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**Final Report**

# Ethiopia Fertilizer and Transport Sector Assessment

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By

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## Acronyms

| | |
|---|---|
| ADD | Agricultural Development Department |
| AFDB | African Development Bank |
| AIDB | Agricultural and Industrial Development Bank |
| AISCO | Agricultural Inputs Supply Corporation |
| AMC | Agricultural Marketing Corporation |
| BCR | Benefit:Cost Ratio |
| CBE | Commercial Bank of Ethiopia |
| CDE | Chemin de Fer (Djibouti-Ethiopia) |
| c.i.f. | Cost, insurance, and freight |
| CIP | Commodity Import Program |
| CSA | Central Statistics Authority |
| DAP | Diammonium Phosphate |
| DCM | Development of Competitive Markets Program |
| EAL | Ethiopian Amalgamated Limited |
| EAS | Ethiopian Authority for Standards |
| EBr | Ethiopian Birr |
| EFTC | Ethiopian Freight Transport Corporation |
| EGTE | Ethiopian Grain Trading Enterprises (formerly AMC) |
| EIC | Ethiopian Insurance Corporation |
| EPTC | Ethiopian Passenger Transport Corporation |
| ERRP | Economic Reconstruction and Rehabilitation Program |
| ERSTAS | Eritrean Shipping and Transit Agency Services |
| ERTA | Ethiopian Road Transport Association |
| FAO | Food and Agricultural Organization of the United Nations |
| FIDA | Fertilizer Importers and Distributors Association |
| FOREX | Foreign Exchange |
| FX | Foreign Exchange |
| GDP | Gross Domestic Product |
| IAR | Institute of Agricultural Research |
| ICB | International Competitive Bid |
| IFAD | International Fund for Agricultural Development |
| IFB | Invitation for Bids |
| IFDC | International Fertilizer Development Center |
| IMF | International Monetary Fund |
| L/C | Letter of Credit |
| MC | Marketing Center of AISCO |
| MIS | Management Information System |
| MOA | Ministry of Agriculture |
| MOA/ADD | Ministry of Agriculture/Agricultural Development Departmen |
| MOPED | Ministry of Planning and Economic Development |
| MOT | Ministry of Transport |
| MOTAC | Ministry of Transport and Communications |
| MTSC | Maritime and Transit Services Corporation |
| NATRACO | National Transport Corporation |
| NBE | National Bank of Ethiopia |

## Acronyms
(Continued)

| | |
|---|---|
| NEP | New Economic Policy |
| NFIU | National Fertilizer Inputs Unit |
| NGO | Nongoverment Organizations |
| NMS | New Marketing System |
| PCRTA | Public Commercial Road Transport Associations |
| PE | Polyethylene |
| PMU | Project Monitoring Unit of ERRP in MOPED |
| RRC | Relief and Rehabilitation Commission |
| RTA | Road Transport Authority |
| SC | Service Cooperative |
| SIDA | Swedish International Development Agency |
| SOE | State-Owned Enterprise |
| TGE | Transitional Government of Ethiopia |
| USAID | United States Agency for International Development |
| WPE | Woven Polyethylene |
| WPP | Woven Polypropylene |

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# Ethiopia Fertilizer and Transport Sector Assessment

## Executive Summary

The United States Agency for International Development's Developing Competitive Markets Program in Ethiopia (DCM) forms a part of the Transitional Government of Ethiopia's (TGE) Economic Reconstruction and Rehabilitation Program, a pivotal component of the TGE's New Economic Policy designed to revitalize the previous administration's stagnant command economy, through economic liberalization, privatization, and rehabilitation of war ravaged areas and displaced persons. The DCM program is part of an international donor community effort to support the TGE's New Economic Policy.

The DCM program is aimed, through cash disbursements, at supporting policy reforms targeted at increasing agricultural sector productivity through the development of competitive private marketing systems. Private sector participation in the fertilizer and transport sectors and the liberalization of these sectors are specific objectives of the DCM program.

This study, performed by the International Fertilizer Development Center (IFDC), assesses the impact of TGE's policy initiatives and their implementation, as of August 1993, on the **development of competitive market systems** in the fertilizer sector and the related transport sector. Further policy initiatives are recommended as the result of this assessment.

By separate report,[1] the consultant provides an assessment of the impact of the USAID DCM program in relation to its objectives and makes recommendations to USAID/Ethiopia for improvements to the program for targeted cash disbursements, benchmark criteria, and technical assistance initiatives.

[1]Assessment of the DCM Program, September 1993.

**Private Sector Participation**

Private sector participation in the fertilizer sector increased substantially in 1992/93 in wholesaling and retailing, and commenced in procurement/distribution. Up to mid-August 1993, private and public sector participation in fertilizer marketing components was approximately as shown below compared to less than 5% participation in wholesaling and retailing in 1991/92.

| | Public | Private |
|---|---|---|
| Procurement(Import) | 87.5% | 12.5% |
| Distribution | 87.5% | 12.5% |
| Wholesaling/Retailing | 33.0% | 67.0% |

Service cooperatives accounted for only 14% of retail sales in 1992/93 (included in public sector above). The Agricultural Inputs Supply Corporation (AISCO) has appointed 1,078 retailers and 29 wholesalers and the private sector importer has 5 wholesalers and approximately 50 retailers plus an agency agreement with Ethiopian Grain Trading Enterprises (EGTE), formerly the Agricultural Marketing Corporation (AMC).

The immediate potential for private sector participation in fertilizer import procurement is very limited. Counterpart fund requirements of around EBr 30 million are required for a cost effective 25,000 mt shipment and this is beyond the capacity of all but one Ethiopian trading company. Risk and practical difficulties for consortia of private companies to import preclude this avenue. There are, however, several companies interested in fertilizer market participation at the distributor level which have the capacity to invest between 5 and 10 million EBr.

Liberalization of the road freight sector and donor assistance for private sector truck imports and spares has increased private sector participation. Estimates of current operating truck numbers and lifting capacities vary between data sources. The range of estimates of the percentage participation for private, public, and NGOs/others is:

| Type | % of Truck Numbers | | % of Lifting Capacity | |
|---|---|---|---|---|
| | Short Haul | Long Haul | Short Haul | Long Haul |
| Private | 72-81 | 26-38 | 72-84 | 25-34 |
| Public | 10-15 | 39-54 | 9-17 | 43-54 |
| NGO/Other | 8-13 | 20-22 | 7-11 | 21-22 |

The parastatal Ethiopian Freight Transport Corporation (EFTC) still dominates the long-haul dry cargo freight sector over the five large and twelve smaller private sector Freight Associations that have been formed and the other parastatal truck fleets.

**Impact of Indirect (Macro) Economic Policies**

The most significant macroeconomic reforms–devaluation, fiscal reforms, liberalization of price controls, private sector participation in trade and investment, and increased autonomy to state-owned enterprises have had major impacts on the fertilizer and transport sectors.

The c.i.f. landed cost of imported DAP increased by 109% due to devaluation in 1993. Fertilizer transport costs increased by 25% and interest expense by 244% (due to increased interest rates and inventory values), resulting in a farm-gate price increase of 61% from EBr 123.54/qtl to EBr 199.37/qtl in AISCO's cost estimates and a blended[2] farm-gate price of EBr 176/qtl. The blended farm-gate price for 1992/93 was 64% above the 1991/92 equivalent price of EBr 107/qtl.

Similarly, the road transport sector has suffered from increased costs for capital investment, spare parts, tires, and fuel.

The TGE responded to the fertilizer cost increases by introducing a 15% subsidy for both urea and DAP in February 1993. No economic justification can be established for this

[2]A price established from the average of 1992 carryover stock cost with 1993 procurement cost.

subsidy as current crop prices and unsubsidized fertilizer prices provide benefit:cost ratios in excess of 2.0 to 3.5 for the major fertilized crops, teff and wheat. Concentration of fertilizer use in Shoa, Gojjam, and Arsi (75% of total peasant sector fertilizer use) means that the subsidy beneficiaries are the farmers in least need of assistance but perhaps the most vocal. Recent survey data indicates that lack of availability of fertilizer and a lack of credit are as important as price rises in curtailing fertilizer use.

**Impact of Direct Sectoral Policy Changes**

Significant changes have taken place in fertilizer sector policies since 1991. The monopoly of AISCO in fertilizer procurement and distribution has been eliminated and a duel channel marketing system established. Private sector import procurement proved, despite many problems, to be as cost effective as AISCO's procurement. AISCO implemented its New Marketing Strategy in late season 1992 and rapidly expanded this in 1993. This strategy, implemented with assistance from FAO, involves the appointment of private sector wholesalers and retailers as alternative fertilizer marketing channels to the previous, but now essentially defunct, Service Cooperatives.

Peasant sector fertilizer demand in 1992/93 is estimated to be 123,500 mt, about 15% below 1991/92, and medium-term growth projections are indicated at between 13% and 15% per year; well below the estimated 25% annual growth rate estimated by the World Bank to be required in order to contain food grain aid imports at their current level.

Reasons for the decline in apparent fertilizer consumption are numerous but essentially are:

1. Confusion over fertilizer prices and subsidy administration during the Belg season.
2. Lack of retail market outlets which still number only an estimated 50% of the pre-1990 Service Cooperative's 2,900 fertilizer outlets although not all of these may have been fully functional.
3. Lack of farm production credit due to the lack of funds within the Agricultural and Industrial Development Bank (AIDB), the non-payment of credit arrears by Service

Cooperatives, the lack of credit channels to farmer groups, and the continued non-participation of the Commercial Bank of Ethiopia (CBE) in farm production credit.

4. Lack of distribution credit to private sector fertilizer dealers.
5. Administrative and business constraints placed on the new private sector dealers due to panterritorial price controls and AISCO's marketing policies.
6. Price increases for fertilizer without active marketing and promotion of fertilizer use benefits to farmers.

As a result, in-country fertilizer stock levels at end of September 1993 are approximately 150,000 mt. This level is excessive and could not be tolerated in a private marketing system. For 1994, import requirements, assuming a target 15% carry-over stock level at the end of September 1994, will be 70,000 mt DAP and 30,000 tons urea.

Transport sector policy changes covering both transport and transit agencies have resulted in the abolition of the ketana system, the formation of seventeen private sector freight associations, a small increase in the number of private sector long-haul trucks, and, theoretically, the establishment of private sector transit agencies.

EFTC still effectively controls long-haul freight rates, although these are deregulated, due to the size of its 22-ton and 30-ton capacity truck fleet. Its trucks are preferentially used by other parastatal organizations to which it provides concessional freight rates and, as a parastatal, EFTC still benefits from past preferential treatment compared to the private sector with respect to spares and tires. Urgent restructuring plans for EFTC are being pursued by MOTAC to improve operating efficiency and eliminate any residual preferential treatment.

The private freight associations tend to be regionally organized and are acting as cartels due to their size (between 250 and 300 trucks per association). To date it appears that these associations follow EFTC rates. Analysis is presented to demonstrate that current freight rates are uneconomic for individual new truck operation mainly due to low achievable capacity utilization resulting from the poor road conditions, absence of freight

brokers and forwarders, imbalance of freight movements on the Assab-Addis corridor, and inability of most private truck operators to respond to market opportunities.

The Maritime and Transit Services Corporation (MTSC) continues to hold a monopoly on transit services because (a) no private sector transit agency applications have been approved, and (b) MTSC enjoys a duopoly arrangement at Assab with its Eritrean equivalent, ERSTAS. This monopoly situation at Assab is being enforced by ERSTAS and the TGE has not yet been able to change the situation.

**Policy Implementation**

Despite the bold economic policy initiatives of the TGE, the implementation of the reforms to date in the fertilizer and transport sectors leaves much to be desired. Late implementation of new policies (with large time lags between policy announcements and implementation), lack of policy coordination, lack of detailed and objective analysis, and lack of monitoring systems to hasten policy development are considered to be major shortcomings and constraints.

In summary, the consultant finds that the policy reforms have led to commendably increased private sector participation in both sectors but little development to date of competition and entrepreneurial initiative that is customer orientated and defines the very role of open competitive markets.

**Fertilizer Sector Issues and Recommendations**

The demise of the Service Cooperatives has made it more difficult for peasant farmers to conveniently gain access to fertilizer supplies and credit. The development of a competitive private sector fertilizer market in Ethiopia can be expected to improve availability of fertilizer and services to peasant farmers that will lead directly to increases in use and that increased use will result in higher production and higher rural incomes. The transition will take time and require adjustment to Government policies and institutions and development of the private sector. The ultimate objective is to establish a viable,

competitive private sector capable of efficiently procuring fertilizer imports and marketing these throughout the agricultural regions through multiple channels, thus providing choice of competitively priced, unsubsidized supplies to farmers with access to credit. A phased diminution of the role of the Government and its agencies is advocated while the private sector is allowed and encouraged to develop its role.

The primary issues involved in increasing availability of fertilizer supplies for farmers, through the development of multiple channels of numerous retail outlets, are:

(1) the provision of equal opportunities for the private and public sectors in procurement, distribution and retailing.
(2) increased credit availability for consumption.
(3) price deregulation and subsidy removal.
(4) improved private sector skills in fertilizer procurement and marketing.
(5) improved sector information monitoring.

Secondary issues which need to be addressed include:
(6) fertilizer legislation.
(7) improved dissemination of fertilizer research findings.
(8) development of fertilizer product mix.

**(1) Equal Opportunities in Procurement** – Inability of most potential private sector importers/distributors to finance counterpart funds for large shipments of fertilizer can be addressed immediately by ensuring that AISCO makes available a proportion of its 1994 procurement to private sector distributors either ex-Assab or ex-Bure. An amount of 25,000 mt of DAP and 5,000 mt urea is suggested as a total allocation for this purpose with individual allotments of 5,000 mt and 1,000 mt, respectively. This will allow potential distributors access to affordable quantities in order to develop distribution networks in competition with AISCO and EAL. Applications should, subject to submission of a marketing program, a limited lifting period and full cash payment, be allocated on a first come first served basis. No restrictions should be applied to where the product is sold.

AISCO has already proceeded with procurement arrangements for 1994 but it is recommended that donors should allocate FX funds equivalent to between US $ 5 million and US $ 10 million for private sector imports. This will allow EAL to continue the development of its distribution network. This allocation should of course be available to other private sector parties through competitive bids. During 1994 it is recommended that donors support procurement training workshops for potential importers so that by 1995 there will be increased participation in competitive bidding.

In 1995 it is recommended that all donor FX funding should be available under a managed competitive bidding system to both the public and private sectors and to the international industry as described in Section 4.

The CBE should continue to provide procurement credit for counterpart fund payments and should be advised of the indicative total annual requirements for this purpose. It should then provide such credit on equal terms and conditions to both public and private sector requests, subject only to prudent commercial risk. The CBE should also allow the use of fertilizer inventory as collateral for importers and distributors.

**(2) Equal Opportunities in Distribution** – AISCO has submitted a rationalization plan to the TGE to allow it to compete and operate more efficiently with the private sector. AISCO must compete with the private sector on the same terms and conditions and have autonomy to make its own marketing management decisions. It is recommended that all preferential concessions currently enjoyed by AISCO such as free access to MOA warehouses and staff, to unsecured credit, and preferential freight rates should be abolished. MOA warehouse rents should be charged at commercial rates when these are used by AISCO. Competitive tendering for public sector warehouses could be introduced to allow access of the private sector to these facilities and to determine market rates for rental tariffs. It is recommended that AISCO's truck fleet should be operated as an autonomous business enterprise separate from AISCO and that AISCO should compete with other public sector enterprises and the private sector for trucking services.

The TGE should fully capitalize AISCO to its authorized limit either by direct equity investment or private equity investment and privatization. This will allow it to operate on a commercial basis and raise working capital funds from the banking sector without government directives to the CBE. AISCO's restructuring plans to eliminate the use of MOA controlled marketing centers and replace these with a network of private sector wholesalers and retailers should be implemented during 1994. The MOA should develop a program for employee control and operation of its marketing centers or leasing these to the private sector.

**(3) Equal Opportunities for Retailing** – In order to encourage the development of numerous retail outlets for fertilizer sales anyone wishing to wholesale or retail fertilizer, including newly constituted cooperatives, should be allowed to do so without any special conditions other than registering as fertilizer dealers with the MOA. Each distributor or wholesaler should be free to select retail dealers in any location and under conditions which they deem necessary for commercial operations.

**(4) Farm Production Credit** – The supply of farm production credit is limited by the financial position of the AIDB, the collapse of the service cooperatives as a conduit for farm credit and most importantly by the preferential interest rates for agriculture which curtail the supply of commercial credit to farmers. All of the resources of the banking system should be available to the farm community for the purchase of farm inputs and particularly fertilizers. It is recommended therefore that preferential interest rates for agriculture be abolished immediately and that the CBE be encouraged to supply distribution credit and farmer credit for fertilizers via loans and overdraft facilities to private sector dealers. AIDB should develop a system of farm credit administration based on credit vouchers issued to farmer groups or cooperatives payable to the fertilizer supplier of the farmer groups' choice. In this way the farm production credit can be channelled through the private, public and cooperative retail sectors. It is also recommended that the TGE should investigate the provision of additional lines of credit and credit indemnity schemes for remote and marginal fertilizer use areas and grain deficit regions as additional services to compensate these areas when panterritorial pricing of fertilizers is discontinued.

**(5) Price Deregulation and Subsidy Removal** – Panterritorial pricing is a market intervention that constrains private sector initiatives in serving all areas and leads to misallocation of resources by penalizing farmers in the areas closest to supply source and subsidizing those farmers further distant. To deregulate pricing without sufficient competition or supplies can lead to increased farm prices during peak demand periods. It is therefore recommended that maximum retail prices be continued during 1994 based on AISCO's blended cost estimates less the direct percentage subsidy subject to the maximum agreed amount. This subsidy should be continued for no more than the next two years as it is not justifiable on either economic or equity grounds. It is anticipated that the subsidy will represent less than 10% of retail fertilizer prices in 1995. Steps should also be taken to eliminate the implicit subsidy inherent in the fixed exchange rate for fertilizer imports. It is recommended that in order to eliminate exchange rate risk the fertilizer import exchange rate should be adjusted annually to approximate the market exchange rate.

In 1995 fertilizer prices should be completely deregulated, provided several major distributors are operating and numerous private sector retailers are in place. There should be no control over margins or prices and regional prices will reflect the differential costs of transport to the regions.

**(6) Improved Private Sector Skills** – With the exception of EAL there is no experience in the private sector of fertilizer procurement or marketing. It is therefore recommended that donor support should be provided during 1994 for education programs in international fertilizer procurement and domestic marketing for the private sector. This should be very practical and include discharging operations at Assab. It is recommended that the appointment of an experienced expatriate should be considered to work with AISCO procurement department with responsibilities to provide training to the private sector.

AISCO appointed private sector dealers receive some training in fertilizer marketing under the NMS. All private sector dealers should be able to participate in such training. It is recommended that this is an area again ideally suited to donor support through the MOA.

Encouragement for the establishment of a Fertilizer Importers and Distributors Association should also be given by the MOA and supported by donors.

**(7) Improved Sector Information and Monitoring** – Private sector import and distribution will call for changes in present administrative arrangements for monitoring the fertilizer market. MOA fertilizer planning, monitoring, and coordination functions will be increased and it will become the focus for interaction with the private sector. It is recommended that MOA establish a Fertilizer Planning and Monitoring Unit to effectively handle these increased responsibilities and to provide a forum for government/private sector interaction. This unit will take over the responsibilities of AISCO in this area and expand upon current AISCO activities.

One of the primary responsibilities of the unit will be to monitor, on a continuous basis, the availability of fertilizers in the market and prices at the farm level. It will also maintain a continuous monitoring of international prices and availability in order to advise the MOA Fertilizer Committee and the Donor Committee of international market developments. During the initial period, it will be desirable to involve the MOA in the scheduling of donor funds. It is recommended that the proposed unit should be responsible for monitoring demand, stock levels and developing total import requirements.

It is recommended that because some of the functions of the proposed MOA fertilizer planning and monitoring unit are now performed by AISCO, some staff transfer from AISCO to the unit could provide the initial staffing nucleus and at the same time reduce the overhead cost of AISCO. Development of this unit is well suited to donor support.

**(8) Fertilizer Legislation** – While all fertilizer marketing was under government control there was no need for comprehensive fertilizer legislation. With the advent of private sector participation this is required to protect consumer interests. It is recommended that the TGE should prepare and enact a comprehensive fertilizer regulation act covering all aspects of product specifications, registration, labelling, and weights, and prescribing

penalties for misrepresentation, adulteration, and underweight packages. The MOA should be empowered to enforce compliance through periodic sampling and analysis of fertilizers in warehouses and stores and investigation of farmer complaints.

**(9) Fertilizer Research and Extension** – Lack of institutional coordination in fertilizer research and the needs for technical extension to private sector fertilizer dealers need to be addressed. The MOA/ADD, NFIU, IAR and donors should coordinate activities to ensure that recent excellent fertilizer research initiatives are continued in the most cost effective manner and the serious soil erosion/degradation problems be coordinated within a farming systems approach. Private sector fertilizer dealers, with their extensive farmer contact, need to be considered as complementary to the extension services of the MOA as agents of change. It is recommended that the MOA develop an ongoing program for disseminating fertilizer use information to private sector importers and dealers.

**(10) Fertilizer Product Mix** – There is a current imbalance in fertilizer nutrient use that is restricting crop production. This can be best resolved by increasing sales of urea to farmers. It is recommended that consideration be given to bagging all urea in 25-kg bags as 25 kg urea and 50 kg DAP provides an $N:P_2O_5$ ratio of 1:1.1 which is almost ideal for cereal use. More intensive efforts should be made by MOA extension services to inform farmers of the additional benefits to be obtained from increased urea use on cereal crops up to the new recommended levels.

Although DAP and urea should remain as the focus for donor support, consideration has to be given to the import of potash and NP and NPK fertilizers. It is recommended that importers be allowed to import such products provided that FX for this purpose is obtained through the auction market. While this may limit these imports, it would provide a means to explore the market opportunities.

A summary of the major market system developments with a tentative timetable is provided in Table 11.1 together with recommendations for actions and support by the TGE and donor agencies.

**Transport Sector Issues and Recommendations**

Deregulation of the transport sector by the TGE and increased assistance provided to the private sector by donor agencies has not yet created the degree of competition required to stimulate improved efficiencies. In part, this may be due to the private sector's limited capacity to identify and capitalize on new market opportunities created under the reform program. This would suggest that increased efforts are required to stimulate change and remove identified constraints to the development of an open competitive road transport sector. However, there is conflicting and unreliable data available on the transport sector that makes planning and policy development almost untenable. It is therefore recommended that priority should be given to establishment of a road transport data base, as recommended by the PMU Inland Transport Advisor, so that reliable information on operation costs and fleet capacities is available.

Development of a competitive transport market cannot occur overnight, but several priority issues are identified which are amenable to further government action and donor support to hasten the development of a competitive market and reduce operating costs. The priorities for action are difficult to establish because all of the issues need to be addressed, but certain recommendations can be implemented immediately and should receive priority as indicated below; other issues need further study or medium-term action programs. These major issues are:

(1) Shortage of total truck capacity to meet peak demands.
(2) The operation of parastatal fleets.
(3) The operating practices of Freight Associations.
(4) Low capacity utilization and low load factors.
(5) Lack of development of private trucking fleets.
(6) Poor road conditions.
(7) Limited port access.

**(1) Capacity Shortage** – Peak demand period capacity shortages, particularly in the long haul subsector, can only be resolved in the medium term by increasing the number of trucks and the operational status of existing trucks. Steps already taken to increase private sector access to new trucks and spares through access to the FX auction and donor programs are constrained by the high cost of imported trucks due to devaluation and the low operating profitability and the complexity of donor programs. It is recommended that MOTAC should, with the Ministry of Finance, initiate a benefit cost study of possible financial incentives such as accelerated depreciation rates and investment allowances to all commercial truck categories or other tax concessions such as reduction or removal of import duties for certain vehicle categories. This study could be commenced immediately with the objective of implementing any beneficial concessions by 1995. An annually fixed exchange rate based on the market rate could be considered for new truck imports as a means of reducing exchange rate risk for importers.

It is also recommended that donors should not limit FX access for new trucks to individual truck operators or impose a limit of one truck per applicant. These conditions restrict access and increase risk for individual truck operators. It is recommended that donor programs be reviewed immediately to direct all new truck and spare parts assistance solely through private sector distributors with suitable provisions and monitoring to ensure that assisted imports are sold only to the private sector. It is also recommended that donors should investigate the operating economies of existing tire re-capping factories that are currently not operating because of a lack of FX for raw materials. Operation of these plants should provide significant net savings in FX and may provide more effective use of FX assistance.

The AID/NGO fleets represent a considerable truck capacity which it is believed is under-utilized following reductions in AID requirements. It is recommended that the TGE should accelerate lease-purchase arrangements to private operators of these fleets so that they operate on a commercial for-hire basis when not required for AID cargoes.

**(2) Parastatal Fleet Operation** – The large size of the EFTC long-haul dry cargo fleet effectively allows EFTC to dominate and be a price leader on long-haul routes. It is recommended that implementation of the restructuring plans for EFTC, being developed by MOTAC, should be made as soon as possible. It is suggested that the long-haul dry cargo fleet could be restructured into 3 or 4 smaller more manageable fleets of 200 to 300 trucks operated as autonomous commercial entities. This will increase competition on long-haul routes and maintain a level of restraint on the operating practices of the large Freight Associations. Consideration could also be given to operating EFTC depots and repair shops as autonomous commercial entities offering maintenance services to all truck fleets on a competitive basis. These suggestions are made without any detailed analysis of EFTC's structure and operating costs.

The continued operation of other smaller parastatal truck fleets is a constraint on competition and possibly capacity utilization. It is recommended that during 1994 MOTAC should provide assistance to parastatals with truck fleets to develop divestment plans for the fleets. Initially the fleets could be separated from the parent parastatals and operated as autonomous commercial enterprises.

**(3) Freight Associations** – The major constraint to the development of effective private Freight Associations lies in the perceived role of these in a competitive market. An intense and continuing effort is required to change the role from one of rate setting and regulation to one of advocacy, support and service for their members. It is recommended that MOTAC should support the development of a private sector National Freight Association to act as a focus for government and private sector interaction with membership drawn from the Freight Associations and individual private truck operators. Such an organization could be used as a conduit for donor supported technical assistance to provide training in general and transport specific management and operational skills and in competitive market operations and for MOTAC as a means of collecting needed industry operating statistics.

**(4) Capacity Utilization** – Poor capacity utilization is the major factor in determining operating costs. While some causes, such as poor road conditions, are firmly in the hands of the TGE and other causes, such as the imbalance of freight movements on the Assab - Addis corridor, are beyond the control of truckers, a major constraint is the absence of freight brokers to perform the role of bringing truckers and customers together. Immediate action can be taken by the TGE to implement the licensing of private freight forwarders as many of these will undoubtedly also take on the role of freight brokers. Negotiations should be held with Eritrean authorities to allow the operation of private freight forwarders in Assab.

The establishment of private freight brokers can also be hastened by MOTAC. It is recommended that MOTAC should develop an information package on the role of freight brokers and publicize this together with invitations for operating licenses for the private sector in all regions. Fostering such developments will be particularly beneficial for the for-hire fleet sector.

**(5) One-Owner Trucking Fleets** – The small size of this sector is a constraint to developing competitive markets through numerous competing small fleet firms. Enlarging the role of this sector should be a long-term objective of the TGE. Recommendations above concerning the establishment of freight brokers, removing constraints on donor assisted new truck purchases, possible financial incentives for new truck operations and the establishment of a national association will all assist in encouraging development of one-owner fleets.

**(6) Road Conditions** – Extremely poor road conditions are adding considerable costs to road transport operations and restricting the capacity utilization of the existing truck fleets. It is recommended that the RTA should give priority to refurbishing weighbridge control centers and enforcing the capacity regulations of existing truck fleets to reduce road damage.

Major road reconstruction programs planned will take several years to implement but in the mean-time priority should be given to a country-wide pot-hole patching program.

**(7) Limited Port Access** – As a result of Eritrean independence Ethiopia is now a land-locked country with almost total reliance on Assab port for imports and exports. Apart from any other considerations this places an undue traffic load on the Assab-Addis route and Assab port. It is recommended that the TGE should pursue a program of negotiations aimed at improving access via Djibouti, Berbera, and Mombassa as alternatives to Assab.

# Ethiopia Fertilizer and Transport Sector Assessment

## 1. Background and Introduction

### 1.1 Background to Policy Reform and USAID's DCM Program

After 17 years of experiencing a command economy under the Derge regime and 30 years of civil war, the Transitional Government of Ethiopia (TGE), by its New Economic Policy announcement of November 1991, committed itself to transforming the stagnant economy through reducing the role of the State in the economy and through promotion of private investment and private sector participation in economic activity.

Economic liberalization and privatization programs, under the umbrella of the Economic Reconstruction and Rehabilitation Project (ERRP), were agreed between the TGE and the International Monetary Fund (IMF), the World Bank, and the international donor community during 1991/92. The policy initiatives of the TGE since 1991 are reviewed in Section 2. These bold economic reforms have included a major devaluation of the Ethiopian Birr (EBr), deregulation of the transport sector, and fairly effective control over inflationary tendencies (World Bank, 1993).

The USAID Development of Competitive Markets program (DCM) is an integral part of the international donor community's assistance to the TGE's ERRP. Specifically, the DCM program is aimed, through cash disbursements, at supporting policy reforms targeted at increasing agricultural sector productivity through the development of competitive private marketing systems. Private sector participation in the fertilizer and transport sectors and the liberalization of these sectors are specific objectives of the DCM program. Project elements within the program include the allocation of foreign exchange, adequate analysis of policy options, and ensure adequate monitoring and evaluation systems. Both program and project agreements were signed in mid-1992 and an amendment to the Program Grant Agreement in September 1992 added a Commodity Import Program (CIP) for the purchase of cotton and certain related services.

## 1.2 The Ethiopian Agricultural Sector

The agricultural sector has, and will continue to have, a dominant role in the economy. It accounts for about 47% of GDP, 85% of exports, and 85% of the labor force. Approximately 6 million smallholders (peasant farmers) produce 90% of the food grains, pulses, and oilseeds production and more than 95% of the coffee, the major export crop and foreign exchange earner. The Peasant Sector accounts for approximately 90% of the total area (about 6 million ha) under major crops and the Producer Cooperatives and State Farms account for about 7% and 3%, respectively. The main crop planting season (Mehr) occurs in May, June, and July and usually represents about 85% to 90% of the annual crop area. A shorter planting season occurs in January and February (Belg).

Cereal crops amount to 85% of the total major crop area and pulses account for a further 11%. The major cereal crops are teff (1.3 million ha), barley (0.95 million ha), wheat (0.64 million ha), and maize (1.1 million ha). In good years, about 6 million tons of cereals are produced as shown in Tables 1.2.1, 1.2.2, and 1.2.3. Average crop yields are very low; less than 1.2 tons/ha for the major cereal crops in 1991/92 (Central Statistics Authority [CSA], 1992), and the majority of peasant farmers are subsistence farmers with grain surplus regions only in Showa, Gojjam, and Arsi on a regular basis. Cereal areas have declined slightly in recent years while the area of pulse and other crops has increased. In addition to the major crops reported by the Central Statistics Authority (CSA) there are about 400,000 ha of coffee, nearly all grown by smallholders. State farms and producer cooperatives grow about 40,000 ha of cotton and 15,000 ha of sugarcane. The cotton area has recently declined and a new sugarmill under construction will add about 7,000 ha of new cane land.

Fertilizer use is very low. Maximum use occurred in 1991/92 at 100,000 tons of nutrients ($N+P_2O_5+K_2O$); approximately 8 kg/ha of crops and pasture. About 94% of fertilizer consumption is estimated to be used on cereals with most (almost 40%) used on teff (Table 1.2.4), while wheat and barley use approximately 24% and 21% of total fertilizer consumption. The main season accounts for about 85% of total fertilizer use. Despite the fact that coffee is the main export crop (Table 1.2.5) no fertilizer is used on this by smallholders.

Ethiopia has a large livestock population with about 30 million cattle, 24 million sheep, and 18 million goats. Grazing land is all communal land as is crop land in some regions, although for the most part crop land is farmed by individual smallholders without full property ownership.

Although Ethiopia has recently been divided into 16 agroecological zones (Srivastava et al., 1993), a broad division can be made between the highlands and lowlands (areas above and below 1,500 m altitude). The highlands cover 40% of the land mass but account for 95% of the cultivated land, accommodate 88% of the population, and about 70% of the livestock population (Constable, 1984). This concentration of agriculture in the highlands, combined with the poor infrastructure development, places a large transport cost burden on the agricultural sector for both input and output marketing.

Deforestation, overgrazing, and continuous cropping of cultivated land combined with low or zero inputs of organic matter or fertilizer nutrients are all factors in low crop productivity and soil erosion. Additional factors impacting on low crop yields include poor seed quality (only 3% of farmers use improved seed [AIDB, 1993]), poor technology extension, the low yield potential of teff, and, until recently, lack of incentives due to government control over input/output markets and prices. A continuing absence of individual property rights almost certainly inhibits individual land stewardship.

In spite of the past problems, the combined average cereal yield per unit area has increased by 0.51 mt/ha in the past 30 years indicating adoption of improved technology by smallholders. The main surplus grain-producing regions of Shoa, Gojjam, and Arsi are also the highest fertilizer use regions, accounting for about 80% of total fertilizer use (Figure 3.1.6).

The need to increase food production immediately is of paramount importance. All of the TGE's agricultural sector policy reforms must be aimed at this objective. Estimates made by the World Bank (World Bank, 1993) indicate that fertilizer use will have to increase at a growth rate of 20%/year over the next 5 years to keep the food deficit at the

current level of about 0.8 million tons. This requires increased fertilizer use and use efficiency combined with use of improved seed and crop management practices. The only major practical way of stimulating increased food production is through increased production per hectare. Increased crop areas need to be evaluated in the light of environmental issues and development cost as longer term developmental objectives.

### 1.3 The Ethiopian Transport Sector

All fertilizer used in Ethiopia is currently imported through the port of Assab in Eritrea and then transported by truck to the use areas. The average distance hauled is about 1,000 km. The inland freight cost adds around EBr 450/mt to the landed cost of fertilizer and is a significant cost component in the delivered farm-gate cost. An efficient and competitive transport system for fertilizer is essential for fertilizer sector efficiency. This assessment of the transport sector is confined to the impact of the sector on the fertilizer sector.

**1.3.1 Road Transport**–A Road Transport Authority (RTA) was established by Government Proclamation in 1967, concerned primarily with establishment of regulations and licensing systems. In the same year, Public Commercial Road Transport Associations (PCRTA) or Freight Associations were established by proclamation. All trucks were privately owned.

In 1976, the new government created the Ethiopian Road Transport Association (ERTA). The PCRTAs were dissolved and their properties arbitrarily transferred to the National Transport Corporation (NATRACO), which completely dictated the operation of their trucks as "associates." Under the centrally planned system, the country was divided into five zones or ketanas. In the ketana system, NATRACO (which was replaced by the Ethiopian Freight Transport Corporation [EFTC] and the Ethiopian Passenger Transport Corporation [EPTC] in the mid-1980s) controlled all trucking activities, allocating routing and loads through a system of regional offices and check points. Over this period, NATRACO/EFTC and other parastatals built up their own government-owned truck fleets.

Foreign exchange for spares, tires, and truck replacement was very limited, particularly for the private sector, and the condition of both public and private sector fleets deteriorated.

Transport tariffs were set by ERTA in 1976, revised in 1980, but were then unchanged until 1992 when the TGE abolished the ketana system. Over this period, with rising costs, tariffs became inadequate, further depressing private sector transport activity.

**1.3.2 The Road System**–Ethiopia has approximately 4,000 km of bitumen roads, 9,000 km of gravel roads, and 6,000 km of earth roads, mostly in poor condition. This is one of the lowest kilometers per capita levels in Africa. The number of trucks per capita is the lowest in Africa.

The roads have been repaired and extended with assistance from the World Bank in a series of projects. The project currently commencing (World Bank, 1992) is for repair and upgrading of major sections of the Assab-Mille (Addis) highway. The Assab-Addis highway, almost 900 km, is the crucial link for the majority of imports and exports. Other major highways generally radiate from Addis Ababa to an inadequate network of secondary and feeder roads.

**1.3.3 Railway: Chemin de Fer Djibouti-Ethiopia (CDE)**–The jointly owned CDE operates a single track, meter gauge line of 781 km from Djibouti to Addis Ababa. Both the track and rolling stock are old and in poor condition. Major rehabilitation is required, but no significant improvements are likely in the short to medium term.

The railway currently moves around 300,000 tons of cargo per year and is not expected to increase much above this level.

**1.3.4 Ports**–Assab is the principal port for imports into Ethiopia of dry, bulk, and oil cargoes, with other goods entering through Djibouti, particularly food aid. Smaller quantities have entered through Massawa for the northern regions. With the separation of Eritrea, including the ports of Assab and Massawa, Ethiopia is now a landlocked country.

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**Assab**–The port is of little practical value to Eritrea but remains as the principal port for imports to and exports from Ethiopia. Cargo capacity is around 1.6 million tpy. Number 1 berth, at 10 m draught, is capable of taking 25,000 tonners, mainly grain and fertilizer bulk carriers, and Number 11 berth for 15-20,000 tonners, and various smaller berths comprise the berth accommodations. There are adequate handling areas and the port operates quite effectively, although some of the port and handling charges are notably high. Trucks from Ethiopia have to negotiate the border at Bure, 75 km from Assab, entrance to the town of Assab and entry to the port.

**Djibouti**–This is considered an efficient port, with container handling facilities, but not very well equipped for handling large volumes of bagged or bulk cargo. It is obviously important as an alternative to Assab for Ethiopia. A highway, heading north from Djibouti, joins the Assab-Addis road about 170 km from Assab at Dobi. A secondary road from the southern border heads southwest towards Dire Dawa. Only humanitarian aid cargoes are currently moving by road because of various procedural problems which need to be addressed at the Governmental level[1].

**1.3.5 Shipping and Forwarding Agencies**–The sole Ethiopian shipping and forwarding agency is the Maritime and Transit Services Corporation (MTSC), a parastatal formed in 1978, taking over the assets of 83 national and 36 foreign-owned transit companies in Assab and Massawa. The MTSC must now work in Assab through the newly formed Eritrean Shipping and Transit Agency Services (ERSTAS) which collects two-thirds of the very high fees charged.

In previous studies, MTSC has been recognized as inefficient and as a bottleneck. The TGE issued a proclamation in February 1992 allowing for the formation of private forwarding and transit agencies. Applications were made immediately but none have yet been approved due to interdepartment disagreements over responsibility for implementation.

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[1]Djibouti Trip Report, February 15, 1993. Dr. G. L. Roberts, Transport Advisor, and Captain Jan Benninger, Shipping Advisor, Project Monitoring Unit (PMU) of ERRP.

It is essential that this situation be corrected as quickly as possible to encourage formation of competitive private shipping and forwarding agencies and to either privatize or eliminate MTSC.

Again, TGE agreement with the Assab port authorities is needed on matters of reciprocity of shipping and forwarding agents, transport, and entry procedures[2].

### 1.4 Objectives and Issues

This report has the objectives of:

- Assessing the fertilizer and transport sector situation, responding specifically to the Study Terms of Reference (Appendix 4).
- Identifying future policy needs.
- Identifying key implementation issues.
- Recommending to USAID/Ethiopia key conditionalities and implementation procedures for the DCM program continuation.

Given the overriding need for increased agricultural production in Ethiopia, particularly of food grains, the key issue is for the policy environment to release the economic forces of an open, competitive market system oriented towards customer satisfaction.

Market force economics equate to private sector driven efficiency which, by its very nature, assures innovative, creative, competitive, and dynamic action. Until the recent reforms of the New Marketing System (NMS), fertilizer and other agricultural inputs were only being distributed in Ethiopia and no marketing occurred. Restrictive limitations to private sector competition in the NMS, as currently applied, are identified in this assessment as continuing constraints to the increased adoption of effective economic fertilizer use by the peasant farm sector. These shortcomings include limited access to fertilizer supplies through restricted private sector market participation, excessive distribution costs, lack of

[2]Assab Trip Report, May 20, 1993. Dr. G. L. Roberts and Captain Jan Benninger, PMU of ERRP.

distribution and farm production credit, and panterritorial pricing restrictions. The lack of a sound market information system inhibits policy analysis, development, and implementation.

**Table 1.2.1 ETHIOPIA: Estimated Area of Major Crops,1986/7 to 1989/90**

Fertilizer and Transport Sector Assessment, IFDC,1993

'000 HA

| | 1986/87* | 1987/88* | 1988/89** | 1989/90** | 1990/91*** | 1991/92*** |
|---|---|---|---|---|---|---|
| **Cereals** | 4786.31 | 5055.19 | 4890.79 | 4965.32 | 3898.63 | 3835.16 |
| Teff | 1272.48 | 1253.39 | 1461.24 | 1226.96 | 1262.66 | 1351.15 |
| Barley | 897.99 | 1056.72 | 958.47 | 912.14 | 550.66 | 593.40 |
| Wheat | 661.86 | 657.83 | 647.63 | 605.07 | 487.40 | 538.46 |
| Maize | 1012.62 | 1095.25 | 1021.10 | 1277.79 | 908.67 | 751.11 |
| Sorghum | 762.65 | 782.62 | 627.07 | 738.25 | 489.05 | 421.27 |
| Millet | 137.62 | 156.49 | 132.96 | 154.77 | 163.41 | 151.46 |
| Oats | 41.09 | 32.89 | 42.32 | 42.43 | 36.78 | 28.31 |
| Rice | N/A | N/A | N/A | 7.91 | N/A | N/A |
| **Pulses** | 602.53 | 736.24 | 636.14 | 642.76 | 674.10 | 700.61 |
| Horse Beans | 259.86 | 281.99 | 227.29 | 227.50 | 243.31 | 295.42 |
| Chick Peas | 95.32 | 135.57 | 126.00 | 121.44 | 116.97 | 138.93 |
| Haricot beans | 52.61 | 82.51 | 93.36 | 110.05 | 91.60 | 37.85 |
| Field Peas | 106.08 | 108.38 | 88.90 | 87.50 | 116.69 | 109.99 |
| Lentils | 46.48 | 64.37 | 37.80 | 39.35 | 40.65 | 42.81 |
| Vetch | 40.88 | 61.42 | 58.64 | 50.19 | 64.88 | 75.61 |
| Soya Beans | 1.30 | 2.00 | 4.15 | 6.73 | N/A | N/A |
| **Others** | 212.34 | 190.38 | 215.49 | 238.30 | 243.14 | 208.15 |
| Neug | 132.32 | 115.45 | 129.54 | 132.49 | 158.79 | 139.13 |
| Linseed | 65.75 | 54.54 | 50.34 | 69.81 | 62.69 | 58.11 |
| Fenugreek | 7.38 | 9.88 | 12.19 | 9.89 | 9.98 | 6.01 |
| Rapeseed | 5.30 | 5.86 | 9.39 | 12.94 | 11.68 | 4.89 |
| Sunflower | 0.82 | 2.22 | 0.17 | 8.46 | N/A | N/A |
| Ground Nuts | 0.60 | 1.21 | 2.58 | 2.47 | N/A | N/A |
| Sesame | 0.17 | 1.22 | 11.28 | 2.24 | N/A | N/A |
| **TOTAL** | 5601.18 | 5981.81 | 5742.42 | 5846.38 | 4815.87 | 4743.92 |
| Coffee | 410.00 | 410.00 | 430.00 | 440.00 | 380.00 | |
| Sugar Cane | 15.00 | 14.50 | 15.50 | 15.50 | 15.00 | |
| Cotton | 53.00 | 37.00 | 35.00 | 36.00 | 37.00 | |

Source: Central Statistics Authority and FAO

Notes: * Excludes Ogadan Autonomous Region

** Excludes Assab, Eritrea, Ogaden and Tigray Autonomous Regions

*** Excludes Assab, Ogaden and Tigray Autonomous Regions and Eritrea.

*** Main Season Only

Coffee, Sugar and Cotton Statistics - FAO

**Table 1.2.2 ETHIOPIA: Estimated Production of Major Crops,1986/8 to 1989/90**

Fertilizer and Transport Sector Assessment, IFDC,1993

'000 MT

| | 1986/87* | 1987/88* | 1988/89** | 1989/90** | 1990/91*** | 1991/92*** |
|---|---|---|---|---|---|---|
| **Cereals** | 5636.43 | 6136.97 | 5733.57 | 6151.11 | 5320.17 | 4567.14 |
| Teff | 1033.22 | 1000.03 | 1217.72 | 1046.14 | 1804.47 | 1175.02 |
| Barley | 993.22 | 1268.87 | 1018.16 | 1063.05 | 711.38 | 704.34 |
| Wheat | 775.32 | 778.76 | 799.94 | 798.76 | 699.54 | 744.66 |
| Maize | 1715.36 | 1964.02 | 1688.69 | 2055.64 | 1158.93 | 1234.48 |
| Sorghum | 963.17 | 909.90 | 849.21 | 972.81 | 670.62 | 547.90 |
| Millet | 119.78 | 168.85 | 112.19 | 152.46 | 220.96 | 127.85 |
| Oats | 36.35 | 49.53 | 47.66 | 48.69 | 54.28 | 32.88 |
| Rice | N/A | N/A | N/A | 13.58 | N/A | N/A |
| **Pulses** | 540.78 | 551.94 | 563.74 | 646.97 | 958.63 | 624.18 |
| Horse Beans | 293.47 | 250.07 | 257.91 | 279.47 | 366.56 | 325.02 |
| Chick Peas | 72.19 | 105.60 | 85.12 | 101.31 | 171.95 | 104.25 |
| Haricot beans | 33.26 | 47.24 | 70.96 | 82.96 | 127.13 | 38.75 |
| Field Peas | 83.47 | 73.27 | 78.41 | 96.55 | 150.16 | 76.17 |
| Lentils | 26.89 | 31.60 | 27.86 | 29.90 | 62.38 | 25.65 |
| Vetch | 30.89 | 43.36 | 41.02 | 54.65 | 80.46 | 54.35 |
| Soya Beans | 0.62 | 0.81 | 2.47 | 2.13 | N/A | N/A |
| **Others** | 84.49 | 80.87 | 78.50 | 97.29 | 313.32 | 87.00 |
| Neug | 45.53 | 42.35 | 40.77 | 42.39 | 203.63 | 51.20 |
| Linseed | 31.12 | 23.03 | 18.92 | 34.00 | 84.04 | 27.07 |
| Fenugreek | 2.43 | 5.96 | 5.99 | 6.37 | 11.69 | 3.41 |
| Rapeseed | 4.10 | 6.32 | 7.40 | 7.83 | 13.97 | 5.32 |
| Sunflower | 0.65 | 1.49 | 0.14 | 5.06 | N/A | N/A |
| Ground Nuts | 0.64 | 1.16 | 1.20 | 1.24 | N/A | N/A |
| Sesame | 0.03 | 0.55 | 4.07 | 0.41 | N/A | N/A |
| **TOTAL** | 6261.70 | 6769.78 | 6375.81 | 6895.38 | 6592.12 | 5278.32 |
| Coffee | 186.00 | 190.00 | 200.00 | 206.34 | 168.00 | |
| Sugar Cane | 1600.00 | 1500.00 | 1700.00 | 1650.00 | 1530.00 | |
| Cotton Lint | 20.00 | 21.00 | 18.00 | 19.00 | 19.00 | |

Source: Central Statistics Authority and FAO

Notes: * Excludes Ogadan Autonomous Region

** Excludes Assab, Eritrea, Ogaden and Tigray Autonomous Regions

*** Excludes Assab, Ogaden and Tigray Autonomous Regions and Eritrea.

*** Main Season Only

Coffee, Sugar and Cotton Statistics - FAO

**Table 1.2.3 ETHIOPIA: Estimated Yields/Ha of Major Crops,1986/8 to 1989/90**

Fertilizer and Transport Sector Assessment, IFDC,1993

'000 MT

| | 1986/87* | 1987/88* | 1988/89** | 1989/90** | 1990/91*** | 1991/92*** |
|---|---|---|---|---|---|---|
| **Cereals** | 1.18 | 1.21 | 1.17 | 1.24 | 1.36 | 1.19 |
| Teff | 0.81 | 0.80 | 0.83 | 0.85 | 1.43 | 0.87 |
| Barley | 1.11 | 1.20 | 1.06 | 1.17 | 1.29 | 1.19 |
| Wheat | 1.17 | 1.18 | 1.24 | 1.32 | 1.44 | 1.38 |
| Maize | 1.69 | 1.79 | 1.65 | 1.61 | 1.28 | 1.64 |
| Sorghum | 1.26 | 1.16 | 1.35 | 1.32 | 1.37 | 1.30 |
| Millet | 0.87 | 1.08 | 0.84 | 0.99 | 1.35 | 0.84 |
| Oats | 0.88 | 0.94 | 1.13 | 1.15 | 1.48 | 1.16 |
| Rice | N/A | N/A | N/A | N/A | N/A | N/A |
| **Pulses** | 0.90 | 0.75 | 0.89 | 1.01 | 1.42 | 0.89 |
| Horse Beans | 1.13 | 0.89 | 1.13 | 1.23 | 1.51 | 1.10 |
| Chick Peas | 0.76 | 0.78 | 0.68 | 0.83 | 1.47 | 0.75 |
| Haricot beans | 0.63 | 0.57 | 0.76 | 0.75 | 1.39 | 1.02 |
| Field Peas | 0.79 | 0.68 | 0.88 | 1.10 | 1.29 | 0.69 |
| Lentils | 0.58 | 0.49 | 0.74 | 0.76 | 1.53 | 0.60 |
| Vetch | 0.76 | 0.71 | 0.70 | 1.09 | 1.24 | 0.72 |
| Soya Beans | 0.48 | 0.40 | 0.59 | 0.32 | N/A | N/A |
| **Others** | 0.40 | 0.42 | 0.36 | 0.41 | 1.29 | 0.42 |
| Neug | 0.34 | 0.37 | 0.31 | 0.32 | 1.28 | 0.37 |
| Linseed | 0.47 | 0.42 | 0.38 | 0.49 | 1.34 | 0.47 |
| Fenugreek | 0.33 | 0.60 | 0.49 | 0.64 | 1.17 | 0.57 |
| Rapeseed | 0.77 | 1.08 | 0.79 | 0.61 | 1.20 | 1.09 |
| Sunflower | 0.79 | 0.67 | 0.81 | 0.60 | N/A | N/A |
| Ground Nuts | 1.07 | 0.96 | 0.47 | 0.50 | N/A | N/A |
| Sesame | 0.20 | 0.45 | 0.36 | 0.18 | N/A | N/A |
| **TOTAL** | 1.12 | 1.13 | 1.11 | 1.18 | 1.37 | 1.11 |
| Coffee | 0.45 | 0.46 | 0.47 | 0.47 | 0.44 | |
| Sugar Cane | 106.67 | 103.45 | 109.68 | 106.45 | 102.00 | |
| Cotton Lint | 0.38 | 0.57 | 0.51 | 0.53 | 0.51 | |

Source: Central Statistics Authority and FAO

Notes: * Excludes Ogadan Autonomous Region

** Excludes Assab, Eritrea, Ogaden and Tigray Autonomous Regions

*** Excludes Assab, Ogaden and Tigray Autonomous Regions and Eritrea.

*** Main Season Only

Coffee, Sugar and Cotton Statistics - FAO

**Table 1.2.4 ETHIOPIA: Estimated Fertilizer Use by Major Crop and Crop Yields, 1986/87 to 1988/89**

Fertilizer and Transport Sector Assessment, IFDC 1993

| CROP | PERCENT SHARE OF TOTAL CROP AREA (%) | PERCENT SHARE OF FERTILIZER CONSUMPTION (%) | AVERAGE YIELD Kg/Ha |
|---|---|---|---|
| TEFF | 21.8 | 39.3 | 835 |
| WHEAT | 16.9 | 23.8 | 1175 |
| BARLEY | 11.4 | 20.8 | 1157 |
| MAIZE | 18.2 | 4.5 | 1796 |
| MILLET | 2.5 | 4.5 | 919 |
| SORGHUM | 13.3 | 1.0 | 1281 |
| OTHERS | 15.9 | 6.1 | - |
| TOTAL | 100.0 | 100.0 | - |

Source: MOA and CSA

**Table 1.2.5 ETHIOPIA: Coffee Production and Exports**

Fertilizer and Transport Sector Assessment, IFDC 1993

| YEAR * | PRODUCTION (MT) | EXPORTS (MT) | EXPORT PERCENT |
|---|---|---|---|
| 1985/86 | 169,980 | 73,200 | 43.06% |
| 1986/87 | 178,440 | 73,920 | 41.43% |
| 1987/88 | 172,980 | 82,620 | 47.76% |
| 1988/89 | 161,940 | 84,000 | 51.87% |
| 1989/90 | 206,340 | 82,920 | 40.19% |
| 1990/91 | 174,540 | 50,940 | 29.19% |
| 1991/92 | 216,000 | N/A | |

Source: International Coffee Organization

Note: * October- September Years

# 2. The Policy and Administrative Environment

Under the old regime certain economic reforms were initiated in 1990. However, implementation of these proposed reforms was not affected and the civil war events of 1990/91 ended the regime. The TGE introduced its New Economic Policy (NEP) in November 1991 and subsequently introduced new administrative procedures under Proclamation No. 7, 1991, providing for the establishment of a new federated national/ regional administrative structure for the transitional period. This legislation established 14 ethnically based administrative regions each with a considerable degree of autonomy for local administrative matters. In 1991/92, during the transition to these new administrative regions there was a serious breakdown of administrative control in many parts of the country adding to the problems of the war ravaged areas. Eritrean independence and separation from Ethiopia in early 1993 has left Ethiopia as a landlocked country.

## 2.1 Changes in Macroeconomic Policies Since 1991

A summary of the major macroeconomic reforms since 1991 is presented in Table 1. The most significant reforms have been the devaluation of the Ethiopian Birr in 1992 to about 70% of the economic exchange rate and the subsequent management of the exchange rate resulting in the present rate being approximately 85% of the assumed economic rate of exchange of EBr 7.00 per US $1.00, as measured by the foreign exchange auction market. Tight fiscal control during 1992/93 reduced inflation from the war affected 21% rates during 1990/91 and 1991/92 to 11.5% in 1992/93.

Although the TGE has endorsed structural economic reform, the implementation of new policies appears to have often been far short of the political intentions. In particular, the abolition of State monopolies, the autonomy of management for state-owned enterprises (SOEs), and the provision of equal conditions for private enterprise have not been well coordinated within and between sectors. As a result private sector development over the past 2 years has been cautious and the impact of the reforms to date has been limited.

**Table 1. ETHIOPIA: Summary of Selected Macro Economic Policy Changes Since 1991**

Fertilizer and Transport Sector Assessment, IFDC 1993

| OLD POLICY | NEW POLICY | IMPACT ON FERTILIZER AND TRANSPORT SECTORS |
|---|---|---|
| Command Economy with restricted, minimal private sector participation. | Open market economy with restricted State participation in production, distribution, and trade. | Private sector participation in production, distribution and trade, except for strategic goods and services |
| Fixed exchange rate(EBr2.07:US$1) | Devaluation and managed exchange rate(EBr5.00:US$1) -> (EBr5.90:US$1) | Increased local costs of imports<br>Increased export unit revenues<br>Increased transport costs |
| State control of Foreign Exchange allocations. | Foreign Exchange auctions | Increased access to FX by private sector for importing goods and services |
| Low,arbitarily fixed domestic interest rates, with sectoral preferences | Upward adjustment of domestic rates but continued sectoral preferences | Agricultural sector rates increased from 5% to 11% and others from 8% to 14% |
| Narrow indirect taxation system based on customs tariffs. | Broader based taxation,reduced tariffs fiscal decentralization | Reduced public spending and revenue transfers |
| State control of all financial institutions | Continued State ownership with increased management autonomy. | Possibly more commercially orientated financial institutions. |
| State owned enterprises under political control and management | Autonomous management for SOEs | Residual surplus payments and capital charges on SOEs abrogated |
| State monopoly of investment in production and distribution at a level of about 11% to 16% of GDP.<br>Capital ceilings on private enterprise | Liberalization of private sector investments with tax concessions and some foreign currency retention or remittal provisions. | Increased private sector and foreign investment potential. |
| No land tenure rights for individuals; limited leasehold or usufructuay rights for cooperatives or associations. | Limited leasehold tenure provisions for private sector companies.<br>Usufructuary land rights for individual peasant farmers. | A continuing structural constraint to private sector investment, particularly in agriculture. |
| State price controls and panterritorial pricing. | Price controls on strategic goods and services, including fertilizers. | Price decontrol of transport but continuing maximum price control on fertilizers |
| Compulsory State aqcuisition of crop production quotas at low prices, prior to 1988. | Open, competitve, private sector and AMC marketing of all food grain crops | Increased price incentives to peasant farmers for surplus production |

Although it is too early to fully analyze the impacts of policy reforms, a very preliminary and limited analysis is presented based on a comparison of a 3-year pre-reform period, 1987/88 to 1989/90, with a 3-year reform period, 1990/91 to 1992/93. This analysis should be treated with extreme caution as 1990/91 was a year in which the war impact was most severe, 1991/92 was a year of administrative upheaval and there is only very limited and preliminary data for 1992/93. In addition to the comparison of the two 3-year periods, data are also presented comparing 1992/93 with the previous year.

Average GDP at market prices during the reform period increased by 19.39% over the pre-reform period and agricultural GDP (at market prices) by 30.89% (Table 2.1.1). In real terms the average GDP fell by 1.68% and the average agricultural GDP increased by 7.74% (Table 2.1.2), and in 1991/92. Both nominal and real export income declined on average during the reform period due to the low export shipments during 1990/91 and 1991/92. Imports, however, increased on average during the reform period by 51.8% in nominal value and 21.09% in real value due to the substantial devaluation in 1992/93. The impact of the devaluation on export earnings was much less than for imports, with export earnings in real terms only increasing by 19% over the pre-reform average value compared to a 92% increase for imports. In 1992/93 all the major economic indicators presented in Tables 2.1.1 and 2.1.2 improved in both nominal and real terms over the previous year.

With no exports of grains (the main fertilizer use crops) the immediate impact of the devaluation on the farm sector has been to increase purchased input and transport costs. The average weighted fertilizer price for the reform period increased by 32.2% in nominal terms but decreased by 16% in real terms (Table 2.1.3). However, the policy change in 1989, which ended compulsory production quota purchases of food crops from the peasant sector at low prices by the Agricultural Marketing Corporation (AMC), resulted in increased average nominal crop prices, although declining (teff) or static (wheat) real prices (Table 2.1.3). As a result of the fertilizer and crop price changes the average fertilizer:teff and fertilizer:wheat price ratios in the reform period were 5.3% and 19.7% below the average ratios of the pre-reform period.

In 1992/93, however, the impact of devaluation on fertilizer:grain price ratios was substantial. The fertilizer:teff price ratio, after subsidy, increased by 37.4% over 1991/92 to a value of 1 and the fertilizer:wheat price ratio increased by 27.8% to a value of 1.35. In spite of the large annual increase these price ratios were not significantly different from the averages of the pre-reform period and actually declined for wheat (Table 2.1.3). If the TGE had not introduced a 15% fertilizer subsidy in 1992/93 fertilizer prices would have increased by 64% in nominal terms and 58% in real terms and the price ratios would have been 1.17 for teff and 1.59 for wheat (Table 2.1.4), representing 50% to 60% increases over 1991/92. Although such increases may have caused a temporary reduction in fertilizer use the price ratios would have still provided substantial economic benefits from fertilizer use.

Exchange rate adjustments since the devaluation have not been applicable to imported agricultural inputs, fuel, or pharmaceuticals. It is unclear when or if the government intends to make future adjustments for these commodities. Failure to do so will provide an implicit and growing economic subsidy.

### 2.2 Changes in Fertilizer Sector Policies Since 1991

Table 2 summarizes the major changes in fertilizer sector policies since 1991. Significant changes have taken place. The monopoly of AISCO in fertilizer procurement and distribution has been broken resulting in a change from a single channel procurement and distribution system to a multiple channel system with a substantial involvement of the private sector in retailing although not in distribution or wholesaling.

In 1992/93 a private sector company, Ethiopia Amalgamated Limited (EAL), availed itself of Forex under the USAID DCM to import approximately 24,000 mt DAP. Although considerable early interest was shown by the private sector in fertilizer importing through the DCM program, all parties except EAL were unable to secure, or risk raising, counterpart funds equivalent to about EBr 30 million. All other fertilizer imports continued to be funded by donor countries through AISCO. There has been a history of slow payment with respect to counterpart funds by AISCO.

**Table 2. ETHIOPIA: Summary of Fertilizer Sector Policy Changes and Implementation 1991-93.**
Fertilizer and Transport Sector Assessment, IFDC 1993

| OLD POLICY | NEW POLICY | IMPLEMENTATION |
|---|---|---|
| **Fertilizer Procurement**<br>State monopoly by Agricultural Inputs Supply Corporation (AISCO) using international tenders. | Private sector participation allowed | Limited by access to FX, counterpart funds, and technical expertise.<br>1 private sector importer 1993 |
| **Fertilizer Distribution**<br>State monopoly through AISCO<br>Wholesale functions by 550 MoA Marketing Centers | Public and Private sector participation allowed subject to MoT and MoA registration requirements. | 27 private sector wholesalers for AISCO with limited areas and operations<br>5 private company wholesalers |
| **Fertilizer Retailing (Peasant Sector)**<br>Monopoly by Service Cooperatives to Peasant Associations | AISCO marketing Centers, limited no. Service Cooperatives, AISCO dealers, Private company dealers, AMC stores | 1993 Sales: AISCO dealers 68%<br>Service Cooperatives 14%<br>Marketing Centers 9%<br>Private dealers and AMC 9% |
| **Fertilizer Retailing (State Sector)**<br>Monopoly by AISCO direct | Open to all participants | 1993 Sales: AISCO direct sales 99%<br>Private Company sales 1% |
| **Fertilizer Pricing**<br>Based on AISCO cost buildup and panterritorial application. | No change in calculation or pan-territorial application;maximum price. | Some discounting by dealers<br>Restrictions on private distribution |
| **Distribution Credit**<br>Provided by AIDB to AISCO @ 5% | By AIDB to AISCO @ 11%<br>By CBE to private sector @ 14%<br>Cash only from AISCO to dealers<br>Private company consignment sales | Limited distribution credit, unfair concession to AISCO, no AIDB credit to private sector. |
| **Farmer Production Credit**<br>Monopoly by AIDB to Peasant Assoc. through Service Cooperatives. | As formerly when Service Cooperative not in arrears, plus new Farmer Groups. | Large Service Cooperative arrears<br>Severely restricted farmer credit |
| **Fertilizer Subsidy**<br>Direct and implict subsidies until 1988<br>No direct subsidies from 1989 | Implicit subsidies continued via AISCO<br>Direct subsidy (15%) in 1993 | NMS does not address subsidy issue<br>Direct subsidy impact on use negligable<br>Implementation of subsidy mismanaged |
| **Fertilizer Legislation**<br>No comprehensive legislation<br>Specifications set for limited product range | No change | Comprehensive fertilizer legislation required for consumer protection |

Note: AISCO - Agricultural Inputs Supply Corporation
MoA - Ministry of Agriculture
MoT - Ministry of Trade
AMC - Agricultural Marketing Corporation
AIDB - Agricultural and Industrial Development Bank
CBE - Commercial Bank of Ethiopia

During 1990/91 and 1991/92 a considerable number of Service Cooperatives (SCs), which were the only retail outlets for fertilizer, were destroyed or damaged as a result of hostilities and civil unrest and ceased to function. Destruction and theft of product and credit funds also occurred. In the pre-reform period AISCO had used approximately 2,900 SCs for fertilizer retailing. The number still functioning in 1991/92 was approximately 550 (no reliable data are available) of which only 250 received fertilizer credit from the Agricultural and Industrial Development Bank (AIDB). Following this loss of retail outlets, AISCO, with the assistance of the United Nations Food and Agricultural Organization (FAO) introduced a New Marketing System in 1991/92. This system included the direct sale to farmers from AISCO Marketing Centers (MCs) and the appointment of 7 private sector wholesalers at 3 Transit Warehouses and 114 private sector dealers. These private sector wholesalers and dealers were mainly appointed in areas where AISCO was unable to provide farmers with fertilizer supplies. In 1992/93 a further 22 wholesalers and 964 dealers were registered by AISCO in all areas except West Harrarghe. Also, in 1992/93 EAL appointed about 50 retailers and 5 wholesalers in the high use fertilizer regions, sold fertilizer direct to some SCs, and used AMC warehouses for storage and as sales outlets.

It appears that during 1992/93 approximately 2,200 fertilizer sales outlets were operating for at least some part of the main fertilizer season. This includes all of the AISCO MCs. This is about a 25% reduction compared to the late 1980s, although it is unclear just how many MCs were effectively operating in the late 1980s. It is also unclear just how many of the AISCO Marketing Centers are currently selling direct to farmer groups as these have only accounted for 9% of total sales. The consultants estimate that about 1,500 to 1,700 sales outlets are currently effective, representing almost a 50% decline. The importance of convenient availability to farmers of fertilizer sales points in a country so poor in transport infrastructure cannot be overemphasized. The fall in number of sales outlets is almost certainly a major factor in the reduced sales volume experienced in 1992/93.

During 1993, up to mid-August private sector AISCO dealers sold 68% of total sales to the peasant sector, SCs 14%, AISCO MCs 9%, and EAL 9%. Private sector participation in fertilizer marketing can be termed as being successfully implemented. However, there are

many restrictions on competition and operational efficiency due to the continued application of panterritorial pricing, only two sources of supply (AISCO and EAL), explicit or implicit, fixed market areas for individual dealers and wholesalers which reduce competition and a lack of distribution credit for the private sector.

After a period of 4 years without a direct financial fertilizer subsidy the TGE re-introduced a subsidy of 15% on both urea and DAP in February 1993. This was a unilateral decision of the TGE, taken without the knowledge of the donors. There is no substantive evidence that the 60% and 50% increases in fertilizer:teff and fertilizer:wheat price ratios over 1991/92 ratios would have led to significantly reduced fertilizer use and reduced crop production. At the unsubsidized fertilizer prices 1.6 kg of wheat and 1.2 kg teff would have purchased 1 kg of DAP and even more urea. With a field response to 1 kg of DAP fertilizer of 4.5 kg for teff and up to 6.5 kg for wheat, the benefit:cost ratios would have been above the normally expected 2:1 critical ratio required to induce resource-poor smallholder farmers to use fertilizer. The policy decision to apply a subsidy, at a budgeted cost of EBr 52 million, appears to have been taken without adequate policy analysis, although political considerations related to farmer support were undoubtedly important. A lack of adequate and reliable market information to enable timely policy analysis and policy development was almost certainly a factor. The use of fertilizer subsidy is discussed more fully in Section 6.

In addition to the real cost increases of fertilizer caused by the devaluation, additional costs have been incurred through increased transport costs. These are analyzed in detail in Section 5. The policy changes relating to transit agencies and transport are summarized in Table 3. The Marine Transit Services Corporation (MTSC) still holds a monopoly on marine and transit freight forwarding in Assab in association with the Eritrean forwarding agency ERSTAS. MTSC's service charges have increased by 144% in 1993 due to the imposition of increased ERSTAS charges. ERSTAS insists on dealing only with MTSC excluding private forwarding agencies from operating at Assab port.

The new truck associations appear to be operating as regional cartels. The Ethiopian Freight Transport Corporation (FFTC), while deregulated, is still the dominant long-haul

**Table 3. ETHIOPIA: Summary of Selected Transport Sector Policy Changes Since 1991**

Fertilizer and Transport Sector Assessment, IFDC 1993

| OLD POLICY | NEW POLICY | IMPACT ON FERTILIZER AND TRANSPORT SECTORS |
|---|---|---|
| **Transit Agency**<br>Sole monopoly of MTSC | Allow private agencies | Applications for private transit agencies received but none registered to date<br>Continued MTSC monopoly |
| **Transit Agency Costs**<br>Low fixed rates set by parastatal | Autonomy in setting charges | Excessive new charges by MTSC |
| **Truck Operations**<br>Private truck operators organized under EFTC Monopoly<br>Other parastatal truck fleets | EFTC monoply dissolved.<br>Private Freight Associations formed<br>Other parastatal truck fleets continue | EFTC fleet dominates trucking sector<br>17 associations acting as cartels<br>No real competitive market |
| **Freight Rtates**<br>Low fixed rates | Market pricing | EFTC effectively continues to set rates, others follow their lead<br>Rates uneconomic for new trucks |
| **Ketana System**<br>EFTC controlled route allocation<br>Inefficient operation | All controls lifted but security checks continue | Discrimination against private sector by parastatals<br>Problems for private truck fleets due to lack of freight agencies |
| **Imported Trucks and Parts**<br>Public sector control of FX for imports<br>No availability to new private operators | FX available to private sector<br>EFTC still dominates spares imports | Continuing barriers for private sector<br>Shortage of spares for private sector |

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trucking organization and appears to determine major route freight rates. Rates on the Assab-Addis route have increased by 20% from 25¢/ton-km to 30¢/ton-km over the past 2 years; a total rate increase of EBr 44.10/ton. Even so, calculations by the study team indicate that such rates are inadequate for the profitable operation of new trucks. Reports were received of a small but growing level of competition among transport associations. However, of the 17 transport associations registered with the Road Transport Authority, 5 are the maximum size and these are organized in the same geographic zone designations as the abolished ketana system. The policy guidelines for truck associations limit their maximum size but do not require that all associations have the maximum allowed number of members. Lack of general business skills and transport specific business skills, difficulty with capital formation, and uncertainty of the future of the transport industry appear to be the major deterrents to the formation and operation of larger for hire truck fleets.

### 2.3 Implementation of Policy Changes

Notwithstanding the difficulties normally associated with significant policy changes such as are being introduced in Ethiopia, the implementation of the policy reforms in the fertilizer and transport sectors leaves much to be desired. Late implementation of new policies, lack of policy coordination, lack of detailed and objective analysis, and lack of impact-monitoring systems to hasten policy development are all major shortcomings.

Private sector fertilizer procurement incurred a 32-day delay in securing an L/C which considerably delayed shipment and combined with differences between contract product specifications and analytical results (confused by differences in analytical methods) caused further delays in product distribution resulting in only 46% of the import tonnage being distributed by mid-August. Actual port charges to the private sector were the same as for AISCO, but charges for temporary storage at an area outside the port were increased considerably by the Municipal Authority.

The combination of two parastatal shipping and forwarding agencies at Assab, MTSC and ERSTAS, has created a situation of very high charges that appear to be levied in an arbitrary fashion, sometimes for services which are not performed. The applications for

private sector participation as shipping and forwarding agents were initiated in February 1992 but no private sector businesses have yet been appointed.

EFTC, as a parastatal, continues to receive business from other parastatals and provides these with preferential haulage rates. Until recently it had preferential access to credit, supplies, spare parts, and tires all of which were in very short supply in the private trucking sector. In part, current deliveries of some spare parts to EFTC are a carryover from the 1989 World Bank Transport Credit procurement. Since deregulation EFTC has not directly received any government support and is now charged with profitable and competitive operation. It has to obtain Forex from the auction market for spare parts in the same way as the private sector. In spite of these recent changes, EFTC appears to be still benefiting from its past position as a parastatal and is able to charge lower rates than other fleets. TGE restructuring studies for EFTC are underway to examine manageable economic fleet sizes and eventual divestment but privatization is not contemplated until there is demonstrable competition within the private sector.

Private sector dealers were appointed very late in the 1991/92 season by AISCO under the New Marketing System (NMS). Stringent guidelines imposed on dealer selection, which were designed to assure the appointment of reliable and dependable dealers, caused delays and many dealers were not appointed until the start of the main season in 1992/93. However, the implementation program for the New Marketing Strategy completed the orientation of 447 MOA marketing agents and field staff by early February 1993.

In 1992/93 AISCO planned to appoint 947 new dealers. They received 1,775 applications and approved registration of only 964, or 54%. The lowest approval rate, 24%, was in South Shoa, a region which had the largest fall in fertilizer use in 1992/93.

Private sector dealers appointed by AISCO who secured supplies from MOA-operated MCs had to deposit funds with AIDB before arranging pickup; an inconvenience and additional cost which is not conducive to private sector efficiency.

AISCO appointed wholesalers, with designated areas and a transport and marketing margin discount, delivered fertilizer close to the supply source where profits could be increased due to panterritorial pricing. AISCO reassigned these wholesalers as retailers and reduced their margins to the retail level.

The AIDB reduced farm production credit due to nonpayment of arrears and provided no distribution credit to the private dealers and wholesalers.

### 2.4 Impact Analysis of Policy Changes

The net result of the policy changes and their implementation should be measured through the impact on fertilizer cost and use, and on crop production. As only 2 years' data are available for the reform period crop production, 1990/91 and 1991/92, both of which were atypical, only the fertilizer cost and use analysis are presented.

Table 2.4.1 provides a summary of AISCO cost changes between 1992 and 1993. There was an overall increase of 61% in the final sales price, composed of a 78% increase in export cost and a 44% increase in distribution costs. The impact of devaluation on c.i.f. cost was offset by lower international prices but still amounted to an increase of 108%. MTSC charges increased 144% due to arbitrary increases imposed by ERSTAS. Inland freight costs increased by 25% reflecting the increased cost of fuel and spares caused by devaluation. Interest charges increased by 244% reflecting both increased interest rates and the devaluation impact on landed product cost.

The major issues arising from the impact of the policy changes on fertilizer costs are:

1. Procurement costs must be minimized.
2. Excessive parastatal organization charges must be eliminated.
3. Inland distribution freight costs must be minimized through improved efficiencies in distribution achieved through greater competition.
4. Stock control must be improved and stock levels reduced to minimize inventory holding costs.

Table 2.4.2 summarizes the change in fertilizer use between the pre-reform and reform periods. The most obvious change is in fertilizer use in the State Farm sector, which declined on average by 37% for nitrogen and 60% for phosphate, with an overall decline in nutrient use of 49%. The peasant sector increased on average by 25% for nitrogen and 32% for phosphate. These overall changes in the reform period mask significant annual changes. Total nutrient use in the peasant sector declined 3.8% in 1990/91 (the last year of the war), increased by 34.5% in 1991/92, and declined by an estimated 15.7% in 1992/93. The state sector nutrient consumption declined by 50.5% in 1990/91 and has since partially recovered, increasing 7.5% in 1991/92 and by 28.3% in 1992/93.

It should be noted that these data do not agree with the data supplied by FAO to the Fertilizer Donor Committee. It was derived from AISCO records using opening and closing stocks from the annual October physical stock counts at MCs and actual monthly deliveries to MCs for 1990/91, 1991/92, and 1992/93. It is assumed that October 1993 closing stocks equal opening stocks at Marketing Centers. Any increase in actual stocks will reduce apparent consumption for 1992/93 in the peasant sector.

The consultant interprets the changes in the peasant sector fertilizer use as follows: 1990/91 consumption declined due to inability to supply war affected areas; 1991/92 was a recovery year for consumption; 1992/93 was affected by mismanagement of the subsidy and price announcements in February/March 1993 leading to a reported loss of 75% of the Belg season (which normally accounts for 20% of total consumption), by a lack of sales outlets, by the price increases, by lack of farm credit, by difficulties faced by private sector dealers, and by the excessively wet season. Supply of fertilizer within the country was never a factor affecting consumption during 1992/93.

The above factors (excepting weather conditions) represent the major issues that need to be addressed by policy development and implementation. The benefits from entrepreneurial efficiencies in an open competitive market will not be achieved without significant policy changes and improved implementation and monitoring.

## 2.5 Development of Competitive Markets

The rationale for the development of open private competitive fertilizer and transport markets resides in the provision of internationally competitive fertilizer supplies to Ethiopian agriculture to increase its productivity and reduce resource misallocation by getting prices right. An open, competitive market which releases the private sector entrepreneurial skills aimed at profit realization through customer satisfaction requires: freedom of entry and exit, fair competition, adequate product/service supply, freedom to price in accord with market forces, and only such regulation as may be required to protect national interests and consumer rights.

Although the TGE has developed and implemented many sound and courageous policy initiatives and the AISCO NMS for fertilizers is a bold step in the right direction, an open competitive market for fertilizers does not yet exist in Ethiopia. Farmers must be given freedom of choice in the products and services they wish to buy and use and from where and how they buy.

Experience in other developing countries with fertilizer sector liberalization has amply demonstrated that:

- The private sector will mobilize its resources to distribute and market fertilizer and other agricultural inputs provided the policy environment allows it and provides incentives for private sector participation while removing barriers to entry. In Bangladesh and Egypt, for example, the private sector was able to domestically market between 80% and 90% of fertilizer within 1 year of deregulation.

- With adequate supply and competition, market pricing by the private sector will be efficient. Localized supply shortages during periods of peak demand or barriers to entry which reduce competition can lead to price gouging.

- The private sector will serve remote and low fertilizer use areas equally as well as high use areas provided full market pricing (i.e., full distribution costs can be recovered)

is allowed and there is adequate competition in high use areas, as a high degree of competition in high use areas forces private sector enterprises to expand their activities to other areas.

- Government policies should be aimed at developing and encouraging private sector participation in markets by removing constraints and barriers to entry and exit, and by developing a regulatory framework to ensure competition.

- The public sector role must be to ensure that there is comprehensive fertilizer sector legislation covering product registration, product quality specifications, and consumer protection through enforcement of laws concerning product adulteration and other malpractices that may occur. In addition, the government needs to monitor the fertilizer sector for policy development purposes.

In Ethiopia the objectives of fertilizer sector policy must be to ensure that all peasant farmers who need to use fertilizer have access to information on benefits of fertilizer use and fertilizer use technology, have easy access to fertilizer supplies in adequate quantities when required, and have available choice in source of supplier and access to farm production credit. The poor road infrastructure and the low level of cash resources of the peasant sector in Ethiopia make it imperative that it is made as easy as possible for farmers to buy and use fertilizer.

The transition to an open competitive fertilizer market in Ethiopia is constrained by the reliance on donors for foreign exchange to procure imports, the lack of private sector capital formation, the lack of a developed financial market for the provision of procurement credit and a fertilizer marketing credit line, by administered maximum retail pricing, by preferential treatment for AISCO, by a lack of private sector experience in fertilizer procurement and marketing, and by uncertainty within the private sector over future government policy. Attention to these areas by the TGE and donor agencies will hasten the transition to a competitive market and its associated benefits.

## Table 2.1.1.ETHIOPIA:Macro Economic Indicators 1987/88 to 1992/93 at Market Prices

Fertilizer and Transport Sector Assessment, IFDC,1993

MILLION EBr

| YEAR | | GDP | AGRIC GDP | EXPORTS | IMPORTS | EXCHANGE RATE | INFLATION RATE |
|---|---|---|---|---|---|---|---|
| | 1987/88 | 11851 | 5054 | 788 | 2275 | 2.07 | 2.20% |
| | 1988/89 | 12414 | 5327 | 918 | 2110 | 2.07 | 9.60% |
| | 1989/90 | 12442 | 5436 | 757 | 2291 | 2.07 | 5.20% |
| A. Average (88-90) | | 12236 | 5272 | 821 | 2225 | 2.07 | 5.67% |
| | 1990/91 | 13645 | 6454 | 572 | 2180 | 2.07 | 20.90% |
| C | 1991/92 | 13912 | 6449 | 396 | 2205 | 2.07 | 21.00% |
| D | 1992/93 | 16266 | 7801 | 1316 | 5749 | 5.00 | 11.50% |
| B. Average (91-93) | | 14608 | 6901 | 761 | 3378 | 3.05 | 17.80% |
| % Change A:B | | 19.39% | 30.89% | -7.27% | 51.80% | 47.18% | 214.12% |
| % Change C:D | | 16.92% | 20.96% | 232.32% | 160.73% | 141.55% | -45.24% |

Source: World Bank Resident Mission in Ethiopia

## Table 2.1.2.ETHIOPIA: Macro Economic Indicators 1987/88 to 1992/93 in Real Terms

Fertilizer and Transport Sector Assessment, IFDC,1993

MILLION ETHIOPIAN BIRR

| YEAR | | GDP | AGRIC GDP | EXPORTS | IMPORTS |
|---|---|---|---|---|---|
| | 1987/88 | 9199 | 3924 | 612 | 1766 |
| | 1988/89 | 9348 | 4011 | 691 | 1589 |
| | 1989/90 | 9206 | 4021 | 560 | 1695 |
| A. Average (88-90) | | 9251 | 3985 | 621 | 1683 |
| | 1990/91 | 9176 | 4340 | 385 | 1466 |
| C | 1991/92 | 8988 | 4166 | 256 | 1424 |
| D | 1992/93 | 9122 | 4375 | 738 | 3224 |
| B. Average (91-93) | | 9095 | 4294 | 460 | 2038 |
| % Change A:B | | -1.68% | 7.74% | -26.00% | 21.09% |
| % Change C:D | | 1.49% | 5.02% | 188.28% | 126.40% |

Note: Deflated by GDP Deflator, 1987/88 = 100

Source: Derived from World Bank Data.

**Table 2.1.3. ETHIOPIA:Fertilizer and Grain Prices 1988 to 1993 with Subsidized Fertilizer Prices in 1992/93**

Fertilizer and Transport Sector Assessment, IFDC 1993

**Nominal Prices**

| YEAR | DAP | UREA | WTD. FERT. PRICE | WHITE TEFF | WHEAT | FERT:TEFF RATIO | FERT:WHEAT RATIO |
|---|---|---|---|---|---|---|---|
| | <---------- | | EBr/QTL | | ----------> | | |
| 1987/88 | 81.4 | 63.7 | 78.6 | 96.8 | 44.3 | 0.81 | 1.78 |
| 1988/89 | 96.6 | 80.9 | 92.6 | 100.5 | 78.0 | 0.92 | 1.19 |
| 1989/90 | 88.8 | 75.1 | 86.2 | 93.8 | 61.5 | 0.92 | 1.40 |
| A. Average 88-90 | 88.9 | 73.2 | 85.8 | 97.0 | 61.3 | 0.88 | 1.45 |
| 1990/91 | 91.0 | 77.3 | 87.8 | 111.0 | 80.3 | 0.79 | 1.09 |
| C 1991/92 | 107.1 | 95.3 | 105.4 | 145.5 | 101.3 | 0.72 | 1.06 |
| D 1992/93 | 149.8 | 132.7 | 147.1 | 147.8 | 108.8 | 1.00 | 1.35 |
| B. Average 91-93 | 116.0 | 101.8 | 113.4 | 134.8 | 96.8 | 0.84 | 1.17 |
| % Change A:B | 30.4% | 39.0% | 32.2% | 38.9% | 58.0% | -5.3% | -19.7% |
| % Change C:D | 39.9% | 39.3% | 39.5% | 1.5% | 7.4% | 37.4% | 27.8% |

**Deflated Prices**

| YEAR | DAP | UREA | WTD. FERT. PRICE | WHITE TEFF | WHEAT | FERT:TEFF RATIO | FERT:WHEAT RATIO |
|---|---|---|---|---|---|---|---|
| | <---------- | | EBr/QTL | | ----------> | | |
| 1987/88 | 81.4 | 63.7 | 78.6 | 96.8 | 44.3 | 0.81 | 1.78 |
| 1988/89 | 89.6 | 75.0 | 85.8 | 93.2 | 72.3 | 0.92 | 1.19 |
| 1989/90 | 78.3 | 66.2 | 76.0 | 82.7 | 54.2 | 0.92 | 1.40 |
| A. Average 88-90 | 83.1 | 68.3 | 80.2 | 90.9 | 56.9 | 0.88 | 1.45 |
| 1990/91 | 59.1 | 50.2 | 57.1 | 72.1 | 52.1 | 0.79 | 1.09 |
| C 1991/92 | 62.7 | 55.8 | 61.7 | 85.2 | 59.3 | 0.72 | 1.06 |
| D 1992/93 | 84.7 | 75.0 | 83.1 | 83.5 | 61.5 | 1.00 | 1.35 |
| B. Average 91-93 | 68.8 | 60.3 | 67.3 | 80.3 | 57.6 | 0.84 | 1.17 |
| % Change A:B | -17.2% | -11.7% | -16.0% | -11.7% | 1.2% | -5.3% | -19.7% |
| % Change C:D | 35.1% | 34.5% | 34.7% | -1.9% | 3.7% | 37.4% | 27.8% |

Notes: (1) Prices deflated by CSA General Price Index
(2) Grain Prices are wholesale prices for Addis less 25%
(3) 1992/93 Fertilizer prices unsubsidized

## Table 2.1.4. ETHIOPIA:Fertilizer and Grain Prices 1988 to 1993 with Unsubsidized Fertilizer Prices in 1992/93

Fertilizer and Transport Sector Assessment, IFDC 1993

**Nominal Prices**

| YEAR | DAP | UREA | WTD. FERT. PRICE | WHITE TEFF | WHEAT | FERT:TEFF RATIO | FERT:WHEAT RATIO |
|---|---|---|---|---|---|---|---|
| | <---------- | | EBr/QTL | | ----------> | | |
| 1987/88 | 81.4 | 63.7 | 78.6 | 96.8 | 44.3 | 0.81 | 1.78 |
| 1988/89 | 96.6 | 80.9 | 92.6 | 100.5 | 78.0 | 0.92 | 1.19 |
| 1989/90 | 88.8 | 75.1 | 86.2 | 93.8 | 61.5 | 0.92 | 1.40 |
| A. Average 88-90 | 88.9 | 73.2 | 85.8 | 97.0 | 61.3 | 0.88 | 1.45 |
| 1990/91 | 91.0 | 77.3 | 87.8 | 111.0 | 80.3 | 0.79 | 1.09 |
| C 1991/92 | 107.1 | 95.3 | 105.4 | 145.5 | 101.3 | 0.72 | 1.06 |
| D 1992/93 | 176.2 | 156.1 | 173.0 | 147.8 | 108.8 | 1.17 | 1.59 |
| B. Average 91-93 | 124.8 | 109.6 | 122.1 | 134.8 | 96.8 | 0.90 | 1.25 |
| % Change A:B | 40.3% | 49.6% | 42.3% | 38.9% | 58.0% | 1.3% | -14.2% |
| % Change C:D | 64.5% | 63.9% | 64.1% | 1.5% | 7.4% | 61.6% | 50.4% |

**Deflated Prices**

| YEAR | DAP | UREA | WTD. FERT. PRICE | WHITE TEFF | WHEAT | FERT:TEFF RATIO | FERT:WHEAT RATIO |
|---|---|---|---|---|---|---|---|
| | <---------- | | EBr/QTL | | ----------> | | |
| 1987/88 | 81.4 | 63.7 | 78.6 | 96.8 | 44.3 | 0.81 | 1.78 |
| 1988/89 | 89.6 | 75.0 | 85.8 | 93.2 | 72.3 | 0.92 | 1.19 |
| 1989/90 | 78.3 | 66.2 | 76.0 | 82.7 | 54.2 | 0.92 | 1.40 |
| A. Average 88-90 | 83.1 | 68.3 | 80.2 | 90.9 | 56.9 | 0.88 | 1.45 |
| 1990/91 | 59.1 | 50.2 | 57.1 | 72.1 | 52.1 | 0.79 | 1.09 |
| C 1991/92 | 62.7 | 55.8 | 61.7 | 85.2 | 59.3 | 0.72 | 1.06 |
| D 1992/93 | 99.6 | 88.3 | 97.8 | 83.5 | 61.5 | 1.17 | 1.59 |
| B. Average 91-93 | 73.8 | 64.7 | 72.2 | 80.3 | 57.6 | 0.90 | 1.25 |
| % Change A:B | -11.2% | -5.2% | -9.9% | -11.7% | 1.2% | 1.3% | -14.2% |
| % Change C:D | 58.9% | 58.3% | 58.4% | -1.9% | 3.7% | 61.6% | 50.4% |

Notes: (1) Prices deflated by CSA General Price Index
(2) Grain Prices are wholesale prices for Addis less 25%
(3) 1992/93 Fertilizer prices unsubsidized

**Table 2.1.5.ETHIOPIA:Teff and Wheat Average Free Market Wholesale and Retail Prices, Addis Ababa, 1983/84 TO 1992/93**

Fertilizer and Transport Sector Assessment, IFDC 1993

(EBR/QTL)

| YEAR | TEFF | | WHEAT | |
|---|---|---|---|---|
| | WHOLESALE | RETAIL | WHOLESALE | RETAIL |
| 1983/84 | 104 | 113 | 67 | 75 |
| 1984/85 | 191 | 181 | 157 | 117 |
| 1985/86 | 185 | 196 | 117 | 129 |
| 1986/87 | 112 | 121 | 77 | 75 |
| Average 84-87 | 148 | 153 | 105 | 99 |
| 1987/88 | 129 | 133 | 59 | 69 |
| 1988/89 | 134 | 132 | 87 | 102 |
| 1989/90 | 125 | 137 | 82 | 95 |
| A - Average 88-90 | 129 | 134 | 76 | 89 |
| 1990/91 | 148 | 156 | 107 | 121 |
| C 1991/92 | 194 | 195 | 135 | 164 |
| D 1992/93 | 197 | 206 | 145 | 155 |
| B - Average 91-93 | 180 | 186 | 129 | 147 |
| Increase A to B | 38.92% | 38.56% | 69.74% | 65.41% |
| Change C to D | 1.55% | 5.64% | 7.41% | -5.49% |

Note: For years 1983/84 to 1988/89 compulsory AMC prices applied to fixed crop production quotas for both farm-gate and wholesale prices. These were EBr 45/qtl for teff (FGP) and EBr 34 for wheat to 1986/87 and then EBr 48 and 36 for teff and wheat until 1988/89.

Wholesale margins were constant at EBr 5/qtl.in all years to 1988/89 for these quotas.

Source: Derived from AMC data files

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**Table 2.1.6 ETHIOPIA: Price Indices 1981/82 to 1992/93**

Fertilizer and Transport Sector Assessment, IFDC, 1993

| YEAR (a) | GENERAL INDEX(b) | FOOD INDEX | OTHER GOODS AND SERVICES | GDP DEFLATOR |
|---|---|---|---|---|
| 1980/81 | 375.2 | 441.2 | 224.7 | |
| 1981/82 | 396.1 | 467.6 | 266.0 | |
| 1982/83 | 394.5 | 471.0 | 288.8 | |
| 1983/84 | 427.8 | 522.8 | 287.3 | 120.3 |
| 1984/85 | 509.4 | 654.7 | 296.7 | 127.8 |
| 1985/86 | 459.4 | 554.9 | 319.4 | 132.3 |
| 1986/87 | 448.3 | 521.3 | 316.9 | 126.2 |
| 1987/88 | 480.0 | 562.4 | 353.7 | 128.8 |
| 1988/89 | 517.6 | 599.0 | 368.1 | 132.8 |
| 1989/90 | 544.2 | 630.1 | 372.3 | 135.2 |
| 1990/91 | 738.7 | 890.6 | 391.4 | 148.7 |
| 1991/92 | 816.4 | 996.2 | 428.2 | 154.8 |
| 1992/93 | 849.0 | 1027.6 | 457.6 | 178.3 |

Notes:

(a) C.S.A.Indices for Addis Ababa refer to financial years(July-June)

(b) 1963/64 = 100

Source: Central Statistical Authority, Retail Price Index for Addis Adaba, August 1993.
World Bank, Resident Mission in Ethiopia, GDP Deflator

**Table 2.4.1 ETHIOPIA: AISCO'S DAP Cost Build-up 1992 and 1993**

Fertilizer and Transport Sector Assessment, IFDC,1993

| | | EBr/Qtl | | Change 1992 to 1993 | |
|---|---|---|---|---|---|
| | COST COMPONENT | 1992 | 1993 | EBr/Qtl | Percent |
| 1 | CIF Liner Terms | 51.09 | 106.71 | 55.62 | 108.8% |
| 2 | Bank Charges | 0.10 | 0.11 | 0.01 | 14.5% |
| 3 | Port Dues @ 0.25% CIF | 0.13 | 0.27 | 0.14 | 107.5% |
| 4 | MTSC Charges | 5.19 | 12.67 | 7.48 | 144.2% |
| 5 | Quay Rent | 14.71 | 7.00 | -7.71 | -52.4% |
| 6 | Port Handling Charges | 0.38 | 0.50 | 0.12 | 32.3% |
| 7 | Inspection Fee | 0.10 | 0.10 | 0.00 | 0.0% |
| 8 | Sub-total (Ex-Assab Cost) | 71.70 | 127.36 | 55.66 | 77.6% |
| 9 | Transport Assab-Transit W/Houses | 19.16 | 23.88 | 4.72 | 24.6% |
| 10 | Unloading/Loading at Transit W/Houses | 0.80 | 2.00 | 1.20 | 150.0% |
| 11 | Rebagging at Transit W/Houses | 0.07 | 0.07 | 0.00 | 0.0% |
| 12 | Transport to Marketing Centers | 11.06 | 13.83 | 2.77 | 25.0% |
| 13 | Unloading at Marketing Centers | 0.50 | 0.50 | 0.00 | 0.0% |
| 14 | Incentive to Marketing Center Staff | 0.20 | 0.20 | 0.00 | 0.0% |
| 15 | Storage and maintenance | 1.00 | 1.42 | 0.42 | 42.0% |
| 16 | Loss Allowance | 1.57 | 0.85 | -0.72 | -45.8% |
| 17 | Interest | 3.28 | 11.28 | 8.00 | 244.4% |
| 18 | Sub-total (Inland Costs) | 37.63 | 54.03 | 16.40 | 43.6% |
| 19 | AISCO's Overhead Cost and Margin | 5.46 | 5.74 | 0.28 | 5.1% |
| 20 | Contingency | 2.19 | 5.24 | 3.05 | 139.3% |
| 21 | Dealer's Overhead Cost and Margin | 6.56 | 7.00 | 0.44 | 6.7% |
| 22 | Total - Sales Price | 123.54 | 199.37 | 75.83 | 61.4% |

Source: AISCO

**Table 2.4.2.ETHIOPIA: AISCO Fertilizer Sales Comparison, 1988-90 to 1991-93**

Fertilizer and Transport Sector Assessment, IFDC,1993

MT

| **Peasant Sector** | | DAP | UREA | N | P2O5 | TOTAL PRODUCT | TOTAL NUTRIENT |
|---|---|---|---|---|---|---|---|
| | 1987/88 | 81,322 | 7,369 | 18,027 | 37,408 | 88690 | 55435 |
| | 1988/89 | 71,334 | 21,024 | 22,511 | 32,814 | 92358 | 55325 |
| | 1989/90 | 99,440 | 13,781 | 24,238 | 45,742 | 113221 | 69981 |
| A. Average 88-90 | | 84,032 | 14,058 | 21,592 | 38,655 | 98,090 | 60,247 |
| | 1990/91 | 95,954 | 12,906 | 23,208 | 44,139 | 108859 | 67347 |
| C | 1991/92 | 128,846 | 17,658 | 31,315 | 59,269 | 146504 | 90584 |
| D | 1992/93 | 103,267 | 15,230 | 26,494 | 49,803 | 123497 | 76296 |
| B.Average 91-93 | | 111,022 | 15,264 | 27,006 | 51,070 | 126,287 | 78,076 |
| % Change A:B | | 32.12% | 8.58% | 25.07% | 32.12% | 28.75% | 29.59% |
| % Change C:D | | -15.97% | -13.75% | -15.40% | -15.97% | -15.70% | -15.77% |

| **State Sector** | | DAP | UREA | N | P2O5 | PRODUCT | NUTRIENT |
|---|---|---|---|---|---|---|---|
| | 1987/88 | 25,786 | 12,748 | 10,506 | 11,862 | 38534 | 22367 |
| | 1988/89 | 23,177 | 11,631 | 9,522 | 10,662 | 34808 | 20184 |
| | 1989/90 | 18,426 | 14,062 | 9,785 | 8,476 | 32488 | 18261 |
| A. Average 88-90 | | 22,463 | 12,814 | 9,938 | 10,333 | 35,277 | 20,271 |
| | 1990/91 | 2,143 | 16,667 | 8,053 | 986 | 18810 | 9038 |
| C | 1991/92 | 11,262 | 5,467 | 4,542 | 5,181 | 16729 | 9722 |
| D | 1992/93 | 13,720 | 8,034 | 6,165 | 6,311 | 21754 | 12477 |
| B.Average 91-93 | | 9,042 | 10,056 | 6,253 | 4,159 | 19,098 | 10,413 |
| % Change A:B | | -59.75% | -21.52% | -37.08% | -59.75% | -45.86% | -48.63% |
| % Change C:D | | 21.83% | 46.97% | 35.74% | 21.83% | 30.04% | 28.33% |

| **TOTAL** | | DAP | UREA | N | P2O5 | PRODUCT | NUTRIENT |
|---|---|---|---|---|---|---|---|
| | 1987/88 | 107,108 | 20,117 | 28,533 | 49,270 | 127225 | 77803 |
| | 1988/89 | 94,511 | 32,655 | 32,033 | 43,475 | 127166 | 75508 |
| | 1989/90 | 117,866 | 27,843 | 34,024 | 54,218 | 145709 | 88242 |
| A. Average 88-90 | | 106,495 | 26,871 | 31,530 | 48,988 | 133,366 | 80,518 |
| | 1990/91 | 98,097 | 29,573 | 31,261 | 45,125 | 127670 | 76385 |
| C | 1991/92 | 140,109 | 23,125 | 35,857 | 64,450 | 163233 | 100307 |
| D | 1992/93 | 121,987 | 23,264 | 32,659 | 56,114 | 145251 | 88773 |
| B.Average 91-93 | | 120,064 | 25,320 | 33,259 | 55,230 | 145,385 | 88,488 |
| % Change A:B | | 12.74% | -5.77% | 5.48% | 12.74% | 9.01% | 9.90% |
| % Change C:D | | -12.93% | 0.60% | -8.92% | -12.93% | -11.02% | -11.50% |

Sourec: Derived from AISCO data.

# 3. Fertilizer Supply and Demand

## 3.1 Development of Fertilizer Use

Fertilizer use in Ethiopia commenced in 1970/71 with less than 1,000 mt of product used, mainly diammonium phosphate (DAP), then expanded quite rapidly during the second half of the 1970s to reach 51,000 mt of DAP and urea consumption by the peasant sector by 1979. The annual growth rate in product use during this decade was 41%. Then followed a period of relatively stagnant use until 1985/86, with consumption varying between 31,000 and 46,000 mt and falling to 24,000 mt in the major drought year of 1984/85. Following the drought, with increased donor support, consumption increased in 1985/86 to a total of 83,000 mt. From 1985/86, with continued donor support to fund imports, consumption increased by 16%/year to reach a total of 163,233 mt in 1991/92 (146,504 mt in peasant sector and 23,125 mt in the state sector) then fell to an estimated total of 145,250 mt in 1992/93. Data are presented in Table 3.1.1 and Figure 3.1.1. It should be noted that these data exclude Eritrean fertilizer consumption from 1987/88 onwards.

Fertilizer use per hectare of arable land is among the lowest in the world at 3.9 kg nutrients/ha (FAO Production Yearbook [42], 1988). In 1988 the MOA estimated that fertilizer use was confined to about 15% of the total arable land and that where fertilizer is used applications are well below recommended rates. A more recent survey (Ammanuel et al., 1991) indicated that wheat growers in Arsi, a region with the highest proportion of fertilizer use on wheat (43% of area fertilized), seldom used more than half a quintal (50 kg) DAP/ha; half the recommended rate.

Approximately 75% of all fertilizer use in the peasant sector is concentrated in three regions: Shoa, Gojjam, and Arsi. This reflects not only the cropping pattern but the prevalence of Vertisol soils which are most responsive to phosphate, and also, access to fertilizer supplies. Fertilizer use in Arsi is essentially confined to DAP.

Most fertilizer is used on cereals. Fertilizer use pattern for cereals was estimated (MOA, 1988) to be 50% for teff, 30% for wheat, 10% for barley, 7% for maize, and 3% for sorghum. The Belg or short rain season (February-March) usually accounts for about 15% of total fertilizer use and the Mehr (main) season (May-August) for the remainder. There is negligible use during the period from October to January.

In the rainfed cereal/pulse cropping systems fertilizer use is highly seasonal and variable between years. Although surveys have indicated that most farmers are aware of fertilizer use benefits. A recent survey (Ammanuel et al., op cit) in 1991 indicated that the universal reasons for low and nonuse of fertilizer by peasant farmers were:

- Nonavailability of fertilizer.
- Fertilizer has become more and more expensive.
- Credit facilities are no longer available.

The total nutrient use in the peasant sector is approximately 26,500 mt N and 44,750 mt $P_2O_5$, a ratio of 1:1.7 (Table 3.1.2). Optimum cereal fertilizer recommendations have an N:$P_2O_5$ ratio of 1:1 and it is obvious that farmers are not only using low rates of phosphate but they are using insufficient nitrogen.

### 3.2 Fertilizer Recommendations

Fertilizer recommendations have been general and controversial. The MOA has a blanket recommendation for wheat in all highland areas of 41 kg N/ha and 46 kg $P_2O_5$/ha. This recommendation is based on field trials conducted in the 1960s. The Institute of Agricultural Research (IAR), after further studies, modified the recommendations to 60 kg/ha of each nutrient. The two sets of recommendations have been used extensively by the extension services and to estimate fertilizer requirements for the country.

Between 1988 and 1991 the ADD/NFIU conducted 2,952 fertilizer trials on farmers' fields using teff, wheat, barley, maize, and sorghum as test crops. These trials resulted in a more comprehensive set of fertilizer rate recommendations for the major cereal crops based

on major soil associations (MOA, 1993) (see Annex Table 1.4). These are generally higher, particularly for nitrogen, than the old recommendations but economic analysis (Annex Table 1.5) indicated that benefit:cost ratios (BCR) of 3 or above could be achieved on the major soil types at the economic optimum rates with 1991/92 fertilizer and cereal prices for all cereal crops except sorghum (with farm-gate cereal prices estimated at 25% to 30% below wholesale prices in Addis Ababa).

Unsubsidized fertilizer prices in 1992/93 would have increased by 64% while grain prices increased by less than 10%, hence the potential BCRs declined. At the economic optimum rates of application BCRs would have varied between 1.2 for sorghum and 2.2 for barley, providing little incentive for fertilizer use by small resource-poor farmers. Fertilizer use at economic optimum rates with unsubsidized prices would have still been very profitable. Introduction of the 15% fertilizer subsidy increased the BCRs to between 1.6 and 2.8 at economic optimum application rates. It is normally accepted that small resource-poor farmers require a minimum BCR of 2 to stimulate investment in fertilizer. There is evidence that farm-gate prices for grain are often below the officially reported values used in calculating the above BCRs and, if so, these will lower the BCRs for farmers. However, most Ethiopian farmers apply fertilizer at well below the optimum economic rates and therefore BCRs are higher than at the economic optimum rates.

The new fertilizer recommendations also include some limited recommendations for the use of potash on wheat and barley (Annex Table 1.4). For the immediate future it is recommended that potash should not be imported using donor funds as the priority lies in increasing use of both nitrogen and phosphate.

### 3.3 Fertilizer Nutrients and Potential Crop Production

A generally accepted relationship in Ethiopia between fertilizer use and increased crop production is a response of between 5 kg grain (teff) and 11 kg grain (maize) per kilogram nutrient. Generalized yield increases at optimal N and $P_2O_5$ levels were estimated from research trials (MOA, 1988) at 450/kg/ha for teff, 600 kg/ha for barley, 1,000 kg/ha for wheat, and 1,800 kg/ha for maize and, in on-farm studies (Ammanuel et al., 1991), wheat

yields were increased by 28% to 178% across zones and generated benefit:cost ratios in excess of 2. Grain response per kilogram fertilizer product is thus approximately 3 kg for teff, 4 kg for barley, 6.5 kg for wheat, and 12 kg for maize. Using the generalized fertilizer use pattern on cereal crops the average response in terms of increased grain production per kilogram of fertilizer product is 4.9 kg.

Fertilizer use patterns are contrary to these response patterns due to the facts that teff and wheat are generally grown on Vertisols which are more responsive to fertilizer applications and produce prices for teff and wheat are more attractive than prices for barley, sorghum, and maize.

The immediate opportunities for increasing cereal crop production are as follows:

- Increasing urea use on areas currently fertilized with DAP.
- Increasing current DAP application rates where farmers are only using 50 kg DAP/ha.
- Increasing the proportion of cereal area fertilized.

### 3.4 Suitability of Current Fertilizer Products

The almost exclusive use of DAP and urea is justified and no change is recommended. These products, with 64% and 46% plant nutrient content, respectively, are the most cost effective fertilizers in the high freight cost environment of Ethiopia. They are also the least cost products per unit of plant nutrient to procure in international markets.

Small quantities, less than 2,000 mt, of compound NP fertilizers have been imported in recent years. These are more expensive and have a higher freight cost per unit of plant nutrient than either DAP or urea. Although they may in some circumstances have agronomic advantages, have a 1:1 N:$P_2O_5$ ratio, and provide convenience of application to farmers, later sidedressing or topdressing of urea are recommended to provide additional nitrogen. Trials comparing the use of compound NP fertilizers with urea and DAP have shown no significant differences in yield response.

Consideration will need to be given to importing potash in the medium term. Some studies by IAR and NFIU have indicated some response to liming on acid soils but it is unlikely that lime applications will be economic and it must be recognized that the substantial yield responses gained in the large number of farmer trials were achieved without liming.

### 3.5 Research and Extension

Excellent fertilizer research is being conducted by ADD/NFIU and this unit is in an excellent position to bring together the ADD, extension, National Soil Service, and IAR to work with farmers. The ADD/NFIU is however a donor-funded project and agreements must be reached on how its work will be continued and who will be the custodian of the database being developed.

Future requirements for soil and plant analysis to provide the basis for fertilizer recommendations will be required. The IAR has regional stations, useful for this purpose but they need to be strengthened.

A strategy to manage soil organic matter must be developed.

A crop modeling capability would be desirable. Crop models are an excellent tool for assessing risks associated with fertilizer use strategies and facilitate extrapolation of site-specific research findings–an advantage where resources are limited.

It is apparent that the extension service is going through a difficult time due to lack of resources. Improved linkages with research and ADD/NFIU would help. As private sector fertilizer and other ag-input dealers develop, the extension service will need to organize to serve these clients as well as farmers.

### 3.6 Environmental Issues

Intensive cultivation, overgrazing, and deforestation are contributing to the degradation of the natural resource base in Ethiopia. Soil organic matter is the best indicator of soil

productivity (MOA, 1992). As soil organic matter decreases soil physical properties deteriorate and soil fertility declines.

Increased use of fertilizer will help reverse the soil degradation process but must also be accompanied by soil conservation practices and strategies in order to minimize adverse environmental effects. It should be recognized that increased fertilizer use, which will increase productivity, will reduce the pressure to expand cultivation onto environmentally fragile land.

The current low use of fertilizer in Ethiopia is unlikely to present any problems associated with either high groundwater nitrates or phosphate-induced fresh water eutrophication but no data have been sighted (see Annex 1).

### 3.7 Future Demand Projections

Actual fertilizer demand projections for Ethiopia are difficult to estimate from existing data. Potential fertilizer use, based on existing crop areas and rate recommendations, is 447,500 mt DAP and 261,600 mt urea (Annex Table 1.7). When existing proportions of crop areas fertilized are assumed the potential demand falls to 187,100 mt (Annex Table 1.7).

Demand for fertilizers is derived from the demand for agricultural output. Farmers produce agricultural output to make a living by earning some profit out of their production activities. The profit may be written as:

$P = Po\ O - Pi\ Xi$ which is transformed to

$P = f(Po,Pi,Xi,T)$, that is a function of

output and input prices (Po and Pi), the use levels of inputs Xi which shifts over time with changes in technology (T)

In order to carry out the process of production, inputs (Xi) are required (or have a demand) which for individual inputs may be written as:

Xi = f(Po, Pi, T), that is, the demand for an input depends upon output and related inputs' prices and upon the level of technology. Over time, it shifts with shifts in technology.

Statistical estimates of fertilizer demand are measured by yearly consumption data together with nutrient prices and agricultural output prices, normally expressed as an agricultural price index. Because of the difficulties of including the myriad of technological changes as explanatory variables in statistical estimations of nutrient demand functions from time-series data, the trends in technological changes are usually represented by a time trend variable. On this basis, for purposes of projecting fertilizer requirements for the near future, the following equations were estimated:

| | | | |
|---|---|---|---|
| LnFi | = | a + cT, where | |
| Fi | = | N, $P_2O_5$, and (N + $P_2O_5$) | |
| T | = | time variable 1980/81 to 1992/93 (1,2,3,....,13) | [1] |

This semi-log time trend equation is commonly used to calculate growth rates and make projections for the near future as a rough guide. Over longer periods, projections made from this equation are generally on the high side because of the exponential growth pattern involved.

| | | | |
|---|---|---|---|
| LnFi | = | a + b ln(Pi/Po) + cT, where | |
| Pi | = | the actual nutrient price | |
| Po | = | the agricultural price index | |
| b | = | price elasticity | |
| c | = | annual growth rate | [2] |

This function, in addition to the time-trend variable, includes prices of N and $P_2O_5$ and the agricultural output price index to deflate the nutrient prices. As no agricultural output price index was available for use, the Addis Ababa general price index was used to deflate nutrient prices.

The data set used is presented in Table 3.7.1 and the estimated coefficients for the equations are presented in Table 3.7.2. It should be noted that with the data used the log function price coefficients are not significant since the standard errors are larger than the coefficients. Without access to more refined data, projections were made using these functions but these should be used with extreme caution.

Tables 3.7.3 to 3.7.5 and Figure 3.7.1 present low medium and high projections of nutrients and products to 2003 derived from the above functions. Overall growth rates of between 13.4%/year and 15.3%/year are indicated. No account is taken of needed changes to increase urea use.

To these forecasts must be added the State Sector. Fertilizer use in the state sector declined markedly in 1990/91 but has since increased. A decline is expected in state farm activity but this should be offset by an increase in commercial farming operations. For the purposes of examining procurement and stock position for 1993/94 and 1994/95 it has been assumed that the state sector demand would grow by 3%/year over the 1992/93 consumption. This assumption has been used with the medium growth projection for the peasant sector.

Using these assumptions for total market demand in 1993/94 and 1994/95 projections have been made for these next 2 years to illustrate the import requirements and projected national stock levels. These are summarized in Figures 3.7.2 to 3.7.5.

**Table 3.1.1.ETHIOPIA: Fertilizer Product Use by Region, 1987/88-1992/93**

Fertilizer and Transport Sector Assessment, IFDC,1993

MT

| YEAR | 1988 | | 1989 | | 1990 | | 1991 | | 1992 | | 1993 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| REGION | DAP | UREA | DAP | UREA | DAP | UREA | DAP | UREA | DAP | UREA | DAP | UREA |
| Shoa | 32,949 | 6,086 | 37,217 | 5,635 | 43,838 | 8,939 | 44,341 | 8,241 | 68,403 | 12,845 | 41,482 | 5,045 |
| Gojjam | 10,878 | 608 | 14,010 | 1,484 | 17,931 | 1,053 | 15,964 | 1,515 | 15,788 | 2,083 | 18,646 | 2,096 |
| Gonder | 855 | 350 | 1,436 | 11,312 | 1,043 | 332 | 771 | 136 | 1,953 | 463 | 5,380 | 870 |
| Hararghe | 3,221 | 254 | 1,437 | 1,535 | 3,092 | 3,419 | 2,946 | 2,971 | 1,500 | 2,108 | 2,083 | 6,228 |
| Sidamo | 4,695 | 0 | 3,596 | 52 | 3,191 | 20 | 5,391 | 0 | 3,517 | 24 | 2,164 | 57 |
| Illubabor | 334 | 10 | 431 | 0 | 521 | 0 | 335 | 0 | 8,622 | 0 | 4,970 | 0 |
| Omo | 206 | 40 | 85 | 30 | 62 | 0 | 21 | 0 | 4,480 | 3 | 3,957 | 0 |
| Wellega | 4,206 | 20 | 4,055 | 248 | 3,613 | 10 | 5,806 | 0 | 4,960 | 0 | 6,495 | 0 |
| Arssi | 16,893 | 0 | 1,360 | 645 | 17,201 | 0 | 13,767 | 42 | 14,748 | 77 | 9,225 | 18 |
| Bale | 3,643 | 0 | 2,538 | 0 | 2,638 | 0 | 1,543 | 0 | 2,436 | 0 | 1,232 | 0 |
| Wello | 985 | 0 | 1,540 | 0 | 722 | 8 | 0 | | 458 | 55 | 233 | 54 |
| Tigray | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,981 | 0 | 1 400 | 862 |
| Keffa | 2,457 | 0 | 3,630 | 83 | 5,588 | 0 | 5,070 | 0 | 0 | 0 | 0 | 0 |
| TOTAL Peasant Sector | 81,322 | 7,369 | 71,334 | 21,024 | 99,440 | 13,781 | 95,954 | 12,906 | 128,846 | 17,658 | 97,267 | 15,230 |
| TOTAL State Sector | 25,786 | 12,748 | 23,177 | 11,631 | 18,426 | 14,062 | 2,143 | 16,667 | 11,262 | 5,467 | 13,720 | 8,034 |
| TOTAL Private Sector | | | | | | | | | | | 11,000 | 0 |
| GRAND TOTAL | 107,108 | 20,117 | 94,511 | 32,655 | 117,866 | 27,843 | 98,097 | 29,573 | 140,109 | 23,125 | 121,987 | 23,264 |

Note: Private Sector Sales to Peasant Sector except for 116 mt.

Source: AISCO

**Table 3.1.2.ETHIOPIA: Fertilizer Nutrient Use by Region, 1987/88-1992/93**

Fertilizer and Transport Sector Assessment, IFDC,1993

MT

| YEAR | 1988 | | 1989 | | 1990 | | 1991 | | 1992 | | 1993 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| REGION | N | P2O5 | N | P2O5 | N | P2O5 | N | P2O5 | N | P2O5 | N | P2O5 |
| Shoa | 8,731 | 15,157 | 9,291 | 17,120 | 12,003 | 20,165 | 11,772 | 20,397 | 18,221 | 31,465 | 9,788 | 19,082 |
| Gojjam | 2,238 | 5,004 | 3,204 | 6,445 | 3,712 | 8,248 | 3,571 | 7,343 | 3,800 | 7,252 | 4,320 | 8,577 |
| Gonder | 315 | 393 | 5,462 | 661 | 340 | 480 | 201 | 355 | 565 | 898 | 1,369 | 2,475 |
| Harargh | 697 | 1,482 | 965 | 661 | 2,129 | 1,422 | 1,897 | 1,355 | 1,240 | 690 | 3,240 | 958 |
| Sidamo | 845 | 2,160 | 671 | 1,654 | 584 | 1,468 | 970 | 2,480 | 644 | 1,618 | 416 | 995 |
| Illubabor | 65 | 154 | 78 | 198 | 94 | 240 | 60 | 154 | 1,552 | 3,966 | 895 | 2,286 |
| Omo | 56 | 95 | 29 | 39 | 11 | 29 | 4 | 10 | 808 | 2,061 | 712 | 1,820 |
| Wellega | 766 | 1,935 | 844 | 1,865 | 655 | 1,662 | 1,045 | 2,671 | 893 | 2,282 | 1,169 | 2,988 |
| Arssi | 3,041 | 7,771 | 542 | 626 | 3,096 | 7,912 | 2,497 | 6,333 | 2,690 | 6,784 | 1,669 | 4,243 |
| Bale | 656 | 1,676 | 457 | 1,167 | 475 | 1,213 | 278 | 710 | 438 | 1,121 | 222 | 567 |
| Wollo | 177 | 453 | 277 | 709 | 134 | 332 | 0 | 0 | 108 | 210 | 67 | 107 |
| Tigray | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 357 | 911 | 648 | 644 |
| Keffa | 442 | 1,130 | 692 | 1,670 | 1,006 | 2,570 | 913 | 2,332 | 0 | 0 | 0 | 0 |
| TOTAL Peasant Sector | 18,027 | 37,408 | 22,511 | 32,814 | 24,238 | 45,742 | 23,208 | 44,139 | 31,315 | 59,269 | 24,514 | 44,743 |
| TOTAL State Sector | 10,506 | 11,862 | 9,522 | 10,662 | 9,785 | 8,476 | 8,053 | 986 | 4,542 | 5,181 | 6,165 | 6,311 |
| TOTAL Private Sector | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1,980 | 5,060 |
| GRAND TOTAL | 28,533 | 49,270 | 32,033 | 43,475 | 34,024 | 54,218 | 31,261 | 45,125 | 35,857 | 64,450 | 32,659 | 56,114 |

Source: AISCO

**Table 3.7.1. ETHIOPIA: Basic Data Used to Statistically Project Demand for Fertilizers**

Fertilizer and Transport Sector Assessment, IFDC,1993

| YEAR | (MT) DAP | UREA | TOTAL | PRICE TO FARME (EBr/QNT) DAP | UREA | WEIGHTED AV PRICE FERTILIZE | ADDIS ABABA GENERAL PRICE INDEX |
|---|---|---|---|---|---|---|---|
| 1971 | 811 | 136 | 947 | 38 | 30 | 36.85 | |
| 1972 | 1,744 | 303 | 2,047 | 38 | 32 | 37.11 | |
| 1973 | 7,666 | 710 | 8,376 | 42 | 32 | 41.15 | |
| 1974 | 12,413 | 667 | 13,080 | 44 | 40 | 43.80 | |
| 1975 | 13,209 | 770 | 13,979 | 50 | 50 | 50.00 | |
| 1976 | 33,636 | 1,409 | 35,045 | 48 | 40 | 47.68 | |
| 1977 | 32,535 | 1,455 | 33,990 | 48 | 40 | 47.66 | |
| 1978 | 32,217 | 1,717 | 33,934 | 55 | 55 | 55.00 | |
| 1979 | 48,277 | 3,010 | 51,287 | 64 | 65 | 64.06 | |
| 1980 | 40,742 | 2,545 | 43,287 | 85 | 85 | 85.00 | |
| 1981 | 29,668 | 1,444 | 31,112 | 116.3 | 83.9 | 114.80 | 375.2 |
| 1982 | 30,255 | 1,418 | 31,673 | 89.0 | 69.7 | 88.09 | 396.1 |
| 1983 | 42,047 | 3,008 | 45,055 | 81.4 | 63.7 | 80.21 | 394.5 |
| 1984 | 42,147 | 4,737 | 46,884 | 81.4 | 63.7 | 79.61 | 427.8 |
| 1985 | 22,296 | 1,823 | 24,119 | 81.4 | 63.7 | 80.06 | 509.4 |
| 1986 | 74,347 | 8,918 | 83,265 | 81.4 | 63.7 | 79.50 | 459.4 |
| 1987 | 88,335 | 9,774 | 98,109 | 79.8 | 56.5 | 77.43 | 448.3 |
| 1988 | 85,327 | 9,920 | 95,247 | 81.4 | 63.7 | 79.55 | 480.0 |
| 1989 | 99,060 | 13,294 | 112,354 | 96.6 | 80.9 | 94.74 | 517.6 |
| 1990 | 76,185 | 24,028 | 100,213 | 88.8 | 75.1 | 85.52 | 544.2 |
| 1991 | 86,498 | 24,431 | 110,929 | 91.0 | 77.3 | 87.98 | 738.7 |
| 1992 | 128,846 | 17,658 | 146,504 | 107.1 | 95.3 | 105.67 | 816.4 |
| 1993(E) | 108,267 | 15,230 | 123,497 | 149.8 | 132.7 | 147.66 | 849.0 |

Notes: Fertilizer Sales from 1987/88 exclude Eritrea
Fertilizer sales to Peasant sector only

**Table 3.7.2 ETHIOPIA: Regression Estimates of Fertilizer Nutrients (1980/81 to1992/93)**

Fertilizer and Transport Sector Assement, IFDC 1993

| EQUATION | | | | | | R Squared | Growth Rate |
|---|---|---|---|---|---|---|---|
| **A. Semi-log** | | | | | | | |
| Ln N | = | 8.532323 + | 0.15159T | | | 0.798 | 15.16 |
| | | (0.309737) | (0.022959) | | | | |
| Ln P2O5 | = | 9.373984 + | 0.12524T | | | 0.735 | 12.52 |
| | | (0.305609) | (0.022653) | | | | |
| Ln (N+P2O5) | = | 9.729083 + | 0.134371T | | | 0.766 | 13.43 |
| | | (0.302322) | (0.02241) | | | | |
| **B. Log** | | | | | | | |
| Ln N | = | 8.491073 + | 0.108317(Pi/Po) | + 0.155016T | | 0.799 | 15.50 |
| | | (0.324361) | (0.620505) | (0.031034) | | | |
| Ln P2O5 | = | 9.013992 + | 0.512652(Pi/Po) | + 0.148696T | | 0.753 | 14.87 |
| | | (0.309753) | (0.609408) | (0.03612) | | | |
| Ln (N+P2O5) | = | 9.572759 + | 0.427287(Pi/Po) | + 0.152944T | | 0.766 | 15.30 |
| | | (0.302322) | (0.611433) | (0.035115) | | | |

Notes: Ln = Natural logarithm

Figures in parenthesis are standard errors

Standard errors of price coefficients in log functions are too high for the price variable to be significant

## Table 3.7.3 ETHIOPIA: Fertilizer Consumption Projection by Exponential Equation

Fertilizer and Transport Assessment, IFDC 1993

| YEAR | NITROGEN | PHOSPHATE | N+P2O5 |
|---|---|---|---|
| 1993/94 | 42,386 | 68,006 | 110,225 |
| 1994/95 | 49,324 | 77,079 | 126,077 |
| 1995/96 | 57,398 | 87,363 | 144,209 |
| 1996/97 | 66,793 | 99,019 | 164,949 |
| 1997/98 | 77,726 | 112,230 | 188,671 |
| 1998/99 | 90,448 | 127,204 | 215,805 |
| 1999/200 | 105,253 | 144,175 | 246,842 |
| 2000/01 | 122,481 | 163,411 | 282,342 |
| 2001/02 | 142,529 | 18[illegible].213 | 322,947 |
| 2002/03 | 165,859 | 209,925 | 369,393 |

| YEAR | UREA | DAP | TOTAL |
|---|---|---|---|
| 1993/94 | 34,295 | 147,838 | 182,133 |
| 1994/95 | 41,659 | 167,563 | 209,222 |
| 1995/96 | 50,462 | 189,919 | 240,381 |
| 1996/97 | 60,971 | 215,258 | 276,229 |
| 1997/98 | 73,500 | 243,978 | 317,477 |
| 1998/99 | 88,419 | 276,530 | 364,949 |
| 1999/200 | 106,167 | 313,424 | 419,591 |
| 2000/01 | 127,256 | 355,241 | 482,497 |
| 2001/02 | 152,292 | 402,638 | 554,930 |
| 2002/03 | 181,988 | 456,358 | 638,346 |

Calculated from Table 3.7.2

**Table 3.7.4 ETHIOPIA: Fertilizer Consumption Projection by Growth Rate of Log Equation Including Intercept and Price Terms**

Fertilizer and Transport Assessment, IFDC 1993

| YEAR | NITROGEN | PHOSPHATE | N+P2O5 |
|---|---|---|---|
| 1993/94 | 43,809 | 79,873 | 125,141 |
| 1994/95 | 51,154 | 92,679 | 145,822 |
| 1995/96 | 59,732 | 107,537 | 169,921 |
| 1996/97 | 69,747 | 124,777 | 198,002 |
| 1997/98 | 81,442 | 144,782 | 230,723 |
| 1998/99 | 95,098 | 167,993 | 268,853 |
| 1999/200 | 111,044 | 194,926 | 313,283 |
| 2000/01 | 129,663 | 226,176 | 365,056 |
| 2001/02 | 151,405 | 262,437 | 425,385 |
| 2002/03 | 176,792 | 304,511 | 495,684 |

| YEAR | UREA | DAP | TOTAL |
|---|---|---|---|
| 1993/94 | 27,291 | 173,638 | 200,929 |
| 1994/95 | 32,367 | 201,475 | 233,842 |
| 1995/96 | 38,374 | 233,776 | 272,150 |
| 1996/97 | 45,481 | 271,255 | 316,736 |
| 1997/98 | 53,888 | 314,742 | 368,631 |
| 1998/99 | 63,830 | 365,202 | 429,032 |
| 1999/200 | 75,584 | 423,751 | 499,335 |
| 2000/01 | 89,478 | 491,687 | 581,165 |
| 2001/02 | 105,896 | 570,515 | 676,411 |
| 2002/03 | 125,295 | 661,980 | 787,275 |

Calculated from Table 3.7.2

**Table 3.7.5 ETHIOPIA: Fertilizer Consumption Projection by Growth Rate of Log Equation Excluding Intercept and Price Terms**

Fertilizer and Transport Assessment, IFDC 1993

| YEAR | NITROGEN | PHOSPHATE | N+P2O5 |
|---|---|---|---|
| 1993/94 | 30,601 | 57,523 | 87,966 |
| 1994/95 | 35,344 | 66,077 | 101,420 |
| 1995/96 | 40,823 | 75,902 | 116,931 |
| 1996/97 | 47,152 | 87,188 | 134,815 |
| 1997/98 | 54,461 | 100,153 | 155,434 |
| 1998/99 | 62,903 | 115,045 | 179,207 |
| 1999/200 | 72,654 | 132,152 | 206,616 |
| 2000/01 | 83,917 | 151,802 | 238,216 |
| 2001/02 | 96,925 | 174,374 | 274,650 |
| 2002/03 | 111,950 | 200,303 | 316,656 |

| YEAR | UREA | DAP | TOTAL |
|---|---|---|---|
| 1993/94 | 17,591 | 125,050 | 142,641 |
| 1994/95 | 20,627 | 143,645 | 164,272 |
| 1995/96 | 24,180 | 165,004 | 189,184 |
| 1996/97 | 28,336 | 189,539 | 217,875 |
| 1997/98 | 33,197 | 217,723 | 250,920 |
| 1998/99 | 38,882 | 250,098 | 288,980 |
| 1999/200 | 45,528 | 287,286 | 332,814 |
| 2000/01 | 53,296 | 330,005 | 383,300 |
| 2001/02 | 62,374 | 379,075 | 441,448 |
| 2002/03 | 72,980 | 435,442 | 508,422 |

Calculated from Table 3.7.2

**Figure 3.1.1.ETHIOPIA: Total Fertilizer Sales 1987/88 - 1992/93 (excl. Eritrea)**

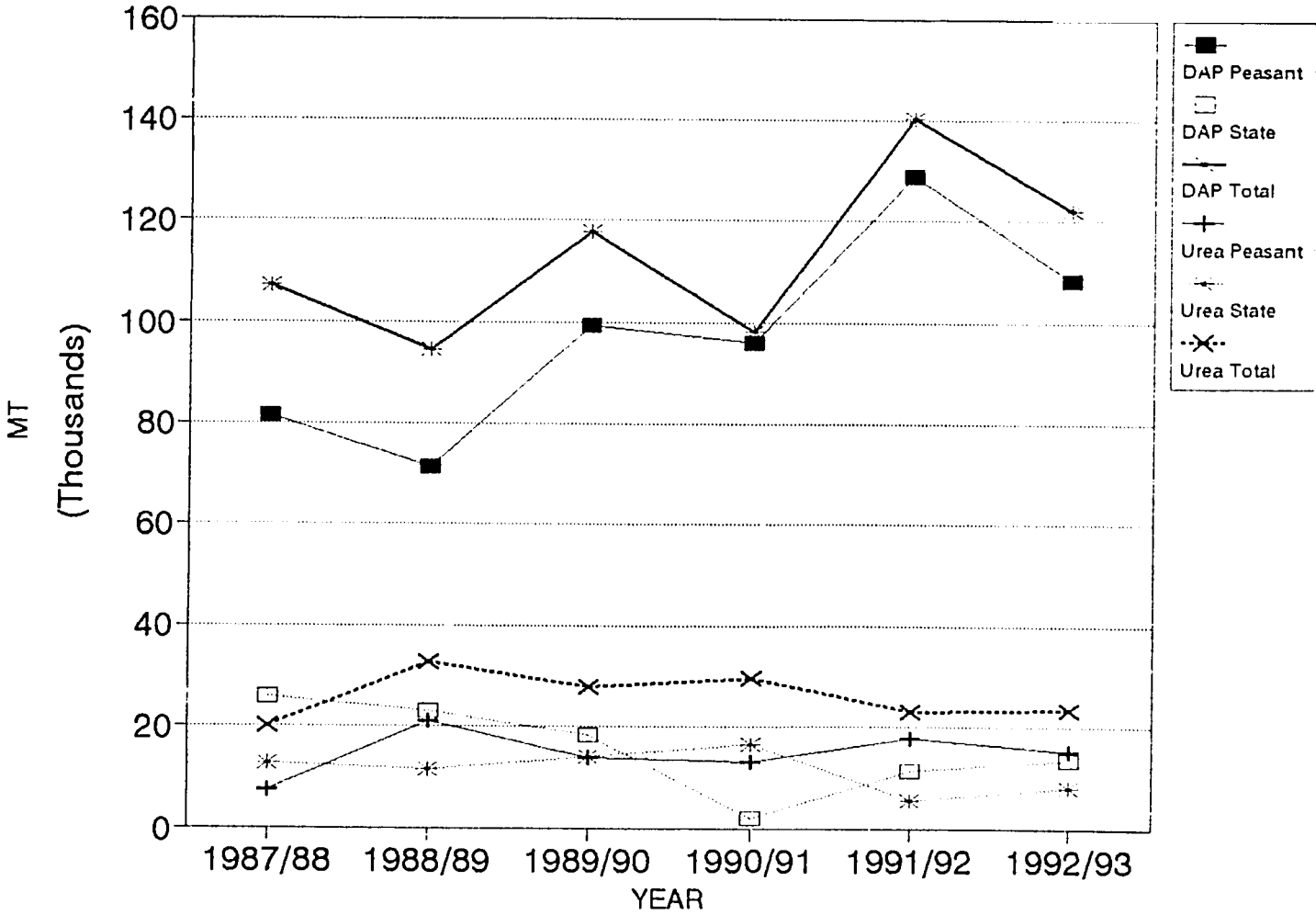

**Fig 3.1.2 ETHIOPIA:UREA Sales by Sector 1987/88 to 1992/93, (excludes Eritrea)**

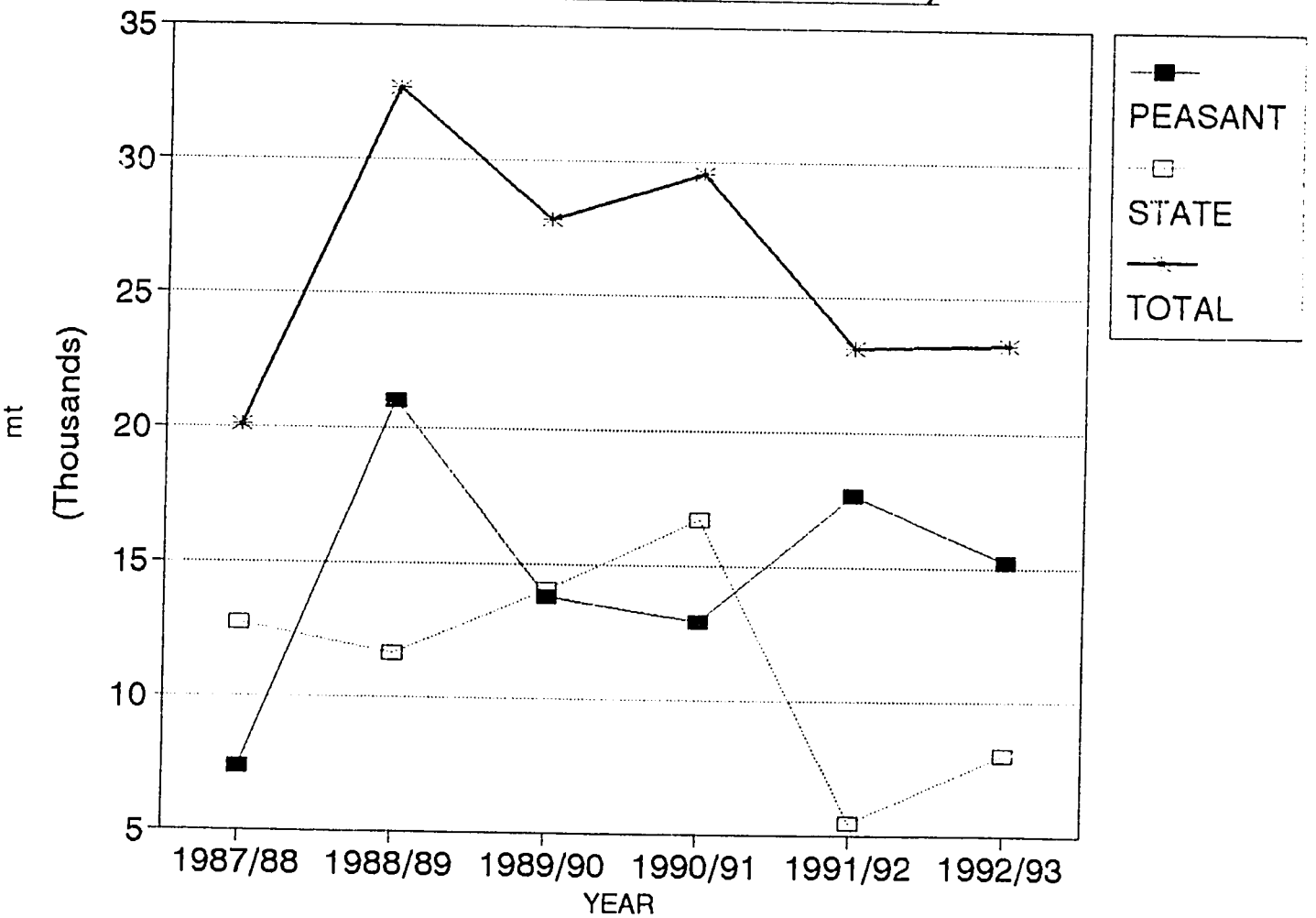

**Fig 3.1.3.ETHIOPIA: DAP Sales by Sector 1987/88 to 1992/93, (excludes Eritrea)**

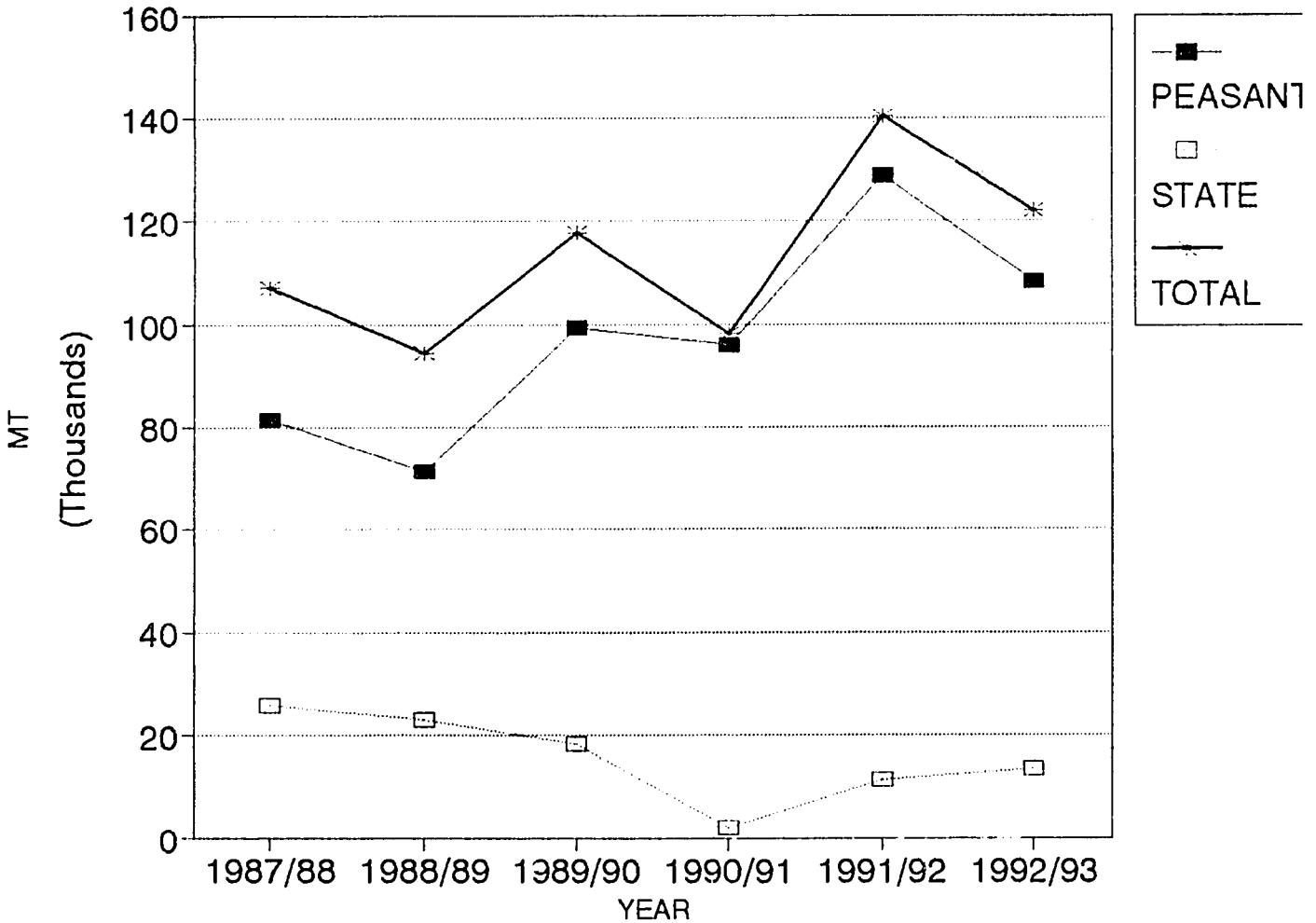

**Fig 3.1.4 ETHIOPIA:UREA Sales by Major Region in Peasant Sector(excl. Eritrea)**

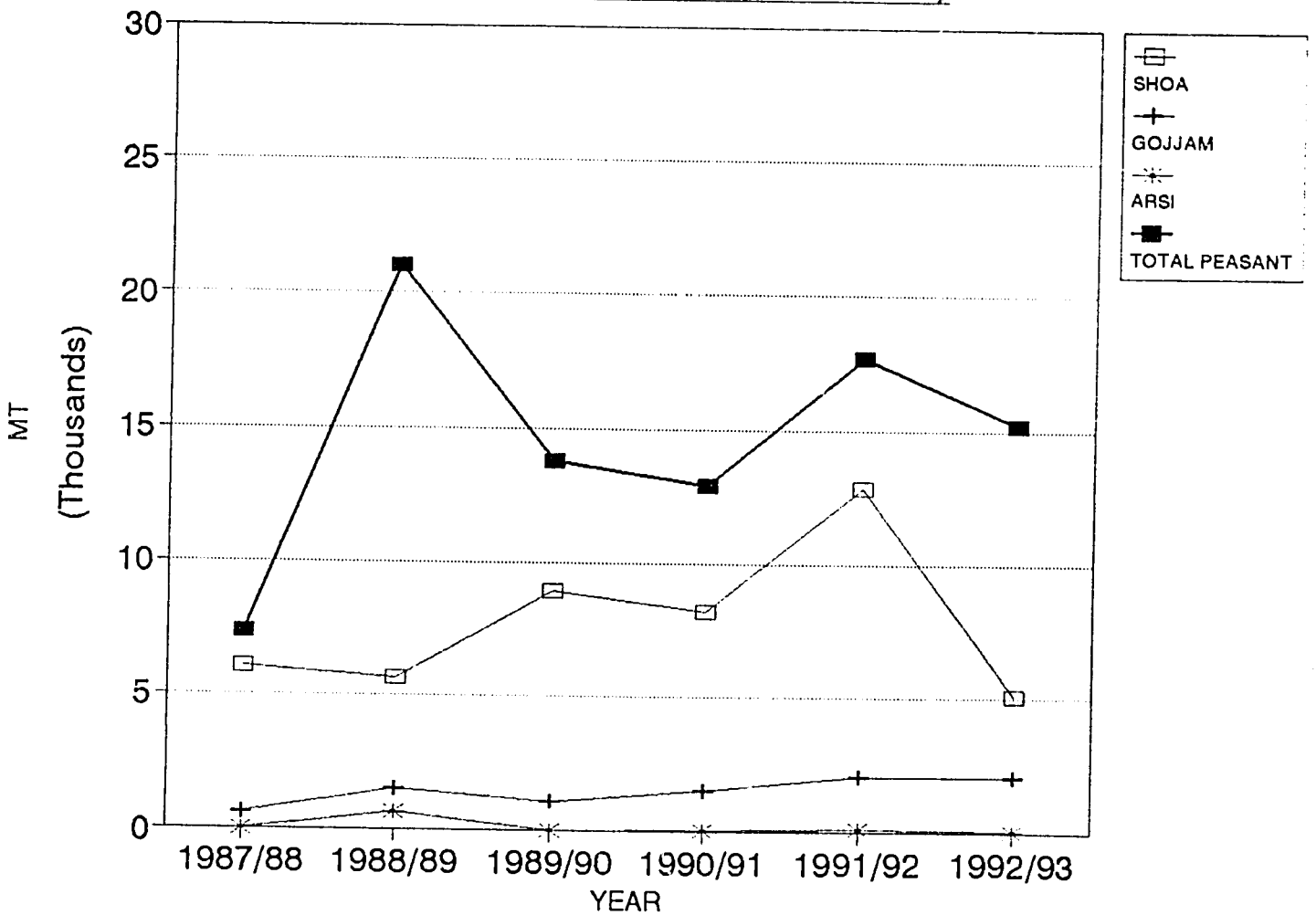

**Fig 3.1.5.ETHIOPIA: DAP Sales by Major Region in Peasant Sector(excl. Eritrea)**

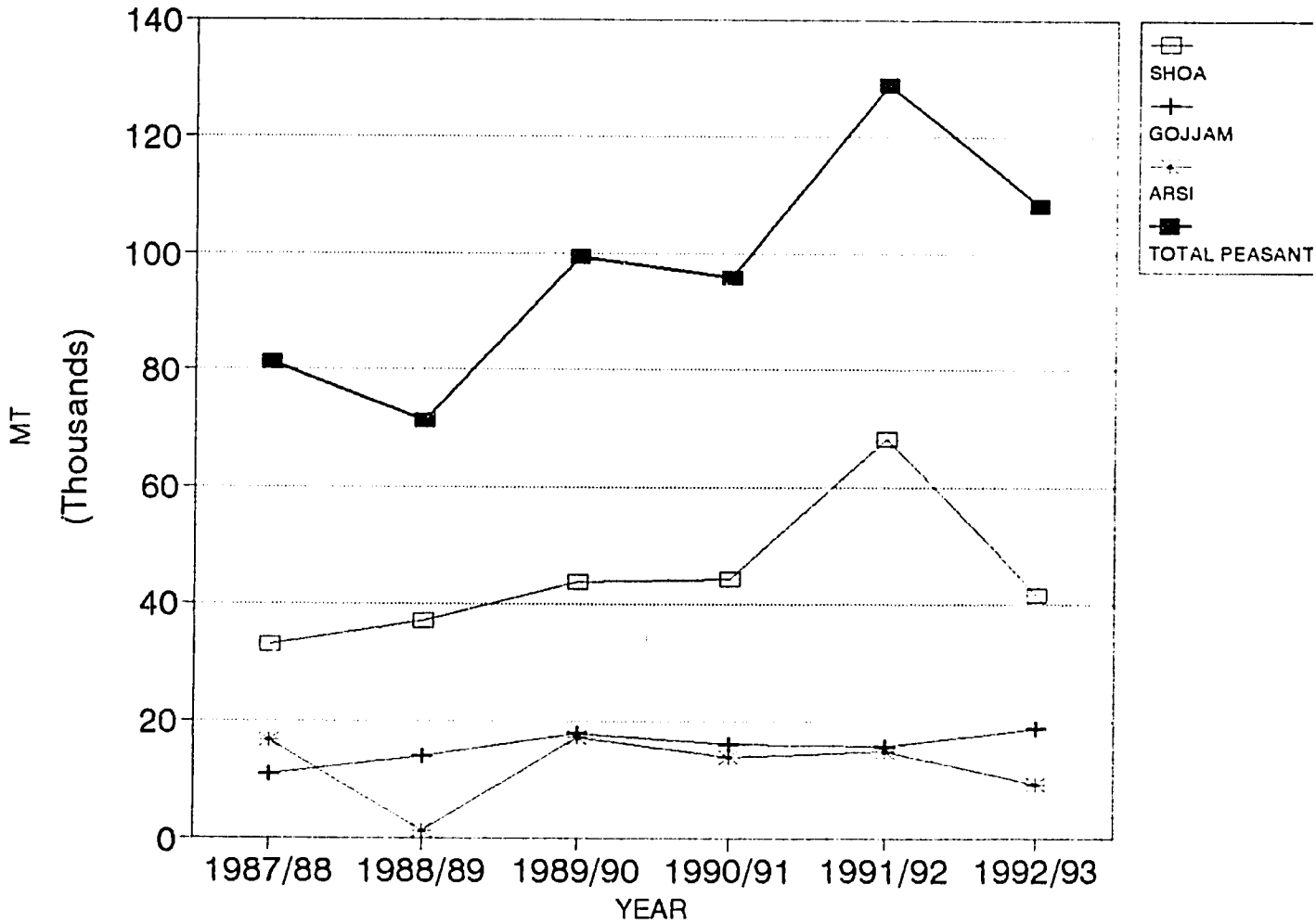

**Fig3.1.6 ETHIOPIA:Nutrient Use by Major Region in Peasant Sector(excl. Eritrea)**

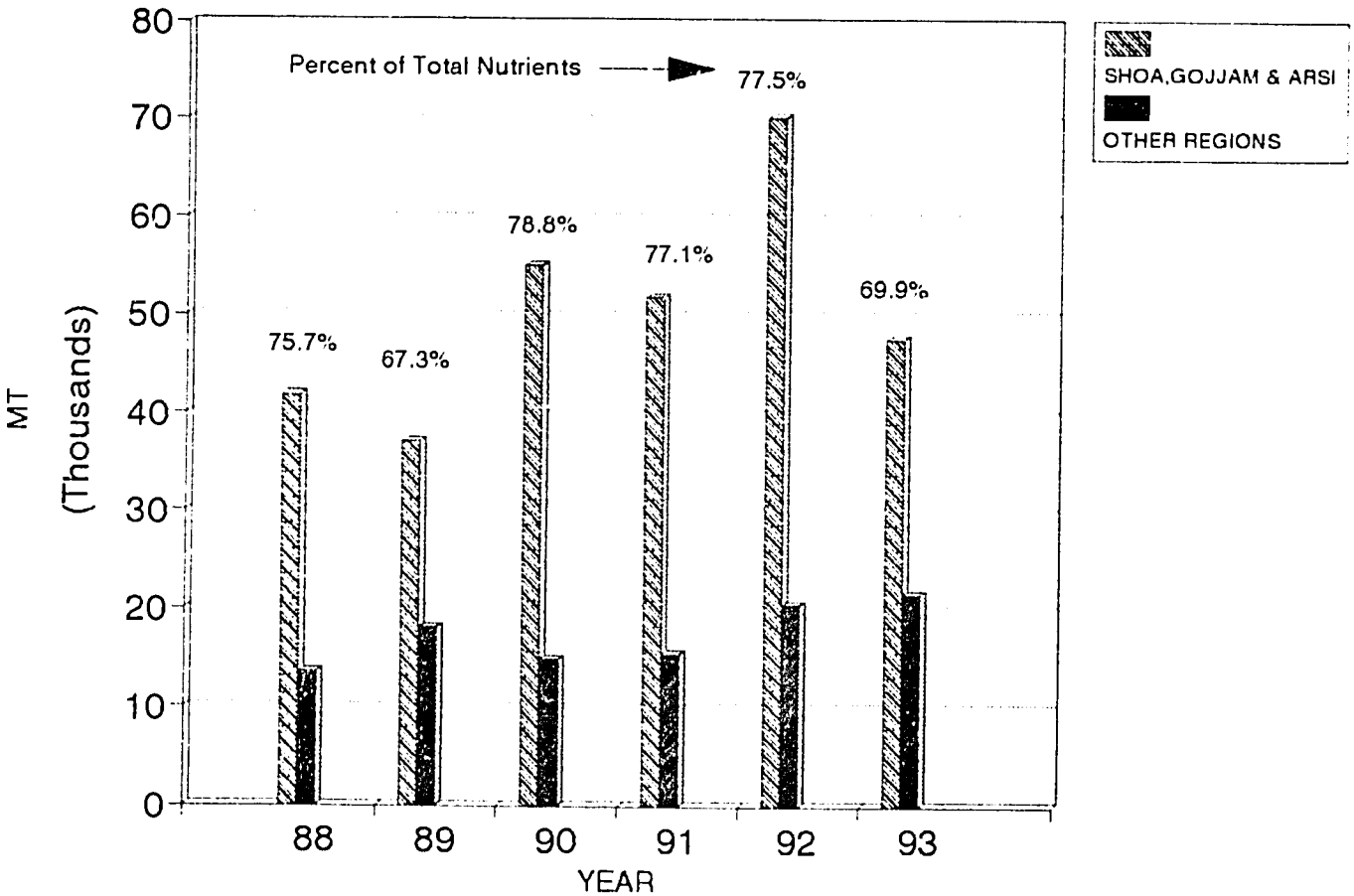

**Figure 3.7.1 ETHIOPIA:Fertilizer Demand Projections for Peasant Sector**

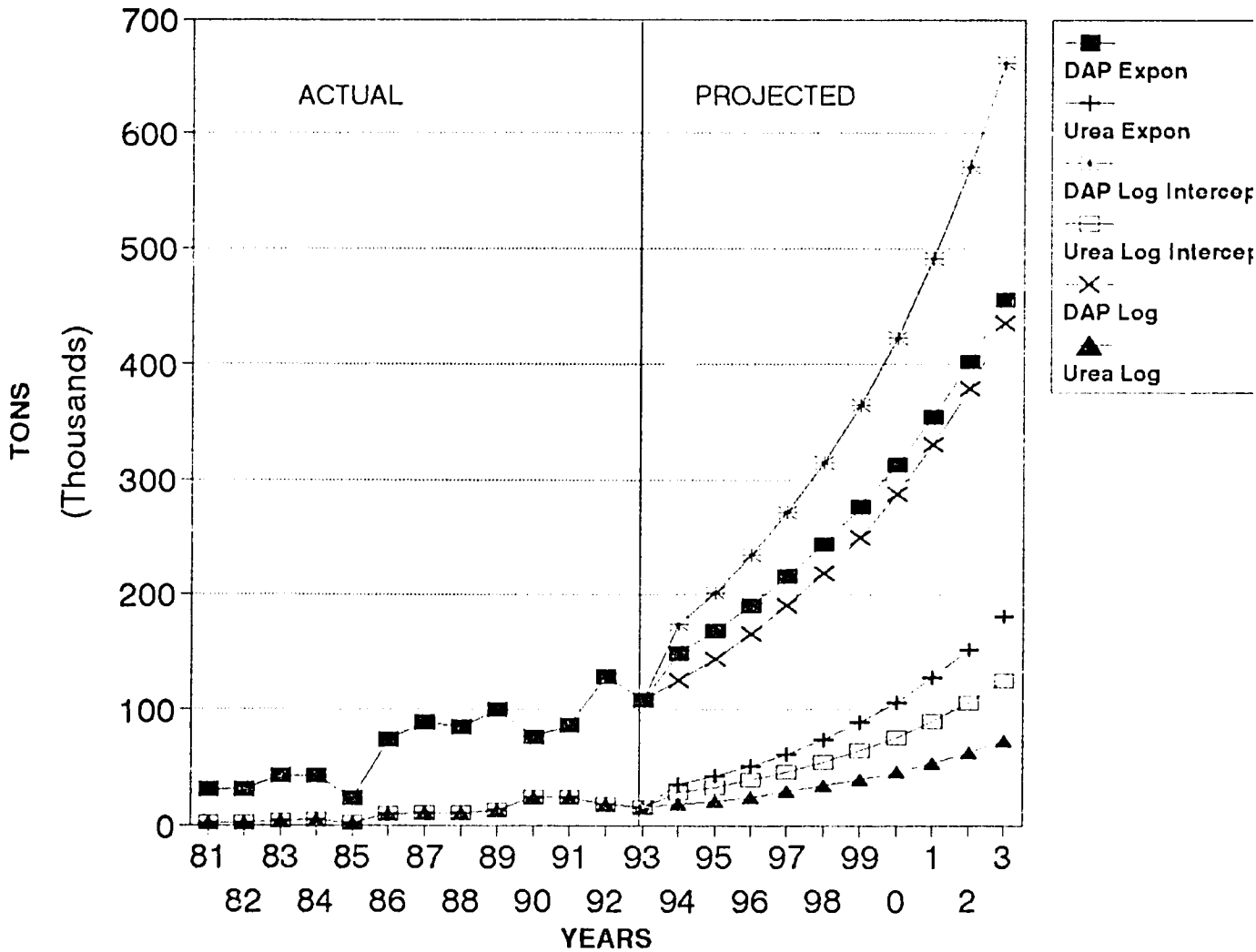

**Figure 3.7.2 ETHIOPIA: Projected DAP Sales and Stocks, 1993-94**

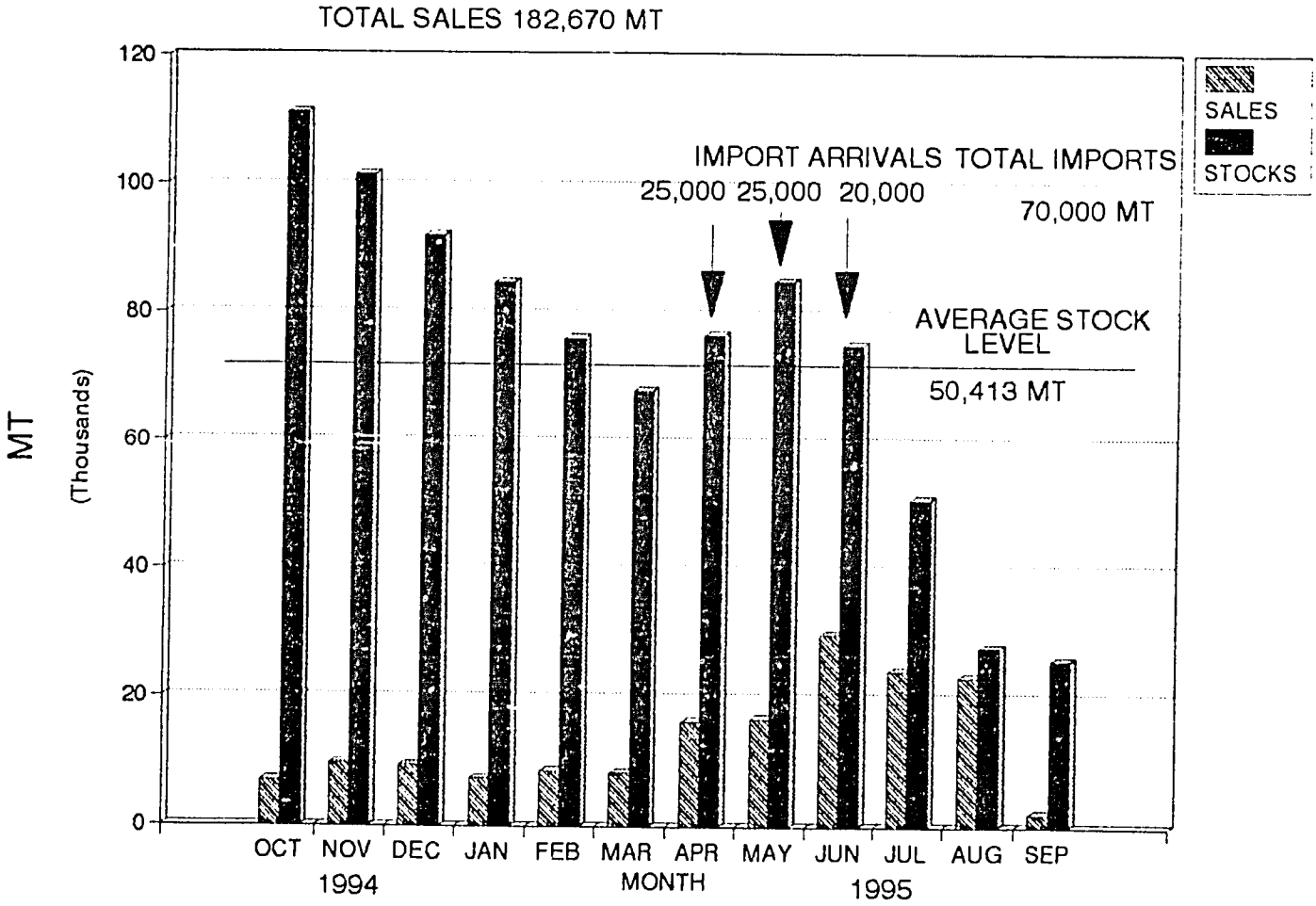

**Figure 3.7.3 ETHIOPIA: Projected UREA Sales and Stocks, 1993-94**

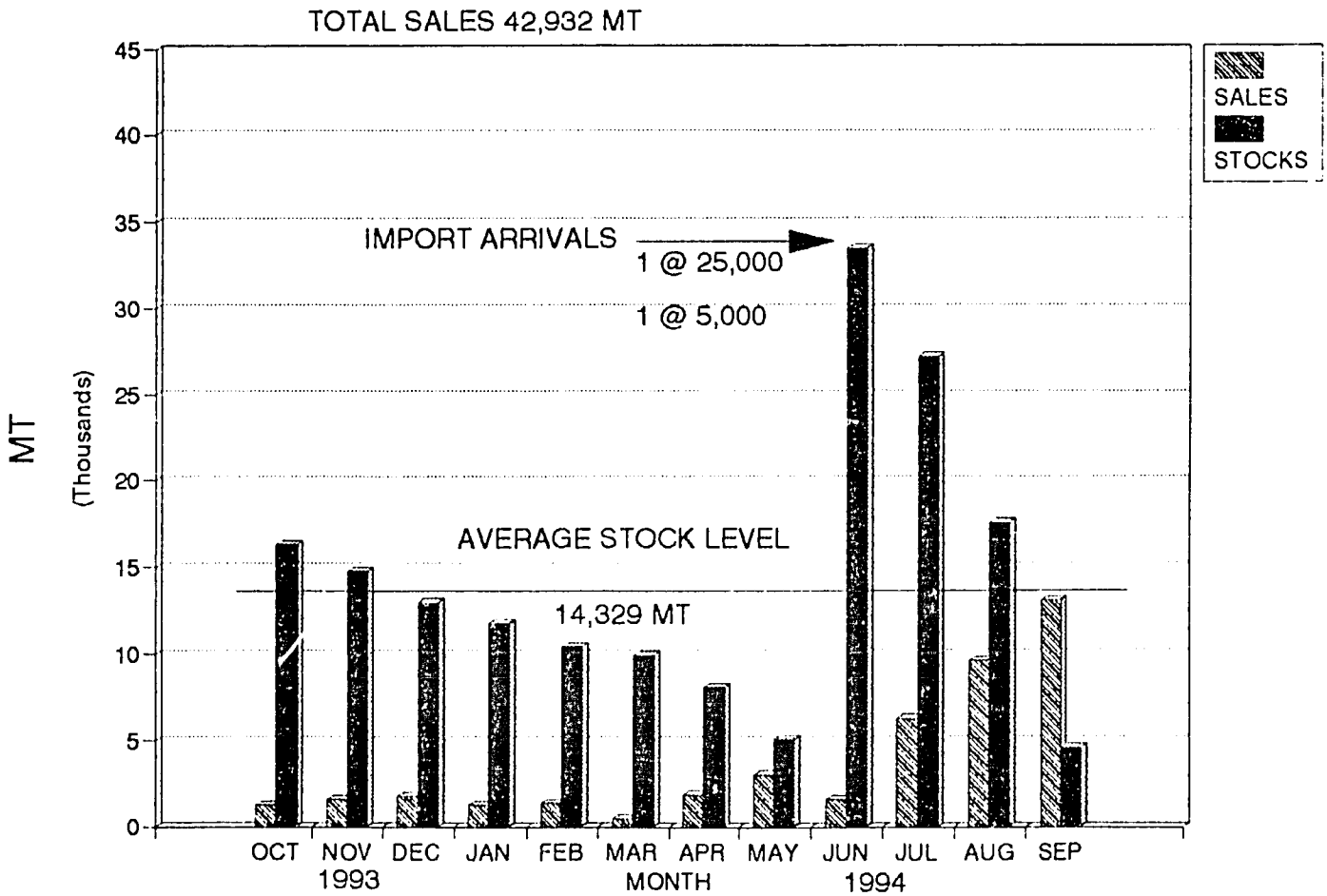

**Figure 3.7.4 ETHIOPIA: Projected DAP Sales and Stocks, 1994-95**

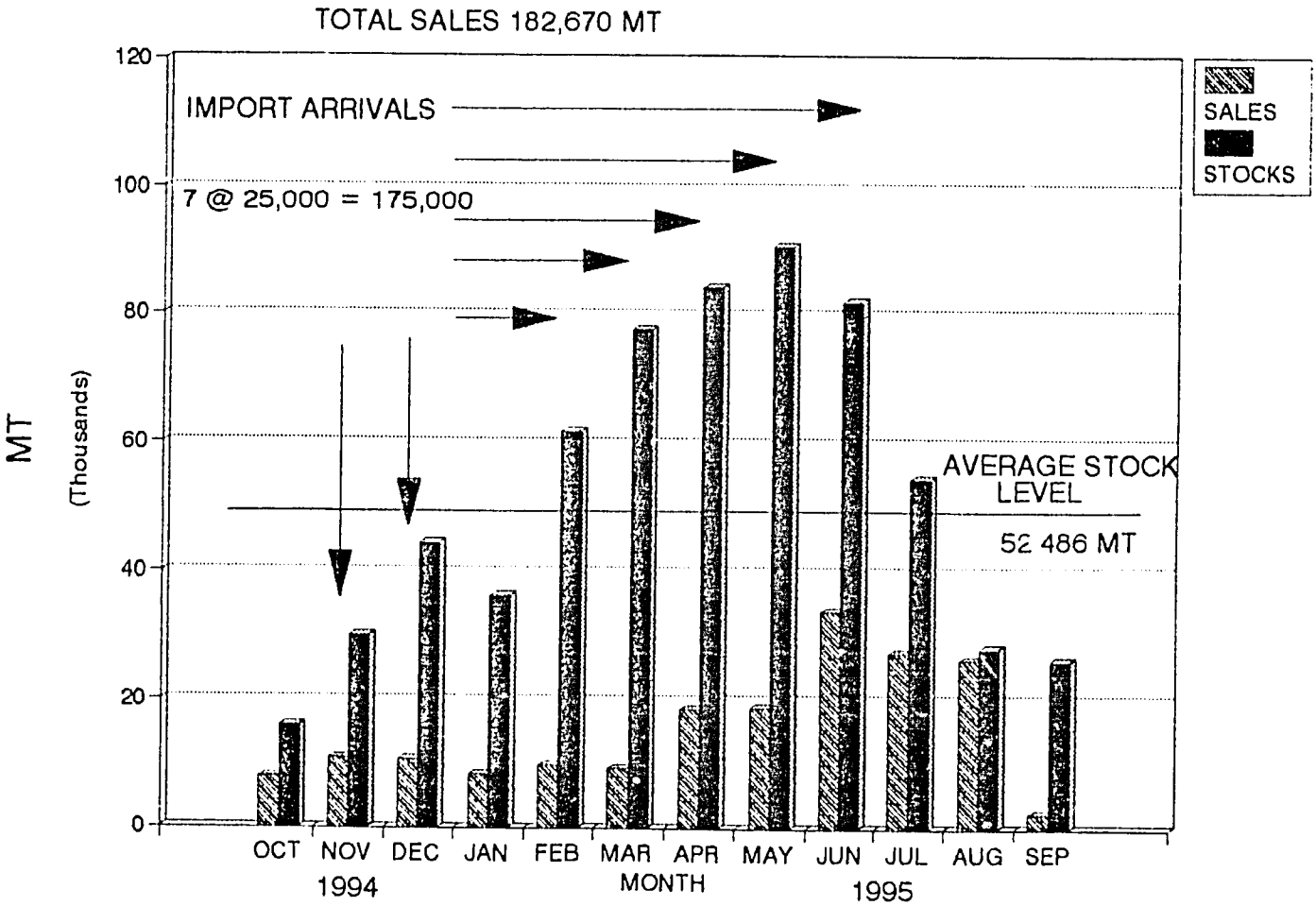


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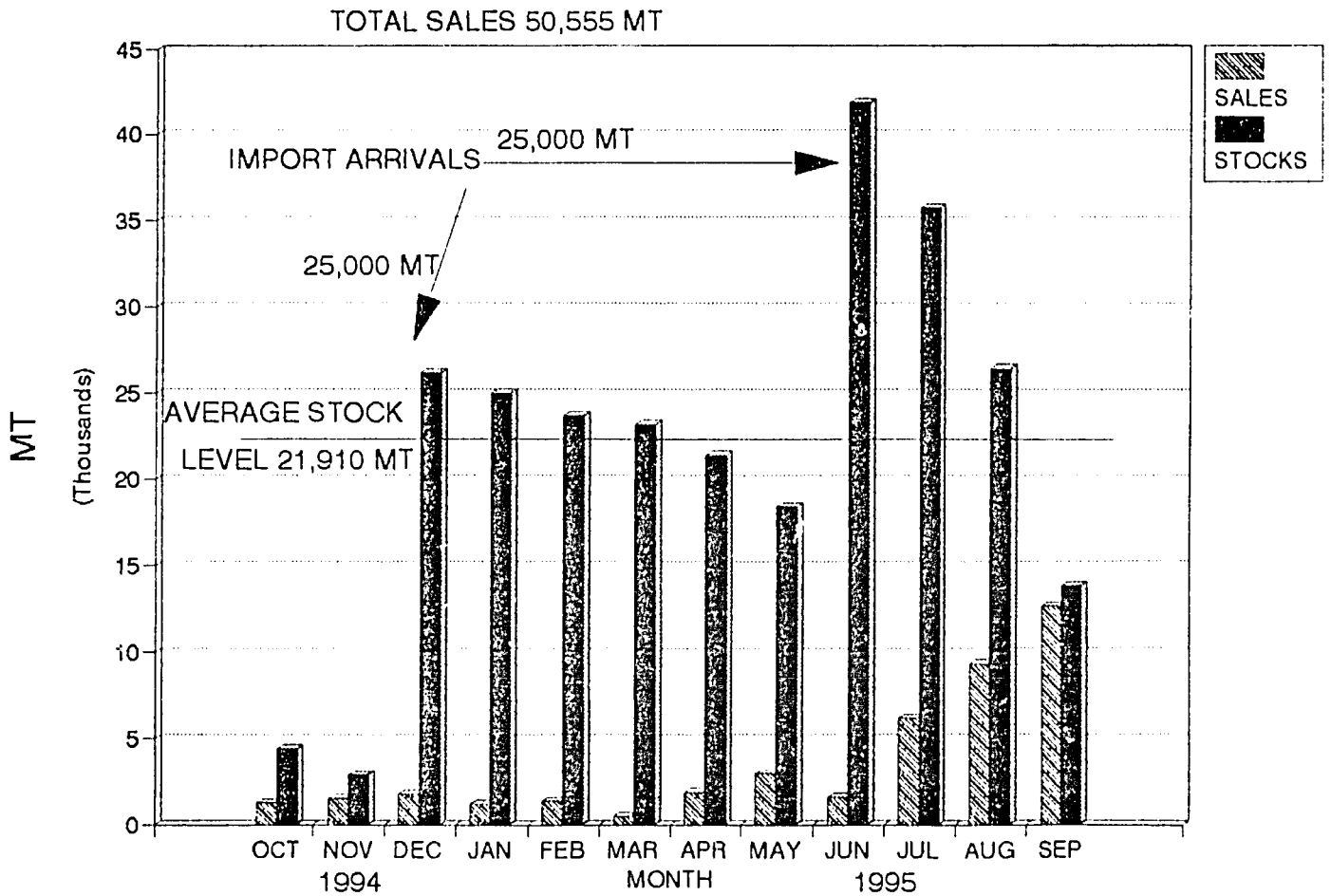
**Figure 3.7.5 ETHIOPIA: Projected UREA Sales and Stocks, 1994-95**



# 4. Fertilizer Procurement

## 4.1 Process Efficiency–AISCO

AISCO issues Invitation for Bids (IFB) for DAP and urea, as agreed by the various donors and with the knowledge of the Donor Committee. The IFBs are of a fairly standard format but require revision, particularly to specify delivery conditions and to improve product and package specifications. Recommendations have been made to AISCO[3] in this respect. AISCO evaluates the bids received and makes recommendations for acceptance to the TGE and the donors.

A discharge and bagging rate of around 1,000 mtpd using two bagging machines appears to be generally accepted. This is a very low average rate for this type of operation. When sufficient trucks have been available discharge rates up to 1,700 tpd have been achieved. It is recommended that a target rate of 2,500 mtpd be adopted, with a minimum of 2,000 mtpd. This should enable some US $5/mt to be negotiated off freight rates and, more importantly, will reduce fertilizer berth occupancy at Assab by around one-half. The rate of 2,500 mtpd can readily be achieved using four bagging machines, with an expectation of 900 mtpd (three shifts) per machine, a rate which is routinely achieved or exceeded in other ports. It will be apparent that the bottleneck in discharging is not in the port operations but in truck availability. It should be noted that AISCO incurred very high port storage costs in 1991/92 (quay rent) as a result of having insufficient trucks for dispatch. As a result of this the Bure buffer dump was established for 1992/93 just inside the Ethiopian border. Until such time as sufficient long-haul trucks are available for timely unloading, namely 100 trucks per day for 12-14 days, a shuttle service to the buffer depot at Bure or to temporary storage just outside the port area should be used to overcome the transport constraint.

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[3]Letter from IFDC Study Team to Ato Yainshet Tekolla, GM, AISCO, September 9, 1993. "AISCO IFBs. Fertilizer Technical and Packaging Specifications."

AISCO should produce a detailed report for each ship, giving costs and operating and performance data, including losses.

**4.2 Process Efficiency and Monitoring–Donors**

Currently all foreign exchange for fertilizer imports is provided by donors including USAID, the European Union, The African Development Bank, the Government of Italy, and the Government of the Netherlands. A small quantity is also financed by the Government of Japan for rehabilitation of ex-soldiers and is not considered as part of the supply to the peasant sector. The World Bank is actively considering a loan to provide a 5-year program for the importation of additional quantities of fertilizer. All donors require that counterpart funds equivalent to the foreign exchange donation be deposited by the importing party with the National Bank of Ethiopia. A joint counterpart fund agreement involving all donors except USAID was signed with the TGE in 1993.

Ethiopia is overwhelmingly dependent on foreign aid for fertilizer imports and in recent years has depended entirely on this source. There is general agreement that this situation will have to continue although the European Union (formerly European Community) wishes to see the TGE provide between 5% and 10% of the foreign exchange needed for fertilizer imports. Under the inherently restrictive nature of aid financing fertilizer import is a complex process. Procurement rules such as International Competitive Bids (ICB) require detailed planning and preparation of tenders, substantial intervals between invitation and opening of tenders and time-consuming bid evaluations. Stepwise approval, usually by both the local and donor governments, adds further delay. Lead times between decisions to procure and fertilizer delivery can be several months. Direct price negotiations can drastically reduce the lead time and the importer's expenses in reaching an agreement with a supplier. Excessive interval between quotation and award and uncertainties about shipping dates caused by rigid procurement rules increase a supplier's commercial risk in price and foreign exchange fluctuations, can cause excessive inventory buildup and/or loss of alternative sales, and enhance exposure to penalties and force majeure conditions. There is an additional cost for bid bonds and performance guarantees. Generally suppliers must raise their prices to cover these extra costs and risks. While freely

negotiated pricing is standard practice in international private sector fertilizer procurement, it cannot be easily practiced by government organizations under aid financing. However, the USAID foreign exchange grant provided under the DCM program to both AISCO and EAL in 1993 illustrates how donor funding and direct negotiation can be applied with beneficial results. Source restrictions attached to some donor funds also result in bids higher than international market prices.

AISCO has a continuing record of late compliance with the requirements for depositing counterpart funds. This has been especially so in years of large inventory carryover such as 1993. In part, this is due to the undercapitalization of AISCO but it also reflects a degree of preferential treatment of the agency by the National Bank and the Commercial Bank of Ethiopia in providing financial services.

The Donor Committee now meets monthly under the chairmanship of the FAO and has recently been expanded to include a representative of MOA in addition to AISCO. AISCO supplies information on procurement, dispatches to marketing centers, sales, stocks, and price buildup, as well as information on development of the New Marketing System. The data are summarized and issued by FAO as an information paper following each meeting.

These meetings are valuable and ensure a continuous monitoring of the fertilizer situation for the donors. It is recognized that some of the AISCO data may not be accurate, e.g., data from MOA stores and the presentation of data by AISCO are confusing. No attempt is made, for example, to compare sales or dispatches with the previous year; comparisons are only made between actuals and plans and sales plans are confused with supply availability. Comparisons with previous year actual data for stocks and dispatches (sales) by month and year to date would provide fixed reference points for comparison which, combined with comparisons to the current plans, would greatly assist in providing a comprehensive assessment of progress to date for the Committee.

### 4.3 Specifications and Standards

Previous reference was made (Section 4.1) to the need for improved IFBs. It is recommended that the USAID Fertilizer Specifications (dated January 27, 1989) be adopted as the common basis for tendering. However, the USAID specifications themselves require revision and updating. The current specifications recognize only woven polypropylene (WPP) bags with loose polyethylene (PE) liners and valve-type bags. The almost universal export bag is WPP with a loose PE liner sewn in at top and bottom. The valved bag is not considered suitable for most developing countries or for manual handling systems. Methods of closure also need improvement.

The "Ethiopian" bag, as specified by AISCO has an unusually thick liner of 175 microns (7 mil), compared to 100 microns (4 mil) for the USAID specification (which is already quite generous), and a fairly common liner thickness of 50 microns (2 mil) in normal commercial practice. This nonstandard specification makes the Ethiopian bag more expensive and more difficult to procure. Recommendations have been made to AISCO and the Ethiopian Authority for Standards (EAS) (Section 4.1), and the recommendations have also been discussed directly by IFDC with the USAID procurement division in Washington, DC.

The possibility of using a 25-kg bag for urea should be considered to promote urea use. A 50-kg bag of DAP plus a 25-kg bag of urea will supply 21.5 kg N and 23 kg $P_2O_5$, almost the correct nutrient ratio for cereal crops and more convenient for small crop areas. This would normally increase packaging costs per ton. To reduce bag costs for urea, use of a woven polyethylene bag with a laminated polyethylene liner is suggested. This bag, developed in India (in the 50-kg size), is of lower cost and is popular with farmers. The top of this bag definitely requires turning over, before sewing, to ensure a more moisture-resistant closure. This is a practice that is recommended for all sewn closure fertilizer bags.

### 4.4 Timing, Scheduling, and Costs

Scheduling of imports is very important and requires: (1) a realistic forecast of demand, (2) accurate information on stock levels, and (3) a realization that stock variation

is not an uncontrollable or unpredictable event. It is the result of a simple arithmetical relationship between sales offtake and supply.

The first two of these requirements are addressed separately in this study, under development of the monitoring unit. The third is explained in Appendix 1, "Ethiopia Stock Control Strategy."

Once the calculation basis and the stock control curves are established, stock control must be recognized and carried out as a continuous, year-round process. It is not a once per year, seasonal operation.

Accepting constraint on discharge of a maximum of two boats of 25,000 mt/month at Assab, it is demonstrated that stocks rise progressively (and substantially) before the main consumption season and then decline to the pre-determined carryover level at the end of the main season. It will then be appreciated that the carryover stock level is only of significance at this one point, i.e., at the end of the main season. Definition of stock levels during the cycle is superfluous.

As demonstrated in Appendix 1, a 10% end-of-season carryover is adequate in Ethiopia. A 30% carryover is considered excessive. At a future demand level of 300,000 mtpy supplied from imports in 12 x 25,000-mt cargoes, on the most effective "just in time" import program, there would be an import season from January to July, with one boat in January, one in February, and two per month thereafter. If planned on an "import season" basis this should allow for better bagging and transport costs to be negotiated.

The inventory carrying cost (for interest charges only at 14%) at the average stock level over the year for the "just in time" program calculated in Appendix 1 is EBr 53/mt on total sales. If the import program is brought forward by 1 month, this cost increases to EBr 75/mt. The effect of increasing the stock carryover is shown below in Table 4.

Table 4. **Inventory Carrying Cost for Different Import Scenarios**

300,000 mtpy

| Import Option | 10% Carryover | | 30% Carryover | |
|---|---|---|---|---|
| | Inventory Carrying Cost Per mt | | Inventory Carrying Cost Per mt | |
| | EBr | US $ | EBr | US $ |
| "Just in Time" | 53.00 | 10.60 | 107.00 | 21.40 |
| 1 Month Earlier | 75.00 | 15.00 | 129.00 | 25.80 |
| 2 Months Earlier | 98.00 | 19.60 | 152.00 | 30.40 |

Planning may be as the basis of Case 1. With continuous monitoring, departures from plan should be seen well in advance.

### 4.5 Port Operations and Costs

Import of fertilizer in bulk and destination bagging is now established as a lower cost method, with benefits in foreign exchange (FX) savings being greater than the overall savings. This is because the principal FX savings are made by avoiding the high cost of bagging and stevedoring in the developed countries.

Destination bagging was pioneered in Assab in the 1970s and commenced again in 1993. The currently accepted bagging rate is 1,000 mtpd, and as discussed earlier, this is definitely too low. An immediate move should be made to 2,000 mtpd for charter purposes, with a target rate of 2,500 tpd. This will reduce freight costs and reduce fertilizer occupancy time of the main deep water berth at Assab. A second berth (No. 11) can take 20,000 tonners and other berths are available for 10-15,000 tonners.

Port charges and handling costs are high in the (now) Eritrean port of Assab, largely because of the parastatal agencies ERSTAS and MTSC. Some charges for recent imports are shown in Table 4.5.1. A more complete cost breakdown is not available, but some charges appear higher than the published tariffs and others are said to be made whether

services are provided or not. The PMU Port and Shipping Adviser is currently studying relative charges in other African ports. This investigation and the rationale for the high port charges should be vigorously pursued. A reduction of $10/mt in this area would help Ethiopian farmers.

Expediting the licensing of private transit and forwarding agencies by the TGE and negotiating with the Eritrean authorities for these to operate in Assab port is vital to more efficient operation of the system and lower costs.

The current complete reliance on the port of Assab for fertilizer imports needs to be addressed by the TGE not only because there is currently little flexibility in negotiating with the Eritrean Government on port charges but also because other ports may offer lower total cost alternatives for fertilizer supply into some market areas.

Although there are currently organizational and political problems in moving fertilizer by road from Djibouti, it is recommended that negotiations with Djibouti should be held to allow a trial shipment through this port to establish the feasibility and costs of the method and to demonstrate an alternative to Assab.

Investigation of the road conditions from Berbera, in northern Somalia, to Dire Dawa should also be made (subject to peaceful conditions in Somalia) as a second alternative to supply this area. Berbera port has apparently been improved and is approximately only 100 km further from Addis Ababa than Assab.

With increased offloading rates at Assab, the port operation is not seen as a constraint, except for 25,000-ton ship arrivals, which should be limited to two per month due to the single berth limitation. Even with improved coordination of fertilizer and grain ship arrivals some berth delays will still be inevitable. Fertilizer discharge planning from 25,000-ton carriers should incorporate the need to move to Berth 11 after partial discharge in order to release Berth 1. This will incur between one-half and one day delay in discharge and some additional port charges. Fertilizer sourced from the Near East or southern Europe may be

more economical in smaller shipments than 25,000 mt when the potential berth delays, truck availability, and inventory holding costs are considered. The constraint is thrown back upon the supply of trucks. By operating a shuttle service to Bure or a temporary storage site in Assab, AISCO should be able to meet the required ship offloading rates.

A temporary buffer dump just outside the port area would normally be considered as the most cost effective way of overcoming constraints of truck availability for continuous discharge. However, this creates time constraints for long-haul trucks associated with border crossings, entry to Assab town and Assab port, and the very poor road conditions between Assab and Bure. Use of the buffer depot at Bure would then improve turnaround times for these trucks on the Addis route. It is estimated that the additional costs of transporting all fertilizer to the Bure buffer dump and operating the dump would be offset by savings in ocean freights resulting from higher offloading rates and savings in transport for the long-haul trucks. The net additional cost is estimated at around EBr 9/mt (Table 4.5.2).

**4.6 Implications for Future AISCO Procurement Operations**

1. The terms and technical specifications in the IFBs should be updated.
2. Offloading rates at Assab should be increased immediately from 1,000 mtpd to a minimum of 2,000 mtpd to reduce marine freight costs.
3. The Bure buffer depot should continue in use, with further development, to facilitate higher offloading rates using a truck shuttle service.
4. The Donor Committee should invite a representative of the private sector to participate in meetings and should better specify and receive from AISCO improved monitoring data.
5. AISCO should prepare a detailed technical and cost report for each ship unloaded.
6. A continuous national stock control procedure on a predictive basis should be introduced to improve scheduling and reduce inventory costs.
7. Port charges levied at Assab by ERSTAS and MTSC should be scrutinized in detail by PMU.
8. Private freight forwarding agents should be licensed by TGE as soon as possible and negotiations made with Eritrean authorities to allow their operation in Assab.

9. Efforts should be made by the TGE to facilitate a trial import of fertilizer through Djibouti to establish a competitive route.
10. The practicality of importing through Berbera to Dire Dawa should be investigated.

**4.7 Private Sector Procurement**

The feasibility of private sector procurement was demonstrated by Ethiopia Amalgamated Ltd. (EAL) during this year when the company imported 24,657 mt DAP under USAID FX funding at a c.i.f. cost of EBr 101.39/qtl, 5% below AISCO's average cost. A number of contractual, technical, port cost, and financial problems were encountered and overcome, but, because of delayed arrival, approximately 13,000 mt will be carried over in stock until 1994. There is agreement between donors that fertilizer imports on a competitive basis by the private sector should be encouraged.

It appears to the consultant that it will be very difficult for other private importers to enter at the 25,000-mt level at this time, with the necessary counterpart funding and expertise. This view is supported by the Addis Ababa Chamber of Commerce. Although the TGE has created the regulatory environment for private sector fertilizer imports and 30 private sector companies are licensed to import, no other Ethiopian private sector trading companies have the ability to raise EBr 30 million or have any previous experience in fertilizer marketing or importing at this time. In addition, lack of knowledge of the entire complexity and risks in the importing procedures, panterritorial retail pricing, concern over AISCO's continued preferential treatment, and a lack of established distribution networks are all significant constraints for private sector entry. The uncertain nature of fertilizer consumption and the uncertainty and changing nature of the policy environment are implicit constraints to entry for potential importers. International fertilizer companies have expressed interest in importing on their own behalf but appear reluctant to do so until clear policies for the fertilizer sector are established. A secondary but very difficult problem is the difficulty of scheduling arrivals over a 6-month period at Assab if all imports are made available to the private sector. All importers will want the latest arrival slot, and the early arrivals may be penalized with significant inventory carrying cost. Conditionalities imposed on procurement by donors also need to be addressed. Under the current system, the

administered maximum retail price is based on procurement cost averaging by AISCO for the range of procurement costs imposed by the different conditionalities of donors. A mixed procurement system involving AISCO and the private sector may still require a system of price compensation, varying with arrival times, for the cost ex-Assab to provide equity in competition between the public and private sectors. Such an arrangement may stifle incentive for the private sector. Individual importers/distributors will also need access to both urea and DAP to fully provide for the market. With current annual use of urea less than 30,000 mt there is an implication that all potential distributors should have access to supplies of imported urea which may only be imported in cost-effective quantities by one or two importers.

### 4.8 Implications for the DCM Program

Now that the regulatory constraint to private sector importing has been removed and the entry of EAL into fertilizer procurement has provided the first step towards competitive procurement the process should be further developed with the objective of creating at least three and preferably four or five private sector importers. The overriding conditions required for this development are:

- Provision of a climate of equal opportunity and competition between importers.
- Efficient use of scarce foreign exchange.
- Removal of other constraints (pricing, credit, information) to further encourage private sector entry.

Fulfillment of the first condition will generally satisfy the second. The first need is to create, as practically as possible, conditions of equal opportunity between the public and private sectors. The second need is to establish an efficient means of foreign exchange utilization and the third need is to create conditions conducive to the emergence of other potential private sector importers by removing the remaining barriers to entry.

The entry of other private sector importers is unlikely to occur immediately. EAL's early entry is related to its significant business presence in Ethiopia, its previous fertilizer experience, management skills in international trading and high level of business acumen.

Experience in other countries has been that the development of domestic private sector marketing systems leads to the emergence of national and regional distributors that gain in confidence and experience until, assured of their ability to market fertilizer in a competitive market, they are prepared to enter the international procurement market. To achieve this development in Ethiopia it will be necessary to foster these potential importers firstly within the domestic market. Until they can provide competition in procurement and domestic marketing, AISCO should be maintained as a competitive force with EAL. Accepting the need for the removal of all other constraints, the first requirement is then to make fertilizer supplies available within Ethiopia to these potential distributors.

### 4.9 Procurement Policy Options

Due to the current port constraints and the limitations on foreign exchange for fertilizer procurement the government should retain responsibility for developing a schedule of indicative import requirements based on demand estimates and stock situations. This will require some administrative changes which are discussed in Section 7.

At least three principal policy choices are available to the TGE for fertilizer procurement. The first entails treating the supply of fertilizer as a public good for an interim period of 2 to 3 years during which time development is fostered of domestic distributors and potential importers. The second is to negotiate with donors on the allocation of foreign exchange between both private and public sector procurement and to provide for the sale of some public sector imports to domestic private sector distributors. The third alternative is one of managed competitive procurement.

**Option 1**–In the first case all import supplies would be available at an administered ex-Assab or ex-Bure price on a first come, first served basis to both the public and private sectors. Actual procurement would remain under the control of the government either through AISCO or through a quasi-governmental procurement agency representing the government, the private sector, and the donors. This choice could provide the opportunity to create a level playing field for all participants within the domestic market and enable all potential private sector distributors and future importers to enter the domestic market. It

would overcome the potential problems of scheduling import shipments between the public and private sectors and overcome cost variations due to donor conditionalities.

There is considerable opposition to this policy alternative within Ethiopia from the donor community, the private sector, and some government officials. On the surface this policy appears to be counter to the stated government policy of developing competitive markets because it entails only public sector procurement. However, it addresses the need to develop multiple, competitive, private sector distribution networks within Ethiopia as a first step in the difficult transition from a centrally controlled to private sector operation. It is accepted that in attempting to achieve this objective it could create the situation of making all parties equal rather than providing equal opportunity for all parties. Additionally, such a policy does not build upon the already demonstrated competition in procurement provided by EAL and therefore may incur additional costs in procurement normally associated with public sector enterprises.

**Option 2**–The second policy would rely on a fixed allocation of donor funds between the public and private sectors in a similar manner to the 1993 allocation of funds by USAID. Annual allocations for each sector would be negotiated between the TGE and the donors. Public sector imports would be made available to domestic distributors on an ex-Assab or ex-Bure basis as an extension of the current NMS, which is presently confined to supply of private sector wholesalers and retailers from transit warehouses and some marketing centers. Private sector distributors would be required to arrange for lifting direct from Assab in minimum parcels of say 5,000 mt during discharge on a cash only basis. This scheme would allow EAL to continue importing in competition with AISCO, allow other private sector importers to enter the bidding process for imports, and provide the opportunity for domestic distributors to procure imports with local currency to develop their own marketing channels. Some constraints to this option are foreseen: the predetermined allocation of foreign exchange between the public and private sectors precludes complete market efficiency in procurement and constrains the degree of competition between the sectors; development of domestic distributors in competition with private sector importers may be impeded by the

higher costs of procurement inherent in public sector importing; additional complexity would be added to AISCO's port receival process.

**Option 3**–The third and recommended alternate policy is one of government-managed competitive procurement in which open competitive bids are invited from all parties, private, public and foreign, for the supply, in part or in full, of indicative import requirements during specified time periods with conditionalities as required by donors of foreign exchange. Selection of responsive bids should be based on criteria of least cost f.o.t. Assab, financial capacity to pay counterpart funds, the business plan for domestic marketing, and provision for development of competition.

Primary selection based on least cost f.o.t. value would ensure market efficiency in use of FX. Secondary selection based on financial capacity will require bidders to show proof of availability of local funds for counterpart payments and ensure that bids are related to financial capacity. Tertiary selection based on domestic business/marketing plans will ensure that the bidder has a viable domestic marketing plan for the import. This plan may include the use of other organizations for distribution and marketing of the import in Ethiopia, the principle being that importers must be free to arrange the marketing of the import as they see fit. The final criterion, provision for the development of competition, will allow the government to select bids on the basis of fostering of competition.

Both AISCO and EAL have suggested that bid evaluation should be based on a guaranteed resale price at selected marketing centers for wholesalers or retailers. This principle should be rejected on three grounds: (1) bid evaluation is primarily for the purpose of ensuring most efficient use of FX, which is best measured by the f.o.t. Assab cost, all other inland costs being domestic funds; (2) smaller importers may not be able to command economies in transport rates and may not wish to utilize the selected marketing centers; and (3) intermediate stores are inherently inefficient, adding considerably to transport costs, with some additional handling costs.

In practice, two importing periods could be open for bids: October to January and February to June. Public notice would be made of total import requirements for each period and availability of donors' funds for fertilizer imports including information about conditionalities for each source of funds, including required month(s) of arrival. This last condition is particularly important. With the port and transport constraints there must be a planned shipping schedule. Potential bidders must be aware of the scheduled arrival times for which they are bidding. Bids would be called for the supply of any portion of import parcels related to the donor financing so that all importers would be allowed to make a bid on all donor-finance parcels available within the period for either the total amount or for a portion of the funds. Under this system the importer is able to make a free choice among available donors with full knowledge of any restrictions that may apply and a free choice on the level of financial commitment. This system will enable smaller importers to participate in the bidding process.

The importers would negotiate price, terms and delivery with suppliers on the basis of procedures, and restrictions on source established by the selected donor. The bids will provide the TGE with a transparency of the cost savings available from the most efficient importers. Final selection of bids based on fostering competition would be based on minimizing the cost of this objective. Bids based on the delivery of 10,000 mt might incur a cost penalty over bids based on 25,000 mt depending on the source of supply. Selection of one or more 10,000-mt bids to foster competition would be based on least additional cost over the lowest cost 25,000-mt bid selected, subject to satisfactory proof of financial capacity and marketing plan. A small penalty in landed cost for these smaller quantity bids should be tolerated. These cost penalties will act as an incentive for smaller importers to form consortia or enlarge their operations as rapidly as possible.

Counterpart funds equivalent to the FX funds would be deposited in full with the National Bank of Ethiopia as a precondition to the opening of an L/C. The interest charges incurred on bank loans by all fertilizer importers to meet this condition would be passed on to farmers but this saves the Treasury a similar amount on its domestic bank financing. At the moment an official exchange rate is allowed for the importation of fertilizer by AISCO.

This rate is EBr 5 per dollar compared to the market exchange rate which has fluctuated between EBr 5.1 and 5.9 per dollar during the year. This preferential exchange rate represents a subsidy on fertilizer. However, a fixed exchange rate for fertilizer imports could be considered as an interim incentive for all importers by removing exchange rate risk. The TGE and donors should consider setting a fixed exchange rate for all fertilizer import counterpart funds annually for the next 2 or 3 years based on the prior period average market rate. This concession can be removed when market exchange rate fluctuations have stabilized somewhat.

Where donors' funds include restrictions which add significantly to procurement costs such as requirements for tenders of International Competitive Bids, as required for World Bank IDA funds, or USAID requirements under some circumstances that imports using their funds must be transported 50% in U.S. vessels, then the importer's added costs should be determined and reimbursed. A method for achieving this would be for the importer to submit at least two price quotations based on direct arms-length negotiation with their selected suppliers or two price quotations, one for U.S. vessels and one for foreign vessels. These quotations would form the basis for counterpart fund payment thus providing a means of cost reimbursement. The TGE would lose the benefit of the additional counterpart funds but this loss would be offset by ensuring fertilizer supply at internationally competitive values.

These recommendations are directed at the first two requirements for developing private sector imports, equal opportunities and efficiency in use of foreign exchange. Removing the credit, pricing, and information constraints for private sector importers is discussed in later sections.

In view of the complexity of the above process it is considered that an experienced expatriate adviser should be appointed to advise and coordinate import operations.

**Table 4.5.1 ETHIOPIA: Reported Port Costs for Bulk Discharge of Fertilizer at Assab**

Fertilizer and Transport Sector Assessment, IFDC, 1993

| | | Ethiopia Amalgamated Ltd. | | | AISCO | | |
|---|---|---|---|---|---|---|---|
| | | Freight Basis: Free Out Bulk (i.e.Shipowner liable for discharge costs. Demurrage/dispatch applies) Tonnage 24,657 | | | Supply Basis: Liner Terms Free Out Delivered in bags. (i.e.Supplier liable for discharge and bagging. no demurrage or dispatch) Tonnage 25,000 | | |
| | | US $ | EBr@5.00 | EBr/mt | US $ | EBr@5.00 | EBr/mt |
| 1 | MTSC Charges | | 2,730,000 | 110.72 | | 2,539,500 | 101.58 |
| 2 | Port Dues | | (incl.above) | | | 64,109 | 2.56 |
| 3 | MTSC/ERSTAS Stevedoring (incl.cranes) | 244,180 | 1,220,900 | 49.52 | Not Applicable (included in price) | | |
| 4 | Supervision & Coordination | 37,182 | 185,910 | 7.54 | Not Applicable (included in price) | | |
| 5 | Additional Hold Equipment | | 71,000 | 2.88 | Not Applicable (included in price) | | |
| 6 | Other Handling | | 0 | 0.00 | | 141,750 | 5.67 |
| 7 | Demurrage | Not Known | | 0.00 | Not Applicable (included in price) | | |
| | TOTAL | 34.13 | | 170.65 | 21.96 | | 109.81 |
| | EAL comparison Less 3,4, & 5 | 22.14 | | 110.72 | 21.96 | | 109.81 |

Note: (1) Tariff @ 31 st May 1993 is $5.00/mt
(2) At $ = EBr 5.00, June, 1993

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**Table 4.5.2 ETHIOPIA: Estimated Additional Costs of Operating Bure Buffer Dump**

Fertilizer and Transport Sector Assessment, IFDC, 1993

ADDITIONAL COSTS OF USING BURE BUFFER DUMP

| | | Br/Ton |
|---|---|---|
| Throughput: 150,000 t.p.y. | | |
| TRANSPORT | Shuttle service Assab-Bure, 75 km at 45 c/ton/km | 33.75 |
| HANDLING | Br 0.5/qtl in and out = EBr. 5/ton x 2 | 10.00 |
| ADMINISTRATION AND MATERIALS | Assume 50 c/qtl | 5.00 |
| LOSS AND DAMAGE | Assume 1/2% (TARGET IS 0) | 7.50 |
| | TOTAL ADDITIONAL DIRECT COSTS | EBr.56.25 |
| | LESS | |
| TRANSPORT. | Saving on long haul transport Bure-Assab, at 30c/ton/km (75km) | 22.50 |
| | NET ADDITIONAL COST FOR USE OF BURE: | Br.33.75 |
| | Rounded = | Br.34/ton |

SEA FREIGHT BENEFIT

By using Bure, a move to 2000 tpd bagging rate from the currently accepted 1000 tpd should enable reduction in Sea Freight of around $5/ton or EBr 25/ton. (See freight indications below).

FREIGHT INDICATIONS FOR IFDC SHIPMENT OF BULK FERTILIZER FROM U.S.GULF TO ASSAB, ERITREA. SHIPMENT PERIOD MID-FEBRUARY, 1994. LOAD/DISCHARGE TERMS: FREE IN / FREE OUT.

Prepared by AMEX INTERNATIONAL, INC. September, 1993.

| QUANTITY IN M/T | LOAD/DISCHARGE RATES | FREIGHT RATE U.S.FLAG | FREIGHT RATE NON U.S.FLAG |
|---|---|---|---|
| 25,000 | 5,000/1,000 | $115.00 | $40.00 |
| 25,000 | 5,000/2,000 | $100.00 | $35.00 |
| 20,000 | 5,000/1,000 | $120.00 | $45.00 |
| 15,000 | 5,000/1,000 | $125.00 | $55.00 |
| 10,000 | 5,000/1,000 | $130.00 | $75.00 |

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# 5. Fertilizer Transport

## 5.1 Introduction

The trucking sector is characterized by an aging and declining fleet, which for many years has been deprived of foreign exchange for tires and spares, particularly in the private sector, so that trucks are generally old and in poor repair, with a low utilization efficiency. Parastatal fleets are in a better condition than private ones. In recent years there has been an influx of AID and NGO vehicles carrying relief supplies, supplemented more recently by imports of some new vehicles under donor funding.

To compound the operating problems, the road system is generally in a poor state of repair, dictating low running speeds and high damage levels to equipment. This is by far the greatest contributor to low truck utilization. Long-haul trucking operations are confined mainly to the almost 900 km route between Assab and Addis Ababa. The main flow is from Assab to the Addis area, with relatively little export, or backhaul, tonnage. Long-haul truck capacity utilization is then not much above 50%.

Reliable information on the transport sector is difficult to obtain. Four recent resource documents are as follows:

1. USAID DCM Program. Transport sector Analysis by P. Kristjanson, Abt Associates, For USAID Ethiopia. April 24, 1992.
2. World Bank, Staff Appraisal Report, No. 11249 ET, Ethiopia-Road Rehabilitation Project (Assab-Mille) dated October 29, 1992.
3. Road Transport Report No. 1, ERRP, Project Inland Transport Adviser, ERRP, Project Monitoring Unit (PMU) dated April 19, 1993.
4. RRC, Relief Transport Operation and Organization Study for Ethiopia-Draft Final Report, dated June 1993.

Correlation of data between these reports, and also with other data sources, is very difficult. It may be summed up by an extract from the G.L. Roberts report (Ref. (c)P.1) as follows:

Page 1: "Conflicting data make it impossible to analyze the trucking subsector as a whole with any level of confidence. Direct comparison between the private and parastatal operators is very difficult given the quality of readily available data and the failure of operators to use even minimum performance indicators" or, Page 2: "Policy Environment: Any policy actions taken in the short term to improve the road transport situation in Ethiopia must be implemented in the absence of any reliable data to support such actions. This presents an early priority, well suited to donor support, for a project to undertake a major review of the existing state of road freight transport and institutionalize the collection and analysis of a comprehensive data base now that road transport is for the most part privatized and deregulated. This would help to insure that the existing lack of data concerning transporters, vehicle fleets, cargo moved and traffic origin and destination for both domestic and international transport does not hamper medium and long-term efforts to provide efficient and effective private road transport services. The end result of this project should be the collection, compilation and analysis of accurate data with the generation of supporting statistics for use by the Road Transport Authority (RTA) to monitor and support the private road freight transport operators."

Dr. Roberts notes that in an ongoing survey of private (individual) truckers, not one keeps operating or financial records. Previously, EFTC kept operating records under the Ketana system, but this is no longer done.

The situation as perceived from these reports and various discussions is examined below.

## 5.2 Parastatal, Private Sector, and NGO Truck Fleets

The dry cargo truck fleets in Ethiopia may be broadly categorized as follows:

- **Private for-Hire**–This sector operates older vehicles, providing the majority of short-haul capacity. The great majority of owner operators are thought to run one or two trucks, and the majority are now affiliated with Freight Associations. Very limited information is available on these operators, who do not appear to keep records, and EFTC no longer keeps operating records, as it used to do under the Ketana system. These operators do not have the resources or knowledge to be involved in the relatively complex procedures for imports of spares or tires.

- **Private Own Account Operators**–These are a significant group in the smaller truck sector. It is probable that some of these vehicles are used informally on a for-hire basis.

- **Parastatals**–These come under two main groups: (1) own account operators, such as MOA (AISCO) and AMC and (2) for-hire vehicles operated by EFTC. These fleets, although somewhat old, are younger than the private sector fleets and maintained in better condition, since they have had better access in the past to foreign exchange for replacements, spare parts, and tires by virtue of their professional management. Some of the recent donor-funded imports of spare parts and tires have been through EFTC under arrangements made prior to deregulation. The EFTC fleet consists of larger capacity vehicles and operates principally in the long-haul sector, which is essentially the Assab to Addis route.

Possibly the best estimate of truck availability was made by the PMU Inland Transport Adviser (Ref (c) in Section 5.1) and is shown in Table 5.2.1.

In an attempt to support these numbers, a comparison was made with vehicles presented for annual inspection, which turns out to be only 35% of the total in Table 5.2.1.

This indicates that either significant numbers of these vehicles are out of service or they are not presented for annual inspection.

Details of the current EFTC fleets are given in Table 5.2.2, with a total of 961 dry cargo vehicles of which 900 (94%) are claimed to be operational. Of these, 50 are of 15-ton capacity and the rest are all in the 22- to 30-ton range. From these data it might be concluded that the number given for parastatals in Table 5.2.1 is high.

The numbers of trucks estimated in the recent RRC Draft Report (Ref. (d) earlier) are shown in Table 5.2.3 based on RTA's inspection records. The numbers are only two-thirds of those given in similar categories in Table 5.2.1 and in a quite different ratio to the inspection records used to support that table data.

These comparisons simply confirm the problems of obtaining reliable data.

**5.3 Freight Capacities**

The estimates of national annual dry freight capacity indicate movement of around 5 million tpy on long- and short-haul traffic.

The majority of the inter-regional and inter-urban movements are carried out by private operators, using older vehicles, now often working through Freight Associations.

The long-haul traffic from Assab is still largely controlled by EFTC. There were delays in moving cargo from Assab in 1992, leading to cargo buildup and congestion in the port. With the reduced level of relief cargoes in 1993, movements do not appear to have been constrained. With the abundant rains of 1993, it is to be hoped that a good harvest will keep relief cargoes at reduced levels.

Estimates by the PMU Port and Shipping Adviser (Ref (c) for cargo movements) through Assab from April 1993 to March 1994 were:

| | Tons |
|---|---|
| Food Aid<br>General Cargo<br>ERRP | 550,000<br>350,000<br>400,000 |
| Total | 1,300,000 |
| Total Less Food Aid | 750,000 |

These estimates appear reasonable, relative to long-haul traffic levels on the Assab-Addis route. The RRC Draft Report (Ref. (d) Table 11) indicates 1,700,000 tons of commercial cargo through Assab plus 200,000 tons of fertilizers in addition to relief cargoes. This compares to 350,000 tons general cargo plus 200,000 tons of "other" ERRP cargo, for a total of 550,000 tons. The RRC figure of 1.7 m is very high and may include fuel and liquids movements.

The RRC Report also anticipates an additional 300 trucks, almost half long-haul, to arrive through late 1993 to early 1994. If correct, this should assist in relieving truck capacity constraints on the Assab-Addis route.

Further conclusions cannot be drawn until further and better data are available.

### 5.4 Truck Operating Costs and Freight Tariffs

Although there is now a degree of privatization in the trucking sector, the tariff on the Assab-Addis route is still effectively controlled by EFTC. The current rate is EBr 33¢/ton-km, or 30¢/ton-km for parastatals such as AISCO.

Rates for secondary movements, e.g., from Transit Centers to Marketing Centers and from Marketing Centers to Retailers, are indicated in the range 45¢ to 50¢/ton-km. These are considered to be higher than the long-haul rates, but probably represent a much lower level of cost recovery, bearing in mind that fixed (standing) costs are allocated over a much

smaller distance, and both fixed and variable (running) costs are allocated over a smaller payload.

To obtain a perspective on tariff levels, indicative costs were calculated using actual operating data from EAL for operation of International trucks of 30 tons payload, i.e., long haul, and 10 tons payload, i.e., secondary movements.

Operating costs include the following components:

| Fixed Annual Costs | Variable Annual Costs |
|---|---|
| Depreciation<br>Interest<br>Licenses<br>Insurance<br>Wages<br>Miscellaneous<br>Maintenance (Part)<br>Administration | Fuel<br>Lubricants<br>Tires<br>Maintenance (Part) |

It is considered that the costs obtained from EAL, an efficient company, are the best available for calculation of *indicative* cost levels, against which current tariff levels can be compared.

Costs were computed on a program run by Dr. G. L. Roberts, PMU Inland Transport Adviser. Utilization of the trucks based on data in the reports previously referenced are given below. The low utilization of the 10-ton truck is notable.

| | 30-ton Truck | 10-ton Truck |
|---|---|---|
| Type<br>Model<br>Utilization | Truck/Semi Trailer<br>International 9600<br>65,000 km/year<br>(36 RT Assab-Addis) | 2-Axle<br>International 4700<br>16,800 km/year |

The common basis for calculation of costs is as follows:

| Cost Basis | Landed Assab, Duty and Tax Paid |
|---|---|
| Financed | 100% |
| Loan Period | 10 years |
| Interest Rate | 14% |
| Depreciation | 10 years, straight line (residual value zero) |
| Utilization | 250 days/year |
| Load Factor | 50% (zero backhaul) |
| Profit | 20% of operating costs |

Other parameters and the cost calculations are detailed in Appendix 2, Tables 1 to 8.

Calculations were made as follows:

1. Full costs, with profit, for new vehicle. This indicates whether purchase and operation of a new vehicle is worthwhile relative to current tariffs.
2. Full costs, zero profit. An owner-driver may decide to work for wages only, to stay in business.
3. Zero profit, zero interest. Foregoing the interest also.
4. Zero profit, zero interest, zero depreciation. This gives a rough indication of the competition a new truck owner may be facing, i.e., competing with an owner-driver with a fully depreciated vehicle (10 years plus), fully paid off and prepared to work for wages only. It is appreciated that the operating costs of new and old trucks will be different in various ways. The comparison is indicative.

The results are given below.

**Truck Operating Costs**
EBr/Ton-Km
At 50% Load Factor

| Case | 30-Ton Payload | 10-Ton Payload |
|---|---|---|
| 1. 20% Profit, Full Costs | 0.59 | 2.30 |
| 2. Zero Profit, Full Costs | 0.49 | 1.91 |
| 3. Zero Profit, Zero Interest | 0.40 | 1.38 |
| 4. Zero Profit, Zero Interest, Zero Depreciation | 0.29 | 0.76 |

As noted these costs are indicative only and based on operational cost data of only one make of truck by one company, although EFTC later provided some operating costs which tended to confirm the EAL data. The estimates thus probably represent the order of magnitude for truck operating costs in Ethiopia. They serve to illustrate that the operator of a new 30-ton payload truck will need approximately twice the present tariff of 30¢-33¢/ton-km to operate profitably on a commercial basis at full cost recovery (Case 1). A competitor, with a wages only operation (Case 4), can survive on the current tariff.

More significantly, mainly because of the very low distance covered annually, the operator of a new 10-ton payload truck needs a very much higher tariff than 45¢/ton-km to operate profitably (five times). To reduce costs he must make many more trips and work with high payload factors, i.e., maximum backload. Unfortunately these factors are not within his control.

### 5.5 The Assab-Addis Corridor

Although it is recommended that alternative routes to the Red Sea should be developed through Djibouti and Berbera, there is no doubt that Assab will remain the primary access for Ethiopia, particularly for bulk cargoes such as fertilizer. In that case, the Assab-Addis road link is clearly the most crucial transport connection in the country, since

over three quarters of agricultural and commercial activity is centered in the regions around Addis Ababa.

Under the World Bank Road Rehabilitation Project,[4] sections of the most seriously deteriorated sections of the highway between Assab and Mille will be repaired and strengthened, together with assistance in implementing an axle load control system and in establishing a Permanent Management System, with some other technical assistance and training. The road rehabilitation proposals are shown in Figure 5.5.1 (Summary of World Bank Proposals for Rehabilitation of Assab-Mille Highway, 1993-1998).

Intergovernmental agreement has apparently been reached so that the Eritrean section from Assab to Bure will be included in the project.

This project will give a significant reduction in trip times from Assab to Addis in the medium and long term. This will lower truck operating costs and yield an effective increase in the capacity of the long-haul truck fleet. At present roundtrip times of 1 to 3 per month are quoted, i.e., from 10 days to 1 month, which is quite unacceptable for an 1,800 km roundtrip.

### 5.6 Development of Competition in Fertilizer Transport

As with the fertilizer sector it appears that deregulation of the transport sector, including abolishment of the ketana system, decontrol of tariffs, establishment of private Freight Associations, and access for the private sector to foreign exchange for spares, tires and new trucks, has not yet created the degree of competition required to stimulate the entrepreneurial initiatives and efficiency that will assist in containing the full impact on transport costs arising from macro economic adjustments. Several constraints are identified which are impeding efficiency and competition. These include:

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[4]Staff Appraisal Report No. 11249Et October 29, 1992.

1. Shortage of total capacity to meet peak demand requirements.
2. Continued domination of parastatal fleets on long-haul rates.
3. Inexperienced management and operation of Freight Associations and individual truck owners.
4. Low capacity utilization and low load factors.
5. Lack of development of private trucking fleets.

**Capacity**–Market efficiency in a deregulated sector can only be accomplished with adequate supply. Instances were reported of long-haul rates on the Assab-Addis route as high as 45¢/ton-km during 1993 when limited capacity was available. Steps already taken, with donor support, to increase the number of operational long-haul trucks in the private sector include the provision of FX for new trucks and spares for older trucks, and the partial transfer of aid fleets to commercial operations. Some constraints associated with these processes exist.

The nonprofitable full cost operation of new trucks at existing freight rates may only be acceptable when new trucks are added to existing fleets where costs can be averaged over the total fleet. This makes the procurement of new trucks more attractive to parastatal fleets than the one or two truck operators of the private sector. The import of new trucks under the USAID DCM for individual truck operators proved to have a high risk component associated with FX variations due to the long lead time in procurement. The procedures for private sector import of spares (e.g., EEC procedures) clearly indicate the complexity of the process and its unattractiveness except for major organizations. To overcome these constraints and create more efficient administration it is therefore recommended that donors should consider providing FX assistance to the private sector for both new trucks and spares solely through private sector distributors with suitable provisions and monitoring to ensure that assisted imports are sold only to the private sector. Eliminating individual truck operators, Associations and private sector companies from the FX allocations will simplify administration, place the onus for developing sales on the truck distributors and spare parts suppliers, and provide all truck operators with equal access to supplies in domestic currency. The availability of FX in the FX auction market for importing spares and trucks provides

an ongoing avenue for anyone to participate in importing requirements. The TGE should consider the provision of financial incentives for the purchase and operation of new trucks. These could include investment or accelerated depreciation allowances for new trucks, tax holidays, and consideration may be given to annually fixing exchange rates for counterpart funds to reduce exchange rate risk as discussed previously for fertilizer imports.

Consideration should also be given to further integration of the relief organization fleets into private sector transport. For example, the 100 truck-trailer fleet supplied under Swedish Aid (SIDA) works under the RRC umbrella, but the owners have paid import duties and taxes and are permitted to operate on a commercial for-hire basis when not required by RRC. These trucks are now being transferred to selected operators through a lease-purchase arrangement.

**Parastatal Fleets**–In the long-haul transport sector, competition and operating efficiency would be enhanced by restructuring EFTC into several smaller fleets of a more manageable size as autonomous commercial entities more suitable for privatization. Urgent restructuring plans for EFTC are being developed but in the meanwhile the very size of the EFTC long-haul dry cargo truck fleet dominates this long-haul sector. This effectively allows EFTC to be the price leader in determining long-haul rates. EFTC is almost certainly benefiting from its established network, arrangements with other Government agencies and availability of its offices and major depots. The full impact of deregulation on EFTC's costs is still to be reflected in its rates. Accordingly, as the full impacts of deregulation on operating costs begin to bear it is likely that transport tariffs will increase. It is important therefore that steps are taken to increase capacity utilization and reduce overheads. It is believed that this will be achieved more efficiently with several smaller fleets than one large one.

The continued operation of other smaller parastatal truck fleets (e.g., AISCO and EGTE) is a constraint on competition and possibly capacity utilization. As an initial step towards their eventual privatization it is recommended that the TGE explores the option of separating the operation of these fleets from their parent parastatal organizations as

autonomous commercial entities. These would provide additional fleets in the market competing for business without being tied to parastatal business and place the parastatals in a position of providing business on a competitive basis to all participants in the sector. Consideration should be given by the TGE to insisting that all parastatals publicly invite competitive bids for transport operations.

**Freight Associations**–In the short-haul sector, there is a great majority of 1 or 2 truck owner-operators with older vehicles, who have now joined into 17 associations of which 5 are maximum size with around 300 vehicles each. These 5 are organized along similar geographic areas as the abolished ketana system. It is important that these are not allowed to control operations as private sector cartels particularly since many are organized on a regional basis. Existing policy guidelines limit the maximum size of associations but do not require all associations to have the maximum number of members. In hindsight it would seem that the maximum size for these associations may have been set too high with the result that the larger ones tend to be primarily performing roles of regulation and rate setting for members while smaller associations, even more lacking in general and transport specific business skills and constrained by difficulty in capital formation, are thus unable to compete effectively with either the larger associations or the parastatals. The Ministry of Transport (MOT) indicated that concern over the lack of competition within the private sector was a constraint to the immediate abolishment of EFTC. The recommended restructuring of EFTC into several smaller fleets would maintain a less dominant but still competitive role.

The major constraint to the development of effective private Freight Associations lies in the perceived role of these associations in a competitive market. At present the associations view their role primarily as one of regulation and rate setting for their members. An intense effort is required to change these attitudes and the role to one of advocacy, support and service for their members. Specific areas of change for these associations could include development of an umbrella Freight Association to act on behalf of all member associations in policy and regulatory review and development with the MOT and the RTA; collection and collation of industry operating statistics; providing members

with advice, assistance and possibly guarantees in obtaining financial support and services, possibly including the formation of credit unions to promote capital formation and member credit; assistance in directing members towards supplies of aid assisted spare parts and trucks; advice on record keeping and operational efficiency; and, most importantly, acting as freight brokers for members rather than rate setters. These changes will take time, possibly up to 5 years. Donor support for technical assistance to provide training in general and transport specific management and operational skills and in competitive market operations would greatly assist these developments.

**Capacity Utilization**–Increasing capacity utilization is the key to containing costs in transport operations. Poor road conditions are the major constraint to capacity utilization and resolution of this is firmly in the hands of the TGE. However, increasing load factors will significantly reduce average costs per ton kilometer. The development of private sector freight brokers should be strongly encouraged, to enable truckers as individuals or groups to operate more efficiently by being able to get both outward and backhaul traffic when available.

The Ministry of Transport can take a lead role in this development by facilitating the immediate licensing of applications from private freight forwarders as many of these could and will undoubtedly take on this role of freight brokers. Consideration should also be given to inviting applications for private freight broker licenses in Addis Ababa and in regional centers. Publicity given to these brokers and their role in providing a service of bringing together both customers and truckers will be required. Benefits for the for-hire fleet sector in particular should be substantial.

**One-Owner Trucking Fleets**–Within the private sector, development of one-owner trucking fleets should also be encouraged, i.e., for-hire operators with perhaps 10 to 50 trucks. At present, the industry structure is heavily skewed, with essentially only parastatals and one-truck private sector truckers (excluding own-account parastatals and relief operations). Limiting donor FX assistance to one new truck per individual is an unnecessary constraint which should be overcome by the recommendations provided above on channeling

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these funds through distributors and encouraging development on private sector truck fleets. Investment and accelerated depreciation allowances or tax holidays, as recommended above, may also be a means of promoting this subsector.

### 5.7 Other Transport Sector Factors and Constraints

**5.7.1 Limited Road System**–A major constraint is the limited extent of the asphalt, all-weather road system and the very limited secondary/feeder road system. It is, for example, estimated that three-fourths of all farms are more than half a days walk from an all weather road. Upgrading of the road system is obviously a lengthy and costly long-term matter. However, it would seem prudent to maintain the roads that do exist in as good condition as possible.

As a nonroad engineer, it is suggested that a pot-hole patching program be implemented as a first priority, regardless of any other road programs. The pot holes slow down traffic considerably, cause damage to vehicles and the impacts from vehicles then cause considerably more damage to the road structure.

**5.7.2 Tires**–It was indicated that there is a new plant in Addis Ababa, and some older ones for re-capping tires, which are not operating because of lack of foreign exchange to import raw materials. Operation of these plants should give a significant net saving in foreign exchange and it is recommended that donors should investigate this area as a potential avenue for effective use of FX assistance.

**5.7.3 Axle Load Control**–New axle load control legislation was introduced in September, 1990, allowing up to 10 tons on axles with twin wheels (4 tires) and 8 tons with single wheels. The RTA has equipment for measuring axle loads at various locations and has demonstrated major overloading (e.g., on the Assab-Mille road, 61% of axles were more than 10 tons and 30% more than 12 tons), but the regulations have not been enforced.

It must be recognized that axle load control is not just a bureaucratic exercise. Virtually all road damage is caused by heavy vehicles and is related to the axle loading. The

damage is not as much to the road surface but to the sub-grade, so that the entire road structure is affected.

Controlled trials have shown that *road damage is approximately proportional to the fourth power of the axle weight.* This means that in the figures quoted above, a 12 ton axle is 20% overloaded relative to a base of 10 tons, but causes almost *twice* the road damage.

Axle load controls should therefore be enforced to extend the life of the road system. Although steps are being taken to reopen and effectively staff inspection stations it is recommended that these actions be given high priority.

**5.8 Key Points**–Eleven key points follow:

1. A road transport data base should be created, as recommended by the PMU Inland Transport Adviser, so that reliable information on operation and costs is available to planners and decisionmakers.

2. EFTC should be restructured into 3 or 4 smaller, more manageable fleets operated as autonomous commercial enterprises on the same basis as other private sector truckers.

3. Other parastatal truck fleets should also be operated as autonomous commercial enterprises.

4. Establishment of freight brokers should be facilitated to assist private operators in operating more efficiently, with higher payload factors.

5. The Ministry of Transport should investigate the costs and benefits for some temporary tax relief to promote the purchase and operation of new trucks.

6. Assistance should be provided to private sector Freight Associations to promote a less regulatory role, to improve management skills and member services and to develop a national Truck Operators Association.

7. The development of for-hire private sector fleet operators should be encouraged through removal of constraints to new truck purchasing, introduction of financial incentives, and development of freight brokers.

8. The AID/NGO fleets should be further integrated into the trucking fleets on a private sector commercial basis.

9. A countrywide pothole patching program should be initiated as a priority.

10. Axle load control should be implemented and enforced to reduce road damage.

11. Donors should provide technical assistance and training for improvement in the management and operation of the private road transport sector.

## Table 5.2.1 ETHIOPIA: Estimate of Road Transport Fleets By Category and Vehicle Capacity

Fertilizer and Transport Sector Assessment, IFDC,1993

| RTA Category | Assumed Meaning | Capacity (MT) | | | | | | TOTAL (Excluding Semi-Trailers) |
|---|---|---|---|---|---|---|---|---|
| | | <1.5 | 1.5-12 | 12-18 | Over 18 | | | |
| | | | | | Truck Trailer | Tractor only | Semi-Trailer | |
| Comm - Comm | For Hire | 1258 | 6997 | 72 | 1287 | 156 | 39 | 9770 |
| Comm - Private | Own Account | 1093 | 994 | 49 | 185 | 37 | 90 | 2358 |
| Comm - Public | Parastatal | 161 | 1920 | 458 | 1836 | 716 | 969 | 5091 |
| Mass. Organizations | Special Plates | 38 | 89 | 5 | 54 | 0 | 0 | 186 |
| U.N. | - | 156 | 372 | 111 | 237 | 184 | 225 | 1060 |
| AID/NGO | - | 384 | 779 | 71 | 324 | 87 | 202 | 1645 |
| TOTAL | - | 3090 | 11151 | 766 | 3923 | 1180 | 1525 | 20110 |

Source: Dr. G.L.Roberts, Transport Advisor, ERRP/PMU, April 19,1993, based on RTA, EFTC, RRC and other data.

**Table 5.2.2. ETHIOPIA: Details of EFTC Truck Fleet @ September 1993**

Fertilizer and Transport sector Assessment, IFDC,1993

| MAKE & MODEL | CAPACITY (MT) | TOTAL INVENTORY | NUMBER OPERATIONAL | YEAR OF PURCHASE |
|---|---|---|---|---|
| DRY CARGO | | | | |
| FIAT 696N | 27.5 | 170 | 163 | 1981 |
| FIAT 300-PT | 30 | 189 | 187 | 1983 |
| FIAT 300-30H | 30 | 177 | 172 | 1984&1986 |
| FIAT 300-36H | 15 | 50 | 50 | 1988 |
| VOLVO N10 | 22 | 18 | 5 | 1978 |
| VOLVO F-12 | 30 | 95 | 94 | 1988 |
| MERCEDES 1924 | 22 | 61 | 39 | 1977 |
| MERCEDES 2624 | 29 | 19 | 9 | 1978 |
| MACK 688 RDS | 30 | 95 | 95 | 1992 |
| DAF 3300 | 30 | 74 | 73 | 1990 |
| SCANIA P82H | 25 | 5 | 5 | 1984 |
| MAN | 30 | 1 | 1 | 1981 |
| FIAT 682 N3 | 22 | 7 | 7 | 1976 |
| TOTAL | | 961 | 900 | |
| TANKERS | | | | |
| FIAT 682 N3 | 30 | 80 | 77 | 1978 |
| MERCEDES 1924 | 30 | 2 | 2 | 1978 |
| MERCEDES 2624 | 45 | 48 | 27 | 1979 |
| FIAT 330-36H | 45 | 25 | 25 | 1990 |
| FIAT 330-30H | 45 | 30 | 29 | 1988 |
| TOTAL | | 185 | 160 | |
| | | | | |
| GRAND TOTAL | | 1146 | 1060 | |

Source: EFTC

**Table 5.2.3. ETHIOPIA: Number of Trucks by Owner and Capacity, 1992 as Reported by RRC in Draft Report**

Fertilizer and Transport sector Assessment, IFDC,1993

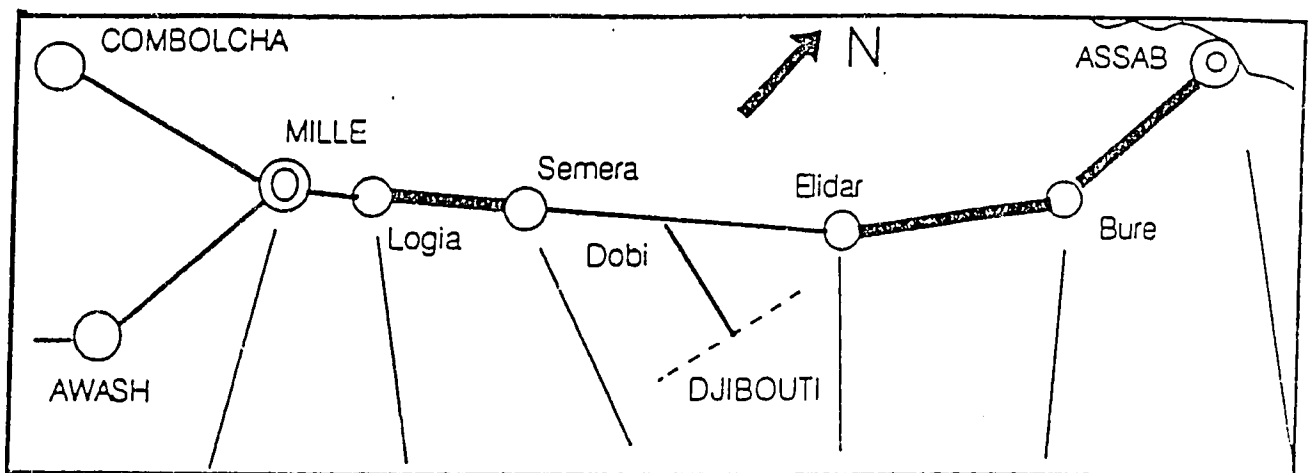
| Operator | Long Haulage Trucks | | |
|---|---|---|---|
| | Number | Average Capacity | Total Capacity |
| | | MT | MT |
| EFTC | 802 | 30 | 22,284 |
| Private | 1,301 | 22 | 28,622 |
| MOA | 55 | 22 | 1,210 |
| AMC | 127 | 22 | 2,794 |
| RRC | 346 | 30 | 10,380 |
| NGOs | 299 | 22 | 6,578 |
| WTOE | 314 | 30 | 9,420 |
| TOR-UNHCR | 131 | 22 | 2,882 |
| 1992 TOTAL | 3,375 | 25 | 84,170 |
| New Trucks | 500 | 22 | 11,000 |
| TOTAL | 3,875 | 25 | 95,170 |
| | Short Haul Trucks | | |
| Private | 2,937 | 8.65 | 25,399 |
| MOA/AMC | 168 | 8.96 | 1,506 |
| RRC | 203 | 6.64 | 1,348 |
| TOR-UNHCR | 42 | 6.90 | 290 |
| NGOs | 256 | 7.17 | 1,835 |
| TOTAL | 3,606 | 8.42 | 30,378 |
| | | | |
| GRAND TOTAL | 7481 | 16.78 | 125548 |

Source: RTA and RRC

FIGURE 5.5.1

SUMMARY OF WORLD BANK PROPOSAL FOR REHABILITATION OF

ASSAB-MILLE HIGHWAY, 1993-1998.




| | MILLE-LOGIA | LOGIA-SEMERA | SEMERA-ELIDAR | ELIDAR-BURE | BURE - ASSAB |
|---|---|---|---|---|---|
| LENGTH KM | 25 | 41 | 134 | 80 | 75 |
| COST US $ MILL | 8.0 | 24.9 | 41.4 | 42.6 | 37.4 |
| DONOR | IDA | IDA | A DB | IDA | IDA |
| PROJECT | RS II | RRP | | RRP | RRP |
| COMMENTS | Force Account | ICB | Force Account | ICB | ICB |

# 6. AISCO's Role in Developing a Competitive Market

## 6.1 Structure and Operation Before 1991

AISCO was legally established as a parastatal in October 1984 under the MOA to procure, import, distribute, and market agricultural inputs to the peasant and state farm sectors. Previously fertilizer had been distributed by the Agricultural Marketing Corporation (AMC). AMC's responsibilities for grain procurement as well as distribution to food deficient regions resulted in fertilizer marketing inefficiencies and farm inputs marketing suffered.

The structure and operation of AISCO prior to 1991 has been reported on previously (Vaes, 1987; Alemmeyhou, 1992). Essentially, AISCO was a single channel parastatal organization charged with procuring fertilizer, seed, agricultural chemicals and small farm tools from imports and local suppliers and distributing these to the Peasant Associations through the Service Cooperatives.

Fertilizer imports were moved to between 4 and 5 transit warehouses (total 50,000 mt capacity), owned or leased by AISCO, from where product was then trans-shipped to 550 Marketing Centers owned and operated by the MOA (total capacity about 40,000 mt). Products were sold to farmers through approximately 2,900 Peasant Association organized Service Cooperatives (SCs). Sales to State Farms were made directly by AISCO.

Annual farm production credit was supplied to the Service Cooperatives by the AID Bank and payments transferred directly to AISCO. AISCO's relationships with other government agencies and departments is summarized below:

- **MOPED** Gives budget approval to AISCO and allocates foreign exchange for purchasing agricultural inputs.

- **MOA** Has overall supervision of AISCO's management, marketing strategies, and operation of the 550 retail establishments (Marketing Centers) through which fertilizer is marketed.
- **NBE** Issues bank permits for the foreign exchange needed by AISCO to procure and import fertilizer.
- **CBE** Opens LC's to pay fertilizer suppliers FOREX and also extends AISCO overdraft facilities for the purchase of agricultural inputs and funding of day to day operations, EBr 100 million for operations and an L/C facility to EBr 125 million for FOREX counterpart funding.
- **ETC** Covers the insurance of AISCOs imports against maritime, land movement, and warehousing losses.
- **MTSC** A government parastatal which has sole rights to clear and forward all AISCO's incoming fertilizer imports.
- **EFTC** Provided freight truck transport for all AISCO fertilizer from ports to interior transit warehouses.
- **AIDB** Provision of agriculture production credit, particularly fertilizer financing, for peasant farmers through the Service Cooperatives and provision of counterpart fund credit.
- **SC** The Service Cooperatives are the link between AISCO and farmers. Farmers, as a group, pool their orders and buy as one from AISCO. Credit facility is provided by AIDB.

This was a parastatal monopolistic system with no competitive marketing. AISCO had no direct farmer contact and was acting only as a procurement and distribution agency. Originally set up with EBr 3 million issued capital and a further EBr 7 million in kind AISCO has had to fund all purchases and meet most operating costs through credit facilities with the interest costs being recovered through incorporation into farm-gate prices.

Preferential interest rates and no charges for MOA warehouse rent or manpower provided a source of implicit subsidies.

A Fertilizer Policy Committee comprised of Ministry of Agriculture, Ministry of Finance, and AISCO representatives is responsible for long-term planning and monitoring of the fertilizer sector and AISCO activities.

### 6.2 The New Marketing System

In 1991/92 physical destruction of many Service Cooperatives and disintegration of most of the remainder, due to default of credit arrears, created a crisis in fertilizer marketing–the retail outlets had mainly disappeared. An FAO study (Parthasarathy, 1992) assisted AISCO in developing a New Marketing System (NMS) which was approved by the TGE in May 1992.

The comprehensive report prepared for FAO recommended a mix of private sector wholesalers and dealers with the still functioning SC's and direct sales to farmer groups from selected MCs and AISCO warehouses. It called for an upgrading of AISCO's marketing skills and of its management information system (MIS), and for a reduced level of stocks at the end of the main season. A retail margin of 7 EBr/qtl was recommended and a 5% wholesaler margin. Stringent screening requirements for wholesaler and retailer selection were also recommended to assure the nomination of reliable and dependent dealers. As dealer selection guidelines for AISCO these were commendable recommendations because a marketing organization should be free to nominate dealers responsive to its needs and the needs of customers. However, in implementing the recommendations, it appears to the consultant that AISCO limited its selections so that in most locations only one private sector dealer was selected thus retaining a single outlet system rather than providing for multiple outlets which would have enhanced retail competition and provided choice for farmer groups.

The strategy was implemented in late Mehr season 1992 and 7 wholesalers and 114 retailers were appointed. Their contribution to sales in 1991/92 was less than 10%, due to their late appointment. These private sector wholesalers and dealers were mainly appointed in areas where AISCO was unable to provide farmers with fertilizer supplies. In 1992/93 a further 22 wholesalers and 964 dealers were registered by AISCO in all areas except West

Harrarghe. Details are provided in Table 6.2.1. In 1992/93, to mid-August, the private sector retail outlets accounted for 65% of AISCO's sales, a very commendable achievement.

The new private retailers are mainly, but not all, small grain traders. Although these businessmen know their farmer customers well their technical knowledge of fertilizer use is lacking. They received orientation to the NMS, along with MOA sales agents but there is a definite need for technical and marketing business training required if they are to be more than just stockists of fertilizer.

No real improvement was made to credit supply and availability in 1991/92 but sales were high as most sales were for cash (Table 6.2.2). One can only presume that because of defaults on previous year's credit, farmers were in a position to buy for cash. In 1992/93, cash sales were also high but direct sales to new cooperative farmer groups (the precursors of the proposed new cooperatives) were assisted by AID Bank credit to these (Table 6.2.3).

Sales made through MOA staffed MCs continued to be on a noncash basis,(i.e. customers, whether private sector retailers or farmer groups, had to deposit money in either AID Bank or CBE and obtain a delivery docket for presentation at the MC to take fertilizer). In many cases this proved to be a very cumbersome and inconvenient process necessitated by the lack of fiscal responsibility in the MOA Marketing Centers.

During 1992/93 AISCO used not only EFTC but also Freight Associations and NGO fleets to transport fertilizer. EFTC transport rates for AISCO on the Assab-Addis route were 30¢/ton-km. This was claimed to be 10% below rates charged to others but it is unclear why the lower rate was applicable to AISCO. In the procurement process, quayside bagging was reintroduced with direct dispatch by truck. The Bure storage area was opened partly to assist this strategy, but principally to avoid the onerous quay storage charges imposed at Assab in 1992, amounting to EBr 30 million.

### 6.3 AISCO's Proposed Competitive Strategy

In recognition of the competitive developments in the fertilizer market (with the advent of EAL imports and marketing) AISCO management has submitted a new organizational and operational plan to the MOA and the Council of Ministers.

Although the consultant was not able to obtain details of the new program it is believed to advocate AISCO operating as a private entrepreneur. This would provide a timely transition to keep existing marketing channels open while new private ones are developed.

AISCO intends to appoint more retailers and to operate between 23 and 41 AISCO controlled distribution centers, and to have customer relationship solely in AISCO's hands.

The establishment of these AISCO controlled distribution centers is also intended to allow AISCO customers to buy fertilizer for cash. Through 1993, AISCO customers could not go to AISCO warehouses or MOA MC's and buy fertilizer for cash. They had to first go to a Commercial Bank, pay for their purchases then return to the MC and collect their fertilizer. This led to inventory stocking delays, farmers not getting fertilizer on time and a complete breakdown of a **customer oriented** marketing system.

AISCO has addressed this deficiency in the proposed reorganization plan submitted to TGE. The consultant was assured by AISCO management that their new mode of marketing will be that of an **Entrepreneurial Marketeer**, with direct customer contact and services, including cash sales at AISCO facilities.

The continued operation of AISCO is required until several alternate private sector marketing organizations emerge and while direct fertilizer subsidies continue to ensure a continuity of fertilizer supply to all areas and to maintain a competitive pricing cap within a deregulated pricing regime. However, transparent changes must be made to AISCO's operation to ensure that its continued operation is not a barrier to entry for the private sector. It must take on an equality footing before it will truly be the equivalent of a

private-Profit Motive-business. As with most public sector enterprises, AISCO benefits from its position as a government-owned entity but it also incurs additional operating costs imposed by Government requirements. This requires the following hidden AISCO subsidies to be abolished:

- TGE loan guarantees or preferential interest rates.
- Special CBE overdrafts–not given to other customers of equal financial capacity.
- Parastatal purchasing preferences, e.g., EIC, MTSC, EFTC, etc.
- Free warehousing or services, e.g., MOA (MC's) personnel.
- Delayed payment of counterpart funds.

In addition, AISCO must be allowed to manage its cash flows in the most appropriate manner and should not be required to:

- Fund the Government with monies (dividends) prior to fiscal year end closing or profit/loss determinations or dividend declaration/disbursement.
- Fund imposed high stock levels at the end of the main season.

Transparency of these changes is required to promote confidence in the private sector that AISCO will not have any unfair advantages in competing with private firms and to ensure that AISCO, as a marketing organization, is not burdened with additional costs. The organization is severely undercapitalized and this is compensated for by access to Government loan guarantees. The additional working capital loans required add to operating costs and account for late payment of counterpart funds. It is therefore recommended that AISCO should be financially restructured in order to allow it to operate along sound commercial lines. All preferential treatments for borrowing could then be abolished, although it is recognized that AISCO already pays commercial interest rates. AISCO's use of MOA warehousing and marketing services should be paid for at market rates. Other parastatal charges to AISCO should be freely negotiated and not subject to special rates or preferences in the supply of services just because it is a Government agency.

Operating costs of AISCO have to be resolved. Its past operation resulted in many unnecessary product transfers and rehandling costs. Expansion of the NMS, along the lines being developed by AISCO, which will reduce the number of marketing centers, place these under direct AISCO control, and increase the number of private sector wholesalers and retailers, will greatly assist in rationalizing costs. Under such operations AISCO product movements from warehouses to marketing centers will be greatly reduced and the need for its own truck fleet will be removed. Consideration should be given to the administrative separation of AISCO's procurement unit from the marketing organization. This would provide a means for the TGE to maintain a higher degree of control over the procurement unit while allowing greater autonomy for the marketing unit.

In addition to structural changes AISCO operations will benefit from improvements to its information and accounting systems. It must operate with a sound MIS and acceptable accounting practices, subject to audit and to audit and asset/liability certification. Although it will need to continue its role of ensuring that adequate fertilizer supplies are available in all areas during the transition to a private sector market the staff must adjust to a more service orientated and flexible attitude to ensure that the needs of dealers, both wholesalers and retailers, are identified and satisfied.

### 6.4 Current and Potential Role of Ethiopian Grain Trading Enterprise (AMC)

A parastatal, Ethiopian Grain Trading Enterprise (EGTE), formerly AMC, is a candidate to market fertilizer. Since the liberalization of grain marketing in 1989 its role has shrunk, so that today it trades in only about 10% of the total grain market, maintaining maximum strategic tradeable stocks of about 160,000 mt. It has a bartering advantage in that it can trade fertilizer for grain in lieu of cash, although it has not done so to date. It has 900,000 mt of modern warehousing under it's control with a 500,000 mt surplus to its own requirements, well situated in key grain growing markets. It has the infrastructure, personnel, transport fleet, customer contacts, warehousing, and grain trade, to make it into a formidable competitor. However, due to its past role as the government's agent for compulsory grain purchase, it has a serious image problem to overcome in the market place together with a suspected extremely high level of overhead costs. Recently it informed some

warehouse rental customers of a proposed threefold increase in storage rents. Given its domination of warehouse rental supply this would appear to be an abuse of its parastatal situation and demonstrates a lack of appreciation of market forces.

During 1993 EGTE entered into an agency agreement with the private sector importer EAL. Due to the late arrival of EAL's DAP and the need to sell as much stock as quickly as possible before planting season ended, EAL and EGTE agreed to cut the EBr 7 retail margin to EBr 4/qtl. EGTE agents took EBr 1/qtl commission on sales, EBr 2 went to EGTE to cover overhead costs and farmers benefitted by EBr 3/qtl. Provided EGTE can continue to exhibit this sort of flexibility it could compete in the market place in its own right. The same terms and business conditions should apply to EGTE as for AISCO. Investigations should be made of the benefits of selling assets, such as warehouses and trucks, to reduce overhead costs. These services can be leased back on an operating cost basis, as and when needed.

### 6.5 The State Farm Sector

State farms are faced with managerial deficiencies and are currently bankrupt, owing more that EBr 2 billion. AISCO is required by its charter to supply State farms. If AISCO is to be on the same footing as the private sector this must be changed or the TGE must guarantee payments. Currently State farms use about 20,000 mt fertilizer/year.

State farms operations require an intensive review. This study cannot resolve a solution, but in the context of developing a competitive market it must be reported that State farms do not present themselves as good, reliable, credit worthy customers.

### 6.6 The Role of Parastatals in Developing Competitive Markets

Parastatals can operate in a liberalized marketing environment as long as they have an arms-length relationship with their governmental owners. Transparency, equal business terms and conditions for private and parastatal firms, no preferentials either direct or indirect are essential. With that understanding parastatals can play an important role in a

competitive market. Employee attitudes will often be the most difficult problem to overcome.

**Table 6.2.1.ETHIOPIA: AISCO Fertilizer Retail Registrations, 1992 and 1993.**

Fertilizer and Transport Sector Assessment, IFDC,1993

| REGION | REGISTERED 1992 | APPLICANTS 1993 | REGISTERED 1993 | TOTAL REGISTERED 1993 |
|---|---|---|---|---|
| EAST SHOA | 17 | 65 | 35 | 52 |
| NORTH SHOA | 0 | 49 | 34 | 34 |
| SOUTH SHOA | 5 | 300 | 71 | 76 |
| WEST SHOA | 25 | 159 | 125 | 150 |
| ADDIS ABABA | 0 | 43 | 12 | 12 |
| TOTAL SHOA | 47 | 616 | 277 | 324 |
| EAST GOJJAM | 25 | 294 | 127 | 152 |
| WEST GOJJAM | 42 | 216 | 113 | 155 |
| TOTAL GOJJAM | 67 | 510 | 240 | 307 |
| E. HARRARGHE | 0 | 87 | 55 | 55 |
| W. HARRARGHE | 0 | 0 | 0 | 0 |
| SIDAMO | 0 | 36 | 36 | 36 |
| NORTH OMO | 0 | 15 | 15 | 15 |
| ILLUBABOR | 0 | 103 | 80 | 80 |
| ARSI | 0 | 185 | 121 | 121 |
| BALE | 0 | 25 | 17 | 17 |
| WELLEGA | 0 | 198 | 123 | 123 |
| TOTAL | 114 | 1775 | 964 | 1078 |

Source: AISCO as reported by FAO in Information on Fertilizer Situation and Implementation of the NMS in 1993.

**Table 6.2.2.ETHIOPIA: Value of Fertilizer Sales in Peasant Sector and Fertilizer Credit**

Fertilizer and Transport Sector Assessment, IFDC,1993

Million EBr

| YEAR | | DAP | UREA | TOTAL | CREDIT | % CREDIT |
|---|---|---|---|---|---|---|
| | 1987/88 | 66.20 | 4.69 | 70.89 | 63.80 | 90.00% |
| | 1988/89 | 68.91 | 17.01 | 85.92 | 75.30 | 87.64% |
| | 1989/90 | 88.30 | 10.35 | 98.65 | 72.20 | 73.19% |
| A. Average 88-90 | | 74.47 | 10.68 | 85.15 | 70.43 | 83.61% |
| | 1990/91 | 87.32 | 9.98 | 97.29 | 39.00 | 40.08% |
| C | 1991/92 | 137.99 | 16.83 | 154.82 | 29.50 | 19.05% |
| D | 1992/93 | 162.18 | 20.21 | 182.39 | 48.50 | 26.59% |
| B.Average 91-93 | | 129.17 | 15.67 | 144.84 | 39.00 | 28.58% |
| % Change A:B | | 73.45% | 46.68% | 70.09% | -44.63% | -65.82% |
| % Change C:D | | 17.53% | 20.10% | 17.81% | 64.41% | 39.55% |

Note: Fertilizer values refer to fertilizer year data (October-September) but credit data refers to July-June years. Therefore, % Credit sales understates the true picture. AISCO records for credit sales in the 1991/92 fertilizer year indicate 41% credit sales. However, the data series presented reflect the overall direction of change in fertilizer production credit.

Source: Derived from AISCO and AIDB data.

## Table 6.2.3.ETHIOPIA: AIDB Fertilizer Input Loans 1987/88 to 1992/93

Fertilizer and Transport Sector Assessment, IFDC 1993

**Nominal Values**

| YEAR | SERVICE COOPERATIVES | | | CREDIT USER GROUPS | | | TOTAL |
|---|---|---|---|---|---|---|---|
| | Number | Total Million EBr | Interest % | Number | Total Million EBr | Interest % | Total Million EBr |
| 1987/88* | n/a | 63.8 | 5.0 | - | - | - | 63.8 |
| 1988/89 | n/a | 75.3 | 5.0 | - | - | - | 75.3 |
| 1989/90 | n/a | 72.2 | 5.0 | - | - | - | 72.2 |
| A. Average 88-90 | 0 | 70.4 | 5.0 | - | - | - | 70.4 |
| 1990/91 | n/a | 39.0 | 5.0 | - | - | - | 39.0 |
| C 1991/92 | 250 | 29.5 | 11.0 | - | - | - | 29.5 |
| D 1992/93 | 420 | 42.8 | 11.0 | 287 | 5.7 | 11.00 | 48.5 |
| B. Average 91-93 | 335.0 | 37.1 | 9.0 | 287 | 5.7 | 11.00 | 39.0 |
| % Change A:B | n/a | -47.3% | 80.0% | - | - | - | -44.6% |
| % Change C:D | 68.00% | 45.33% | 0.00% | - | - | - | 64.56% |

**Deflated Prices**

| YEAR | SERVICE COOPERATIVES | | | CREDIT USER GROUPS | | | TOTAL |
|---|---|---|---|---|---|---|---|
| | Number | Total Million EBr | Interest % | Number | Total Million EBr | Interest % | Total Million EBr |
| 1987/88* | n/a | 63.8 | 5.0 | - | - | - | 63.8 |
| 1988/89 | n/a | 69.8 | 5.0 | - | - | - | 69.8 |
| 1989/90 | n/a | 63.7 | 5.0 | - | - | - | 63.7 |
| A. Average 88-90 | 0 | 65.8 | 5.0 | - | - | - | 65.8 |
| 1990/91 | n/a | 25.4 | 5.0 | - | - | - | 25.4 |
| C 1991/92 | 250 | 17.3 | 11.0 | - | - | - | 17.3 |
| D 1991/92 | 420 | 24.2 | 11.0 | 287 | 3.2 | 11.00 | 27.4 |
| B. Average 91-93 | 335.0 | 22.3 | 9.0 | 287 | 3.2 | 11.00 | 23.4 |
| % Change A:B | n/a | -66.1% | 80.0% | - | - | - | -64.5% |
| % Change C:D | 68.00% | 39.74% | 0.00% | - | - | - | 58.24% |

Source: Agricultural and Industrial Development Bank (AIDB)

# 7. Private Sector Role in Developing a Competitive Market

## 7.1 Private Sector Importing

In addition to AISCO's appointment of private sector dealers under its NMS the private sector made it's first imports of fertilizer in 1993 after the TGE liberalized fertilizer imports. EAL purchased 24,647 mt DAP with FX funding by USAID. Approximately 11,000 mt was sold during crop year 1992/93 leaving about 13,000 mt carried over to 1993/94.

USAID's DCM program provided US$ 15 million in 1993 for fertilizer imports. $10 million was allocated to AISCO and $5 million to the private sector to assist Ethiopian firms to enter the newly liberalized fertilized market. Interest was high with approximately 30 private marketeers expressing interest to enter this market. However, only one company, EAL, had the financial strength to come up with counterpart funds needed to acquire the FX, approximately EBr 25 million. Boat load purchases were mandatory to keep EAL competitive in the domestic market place against AISCO.

A constraint is evident in that private traders do not have the ability to finance the purchase of large ship load quantities, nor are they willing to test the market with such huge investments.

A further constraint for private sector importing is that in order to obtain urea supplies, to provide a balanced product mix, a maximum boat-load quantity is currently over 50% of total annual sales in Ethiopia. Split urea/DAP shipments are not practical because of different manufacturing locations; costs increase as ships stop to take on separate cargoes.

There are practical difficulties in using consortia to import, especially when knowledge and expertise are lacking. For commercial and legal reasons some sort of legal entity is required of a consortium to guarantee an L/C and this commitment often precludes the formation of consortia as a solution to the 25,000 mt procurement constraint. USAID FX

allocations require U.S. sourced fertilizer for which the freight cost precludes delivery in less than optimum 25,000 mt quantities. Other fertilizer sources, closer to Ethiopia, available under other donor conditionalities offer opportunities for smaller import quantities by the private sector without too large a freight cost disadvantage. For USAID FX allocations consideration should be given to supporting the use of an expert adviser to assist consortia formation and procurement.

### 7.2 Private Sector Distributors

There is considerable interest in private sector marketing of smaller volumes in selected market areas. There are many private firms able and willing to finance investments of between EBr 5 to 10 million. Two new private investment trading companies, "ODA Share Co." and "Gunna General Contractors," look with interest at limited fertilizer marketing. However, they are also cognizant that if AISCO remains as a parastatal it may continue to enjoy its current preferential treatment.

Also, the private marketer needs market-oriented pricing not panterritorial prices. These remove incentive to market in more remote areas and preclude cost efficiencies in transporting to these areas. These companies wish to use their marketing and business skills to set competitive prices according to market forces.

A very real danger under the current pricing arrangements is that it is possible for the private sector to concentrate its marketing in high use areas to reduce costs, sell at below the administered maximum retail price, reduce AISCO's sales in these low cost areas and therefore increase AISCO's average costs.

Fertilizer marketing is a volume handling business, the private marketer will resist long-term inventory investment, which is the present situation with AISCO's monopoly. Pricing incentives have to be provided to induce inventory buildup and to have the fertilizer available in the market for the peak demand cropping seasons. In essence, the private marketeer will require better control of purchase, a more definitive market demand and supply schedule.

The private distributor and marketer will be more interested in smaller controlled volumes of fertilizer rather than large cargoes such as EAL bought and still has 50% plus in inventory. The consultant has addressed this constraint with a recommendation for the sale of AISCO procured fertilizer in minimum quantities ex-Assab or ex-Bure to registered distributors at fixed prices, with monthly discounts for early lifting incentives on a cash only, first come-first served basis, with a minimum annual offtake of 5,000 mt. This is discussed in more detail in Section 8 and Appendix 3.

### 7.3 Private Sector Dealers (Retailers)

The major private sector thrust will come from the small retailers, both AISCO's dealer network and private company networks, which will provide the nation with a motivated, proprietary market. This small merchant will provide the impetus towards the Ethiopian fertilizer market becoming a customer oriented market, as opposed to what is now a distributor oriented market revolving around the needs of the distribution organizations–AISCO, MOA, and AID Bank–rather than around the needs of the customer.

Participation by the private sector in domestic marketing will require ease in buying and marketing fertilizer:

- without FX
- in small lots
- at opportune times
- on equal footing to parastatals
- to sell at competitive market prices
- to sell in own chosen markets
- to achieve a profit

The private sector marketing flow of fertilizer consists of a demand pull from the ultimate customer. The easier it is for the customer to buy, the greater is the product demand. All major participants in marketing fertilizer must have their farmer services in the hands of key retailers, the next step of the pull economy. The retailer must be able to buy

when, where, and how at his discretion to satisfy his farmer customer demands. The next part of the "pull" is the wholesaler or distributor. Distributors must have their systems set up to keep their pipelines full at key demand intervals. Similarly distributors exert a pull on suppliers.

This marketing system depends on a private sector doing what it does best–satisfying customer needs. The whole privatization process leaves the supplying, distributing, retailing, and using in the hands of the customer. Each link in the chain is the customer of the previous link.

Ethiopia has a good base in the rural market with the small grain trader. A competitive marketing system can be envisaged in which several thousand small retailers, including cooperatives, provide farmers with choice of supplier and ease of access to fertilizer.

Abandoning over 450 MOA MC's could have a negative side, underutilization of warehouses and staff. The MOA should consider privatizing their warehouses or leasing them to staff as private retail outlets. This could be achieved by offering current MOA staff the opportunity to lease warehouses for them to run as independent private retail outlets. This transition for MOA staff will not be easy and a complete transition program would need to be developed including training in simple business management, record keeping, and cash management, and arrangements for securing bank loans. These businesses may be disadvantaged compared to small grain traders initially having only inputs marketing but they would have advantages in location next to MOA offices frequented by farmers. Leasing warehouses to existing private sector businesses is an alternative.

### 7.4 Implications for Developing a Competitive Market

1. Without removal of existing constraints private sector importation will be limited in the near future to only one firm and with the potential to create a monopolistic private sector distribution system, concentrating in areas of high demand.

2. Registration of private sector dealers should be unqualified except that they must be legally registered businesses.

3. Multiple national and regional distributors will only emerge if conditions are created to provide ease of access to fertilizer supplies and they are free to market wherever they choose.

4. Intense competition will force national and regional distributors into remote areas to increase sales as has occurred in Bangladesh and Egypt for example.

5. A competitive mixed (public and private) open market system can only be created with market pricing and equal conditions for public and private sectors.

6. Technical and marketing skills of the private sector need to be developed to enable the private sector to serve Ethiopia's farmers.

# 8. Fertilizer Pricing

## 8.1 Disadvantages of Pan-Territorial Pricing

Pan-territorial pricing is an administratively cumbersome and economically unsound market intervention that distorts resource use. It has often been used in developing countries as a supposedly equitable means of pricing fertilizer but it disadvantages some farmers while providing advantages to others. It is supposed to provide a means to ensure that farmers in more remote areas can obtain fertilizer at prices which enable them to use fertilizer economically.

In practice all distribution freights are averaged. This supposes that all locational demands can be forecast accurately in order to calculate total distribution costs. These costs are then applied as an average freight cost.

This method works against improved efficiencies in transportation through private sector initiatives and the forces of competition. It is impossible to apply equitably in a mixed public/private or private competitive market.

Farmers closer to supply sources, i.e. those located in areas with the lowest transport costs, pay higher prices than need be, while farmers in more remote areas pay less than they should. Depending on the degree of cross-subsidization, the price distortion can cause misallocation of fertilizer resources, (over or under use) and even cropping pattern distortions. In Ethiopia farmers in Showa, Gojjam, Arsi (the main use areas), and other locations close to Addis subsidize fertilizer costs to farmers in all other regions.

Private sector competition and service to remote areas can only be achieved when market pricing is applied. The private sector must be able to recoup all distribution costs in all areas because, without a profit incentive in all areas, it will concentrate on marketing only in those areas where a profit can be made. With the continued operation of AISCO, this will result in AISCO sales declining in the lower transportation cost areas with the

result that its average transportation cost increases. Already problems have arisen with AISCO-appointed wholesalers receiving wholesale discounts to enable them to transport fertilizer to distant areas but choosing instead to sell in areas close to the transit warehouses where, because of pan-territorial pricing, a larger profit could be obtained.

For the development of a competitive private market it is absolutely essential that freedom to set prices (market pricing) is allowed. The effect of this significant policy change will be manifest in price variations across the country, reflecting the real cost of distributing fertilizer to each location. The key issue of market pricing is therefore one of its impact on demand in various locations.

### 8.2 Impact of Market Pricing

The real price of fertilizer is measured in relation to crop prices and net increased production value response to the use of fertilizer. With grain yield responses of between 5 and 10 kg to 1 kg fertilizer nutrient in Ethiopia, it is straight forward to calculate value:cost and benefit:cost ratios for the major grain crops.

In the past, fertilizer and crop price ratios were administered to provide reasonable value:cost ratios (Vaes, 1987), but the compulsory purchase prices for quota allocations were low and provided no incentive to farmers. As discussed in Section 1, current market crop prices offer good economic incentives for farmers to use fertilizer. However, farmgate crop prices vary considerably between regions due to locational distance from the main market in Addis Ababa and level of surplus or deficit grain production.

Table 8.2.1 illustrates the regional retail grain price variations in 1991, expressed as deviations from the Addis Ababa price. Teff price had the least regional variation (14%) and barley, sorghum, and maize the highest variation (44%-53%). Using these variations as a base, estimates are presented in Table 8.2.2 of average, maximum, and minimum regional wholesale and farmgate crop prices derived from retail prices in Addis Ababa for 1992/93. Minimum mixed teff and mixed wheat farmgate prices are estimated at EBr 102 and 50/qtl, respectively.

Market pricing for fertilizer will create similar variations. Using AISCO's 1992/93 cost buildup, estimates were calculated of regional fertilizer prices based on full market pricing and freight differentials (Tables 8.2.3 and 8.2.4). The range in prices would have been 24 EBr/qtl for urea and for DAP 21 EBr/qtl representing, respectively, 15% and 12% variations about the average price. This smaller price variation in regional fertilizer prices compared to regional grain prices (except teff) is due to the absence of any supply side considerations in the estimated fertilizer prices compared to grain prices. Estimates of average, maximum, and minimum decontrolled farm-gate fertilizer prices for three exchange rates and six f.o.b. costs are presented in Table 8.2.5. Farm-gate DAP price estimates range from EBr 166 to 210/qtl at an exchange rate of 5:1; urea estimates range from EBr 153 to 197/qtl for the same exchange rate.

These regional variations in both fertilizer and grain prices are combined in two-way matrices in Tables 8.2.6 and 8.2.7 to illustrate the impact of all combinations of regional fertilizer and grain market prices using minimum, average, and maximum fertilizer and grain prices. These price ranges per hectare are based on a fertilizer application rate of 100 kg DAP per hectare (Table 8.2.6) and 100 kg DAP plus 50 kg urea per hectare (Table 8.2.7); average fertilizer prices as calculated in Tables 8.3.1 and 8.3.2. and average grain prices January–June, 1993.

Part B of each Table illustrates the required yield response per hectare necessary to provide a benefit:cost ratio of 2. These yield responses are expressed as kilograms grain per kilogram fertilizer plant nutrient in part C of each table.

These estimates indicate that, for white teff, two-thirds of all price combinations will produce 2:1 benefit:cost ratios. Only in those regions where average and maximum fertilizer prices are combined with minimum teff prices will the crop response needed for economic fertilizer use exceed expected yield responses.

For the lower value mixed teff prices, benefit:cost ratios of 2:1 can be expected except in areas with the lowest teff price.

All combinations of wheat prices and fertilizer prices, except for the maximum fertilizer/minimum mixed wheat price combination, will produce benefit:cost ratios of 2 or more.

These estimates illustrate that market pricing of fertilizer per se will not limit fertilizer use in most of Ethiopia. Lower fertilizer application rates, which provide increased benefit:cost ratios, will be required in the extreme price combination areas. These regions, with the highest farm-gate fertilizer prices, will be Keffa, West Gojjam, and North Omo.

### 8.3 Estimated Market Prices for Fertilizer

Tables 8.3.1 to 8.3.4 illustrate expected DAP and urea market prices for 1994 based on the procurement changes detailed in previous sections of this report and no price controls beyond free on truck, Assab or Bure.

Based on f.o.b. bulk prices of US $135/mt and US $115/mt for DAP and urea, respectively, average retail prices can be expected to be about EBr 178.00/qtl for DAP and EBr 168.00/mt for urea, **without subsidy.** However, when AISCO pricing is considered, there will be additional overhead costs and contingencies and the blended prices will be higher due to the large stock carryover and the interest cost incurred.

The estimates are based on the assumptions shown in the tables and indicate distributor and retailer returns on investment (ROIs) of 14% to 15%. Additional stock-turns above the assumed low values greatly increase ROIs. It should be noted that both retail and distributor ROIs could be expressed as returns over a 6-month period which, annualized will double the rates of return.

### 8.4 Fertilizer Subsidy

Fertilizer subsidy is a market intervention policy tool that is extremely questionable in terms of equity and net social benefit and can create price distortion leading to misallocation of resources. In Ethiopia, implicit fertilizer subsidies are applied through various mechanisms, and an explicit 15% subsidy was introduced in 1993. A very preliminary

indicative estimate of the total cost of these subsidies in 1993 is almost EBr 68 million. This estimate is constructed as follows:

| | | | |
|---|---|---|---|
| Explicit Subsidy: | 121,987 mt DAP @ EBr 264.3/mt | = | 32.24 million |
| | 23,264 mt Urea @ EBr 234.1/mt | = | 5.44 million |
| | Subtotal | = | 37.68 million |
| Implicit Subsidy: | Concessional exchange rate | = | 7.55 million |
| | Distribution credit interest | = | 6.1 million |
| | Storage costs | = | 12.00 million |
| | Freight concessions | = | 4.00 million |
| | Farmer credit interest | = | 0.70 million |
| | Subtotal | = | 30.35 million |
| Total Subsidy: | | = | 67.93 million |

Details of the derivation of implicit subsidy estimates are presented in Table 8.4.1. Basically the implicit subsidy is estimated from differences between (a) the exchange rate used for fertilizer imports (5.0) and the market rate (assumed to be 5.3), (b) the budgeted AISCO interest cost and the computed interest cost on AISCO's average stock holding, (c) the budgeted AISCO warehousing cost and the commercial cost for 90,000 mt storage rental, (d) an estimated 10% difference between AISCO's transport rates and private sector rates, and (e) the interest rate cost at 11% for farmer loans over 6 months and the cost at a 14% interest rate. No account has been taken of administrative and labor costs associated with the MOA MCs, only the free cost of warehousing. Elimination of these subsidies in AISCO's operations, particularly the free use of MOA MCs and late payment of counterpart funds, is necessary to provide equitable conditions for competition between the public and private sectors. AISCO's rationalization and operation on a commercial footing will require it to operate more efficiently to compete with the private sector.

Based on the original sales target for 1993, the TGE estimated that the total explicit subsidy would be EBr 52 million. It was reported that, by agreement with the IMF, the TGE

will limit the duration of this subsidy to 3 years and the total amount per year to EBr 52 million.

As discussed in Section 1, no economic justification exists for the 15% fertilizer subsidy at 1992/93 prices of both fertilizer and grains. From the considerations above on projected market prices the same condition will prevail for market prices. If the objective of the subsidy was to cushion the price increase "shock" created by the devaluation impact and ensure continued growth in fertilizer use, then this objective was not achieved. If the objective was to provide assistance to peasant farmers in the low fertilizer use, grain deficit regions, then more direct forms of assistance would have been more cost effective and efficient because the major beneficiaries of the subsidy are the farmers in the high fertilizer use, grain surplus regions.

The unsubsidized projected market prices for 1994 represent less than 20% price increases (nominal) over 1993 subsidized prices, although some upward movement in international DAP prices is now evident which may increase these estimates. Also, AISCO has a large inventory carryover which is going to inflate a blended price calculation for 1994. Continuation of the subsidy during 1994, within the agreed total limit, will reduce the rate of subsidy from 15% to about 12% of the blended 1994 product prices (Table 8.4.2). From an administrative efficiency viewpoint, the subsidy should continue to be paid directly to importers by way of an allowed rebate per ton on counterpart fund requirements. The continued presence of AISCO as a price setter will ensure that the private sector passes on the subsidy to farmers. Both urea and DAP should also continue to be subsidized at equal percentage rates of the computed average retail prices. This avoids any price distortion between products.

It is recommended that the TGE give consideration to re-directing the subsidy funds towards a more specifically targeted objective. Consideration might be given to redirecting the subsidy to the more remote, low fertilizer use regions as either a revolving fertilizer credit line, to ensure that these farmers have increased access to crop production credit, or

for the formation of a credit guarantee or refinance scheme. These options require further investigation.

### 8.5 AISCO Pricing Arrangements

Although the conditions for Procurement Agency pricing to distributors have been enunciated, special consideration has to be given to monthly price variations and prior announcement of prices to distributors.

In a competitive market the private sector will not lift product and buildup stocks in regional locations without incentives. The normal business response will be to buy as late as possible to reduce inventory holding costs, ignoring the lost profit opportunities of stock outs during peak demand. Pre-season discounts therefore have to be available which provide sufficient incentive for distributors to lift product early. In Ethiopia this will be essential because of the total reliance on imports and the need to have an extended import schedule.

Pre-season discounts can be accommodated by the AISCO by calculating distributors' costs of interest and warehousing for 3 months plus a profit incentive for liftings between November and April. The cost to the AISCO of these discounts is calculated for the months in which they will apply and then averaged over total sales and added to the base price for Bure. The seasonal discounts can then be deducted, at no cost, from the increased average base price as illustrated below for DAP:

| | | | EBr/qtl |
|---|---|---|---|
| Distributor cost for Bure (base price) | | | 122.20 |
| Average base price including discount cost | | | 124.90 |
| Seasonal Prices and Discounts | | | |
| Month | Price | Discount | Discount |
| | (EBr/qtl) | (EBr/qtl) | (%) |
| October | 124.90 | 0.00 | 0.00 |
| November | 112.90 | 12.00 | 9.60 |
| December | 114.90 | 10.00 | 8.00 |
| January | 115.90 | 9.00 | 7.20 |
| February | 117.90 | 7.00 | 5.60 |
| March | 118.90 | 6.00 | 4.80 |
| April | 121.90 | 3.00 | 2.40 |
| May | 124.90 | 0.00 | 0.00 |
| June | 124.90 | 0.00 | 0.00 |
| July | 124.90 | 0.00 | 0.00 |
| August | 124.90 | 0.00 | 0.00 |
| September | 124.09 | 0.00 | 0.00 |

Full details of these discount calculations are presented in Table 8.5.1.

These prices must be announced well in advance of the seasonal discount period so that distributors will plan to organize finance, transport and storage to make early liftings.

**Table 8.2.1.ETHIOPIA: Regional Comparison of Retail Market Oriented Prices for Grains, 1991**

Fertilizer and Transport Sector Assessment, IFDC,1993

(July -December Retail Price Averages), 1992

| MARKET | MIXED TEFF EBR/QTL | MIXED WHEAT EBR/QTL | MIXED BARLEY EBR/QTL | MIXED SORGHUM EBR/QTL | MAIZE EBR/QTL | AVERAGE GRAIN EBR/QTL | HORSE BEANS EBR/QTL | CHICK PEAS EBR/QTL | AVERAGE PULSE EBR/QTL |
|---|---|---|---|---|---|---|---|---|---|
| ADDIS ABABA ACTUAL | 140.00 | 97.00 | 80.00 | 75.00 | 63.00 | 91.00 | 98.00 | 108.00 | 103.00 |
| ADDIS ABABA INDEX | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| PRICE INDICES | | | | | | | | | |
| AMBO | 81 | 74 | 76 | | 78 | 77 | 80 | 69 | 74.50 |
| A. MINCH | 94 | | | 67 | 100 | 87 | | | |
| ASSELA | 90 | 70 | 76 | | | 79 | | | |
| A.TEFERI | 94 | | | 129 | | 112 | | | |
| AWASSA | 90 | 89 | 100 | | 102 | 95 | | | |
| B.DAR | 69 | | 84 | | 81 | 78 | | | |
| COMBOLCHA | 99 | 90 | | | 143 | 111 | 84 | 91 | 87.50 |
| D. BEHRA | 89 | 85 | 80 | 91 | | 86 | 62 | 70 | 66.00 |
| D. MARKOS | 70 | 66 | | | | 68 | 82 | 75 | 78.50 |
| D. ZEIT | 96 | 84 | | | 103 | 94 | 66 | 86 | 76.00 |
| DESSIE | 96 | 85 | 98 | 120 | 116 | 103 | 61 | 79 | 70.00 |
| DIRE DAWA | 113 | 120 | 134 | 165 | 140 | 134 | 122 | 124 | 123.00 |
| GONDER | 76 | 88 | 109 | 96 | 100 | 94 | 83 | 74 | 78.50 |
| HARA | 109 | 93 | 124 | 153 | 144 | 125 | | 92 | 92.00 |
| HOSSAEN | 70 | 60 | 63 | | 89 | 71 | 61 | | 61.00 |
| JIMA | 71 | 86 | 100 | 53 | 73 | 77 | 87 | | 87.00 |
| NAZARETH | 91 | 78 | 88 | | 106 | 91 | 67 | 82 | 74.50 |
| NEKEMPT | 77 | 78 | 81 | | 83 | 80 | 110 | | 110.00 |
| SHASHE | 87 | 77 | 81 | | 90 | 84 | 92 | | 92.00 |
| WOLAYIT | 79 | 78 | 94 | | 83 | 84 | | 113 | 113.00 |
| WOLLISO | 72 | 91 | 106 | | 87 | 89 | 71 | | 71.00 |
| ZIWAY | 93 | 74 | 75 | | 98 | 85 | | | |
| UNWEIGHTED AVERAGE | 87 | 82 | 92 | 109 | 101 | 91 | 81 | 87 | 84 |
| **PRICES OUTSIDE ADDIS ABABA (EBR/QTL)** | | | | | | | | | |
| MAXIMUM MARKET PRICE | 158.20 | 116.40 | 107.20 | 123.75 | 90.72 | **122.30** | 119.56 | 133.92 | **126.69** |
| MINIMUM MARKET PRICE | 96.60 | 58.20 | 50.4 | 39.75 | 45.99 | **61.88** | 59.78 | 74.52 | **62.83** |
| RANGE IN PRICE | 61.60 | 58.20 | 56.80 | 84.00 | 44.73 | **60.42** | 59.78 | 59.40 | **63.86** |
| AVERAGE PRICE | 121.29 | 79.95 | 72.84 | 81.94 | 63.56 | **82.79** | 78.96 | 93.76 | **86.21** |
| STANDARD DEVIATION | 17.65 | 30.32 | 34.24 | 43.84 | 28.02 | **15.36** | 17.97 | 19.02 | **18.24** |
| S.D. as percent of average | 14.55% | 37.92% | 46.37% | 53.50% | 44.08% | **18.55%** | 22.76% | 20.29% | **21.16%** |
| AVERAGE PRICE AS A PERCENT OF ADDIS PRICE | 86.64% | 82.42% | 92.29% | 109.25% | 100.89% | **90.98%** | 80.57% | 86.82% | **83.69%** |

Source: Derived from AMC Data

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**Table 8.2.2.ETHIOPIA:Estimated Teff and Wheat Farm Gate Prices 1992/93**

Fertilizer and Transport Sector Assessment, IFDC 1993

| RETAIL PRICES | TEFF WHITE | TEFF MIXED | WHEAT WHITE | WHEAT MIXED |
|---|---|---|---|---|
| ADDIS ABABA PRICE | 223 | 198 | 162 | 134 |
| AVERAGE REGIONAL PRICE | 193 | 172 | 134 | 110 |
| MAXIMUM REGIONAL PRICE | 218 | 194 | 151 | 125 |
| MINIMUM REGIONAL PRICE | 133 | 118 | 80 | 66 |
| **WHOLESALE PRICES** | | | | |
| AVERAGE REGIONAL PRICE | 184 | 163 | 125 | 101 |
| MAXIMUM REGIONAL PRICE | 209 | 185 | 142 | 116 |
| MINIMUM REGIONAL PRICE | 124 | 109 | 71 | 57 |
| **FARM GATE PRICES** | | | | |
| AVERAGE REGIONAL PRICE | 177 | 156 | 118 | 94 |
| MAXIMUM REGIONAL PRICE | 202 | 178 | 135 | 109 |
| MINIMUM REGIONAL PRICE | 117 | 102 | 64 | 50 |

Source: Derived from AMC price files for Addis Ababa retail prices and assuming wholesale margin of EBr 9/qtl and farm gate differential of EBr 7/qtl. Regional prices derived from Table 9.2.1

**Table 8.2.3.ETHIOPIA: Regional Comparison of Market Oriented Prices for DAP, 1993**

Fertilizer and Transport Sector Assessment, IFDC,1993

| REGION | BASE PRICE | KM FROM ASSAB | RATE/KM | TOTAL FREIGHT COST | MARKETING CENTER PRICE |
|---|---|---|---|---|---|
| | EBR/QTL | KM | EBR/QTL | EBR/QTL | EBR/QTL |
| NORTH SHOA | 153.75 | 1012 | 0.0255 | 25.81 | 179.56 |
| WEST SHOA | 153.75 | 986 | 0.0255 | 25.14 | 178.89 |
| EAST SHOA | 153.75 | 782 | 0.0255 | 19.94 | 173.69 |
| ADDIS ABABA | 153.75 | 882 | 0.0255 | 22.49 | 176.24 |
| WOLLEGA | 153.75 | 1213 | 0.0255 | 30.93 | 184.68 |
| ILLUBABOR | 153.75 | 1207 | 0.0255 | 30.78 | 184.53 |
| KEFFA | 153.75 | 1462 | 0.0255 | 37.28 | **191.03** |
| EAST GOJJAM | 153.75 | 1182 | 0.0255 | 30.14 | 183.89 |
| WEST GOJJAM | 153.75 | 1347 | 0.0255 | 34.35 | 188.10 |
| EAST HARARGHE | 153.75 | 1207 | 0.0255 | 30.78 | 184.53 |
| WEST HARARGHE | 153.75 | 1007 | 0.0255 | 25.68 | 179.43 |
| DIRE DAWA | 153.75 | 1187 | 0.0255 | 30.27 | 184.02 |
| SIDAMO | 153.75 | 1016 | 0.0255 | 25.91 | 179.66 |
| NORTH OMO | 153.75 | 1246 | 0.0255 | 31.77 | 185.52 |
| ARSI | 153.75 | 857 | 0.0255 | 21.85 | 175.60 |
| BALE | 153.75 | 1142 | 0.0255 | 29.12 | 182.87 |
| NORTH GONDER | 153.75 | 1047 | 0.0255 | 26.70 | 180.45 |
| SOUTH GONDER | 153.75 | 897 | 0.0255 | 22.87 | 176.62 |
| TIGRAY | 153.75 | 877 | 0.0255 | 22.36 | 176.11 |
| WELLO | 153.75 | 630 | 0.0255 | 16.07 | **169.82** |
| UNWEIGHTED AVERAGE | 153.75 | 1059 | 0.0255 | 27.01 | 180.76 |
| WEIGHTED AVERAGE | 153.75 | 880 | 0.0255 | 22.45 | 176.20 |

| | |
|---|---|
| MAXIMUM MARKETING CENTER PRICE | 191.03 |
| MINIMUM MARKETING CENTER PRICE | 169.82 |
| RANGE IN PRICE | 21.22 |
| PRICE RANGE AS PERCENT OF WEIGHTED AVERAGE | 12.04% |

Notes:

1.Average weighted price is the unsubsidized pan-territorial price

2. Average weighted freight cost is AISCO's average freight cost for 1992 and 1993

Source: Derived from AISCO cost build-up data 1992 and 1993.

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**Table 8.2.4.ETHIOPIA: Regional Comparison of Market Oriented Prices for Urea, 1993**

Fertilizer and Transport Sector Assessment, IFDC,1993

| REGION | BASE PRICE | KM FROM ASSAB | RATE/KM | TOTAL FREIGHT COST | MARKETING CENTER PRICE |
|---|---|---|---|---|---|
| | EBR/QTL | KM | EBR/QTL | EBR/QTL | EBR/QTL |
| NORTH SHOA | 130.46 | 1012 | 0.029 | 29.35 | 159.81 |
| WEST SHOA | 130.46 | 986 | 0.029 | 28.59 | 159.05 |
| EAST SHOA | 130.46 | 782 | 0.029 | 22.68 | 153.14 |
| ADDIS ABABA | 130.46 | 882 | 0.029 | 25.58 | 156.04 |
| WOLLEGA | 130.46 | 1213 | 0.029 | 35.18 | 165.64 |
| ILLUBABOR | 130.46 | 1207 | 0.029 | 35.00 | 165.46 |
| KEFFA | 130.46 | 1462 | 0.029 | 42.40 | **172.86** |
| EAST GOJJAM | 130.46 | 1182 | 0.029 | 34.28 | 164.74 |
| WEST GOJJAM | 130.46 | 1347 | 0.029 | 39.06 | 169.52 |
| EAST HARARGHE | 130.46 | 1207 | 0.029 | 35.00 | 165.46 |
| WEST HARARGHE | 130.46 | 1007 | 0.029 | 29.20 | 159.66 |
| DIRE DAWA | 130.46 | 1187 | 0.029 | 34.42 | 164.88 |
| SIDAMO | 130.46 | 1016 | 0.029 | 29.46 | 159.92 |
| NORTH OMO | 130.46 | 1246 | 0.029 | 36.13 | 166.59 |
| ARSI | 130.46 | 857 | 0.029 | 24.85 | 155.31 |
| BALE | 130.46 | 1142 | 0.029 | 33.12 | 163.58 |
| NORTH GONDER | 130.46 | 1047 | 0.029 | 30.36 | 160.82 |
| SOUTH GONDER | 130.46 | 897 | 0.029 | 26.01 | 156.47 |
| TIGRAY | 130.46 | 877 | 0.029 | 25.43 | 155.89 |
| WELLO | 130.46 | 630 | 0.029 | 18.27 | **148.73** |
| UNWEIGHTED AVERAGE | 130.46 | 1642 | 0.029 | 30.72 | 161.18 |
| WEIGHTED AVERAGE | 130.46 | 1059 | 0.029 | 25.63 | 156.09 |

| | |
|---|---|
| MAXIMUM MARKETING CENTER PRICE | 172.86 |
| MINIMUM MARKETING CENTER PRICE | 148.73 |
| RANGE IN PRICE | 24.13 |
| PRICE RANGE AS PERCENT OF WEIGHTED AVERAGE | 15.46% |

Notes:

1.Average weighted price is the unsubsidized pan-territorial price

2. Average weighted freight cost is AISCO's average freight cost for 1992 and 1993.

Source: Derived from AISCO cost build-up data 1992 and 1993.

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## Table 8.2.5.ETHIOPIA:Projected Fertilizer Retail Prices at Varying FOB Costs and Exchange Rates

Fertilizer and Transport Sector Assessment, IFDC 1993

**DAP Minimum Retail prices**

| FOB COS (US$/MT) | EXCHANGE RATE (EBr:US$) 5 | 6 | 7 |
|---|---|---|---|
| | (EBr/QTL) | | |
| 135 | 166 | 185 | 203 |
| 140 | 168 | 188 | 207 |
| 145 | 171 | 191 | 211 |
| 150 | 174 | 195 | 215 |
| 155 | 177 | 198 | 219 |
| 160 | 180 | 201 | 223 |

**UREA Minimum Retail prices**

| FOB COS (US$/MT) | EXCHANGE RATE (EBr:US$) 5 | 6 | 7 |
|---|---|---|---|
| | (EBr/QTL) | | |
| 115 | 153 | 168 | 183 |
| 120 | 156 | 172 | 187 |
| 125 | 159 | 175 | 191 |
| 130 | 162 | 178 | 195 |
| 135 | 164 | 182 | 199 |
| 140 | 167 | 185 | 203 |

**DAP Average Retail prices**

| FOB COS (US$/MT) | EXCHANGE RATE (EBr:US$) 5 | 6 | 7 |
|---|---|---|---|
| | (EBr/QTL) | | |
| 135 | 181 | 200 | 218 |
| 140 | 183 | 203 | 222 |
| 145 | 186 | 206 | 226 |
| 150 | 189 | 210 | 230 |
| 155 | 192 | 213 | 234 |
| 160 | 195 | 216 | 238 |

**UREA Average Retail prices**

| FOB COS (US$/MT) | EXCHANGE RATE (EBr:US$) 5 | 6 | 7 |
|---|---|---|---|
| | (EBr/QTL) | | |
| 115 | 168 | 183 | 198 |
| 120 | 171 | 187 | 202 |
| 125 | 174 | 190 | 206 |
| 130 | 177 | 193 | 210 |
| 135 | 179 | 197 | 214 |
| 140 | 182 | 200 | 218 |

**DAP Maximum Retail prices**

| FOB COS (US$/MT) | EXCHANGE RATE (EBr:US$) 5 | 6 | 7 |
|---|---|---|---|
| | (EBr/QTL) | | |
| 135 | 196 | 215 | 233 |
| 140 | 198 | 218 | 237 |
| 145 | 201 | 221 | 241 |
| 150 | 204 | 225 | 245 |
| 155 | 207 | 228 | 249 |
| 160 | 210 | 231 | 253 |

**UREA Maximum Retail prices**

| FOB COS (US$/MT) | EXCHANGE RATE (EBr:US$) 5 | 6 | 7 |
|---|---|---|---|
| | (EBr/QTL) | | |
| 115 | 183 | 198 | 213 |
| 120 | 186 | 202 | 217 |
| 125 | 189 | 205 | 221 |
| 130 | 192 | 208 | 225 |
| 135 | 194 | 212 | 229 |
| 140 | 197 | 215 | 233 |

Source: IFDC Estimates derived from Tables 8.3.1 and 8.3.2.

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**Table 8.2.6. ETHIOPIA:Benefit Cost Ratios for Teff and Wheat at Varying Projected Prices for DAP and Grain**

Fertilizer and Transport Sector Assessment, IFDC 1993

**A.PRICES** — TEFF

| FERTILIZER COST(1) PER HA. | | WHITE TEFF FARMGATE PRICE | | | MIXED TEFF FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | EBr/HA | <---- EBr/Qtl ----> | | | | | |
| MINIMUM | 166 | 117 | 177 | 202 | 102 | 156 | 178 |
| AVERAGE | 181 | 117 | 177 | 202 | 102 | 156 | 178 |
| MAXIMUM | 196 | 117 | 177 | 202 | 102 | 156 | 178 |

**B.YIELD RESPONSE REQUIRED FOR BENEFIT COST RATIO OF 2:1**

| FERTILIZER COST PER HA. | | WHITE TEFF FARMGATE PRICE | | | MIXED TEFF FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | EBr/HA | <---- Qtl/Ha ----> | | | | | |
| MINIMUM | 166 | 4.26 | 2.81 | 2.47 | 4.88 | 3.19 | 2.80 |
| AVERAGE | 181 | 4.64 | 3.07 | 2.69 | 5.32 | 3.48 | 3.05 |
| MAXIMUM | 196 | 5.03 | 3.32 | 2.91 | 5.76 | 3.77 | 3.30 |

**C. YIELD RESPONSE (KG GRAIN/KG NUTRIENT) REQUIRED FOR BENEFIT COST RATIO OF 2:1**

| FERTILIZER NUTRIENT PER HA. | | WHITE TEFF FARMGATE PRICE | | | MIXED TEFF FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | KG | <---- Kg ----> | | | | | |
| MINIMUM | 64 | 6.65 | 4.40 | 3.85 | 7.63 | 4.99 | 4.37 |
| AVERAGE | 64 | 7.25 | 4.79 | 4.20 | 8.32 | 5.44 | 4.77 |
| MAXIMUM | 64 | 7.85 | 5.19 | 4.55 | 9.01 | 5.89 | 5.16 |

**A.PRICES** — WHEAT

| FERTILIZER COST(1) PER HA. | | WHITE WHEAT FARMGATE PRICE | | | MIXED WHEAT FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | EBr/HA | <---- EBr/Qtl ----> | | | | | |
| MINIMUM | 166 | 64 | 118 | 135 | 50 | 94 | 109 |
| AVERAGE | 181 | 64 | 118 | 135 | 50 | 94 | 109 |
| MAXIMUM | 196 | 64 | 118 | 135 | 50 | 94 | 109 |

**B.YIELD RESPONSE REQUIRED FOR BENEFIT COST RATIO OF 2:1**

| FERTILIZER COST PER HA. | | WHITE WHEAT FARMGATE PRICE | | | MIXED WHEAT FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | EBr/HA | <---- Qtl/Ha ----> | | | | | |
| MINIMUM | 166 | 7.78 | 4.22 | 3.69 | 9.96 | 5.30 | 4.57 |
| AVERAGE | 181 | 8.48 | 4.60 | 4.02 | 10.86 | 5.78 | 4.98 |
| MAXIMUM | 196 | 9.19 | 4.98 | 4.36 | 11.76 | 6.26 | 5.39 |

**C. YIELD RESPONSE (KG GRAIN/KG NUTRIENT) REQUIRED FOR BENEFIT COST RATIO OF 2:1**

| FERTILIZER NUTRIENT PER HA. | | WHITE WHEAT FARMGATE PRICE | | | MIXED WHEAT FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | KG | <---- Kg ----> | | | | | |
| MINIMUM | 64 | 12.16 | 6.59 | 5.76 | 15.56 | 8.28 | 7.14 |
| AVERAGE | 64 | 13.26 | 7.19 | 6.28 | 16.97 | 9.03 | 7.78 |
| MAXIMUM | 64 | 14.36 | 7.79 | 6.81 | 18.38 | 9.77 | 8.43 |

Notes:(1) Fertilizer costs based on 1 qtl DAP/hectare

(2) Fertilizer cost ranges derived from Table 8.2.5, based on 1994 price projections with an exchange rate of 5:1.

(3) Grain prices based on estimates in Table 8.2.2.

(4) Shaded areas indicate expected yield responses.

**Table 8.2.7 ETHIOPIA:Benefit Cost Ratios for Teff and Wheat at Varying Projected Prices for Fertilizer and Grain (DAP+UREA)**

Fertilizer and Transport Sector Assessment, IFDC 1993

**A.PRICES** — TEFF

| FERTILIZER COST(1) PER HA. | | WHITE TEFF FARMGATE PRICE | | | MIXED TEFF FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | EBr/HA | <---- EBr/Qtl ---- | | | | | > |
| MINIMUM | 242 | 117 | 177 | 202 | 102 | 156 | 178 |
| AVERAGE | 265 | 117 | 177 | 202 | 102 | 156 | 178 |
| MAXIMUM | 287 | 117 | 177 | 202 | 102 | 156 | 178 |

**B.YIELD RESPONSE REQUIRED FOR BENEFIT COST RATIO OF 2:1**

| FERTILIZER COST PER HA. | | WHITE TEFF FARMGATE PRICE | | | MIXED TEFF FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | EBr/HA | <---- Qtl/Ha ---- | | | | | > |
| MINIMUM | 242 | 6.21 | 4.10 | 3.59 | 7.12 | 4.65 | 4.08 |
| AVERAGE | 265 | 6.79 | 4.49 | 3.94 | 7.79 | 5.10 | 4.47 |
| MAXIMUM | 287 | 7.36 | 4.86 | 4.26 | 8.44 | 5.52 | 4.84 |

**C. YIELD RESPONSE (KG GRAIN/KG NUTRIENT) REQUIRED FOR BENEFIT COST RATIO OF 2:1**

| FERTILIZER NUTRIENT PER HA. | | WHITE TEFF FARMGATE PRICE | | | MIXED TEFF FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | KG | <---- Kg ---- | | | | | > |
| MINIMUM | 87 | 7.13 | 4.71 | 4.13 | 8.18 | 5.35 | 4.69 |
| AVERAGE | 87 | 7.81 | 5.16 | 4.52 | 8.96 | 5.86 | 5.13 |
| MAXIMUM | 87 | 8.46 | 5.59 | 4.90 | 9.70 | 6.34 | 5.56 |

**A.PRICES** — WHEAT

| FERTILIZER COST(1) PER HA. | | WHITE WHEAT FARMGATE PRICE | | | MIXED WHEAT FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | EBr/HA | <---- EBr/Qtl ---- | | | | | > |
| MINIMUM | 242 | 64 | 118 | 135 | 50 | 94 | 109 |
| AVERAGE | 265 | 64 | 118 | 135 | 50 | 94 | 109 |
| MAXIMUM | 287 | 64 | 118 | 135 | 50 | 94 | 109 |

**B.YIELD RESPONSE REQUIRED FOR BENEFIT COST RATIO OF 2:1**

| FERTILIZER COST PER HA. | | WHITE WHEAT FARMGATE PRICE | | | MIXED WHEAT FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | EBr/HA | <---- Qtl/Ha ---- | | | | | > |
| MINIMUM | 242 | 11.34 | 6.15 | 5.38 | 14.52 | 7.72 | 6.66 |
| AVERAGE | 265 | 12.42 | 6.74 | 5.89 | 15.90 | 8.46 | 7.29 |
| MAXIMUM | 287 | 13.45 | 7.30 | 6.38 | 17.22 | 9.16 | 7.90 |

**C. YIELD RESPONSE (KG GRAIN/KG NUTRIENT) REQUIRED FOR BENEFIT COST RATIO OF 2:1**

| FERTILIZER NUTRIENT PER HA. | | WHITE WHEAT FARMGATE PRICE | | | MIXED WHEAT FARMGATE PRICE | | |
|---|---|---|---|---|---|---|---|
| | | MINIMUM | AVERAGE | MAXIMUM | MINIMUM | AVERAGE | MAXIMUM |
| | KG | <---- Kg ---- | | | | | > |
| MINIMUM | 87 | 13.04 | 7.07 | 6.18 | 16.69 | 8.88 | 7.66 |
| AVERAGE | 87 | 14.28 | 7.74 | 6.77 | 18.28 | 9.72 | 8.38 |
| MAXIMUM | 87 | 15.46 | 8.39 | 7.33 | 19.79 | 10.53 | 9.08 |

Notes:(1) Fertilizer costs based on 1 qtl DAP + 0.5 qtl Urea/hectare

(2) Fertilizer cost ranges derived from Table 8.2.5, based on 1994 price projections with an exchange rate of 5:1.

(3) Grain prices based on estimates in Table 8.2.2

(4) Shaded values indicate expected achievement of yield responses

## Table 8.3.1.ETHIOPIA: DAP Procurement Cost Projection 1994 FOT Assab

Fertilizer and Transport Assessment , IFDC 1993

Exchange Rates: Commodity: 5 Other: = 6

| ITEM | US $/MT | EBr/MT | EBr/QTL | 25,000 MT/Yr EBr TOTAL |
|---|---|---|---|---|
| F.O.B Stowed USG(incl. bags + 5%) (1) | 135.00 | 675.00 | 67.50 | 16875000 |
| Freight USG port to Assab | 35.00 | 175.00 | 17.50 | 4375000 |
| Insurance @ 1% | 1.35 | 6.75 | 0.68 | 168750 |
| **C.I.F. Assab Free Out** | 171.35 | 856.75 | 85.68 | 21418750 |
| Bank Charges @ 1.5% C.I.F. | 2.57 | 12.85 | 1.29 | 321281 |
| Supervision Fee (2) | 1.50 | 9.00 | 0.90 | 225000 |
| MTSC Transit/Administration Charges (3) | 19.69 | 118.12 | 11.81 | 2953000 |
| Port Charges | 1.00 | 6.00 | 0.60 | 150000 |
| Stevedoring (4) | 5.00 | 30.00 | 3.00 | 750000 |
| Crainage(4), 2,000 MT/day (4) | 2.00 | 12.00 | 1.20 | 300000 |
| Equipment in hold (4) | 0.50 | 3.00 | 0.30 | 75000 |
| Bagging | 16.00 | 96.00 | 9.60 | 2400000 |
| Losses @ 0.5% C.I.F. Free Out | 0.86 | 5.14 | 0.51 | 128513 |
| Administration and Overhead | 0.00 | 12.00 | 1.2 | 300000 |
| Interest @ 14% for 3 months on 75% | 5.79 | 30.47 | 3.05 | 761816 |
| **For 25% of shipment (5)** | | | | |
| Local Freight Assab 10Km @ 0.45 | 0.19 | 1.13 | 0.11 | 28125 |
| Unloading/loading Assab Storage | 0.42 | 2.50 | 0.25 | 62500 |
| Storage at Assab for 1 month | 0.25 | 1.50 | 0.15 | 37500 |
| Interest @ 14% for 1 month on 75% | 1.99 | 10.47 | 1.05 | 261725 |
| **Procurement Cost F.O.T. Assab** | 229.09 | 1206.93 | 120.69 | 30173210 |
| Procurement Margin (6) | 2.86 | 15.09 | 1.51 | 377165 |
| **Distributor Price F.O.T., Assab** | 231.96 | 1222.01 | 122.20 | 30550375 |

Notes: (1) Stowed United States Gulf port.

(2) Charge incurred whether service needed or not.

(3)This fee is extortionate and should be renegotiated.

(4)On cif free out (charter party) terms, these costs are currently cargo costs, not ship costs. However, previous fob costs were inflated to include these costs and, also, the cost of bagging.

(5) Assumes 25% of discharge is temporarily stored at Assab

(6)Assumes a 20% return on equity investment of EBr 7.5 million (25% of total procurement cost in counterpart funds

## Table 8.3.2.ETHIOPIA: DAP Distribution and Marketing Cost Projection 1994

Fertilizer and Transport Assessment , IFDC 1993

| | US $/MT | EBr/MT | EBr/QTL | 10,000 MT/Yr EBr TOTAL |
|---|---|---|---|---|
| **DISTRIBUTOR MARKETING COST BUILD-UP** | | | | |
| **Distributor Cost F.O.T., Assab** | 231.96 | 1222.01 | 122.20 | 12220150 |
| Freight Assab - Marketing Center | | | | |
| 1057 Km @ .38/KmT (1) | 66.94 | 401.66 | 40.17 | 4016600 |
| Unloading into store | 0.83 | 5.00 | 0.50 | 50000 |
| **Cost Into Store** | 299.73 | 1628.67 | 162.87 | 16286750 |
| Warehousing @ 50% aver. stock | 2.00 | 12.00 | 1.20 | 120000 |
| Interest @ 14% for 5 months on 50% | 8.74 | 47.50 | 4.75 | 475030 |
| Load out of store | 0.83 | 5.00 | 0.50 | 50000 |
| Losses @ 0.25% | 0.75 | 4.07 | 0.41 | 40717 |
| Overhead Costs | 0.17 | 1.00 | 0.10 | 10000 |
| **Cost ex-Store** | 312.22 | 1698.25 | 169.82 | 16982497 |
| Distributor Margin | 5.00 | 30.00 | 3.00 | 300000 |
| Wholesale Price ex-store | 317.22 | 1728.25 | 172.82 | 17282497 |
| Distributor Margin as % markup | 1.60% | 1.77% | 1.77% | 1.77% |
| Equity 50% of Capital, 4 turnovers | 39.03 | 212.28 | 21.23 | 2122812 |
| R.O.I. for Distributor | | | | 14.13% |
| **RETAILER COST BUILD-UP** | | | | |
| **Retailer Costs** | | | | **200 MT/Yr** |
| Wholesale Cost FOT | 317.22 | 1728.25 | 172.82 | 345650 |
| Freight @ 0.75 x 50 Km | 6.25 | 37.50 | 3.75 | 7500 |
| Unloading | 0.83 | 5.00 | 0.50 | 1000 |
| Warehouse cost | 0.08 | 0.50 | 0.05 | 100 |
| Interest @ 14% for 5 months on 10% | 0.86 | 5.17 | 0.52 | 1033 |
| Losses @ 0.25% | 0.81 | 4.43 | 0.44 | 885 |
| Overhead costs | 0.17 | 1.00 | 0.10 | 200 |
| Total Cost In store | 326.23 | 1781.8[illegible] | 178.18 | 356369 |
| Retail Margin | 4.17 | 25.00 | 2.50 | 5000 |
| **Retail Price** | 330.40 | 1806.84 | 180.68 | 361369 |
| Retailer Margin as % mark-up | 1.26% | 1.38% | 1.38% | 1.38% |
| Equity 50% of Capital,10 turnovers | 32.62 | 178.18 | 17.82 | 35637 |
| R.O.I. for Retailer | | | | 14.03% |

Notes:

(1)Average freight cost from Assab based on 880 Km @ 0.36 EBr/MT/Km plus 177 Km @ 0.495 EBr/MT/Km. These rates are 10% above current rates. Maximum and minimum freight costs are estimated at EBr/MT 550 and 250 respectively.

## Table 8.3.3.ETHIOPIA: UREA Procurement Cost Projection 1994 FOT Assab

Fertilizer and Transport Assessment , IFDC 1993

Exchange Rates: Commodity: 5 Other: = 6

| ITEM | US $/MT | EBr/MT | EBr/QTL | 25,000 MT/Yr EBr TOTAL |
|---|---|---|---|---|
| F.O.B Stowed ME(incl. bags + 5%) (1) | 115.00 | 575.00 | 57.50 | 14375000 |
| Freight ME port to Assab | 20.00 | 100.00 | 10.00 | 2500000 |
| Insurance @ 1% | 1.15 | 5.75 | 0.58 | 143750 |
| **C.I.F. Assab Free Out** | 136.15 | 680.75 | 68.08 | 17018750 |
| Bank Charges @ 1.5% C.I.F. | 2.04 | 10.21 | 1.02 | 255281 |
| Supervision Fee (2) | 1.50 | 9.00 | 0.90 | 225000 |
| MTSC Transit/Administration Charges (3) | 19.69 | 118.12 | 11.81 | 2953000 |
| Port Charges | 1.00 | 6.00 | 0.60 | 150000 |
| Stevedoring (4) | 5.00 | 30.00 | 3.00 | 750000 |
| Crainage(4), 2,000 MT/day (4) | 2.00 | 12.00 | 1.20 | 300000 |
| Equipment in hold (4) | 0.50 | 3.00 | 0.30 | 75000 |
| Bagging | 16.00 | 96.00 | 9.60 | 2400000 |
| Losses @ 0.5% C.I.F. Free Out | 0.68 | 4.08 | 0.41 | 102113 |
| Administration and Overhead | 0.00 | 12.00 | 1.2 | 300000 |
| Interest @ 14% for 3 months on 75% | 4.84 | 25.76 | 2.58 | 643890 |
| **For 25% of shipment (5)** | | | | |
| Local Freight Assab 10Km @ 0.45 | 0.19 | 1.13 | 0.11 | 28125 |
| Unloading/loading Assab Storage | 0.42 | 2.50 | 0.25 | 62500 |
| Storage at Assab for 1 month | 0.25 | 1.50 | 0.15 | 37500 |
| Interest @ 14% for 1 month on 75% | 1.66 | 8.86 | 0.89 | 221385 |
| **Procurement Cost FOT Assab** | 191.92 | 1020.90 | 102.09 | 25522544 |
| Procurement Margin (6) | 2.40 | 12.76 | 1.28 | 319032 |
| **Distributor Price F.O.T., Assab** | 194.32 | 1033.66 | 103.37 | 25841576 |

Notes: (1) Stowed Middle East port.

(2) Charge incurred whether service needed or not.

(3)This fee is extortionate and should be renegotiated.

(4)On cif free out (charter party) terms, these costs are currently cargo costs, not ship costs. However, previous fob costs were inflated to include these costs and, also, the cost of bagging.

(5) Assumes 25% of discharge is temporarily stored at Assab

(6)Assumes a 20% return on equity investment of EBr 7.5 million (25% of total procurement cost)

## Table 8.3.4.ETHIOPIA: UREA Distribution and Marketing Cost Projection 1994

Fertilizer and Transport Assessment , IFDC 1993

| | US $/MT | EBr/MT | EBr/QTL | 10,000 MT/Yr EBr TOTAL |
|---|---|---|---|---|
| **DISTRIBUTOR MARKETING COST BUILD-UP** | | | | |
| **Distributor Cost F.O.T., Assab** | 194.32 | 1033.66 | 103.37 | 10336630 |
| Freight Assab - Marketing Center | | | | |
| 1236 Km @ .38/KmT (1) | 78.28 | 469.68 | 46.97 | 4696800 |
| Unloading into store | 0.83 | 5.00 | 0.50 | 50000 |
| **Cost Into Store** | 273.44 | 1508.34 | 150.83 | 15083430 |
| Warehousing @ 50% aver. stock | 2.00 | 12.00 | 1.20 | 120000 |
| Interest @ 14% for 5 months on 50% | 7.98 | 43.99 | 4.40 | 439933 |
| Load out of store | 0.83 | 5.00 | 0.50 | 50000 |
| Losses @ 0.25% | 0.68 | 3.77 | 0.38 | 37709 |
| Overhead Costs | 0.17 | 1.00 | 0.10 | 10000 |
| **Cost ex-Store** | 285.09 | 1574.11 | 157.41 | 15741072 |
| Distributor Margin | 5.00 | 30.00 | 3.00 | 300000 |
| Wholesale Price ex-store | 290.09 | 1604.11 | 160.41 | 16041072 |
| Distributor Margin as % markup | 1.75% | 1.91% | 1.91% | 1.91% |
| Equity 50% of Capital. 4 turnovers | 35.64 | 196.76 | 19.68 | 1967634 |
| R.O.I. for Distributor | | | | 15.25% |
| **RETAILER COST BUILD-UP** | | | | |
| **Retailer Costs** | | | | **200 MT/Yr** |
| Wholesale Cost FOT | 290.09 | 1604.11 | 160.41 | 320821 |
| Freight @ 0.75 x 50 Km | 6.25 | 37.50 | 3.75 | 7500 |
| Unloading | 0.83 | 5.00 | 0.50 | 1000 |
| Warehouse cost | 0.08 | 0.50 | 0.05 | 100 |
| Interest @ 14% for 5 months on 10% | 0.80 | 4.80 | 0.48 | 961 |
| Losses @ 0.25% | 0.74 | 4.12 | 0.41 | 823 |
| Overhead costs | 0.17 | 1.00 | 0.10 | 200 |
| Total Cost In store | 298.97 | 1657.03 | 165.70 | 331406 |
| Retail Margin | 4.17 | 25.00 | 2.50 | 5000 |
| **Retail Price** | 303.14 | 1682.03 | 168.20 | 336406 |
| Retailer Margin as % mark-up | 1.37% | 1.49% | 1.49% | 1.49% |
| Equity 50% of Capital,10 turnovers | 29.90 | 165.70 | 16.57 | 33141 |
| R.O.I. for Retailer | | | | 15.09% |

Notes:

(1)Average freight cost from Assab based on 882Km @ 0.36 EBr/MT/Km plus 177 Km @ 0.495 EBr/MT/Km. These rates are 10% above current rates. Maximum and minimum freight costs are estimated at EBr/MT 550 and 251 respectively.

**Table 8.4.1 ETHIOPIA: Estimated Implicit Subsidy, 1993**

Fertilizer and transport Sector Assessment, IFDC,1993

| COST ITEM | ACTUAL RATE | TOTAL COST (EBr million) | MARKET RATE | TOTAL COST (EBr million) | TOTAL IMPLICIT SUBSIDY (EBr million) |
|---|---|---|---|---|---|
| Exchange Rate (EBr:US$) | 5:1 | 125.9 | 5.3:1 | 133.5 | 7.6 |
| Distribution Credit Interest (%) | 14 | [1] 19.19 | 14 | [2] 25.3 | 6.1 |
| Storage Charges (EBr/month/mt) | 1.4 | [3] 1.7 | 7.8 | [4] 13.6 | 11.9 |
| Freight Rates (EBr/mt/km) | 30 | [5] 45.9 | 33 | [6] 50.0 | 4.1 |
| Farm Credit Interest (%) | 11 | [7] 2.7 | 14 | [8] 3.4 | 0.7 |
| Total | | 195.3 | | 225.7 | 30.4 |

Notes: (1) AISCO interest charge on DAP and urea 1993.
(2) Interest cost calculated on average AISCO stock level, 1993
(3) Actual storage charge by AISCO, 1993.
(4) Estimated storage charge for 90,000 mt storage for full year.
(5) AISCO freight cost 1993.
(6) Estimated freight cost @ 10% higher rate on long-haul freight.
(7)Interest charge on AIDB loans, 1993 @ 11% interest rate.
(8)Interest charge on AIDB loans, 1993 @ 14% interest rate.

**Table 8.4.2 ETHIOPIA: Estimated Blended Price Calculations for 1994**

Fertilizer and Transport Sector Assessment, IFDC,1993

| | UREA | | | DAP | | |
|---|---|---|---|---|---|---|
| | (Qtl) | (EBr/Qtl) | Total Value (EBr) | (Qtl) | (EBr/Qtl) | Total Value (EBr) |
| Carry-over stocks | 250,000 | 132.68 | | 1,320,000 | 149.77 | |
| 1993 Farmer price | | 156.09 | 39,022,500 | | 176.2 | 232,584,000 |
| Less O/H and margin | | 10.18 | 2,545,000 | | 10.18 | 13,437,600 |
| Less dealer margin | | 7.4 | 1,850,000 | | 7.4 | 9,768,000 |
| | | 173.67 | 43,417,500 | | 193.78 | 255,789,600 |
| Plus interest for 1993 | | 24.31 | 6,078,450 | | 27.13 | 35,810,544 |
| Net Cost of Stocks | | 197.98 | 49,495,950 | | 220.91 | 291,600,144 |
| 1994 Procurement | 200,000 | 160.41 | 32,082,000 | 1,000,000 | 180 | 180,000,000 |
| O/H and margin | | 11 | 2,200,000 | | 11 | 11,000,000 |
| Dealer margin | | 7 | 1,400,000 | | 7 | 7,000,000 |
| Total cost | | 178.41 | 35,682,000 | | 198 | 198,000,000 |
| Average Retail Value | | 189.28 | 85,177,950 | | 211.03 | 489,600,144 |
| FAO Sales Forecast | 300,000 | | | 1,750,000 | | |
| Subsidy @ 12% | | 16.68 | 5,004,000 | | 25.32 | 44,317,254 |
| Subsidized Retail Price | | 172.60 | | | 185.71 | |
| Increase over 1993 | | 30.09% | | | 24.00% | |

**Table 8.5.1.ETHIOPIA: Calculation of Seasonal Prices for Distributors**

Fertilizer and Transport Sector Assessment, IFDC,1993

| MONTH | IMPORTS MT | DISPATCH PER MTH. | STOCKS MT | DISCOUNT EBr/MT | TOTAL DISCOUNT | BASE PRICE | MONTHLY PRICE | TOTAL REVENUI |
|---|---|---|---|---|---|---|---|---|
| OPENING | | | 5000 | | | 1222.2 | | |
| OCT | | 2000 | 3000 | 0 | 0 | 1249 | 1249 | 2498000 |
| NOV | 25000 | 8000 | 20000 | 120 | 960000 | 1249 | 1129 | 9032000 |
| DEC | | 10000 | 10000 | 100 | 1000000 | 1249 | 1149 | 11490000 |
| JAN | 25000 | 10000 | 25000 | 90 | 900000 | 1249 | 1159 | 11590000 |
| FEB | 25000 | 10000 | 40000 | 70 | 700000 | 1249 | 1179 | 11790000 |
| MAR | 25000 | 20000 | 45000 | 60 | 1200000 | 1249 | 1189 | 23780000 |
| APRIL | 25000 | 20000 | 50000 | 30 | 600000 | 1249 | 1219 | 24380000 |
| MAY | 25000 | 30000 | 45000 | 0 | 0 | 1249 | 1249 | 37470000 |
| JUNE | 25000 | 40000 | 30000 | 0 | 0 | 1249 | 1249 | 49960000 |
| JULY | 25000 | 30000 | 25000 | 0 | 0 | 1249 | 1249 | 37470000 |
| AUG | | 20000 | 5000 | 0 | 0 | 1249 | 1249 | 24980000 |
| SEPT | | 0 | 5000 | 0 | 0 | 1249 | 1249 | 0 |
| TOTAL | 200000 | | | | 5360000 | | | 244440000 |
| AVERAGE COST OVER TOTAL TONNAGE | | | | | 26.80 | | | 1222.2 |

Note: Base Price/mt EBr 1222.20 before seasonal discount cost

Base price/mt after seasonal discount cost added = Ebr 1249.00/mt (1222.2 + 26.6)

Monthly discount based on interest EBr 18.6/month; storage EBr 1.20/month, and incentive EBr 2.20/month/mt

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## Table 8.4.2 ETHIOPIA: Estimated Blended Price Calculations for 1994

Fertilizer and Transport Sector Assessment, IFDC,1993

| | UREA | | | DAP | | |
|---|---|---|---|---|---|---|
| | (Qtl) | (EBr/Qtl) | Total Value (EBr) | (Qtl) | (EBr/Qtl) | Total Value (EBr) |
| Carry-over stocks | 250,000 | 132.68 | | 1,320,000 | 149.77 | |
| 1993 Farmer price | | 156.09 | 39,022,500 | | 176.2 | 232,584,000 |
| Less O/H and margin | | 10.18 | 2,545,000 | | 10.18 | 13,437,600 |
| Less dealer margin | | 7.4 | 1,850,000 | | 7.4 | 9,768,000 |
| | | 173.67 | 43,417,500 | | 193.78 | 255,789,600 |
| Plus interest for 1993 | | 24.31 | 6,078,450 | | 27.13 | 35,810,544 |
| Net Cost of Stocks | | 197.98 | 49,495,950 | | 220.91 | 291,600,144 |
| 1994 Procurement | 200,000 | 160.41 | 32,082,000 | 1.000,000 | 180 | 180,000,000 |
| O/H and margin | | 11 | 2,200,000 | | 11 | 11,000,000 |
| Dealer margin | | 7 | 1,400,000 | | 7 | 7,000,000 |
| Total cost | | 178.41 | 35,682,000 | | 198 | 198,000,000 |
| Average Retail Value | | 189.28 | 85,177,950 | | 211.03 | 489,600,144 |
| FAO Sales Forecast | 300,000 | | | 1,750,000 | | |
| Subsidy @ 12% | | 16.68 | 5,004,000 | | 25.32 | 44,317,254 |
| Subsidized Retail Price | | 172.60 | | | 185.71 | |
| Increase over 1993 | | 30.09% | | | 24.00% | |

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## Table 8.5.1.ETHIOPIA: Calculation of Seasonal Prices for Distributors

Fertilizer and Transport Sector Assessment, IFDC,1993

| MONTH | IMPORTS MT | DISPATCH PER MTH. | STOCKS MT | DISCOUNT EBr/MT | TOTAL DISCOUNT | BASE PRICE | MONTHLY PRICE | TOTAL REVENUE |
|---|---|---|---|---|---|---|---|---|
| OPENING | | | 5000 | | | 1222.2 | | |
| OCT | | 2000 | 3000 | 0 | 0 | 1249 | 1249 | 2498000 |
| NOV | 25000 | 8000 | 20000 | 120 | 960000 | 1249 | 1129 | 9032000 |
| DEC | | 10000 | 10000 | 100 | 1000000 | 1249 | 1149 | 11490000 |
| JAN | 25000 | 10000 | 25000 | 90 | 900000 | 1249 | 1159 | 11590000 |
| FEB | 25000 | 10000 | 40000 | 70 | 700000 | 1249 | 1179 | 11790000 |
| MAR | 25000 | 20000 | 45000 | 60 | 1200000 | 1249 | 1189 | 23780000 |
| APRIL | 25000 | 20000 | 50000 | 30 | 600000 | 1249 | 1219 | 24380000 |
| MAY | 25000 | 30000 | 45000 | 0 | 0 | 1249 | 1249 | 37470000 |
| JUNE | 25000 | 40000 | 30000 | 0 | 0 | 1249 | 1249 | 49960000 |
| JULY | 25000 | 30000 | 25000 | 0 | 0 | 1249 | 1249 | 37470000 |
| AUG | | 20000 | 5000 | 0 | 0 | 1249 | 1249 | 24980000 |
| SEPT | | 0 | 5000 | 0 | 0 | 1249 | 1249 | 0 |
| TOTAL | 200000 | | | | 5360000 | | | 244440000 |
| AVERAGE COST OVER TOTAL TONNAGE | | | | | 26.80 | | | 1222.2 |

Note: Base Price/mt EBr 1222.20 before seasonal discount cost

Base price/mt after seasonal discount cost added = Ebr 1249.00/mt (1222.2 + 26.8)

Monthly discount based on interest EBr 18.6/month; storage EBr 1.20/month, and incentive EBr 2.20/month/mt

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# 9. Credit

## 9.1 The Role of Credit in a Competitive Market System

The availability of soundly managed commercial credit for procurement, distribution and farmers is essential for the development of an open competitive fertilizer market and increased fertilizer use. Importers require finance for counterpart funds, distributors, wholesalers and retailers to maintain inventories, and farm production credit is essential when farmers have limited or no cash resources to purchase inputs such as fertilizer. Lack of farm credit availability was a contributing factor to reduced fertilizer use in 1992/93.

Significant changes have occurred in the financial sector since 1991, and the total requirements and cost of fertilizer credit have increased as the result of macroeconomic policy changes (Section 1). Several significant general credit constraints still exist for both the development of a privatized fertilizer marketing system and the availability of farm credit including (a) preferential interest rates for agriculture, (b) the lack of private property ownership which limits collateral in the private sector, and (c) the limited infrastructure of the banking system.

Although interest rates have been increased under the reforms, preferential interest rates still exist for agriculture. These range from 11%-12% compared to 14%-15% for other sectors. The central bank rate is 10%, and therefore the rate differential on agricultural loans for the CBE and AIDB is 1%-2% compared to 4%-5% for other lending. The CBE reported that it is not interested in loaning to agriculture at such a slim lending margin because all of its rural branches are already losing money due to high operating costs. The effect of this interest rate policy is to restrict the quantity of credit available to agriculture. It is strongly recommended that agriculture's preferential rate be abolished in order to increase the supply of credit to the sector.

The lack of property ownership rights in urban and rural areas restricts the ability of farmers and the private business sector to provide collateral. A recommendation on this is

beyond the scope of this study, but the impact of individual property ownership rights on capital formation and private sector business development needs to be considered by the TGE in its policy development.

The limited infrastructure of the banking system, with only 29 AIDB branches and approximately 130 CBE branches, is a major constraint on commercial activities, particularly in rural areas. Although the banks have been given increased autonomy and the CBE is now allowed to compete with AIDB, further deregulation of the financial system and the operation of private banks should be a priority for increasing the total level of competitive financial services available.

**9.2 Procurement Credit Developments and Requirements**

AIDB traditionally funded AISCO for the importation of farm inputs, including fertilizer, with the proceeds of loans obtained from IFAD, IDA, and NBE. AIDB was bankrupt in 1992/93 due to a more than EBr 2 billion debt from State Farms and EBr 78 million arrears from Service Cooperatives and was unable to fund AISCO fertilizer import counterpart funds. The Council of Representatives has approved a Proclamation for transferring the debt to the Ministry of Finance, and it is hoped that the Bank will be recapitalized and re-established very soon. The TGE was reported to have set up a debt management body to recover outstanding bad debts and loans, but AID Bank must attempt to recover as many Service Cooperative arrears as possible. It is reported that the African Development Bank (ADB) will provide a further US$ 30 million for refinancing. In addition, IFAD is negotiating with AID Bank to provide loan assistance in support of restructuring, branch expansion, and technical assistance. In AID Bank's restructuring proposals, steps are to be taken to generate deposit mobilization (never undertaken in the past by AID Bank), to provide distribution credit to the private sector fertilizer dealers and farm production credit to the reconstituted cooperatives.

As a result of the financial problems with AID Bank, AISCO was faced with serious problems in financing counterpart fund payments in the past few years. Payments have tended to be late, and in 1993 imports funded by the EU had not had counterpart funds

deposited by AISCO as late as September. Although AISCO now has a fertilizer procurement L/C line of credit with the CBE for EBr 100 million, excessive inventory levels in 1993 have created serious cash flow problems for AISCO and late payment of counterpart funds.

During 1992/93 the CBE also provided L/C and overdraft facilities to EAL, the private sector importer. Interest rates and charges for both AISCO and EAL were the same, but the AISCO credit lines were made without substantive collateral backing, apparently under instructions from the Ministry of Finance. The CBE was also required to fund AIDB in 1992/93 for farm production credit.

With the low level of imports required in 1994 due to the high level of carry-over stocks, it is estimated that total counterpart funds required will be approximately EBr 100-120 million assuming a 5:1 exchange rate. In 1995 the amount will probably be almost double this to return to a more normal import schedule and growth in the market and could increase with exchange rate adjustments. As the private sector will be required to furnish equity funds for some portion of the counterpart fund payments, this will reduce the total credit required. The CBE will probably need to use the fertilizer stocks of private sector importers as collateral for large procurement loans. It is believed that this type of security was used this year for EAL. No specific directions to CBE on allocating funds to the private sector should be enforced by the NBE; rather it is recommended that the CBE should be informed of the total annual estimate of counterpart funds required and any specific portion available for private sector fertilizer procurement and be allowed to judge the commercial risk of each private sector loan application.

### 9.3 Distribution Credit Developments and Requirements

Under the old policies, distribution credit was supplied to AISCO, and continues to be, by the CBE. AISCO has a EBr 100 million overdraft facility which represents approximately 100% financing of its working capital. Distribution credit requirements for the peasant sector fertilizer sales are estimated to increase from EBr 53 million in 1993/94 to EBr 93 million in 1997/98 in real terms. These estimates are based on the forecasts

presented in Section 3 and the estimated credit requirements per product ton sold by distributors and retailers as estimated in Section 8. These estimates assume that the private sector will invest 50% equity in inventory and turn stock over several times.

No concerted effort was made by the CBE to provide fertilizer dealers with distribution credit, although overdraft facilities or medium term loans were available based on sound commercial credit practice. AISCO dealers sourcing supplies from MOA MCs were forced to deposit money with CBE prior to taking delivery for each order placed, a time wasting and inconvenient practice but necessitated by the lack of any financial arrangements at MCs.

CBE claims to be very interested in securing fertilizer distribution credit business at the trade sector interest rate of 14%-14.5%, but this will require removal of the preferential interest rate for agriculture and a more convenient line of credit for private sector dealers.

From discussions with Staff in both banks it is apparent that a considerable amount of credit management and customer orientation training is required for distribution credit, particularly for branch staff. With a reduced level of distribution credit required, there should be no problem in mobilizing funds, provided AID Bank is refinanced.

### 9.4 Farm Production Credit Developments and Requirements

The impact of devaluation and other macroeconomic reforms on farm production credit needs is large. Possibly as much as 80% of fertilizer sales were made on credit terms prior to 1990 with the total credit from AID Bank averaging around EBr 70 million/year. These credit sales may have been inflated somewhat because some Service Cooperatives were obtaining credit but selling to farmers on a cash basis where farmers were in credit arrears. The CBE was not allowed to provide farm credit or was restricted from lending to farmers in proximity to AID Bank branches, a restriction that no longer applies.

In 1991/92 cash sales of fertilizer in the peasant sector increased to 59% with three regions exhibiting very high cash sale proportions: South Shoa–66%, Arsi–76%, and

Gojjam–97%. The average for all other regions was 42%. Cash sales continued at a high level in 1992/93 with credit sales only accounting for approximately 15% of total sales. The data may overestimate the fall in credit sales to farmers in the past 2 years because previously it was recorded at the SC level, not at the Peasant Association level. AID Bank also reports that in 1992/93 farmers chose to buy in cash rather than pay credit arrears to both functioning and nonfunctioning SCs.

Total fertilizer sales values for the next 5 years are forecast to increase from EBr 244 million to EBr 429 million at 1993 prices. The proportion of these values that will need to be on credit is problematical, but it is assumed that credit facilities should be available for at least 50% of the total sales. On this basis the farm fertilizer credit needs for the next 5 years will increase from EBr 122 million to EBr 215 million in 1997/98. The substantial growth in credit requirements will need to be funded.

Both AID Bank and CBE should be supplying farm production credit to ensure market coverage and supply. This will require an increase in interest rates for the agricultural sector.

Farmer groups should be given credit for farm inputs by AIDB in the form of credit vouchers payable to the fertilizer supplier of the farmer groups' choice. In this way the farm production credit can be channelled through the private, public and cooperative retail sectors. It is unlikely that the CBE will be interested in supplying farm production credit directly to farmer groups. This is administratively expensive. Private sector dealers are, however, an excellent channel for farmer credit. Experience in many countries has shown that such dealers obtain very high collection rates and reduce administrative expenses to the banking system. It is therefore recommended that the CBE and AIDB should develop credit lines specifically for this purpose. This would be more easily developed if property ownership was available for use as collateral.

# 10. Administrative and Procedural Arrangements

## 10.1 MOA Fertilizer Planning and Monitoring Unit

Private sector import and distribution will call for changes in present administrative arrangements for monitoring the fertilizer market. MOA fertilizer planning, monitoring and coordination functions will be increased and it will become the focus for interaction with the private sector. It is recommended that MOA establish a Fertilizer Planning and Monitoring Unit to effectively handle these increased responsibilities and to provide a forum for government/private sector interaction. This unit will take over the responsibilities of AISCO in this area and expand upon current AISCO activities.

One of the primary responsibilities of the unit will be to monitor, on a continuous basis, the availability of fertilizers in the market and prices at the farm level. It will also maintain a continuous monitoring of international prices and availability in order to advise the MOA Fertilizer Committee and the Donor Committee of international market developments. During the initial period, it will be desirable to involve the MOA in the scheduling of donor funds. It is recommended that the proposed unit should be responsible for monitoring demand, stock levels and developing total import requirements.

It is recommended that because some of the functions of the proposed MOA fertilizer planning and monitoring unit are now performed by AISCO, some staff transfer from AISCO to the unit could provide the initial staffing nucleus and at the same time reduce the overhead cost of AISCO. Development of this unit is well suited to donor support.

The unit should also be required to maintain a register of fertilizer importers, distributors, wholesalers and retailers to provide information on market coverage in terms of outlets.

### 10.2 Fertilizer Importer/Distributor Association

As private sector importers and distributors emerge the MOA should encourage the formation of a Fertilizer Importers and Distributors Association (FIDA) which would represent all importers and distributors of fertilizer in Ethiopia. There should be no special qualifications for membership in the association and membership should be open to all present or potential importers/distributors. It is envisaged that the association would provide the private sector with consultative representation to MOA and the Donor Committee. It would prepare and submit the schedule of import requirements for its members as well as details of sales, stocks and imports at intervals during the year. It would also be the focus for the training of retailers in the proper use of fertilizers. The association should not be allowed to import on its own account as this would reduce competition in procurement.

### 10.3 Pricing and Subsidy Administration

During 1994 it is recommended that a maximum recommended retail price should be maintained. Complete price decontrol requires a strong degree of competition between competing distribution networks and the presence of multiple retail outlets in most locations. It is not clear to what extent this will develop during 1994. The current estimation of AISCO's costs, including price blending, should continue for another year. Subsidy calculation expressed as a percentage reduction of the recommended retail price should be paid to importers. Overinvoicing as to quantity can be prevented by checking the quantity bagged with the Bill of Lading. This function is within the jurisdiction of the customs authority and enhanced vigilance by them should keep the situation under control. The TGE may also insist upon the employment of a reputed inspection agency at the port of loading.

By 1995 it should be possible to completely deregulate retail prices given the development of several distribution networks and reduced carry-over stocks held by AISCO. It is essential that this be done to overcome the constraints of panterritorial pricing and allow efficiencies in distribution to develop.

**10.4 Fertilizer Legislation**

While all fertilizer procurement and marketing was under government control there was no need for comprehensive fertilizer legislation. With the advent of private sector participation such legislation is required to protect consumer interests. It is recommended that the TGE should enact a comprehensive fertilizer regulation act covering all aspects of product specifications, registration, labelling, and weights, and prescribing penalties for misrepresentation, adulteration, and underweight packages. The MOA should be empowered to enter any registered fertilizer dealer's, wholesaler's, or distributor's store or warehouse for the purposes of taking fertilizer samples for analysis by the Ethiopian Standards Authority. These powers should be applied for routine checks and in the cases of complaints by farmers.

# 11. Issues, Recommendations, and Implementation

## 11.1 Fertilizer Sector Issues and Recommendations

The demise of the Service Cooperatives has made it more difficult for peasant farmers to conveniently gain access to fertilizer supplies and credit. The development of a competitive private sector fertilizer market in Ethiopia can be expected to improve availability of fertilizer and services to peasant farmers that will lead directly to increases in use and that increased use will result in higher production and higher rural incomes. The transition will take time and require adjustment to Government policies and institutions and development of the private sector. The ultimate objective is to establish a viable, competitive private sector capable of efficiently procuring fertilizer imports and marketing these throughout the agricultural regions through multiple channels, thus providing choice of competitively priced, unsubsidized supplies to farmers with access to credit. A phased diminution of the role of the Government and its agencies is advocated while the private sector is allowed and encouraged to develop its role.

The primary issues involved in increasing availability of fertilizer supplies for farmers, through the development of multiple channels of numerous retail outlets, are:

(1) the provision of equal opportunities for the private and public sectors in procurement, distribution and retailing.
(2) increased credit availability for consumption.
(3) price deregulation and subsidy removal.
(4) improved private sector skills in fertilizer procurement and marketing.
(5) improved sector information monitoring.

Secondary issues which need to be addressed include:

(6) fertilizer legislation.
(7) improved dissemination of fertilizer research findings.
(8) development of fertilizer product mix.

**(1) Equal Opportunities in Procurement** – Inability of most potential private sector importers/distributors to finance counterpart funds for large shipments of fertilizer can be addressed immediately by ensuring that AISCO makes available a proportion of its 1994 procurement to private sector distributors either ex-Assab or ex-Bure. An amount of 25,000 mt of DAP and 5,000 mt urea is suggested as a total allocation for this purpose with individual allotments of 5,000 mt and 1,000 mt, respectively. This will allow potential distributors access to affordable quantities in order to develop distribution networks in competition with AISCO and EAL. Applications should, subject to submission of a marketing program, a limited lifting period and full cash payment, be allocated on a first come first served basis. No restrictions should be applied to where the product is sold.

AISCO has already proceeded with procurement arrangements for 1994 but it is recommended that donors should allocate FX funds equivalent to between US $5 million and US $10 million for private sector imports. This will allow EAL to continue the development of its distribution network. This allocation should of course be available to other private sector parties through competitive bids. During 1994 it is recommended that donors support procurement training workshops for potential importers so that by 1995 there will be increased participation in competitive bidding.

In 1995 it is recommended that all donor FX funding should be available under a managed competitive bidding system to both the public and private sectors and to the international industry as described in Section 4.

The CBE should continue to provide procurement credit for counterpart fund payments and should be advised of the indicative total annual requirements for this purpose. It should then provide such credit on equal terms and conditions to both public and private sector requests, subject only to prudent commercial risk. The CBE should also allow the use of fertilizer inventory as collateral for importers and distributors.

**(2) Equal Opportunities in Distribution** – AISCO has submitted a rationalization plan to the TGE to allow it to compete and operate more efficiently with the private sector.

AISCO must compete with the private sector on the same terms and conditions and have autonomy to make its own marketing management decisions. It is recommended that all preferential concessions currently enjoyed by AISCO such as free access to MOA warehouses and staff, to unsecured credit, and preferential freight rates should be abolished. MOA warehouse rents should be charged at commercial rates when these are used by AISCO. Competitive tendering for public sector warehouses could be introduced to allow access of the private sector to these facilities and to determine market rates for rental tariffs. It is recommended that AISCO's truck fleet should be operated as an autonomous business enterprise separate from AISCO and that AISCO should compete with other public sector enterprises and the private sector for trucking services.

The TGE should fully capitalize AISCO to its authorized limit either by direct equity investment or private equity investment and privatization. This will allow it to operate on a commercial basis and raise working capital funds from the banking sector without government directives to the CBE. AISCO's restructuring plans to eliminate the use of MOA controlled marketing centers and replace these with a network of private sector wholesalers and retailers should be implemented during 1994. The MOA should develop a program for employee control and operation of its marketing centers or leasing these to the private sector.

**(3) Equal Opportunities for Retailing** – In order to encourage the development of numerous retail outlets for fertilizer sales anyone wishing to wholesale or retail fertilizer, including newly constituted cooperatives, should be allowed to do so without any special conditions other than registering as fertilizer dealers with the MOA. Each distributor or wholesaler should be free to select retail dealers in any location and under conditions which they deem necessary for commercial operations.

**(4) Farm Production Credit** – The supply of farm production credit is limited by the financial position of the AIDB, the collapse of the service cooperatives as a conduit for farm credit and most importantly by the preferential interest rates for agriculture which curtail the supply of commercial credit to farmers. All of the resources of the banking system

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should be available to the farm community for the purchase of farm inputs and particularly fertilizers. It is recommended therefore that preferential interest rates for agriculture be abolished immediately and that the CBE be encouraged to supply distribution credit and farmer credit for fertilizers via loans and overdraft facilities to private sector dealers. AIDB should develop a system of farm credit administration based on credit vouchers issued to farmer groups or cooperatives payable to the fertilizer supplier of the farmer groups' choice. In this way the farm production credit can be channelled through the private, public and cooperative retail sectors. It is also recommended that the TGE should investigate the provision of additional lines of credit and credit indemnity schemes for remote and marginal fertilizer use areas and grain deficit regions as additional services to compensate these areas when panterritorial pricing of fertilizers is discontinued.

**(5) Price Deregulation and Subsidy Removal** – Panterritorial pricing is a market intervention that constrains private sector initiatives in serving all areas and leads to misallocation of resources by penalizing farmers in the areas closest to supply source and subsidizing those farmers further distant. To deregulate pricing without sufficient competition or supplies can lead to increased farm prices during peak demand periods. It is therefore recommended that maximum retail prices be continued during 1994 based on AISCO's blended cost estimates less the direct percentage subsidy subject to the maximum agreed amount. This subsidy should be continued for no more than the next two years as it is not justifiable on either economic or equity grounds. It is anticipated that the subsidy will represent less than 10% of retail fertilizer prices in 1995. Steps should also be taken to eliminate the implicit subsidy inherent in the fixed exchange rate for fertilizer imports. It is recommended that in order to eliminate exchange rate risk the fertilizer import exchange rate should be adjusted annually to approximate the market exchange rate.

In 1995 fertilizer prices should be completely deregulated, provided several major distributors are operating and numerous private sector retailers are in place. There should be no control over margins or prices and regional prices will reflect the differential costs of transport to the regions.

**(6) Improved Private Sector Skills** – With the exception of EAL there is no experience in the private sector of fertilizer procurement or marketing. It is therefore recommended that donor support should be provided during 1994 for education programs in international fertilizer procurement and domestic marketing for the private sector. This should be very practical and include discharging operations at Assab. It is recommended that the appointment of an experienced expatriate should be considered to work with AISCO procurement department with responsibilities to provide training to the private sector.

AISCO appointed private sector dealers receive some training in fertilizer marketing under the NMS. All private sector dealers should be able to participate in such training. It is recommended that this is an area again ideally suited to donor support through the MOA.

Encouragement for the establishment of a Fertilizer Importers and Distributors Association should also be given by the MOA and supported by donors.

**(7) Improved Sector Information and Monitoring** – Private sector import and distribution will call for changes in present administrative arrangements for monitoring the fertilizer market. MOA fertilizer planning, monitoring and coordination functions will be increased and it will become the focus for interaction with the private sector. It is recommended that MOA establish a Fertilizer Planning and Monitoring Unit to effectively handle these increased responsibilities and to provide a forum for government/private sector interaction. This unit will take over the responsibilities of AISCO in this area and expand upon current AISCO activities.

One of the primary responsibilities of the unit will be to monitor, on a continuous basis, the availability of fertilizers in the market and prices at the farm level. It will also maintain a continuous monitoring of international prices and availability in order to advise the MOA Fertilizer Committee and the Donor Committee of international market developments. During the initial period, it will be desirable to involve the MOA in the scheduling of donor funds. It is recommended that the proposed unit should be responsible for monitoring demand, stock levels and developing total import requirements.

It is recommended that because some of the functions of the proposed MOA fertilizer planning and monitoring unit are now performed by AISCO, some staff transfer from AISCO to the unit could provide the initial staffing nucleus and at the same time reduce the overhead cost of AISCO. Development of this unit is well suited to donor support.

**(8) Fertilizer Legislation** – While all fertilizer marketing was under government control there was no need for comprehensive fertilizer legislation. With the advent of private sector participation this is required to protect consumer interests. It is recommended that the TGE should prepare and enact a comprehensive fertilizer regulation act covering all aspects of product specifications, registration, labelling, and weights, and prescribing penalties for misrepresentation, adulteration, and underweight packages. The MOA should be empowered to enforce compliance through periodic sampling and analysis of fertilizers in warehouses and stores and investigation of farmer complaints.

**(9) Fertilizer Research and Extension** – Lack of institutional coordination in fertilizer research and the needs for technical extension to private sector fertilizer dealers need to be addressed. The MOA/ADD, NFIU, IAR and donors should coordinate activities to ensure that recent excellent fertilizer research initiatives are continued in the most cost effective manner and the serious soil erosion/degradation problems be coordinated within a farming systems approach. Private sector fertilizer dealers, with their extensive farmer contact, need to be considered as complementary to the extension services of the MOA as agents of change. It is recommended that the MOA develop an ongoing program for disseminating fertilizer use information to private sector importers and dealers.

**(10) Fertilizer Product Mix** – There is a current imbalance in fertilizer nutrient use that is restricting crop production. This can be best resolved by increasing sales of urea to farmers. It is recommended that consideration be given to bagging all urea in 25-kg bags as 25 kg urea and 50 kg DAP provides an $N:P_2O_5$ ratio of 1:1.1 which is almost ideal for cereal use. More intensive efforts should be made by MOA extension services to inform farmers of the additional benefits to be obtained from increased urea use on cereal crops up to the new recommended levels.

Although DAP and urea should remain as the focus for donor support, consideration has to be given to the import of potash and NP and NPK fertilizers. It is recommended that importers be allowed to import such products provided that FX for this purpose is obtained through the auction market. While this may limit these imports, it would provide a means to explore the market opportunities.

A summary of the major market system developments with a tentative timetable is provided in Table 11.1 together with recommendations for actions and support by the TGE and donor agencies.

**Transport Sector Issues and Recommendations**

Deregulation of the transport sector by the TGE and increased assistance provided to the private sector by donor agencies has not yet created the degree of competition required to stimulate improved efficiencies. In part, this may be due to the private sector's limited capacity to identify and capitalize on new market opportunities created under the reform program. This would suggest that increased efforts are required to stimulate change and remove identified constraints to the development of an open competitive road transport sector. However, there is conflicting and unreliable data available on the transport sector that makes planning and policy development almost untenable. It is therefore recommended that priority should be given to establishment of a road transport data base, as recommended by the PMU Inland Transport Advisor, so that reliable information on operation costs and fleet capacities is available.

Development of a competitive transport market cannot occur overnight but several priority issues are identified which are amenable to further government action and donor support to hasten the development of a competitive market and reduce operating costs. The priorities for action are difficult to establish because all of the issues need to be addressed but certain recommendations can be implemented immediately and should receive priority as indicated below, other issues need further study or medium term action programs. These major issues are:

(1) Shortage of total truck capacity to meet peak demands.

(2) The operation of parastatal fleets.

(3) The operating practices of Freight Associations

(4) Low capacity utilization and low load factors.

(5) Lack of development of private trucking fleets.

(6) Poor road conditions.

(7) Limited Port Access

**(1) Capacity Shortage** – Peak demand period capacity shortages, particularly in the long haul subsector, can only be resolved in the medium term by increasing the number of trucks and the operational status of existing trucks. Steps already taken to increase private sector access to new trucks and spares through access to the FX auction and donor programs are constrained by the high cost of imported trucks due to devaluation and the low operating profitability and the complexity of donor programs. It is recommended that MOTAC should, with the Ministry of Finance, initiate a benefit cost study of possible financial incentives such as accelerated depreciation rates and investment allowances to all commercial truck categories or other tax concessions such as reduction or removal of import duties for certain vehicle categories. This study could be commenced immediately with the objective of implementing any beneficial concessions by 1995. An annually fixed exchange rate based on the market rate could be considered for new truck imports as a means of reducing exchange rate risk for importers.

It is also recommended that donors should not limit FX access for new trucks to individual truck operators or impose a limit of one truck per applicant. These conditions restrict access and increase risk for individual truck operators. It is recommended that donor programs be reviewed immediately to direct all new truck and spare parts assistance solely through private sector distributors with suitable provisions and monitoring to ensure that assisted imports are sold only to the private sector. It is also recommended that donors should investigate the operating economies of existing tire re-capping factories that are currently not operating because of a lack of FX for raw materials. Operation of these plants

should provide significant net savings in FX and may provide more effective use of FX assistance.

The AID/NGO fleets represent a considerable truck capacity, which it is believed is under-utilized following reductions in AID requirements. It is recommended that the TGE should accelerate lease-purchase arrangements to private operators of these fleets so that they operate on a commercial for-hire basis when not required for AID cargoes.

**(2) Parastatal Fleet Operation** – The large size of the EFTC long-haul dry cargo fleet effectively allows EFTC to dominate and be a price leader on long-haul routes. It is recommended that implementation of the restructuring plans for EFTC, being developed by MOTAC, should be made as soon as possible. It is suggested that the long-haul dry cargo fleet could be restructured into 3 or 4 smaller more manageable fleets of 200 to 300 trucks operated as autonomous commercial entities. This will increase competition on long-haul routes and maintain a level of restraint on the operating practices of the large Freight Associations. Consideration could also be given to operating EFTC depots and repair shops as autonomous commercial entities offering maintenance services to all truck fleets on a competitive basis. These suggestions are made without any detailed analysis of EFTC's structure and operating costs.

The continued operation of other smaller parastatal truck fleets is a constraint on competition and possibly capacity utilization. It is recommended that during 1994 MOTAC should provide assistance to parastatals with truck fleets to develop divestment plans for the fleets. Initially the fleets could be separated from the parent parastatals and operated as autonomous commercial enterprises.

**(3) Freight Associations** – The major constraint to the development of effective private Freight Associations lies in the perceived role of these in a competitive market. An intense and continuing effort is required to change the role from one of rate setting and regulation to one of advocacy, support and service for their members. It is recommended that MOTAC should support the development of a private sector National Freight Association to act as

a focus for government and private sector interaction with membership drawn from the Freight Associations and individual private truck operators. Such an organization could be used as a conduit for donor supported technical assistance to provide training in general and transport specific management and operational skills and in competitive market operations and for MOTAC as a means of collecting needed industry operating statistics.

**(4) Capacity Utilization** – Poor capacity utilization is the major factor in determining operating costs. While some causes, such as poor road conditions, are firmly in the hands of the TGE and other causes, such as the imbalance of freight movements on the Assab - Addis corridor, are beyond the control of truckers, a major constraint is the absence of freight brokers to perform the role of bringing truckers and customers together. Immediate action can be taken by the TGE to implement the licensing of private freight forwarders as many of these will undoubtedly also take on the role of freight brokers. Negotiations should be held with Eritrean authorities to allow the operation of private freight forwarders in Assab.

The establishment of private freight brokers can also be hastened by MOTAC. It is recommended that MOTAC should develop an information package on the role of freight brokers and publicize this together with invitations for operating licenses for the private sector in all regions. Fostering such developments will be particularly beneficial for the for-hire fleet sector.

**(5) One-Owner Trucking Fleets** – The small size of this sector is a constraint to developing competitive markets through numerous competing small fleet firms. Enlarging the role of this sector should be a long-term objective of the TGE. Recommendations above concerning the establishment of freight brokers, removing constraints on donor assisted new truck purchases, possible financial incentives for new truck operations and the establishment of a national association will all assist in encouraging development of one-owner fleets.

**(6) Road Conditions** – Extremely poor road conditions are adding considerable costs to road transport operations and restricting the capacity utilization of the existing truck

fleets. It is recommended that the RTA should give priority to refurbishing weighbridge control centers and enforcing the capacity regulations of existing truck fleets to reduce road damage.

Major road reconstruction programs planned will take several years to implement but in the meantime priority should be given to a country-wide pot-hole patching program.

(7) **Limited Port Access** – As a result of Eritrean independence Ethiopia is now a land-locked country with almost total reliance on Assab port for imports and exports. Apart from any other considerations this places an undue traffic load on the Assab-Addis route and Assab port. It is recommended that the TGE should pursue a program of negotiations aimed at improving access via Djibouti, Berbera, and Mombassa as alternatives to Assab.

**Table 11.1 ETHIOPIA: Summary of Proposed Fertilizer Market Developments**

Fertilizer and Transport Sector Assessment, IFDC,1993

| | 1994 | 1995 | 1996 | 1997 |
|---|---|---|---|---|
| Fertilizer Committee | Approves demand forecast and import requirements | Approves demand forecast and import requirements | Approves demand forecast and import requirements | Approves demand forecast and import requirements |
| Procurement FX | FX allocation<br>Private $5-10 million<br>Public remainder | Managed competitive bidding for all FX by public and private sectors | Managed competitive bidding for all FX by public and private sectors | Managed competitive bidding for all FX by public and private sectors |
| Fertilizer Import Exchange Rate | Fixed at estimated average market rate | Fixed at estimated average market rate | Fixed at estimated average market rate | Market Rate |
| Procurement Credit | AISCO - CBE<br>Private CBE<br>Total EBr 100 million | AISCO - CBE<br>Private - CBE<br>Total EBr 181 million | AISCO - CBE<br>Private - CBE<br>Total EBr 205 million | AISCO - CBE<br>Private - CBE<br>Total EBr 235 million |
| Distribution | AISCO operated MCs<br>AISCO retail network<br>AISCO to distributors<br>EAL retail network | AISCO operated MCs<br>AISCO retail network<br>AISCO to distributors<br>Private sector networks | AISCO operated MCs<br>AISCO retail network<br>AISCO to distributors<br>Private sector networks | AISCO operated MCs<br>AISCO to distributors<br>Private sector networks |
| Distribution Credit | Source CBE<br>AISCO EBr 70million<br>Private EBr 53 million | Source CBE | Source CBE | Source CBE |
| Retailers | Expanded AISCO network<br>Expanded EAL network<br>Initial other networks | Expanded private sector dealer networks | | |
| MOA MCs | Leased to MOA agents<br>Leased to private dealers | | | |
| Retail Price | Blended maximum price<br>Panterritorial pricing | Market pricing | | |
| Explicit Subsidy | Estimated @ 12% of AISCO retail price | Estimated @ less than 10% of retail price | Explicit subsidy removed | |
| Farm Credit | 14% interest rate<br>Source: AIDB and CBE<br>AIDB with vouchers<br>CBE through dealer credit | | | |
| Fertilizer MIS Unit | Established from AISCO staff | Retail price monitoring<br>Demand estimation<br>Stock monitoring<br>International price monitorin<br>Develop import requirements | | |
| Training | International procurement for potential importers<br>Dealer Traing<br>MOA agent training | Dealer training | Dealer training | Dealer training |
| Legislation | Develop legislation | Enact legislation | | |

# Annex 1

# Agronomic Issues and Fertilizer Use

# Annex 1
# Agronomic Issues and Fertilizer Use

## 1. Introduction

Elevation in Ethiopia ranges from 110 m below sea level in the Dallol Depression to 4,620 m above sea level in the Simen Mountain Massif. Climatic types range from equatorial desert to hot and cool steppe, and from tropical savannah and rain forest to warm temperate cool highland (The National Atlas of Ethiopia, Ethiopia Mapping Authority, 1988).

More recently, Ethiopia has been divided into 16 agroecological zones based on altitude, length of growing period, and temperature (Srivastava et al., 1993). This is a refinement of the earlier system which divided the country into four climatic zones.

The country is generally divided into highlands (areas above 1,500 m altitude) and lowlands (areas below 1,500 m altitude). The highlands cover 40% of the land mass but account for about 95% of the cultivated land, accommodating 88% of the human population and 70% of the total livestock population (Constable, 1984).

Most of the highlands receive enough rainfall (>1,500 mm annually) either most of the year or during the summer (May to September). Other areas receive rain either during the summer and spring (February to May) or during the spring and fall (September to December).

Due to the diversity of the soil-forming factors–particularly climate, topography, and parent material, there are 18 dominant soil associations in Ethiopia. The main arable agricultural soils are as follows (The National Atlas of Ethiopia, Ethiopia Mapping Authority, 1988).

- Cambisols (covering 7.5% of the country).
- Fluvisols (8.5%).
- Luvisols (8%).
- Nitosols (12.5%).
- Andosols (1%).
- Vertisols (10%).

## 2. The Role of Peasant Sector Farming Systems in Agricultural Production

Estimates (World Bank, 1993) indicate that there are 6 million smallholders who produce 90% of the food grains and 98% of coffee–the principal foreign exchange earner for Ethiopia.

The majority of smallholder farmers who adopted improved farming technologies apply chemical fertilizers to cereal crops. The peasant sector accounts for 80% of total fertilizer demand and supply (MOA, 1990). Hence, use of fertilizer on cereals will be used to illustrate fertilizer use trends by smallholder farmers.

Since the land is being intensively cropped in the highlands–two crops a year for some areas–without returning any organic residues, inherent soil fertility is declining.

Most of the farmers practice mixed farming but due to high population pressure in the highlands, many smallholder families have limited land–sometimes less than 1 ha for arable crops. The grazing areas are communal and families are limited to 2-4 head of cattle due to shortage of land. Forests used to cover 40% of Ethiopia; current forest area is estimated to be 3%.

Traditionally soil productivity was maintained through a system of fallows that were used for grazing coupled with use of farmyard manure (FYM) and incorporation of crop residues into the soil. Farmers have also traditionally used soil burning (guie) to improve

productivity of Vertisols in some highland areas. However, investigations of changes in the soil following guie indicated that burning leaves the soil in a less productive state. The investigators suggested the practice be avoided (Tedla et al., 1993).

Increased population pressure has forced farmers to abandon fallowing, which results in intensive continuous cropping. A recent survey indicated that if a family is unable to till all the cultivable land, because of a shortage of inputs, particularly labor and draught animals, the land is normally leased (Asamenew et al., 1993).

Since land in the highlands is limited, animals obtain a maximum of 50% of their feed requirements through grazing. Hence, crop residues are reserved for feeding livestock and also used as building materials. Following the severe deforestation, animal manure is primarily used as fuel–manure demand for fuel is so high that any excess is sold to families with fewer or no animals. As a result, very little manure is applied to the soil.

## 3. Crop Production Trends

Crop production has steadily increased over the years. Initially increases in production were realized through increasing crop areas. Total production of the major cereal crops–teff, wheat, barley, sorghum, and maize–increased from 4.065 million mt in 1962 to 6.457 million mt in 1991. Cereal production by region is indicated in Annex Table 1.1. The bulk of cereals is grown in the highland areas of Arsi, Gojjam, Gonder, Illubabor, and Showa.

Total area harvested for the major cereal crops was 5.593 million ha in 1962 and 5.190 million ha in 1991–the lowest harvested area was 4.368 million ha in 1976 and the highest was 5.787 million ha in 1964. The decline in total area under cereals is partly due to farmers switching to other crops like potatoes and oil crops.

The combined average yield per unit area for the major cereals has increased from 0.727 mt/ha in 1962 to 1.237 mt/ha in 1991. This increase in yield per unit area over the years indicates that smallholder farmers are adopting improved technologies including use of improved varieties, better agronomic practices, and fertilizers.

The average control (no N and no $P_2O_5$ applied) yields for studies conducted on farmers' fields by ADD/NFIU were over 20% lower than the national average yields for teff and barley. For wheat the ADD/NFIU average yield was similar to the national average yield (MOA, 1992). The findings provide additional evidence that smallholder farmers have, generally, adopted more intensive cultivation practices--including use of fertilizers on teff, wheat, and barley.

## 4. Fertilizer Use

Fertilizer use in Ethiopia commenced in 1970/71 with less than 1,000 mt of product used, then expanded quite rapidly during the second half of the 1970s to reach 51,000 mt of DAP and urea consumption in the peasant sector by 1979. The annual growth rate in product use during this decade was 41%. Then followed a period of relatively stagnant use until 1985/86, with consumption varying between 31,000 and 46,000 mt and falling to 24,000 mt in the major drought year of 1984/85. Following the drought, with increased donor support, consumption increased in 1985/86 to a total of 83,000 mt. From 1985/86, with continued donor support to fund imports, consumption increased by 16% per annum to an estimated 123,500 mt in the peasant sector and 22,000 mt in the state sector (Annex Table 1.2). Fertilizer use in the peasant sector is concentrated in three regions–Showa, Gojjam, and Arsi. These account for approximately 75% of total peasant sector fertilizer consumption. The regional use of fertilizer since 1987/88, excluding Eritrea, is summarized in Annex Table 1.3.

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## 5. Fertilizer Recommendations

Reviews of previous research (MOA, 1987 and 1988) and more recent research (Amanuel et al., 1991) all indicate significant responses to applied nitrogen (N) and phosphate ($P_2O_5$) fertilizers. Yield increases at optimal N and $P_2O_5$ fertilizer levels were estimated (MOA, 1988) to be 450 kg/ha for teff, 600 kg/ha for barley, 1,100 kg/ha for wheat, and 1,800 kg/ha for maize.

In on-farm wheat studies (Amanuel et al., 1991) the optimum-level applications of N and $P_2O_5$ fertilizers increased grain yields by 29%-178% across zones and generated rates of return on farmers' investment in excess of 100%–sensitivity analysis was conducted after removing subsidies applied to fertilizers at the time (28% for N and 23% for $P_2O_5$).

Fertilizer recommendations have been general and controversial. For example, MOA recommends a blanket application of 46 kg $P_2O_5$ and 41 kg N/ha for wheat in the highland regions all over the country. These recommendations were based on "Freedom From Hunger Campaign" field studies conducted in the 1960s. The Institute of Agricultural Research (IAR), after further studies, modified the recommendations to 60 kg $P_2O_5$ and 60 kg N/ha. The two sets of recommendations have been used by the extension services and to estimate fertilizer requirements for the country.

A more comprehensive on-farm study (Amanuel et al., 1991) indicated that optimum N and $P_2O_5$ fertilizer levels are zone-specific and markedly different from the MOA blanket recommendations. The on-farm study optimum rate ranges were 0-46 kg $P_2O_5$ and 0-92 kg N/ha. The study also indicated that in some cases it was not profitable to use fertilizers. This is to be expected since soils, climate, and more recently crop prices, vary considerably in Ethiopia.

Between 1988 and 1991, the ADD/NFIU conducted 2,952 fertilizer trials on farmers' fields using teff, wheat, barley, maize, and sorghum as test crops. The objectives of the studies were to verify research findings and revise extension fertilizer recommendations

(MOA. 1992c). The studies have yielded more comprehensive fertilizer recommendations for the major cereal crops (Annex Table 1.4) based on the major soil associations (MOA, 1993).

Although the new ADD/NFIU recommendations are generally higher than the previous blanket recommendations, economic analysis indicates high rates of return (Annex Table 1.5). The economic analysis indicated that if fertilizer prices increased by 100% grain prices would have to increase by an average of 25% to maintain the profit levels.

Despite the high rates of return, estimates indicate that fertilizer use is confined to 15% of the cultivated area (MOA, 1988) and, where fertilizer is used, the quantities applied were well below the recommended rates. A survey associated with the wheat study above (Amanuel et al., 1991), indicated that in Arsi, a zone with the highest fertilizer use on wheat (43%), the farmers who applied fertilizer seldom exceeded 9 kg N and 23 kg $P_2O_5$/ha.

The universal reasons for the trends of fertilizer use by smallholder farmers and the low rates where fertilizers are applied are:

- Fertilizer was not available.
- Fertilizer has become more and more expensive.
- Credit facilities are no longer available.

Surveys have indicated that most farmers are aware of the benefits of applying fertilizers. The surveys also indicate that fertilizer use fluctuates a lot with seasons. For example, a survey over five years, 1989-93, revealed that the number of villages using fertilizer in East and West Hararghe was between 40% and 45% in 1989. By 1993, the villages using fertilizer in East Hararghe were 20% and virtually none for West Hararghe (SCF, 1993). In West Hararghe, 45% of those not using fertilizer said it was not available

while 40% said it was too expensive. In East Hararghe, 80% said fertilizer was available, the main complaint being the recent price increases.

Fertilizer use pattern for cereals was estimated (MOA, 1988) to be 50% for teff, 30% for wheat, 10% for barley, 7% for maize, and 3% for sorghum. The trend is contrary to the response patterns above. Reasons for the fertilizer use pattern include:

- Teff and wheat are generally grown on Vertisols. Farmers tend to apply fertilizers to Vertisols and use little fertilizer on the red soils (Nitosols, Cambisols, and Luvisols).

- Produce prices for teff and wheat are more attractive compared to barley, maize, and sorghum.

## 6. Fertilizer Prices and Farm Incomes

Fertilizer prices did not change much until the 1988/89 marketing year when prices increased by 21%. The next major increase (19%) occurred in 1991/92 marketing year followed by a 34% increase for 1992/93 (Annex Table 1.6).

Cereal grain prices have fluctuated more over the last 10 years compared to fertilizer prices (Annex Table 1.6). Grain prices were high for 1984/85 following a drought but dropped after 1985/86. Prices rose again following the price liberalization in 1991/92. The 1992/93 prices are not much higher relative to the 1991/92 prices indicating that produce prices are stabilizing.

As indicated above, use of fertilizers is still profitable despite the increase in prices, but farmers may be resisting the relatively large increases for the two consecutive marketing years, 19% for 1991/92 and 34% for 1992/93.

## 7. Fertilizer Types

Urea and DAP are the main nutrient sources used in Ethiopia. Changes are not recommended in the near future, except for increasing the quantities of urea.

The two most limiting nutrients are N and $P_2O_5$. DAP effectively supplies $P_2O_5$ and starter N while urea may be the cheapest source for topdressing N.

Fertilizer is imported into Ethiopia and distributed with an average N:$P_2O_5$ ratio of 1:1.89 (regional range 1:0.67 to 1:2.55). The more comprehensive fertilizer recommendations developed by the ADD/NFIU have an average N:$P_2O_5$ ratio of 1:1.09. This ratio is closer to what should be expected.

Achieving the recommended ratio will mean an increase in the quantities of urea imported but, before this is done, efforts should be made to demonstrate to farmers the benefits of topdressing with urea. Some farmers appear to prefer applying fertilizer only once–at planting. Where farmers feel that more N is required, some go as far as increasing the DAP quantities so that they can achieve high levels of N without topdressing. This leads to inefficient use of both N and $P_2O_5$.

The ADD/NFIU studies have indicated $K_2O$ requirements on some soils for wheat and barley. More studies are required to determine the extent of the requirements. With time the soil $K_2O$ reserves will be depleted and $K_2O$ may become limiting. Quantities required to correct the deficiencies will be large, the best strategy might be to start including small quantities of $K_2O$ in fertilizers distributed.

In recent years small quantities of NP fertilizers have been imported, 20-20-0 or 23-23-0. These products have a better N:$P_2O_5$ ratio than DAP for the cereal crops in Ethiopia. However, when used at planting during the main wet season, it is likely that much of the N will be leached before crop plants are capable of utilizing it. Later side dressing with urea can be expected to be more efficient to supply additional nitrogen. It should also

be noted that these products are more expensive c.i.f. than DAP and have a higher transport cost per unit of plant nutrient than DAP.

## 8. Fertilizer Demand

Actual fertilizer demand for Ethiopia is difficult to estimate from existing data. Potential fertilizer demand for cereals can be estimated using the available cereal area and the new fertilizer recommendations. Calculations indicate a potential requirement of 709,157 tons of fertilizer–447,527 mt of DAP and 261,630 mt of urea (Annex Table 1.7).

When current fertilizer patterns for cereal crops are considered, the total figure is reduced to 187,112 mt (Annex Table 1.7). This may be a more realistic estimate for short-term strategies. It is below the current FAO and TGE (prepared by the MOA) forecasts of demand which are approximately 200,000 mt and 250,000 mt, respectively. These forecasts however, proved to be unrealistically high for 1992/93.

## 9. Environmental Issues

Intensive cultivation and overgrazing are contributing to the degradation of the natural soil resource base in Ethiopia.

Soil organic matter is the best indicator of soil productivity in Ethiopia (MOA, 1992). It is the main source of major crop nutrients and ensures good soil physical properties.

As soil organic matter decreases soil physical properties deteriorate and soil fertility declines. The low soil fertility leads to poor ground cover while poor soil physical properties lead to poor water infiltration. The two combine to accelerate soil erosion. As the erosion increases, yields per unit area decline, grazing lands have less soil cover, and rivers and reservoirs are silted.

Due to shortage of land, particularly in the highlands of Ethiopia, grazing areas can supply a maximum of only 50% of animal feed requirements. Hence crop residues are reserved for feeding animals. Extensive deforestation in the highlands has forced farmers to use animal manure as the primary fuel. The result is that little organic matter is returned to the soil; leading to a decline of soil organic level with time and the attendant soil fertility and environmental problems.

Although the level of chemical fertilizer use in Ethiopia is increasing, estimated to have increased from 0.4 kg nutrient in 1971 to 3.9 kg nutrient ($N$-$P_2O_5$-$K_2O$)/ha of arable land (FAO Production Yearbook [42], 1988), fertilizer quantities applied are still too low to have adverse environmental effects.

Increased use of fertilizers will, in fact, help reverse the soil degradation process through:

- An increase of yield per unit area thus reducing total land area required for arable crops.
- A reduction of erosion as fertilizers would boost crop growth rates ensuring that the soil is covered early in the season.
- An increase of soil organic matter, as phosphatic fertilizers increase root growth.
- Better ground cover for areas left fallow due to higher nutrient reserves and better soil physical properties.
- An increase in use of crop residues for crop production as the quality and area of better grazing lands increases.

However, use of fertilizer must be coupled with soil conservation practices and strategies to manage organic matter in order to minimize adverse environmental effects.

## 10. Strategies For the Future

The current efforts by ADD/NFIU are focused on agricultural areas with altitudes above 1,400 m. Low altitude and marginal areas also need attention.

The ADD/NFIU is a donor-funded project. This project is in a better position to bring together the ADD, extension, National Soil Service, and IAR to work with the farmer--their client. ADD/NFIU should also initiate discussions on how the excellent work they have started will be continued, and who will be the custodian of the data base they are developing.

In the long run, soil and plant analysis data will be used for fertilizer recommendations. IAR has regional stations that will be useful for this purpose. These stations will have to be strengthened.

In the meantime, IAR and ADD/NFIU should collaborate to establish critical nutrient levels and study nutrient dynamics. The opportunity of the extensive ADD/NFIU sites should not be missed.

A strategy to manage soil organic matter must be developed before soil physical properties deteriorate to levels where fertilizers are no longer effective. In addition, as soil organic matter levels decline soil acidity may also become a problem. Fuel supplies at the farm level will have to be included in the strategies so that farmyard manure can be returned to the soil.

There will always be cases where yields cannot be increased economically by application of fertilizers or where farmers cannot afford fertilizers. Studies to identify these situations and the use of soil ameliorants should be increased.

A crop modelling capability would be desirable. Crop models are an excellent tool for assessing risks associated with fertilizer use strategies, thus enhancing the decisionmaking

capacity of policymakers. Models also facilitate extrapolation of site-specific research findings–an advantage where resources are limited.

It is apparent that the extension service is going through a difficult time due to limited resources. Linkages with research and the ADD/NFIU may help them tremendously. They need to be able to face the new farmer through a participatory approach.

As liberalization of fertilizer trade continues, dealers and retailers will have to be trained for effective service to the farmers.

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## Annex Table 1.1 ETHIOPIA:Regional Cereal production and Fertilizer Supply, 1991/92

Fertilizer and Transport Sector Assessment, IFDC 1993

| | TOTAL FERTILIZER NUTRIENTS | | | TOTAL CEREALS | | | |
|---|---|---|---|---|---|---|---|
| | N | P2O5 | TOTAL | AREA | PRODUCTION | YIELD | Kg Nutrient |
| REGION | Mt | | | Ha | Mt | Mt/Ha | per Ha |
| Shoa | 18,221 | 31,465 | 49,687 | 1,038,386 | 1,269,991 | 1.22 | 47.85 |
| Gojjam | 3,800 | 7,262 | 11,063 | 1,061,646 | 1,021,014 | 0.96 | 10.42 |
| Gonder | 565 | 898 | 1,463 | 52,808 | 31,685 | 0.60 | 27.70 |
| Hararghe | 1,240 | 690 | 1,930 | 232,268 | 252,161 | 1.09 | 8.31 |
| Sidamo | 644 | 1,618 | 2,262 | 72,224 | 155,281 | 2.15 | 31.32 |
| Illubabor | 1,552 | 3,966 | 5,518 | 304,758 | 377,900 | 1.24 | 18.11 |
| Omo | 808 | 2,061 | 2,869 | 136,721 | 129,928 | 0.95 | 20.98 |
| Wellega | 893 | 2,282 | 3,175 | 229,773 | 243,559 | 1.06 | 13.82 |
| Arssi | 2,690 | 6,784 | 9,474 | 294,474 | 471,159 | 1.60 | 32.17 |
| Bale | 438 | 1,121 | 1,559 | 72,046 | 102,306 | 1.42 | 21.64 |
| Wollo | 108 | 210 | 318 | 273,755 | 370,632 | 1.35 | 1.16 |
| Tigray | 357 | 911 | 1,268 | na | na | na | na |
| Keffa | 0 | 0 | 0 | 73,283 | 128,246 | 1.75 | 0.00 |
| TOTAL Peasant Sector | 31,315 | 59,269 | 90,584 | 3,842,144 | 4,553,862 | 1.19 | 23.58 |

Source: Central Statistics Authority, 1992 and AISCO

## Annex Table 1.2 ETHIOPIA: Total Fertilizer Use

Fertilizer and Transport Sector Assessment, IFDC 1993

(MT)

| | PEASANT SECTOR | | | STATE SECTOR | | | T | TOTAL | | |
|---|---|---|---|---|---|---|---|---|---|---|
| YEAR | DAP | UREA | TOTAL | DAP | UREA | TOTAL | | DAP | UREA | TOTAL |
| 1971 | 811 | 136 | 947 | n/a | n/a | n/a | | 811 | 136 | 947 |
| 1972 | 1,744 | 303 | 2,047 | n/a | n/a | n/a | | 1,744 | 303 | 2,047 |
| 1973 | 7,666 | 710 | 8,376 | n/a | n/a | n/a | | 7,666 | 710 | 8,376 |
| 1974 | 12,413 | 667 | 13,080 | n/a | n/a | n/a | | 12,413 | 667 | 13,080 |
| 1975 | 13,209 | 770 | 13,979 | n/a | n/a | n/a | | 13,209 | 770 | 13,979 |
| 1976 | 33,636 | 1,409 | 35,045 | n/a | n/a | n/a | | 33,636 | 1,409 | 35,045 |
| 1977 | 32,535 | 1,455 | 33,990 | n/a | n/a | n/a | | 32,535 | 1,455 | 33,990 |
| 1978 | 32,217 | 1,717 | 33,934 | n/a | n/a | n/a | | 32,217 | 1,717 | 33,934 |
| 1979 | 48,277 | 3,010 | 51,287 | n/a | n/a | n/a | | 48,277 | 3,010 | 51,287 |
| 1980 | 40,742 | 2,545 | 43,287 | n/a | n/a | n/a | | 40,742 | 2,545 | 43,287 |
| 1981 | 29,668 | 1,444 | 31,112 | n/a | n/a | n/a | | 29,668 | 1,444 | 31,112 |
| 1982 | 30,255 | 1,418 | 31,673 | n/a | n/a | n/a | | 30,255 | 1,418 | 31,673 |
| 1983 | 42,047 | 3,008 | 45,055 | n/a | n/a | n/a | | 42,047 | 3,008 | 45,055 |
| 1984 | 42,147 | 4,737 | 46,884 | n/a | n/a | n/a | | 42,147 | 4,737 | 46,884 |
| 1985 | 22,296 | 1,823 | 24,119 | n/a | n/a | n/a | | 22,296 | 1,823 | 24,119 |
| 1986 | 74,347 | 8,918 | 83,265 | n/a | n/a | n/a | | 74,347 | 8,918 | 83,265 |
| 1987 | 88,335 | 9,774 | 98,109 | n/a | n/a | n/a | | 88,335 | 9,774 | 98,109 |
| 1988 | 81,322 | 7,369 | 88,691 | 25,786 | 12,748 | 38,534 | | 107,108 | 20,117 | 127,225 |
| 1989 | 71,334 | 21,024 | 92,358 | 23,177 | 11,631 | 34,808 | | 94,511 | 32,655 | 127,166 |
| 1990 | 99,440 | 13,781 | 113,221 | 18,426 | 14,062 | 32,488 | | 117,866 | 27,843 | 145,709 |
| 1991 | 95,954 | 12,906 | 108,860 | 2,143 | 16,667 | 18,810 | | 98,097 | 29,573 | 127,670 |
| 1992 | 128,846 | 17,658 | 146,504 | 11,262 | 5,467 | 16,729 | | 140,108 | 23,125 | 163,233 |
| 1993(Est) | 108,267 | 15,230 | 123,497 | 13,720 | 8,034 | 21,754 | | 121,987 | 23,264 | 145,251 |

Source: 1970/71 to 1986/87 AISCO, as reported by Vaes, 1988.
1987/88 to 1990/91 AISCO as reported by Alememayehu Bekele, 1992
1991/92 to 1992/93 Estimated by IFDC from AISCO sales reports

## Annex Table 1.4 ETHIOPIA: Proposed Fertilizer Recommendations

Fertilizer and Transport Sector Assessment, IFDC,1993

| SOILS | NITROGEN (KG N/HA) | | | | | PHOSPHATE KG P2O5/HA) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Teff | Wheat | Barley | Sorghum | Maize | Teff | Wheat | Barley | Sorghum | Maize |
| Vertisols | 80 | 70 | 45 | | | 60 | 55 | 45 | | |
| Nitosols | 40 | 70 | 60 | | 75 | 55 | 65 | 65 | | 80 |
| Cambisols | 50 | 55 | | | 50 | 50 | 54 | | | 50 |
| Luvisols | 45 | 50 | | | | 50 | 70 | | | |
| Andosols | 45 | 50 | | | | 50 | 45 | | | 55 |
| Black Soils | 75 | 75 | 70 | 40 | 65 | 60 | 55 | 70 | 30 | 55 |
| Grey Soils | 75 | 50 | | | 55 | 50 | 45 | | | 55 |
| Red Soils | 40 | 40 | 55 | 35 | 65 | 50 | 50 | 65 | 75 | 75 |
| Brown Soils | 50 | 75 | 55 | | 55 | 55 | 70 | 60 | | 50 |
| AVERAGE | 56 | 59 | 57 | 37 | 59 | 53 | 57 | 61 | 53 | 60 |

1 Source MOA, 1993

2 Potash Recommendations:

Teff and sorghum -- no potash recommended

Wheat -- 30 kg K2O/ha on nitosols and red soild in Arsi and Bale

Barley -- 30 kg K2O/ha on all nitosols and brown soils; on red soils in Showa, Arsi and Bale and 20 kg K2O on vertisols in Showa, Arsi and Bale.

3 ratio (N:P2O5): teff=1:0.95; wheat= 1:0.96; barley=1:1.07;sorghum=1:1.43; maize=1:1.02; all cereals=1:1.09.

**Annex Table 1.3. ETHIOPIA: AISCO Fertilizer Sales by Region and Product, 1988-1993**

Fertilizer and Transport Sector Assessment, IFDC,1993

QTLS

| YEAR | 1987/88 | 1988/89 | 1989/90 | 1990/91 | 1991/92 | 1992/93 | 1987/88 | 1988/89 | 1989/90 | 1990/91 | 1991/92 | 1992/93 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| REGION | DAP | DAP | DAP | DAP | DAP | DAP | UREA | UREA | UREA | UREA | UREA | UREA |
| Shoa | 329491 | 372165 | 438390 | 443405 | 684027 | 414820 | 60863 | 56351 | 89390 | 82411 | 128454 | 50452 |
| Gojjam | 108783 | 140099 | 179310 | 159635 | 157878 | 186461 | 6081 | 14838 | 10530 | 15154 | 20834 | 20957 |
| Gonder | 8553 | 14362 | 10430 | 7714 | 19529 | 53801 | 3500 | 113118 | 3320 | 1360 | 4630 | 8700 |
| Harargh | 32207 | 14368 | 30920 | 29463 | 15001 | 20826 | 2541 | 15350 | 34190 | 29710 | 21079 | 62283 |
| Sidamo | 46949 | 35958 | 31910 | 53910 | 35172 | 21637 | 0 | 520 | 200 | 0 | 240 | 568 |
| Illubabor | 3339 | 4309 | 5210 | 3348 | 86221 | 49704 | 100 | 0 | 0 | 0 | 0 | 0 |
| Omo | 2063 | 845 | 620 | 210 | 44802 | 39572 | 400 | 300 | 0 | 0 | 26 | 0 |
| Wellega | 42060 | 40548 | 36130 | 58055 | 49603 | 64952 | 200 | 2480 | 100 | 0 | 0 | 0 |
| Arssi | 168930 | 13604 | 172010 | 137673 | 147484 | 92249 | 0 | 6452 | 0 | 420 | 767 | 183 |
| Bale | 36428 | 25376 | 26380 | 15429 | 24360 | 12319 | 0 | 0 | 0 | 0 | 0 | 0 |
| Wello | 9848 | 15403 | 7220 | 0 | 4576 | 2326 | 0 | 0 | 80 | | 550 | 538 |
| Tigray | 0 | 0 | 0 | 0 | 19810 | 14003 | 0 | 0 | 0 | 0 | 0 | 8615 |
| Keffa | 24566 | 36301 | 55880 | 50697 | 0 | 0 | 0 | 831 | 0 | 0 | 0 | 0 |
| TOTAL Peasant Sector | 813217 | 713338 | 994400 | 959539 | 1288463 | 1082670 | 73685 | 210240 | 137810 | 129055 | 176580 | 152296 |
| TOTAL State Sector | 257860 | 231772 | 184263 | 21431 | 112622 | 137203 | 127484 | 116308 | 140616 | 166671 | 54566 | 80340 |
| TOTAL Private Sector | | | | | | 110000 | | | | | | 0 |
| GRAND TOTAL | 1071077 | 945110 | 1178663 | 980970 | 1401085 | 1329873 | 201169 | 326548 | 278426 | 295726 | 231246 | 232636 |

**Annex Table 1.5 ETHIOPIA: Benefit:Cost Ratios at the new Fertilizer Recommendation Levels**

Fertilizer and Transport Sector Assessment, IFDC,1993

| SOILS | Teff | Wheat | Barley | Sorghum | Maize |
|---|---|---|---|---|---|
| Vertisols | 3.2 | 3.3 | 4.2 | | |
| Nitosols | 2.7 | 3.4 | 3.8 | | 3.7 |
| Cambisols | 2.8 | 2.6 | | | 4.2 |
| Luvisols | 3.0 | 2.8 | | | |
| Andosols | 2.6 | 3.0 | | | 3.5 |
| Black Soils | 3.1 | 3.1 | 2.9 | 1.9 | 2.8 |
| Grey Soils | 2.8 | 3.1 | | | 3.8 |
| Red Soils | 2.6 | 3.1 | 3.6 | 2.8 | 3.4 |
| Brown Soils | 2.7 | 3.3 | 3.3 | | 4.3 |
| Crop Prices used (EBr per kg) 3 | 1.22 | 0.88 | 0.79 | 0.72 | 0.65 |
| Required Crop Price increase (%) 4 | 25-36 | 23-34 | 20-38 | 28-43 | 22-34 |
| 1992/93 Fertilizer Prices (EBr/kg) | 1.97 | 1.45 | 1.42 | 1.34 | 0.94 |
| 1992/93 Fertilizer Price Increase (%) | 61 | 65 | 80 | 86 | 45 |

1. Source: MOA, 1993
2. Fertilizer prices were based on the 1991/92 prices; EBr 107.1 for DAP and EBr 95.3 for urea per quintal.
3. Average monthly prices from July 1991 to June 1992 adjusted down by 25% for teff, wheat and barley and 30% for maize and sorghum to equate farmgate prices.
4. Crop price increase required to maintain profit at present level if fertilizer prices increase 100 to 130%.

## Annex Table 1.6 ETHIOPIA: Mean Cereal Prices and Fertilizer Costs, 1983/84 to 1992/93

Fertilizer and Transport Sector Assessment, IFDC,1993

| CROP [1] | MARKETING YEAR (JULY - JUNE) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | 83/84 | 84/85 | 85/86 | 86/87 | 87/88 | 88/89 | 89/90 | 90/91 | 91/92 | 92/93 |
| | (EBr/Qtl) | | | | | | | | | |
| Teff | 104 | 191 | 185 | 112 | 129 | 134 | 125 | 148 | 194 | 197 |
| Wheat | 67 | 157 | 117 | 77 | 59 | 104 | 82 | 107 | 135 | 145 |
| Sorghum | 76 | 147 | 125 | 70 | 67 | 107 | 75 | 100 | 141 | 134 |
| Barley | 69 | 125 | 113 | 71 | 67 | 102 | 87 | 106 | 137 | 142 |
| Maize | 38 | 125 | 76 | 43 | 41 | 57 | 48 | 68 | 100 | 94 |
| Fertilizer Cost [2] | 113.0 | 113.0 | 113.2 | 108.0 | 113.2 | 137.1 | 126.7 | 129.7 | 154.8 | 207.6 |

1. Crop prices are average Addis Ababa monthly wholesale prices for white grains.

2. Cost of using blanket fertilizer recommendation of 100 kg of DAP and 50 kg urea per hectare.

## Annex Table 1.7 ETHIOPIA: Potential Fertilizer Demand Based on Proposed 1992/93 Recommendations

Fertilizer and Transport Sector Assessment, IFDC,1993

| CROP | 1991/92 Area (HA) | Fertilizer Recommendation | | Fertilizer Required 1 | | Total Potential Demand (mt) | Current Percent of Crop Areas Fertilized (%) | Current Potential Demand 2. (mt) |
|---|---|---|---|---|---|---|---|---|
| | | DAP (kg/ha) | Urea (kg/ha) | DAP (mt) | Urea (mt) | | | |
| Teff | 1,351,150 | 115.2 | 75.9 | 155,652 | 102,552 | 258,204 | 50 | 129,102 |
| Wheat | 538,460 | 123.9 | 80.7 | 66,715 | 43,454 | 110,169 | 30 | 33,051 |
| Sorghum | 421,270 | 115.2 | 35.4 | 48,530 | 14,913 | 63,443 | 3 | 1,903 |
| Barley | 593,400 | 132.6 | 72.0 | 78,685 | 42,725 | 121,410 | 10 | 12,141 |
| Maize | 751,110 | 130.4 | 77.2 | 97,945 | 57,986 | 155,931 | 7 | 10,915 |
| Total | | | | 447,527 | 261,630 | 709,157 | | 187,112 |

1. Fertilizer required if applied to total areas at current recommendations.

2.Based on current usage patterns.

# Appendix 1

# Ethiopian Fertilizer Stock Control Strategy

# Appendix 1

## Ethiopian Fertilizer Stock Control Strategy

Stock variation is not an uncontrollable or unpredictable event. It is the result of a simple arithmetical relationship between sales offtake and supply, whether supply is from local production or imports. Variation of stocks is therefore predictable and to some degree controllable.

The stock control curve is best calculated starting at the end of the main offtake season, when stocks are at a minimum.

To illustrate the approach for the Ethiopian situation, the calculation for total monthly fertilizer stocks is based on a purely indicative monthly sales offtake pattern and total annual sales of 300,000 mt. The method can be applied to a single product at a single location or on a district or regional basis and on different timeframes and to any sales and supply pattern.

**Assumptions**

1. Calculation starts with carryover stocks start at end of September at the end of the Mehr season.
2. Sales 20% Belg, 80% Mehr, with monthly sales according to indicative data:

| Oct. | Nov. | Dec. | Jan. | Feb. | March | April | May | June | July | Aug. | Sept. | Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| (%) | | | | | | | | | | | | |
| 0 | 0 | 0 | 5 | 10 | 5 | 0 | 14 | 24 | 33 | 9 | 0 | 100 |

3. Annual sales 300,000 mt.
4. Opening stock 30,000 mt, equivalent to 10% carryover stock.
5. Imports 300,000 mt as 12 x 25,000 mt cargoes, offloading at Assab at 2,000 mtpd. Assume 2 months with one vessel unloading, 5 months with 2 vessels unloading.

**Case 1**

"Just in Time" (JIT) arrival of imports, on the latest schedule possible, to maintain (1) minimum inventory, (2) sufficient inventory to cover the following month's sales at all times, and (3) 10% carryover stock at end of Mehr season.

**Case 2**

JIT program with import program **1 month earlier** to give cover against delays.

**Case 3**

JIT program with imports scheduled **2 months earlier** to give even greater security.

**Cases 4, 5, and 6**

As for Cases 1-3 but with 30% stock carryover at end of Mehr season.

**Impacts**

Tables 1 and 2 and Figures 1-6 illustrate the maximum and annual average monthly end-stocks as percents of total sales for the three respective cases with either 10% or 30% minimum stock carryovers. It can be seen that imports are assumed to be handled over a 7-month period on an essentially continuous basis.

The effects of moving the import schedule forward can be summarized as follows:

| Case | Maximum Stock | | Average Stock | | Average Stock Holding Cost, EBr/mt Sales |
|---|---|---|---|---|---|
| | (%) | (mt) | (%) | (mt) | |
| 1 | 42 | 126,000 | 19.6 | 58,830 | 53 |
| 2 | 59 | 177,000 | 27.9 | 83,820 | 75 |
| 3 | 76 | 228,000 | 36.3 | 108,840 | 98 |
| 4 | 63 | 189,000 | 39.6 | 118,830 | 107 |
| 5 | 79 | 237,000 | 47.9 | 143,820 | 129 |
| 6 | 96 | 298,000 | 56.3 | 168,840 | 152 |

- 100

Average stockholding cost based on interest charges at 14%/year into-store costs of EBr 1,930/mt.

The JIT strategy with 10% minimum carryover stock costs US $5.00/mt (EBr 5.3/qtl) and almost doubles when shipping is brought forward by 2 months (Case 3).

With 30% minimum carryover stocks the interest cost increases to US $20.00/mt for a JIT strategy and approaches US $30.00/mt when shipping is brought forward by 2 months.

Recognition of the cost penalties arising from conservative inventory strategies is essential. The current 30% minimum stock carryover policy is not warranted.

**Stock Control Monitoring Strategy**

Monitoring should be carried out on a continuous, year round basis. Stock control curves may be created for all locations and all products for which satisfactory data are available. The effects of changes in the system or movement outside of the predetermined parameters should be seen well in advance.

**Table 1. ETHIOPIA: Calculation of In-Country Stock Levels with Variation in Import Program Timi**

Fertilizer and Transport Sector Assessment ,IFDC,1993

Annual Sales 300,000 MT., Carry-over Stocks 10%

**CASE 1** **(Just-in-Time Imports)**

**Percent of Annual Sales**

| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL/AVE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sales | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 14 | 24 | 33 | 9 | 0 | 100 |
| Import Supply | 0 | 0 | 0 | 8 | 8 | 17 | 17 | 17 | 17 | 17 | 0 | 0 | 100 |
| (Ships) | 0 | 0 | 0 | (1) | (1) | (2) | (2) | (2) | (2) | (2) | 0 | 0 | (12) |
| Month End Stock | 10 | 10 | 10 | 13 | 12 | 23 | 40 | **43** | 35 | 19 | 10 | 10 | 19.61 |

**CASE 2** **(Imports One Month Earlier)**

| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL/AVE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sales | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 14 | 24 | 33 | 9 | 0 | 100 |
| Import Supply | 0 | 0 | 8 | 8 | 17 | 17 | 17 | 17 | 17 | 0 | 0 | 0 | 100 |
| (Ships) | 0 | 0 | (1) | (1) | (2) | (2) | (2) | (2) | (2) | 0 | 0 | 0 | (12) |
| Month End Stock | 10 | 10 | 18 | 22 | 28 | 40 | 57 | **59** | 52 | 19 | 10 | 10 | 27.94 |

**CASE 3** **(Imports Two Months Earlier)**

| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL/AVE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sales | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 14 | 24 | 33 | 9 | 0 | 100 |
| Import Supply | 0 | 8 | 8 | 17 | 17 | 17 | 17 | 17 | 0 | 0 | 0 | 0 | 100 |
| (Ships) | 0 | (1) | (1) | (2) | (2) | (2) | (2) | (2) | 0 | 0 | 0 | 0 | (12) |
| Month End Stock | 10 | 18 | 27 | 38 | 45 | 57 | 73 | **76** | 52 | 19 | 10 | 10 | 36.28 |

Totals may not add due to rounding

**Table 2. ETHIOPIA: Calculation of In-Country Stock Levels with Variation in Import Program Timi**

Fertilizer and Transport Sector Assessment ,IFDC,1993

Annual Sales 300,000 MT., Carry-over Stocks 30%

**CASE 4** **(Just-in-Time impo :s)** **Percent of Annual Sales**

| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL/AVE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sales | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 14 | 24 | 33 | 9 | 0 | 100 |
| Import Supply | 0 | 0 | 0 | 8 | 8 | 17 | 17 | 17 | 17 | 17 | 0 | 0 | 100 |
| (Ships) | 0 | 0 | 0 | (1) | (1) | (2) | (2) | (2) | (2) | (2) | 0 | 0 | (12) |
| Month End Stock | 30 | 30 | 30 | 33 | 32 | 43 | 60 | 63 | 55 | 39 | 30 | 30 | 39.61 |

**CASE 5** **(Imports One Month Earlier)**

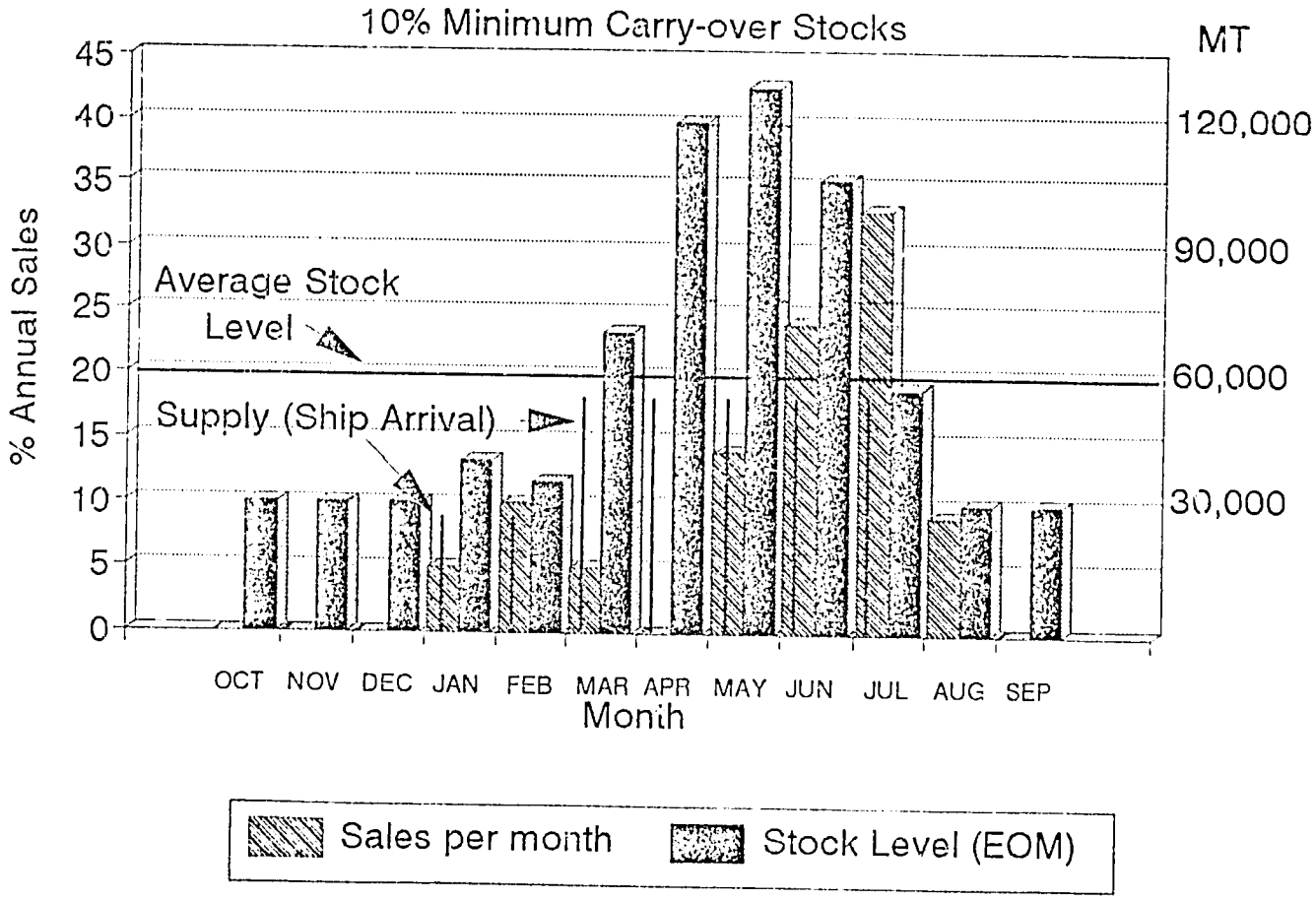
| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL/AVE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sales | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 14 | 24 | 33 | 9 | 0 | 100 |
| Import Supply | 0 | 0 | 8 | 8 | 17 | 17 | 17 | 17 | 17 | 0 | 0 | 0 | 100 |
| (Ships) | 0 | 0 | (1) | (1) | (2) | (2) | (2) | (2) | (2) | 0 | 0 | 0 | (12) |
| Month End Stock | 30 | 30 | 38 | 42 | 48 | 60 | 77 | 79 | 72 | 39 | 30 | 30 | 47.94 |

**CASE 6** **(Imports Two Months Earlier)**

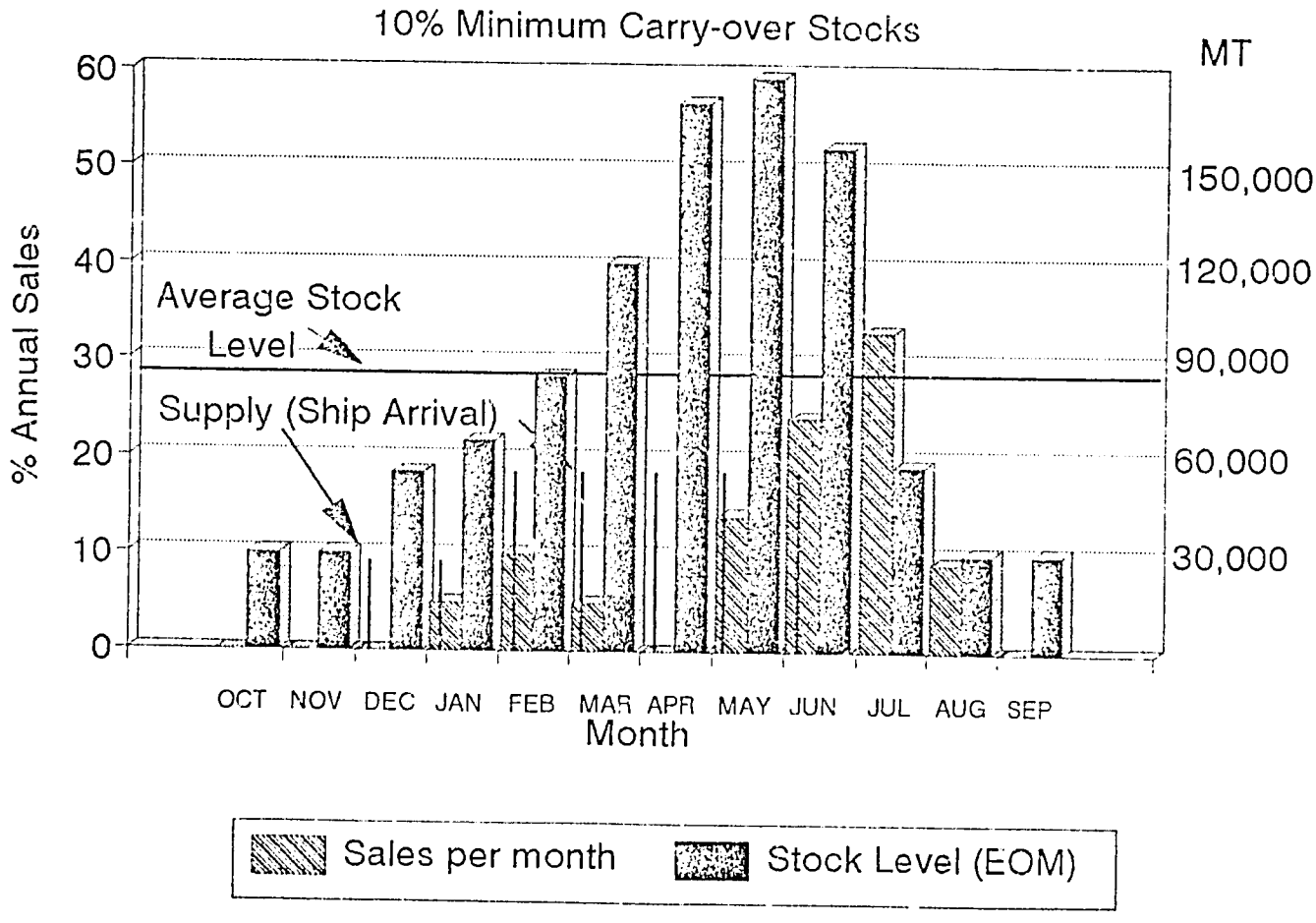
| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL/AVE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Sales | 0 | 0 | 0 | 5 | 10 | 5 | 0 | 14 | 24 | 33 | 9 | 0 | 100 |
| Import Supply | 0 | 8 | 8 | 17 | 17 | 17 | 17 | 17 | 0 | 0 | 0 | 0 | 100 |
| (Ships) | 0 | (1) | (1) | (2) | (2) | (2) | (2) | (2) | 0 | 0 | 0 | 0 | (12) |
| Month End Stock | 30 | 38 | 47 | 58 | 65 | 77 | 93 | 96 | 72 | 39 | 30 | 30 | 56.28 |

Totals may not add due to rounding

## Figure 1. Impact of Import Timing on Stock Levels, Case 1 (Just In Time)



## Figure 2. Impact of Import Timing on Stock Levels, Case 2 (1 Month Earlier)

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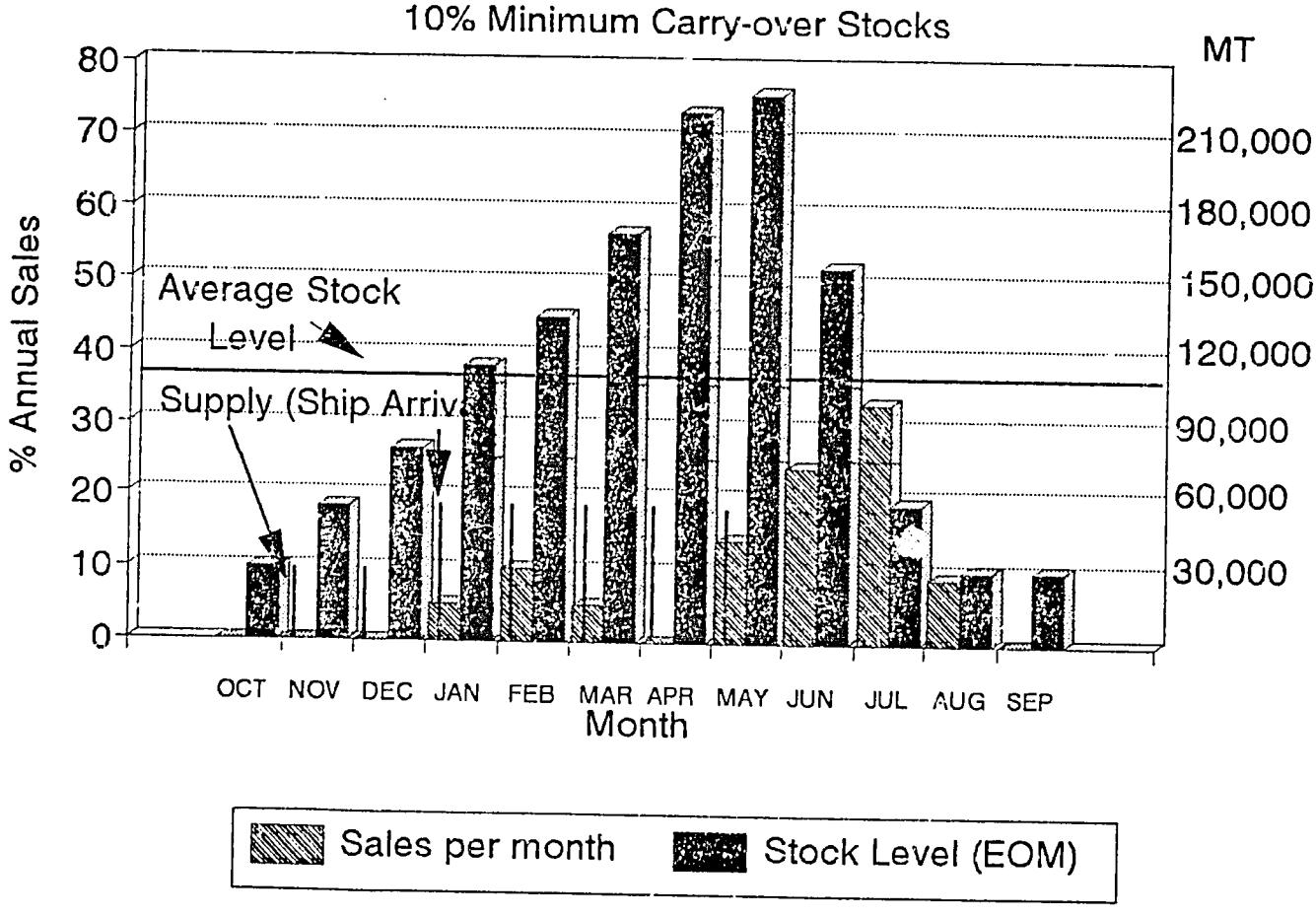
## Figure 3. Impact of Import Timing on Stock Levels, Case 3 (2 Months Earlier)

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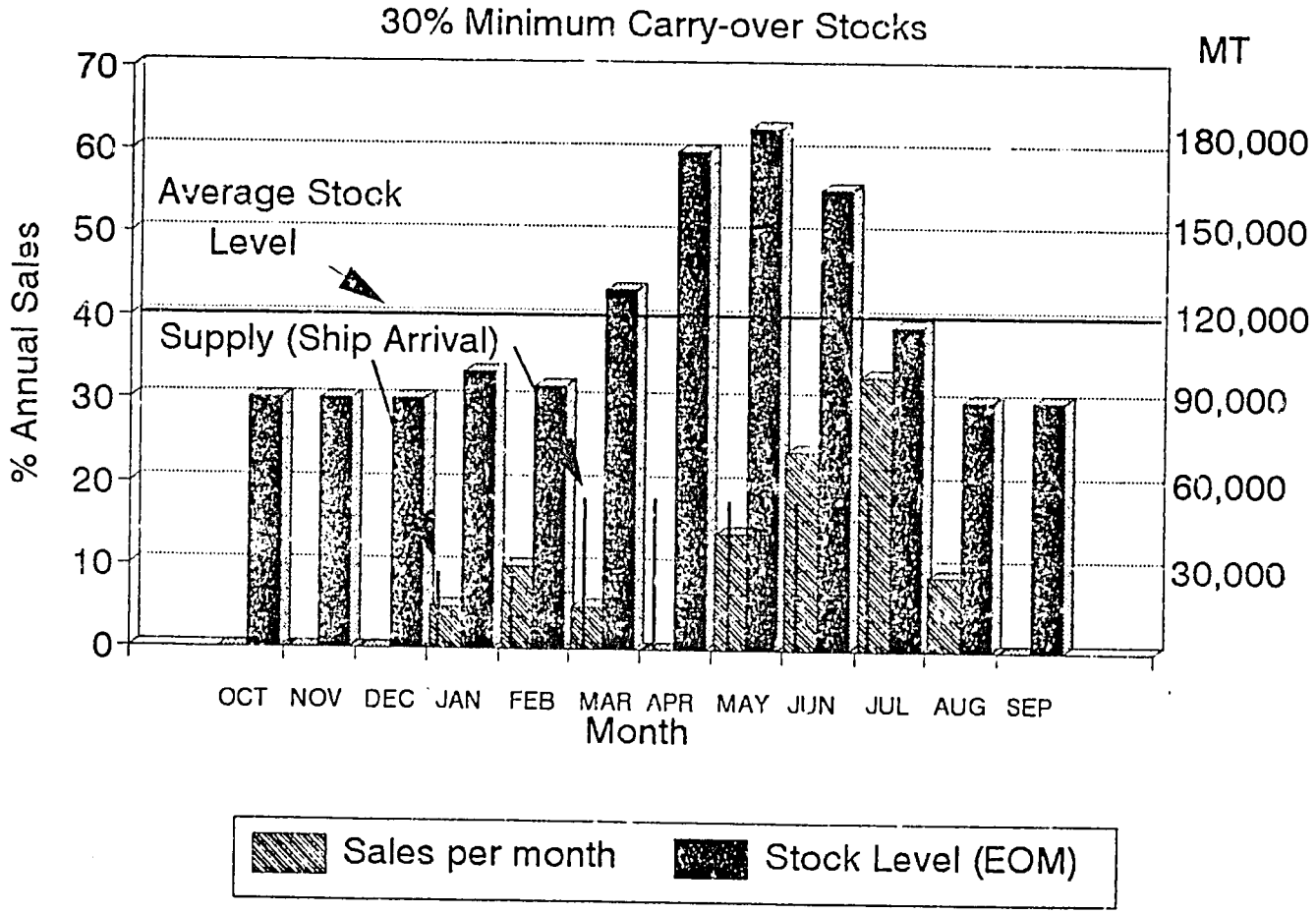
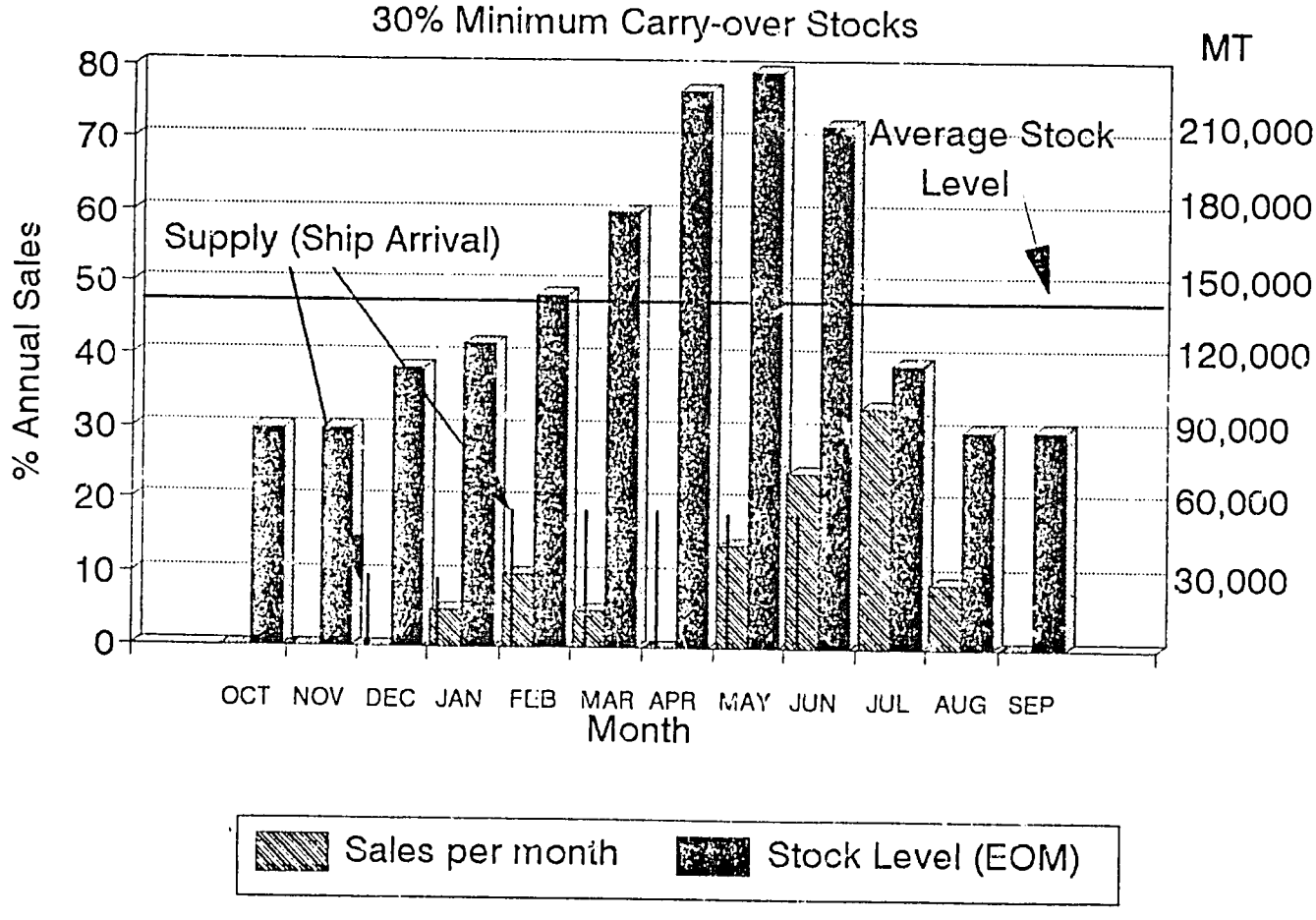
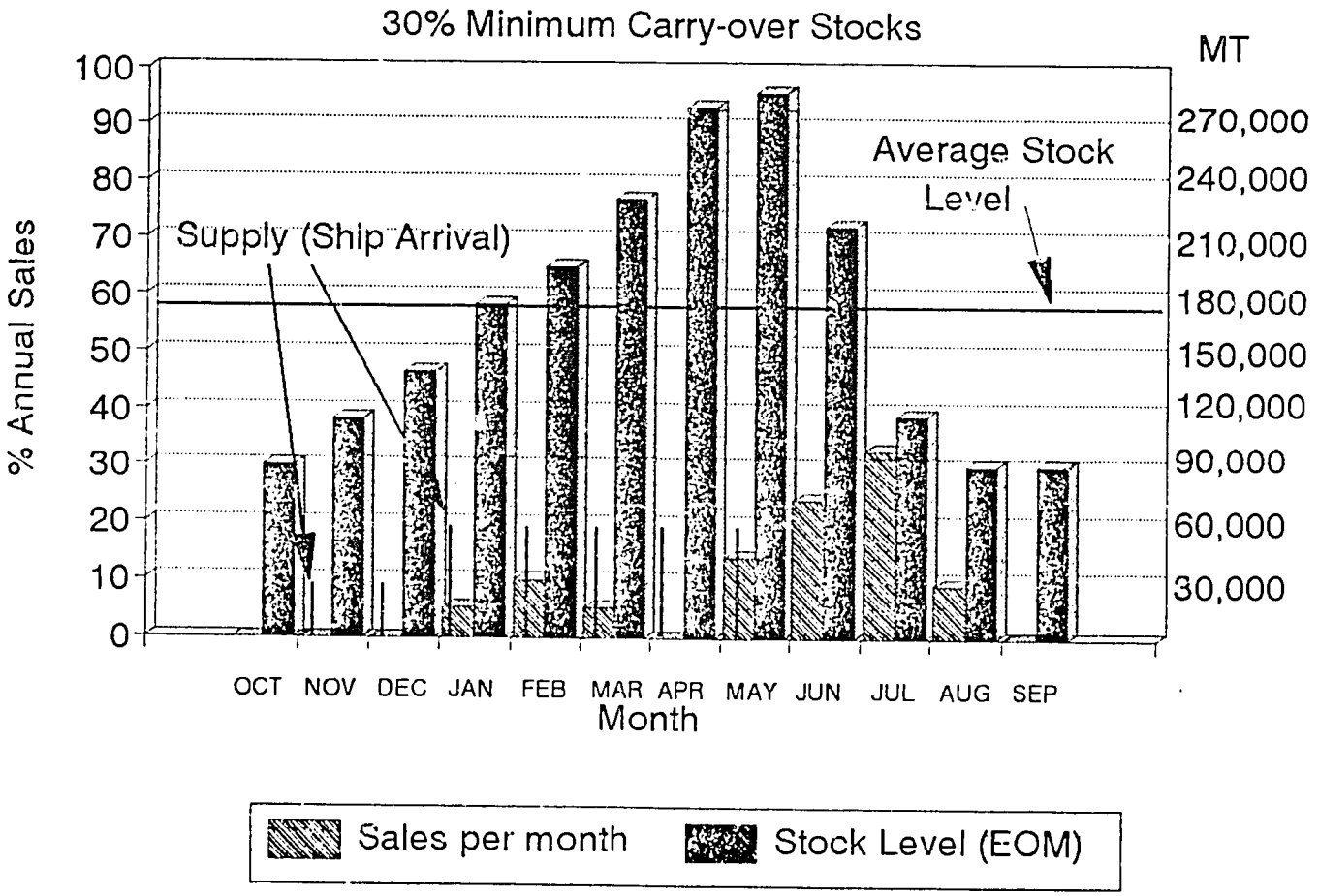
## Figure 4. Impact of Import Timing on Stock Levels, Case 1 (Just In Time)



## Figure 5. Impact of Import Timing on Stock Levels, Case 2 (1 Month Earlier)



## Figure 6. Impact of Import Timing on Stock Levels, Case 3 (2 Months Earlier)



# Appendix 2

# Estimates of Road Transport Operating Costs

APPENDIX 2 (TABLE 1) Truck Operating Costs

30 Ton Payload
20% Profit
Full Costs

| LONG HAUL TRUCK TRACTOR AND SEMI-TRAILER OPERATING COST ESTIMATES: COSTS SHOWN IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Trk./Semi-trailer | Long haul | 30 | 18 |
| *VEHICLE COST DELIVERED, DUTY PAID | 882,290 | | | |
| *FINANCED (% OF DELIVERED COST) | 100 | | | |
| *LOAN PERIOD (YR) | 10 | | | |
| *INTEREST RATE | 14% | | | |
| *INTEREST RATE FACTOR | 15.53 | | | |
| *DEPRECIATION PERIOD (YR) | 10 | | | |
| *SALVAGE RATE (% VEHICLE COST) | 0 | | | |
| SALVAGE VALUE | 0 | | | |
| *UTILIZATION (KM/YR)(AA/ASB/AA 36 TRIPS YR) | 65,000 | | | |
| *UTILIZATION (DAYS/YR) | 250 | | | |
| *LOAD FACTOR (% OF VEHICLE CAPACITY) | 50 | 60 | 70 | 90 |
| *TYRE COST | 1,300 | | | |
| *AVERAGE TYRE LIFE (KM) | 25,000 | | | |
| *FIXED MAINTENANCE (% OF FIXED COSTS) | 7 | | | |
| *VAR. MAINTENANCE (% OF VAR. COSTS) | 25 | | | |
| *ADMINISTRATION (% OF FIXED COSTS) | 10 | | | |
| *FUEL CONS. (LT/100 KM) | 60 | | | |
| *FUEL COST PER LITER | 1.45 | | | |
| *LUBR/OIL COST (% OF FUEL) | 10 | | | |
| *INSURANCE (% OF VEHICLE COST) | 3 | | | |
| *PROFIT (% OF TOTAL VEHICLE COSTS) | 20 | | | |
| FIXED ANNUAL COSTS | | Cost/km | Cost/day | |
| DEPRECIATION | 68,229 | 1.36 | 352.92 | |
| INTEREST | 76,195 | 1.17 | 304.78 | |
| LICENSES | 500 | 0.01 | 2.00 | |
| INSURANCE | 26,469 | 0.41 | 105.88 | |
| WAGES | 12,000 | 0.18 | 48.00 | |
| MISCELLANEOUS | 10,000 | 0.15 | 40.00 | |
| MAINTENANCE | 17,997 | 0.28 | 71.99 | |
| ADMINISTRATION | 25,710 | 0.40 | 102.84 | |
| | | | | |
| SUM OF FIXED COSTS | 257,100 | | | |
| FIXED COST PER KILOMETER | | 3.96 | | |
| FIXED COST PER DAY | | | 1,028.40 | |
| | | | | |

ACKNOWLEDGEMENT : COMPUTATION BY DR. G.L. ROBERTS, INLAND TRANSPORT ADVISER, PMU OF ERRP.

| LONG HAUL TRUCK TRACTOR AND SEMI-TRAILER OPERATING COST ESTIMATES: COSTS SHOWN IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Trk /Semi-trailer | Long haul | 30 | 10 |
| VARIABLE ANNUAL COSTS | | Cost/km | | |
| FUEL | 75,400 | 1.16 | | |
| LUBR/OIL | 7,540 | 0.12 | | |
| TYRES | 84,240 | 1.30 | | |
| MAINTENANCE | 55,727 | 0.86 | | |
| | | | | |
| SUM OF VARIABLE COSTS | 222,907 | | | |
| VARIABLE COST PER KILOMETER | | 3.43 | | |
| | | | | |
| TOTAL COSTS | 480,007 | | | |
| TOTAL COSTS PER KILOMETER | | 7.38 | | |
| | | | | |
| | | | | |
| | | | | |
| TRANSPORT RATE REQUIRED FOR PROFIT | LOAD FACTOR | TON-KM RATE | | |
| | 50 | 0.59 | | |
| | 60 | 0.49 | | |
| | 70 | 0.42 | | |
| | 90 | 0.33 | | |
| | | | | |
| | | | | |
| | | | | |

CLAYTON.30A 100% FINANCED, 10 YEAR LOAN, 14% INTEREST, 20% PROFIT

APPENDIX 2 (TABLE 2)

## TRUCK OPERATING COSTS

30 ton payload
Zero Profit
Full Costs

| LONG HAUL TRUCK TRACTOR AND SEMI-TRAILER OPERATING COST ESTIMATES: COSTS SHOWN IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Trk./Semi-trailer | Long haul | 30 | 18 |
| *VEHICLE COST DELIVERED, DUTY PAID | 882,290 | | | |
| *FINANCED (% OF DELIVERED COST) | 100 | | | |
| *LOAN PERIOD (YR) | 10 | | | |
| *INTEREST RATE | 14% | | | |
| *INTEREST RATE FACTOR | 15.53 | | | |
| *DEPRECIATION PERIOD (YR) | 10 | | | |
| *SALVAGE RATE (% VEHICLE COST) | 0 | | | |
| SALVAGE VALUE | 0 | | | |
| *UTILIZATION (KM/YR)(AA/ASB/AA 36 TRIPS YR) | 65,000 | | | |
| *UTILIZATION (DAYS/YR) | 250 | | | |
| *LOAD FACTOR (% OF VEHICLE CAPACITY) | 50 | 60 | 70 | 90 |
| *TYRE COST | 1,800 | | | |
| *AVERAGE TYRE LIFE (KM) | 25,000 | | | |
| *FIXED MAINTENANCE (% OF FIXED COSTS) | 7 | | | |
| *VAR. MAINTENANCE (% OF VAR. COSTS) | 25 | | | |
| *ADMINISTRATION (% OF FIXED COSTS) | 10 | | | |
| *FUEL CONS. (LT/100 KM) | 80 | | | |
| *FUEL COST PER LITER | 1.45 | | | |
| *LUBR/OIL COST (% OF FUEL) | 10 | | | |
| *INSURANCE (% OF VEHICLE COST) | 3 | | | |
| *PROFIT (% OF TOTAL VEHICLE COSTS) | 0 | | | |
| FIXED ANNUAL COSTS | | Cost/km | Cost/day | |
| DEPRECIATION | 88,229 | 1.36 | 352.92 | |
| INTEREST | 76,195 | 1.17 | 304.78 | |
| LICENSES | 500 | 0.01 | 2.00 | |
| INSURANCE | 26,469 | 0.41 | 105.88 | |
| WAGES | 12,000 | 0.18 | 48.00 | |
| MISCELLANEOUS | 10,000 | 0.15 | 40.00 | |
| MAINTENANCE | 17,997 | 0.28 | 71.99 | |
| ADMINISTRATION | 25,710 | 0.40 | 102.84 | |
| | | | | |
| SUM OF FIXED COSTS | 257,100 | | | |
| FIXED COST PER KILOMETER | | 3.96 | | |
| FIXED COST PER DAY | | | 1,028.40 | |
| | | | | |

| LONG HAUL TRUCK TRACTOR AND SEMI-TRAILER OPERATING COST ESTIMATES: COSTS SHOWN IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Trk./Semi-trailer | Long haul | 30 | 18 |
| VARIABLE ANNUAL COSTS | | Cost/km | | |
| FUEL | 75,400 | 1.16 | | |
| LUBR/OIL | 7,540 | 0.12 | | |
| TYRES | 84,240 | 1.30 | | |
| MAINTENANCE | 55,727 | 0.86 | | |
| | | | | |
| SUM OF VARIABLE COSTS | 222,907 | | | |
| VARIABLE COST PER KILOMETER | | 3.43 | | |
| | | | | |
| TOTAL COSTS | 480,007 | | | |
| TOTAL COSTS PER KILOMETER | | 7.38 | | |
| | | | | |
| | | | | |
| | | | | |
| TRANSPORT RATE REQUIRED FOR PROFIT | LOAD FACTOR | TON-KM RATE | | |
| | 50 | 0.49 | | |
| | 60 | 0.41 | | |
| | 70 | 0.35 | | |
| | 90 | 0.27 | | |
| | | | | |
| | | | | |
| | | | | |

CLAYTON.30B 100% FINANCED, ZERO PROFIT

APPENDIX 2 (TABLE 3) Trucking Operating Costs

30 Ton payload
Zero Profit
Zero Interest

| LONG HAUL TRUCK TRACTOR AND SEMI-TRAILER OPERATING COST ESTIMATES: COSTS SHOWN IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Trk./Semi-trailer | Long haul | 30 | 18 |
| *VEHICLE COST DELIVERED, DUTY PAID | 882,290 | | | |
| *FINANCED (% OF DELIVERED COST) | 100 | | | |
| *LOAN PERIOD (YR) | 10 | | | |
| *INTEREST RATE | 0% | | | |
| *INTEREST RATE FACTOR | 0 | | | |
| *DEPRECIATION PERIOD (YR) | 10 | | | |
| *SALVAGE RATE (% VEHICLE COST) | 0 | | | |
| SALVAGE VALUE | 0 | | | |
| *UTILIZATION (KM/YR)(AA/ASB/AA 36 TRIPS YR) | 65,000 | | | |
| *UTILIZATION (DAYS/YR) | 250 | | | |
| *LOAD FACTOR (% OF VEHICLE CAPACITY) | 50 | 60 | 70 | 90 |
| *TYRE COST | 1,800 | | | |
| *AVERAGE TYRE LIFE (KM) | 25,000 | | | |
| *FIXED MAINTENANCE (% OF FIXED COSTS) | 7 | | | |
| *VAR. MAINTENANCE (% OF VAR. COSTS) | 25 | | | |
| *ADMINISTRATION (% OF FIXED COSTS) | 10 | | | |
| *FUEL CONS. (LT/100 KM) | 80 | | | |
| *FUEL COST PER LITER | 1.45 | | | |
| *LUBR/OIL COST (% OF FUEL) | 10 | | | |
| *INSURANCE (% OF VEHICLE COST) | 3 | | | |
| *PROFIT (% OF TOTAL VEHICLE COSTS) | 0 | | | |
| FIXED ANNUAL COSTS | | Cost/km | Cost/day | |
| DEPRECIATION | 88,229 | 1.36 | 352.92 | |
| INTEREST | 0 | 0.00 | 0.00 | |
| LICENSES | 500 | 0.01 | 2.00 | |
| INSURANCE | 26,469 | 0.41 | 105.88 | |
| WAGES | 12,000 | 0.18 | 48.00 | |
| MISCELLANEOUS | 10,000 | 0.15 | 40.00 | |
| MAINTENANCE | 11,571 | 0.18 | 46.28 | |
| ADMINISTRATION | 16,530 | 0.25 | 66.12 | |
| | | | | |
| SUM OF FIXED COSTS | 165,299 | | | |
| FIXED COST PER KILOMETER | | 2.54 | | |
| FIXED COST PER DAY | | | 661.20 | |
| | | | | |

| LONG HAUL TRUCK TRACTOR AND SEMI-TRAILER OPERATING COST ESTIMATES: COSTS SHOWN IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Trk./Semi-trailer | Long haul | 30 | 18 |
| VARIABLE ANNUAL COSTS | | Cost/km | | |
| FUEL | 75,400 | 1.16 | | |
| LUBR/OIL | 7,540 | 0.12 | | |
| TYRES | 84,240 | 1.30 | | |
| MAINTENANCE | 55,727 | 0.86 | | |
| | | | | |
| SUM OF VARIABLE COSTS | 222,907 | | | |
| VARIABLE COST PER KILOMETER | | 3.43 | | |
| | | | | |
| TOTAL COSTS | 386,206 | | | |
| TOTAL COSTS PER KILOMETER | | 5.97 | | |
| | | | | |
| | | | | |
| | | | | |
| TRANSPORT RATE REQUIRED FOR PROFIT | LOAD FACTOR | TON-KM RATE | | |
| | 50 | 0.40 | | |
| | 60 | 0.33 | | |
| | 70 | 0.28 | | |
| | 90 | 0.22 | | |
| | | | | |
| | | | | |
| | | | | |

CLAYTON.30C 100% FINANCED, ZERO INTEREST, ZERO PROFIT

APPENDIX 2 (TABLE 4) TRUCK OPERATING COSTS

30 Ton Payload
Zero Profit
Zero Interest
Zero Depreciation

| LONG HAUL TRUCK TRACTOR AND SEMI-TRAILER OPERATING COST ESTIMATES: COSTS SHOWN IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Trk./Semi-trailer | Long haul | 30 | 18 |
| *VEHICLE COST DELIVERED, DUTY PAID | 882,290 | | | |
| *FINANCED (% OF DELIVERED COST) | 100 | | | |
| *LOAN PERIOD (YR) | 10 | | | |
| *INTEREST RATE | 0% | | | |
| *INTEREST RATE FACTOR | 0 | | | |
| *DEPRECIATION PERIOD (YR) | 0 | | | |
| *SALVAGE RATE (% VEHICLE COST) | 0 | | | |
| SALVAGE VALUE | 0 | | | |
| *UTILIZATION (KM/YR)(AA/ASB/AA 36 TRIPS YR) | 65,000 | | | |
| *UTILIZATION (DAYS/YR) | 250 | | | |
| *LOAD FACTOR (% OF VEHICLE CAPACITY) | 50 | 60 | 70 | 90 |
| *TYRE COST | 1,800 | | | |
| *AVERAGE TYRE LIFE (KM) | 25,000 | | | |
| *FIXED MAINTENANCE (% OF FIXED COSTS) | 7 | | | |
| *VAR. MAINTENANCE (% OF VAR. COSTS) | 25 | | | |
| *ADMINISTRATION (% OF FIXED COSTS) | 10 | | | |
| *FUEL CONS. (LT/100 KM) | 80 | | | |
| *FUEL COST PER LITER | 1.45 | | | |
| *LUBR/OIL COST (% OF FUEL) | 10 | | | |
| *INSURANCE (% OF VEHICLE COST) | 3 | | | |
| *PROFIT (% OF TOTAL VEHICLE COSTS) | 0 | | | |
| FIXED ANNUAL COSTS | | Cost/km | Cost/day | |
| DEPRECIATION | 0 | 0.00 | 0.00 | |
| INTEREST | 0 | 0.00 | 0.00 | |
| LICENSES | 500 | 0.01 | 2.00 | |
| INSURANCE | 26,469 | 0.41 | 105.88 | |
| WAGES | 12,000 | 0.18 | 48.00 | |
| MISCELLANEOUS | 10,000 | 0.15 | 40.00 | |
| MAINTENANCE | 4,130 | 0.06 | 16.52 | |
| ADMINISTRATION | 5,900 | 0.09 | 23.60 | |
| | | | | |
| SUM OF FIXED COSTS | 58,999 | | | |
| FIXED COST PER KILOMETER | | 0.91 | | |
| FIXED COST PER DAY | | | 236.00 | |
| | | | | |

| LONG HAUL TRUCK TRACTOR AND SEMI-TRAILER OPERATING COST ESTIMATES: COSTS SHOWN IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Trk./Semi-trailer | Long haul | 30 | 18 |
| VARIABLE ANNUAL COSTS | | Cost/km | | |
| FUEL | 75,400 | 1.15 | | |
| LUBR/OIL | 7,540 | 0.12 | | |
| TYRES | 84,240 | 1.30 | | |
| MAINTENANCE | 55,727 | 0.86 | | |
| | | | | |
| SUM OF VARIABLE COSTS | 222,907 | | | |
| VARIABLE COST PER KILOMETER | | 3.43 | | |
| | | | | |
| TOTAL COSTS | 281,906 | | | |
| TOTAL COSTS PER KILOMETER | | 4.34 | | |
| | | | | |
| | | | | |
| | | | | |
| TRANSPORT RATE REQUIRED FOR PROFIT | LOAD FACTOR | TON-KM RATE | | |
| | 50 | 0.29 | | |
| | 60 | 0.24 | | |
| | 70 | 0.21 | | |
| | 90 | 0.16 | | |
| | | | | |
| | | | | |
| | | | | |

CLAYTON.30D 100% FINANCED, ZERO INTEREST, ZERO DEPRECIATION, ZERO PROFIT

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APPENDIX 2 (TABLE 5) Truck Operating Cost

10 Ton Payload
20% Profit
Full Costs

| LONG HAUL TRUCK OPERATING COST ESTIMATES: COSTS EXPRESSED IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| •PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | • CAPACITY/MT | • NO. TYRES |
| VEHICLE TYPE | Truck | Delivery | 10 | 6 |
| •VEHICLE COST DELIVERED, DUTY PAID | 430,000 | | | |
| •FINANCED (% OF DELIVERED COST) | 100 | | | |
| •LOAN PERIOD (YR) | 10 | | | |
| •INTEREST RATE | 14% | | | |
| •INTEREST RATE FACTOR | 15.53 | | | |
| •DEPRECIATION PERIOD (YR) | 10 | | | |
| •SALVAGE RATE (% VEHICLE COST) | 0 | | | |
| SALVAGE VALUE | 0 | | | |
| •UTILIZATION KM/YR | 16,800 | | | |
| •UTILIZATION (DAYS/YR) | 250 | | | |
| •LOAD FACTOR (% OF VEHICLE CAPACITY) | 50 | 60 | 70 | 90 |
| •TYRE COST | 1,800 | | | |
| •AVERAGE TYRE LIFE (KM) | 25,000 | | | |
| •FIXED MAINTENANCE (% OF FIXED COSTS) | 7 | | | |
| •VAR. MAINTENANCE (% OF VAR. COSTS) | 25 | | | |
| •ADMINISTRATION (% OF FIXED COSTS) | 10 | | | |
| •FUEL CONS. (LT/100 KM) | 50 | | | |
| •FUEL COST PER LITER | 1.45 | | | |
| •LUBR/OIL COST (% OF FUEL) | 10 | | | |
| •INSURANCE (% OF VEHICLE COST) | 3 | | | |
| •PROFIT (% OF TOTAL VEHICLE COSTS) | 20 | | | |
| FIXED ANNUAL COSTS | | Cost/km | Cost/day | |
| DEPRECIATION | 43,000 | 2.56 | 172.00 | |
| INTEREST | 37,135 | 2.21 | 148.54 | |
| LICENSES | 500 | 0.03 | 2.00 | |
| INSURANCE | 12,900 | 0.77 | 51.60 | |
| WAGES | 12,000 | 0.71 | 48.00 | |
| MISCELLANEOUS | 5,000 | 0.30 | 20.00 | |
| MAINTENANCE | 9,322 | 0.55 | 37.29 | |
| ADMINISTRATION | 13,317 | 0.79 | 53.27 | |
| | | | | |
| SUM OF FIXED COSTS | 133,174 | | | |
| FIXED COST PER KILOMETER | | 7.93 | | |
| FIXED COST PER DAY | | | 532.70 | |
| | | | | |

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| LONG HAUL TRUCK OPERATING COST ESTIMATES: COSTS EXPRESSED IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Truck | Delivery | 10 | 6 |
| VARIABLE ANNUAL COSTS | | Cost/km | | |
| FUEL | 12,180 | 0.73 | | |
| LUBR/OIL | 1,218 | 0.07 | | |
| TYRES | 7,258 | 0.43 | | |
| MAINTENANCE | 6,885 | 0.41 | | |
| | | | | |
| SUM OF VARIABLE COSTS | 27,541 | | | |
| VARIABLE COST PER KILOMETER | | 1.64 | | |
| | | | | |
| TOTAL COSTS | 160,715 | | | |
| TOTAL COSTS PER KILOMETER | | 9.57 | | |
| | | | | |
| | | | | |
| | | | | |
| TRANSPORT RATE REQUIRED FOR PROFIT | LOAD FACTOR | TON-KM RATE | | |
| | 50 | 2.30 | | |
| | 60 | 1.91 | | |
| | 70 | 1.64 | | |
| | 90 | 1.28 | | |
| | | | | |
| | | | | |
| | | | | |

CLAYTON.10A 100% FINANCED, 10 YEAR LOAN, 14% INTEREST, 20% PROFIT

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APPENDIX 2 (TABLE 6)

Truck Operating Costs

10 Ton Payload
Zero Profit
Full Costs

| LONG HAUL TRUCK OPERATING COST ESTIMATES: COSTS EXPRESSED IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER : | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Truck | Delivery | 10 | 6 |
| *VEHICLE COST DELIVERED, DUTY PAID | 430,000 | | | |
| *FINANCED (% OF DELIVERED COST) | 100 | | | |
| *LOAN PERIOD (YR) | 10 | | | |
| *INTEREST RATE | 14% | | | |
| *INTEREST RATE FACTOR | 15.53 | | | |
| *DEPRECIATION PERIOD (YR) | 10 | | | |
| *SALVAGE RATE (% VEHICLE COST) | 0 | | | |
| SALVAGE VALUE | 0 | | | |
| *UTILIZATION KM/YR | 16,800 | | | |
| *UTILIZATION (DAYS/YR) | 250 | | | |
| *LOAD FACTOR (% OF VEHICLE CAPACITY) | 50 | 60 | 70 | 90 |
| *TYRE COST | 1,800 | | | |
| *AVERAGE TYRE LIFE (KM) | 25,000 | | | |
| *FIXED MAINTENANCE (% OF FIXED COSTS) | 7 | | | |
| *VAR. MAINTENANCE (% OF VAR. COSTS) | 25 | | | |
| *ADMINISTRATION (% OF FIXED COSTS) | 10 | | | |
| *FUEL CONS. (LT/100 KM) | 50 | | | |
| *FUEL COST PER LITER | 1.45 | | | |
| *LUBR/OIL COST (% OF FUEL) | 10 | | | |
| *INSURANCE (% OF VEHICLE COST) | 3 | | | |
| *PROFIT (% OF TOTAL VEHICLE COSTS) | 0 | | | |
| FIXED ANNUAL COSTS | | Cost/km | Cost/day | |
| DEPRECIATION | 43,000 | 2.56 | 172.00 | |
| INTEREST | 37,135 | 2.21 | 148.54 | |
| LICENSES | 500 | 0.03 | 2.00 | |
| INSURANCE | 12,900 | 0.77 | 51.60 | |
| WAGES | 12,000 | 0.71 | 48.00 | |
| MISCELLANEOUS | 5,000 | 0.30 | 20.00 | |
| MAINTENANCE | 9,322 | 0.55 | 37.29 | |
| ADMINISTRATION | 13,317 | 0.79 | 53.27 | |
| | | | | |
| SUM OF FIXED COSTS | 133,174 | | | |
| FIXED COST PER KILOMETER | | 7.93 | | |
| FIXED COST PER DAY | | | 532.70 | |
| | | | | |

| LONG HAUL TRUCK OPERATING COST ESTIMATES: COSTS EXPRESSED IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Truck | Delivery | 10 | 6 |
| VARIABLE ANNUAL COSTS | | Cost/km | | |
| FUEL | 12,180 | 0.73 | | |
| LUBR/OIL | 1,218 | 0.07 | | |
| TYRES | 7,258 | 0.43 | | |
| MAINTENANCE | 6,885 | 0.41 | | |
| | | | | |
| SUM OF VARIABLE COSTS | 27,541 | | | |
| VARIABLE COST PER KILOMETER | | 1.64 | | |
| | | | | |
| TOTAL COSTS | 160,715 | | | |
| TOTAL COSTS PER KILOMETER | | 9.57 | | |
| | | | | |
| | | | | |
| | | | | |
| TRANSPORT RATE REQUIRED FOR PROFIT | LOAD FACTOR | TON-KM RATE | | |
| | 50 | 1.91 | | |
| | 60 | 1.60 | | |
| | 70 | 1.37 | | |
| | 90 | 1.06 | | |
| | | | | |
| | | | | |
| | | | | |

CLAYTON.10B 100% FINANCED, 10 YEAR LOAN, 14% INTEREST, ZERO PROFIT

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APPENDIX 2 (TABLE 7)

## Truck Operating Costs

10 Ton Payload
Zero Profit
Zero Interest

| LONG HAUL TRUCK OPERATING COST ESTIMATES: COSTS EXPRESSED IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Truck | Delivery | 10 | 6 |
| *VEHICLE COST DELIVERED, DUTY PAID | 430,000 | | | |
| *FINANCED (% OF DELIVERED COST) | 100 | | | |
| *LOAN PERIOD (YR) | 10 | | | |
| *INTEREST RATE | 0% | | | |
| *INTEREST RATE FACTOR | 0 | | | |
| *DEPRECIATION PERIOD (YR) | 10 | | | |
| *SALVAGE RATE (% VEHICLE COST) | 0 | | | |
| SALVAGE VALUE | 0 | | | |
| *UTILIZATION KM/YR | 16,800 | | | |
| *UTILIZATION (DAYS/YR) | 250 | | | |
| *LOAD FACTOR (% OF VEHICLE CAPACITY) | 50 | 60 | 70 | 90 |
| *TYRE COST | 1,800 | | | |
| *AVERAGE TYRE LIFE (KM) | 25,000 | | | |
| *FIXED MAINTENANCE (% OF FIXED COSTS) | 7 | | | |
| *VAR. MAINTENANCE (% OF VAR. COSTS) | 25 | | | |
| *ADMINISTRATION (% OF FIXED COSTS) | 10 | | | |
| *FUEL CONS. (LT/100 KM) | 50 | | | |
| *FUEL COST PER LITER | 1.45 | | | |
| *LUBR/OIL COST (% OF FUEL) | 10 | | | |
| *INSURANCE (% OF VEHICLE COST) | 3 | | | |
| *PROFIT (% OF TOTAL VEHICLE COSTS) | 0 | | | |
| FIXED ANNUAL COSTS | | Cost/km | Cost/day | |
| DEPRECIATION | 43,000 | 2.56 | 172.00 | |
| INTEREST | 0 | 0.00 | 0.00 | |
| LICENSES | 500 | 0.03 | 2.00 | |
| INSURANCE | 12,900 | 0.77 | 51.60 | |
| WAGES | 12,000 | 0.71 | 48.00 | |
| MISCELLANEOUS | 5,000 | 0.30 | 20.00 | |
| MAINTENANCE | 6,190 | 0.37 | 24.76 | |
| ADMINISTRATION | 8,843 | 0.53 | 35.37 | |
| | | | | |
| SUM OF FIXED COSTS | 88,433 | | | |
| FIXED COST PER KILOMETER | | 5.26 | | |
| FIXED COST PER DAY | | | 353.73 | |
| | | | | |

| LONG HAUL TRUCK OPERATING COST ESTIMATES: COSTS EXPRESSED IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Truck | Delivery | 10 | 6 |
| VARIABLE ANNUAL COSTS | | Cost/km | | |
| FUEL | 12,180 | 0.73 | | |
| LUBR/OIL | 1,218 | 0.07 | | |
| TYRES | 7,258 | 0.43 | | |
| MAINTENANCE | 6,885 | 0.41 | | |
| | | | | |
| SUM OF VARIABLE COSTS | 27,541 | | | |
| VARIABLE COST PER KILOMETER | | 1.64 | | |
| | | | | |
| TOTAL COSTS | 115,974 | | | |
| TOTAL COSTS PER KILOMETER | | 6.90 | | |
| | | | | |
| | | | | |
| | | | | |
| TRANSPORT RATE REQUIRED FOR PROFIT | LOAD FACTOR | TON-KM RATE | | |
| | 50 | 1.38 | | |
| | 60 | 1.15 | | |
| | 70 | 0.99 | | |
| | 90 | 0.77 | | |
| | | | | |
| | | | | |
| | | | | |

CLAYTON.10C 100% FINANCED, ZERO INTEREST, ZERO PROFIT

APPENDIX 2 (TABLE 8) Truck Operating Costs

10 Ton Payload
Zero Profit
Zero Interest
Zero Depreciation

| LONG HAUL TRUCK OPERATING COST ESTIMATES: COSTS EXPRESSED IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Truck | Delivery | 10 | 6 |
| *VEHICLE COST DELIVERED, DUTY PAID | 430,000 | | | |
| *FINANCED (% OF DELIVERED COST) | 100 | | | |
| *LOAN PERIOD (YR) | 10 | | | |
| *INTEREST RATE | 0% | | | |
| *INTEREST RATE FACTOR | 0 | | | |
| *DEPRECIATION PERIOD (YR) | 0 | | | |
| *SALVAGE RATE (% VEHICLE COST) | 0 | | | |
| SALVAGE VALUE | 0 | | | |
| *UTILIZATION KM/YR | 16,800 | | | |
| *UTILIZATION (DAYS/YR) | 250 | | | |
| *LOAD FACTOR (% OF VEHICLE CAPACITY) | 50 | 60 | 70 | 90 |
| *TYRE COST | 1,800 | | | |
| *AVERAGE TYRE LIFE (KM) | 25,000 | | | |
| *FIXED MAINTENANCE (% OF FIXED COSTS) | 7 | | | |
| *VAR. MAINTENANCE (% OF VAR. COSTS) | 25 | | | |
| *ADMINISTRATION (% OF FIXED COSTS) | 10 | | | |
| *FUEL CONS. (LT/100 KM) | 50 | | | |
| *FUEL COST PER LITER | 1.45 | | | |
| *LUBR/OIL COST (% OF FUEL) | 10 | | | |
| *INSURANCE (% OF VEHICLE COST) | 3 | | | |
| *PROFIT (% OF TOTAL VEHICLE COSTS) | 0 | | | |
| FIXED ANNUAL COSTS | | Cost/km | Cost/day | |
| DEPRECIATION | 0 | 0.00 | 0.00 | |
| INTEREST | 0 | 0.00 | 0.00 | |
| LICENSES | 500 | 0.03 | 2.00 | |
| INSURANCE | 12,900 | 0.77 | 51.60 | |
| WAGES | 12,000 | 0.71 | 48.00 | |
| MISCELLANEOUS | 5,000 | 0.30 | 20.00 | |
| MAINTENANCE | 2,564 | 0.15 | 10.26 | |
| ADMINISTRATION | 3,663 | 0.22 | 14.65 | |
| | | | | |
| SUM OF FIXED COSTS | 36,627 | | | |
| FIXED COST PER KILOMETER | | 2.18 | | |
| FIXED COST PER DAY | | | 146.51 | |
| | | | | |

| LONG HAUL TRUCK OPERATING COST ESTIMATES: COSTS EXPRESSED IN ETHIOPIAN BIRR | | | | |
|---|---|---|---|---|
| *PARAMETERS ENTERED BY USER | VEHICLE TYPE | USE | * CAPACITY/MT | * NO. TYRES |
| VEHICLE TYPE | Truck | Delivery | 10 | 6 |
| VARIABLE ANNUAL COSTS | | Cost/km | | |
| FUEL | 12,180 | 0.73 | | |
| LUBR/OIL | 1,218 | 0.07 | | |
| TYRES | 7,258 | 0.43 | | |
| MAINTENANCE | 6,885 | 0.41 | | |
| | | | | |
| SUM OF VARIABLE COSTS | 27,541 | | | |
| VARIABLE COST PER KILOMETER | | 1.64 | | |
| | | | | |
| TOTAL COSTS | 64,168 | | | |
| TOTAL COSTS PER KILOMETER | | 3.82 | | |
| | | | | |
| | | | | |
| | | | | |
| TRANSPORT RATE REQUIRED FOR PROFIT | LOAD FACTOR | TON-KM RATE | | |
| | 50 | 0.76 | | |
| | 60 | 0.64 | | |
| | 70 | 0.55 | | |
| | 90 | 0.42 | | |
| | | | | |
| | | | | |
| | | | | |

CLAYTON.10D 100% FINANCED, ZERO INTEREST, ZERO DEPRECIATION, ZERO PROFIT

# Appendix 3

# Port and Bure Operating Systems for AISCO

# Appendix 3

## Port and Bure Operating Systems for AISCO

**Facilities and Operations at Assab**

1. Assumptions:
   a. Ships on normal charter party, free out basis (lower freight cost, liability for demurrage).
   b. Guaranteed discharge rate (charter party) 2,000 tons per weather working day of 24 hours. Target operating rate, 2,500 tons/WWD.

2. **Ship Offloading:**

   Detailed operating records must be kept by an independent agency, because of responsibility for demurrage, between;
   a. Bagging contractor (assumed) if machines cause delay.
   b. Procurement agency if transport system causes delay.
   c. Port Authority if cranes or other port activity causes delay.
      (Reminder: negotiations essential to permit use of ships' gear).
   d. Ship owner.

3. **Bagging Operation**

   Each container bagging unit has two lines with a design rate of 30 tons/hr each, or 60 tons/hr total. Assuming effective 5 hours operation or 300 tons per shift or 900 tpd, three bagging units are needed, (nominal 2,700 tpd) to achieve the target rate of 2,500 tpd and the guaranteed 2,000 tpd charter party rate. (These rates have been exceeded in other ports).

**4. Transport from Assab to Bure**

a. Basis: To be carried out as a shuttle service, using semi-trailers, on a contracted basis. The motive units (tractors) will operate on a drop-off basis, i.e. the tractor will collect a loaded trailer in the port, drive to Bure, drop off the trailer for offloading, collect an empty trailer, return to Assab, drop off the empty, collect a full trailer and start the cycle again.

b. Loading Plan: Each bagging unit has two truck-loading conveyors. If possible, each conveyor should swing between two truck loading positions i.e. 4 in all. Whenever possible, the returning semitrailer should drop the empty trailer into a vacant position at a bagging unit and also pick up a loaded trailer directly. However, additional port based motive units and spare trailers will be needed, to ensure trailers are moved promptly to and from the bagging units.

c. Number of Vehicles: Assuming 2,500 tpd with an average load of 25 tons, we need 100 loads/day, around 33 per shift, or 11 per machine per shift, say 6 each line per shift. Assuming a 4-hour trip each way, allow 12 hours per round-trip (drivers need rest and food), or 2 RT per day, or a minimum of 50 tractors for 100 loads/day. Allow 4 extra MU's, plus 3 in the port to service the bagging units, plus 3 based at Bure for a total of 60 motive units.

Assuming 50 trailers permanently linked with MU's, 10 spare at Assab and 10 spare at Bure, this gives a total of 70 trailers.

Indicative totals are therefore 60 motive units and 70 trailers. Actual requirements will only be determined by trial and error.

d. Facilities and Operations at Bure:

(1) Location: The Bure "dump" is just inside the Ethiopian border, next to the highway, on a fairly level, barren, rocky area which has been

cleared. Potential capacity is said to be "almost unlimited." Initially a storage area for 25,000 tons may be considered, with reservation of a similar area of land.

(2) Throughput: The Bure operation is working well but still needs to be carefully thought through. It is expected to receive 2,500 tpd from Assab on a 24-hour basis over a 10/12-day period, during the fertilizer "import" season (4-6 months). It will load out at up to 2,000 tpd during this period and at lower rates over the rest of the year.

(3) Facilities: The site needs to be fenced and lit, with a sizable truck parking area; an area for truck to truck transfer; the main storage area with truck access for unloading/stacking and reloading; offices; equipment storage; water storage; amenities for supervisors and workers; amenities for truck drivers; security, gate control and documentation, communications and on-site generating capacity, principally for lighting and air conditioning.

Supply of materials from Addis Ababa should be no problem because almost all trucks will be arriving empty; water and fuel may be trucked from Assab. It is hoped that accommodation for staff, workers, and truckers will be developed by private enterprise in Bure. Otherwise, arrangements will have to be made in or near the site area.

Handling will be on a manual basis, in line with current practice. It is recommended that some 4 bag elevators should be supplied for loading out from storage to trucks. These will eliminate the hardest manual labor and speed up the process. Indicative cost for 4 is US $80,000 fob Tampa.

(5) Storage: The current storage system with bags laid on a raised rock base and stacked 10 to 12 high is effective. However, the stacks must be covered with a white or light covered plastic sheet (not black or clear) to protect against (1) rain, however occasional, (2) against UV damage from sunlight (3) wind-blown dust and dirt.

(6) Manning: This is left to AISCO in line with technical requirements and local conditions.

# Appendix 4

# Terms of Reference

Attachment 2

# Fertilizer & Transport Sector Assessment

## Program Description

### I. Background

The Development of Competitive Markets (DCM) program provides resources in the form of a cash transfer in order to "jumpstart" the Ethiopian economy. Policy reform is a keystone of the DCM program and involves legislation and operational liberalization of the transport and agricultural (fertilizer) sectors. The Fertilizer and Transport Sector Assessment (FTSA) is aimed at enunciating critical policy issues which require further consideration in order to encourage a lasting change in Ethiopia's market economy and effect a more efficient delivery (and use) of fertilizer and commercial transport. With this knowledge, USAID/E, the TGE and other donors will gain important insights into the successes and shortcomings of present reform measures and what needs to be accomplished to keep the TGE moving toward sound economic reform.

Background documents include the DCM PAAD and PAAD amendment, the DCM Program and Project Agreement (and amendments thereto) and the following three studies:

A. "Towards Liberalizing of Fertilizer Trade in Ethiopia", by Gizaw Negussie, dated March, 1992.

B. "Ethiopia Fertilizer Marketing Assistance", by N.S. Parthasarthy, dated March, 1992.

C. "National Fertilizer Project", FAO Preparation Mission, 3 Volumes, July 17, 1992.

D. "Transport Sector Analysis", by Patti Kristjanson, dated April 24, 1992.

The assessment efforts described in this Scope of Work shall draw upon these (and other) background documents and shall not duplicate these preceding efforts.

### II. Purpose

The Fertilizer and Transport Sector Assessment (FTSA) is being conducted in order to obtain a more in depth understanding of issues (policy, regulatory, economic, logistic and financial) that affect the further liberalization and efficiency of the fertilizer and transport sectors in relation to the successful implementation of the USAID/E-funded Development of Competitive Markets Program. The information from this assessment will be

shared with the TGE and other donors. This study will include a review of TGE progress to date and will provide information on the likely outcome of various policy reforms on the "welfare" of agricultural producers, traders, consumers and transporters. The assessment will heighten policy and operational dialogues between the TGE, USAID/E and other donors on reforms that have been, or should be taken in order to effectively implement the medium-term Emergency Recovery and Reconstruction Project (ERRP).

## III. Timeframe

The anticipated timeframe is June-August, 1993.

## IV. Work Week

A six day work week is authorized by USAID/E.

## V. Level of Effort

It is anticipated that approximately 25 person-weeks of expatriate effort will be required to accomplish the tasks, inclusive of pre- and post-TDY briefings in AID/W and in-country efforts. An additional 10 person-weeks of local expert assistance is required. The expatriate team will be comprised of four consultants. Two local experts (from the TGE and/or private sector) will be full-time team members with demonstrable expertise in agricultural economics and/or operations management in the fertilizer and/or the transport sectors. (It will be essential to identify local experts who can follow-up on the team's recommendations and influence decisions relative to the implementation of the team's recommendations.

## VI. Scope of Work

### A. General Tasks

In the context of the DCM Program, the FTSA will include the following:

- **Review Existing Information** - compile a review of existing information (e.g. status of fertilizer imports and distribution, port operations, logistic issues, truck purchases and relevant statistics);

- **Future Policy Needs** - list other policy or regulatory reforms which appear to be necessary in liberalizing the fertilizer & transport sectors over the life of the DCM (ERRP).

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- **Identify Key Implementation Issues** - present key implementation issues expressed by public and private sector participants in the fertilizer and transport sectors; and,

- **Assess Impact of Reforms to Date** - review and assess the impact of recent policy reforms regarding fertilizer marketing and transport (document extent to which fertilizer and transport reforms are being implemented at the local level - particularly involvement/concerns of private sector).

- **Consensus Building** - The team, in conjunction with USAID/E staff, will hold meetings with TGE and private sector representatives at the outset and the end of the TDY to respectively explain their mission and findings and build a consensus relative to their recommendations.

**B. Specific Tasks**

**B.1 Fertilizer**

**B.1a The team will review achievements and shortcomings in the wholesale and retail trade of fertilizer and market liberalization. They will:**

- Review the process and requirements for registering private wholesalers and retailers relative to DCM tranche 2 conditionality (suggest modifications as appropriate);

- Determine what financing, storage and transportation requirements are needed to deliver fertilizer and the proportionate capacity of the private sector to meet these needs;

- Assess the potential for, and constraints to, increasing private sector participation (price, farm-gate, credit system, subsidies, etc.);

- Review the mechanism for private sector importation of fertilizer and the efficiency of the process of foreign exchange allocation for fertilizer imports;

- Assess the impact (to the extent possible) in terms of volume and regional distribution that private sector wholesaling and retailing has had on overall fertilizer distribution.

- Assess the both the impact to date and the potential impact of increased fertilizer use in terms of increased agricultural production and incomes and food security for farmers, agribusinesses, and consumers.

B.1b The team will review competitive pricing of fertilizer at the wholesale and retail levels and the impact of devaluation of the Birr, including the:

- Assessment of present (and planned) wholesale and retail pricing build ups (costs incorporated into final ceiling price of fertilizer) (AISCO and the MOAg);

- Analysis of the impact of discontinuing pan-territorial pricing on incentives to wholesalers and retailers as well as the impact on farmers and grain consumers;

- Review of the impact of retail price decontrol and devaluation on retailers, farmers and grain consumers (include comment on AISCO's role as a competitor with the private sector and incentive options to have farmers use/buy fertilizers at higher prices);

- Assessment of the appropriateness of the pacing and timing of price decontrol.

B.1c The team will comment on the impact and appropriateness of the TGE-proposed fertilizer voucher scheme (to raise the purchasing power of poorer households) and the effect it might have on fertilizer market liberalization as well as farmers, traders and consumers.

B.1d The team will consider the future role that AISCO should play in a liberalized fertilizer market (i.e., should the more competitive areas be left to the private sector while AISCO distributes to more remote areas?, etc.) including their role in voucher distribution.

B.1e The team will present a set of concise technical analyses relative to fertilizer marketing. They will:

- Analyze and provide comment on the total imports, distribution, and supply of fertilizer in Ethiopia;

- Review the reasonableness of FAO and TGE estimates regarding fertilizer import requirements for CY 1994 (and beyond) - provide comment on minimum quantities of DAP and Urea required;

- Review existing information on phosphates, nitrogen and other nutrients used (or tested under experimental conditions) as fertilizer in Ethiopia to determine the appropriateness of emphasizing DAP (or alternative compounds) for importation and distribution throughout the country (consider Regulation 16 [Environmental] provisions).

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**B.2 Transport**

**The team will also provide insights into the policy and operational climate relative to the implementation of reforms in the transport sector. In this regard, the team will:**

- Review efficiency of freight clearing operations at Assab and potential to improve efficiency (consider the management role of the TGE clearing goods through Assab);

- Assess the off-loading capacity of Assab port and the implications for a CY 1993-1994 plan for off loading;

- Access other constraints relevant to port facilities (storage, bagging) and present options for overcoming future constraints;

- Calculate and comment on differential costs of transport at the wholesale level;

- Review the competitiveness of U.S. trucks and in-country service in relation to other manufacturers and distributors (price, other donors, lessons learned);

- Review issues relevant to the procurement of trucks via USAID's DCM cash transfer program (i.e. taxes, insurance Birr deposit requirements, bank charges, etc.).

- Assess this and next year's plan for off-loading fertilizer and other ERRP commodities.

**VII. Team Composition**

It is planned that the team be composed of a team leader, an agricultural economist, an agronomist, a transport/logistics expert, a local fertilizer advisor and a local transport advisor. It is expected that all team members will be well-versed in operational issues pertaining to their respective fields of expertise. The team leader will be responsible for overall guidance, liaison with host government and other donors (the World Bank, FAO and the EEC), and consensus building activities. The agricultural economist will be expected to grapple with the economic and financial aspects of the study particularly with respect to price decontrols. The agronomist will be expected to review the agronomic aspects of fertilizer use in Ethiopia. The transport/logistics expert will review the operational and implementation issues associated with DCM investments in the transport sector. The local advisors are expected to contribute to the technical aspects of the study as well as serve as facilitators, and to provide cultural insights into the study.

They will also be expected to assist in policy dialogue with local officials.

Each external consultant should be familiar with basic computer use and have commensurate skills in WordPerfect 5.1 as a minimum. It is highly desirable that at least some members of the team also have capability in graphics software and Lotus 2.2. Each member must bring a portable computer for use in Ethiopia. The following professional skills will be required.

**Agricultural Economist/Policy Analyst (AEPA) Team Leader** - As the team leader, the AEPA should have demonstrable skills in policy analysis, program design, implementation and field operations. He/She must have at least 10 years experience relative to the fertilizer sector. Specific experience in policy reform concerning market liberalization in developing countries (particularly in Africa) is highly desirable. Demonstrable writing, organizational and inter-personal skills are requisites. The ability to verbally and visually present conclusions and recommendations to government, private sector and donor representatives is required. The Team Leader will be responsible for the overall preparation of the report. It will be his/her responsibility to ensure clarity, brevity and accuracy throughout the document.

**Agricultural Economist AE** - The AE must have at least 10 years of field experience working in developing countries with at least 3 years experience in Africa. He/She must be experienced in fertilizer use and logistics planning. The AE must also possess demonstrable experience in the implementation of policy reform and should complement the AEPA in operational skills. He/She must be capable of effectively communicating (verbally as well as in writing) with the host government, private sector and donor community and have demonstrable organizational, data analysis and computer skills.

**Agronomist** - Must have at least 5 years of experience in analyzing agronomic aspects of fertilizer use in Africa. Must be familiar with fertilizer use on the crops commonly grown in Ethiopia (Tef, Maize, Sorghum, Barley, Wheat, Coffee) and with the various soil types found in Ethiopia. Must have experience with the principal fertilizers used in Ethiopia (DAP, Urea, other common composite fertilizers). Must be able to effectively communicate results (verbally and in writing) to host government officials, interested private sector parties and donor organizations.

**Transport/Logistics Specialist (TLS)** - The TLS should possess a working knowledge about the transport sector and the logistical needs relative to distributing commodities within a developing country. He/She should have some experience in logistical management, for example port-clearing procedures and commodity

import. The TLS will be tasked with assessing policy, administrative and logistic issues associated with the distribution of fertilizer and the purchase of trucks by local buyers. He/She will be expected to review and assess the DCM investment into the transport sector and identify major issues of concern relative to local purchase, present administrative regulations and the capabilities of U.S. trucking agents in Addis Ababa. The TLS should have at least five years experience in the transport and/or logistic, and have demonstrable writing, organizational and computer skills.

**Local Fertilizer Advisor (LFA)** - The LFA must have technical background and experience in dealing with fertilizer use and marketing. He/She must be able to communicate effectively in Amharic and English and be comfortable in dealing with government officials, officials from donor organizations, and individuals from the private sector. The USAID Mission will assist with the identification of the LFA with inputs from the MOAg and the Addis Ababa Chamber of Commerce.

**Local Transport Advisor (LTA)** - The LTA should be familiar with the issues relevant to increased private sector involvement in the transport sector. He/She should have experience in administration and have a working knowledge of transport issues associated with the implementation of the ERRP. The LTA should be able to communicate effectively in Amharic and English and will serve as the counterpart to the TLS. The USAID Mission will assist with the identification of the LTA with inputs from MOTAC and the Addis Ababa Chamber of Commerce.

## VIII. Reports

**Final Outline** - The team will produce a complete outline of the planned assessment report one week after the team's arrival in country.

**Draft Report** - A draft final report will be provided to appropriate host country officials, USAID and other donors at the end of four weeks in country.

**Debriefing** - Prior to departure the team will debrief senior mission and TGE officials. The team will provide flip chart and handout information which summarizes findings and conclusions.

**Consensus Building** - The fifth week of the consultancy will be for holding discussions and formal debriefings, etc., with TGE Officials and selected members of the private sector. This exercise will be pursued to assure clarity of the team's conclusions and to obtain agreement on future policy, administrative and operational directions.

**Final Draft Report** - A final draft report will be provided to the mission NLT two days prior to the departure of the team leader.

**Final Report** - The Grantee will produce the final report incorporating comments of the USAID Mission, TGE officials, and other donors within 30 days after the team departs Ethiopia.

## IX. Provision of Operational Support

The Grantee will arrange for office space rental (e.g. Hilton Suite), in-country transport, and car rental for team members, plus salary (if Ethiopian private sector), per diem for counterpart team members, and other operational support items as appropriate to execute the assessment with a high degree of efficiency. The grantee will ensure that one of the team members (the Team Leader) be identified to administer this support and that this individual be provided an adequate amount of traveller's checks to cover anticipated expenses. A portable printer should be carried with the team, however, if this is not the case, funds should also be available to rent a printer in Addis Ababa.

## List of Persons Contacted

**Addis Ababa Chamber of Commerce**
Ato Hussein Shebeshi, Research Head

**Agricultural & Industrial Bank**
Dr. Makonnen Fantaw, Mrg. Agricultural Department

**Agricultural Inputs Supply Corp.**
Ato Yainshet Tekolla, General Manager
Ato Alem Wold Yohannes, Head Procurement & Transit
Ato Tesfalidet Mehari, Head Sales & Distribution
Ato Alemayehu Bekele, Head Planning

**Assab Port**
Port Director and other officials
Capt. of MV IOWA Trader
Capt. of MV UNIARCH

**Commercial Bank of Ethiopia**
Ato Kidane Wolde, Mgr. Credit Division
Ato Abreham Haileyesus, Head Rural Credit

**Cranfield University–Silsoe College (FAO Project)**
Professor Gwynne Evans, Ag. Training Specialist

**DMTS Corporation**
Mr. Dick Chelius, Senior Project Mgr.
Mr. Chernnett Georgis, Project Mrg.

**FAO-UN**
Dr. Ingo R. Loerbroks, Representative Ethiopia
Ato Sisay, Adviser to Representative

**Ford-AFCOR (Ethiopia) Pvt. Ltd. Co.**
Ato Abdulwassi Aboubaker, General Mgr.

**Freighters International Ltd.**
Ato Daniel Zemichael, Manager

**Ethiopia Amalgamated Ltd.**
Ato Gebreyes Begna, Statuatery, General Mgr.
Ato Fekade Mamo, Director, Sales & Distribution
Ato Akalu Geleta, Head, Research & Development
Ato Melesse Gebre Egzi, Director, Procurement & Logistics
Ato Bayou Mulat, Director, Transport, Shipping & Transit
Ato Gebregziabher Bekume, Finance Mrg.
Ato Mengistu Kebede, Mrg. Agricultural Inputs
Ato Tilahun Tabessa, Mgr. Machinery & Equipment Trading

**Commission of the European Communities**
Mr. Richard Zink, Rural Development Adviser

**Ethiopian Grain Trade Enterprise**
Ato Gebremeskel Desalegne, General Mgr.

**Embassy of Italy–Addis Ababa**
Sr. Ermino Sacco, Rural Development Adviser

**ERRP-PMU**
Capt. Jan Benninger, Port & Shipping Adviser
Col. Hiluf Bekele, Senior Monitor and Logistics
Dr. Menwoyellet Asmare, Senior Impact & Policy
Dr. Gary Roberts, Transportation Adviser

**International Monetary Fund**
Mr. Michael C. Niebling, Resident Representative

**Jeep–Ethiopia Jeep**
Ato Idris Abdul Hamid, Managing Director

**Mack Trucks Inc.**
Mr. Clifford A. Williams, Regional Mgr.-Africa

**Ministry for External Economic Cooperation**
Ato Israel Kidane Mariam, Vice Minister
Ato Geremew Getahun, Head, Department America & Asia

**Ministry of Agriculture**
Dr. Alemayehu Awetohegn

**Ministry of Transport & Communication**
Ato Ayenew Bitewelign, Vice Minister

**Royal Netherlands Embassy**
M. Rienk W. Wiersma, First Secretary, Development Coordination

**Norsk Hydro**
Mr. Henri Groenen, Asst. V.P. International MKTg
Mr. Leif Salomonsen, MKTg Mgr. Africa-Near East
Mr. Per Barbakken, Managing Dir. HYDRO-KENYA
Dr. Bisrat Gebre Egziabhier, HYDRO Agent-Ethiopia

**Oda Share Limited**
Ato Debela Gutema Bondo, Managing Director

**Shell Ethiopia Ltd.**
Ato Alemayehu Makonnen, Mgr. Supply & Distribution

**Twenty-Twenty Developers Share Co.**
Ato Hailu Sebside, Board Chairman
Ato Zelalem Seity, General manager
Ato Seifu Haile Michael, Deputy General Mrg.

**World Bank Resident Mission**
Dr. Amar Jit S. Sodhi, Senior Operations Officer

**Zeka International Inc.**
Mr. Ralph A. Davis, President
Ato Kahsay Mengistab, Vice President