

PJ-AAZ-509

FERTILIZER MARKETING SYSTEMS AND POLICIES IN DEVELOPING COUNTRIES

by

MOHINDER S. MUDAHAR

and

EDWIN C. KAPUSTA

International Fertilizer Development Center (IFDC)

Prepared for

SIGMA ONE CORPORATION

PIO/T No. 6361292

Contract No. DHR-1096-C-00-6037-00

Applied Research and Technical
Assistance in Agricultural Marketing

December, 1986

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CHAPTER 1

INTRODUCTION

Role of Fertilizer

Economic development of agriculture-dependent low income countries depends on the sustained growth in agricultural productivity. This, in turn, depends in large measure on the expanded application of advanced crop production technologies involving the increased and more efficient use of agricultural inputs, including fertilizers, improved seed varieties, pest control, modern farm implements, and water. The vital role of fertilizer in raising crop output and land productivity is universally recognized. The crucial role of fertilizer is apparent from the high priorities accorded fertilizer supply and demand enhancement policies in national plans of developing countries striving to achieve food self-sufficiency.

In order to expand fertilizer use and use efficiency, fertilizer must be made available to farmers in the most suitable forms and types, at the needed times and places, in adequate amounts, and at prices which will provide incentives to farmers to use it. Also farmers must be made aware of the role of fertilizer and provided with fertilizer-related technical information needed to increase crop yields and maximize economic benefits from its use. The effective performance of these fertilizer marketing functions is essential to promoting agricultural growth through expanded and efficient use of fertilizers in developing countries.

Fertilizer Use in Developing Countries

Fertilizer use in the foodcrop sector in most developing countries began around the 1950s. As reported in Table 1.1, fertilizer consumption in developing countries was about 1.8 million mt in 1953/54, which was about 10% of the world fertilizer consumption. However, fertilizer consumption in developing countries increased to 42.9 million mt (24-fold increase over a 30-year period) in 1983/84, which was about 35% of the world fertilizer consumption. Expanded fertilizer use led to an increase in agricultural production. However, it also created many problems related to fertilizer supply management and fertilizer

marketing. Fertilizer use (both per hectare and aggregate), however, is still rather low in most developing countries.

Attributes of Fertilizer Market

Fertilizer is an intermediate product and its demand is a derived demand. The level and growth in fertilizer demand depends upon the size and growth in the agricultural sector. Fertilizer is a bulky product and thus creates high demand for transportation facilities, especially during the peak demand periods. Since fertilizer use is seasonal, it also requires large storage facilities. There are generally large numbers of small consumers dispersed all over the country, leading to high marketing costs especially in countries with small fertilizer market. There is very little product differentiation since fertilizers are fairly standardized products. Government intervention is rather widespread in the fertilizer sector--production, trade, marketing, use, and pricing--in most developing countries.

Trends in Fertilizer Marketing

The following are the broad global trends in fertilizer marketing:

1. Gradual shift in favor of high analysis fertilizers, resulting in lower marketing costs per unit of nutrients.
2. Gradual shift in favor of multinutrient (compounds or bulk-blended) fertilizer products.
3. Transport of fertilizer in bulk, resulting in lower transport and handling costs but relatively higher losses as compared to bagged fertilizer.
4. Increasing use of liquid fertilizers, especially in developed countries.
5. Recognition of micronutrient and sulfur deficiencies and supply of these nutrients along with primary nutrients (N, P, and K).
6. Greater emphasis on multichannel fertilizer marketing systems as opposed to single channel systems.
7. Greater involvement of the private sector in fertilizer marketing in addition to (or in lieu of) cooperatives and government agencies.

These gradual changes are due to many factors, including developments in fertilizer technology, an increase in the size and complexity of fertilizer market, an increase in demand for fertilizer-related technical advice, and government policy.

Fertilizer Marketing Problem

Despite significant progress made in strengthening fertilizer marketing systems in many developing countries, particularly in Asia and Latin America, marketing related constraints to expanded fertilizer use persist to varying degrees in most developing countries. The most important of these relate to: restricted availability of fertilizers, low level of farmer knowledge on fertilizer use, unfavorable fertilizer/crop price relationships, and limited fertilizer credit availability. In many countries there is also a lack of government commitment and/or capability to plan and implement coordinated fertilizer supply, marketing, and use policies and the absence of an economic environment conducive to fostering the expanded use of fertilizer.

Fertilizer is a vital input for agriculture and food production. Most developing countries produce and/or import fertilizer to meet their requirements. Fertilizer plants are often located near the raw material supply sources. Fertilizer is used by large numbers of farmers, small and large, who are dispersed all over the country and are often far from the fertilizer plants or ports.

Fertilizer is not only a strategic input, it is also a rather bulky product. It requires an efficient fertilizer transportation system to move fertilizer from the plant or port to farmers' doorstep. Since fertilizer use is seasonal (generally bimodal) it also requires large storage capacity. Fertilizer, of course, is of little value unless it is used by the farmers. In this context, fertilizer marketing provides an important link between fertilizer production and/or imports and fertilizer use. Fertilizer distribution (transportation, storage, and handling) is an essential component of fertilizer marketing.

Fertilizer marketing systems are relatively inefficient in most developing countries. As a result, the economic costs associated with inefficient fertilizer marketing are high either in the form of high financial costs and/or in the form of lost potential agricultural production due to lack of fertilizer, untimely fertilizer deliveries or wrong fertilizers. In order to

maintain incentive prices at the farm-level, governments often intervene and provide financial assistance in the form of fertilizer subsidies to compensate for high procurement and marketing costs. Fertilizer subsidies related to marketing can be reduced or even eliminated by making the fertilizer marketing system more competitive, efficient and cost-effective.

Objectives of the Study

Broadly, the purpose of this paper is to provide an overview of fertilizer marketing systems and policies in developing countries. More specifically, the objectives of the study are: (a) to discuss role of fertilizer marketing; (b) to provide an overview for comparative fertilizer marketing systems and policies in few selected countries; (c) to describe the evolution of fertilizer marketing system and policy in Bangladesh; and (d) to identify measures in order to improve the efficiency of fertilizer marketing systems in developing countries.

In addition to a broad comparative perspective, many of the issues related to fertilizer marketing systems and policies are described in the context of Bangladesh. This is primarily due to recent significant changes in fertilizer marketing in Bangladesh. Bangladesh has experimented with the implementation of major policy reforms in the area of fertilizer marketing, including privatization of retail trade, fertilizer price deregulation, and reduction in fertilizer subsidies. The lessons learned from Bangladesh experience in fertilizer marketing will be of great interest and relevance for other developing countries.

The comparative analysis of fertilizer marketing systems and policies in few selected countries (including Bangladesh) provides the basis for recommendations for improving the efficiency of fertilizer marketing system in developing countries in Asia, Africa, and Latin America.

Table 1.1. Evolution of Fertilizer (N+P₂O₅+K₂O) Consumption in the World^a

<u>Year</u>	<u>Fertilizer Consumption in</u>		
	<u>Developed Countries</u>	<u>Developing Countries</u>	<u>World</u>
	- - - - - (million mt) - - - - -		
1953/54	17.2	1.8	19.0
1963/64	32.1	5.5	37.5
1973/74	65.1	18.5	83.6
1983/84	81.2	42.9	124.0

a. Derived from data reported in FAO (1985).

CHAPTER 2

ROLE OF FERTILIZER MARKETING

The purpose of this chapter is twofold: (1) to examine the factors affecting the development of fertilizer marketing systems and (2) to provide an overview of fertilizer marketing functions and strategies in developing countries.

Development of Fertilizer Marketing Systems

The organizational structure and operations of fertilizer marketing systems differ markedly across various developing countries. This is partly due to differences in socioeconomic conditions, stage of fertilizer use development and most importantly national government policy. In most developing countries, the development of the fertilizer sector and its marketing component has occurred or is taking place in an environment characterized by the following.

1. Relatively low but growing levels of fertilizer use which portend increased expenditures on fertilizer in the years ahead.
2. A geographically dispersed fertilizer market composed of a large number of small farmers generally lacking the level of knowledge, skills, and equipment to use fertilizer efficiently and requiring both technical and financial assistance.
3. The absence of an adequate fertilizer-related agronomic data base necessitating the costly expansion of fertilizer use research facilities, programs, and staffs.
4. Inadequate national agricultural extension programs requiring additional funding to expand facilities, programs, equipment, and staff.
5. Lack of adequate domestic fertilizer supply capability due to lack of raw materials and/or lack of production capacity necessitating construction of costly manufacturing facilities, improving plant operations, and/or increasing imports each of which entails the major expenditure of scarce foreign exchange.

6. Inadequate fertilizer transport, storage and handling, and communications infrastructure requiring important capital outlays for providing needed infrastructure and equipment.
7. Lack of complimentary farm inputs such as fertilizer-responsive seeds, pest control agents, and modern implements.
8. Lack of sufficient numbers of adequately qualified management and technical support personnel to organize and operate the supply, marketing, and use research facets of the fertilizer sector.

The developing countries facing these problems require large-scale investments in creating fertilizer supply capability and marketing infrastructure, not to mention expanded fertilizer research and extension services. The national importance of expanding fertilizer use coupled with the high costs associated with organizing and implementing needed fertilizer sector programs has led to widespread government involvement in virtually all aspects of fertilizer sector development and operation. As a consequence government actions rather than market forces most often dictate the ownership, organization, and operation of fertilizer supply and marketing systems in developing countries.

In addition to government agencies, private, and cooperative organizations also participate in various fertilizer sector activities in most developing countries. However, governments usually engage in and/or exercise control over fertilizer research, extension, production, importation, marketing, quality, prices, and trade. Private and cooperative organizations participate primarily in supply and marketing activities. On the whole fertilizer marketing systems in developing countries differ markedly in terms of public and private sector participation, organizational forms, and operational functions, depending on the nature and degree of government intervention.

Fertilizer Marketing Functions and Strategies

Despite wide variation in their organization and operation, fertilizer marketing systems in developing countries have, or should have, a common purpose--that of determining and serving farmers' fertilizer needs in a timely and cost-effective manner. The achievement of this goal requires the successful performance of the following activities which collectively constitute the marketing function: product selection, demand estimation, procurement, distribution, sales, market development, pricing, and supply of credit.

The performance of a national marketing system will be determined by how well each of these activities is executed by the public and private organizations which are charged with their implementation and how effectively the activities of these individual organizations are organized and integrated into the nation's overall marketing scheme. The fragmentation of responsibilities for different marketing activities between different ministries (e.g., agriculture, industry, finance, or planning) or departments within the same ministry, often encumbered with jurisdictional rivalries, may add to problems in coordination and timely execution of the interdependent marketing activities to the detriment of the overall national marketing effort.

Delays in or inaccurate assessment of demand by the agency responsible for that activity, and/or delays in making foreign exchange available for procurement of imports, could delay ordering by the importing agency and result in late arrival of needed fertilizers and shortages at the farm level. Delays in ordering and tardy arrival of fertilizer are not uncommon occurrences in some developing countries. In an attempt to ameliorate these problems, some governments have established central government bodies to plan, coordinate, and monitor all fertilizer sector activities. Examples of such government-sponsored agencies include the National Fertilizer Secretariat in Sri Lanka, the Fertilizer and Pesticide Authority in the Philippines, and the Fertilizer Industry Coordination Committee in India.

As noted earlier, fertilizer marketing strategies and systems are country-specific in nature and usually involve the interaction of several public- and private-sector agencies. This makes it difficult to generalize as to the organization and operation of the individual marketing activities across a broad spectrum of developing countries. However, some general observations may be helpful in identifying areas for improving the operations and efficiency of fertilizer marketing functions, and hence, fertilizer marketing systems.

Fertilizer Product Selection

It is of paramount importance to provide farmers with the products most suitable for specific soil and cropping situations in order to improve fertilizer use efficiency and raise farmer income. While marketing organizations are responsible for making the most suitable products available to farmers, the national agricultural research institutes bear the main burden for determining the suitability of different fertilizer products and determining fertilizer

needs of crops under specific agroclimatic conditions. Significant progress has been made in building national and regional agricultural research facilities and programs in many parts of the developing world; however, from the perspective of improving fertilizer use efficiency and profitability, there is a need for expanding the agronomic data base in most developing countries, particularly in respect to localized site-specific cropping situations. This is essential for formulation of more useful fertilizer use recommendations. Marketing organizations rarely possess the financial resources or technical skills to conduct basic fertilizer use research but should maintain close contacts with national research organizations to benefit from their findings.

Estimation of Fertilizer Demand

An accurate and timely estimation of demand is crucial in meeting farmers' requirements for fertilizer--what, when, and where--while avoiding excessive and costly inventory accumulations. Long-term national fertilizer demand projections used in long range supply planning are often made by planning agencies with inputs from the Ministry of Agriculture, extension service, and public and private marketing organizations. Projecting long-term demand generally involves factors related to the economics of fertilizer use, cropped acreage, irrigation, credit availability, and crop production technology. The time series data on these variables needed for demand projection are usually not readily available. The need for improvements in the data base and projection techniques is evident from experiences of many countries, including Thailand, Venezuela, and Bangladesh.

National level short-term and annual sales forecasts may be prepared by various government bodies, with inputs from other concerned organizations, and/or by individual marketing organizations. More realistic annual sales forecasts (by month, by product, by region, and by sales outlet) are best prepared from information gathered by local sales personnel familiar with local farm conditions. However, due to difficulties encountered in Nigeria, Cameroon, and Ghana in obtaining timely and accurate information on fertilizer receipts, sales, and inventories, there appears to be wide scope for improving the sales forecasting process and monitoring system in these and other developing countries.

The establishment of marketing research facilities and improvement of the management information system would improve sales forecasting and demand estimation in several developing countries where sales forecasting appears to be carried out more or less in an ad hoc fashion.

Fertilizer Procurement

Public fertilizer marketing organizations usually purchase as much of their anticipated needs as possible from local fertilizer plants and obtain the remainder of their requirements from external sources via direct purchases, donor grants, and/or bilateral trade agreements. Local production capability is often erratic and unreliable necessitating close monitoring of supplies from these sources. The need to improve product procurement and transport procedures and schedules is often indicated.

Fertilizer procurement from external sources requires long lead time (4-6 months). The purchase and delivery of fertilizers from overseas sources requires detailed advance planning in terms of quantities to be purchased, suppliers, ocean transport, port handling, and inland transport. Past experiences in Bangladesh, Ghana, and Nepal point to the need for significant improvements in import planning and procurement systems. Purchasing department personnel could benefit from additional training in all aspects of international market operation and procurement techniques, including product sources, price trends, ocean freight costs, port loading and unloading facilities, in-country storage facilities, and inland transport.

For donor-supplied fertilizers, there is a need for close coordination between donors and the host country to determine fertilizer needs and to develop orderly supply schedules in order to assure timely arrival and avoid port congestion. Countertrade or barter arrangements offer a means of conserving foreign exchange but involve close coordination between the fertilizer procurement agency and other branches of government. Countertrade arrangements are important in India, Indonesia, and several other developing countries.

Many developing countries import bagged fertilizer. This may be appropriate when import quantities are low. However, as imports rise, significant savings in overall cost and foreign exchange may be possible by importing fertilizer in bulk and bagging it at the port of entry as practiced in Bangladesh, India, and several other countries.

Fertilizer Distribution

Timely fertilizer availability at the farm level is the key requisite for expanding fertilizer use. Supply shortages can and do lead to higher farm-level prices which deter usage. Accurate assessment of demand, timely procurement, and the ability to physically distribute fertilizers to use areas are important factors affecting fertilizer availability at the farm level.

Physical distribution is the most costly component of the fertilizer marketing process in developing countries. According to FAO reports, distribution costs (transport, storage, handling, and losses) represent from 30% to 50% of the total fertilizer marketing costs in several Asian and African countries. Of these the cost of transport is usually by far the most important. Improvements in the efficiency of the transport, handling, and storage functions throughout the entire distribution chain, from supply point to local sales outlet, offer excellent opportunities for reducing farm-level delivered costs and should receive primary consideration in fertilizer marketing improvement projects. In many developing countries, meaningful information on marketing costs of publicly operated systems is often unavailable. In such instances a first order of business should be to assemble distribution cost data to serve as a basis for prioritizing distribution improvement program activities.

The design of a cost-effective physical distribution system usually involves determining the number, locations, and capacities of warehouses (plant and transit) and local-level sales outlets based on present and projected area demand, off-take rates, and restocking schedules. Furthermore, fertilizer distribution systems must be monitored on a regular basis and changes must be made as needed to keep pace with changing demand patterns. Least-cost movement (transport) plans should be developed based on the availability and costs of road, rail, and water transport. Reasonable movement contracts must be negotiated with reliable transport firms, bearing in mind that transport costs may be minimized by scheduling regular shipments from supply points to intermediate warehouses and sales outlets.

Fertilizer distribution costs may be reduced by making greater use of direct shipments from production plants or import warehouses to district wholesalers and local retailers. Bypassing shipments to intermediate warehouses can cut transport costs since longer mileage freight rates are generally lower than rates for a number of shorter hauls of an equal distance. The fewer number of loading and unloading operations lessen the possibility of bag breakage and product losses.

The evidence from some developing countries indicates that public-sector fertilizer warehouse operations can be improved through better warehouse management practices, particularly with respect to product-stacking procedures, proper segregation of products and first-in first-out stock movement plans. In most instances housekeeping practices could also be improved. Warehouse

operating personnel should be trained in product properties and handling techniques to avoid excessive warehousing losses. There is often a need to develop or strengthen stock-control systems to continuously monitor inventory levels and replenishment schedules. More effective cost accounting systems are often required to monitor and control costs of all facets of distribution system operation.

Fertilizer Sales Channels

With few exceptions, fertilizer marketing systems in most developing countries involve the participation of a number of public, private, and cooperative sales channels. In some countries (Bangladesh and Nigeria) the marketing process has been relegated to publicly operated agricultural inputs marketing agencies. These agencies may sell directly to farmers through their own retail outlets or act as primary wholesalers selling to private or cooperative wholesalers or retailers who store and sell fertilizers to farmers.

In other countries (India and Venezuela), public and private companies and/or cooperatives market products (which they produce or purchase from other domestic or import sources) through their own outlets or through other public, private, or cooperative wholesale or retail dealers. In any event in most developing countries, fertilizers reach the farmer through a network of wholesalers and retailers. The marketing management skills of these wholesalers and retailers can be a decisive factor in promoting fertilizer use. In some countries fertilizers are also sold to farmers through extension services, regional agricultural development programs, commodity marketing boards, or agricultural credit banks.

Regardless of sectoral affiliation, the fertilizer retailer can be an important force in influencing farmers to expand fertilizer use and use it more efficiently. By virtue of his close association with farmers in his area and his knowledge of local farming conditions the dealer is in a unique position to advise farmers on the types and quantities of fertilizer to use and how to apply them to achieve best results. In most developing countries private fertilizer dealers are local shopkeepers who handle a variety of agricultural inputs and general household merchandise and are not particularly adept in fertilizer marketing. In order to better serve farmers' needs and stimulate fertilizer sales, dealers generally require training in the agro-economic aspects of fertilizer use, market development, and sales techniques. Dealer training in business

management, including accounting, stock control, and credit procedures, should assist the dealer in operating his fertilizer business more profitably and motivate him to promote fertilizer sales more aggressively.

Although high priority has been assigned to the development of agricultural cooperatives in many developing countries, they generally play a far less important role in fertilizer marketing than private dealers. India and South Korea are among the notable exceptions. In Indonesia the government is increasing cooperative activities in fertilizer marketing. Cooperatives, and other public sector dealers, require training similar to that prescribed for private sector dealers. Additional incentives, in the way of salary adjustments, improved working conditions, and job performance recognition would be helpful in overcoming the complacency and lack of motivation, cost consciousness, and innovation usually ascribed to public sector fertilizer marketing organizations.

Fertilizer wholesalers have been established by public, private, and cooperative enterprises in many developing countries. Fertilizer wholesalers purchase, store, and sell fertilizers and may provide credit to the retailers which they serve. Wholesalers may also engage in promotional activities and provide technical assistance and training to retailers to support their overall marketing efforts. Wholesalers could in many cases benefit from the same type of training as that suggested above for retailers.

The multi-sales channel approach to fertilizer marketing is generally beneficial for all developing countries. The competition which it fosters should increase fertilizer availability at competitive prices and give farmers a greater choice of product sources and services. While competition is to be encouraged, great care must be exercised in developing national fertilizer marketing policies which treat all participants in the marketing system equitably in respect to marketing areas, pricing flexibility, and government regulation.

Fertilizer Market Development

Market development, including sales promotion and farmer technical assistance, is a necessary activity in expanding fertilizer use and use efficiency. The main issues are the types of technical assistance programs and promotional services which are required to motivate farmers to buy and use more fertilizer and how these services might be provided in the most cost-effective manner under given country conditions. Technical advisory and promotion services

which include farm demonstrations, farmers' meetings, field days, soil testing, and farmer communications programs are provided by government research and extension services, universities, and fertilizer marketing organizations.

The nature of the market development activity which may be required depends on the stage of fertilizer use development in a particular developing country. In those countries, including many in Africa and some in Asia and Latin America where fertilizer use is still in the relatively early stages of development, market development programs should, and generally do, focus mainly on educating farmers on the benefits of fertilizer use through programs involving personal contacts with farmers. Fertilizer demonstrations, farmers' meetings, and field days are used to demonstrate the effectiveness and profitability of fertilizer use at this stage. Agricultural research and extension organizations assume a leadership role in providing these programs with the fertilizer industry offering secondary support. In many developing countries, the national extension services are lacking in funds and technical personnel and are too thinly spread to reach and effectively service the mass of small farmers requiring technical assistance.

As farmers' knowledge of fertilizer use increases and consumption rises, the role of fertilizer marketing agencies in market development becomes increasingly more active, but the involvement of the agricultural research and extension service agencies remains essential. At the stage of expanding fertilizer use, which is common to most Asian and Latin American countries, mass media advertising and other communication forms become extremely important to reach large numbers of farmers and to provide more advanced technical information. At this stage properly trained fertilizer retailers, given technical and promotional support by fertilizer manufacturers and wholesalers, can be very effective in encouraging expanded fertilizer use through enhanced promotional schemes and farmer-advisory services. The potential contribution of fertilizer dealers in promoting fertilizer use is recognized in many developing countries--such as Venezuela, Bangladesh, Brazil, and India--where dealer development and training programs have been incorporated into fertilizer market development strategies.

Although much progress has been made on many fronts in recent years, the promotional activities and farmer assistance programs in many countries fail to reach the large numbers of small farms requiring these services. Deficiencies in national extension services and the lack of trained marketing company sales personnel, wholesales, and retailers continue to impede the implementation of

more effective market development programs. Many fertilizer marketing organizations, mainly those in the public sector, lack the organizational structure, personnel, and facilities to carry out needed dealer development programs.

Fertilizer Pricing

Fertilizer price is a principal determinant of fertilizer use. Farmers will not use fertilizer in the absence of sufficiently favorable fertilizer/crop price ratios and value/cost ratios. In many developing countries, these price ratios would be too low to induce farmers to use fertilizer were it not for government fertilizer subsidies. The fertilizer/crop ratio may be altered by adjusting either the fertilizer or crop price, or both. In an effort to keep consumer food prices low, most developing countries have elected to adjust fertilizer prices by subsidizing fertilizer production and/or marketing activities. As a consequence, government intervention in determining fertilizer prices is the norm in most developing countries. Furthermore, in many countries, governments exercise direct or indirect control of retail prices of fertilizer.

Governments regulate fertilizer prices for several reasons: to ensure stable and uniform countrywide prices, to guard against excessive margins by fertilizer marketers, or to protect the operations of high-cost local producers. The degree of price control can range from the establishment of fixed retail prices to the setting of prices and margins at successive stages of fertilizer marketing. As observed in Bangladesh and elsewhere, the price control is generally ineffective when demand exceeds supply. In those countries where prices are subject to government control, prices and margins should be set at levels which will provide incentives to manufacturers and marketers to engage in market development activities and make capital investments.

Setting of national uniform prices, and in effect equalizing transport costs, is a central issue of fertilizer pricing policy in many countries. It becomes more important in efforts to reduce subsidies and encourage increased private-sector participation in fertilizer marketing. Seasonal pricing and volume discounts are other important issues in pricing policy. The establishment of seasonal prices should enhance fertilizer availability at the farm level by stimulating off-season movement from supply points to sales outlets and by reducing the burden on the transport system during the heavy demand planting season. Volume discounts would promote the development of wholesalers and lower transport costs by allowing larger unit shipments.

Price factors are important at every stage of fertilizer use development in developing countries. In the early introductory stages, a large and direct price subsidy is usually necessary to induce farmers to use fertilizers. As fertilizer use increases, price subsidies can rise substantially to a point that they become excessively burdensome to the government and remedial action in the form of subsidy reduction becomes necessary. Improvements in the marketing system can lead to cost reductions which may in part offset the effect of subsidy reduction. When fertilizer use is fully developed, subsidies can reach unsustainable levels. However, economic factors affecting fertilizer use, i.e., fertilizer/crop price relationships, assume even greater importance in setting fertilizer prices.

Fertilizer Credit

Credit availability is an important element in expanding fertilizer use. Both crop production credit and fertilizer distribution credit are generally needed. The importance of production credit is evident from FAO reports which indicate that between 30% and 60% of the fertilizer distributed by government agencies and cooperatives in many Asian countries involves credit. However, in most developing countries, farmers have only limited access to short- and medium-term production loans through agricultural and commercial banks, cooperatives, growers' associations, and other loan programs. Delinquencies in payment and nonrepayment of loans and high delivery and recovery costs are major problems to lending institutions.

From the farmer's perspective, loan application processes are overly cumbersome and time consuming and collateral requirements may be difficult to meet. The role of fertilizer marketing organizations in agricultural production credit is generally limited to increasing farmer awareness of availability of credit from various sources, providing assistance in developing credit needs, and assisting farmers in applying for loans at lending institutions. Fertilizer wholesalers and retailers may at times provide production loans to credit-worthy farmers, particularly if these dealers have access to institutional credit. If denied access to credit from public and commercial lending institutions and retailers, farmers often turn to friends or money lenders who may charge exorbitant interest rates. The high cost of borrowed money can reduce farmers' profitability of fertilizer use and dampen his desire to use it.

Lack of access of public and private fertilizer marketing organizations to institutional credit to finance stocks and investments in marketing system

infrastructures is another important constraint to the increased and timely availability of fertilizer to farmers. Fertilizer wholesalers and retailers generally require financial assistance to purchase and carry inventory to ensure timely availability of fertilizer. In many countries the 1-3 month delayed payment terms extended wholesalers and retailers by fertilizer suppliers are helpful but do not cover the seller's credit needs.

In order to encourage expanded fertilizer use additional production and distribution credit should be made more readily available to farmers and fertilizer dealers through lending institutions at reasonable interest rates. In regard to production credit, loan application procedures should be streamlined and collateral needs liberalized. Distribution loans, normally secured by dealers' stocks, should be made more readily available to increased numbers of wholesalers and retailers.

CHAPTER 3

COMPARATIVE FERTILIZER MARKETING SYSTEMS AND POLICIES

The comparative fertilizer marketing systems and policies are briefly discussed for seven developing countries. These are Bangladesh, India, Indonesia, and Pakistan from Asia; Cameroon from Africa; and Brazil and Mexico from Latin America. According to FAO, all these countries are classified as developing market economies. This chapter draws extensively from a study by Mudahar and Schultz (1986).

Role of Agriculture and FertilizerPopulation Dynamics

The average population growth has been above 2.0%/year in all the developing countries; and close to 3.0%/year in the case of Cameroon, Mexico, and Pakistan (Table 3.1). The majority of the population is still rural, with population density over 1,500 persons/1,000 ha of cropped land in all the developing countries; and over 7,000 persons/1,000 ha of cropped land in the case of Bangladesh and Indonesia. Food production, a basic necessity, must keep pace with population growth since most of these countries have a precarious balance of payment situation and may not be able to import food commercially.

Contribution of Agriculture

As GNP/capita increases, the relative contribution of agriculture declines. In the Asian and African countries, the agricultural sector accounts for over 50% of the labor force and over 25% of gross domestic product (GDP) (Table 3.1). Clearly, economic development in these countries is closely linked with agricultural production performance. One must not undermine the importance and implications of agricultural development for equity, employment, and participatory economic growth since a large share of population and labor force is still in the agricultural sector.

Role of Fertilizer

Fertilizer is a vital input for agricultural production, both food and export crops. The available empirical evidence indicates that approximately one-fifth to one-third of incremental agricultural production can be attributed to fertilizer use. Given the relative scarcity of cropped land or very high cost of development of new lands, agricultural growth strategies must focus on multiple cropping and yield growth strategies. These strategies will not succeed in the absence of fertilizer use by farmers. One must realize, however, that fertilizer use and its productivity depends upon many associated technical factors and economic policies. In any case, the right type fertilizer must be made available to farmers at the right time, right place, and at the right price. Fertilizer marketing plays a vital role in all of these activities.

National Fertilizer Sector Dynamics

Fertilizer Consumption

All of the countries in this survey are still passing through early (but at different levels) stages of fertilizer use development. The aggregate fertilizer consumption has been growing at about 10%/year or higher (Table 3.2). It will be relatively more difficult to maintain these high consumption growth rates in the future due to (a) fertilizer consumption in the base periods is much higher now than in the past (in most developing countries fertilizer use in general agriculture began in the 1950s) and (b) fertilizer use has become rather common. Future growth in fertilizer use will come from an increase in fertilizer rates and its use on crops and in regions where it is not currently used.

Fertilizer Security

After the fertilizer crisis and skyrocketing fertilizer prices in the international market in the 1970s, many developing countries expanded domestic fertilizer capacity based on indigenous and/or imported fertilizer intermediates and raw materials. Since the fertilizer raw materials are not evenly distributed, all the countries may not be able to become self-sufficient in meeting their fertilizer needs. Many modern fertilizer plants (primarily nitrogen) were built

or are under construction and several of the study countries have improved fertilizer self-sufficiency index (Table 3.2). Indigenous fertilizer production does provide fertilizer security and may stabilize domestic fertilizer prices. However, in many cases these objectives have been or are being achieved at high economic costs and large fertilizer subsidies which are often difficult to justify purely on economic grounds.

Fertilizer Imbalance

The appropriateness of balance in applied fertilizer nutrients must be viewed in the context of soils, crops, farming systems, and crop technology. The available evidence indicates that there is an overemphasis on nitrogen in most developing countries, often at the cost of other primary, secondary, and micronutrients (Table 3.2). Most of these nutrients are not only less expensive but also are less energy intensive as compared to nitrogen. Lack of proper balance in applied nutrients reduces fertilizer productivity and profitability.

Fertilizer Use by Farms

In Asian countries, a major share of fertilizer is used on food crops. Both small and large farmers grow food crops. The relative share in aggregate fertilizer consumption by small farmers is generally about the same as their share in cropped land. On the other hand, in African and Latin American countries, a large share of fertilizer is used on cash and export crops grown primarily by large farmers, plantations, and estates. Even in these countries, however, the relative share in fertilizer use by small farmers and on food crops is gradually increasing, partly in response to policy reforms, improvements in crop technology for food crops and stated national goals of food self-sufficiency.

Fertilizer Use by Products

The popular nutrient supply sources include urea for nitrogen, triple superphosphate (TSP), and diammonium phosphate (DAP) for phosphates, and potassium chloride (KCl) for potassium (Table 3.3). Ammonium sulfate (AS), as a source of nitrogen, is used primarily in those countries where it is produced as a by-product. Single superphosphate (SSP), as a source of phosphates, is used in those countries which have indigenous phosphate rock. The following trends are apparent in nutrient supply sources over time.

1. The high analysis fertilizers are gradually replacing low analysis fertilizers, such as urea for AS and TSP for SSP. The high analysis fertilizers do save transportation, storage, and handling costs per unit of nutrient supplied. However, they are also responsible for widespread sulfur deficiencies in tropical agriculture since sulfur supplied by AS or SSP is not included in urea or TSP.
2. As fertilizer use goes up and the fertilizer sector develops, straight solid fertilizers are replaced by multinutrient compounds, solid blends, or solutions. The use of fertilizers in the form of compounds reduces distribution costs, improves nutrient balance and fertilizer productivity.
3. As fertilizer consumption increases, more and more fertilizer moves in bulk and is either sold in bulk or bagged closer to the point of consumption. This approach does save distribution costs but runs a higher risk of adulteration and physical loss.

Fertilizer Marketing Organization

Government involvement in the fertilizer sector in developing countries is quite common and it is usually rationalized as follows: (a) fertilizer is an essential commodity required for the production of food; thus, government control is mandated to achieve the most equitable distribution of fertilizer and widespread benefit to the country; (b) fertilizer production facilities are capital intensive and thus unattractive for private-sector development; and (c) fertilizer distribution requires a major investment in infrastructure and related facilities that usually is beyond the capabilities of nongovernment entities. In some developing countries cooperatives play an important role in the supply and distribution of fertilizers. Cooperatives, with the exception of some producer cooperatives, are usually owned and/or subsidized by the government, and they usually focus on specific fertilizer-related activities. The following common marketing features prevail among the study countries:

1. The primary distribution system (from the factory gate or port to primary distribution points in the major marketing regions) is dominated by the government.
2. Shipment of fertilizer in bags predominates although bulk movement to bagging and/or mixing plants is used in special circumstances.

3. Government-owned, government-assisted, or private-sector cooperatives play a major role in wholesaling and retailing fertilizer.
4. Producer cooperatives, parastatals, and other large consumers of fertilizer often operate with relative independence from the overall fertilizer supply system, which is usually designed to serve the smallholder.
5. Private fertilizer dealers (especially retailers) are very important in providing the final links in the distribution chain between the primary or secondary distribution points and the farmer.
6. Promotion of fertilizer through dealer training, farm-level demonstrations, and education is recognized as an essential element to bring about increased fertilizer consumption and crop production.
7. There is often lack of effective coordination and communication among different ministries.
8. There is also a lack of adequate training in fertilizer use research and farm-level demonstration activities.
9. The farm-level delivery of bulk fertilizers and the use of fluid fertilizers are almost nonexistent.
10. Governments play important roles, directly or indirectly, in influencing the organization and operation of fertilizer marketing.

Marketing Infrastructure and Cost

Most of the technical and operational innovations being used or under study are designed to ensure delivery of fertilizer to the farm level in the correct quantity and at the correct time. Because of the inflexible nature of most fertilizer processes, and the seasonality of demand for fertilizer, the most common method used to obtain this goal usually involves large in-country storage of fertilizer. Storage is provided (1) at the production unit or near the port, (2) at primary distribution points located throughout the market area, (3) in warehouses located at secondary distribution points, and (4) in warehouses operated by cooperatives, parastatals, wholesalers, and retailers. In many cases the in-country fertilizer inventory amounts to the annual consumption, and is rarely below about 50% of annual consumption. In some cases (for example, Bangladesh and India), seasonal price discounts designed to encourage off-season purchases and farm-level storage have been quite successful.

Because of the high cost of building storage facilities and the financing of large fertilizer inventories, most of the primary or regional storage facilities (including fertilizer inventories) are operated by the following government-subsidized organizations: (1) manufacturers or marketing organizations (for example, FERTIMEX in Mexico and PUSRI in Indonesia), (2) agricultural supply organizations (for example, BADC in Bangladesh), or (3) government-owned warehouse organizations (for example, central and state warehouse corporations in India). In the extreme case (Mexico), title to the fertilizer is maintained by the government (FERTIMEX) until the fertilizer is actually paid for by the farmer.

Another distinctive feature common to the systems in all the study countries is that the fertilizer marketing cost is relatively high, ranging from about US \$20/mt to as much as about US \$230/mt, with about US \$40-\$75/mt being typical (Table 3.4). In many cases the true cost to the country is difficult to determine because of the financial structure of the various marketing and distribution organizations, different accounting procedures, subsidies, and special concessions. In any event transportation and inventory finance charges are the two major cost components of all the physical distribution systems. The following are among the most common methods used by most of the countries studied to minimize or decrease the cost of transportation and storage without jeopardizing timely delivery of fertilizer to the farmer:

1. Improved demand forecasting of farm-level fertilizer needs.
2. Optimization of transport and storage facilities based on improved demand forecasting.
3. Use of block trains to obtain favorable costs, more efficient handling, and optimum use of limited rolling stock.
4. Bulk shipments to regional bulk-blending or bagging stations to minimize freight and handling costs and to speed up discharge rates and thereby optimize the use of available facilities.
5. Use of coastal and inland water transport, especially on long-distance routes.
6. Expansion of the role of private-sector wholesalers and retailers to ease government-owned warehousing requirements and inventory costs.
7. Price discounts to encourage farmers to purchase fertilizer during the off-season and thus relieve congestion of transport and storage facilities.

Fertilizer Price Policy

The average farm level fertilizer prices for the study countries are reported in Table 3.5. It is striking to find large variations in farm-level prices for a given fertilizer from one country to another. For example, urea price varies from a low of US \$83 in Cameroon to a high of US \$252 in Brazil. Similar differences are evident in other fertilizers as well. Major points which emerge from the comparative analysis of national fertilizer price policy are the following:

1. Both ex-factory and retail (except Bangladesh) fertilizer prices are fixed by the government and are generally designed to achieve predetermined goals of production efficiency in the fertilizer industry, and price parity with agricultural commodities at the farm-level (Table 3.6).
2. The available evidence indicates that regulated official fertilizer prices at the retail level may not always be equal to the actual prices paid by farmers. The actual prices are generally higher when there is fertilizer scarcity and lower when there is a glut. Adequate national fertilizer supply does not always assure lack of localized scarcities at the crucial times. In this context, fertilizer supply management and efficient marketing become very important to assure reasonable fertilizer prices at the farm-level. Bangladesh deregulated retail-level fertilizer prices all over the country in 1983. The deregulation policy does not appear to have had any adverse impact on fertilizer prices or availability which can be traced directly to deregulation.
3. With the exception of Bangladesh, the retail fertilizer prices are held uniform across the country through equated freight and/or transport subsidy. Such a policy is easy to administer and does not discriminate against the farmers in remote areas. However, farmers close to the supply source pay relatively higher price due to equalized high transportation charges, in case there is no transportation subsidy.
4. In the case of Indonesia and Cameroon, retail fertilizer prices were the same for different fertilizers, irrespective of their nutrient content and cost. Such a policy cannot be justified on economic or efficiency grounds.

5. It is rather common to hold retail fertilizer prices constant (in nominal terms) over extended periods of time. Some of the examples are India, Indonesia, and Cameroon. As a result, real fertilizer prices decline over time. In recent years, many countries have raised fertilizer prices in discrete jumps. It is much more practical and realistic to raise retail fertilizer prices gradually, once or twice a year, rather than in big jumps once in several years.
6. Several countries, including India and Pakistan, have recently raised retail fertilizer prices in order to reduce the burden of fertilizer subsidy. The increase in fertilizer prices does reduce fertilizer consumption, at least in the short run, unless it is associated with positive nonprice policies, including high yielding crop varieties, irrigation, credit, and adequate fertilizer supply at the right time and place.
7. Cameroon has been following a dual fertilizer price policy, i.e., subsidized prices for coffee and food crops and nonsubsidized prices for all other crops. There is evidence of leakage and black market for subsidized fertilizer. Furthermore, such a price policy is difficult to administer. If, in fact, there is a need to provide incentives to coffee farmers, it may be more appropriate to manipulate crop prices as compared with dual-price policy for fertilizer.
8. The retail fertilizer prices in Brazil are very high as compared with derived border prices for imported fertilizers. These high prices are partly due to trade barriers to protect its high cost domestic fertilizer industry. Brazil established a large-scale fertilizer industry to achieve fertilizer security as the overriding national goal. However, this policy has been responsible for high cost fertilizer industry, high retail prices, a drop in fertilizer consumption, and agricultural production.
9. Farmers in most countries are not paying the economic prices of fertilizer. During 1985, as reported in Table 3.5, fertilizer prices paid by farmers in Indonesia; Mexico, and Turkey were even lower than the f.o.b. prices of fertilizers. In India, for example, the retail price of urea paid by farmers in 1985 was US \$177/mt. On the other hand, the average delivered cost of imported urea up to the retail point would have been US \$227/mt (US \$135 f.o.b. price, US \$50 sea freight and insurance and US \$42 for port handling, equated freight, and marketing margins) with transport subsidy,

and US \$265/mt without transport subsidy. Clearly, there was a large component of price subsidy, and hence scope to reduce the fertilizer subsidy by raising urea prices. In fact, fertilizer prices were raised (reverted back to 1981 levels) in India effective February 1, 1986. However, the fertilizer prices should be raised in such a way as to maintain a parity with crop prices in order to provide incentives to farmers. The f.o.b. urea (or other fertilizers) prices in the latter half of 1985 and in early 1986 were lower than the 1985 average prices, indicating that the prevailing current fertilizer prices paid by farmers may be close to economic prices.

Fertilizer Subsidy Policy

With the exception of Brazil, fertilizer subsidies (direct and indirect) are given in all the other countries. However, the fertilizer subsidy cost is becoming a serious burden and most countries are now making serious efforts to reduce fertilizer subsidies, but only gradually (Table 3.7). The following conclusions emerge from the comparative analysis of several countries with respect to their experience with fertilizer subsidies.

1. The reasons for high fertilizer subsidies are many and vary from one country to another. Broadly, high fertilizer subsidies are due to (a) high production costs for indigenous fertilizers, (b) high procurement costs for imported fertilizers, (c) high marketing costs, primarily transportation, and (d) the desire to have low fertilizer prices at the retail level. In India, for example, 47% of increase in fertilizer subsidy from 1980/81 to 1983/84 was due to an increase in cost of main inputs in fertilizer production. India has already taken several steps to reduce fertilizer subsidy. This includes (a) an increase in retail fertilizer prices, (b) an elimination of custom duties on all imported equipment for the fertilizer sector, and (c) an elimination of excise duty on electricity. There is need to rationalize the retention price scheme in order to further reduce fertilizer subsidy.
2. After the energy and fertilizer crisis of the 1970s, many developing countries pursued a policy of import-substitution, with the objective of stabilizing prices and to reduce dependency on the international market. They have been partly successful in reducing the share of imported

fertilizers but at a large economic cost. Brazil and India are good examples. Most of the new plants in India have very high cost of production as compared with the international prices. Since the fertilizer prices are too high for farmers, respective governments (not Brazil) are subsidizing the fertilizer production. For example, in India during 1983/84, 86% of the subsidy was for indigenously produced fertilizers and the remaining 14% was for imported fertilizers. Within the indigenous fertilizer sector, 79% of the subsidy was for the retention price scheme (price subsidy) and 21% for freight subsidy scheme (freight subsidy). Concerted efforts must be made to reduce fertilizer subsidy through (a) improved operational efficiency and management of fertilizer plants, (b) reduced energy consumption, (c) reduced capital and operational costs of fertilizer production, and (d) rationalization of input pricing for the fertilizer industry.

3. Most of the subsidy goes for fertilizers containing the primary plant nutrients (N, P, and K), although there may be evidence of other nutrient deficiencies. For example, in the case of Indonesia during 1981/82, 90% of the fertilizer subsidy was for urea and TSP only. If subsidies must be given, blanket fertilizer subsidies must be replaced by component subsidies with clearly identified goals (security, economic or technical), time phasing, cost limits, and efficiency norms.
4. In most countries, fertilizer subsidy schemes are not efficiently administered and implemented. For example, Brazil terminated its fertilizer subsidy policy after 2 years (1975 and 1976) because of poor implementation.
5. Relatively little is known about the cost of different subsidy components and their cost effectiveness. In the absence of such crucial information, it is difficult to design rational and efficient fertilizer subsidy schemes. For example, during 1984, 42% of total fertilizer subsidy cost of US \$365 million in Mexico was indirect subsidy in the form of low ammonia prices. Most other countries subsidize natural gas prices to ammonia/urea plants.
6. A large share of fertilizer subsidies merely compensates for high production, procurement, and marketing costs which are partly due to operational inefficiencies and partly due to uneconomic national policies. As a result, farmers are not the only beneficiaries of fertilizer subsidies; others include producers, importers, distributors, and consumers of agricultural commodities. Most developing countries are reluctant to raise crop prices

because of consumer pressure, especially in the urban areas. These same governments also argue that input, including fertilizer, subsidy schemes are less inflationary, less expensive, and easy to administer. However, some of these subsidy schemes have little economic justification.

Table 3.1. Key Economic Indicators for Selected Developing Countries During 1983

Country	Population (million)	Population Growth ^a (%)	Population Density		Rural Population (%)	GNP/ Capita (US \$)	Contribution of Agriculture		Food Index ^d	Cropped Land Under Irrigation (%)
			Total Area (Persons/'000 ha)	Cropped Land ^b			Labor Force ^e (%)	GDP		
Bangladesh	96	2.4	6,667	10,507	83	130	74	47	101	20
India	733	2.3	2,230	4,354	76	260	71	36	108	23
Indonesia	156	2.3	819	7,681	76	560	58	26	121	27
Pakistan	90	3.0	1,119	4,392	71	390	57	27	105	72
Cameroon	10	3.1	17	1,437	61	820	83	24	84	e
Brazil	130	2.3	153	1,740	29	1,880	30	12	113	3
Mexico	75	2.9	380	3,178	31	2,240	35	8	106	22

a. From 1973 to 1983.

b. Persons/'000 ha of cropped land.

c. Refers to 1981.

d. Refers to 1981-83 average index of food production/capita; base index is 100 for 1974-76.

e. Less than 1%.

Table 3.2. National Fertilizer Sector Status in Selected Developing Countries During 1983/84

Country	Consumption	Production ('000 mt of nutrients)	Imports	Exports	Use ^a (kg/ha)	Self-Sufficiency Index ^b (%)	N:P ₂ O ₅ :K ₂ O Balance	Annual Growth in Consumption ^d		
								A	B	C
Bangladesh	545	416	195	28	60	76				
India	6,608	4,546	1,355	0	39	69	8.9:4.2:1.0	13.1	10.0	6.3
Indonesia	1,495	1,445	367	162	74	97	7.4:2.1:1.0	12.1	10.5	7.3
Pakistan	1,201	1,106	282	159	59	92	9.7:3.1:1.0	16.5	18.8	17.5
Cameroon	33	0	33	0	5	0	32.1:9.1:1.0	16.4	10.8	6.2
Brazil	2,157	1,455	832	129	29	67	0.8:0.3:1.0	8.7	11.5	3.0
Mexico	1,445	1,303	233	91	61	90	0.8:1.2:1.0	14.6	0.0	-11.4
							18.8:7.1:1.0	9.6	6.8	12.0

a. Kg/ha of arable land and permanent crops.

b. Domestic production as percent of total consumption, in terms of nutrients from finished fertilizers only. Does not account for stocks.

c. Compound growth rate from 1965/66 to 1982/83; which are 3-year averages, centered on the years shown. For example, 1965/66 is an average of 1964/65, 1965/66, and 1966/67; and 1982/83 is an average of 1981/82, 1982/83, and 1983/84.

d. Compound growth rate from 1976/77 to 1982/83; which are 3-year averages, centered on the years shown.

e. Compound growth rate from 1979/80 to 1982/83; which are 3-year averages, centered on the years shown.

Table 3.3. Contribution of Different Fertilizer Products to Nutrient Consumption in Selected Developing Countries During 1983/84

Country	Nitrogen ^a				Phosphate ^a				Potassium ^a			
	Urea	AS	Other Straights (%)	Compounds	SSP	TSP	Other Straights (%)	Compounds ^b	KCl	KS ^c	Other Straights (%)	Compounds
Bangladesh	95	- ^d	-	5	-	74	-	26	100	-	-	-
India	82	2	2	14	17	1	1	81	59	1	-	40
Indonesia	92	7	-	1	-	95	4	1	95	1	-	4
Pakistan	74	2	8	16	7	-	-	93	-	63	-	37
Cameroon	17	32	-	50	-	2	9	89	43	-	-	57
Brazil	44	20	16	20	26	19	11	44	82	2	-	16
Mexico	39	25	21	15	15	40	3	42	21	25	-	54

a. Percent contribution to total N, P₂O₅, or K₂O consumption.

b. The share of ammonium phosphates, primarily DAP, in compound phosphate fertilizers was 26% in Bangladesh, 59% in India, 59% in Pakistan, 10% in Cameroon, 35% in Brazil, and 35% in Mexico.

c. Potassium sulfate (K₂SO₄).

d. Negligible or none.

Table 3.4. Estimated Fertilizer Marketing Costs in Selected Developing Countries

<u>Country</u>	<u>Storage^a</u>	<u>Transportation</u>	<u>Margins or Commissions</u> (\$/mt)	<u>Interest on Inventories^b</u>	<u>Other Costs</u>	<u>Total^c</u>
Bangladesh	22	13	6-10	18	-	59-63
India	6	2 ^d -5 ^e (rail) 3 ^d -8 ^e (road)	11-22	9	-	31-50
Indonesia	8-15	8-32	11-15	5-6	2-4 ^f	34-72
Pakistan	3	-	-	6	-	18-53 ^g 65-74 ^h
Cameroon	110 ⁱ	21 ^j -58 ^k (rail) 21 ^j -117 ^k (road)	-	19	-	75-230 ^l
Brazil	10	2-5 ^j	-	14	-	- ^m
Mexico	4	20	-	7	-	40 ⁿ

a. Based on reported inventories assuming \$1/mt in and \$1/mt out (handling plus \$3/mt-month).

b. Based on reported inventories valued at \$200/mt and 12% annual interest. If storage capacity only was given, quantity assumed was equivalent to 50% of storage capacity.

c. Other costs are generally not available. Therefore, total is not necessarily sum of cost components listed.

d. Journey of 1-25 km.

e. Journey of 276-300 km.

f. Advertising, promotion, and education.

g. Domestically produced fertilizer.

h. Imported fertilizer.

i. Storage plus all handling including ship unloading, port charges, and losses of product.

j. Assumes 250 km journey.

k. Assumes 900 km journey.

l. Depends on source of estimate.

m. Sufficient data not available to determine or estimate total cost.

n. Reported total not including interest on inventory and other finance costs.

Table 3.5. Average Farm-Level Fertilizer Product Prices in Selected Developing Countries During 1985

Country	Average Farm-Level Prices				
	Urea	AS	DAP	TSP	KCl
	(\$/mt)				
Bangladesh	183	- ^a	-	179	146
India	177	123	268	192	96
Indonesia	91	91	-	91	91
Pakistan	152	75	-	-	-
Cameroon	83	83	-	-	-
Brazil	252	200	427	314	227
Mexico	85	33	-	99	90
International (f.o.b.) ^b	135	81	184	136	99

a. Not available.

b. 1985 annual average international spot prices, f.o.b. Western Europe for bagged urea; U.S. Gulf for AS, DAP, and TSP in bulk; and Vancouver for KCl in bulk. \$15.00/mt was added for bagging and bags when price was quoted in bulk. The current international fertilizer prices are lower than indicated since they have been declining in the last year or so.

Table 3.6. An Overview of Fertilizer Pricing and Subsidy Policies in Selected Developing Countries During 1985

<u>Country</u>	<u>Price Regulation</u>		<u>Retail Price Uniformity</u>	<u>Fertilizer Subsidy</u>	
	<u>Ex-Factory</u>	<u>Retail</u>		<u>Producer</u>	<u>Farmer</u>
Bangladesh	Yes	No	No	Yes	Yes
India	Yes	Yes	Yes	Yes	Yes
Indonesia	Yes	Yes	Yes	Yes	Yes
Pakistan	Yes	Yes	Yes	Yes	Yes
Cameroon	a	Yes ^b	Yes ^b	a	Yes ^b
Brazil	Yes	Yes	No	No	No
Mexico	Yes	Yes	Yes	Yes	Yes

a. Cameroon has no production facilities in operation.

b. For subsidized fertilizers only; Cameroon follows dual pricing policy at the retail level.

Table 3.7. Estimated Cost of Fertilizer Subsidy in Selected Developing Countries

Country	Year	Subsidy Cost	
		Local Currency	US \$
Bangladesh	1983/84	TK 1,426 million	56.3 million
	1984/85 ^a	TK 900 million	33.0 million
India	1983/84 ^b	Rs 10.48 billion	919.3 million
	1984/85 ^b	Rs 19.32 billion	1,545.6 million
Indonesia	1981/82	Rs 243,805 billion	369.4 million
Pakistan	1982/83 ^c	Rs 1,840 million	129.6 million
	1983/84 ^c	Rs 1,137 million	72.0 million
Cameroon	1984/85 ^d	FCFA 6,109 million	13.6 million
	1984/85 ^e	FCFA 9,840 million	21.9 million
Mexico	1984 ^f	-g	365.0 million

a. Estimated.

b. Budgeted.

c. Net.

d. USAID estimate.

e. IFDC estimate.

f. Direct and indirect.

g. Not available.

CHAPTER 4

FERTILIZER MARKETING SYSTEM AND POLICY IN BANGLADESH

The purpose of this chapter is to analyze the fertilizer marketing system and fertilizer marketing policy in Bangladesh.¹ Specifically, the objectives are: (1) to discuss the evolution of the fertilizer marketing system and policy, (2) to describe the existing fertilizer marketing organization and channels, (3) to analyze fertilizer marketing costs and margins, (4) to evaluate the operational efficiency of the fertilizer marketing system, and (5) to describe specific measures taken to improve the efficiency of fertilizer marketing system in Bangladesh.²

Evolution of the Fertilizer Marketing System

Fertilizer was introduced in Bangladesh around 1951. The market for fertilizer has expanded from a mere 3,000 mt of product in 1951/52 to about 74,000 mt of product in 1962/63 to almost 1.2 million mt of product in 1985/86. The historical dynamics of fertilizer consumption, as measured by sales, in Bangladesh is reported in Figure 4.1. The fertilizer marketing system in Bangladesh is by no means a "static" system. In recent years, the marketing system has experienced several major changes under the impetus of USAID's Fertilizer Distribution Project which was initiated in 1978. The marketing system appears to be adjusting well to these changes.³

1. This chapter is based on Mudahar (1984) and Kapusta (1985).
2. The analysis of fertilizer marketing system and policy in Bangladesh is based on both primary and secondary data. The relevant BADC and non-BADC sources of secondary data include BADC (1981), BADC (1984), Hoque (1982), Food and Fertilizer Planning and Monitoring Secretariat (1983), and Bangladesh Ministry of Agriculture and USAID (1982). The primary data used in the analysis were collected through the BADC/IFDC monthly farmer fertilizer price surveys.
3. Further details on different aspects of the fertilizer marketing system in Bangladesh are available in several IFDC publications, including Chuang, Hill, and Barnett (1978); Hill and Benton (1979); Hill and Benton (1980); Clayton (1981); IFDC (1982); Moots (1982); and Mudahar (1983, 1984).

Phase I

The Bangladesh Agricultural Development Corporation (BADC) has been responsible for marketing fertilizer since 1962/63. The predecessor of BADC was the East Pakistan Agricultural Development Corporation (EPADC), which was established in 1961; the name was changed to BADC in 1971. BADC is a corporation which is wholly owned by the government. Along with fertilizer, BADC is responsible for distributing seeds and irrigation equipment and services. The suggested organization of its Supply Wing (reflecting changes to facilitate the implementation of the new marketing system described later), which is responsible for fertilizer marketing, is shown in Figure 4.2. Total BADC employment approximates 21,000, with about 2,800 involved in fertilizer-related activities. The key regulatory features of the marketing system in Phase I, the so-called Old Marketing System (OMS), were the following:

1. BADC, an "absolute public monopoly" was responsible for procuring and distributing fertilizer up to the level of Thana Sales Center (TSC), beyond which private dealers and cooperatives sold to farmers.⁴
2. The private dealers, limited to 15 in every union, were appointed by BADC, and each dealer was assigned to a fixed marketing territory.
3. The fertilizer retail price at which a dealer could sell to a farmer was fixed and uniform throughout the country.
4. The dealer's commission was fixed by BADC at a level which was low and perceived by dealers as providing limited economic incentive.

Phase II

The fertilizer marketing system in Phase II, the so-called New Marketing System (NMS), was first introduced in Chittagong Division on December 1, 1978; it was expanded to Dhaka and Khulna Divisions on January 1, 1980, and later expanded to the whole country (except Chittagong Hill Tracts) on July 1, 1980. The primary features of NMS included the following:

1. BADC was still "absolute public monopoly" for fertilizer procurement but its role in fertilizer distribution was reduced to servicing Primary Distribution Points (PDPs) and viable TSCs only.

⁴ The name of thana administrative unit was changed to Upazila in 1985--see footnote 5. For ease of discussion the older thana designation is used in this paper.

2. Any number of private dealers could sell fertilizer by merely registering with BADC without any restrictions on their number or market territory (except within the 5-mile border zone).
3. The retail price at which a dealer could sell fertilizer to a farmer was still fixed and uniform throughout the country.
4. The economic incentives to private dealers were expanded (but were still regulated) through an increase in dealer's commission, price flexibility at wholesaler level, quantity discounts and credit facilities.

Phase III

The NMS was further modified by deregulating retail fertilizer prices. The price deregulation was first introduced in the Chittagong Division on April 1, 1982, and later expanded to the whole country (except Chittagong Hill Tracts) on April 1, 1983. The concept of price deregulation in this context is rather limited. The PDP and TSC prices are still regulated by BADC and are fixed at the same level across all PDPs or TSCs for a particular fertilizer. However, the dealers are free to sell fertilizer to farmers at any price.

Fertilizer Marketing Organization and Channels

Marketing Organization

The fertilizer marketing system in Bangladesh is organized somewhat like a "pyramid." BADC, an absolute public monopoly, is responsible for procuring fertilizer from domestic fertilizer plants (except ammonium sulfate) and through imports (commercial or grants) at the national level. BADC is also responsible for distributing nationally procured fertilizer up to PDPs and TSCs through various transit and intermediate warehouses. As shown in Figure 4.3, a large number of private dealers and cooperatives sell fertilizer to farmers, directly as well as through their subdealers. The private fertilizer dealers at the retail level compete with each other and with cooperatives involved in fertilizer sales.

Spatial Dimensions

According to Bangladesh Bureau of Statistics (1982) and Bangladesh Times (1983), as of 1983, Bangladesh was divided into 4 administrative divisions,

21 districts, 65 subdivisions, 477 thanas, and 4,420 unions (Figure 4.4).⁵ There are about 65,000 villages in Bangladesh and each union consists of approximately 15 villages. Furthermore, the total number of households in Bangladesh is about 13.47 million, and 6.256 million of these are directly involved in farming--58% as owners, 41% as owner-cum-tenants, and the remaining less than 1% as pure tenants. The large number of small farmers, who are widely and remotely distributed across the countryside, provide a challenge and an opportunity to make the right kind of fertilizer available in adequate quantities to all farmers at the right time and at reasonable prices.⁶

Fertilizer Allocation

National targets for fertilizer sales are set for the long term (as part of 5-year plans) and short term (as annual targets which are derived from long-term targets). The national annual target is then split into district-level monthly/seasonal targets. BADC then allocates fertilizer to each district according to these targets. The fertilizer allocation is, however, adjusted from time to time in view of changes in fertilizer demand and supply at the district and national levels. Such a strategy ensures equitable distribution of fertilizer to different districts but also implies a maximum limit on the amount of fertilizer a dealer can purchase and sell. There are also regulations that impose a limit on the amount of fertilizer a dealer can purchase from a PDP or TSC, especially in periods of scarcity.

5. In 1984, the administrative structure was altered as follows:

<u>Old</u>	<u>Geographical Coverage</u>	<u>New</u>
Union	6-12 Villages	Union
Thana (Police Station)	6-13 Unions	Upazila
Subdivision	5-12 Thanas	-
District (Zila)	1-6 Subdivisions/12-30 Upazilas	Zila (District)
Division	3-7 Districts	-

6. According to Sidhu, Baanante, and Ahsan (1982), the percentage share of sample farmers using fertilizer was 68%, 62%, and 61% in Boro, Aus, and Aman seasons, respectively, during 1979/80. However, the percentage share of farmers actually using fertilizer increases with an increase in farm size. For example, during Aman 1980 season, the percentage share of sample farmers using fertilizer was 54%, 57%, 67%, and 72%, respectively, for farm size categories of less than 1.0 acre, between 1.0-2.5 acres, between 2.5-5.0 acres, and greater than 5.0 acres. On the other hand, fertilizer use per acre appears to have an inverse relationship with farm size.

Marketing Channels

The fertilizer marketing channels in Bangladesh, as outlined in Figure 4.3, can be broadly divided into three categories: (1) government, (2) private, and (3) cooperatives. The role of government in retailing fertilizer is limited to those identified remote areas not served by others and in border areas where private dealers and cooperatives are not allowed to sell fertilizer. The private fertilizer dealers operate at both wholesale and retail levels. Dealers purchase fertilizer from BADC PDPs and TSCs and sell fertilizer through their own outlets as well as through their subdealers. The cooperatives are also involved in fertilizer marketing. Thana Central Cooperative Associations (TCCA), now Upazila Central Cooperative Associations, purchase fertilizer from BADC and then distribute it through local Krishi Samabaya Samity (KSS) outlets. In the OMS, the cooperatives were given preferential treatment over the private dealers and accounted for about 25% share of the market. However, in the NMS most of these economic incentives have been withdrawn from cooperatives and their market share dropped significantly to less than 10%.

Dealer Profile

Precise information on the number of dealers (both wholesale and retail) in Bangladesh is rather sketchy. In 1978/79 under the OMS there were about 35,400 registered dealers of which about 18,800 were actively engaged in selling fertilizer; there were no private wholesalers. With the relaxation of dealer registration requirements and operation of rules under the NMS the number of active dealers rose to about 24,000 then dropped off to a current level of 23,000, including about 5,000 small-scale wholesalers. The increase in number of registered fertilizer dealers may be partly misleading since under the NMS the same dealer can be registered at more than one PDP. About 87% of registered dealers in NMS were also OMS dealers.

The size of many retail fertilizer dealerships, as indicated by the amount of retail fertilizer sales, appears to be so small that it is not economically viable for an individual to deal exclusively in fertilizer. According to Hill and Benton (1980), 70% of active dealers are part time, and the average annual sale per dealer has increased from approximately 25 mt in 1975/76 to 34 mt in 1977/78. Based on sales of about 1.2 million mt in 1985/86, the average retail dealer sold about 52 mt.

Fertilizer Marketing Costs

The actual fertilizer distribution costs in most developing countries are generally very high. Bangladesh is no exception. Furthermore, because of government regulations in the marketing system, hidden subsidies, and operational inefficiencies, the estimated marketing costs do not always reflect the actual costs of fertilizer marketing.

Magnitude of Marketing Costs

The magnitude of fertilizer (marketing) incidental costs, as determined by the accounting system used by BADC, is based on cost estimates for moving fertilizer from port or factory to the farmer. The incidental costs are fixed at the same level for all the fertilizer materials, irrespective of the origin or destination of fertilizer, and whether the fertilizer is imported or domestically produced. The estimated incidental costs in the NMS have decreased from TK 722/mt in 1978/79 to TK 511/mt in 1984/85 as shown in Table 4.1. These average incidental costs are added to average c. & f. or f.o.r. prices in order to obtain average delivered cost for fertilizer at the retail level. The derived average fertilizer costs indirectly form the basis for establishing retail fertilizer price and determining fertilizer subsidy.

The magnitude of incidental costs is fixed at the same level for all the fertilizers, whereas the average fertilizer costs vary by fertilizer and their source of supply. As a result, the relative share of incidental costs in average fertilizer costs varies from one fertilizer to another.

Components of Marketing Costs

The magnitude of various components of incidental (marketing) costs, along with their relative share, is reported in Table 4.1 for 1978/79 and 1984/85. During 1978/79 (transitional year between OMS and NMS), the average incidental costs for fertilizer marketing and distribution in Bangladesh were estimated to be TK 722/mt. For 1984/85, under NMS, these costs had dropped to about TK 511/mt. These costs are obtained by dividing total fertilizer marketing and distribution costs, as estimated by BADC, by total tonnage of fertilizer sold during the year in question.

The relative contribution of 11 individual cost components has been estimated and reported in the table. During 1978/79, three components accounted

for approximately 84% of total incidental costs. This includes 43.8% for movement and handling, 21.7% for commission, and 18.3% for inventory loss. Staff pay and allowances accounted for 5.5% of total costs. In 1984/85, movement and handling costs remained the largest contributor to marketing costs, accounting for about 64.4% of total costs. Overhead and staff pay and allowances were other important cost elements making up about 14.7% and 9.4% of total marketing costs, respectively. At this stage, it is important to point out that the incidental costs and their cost components are based on BADC's bookkeeping system and hence do not reflect the actual fertilizer marketing and distribution costs.

As has been estimated by Hill and Benton (1980), the relative share of individual cost components at the district level has changed with the establishment of NMS. During 1978/79 the share of commission paid increased from 39% to 58%; the share of transport and handling cost declined from 15% to 3%; and the share of inventory interest declined from 30% to 26%. Comparable data for later years was not immediately available. These shifts reflect the general philosophy underlying the NMS, i.e., increase economic incentives to dealers and lower distribution costs through an improvement in operational efficiency in fertilizer marketing.

Dealer's Commission in the OMS

The commission paid to fertilizer dealers in the OMS was fixed by BADC. Broadly, the criteria used to fix dealers' commissions were: (1) the greater the distance of the dealer from BADC sale point, the greater the commission; and (2) the commission was higher in the border zone than in the interior. Cooperatives were given a wholesaler discount which permitted them to sell to private and local cooperative dealers. The evolution of commission for private fertilizer dealers in OMS is reported in Table 4.2. On the average, the commission increased from TK 44.28/mt in 1973/74 to TK 138.74/mt during 1977/78. From the BADC sale point to his store, the dealer pays all the costs from the commission.

Dealer's Commission in the NMS

As reported in Table 4.3, the process of establishing a commission for fertilizer dealers was simplified in the NMS. The commission at TSC was approximately 60% of that paid at PDP. This was partly because, on the average, the

distance of the dealer from TSC was less than the corresponding distance from PDP. However, the commission is the same for all those buying from TSC or PDP, irrespective of their distance or mode of transportation. Quantity discounts are available for purchases from PDP but not from TSC. The dealer pays all the transportation and handling costs after fertilizer purchase from his commission. Since December 7, 1981, there has been no increase in the PDP or TSC commission for the fertilizer dealer. BADC stopped fixing dealer commissions after retail fertilizer prices were deregulated.

Relative Share of Dealer's Commission

In Bangladesh, dealer's commission is equivalent to dealer discount from official retail fertilizer prices. The commission is already accounted for in estimating incidental costs. Fertilizer commission is uniform for all the fertilizers, irrespective of their PDP, TSC, or retail prices. As reported in Table 4.4, the fertilizer commission during 1983 at PDP was approximately 7%-9% and at TSC was 4%-5% of the official retail price. Even though the commission was uniform for all the fertilizers, the percentage of commission was high for low-priced fertilizers and vice versa. At the PDP level, dealer commission was even higher for those who were eligible for a quantity discount, which was TK 30/mt to TK 40/mt, depending upon the quantity purchased.

Operational Efficiency of Marketing System

Government intervention and distortions in the fertilizer market make it difficult to determine the operational efficiency of the marketing system. Despite serious constraints with respect to infrastructure and resources, the marketing system in Bangladesh is performing rather well in providing fertilizer to farmers on time and in adequate quantities. There is, however, substantial scope for reducing fertilizer marketing costs and improving the operational efficiency of the marketing system.

Fertilizer Market Equilibrium

First, fertilizer demand is seasonal, whereas fertilizer production is a continuous process. However, fertilizer imports create discontinuity in fertilizer supply, especially at low levels of fertilizer production.

Second, fertilizer demand is diffused all over the country, whereas fertilizer supply is localized depending upon the number and location of fertilizer plants and ports.

Third, there is a need to make a clear distinction between (1) fertilizer available at the national level with BADC and BCIC; (2) fertilizer available with BADC, including transit godowns, warehouses at the port, and ships at port or in high seas; (3) fertilizer available with BADC for immediate distribution; and (4) fertilizer available with fertilizer dealers.

These factors have important implications for fertilizer market equilibrium, storage needs, size of inventory and fertilizer transportation. Proper planning of fertilizer supply to meet seasonal fertilizer requirements is necessary and large capital investments are required to build storage facilities at strategic points as well as adequate transportation facilities.

According to FAO statistics on fertilizer consumption and production, the worldwide fertilizer market is approximately in equilibrium when supply exceeds demand by 3% to 7%, depending upon the fertilizer and international market conditions. This allows for fertilizer losses and fertilizer in the pipeline. However, at the national level supply should generally exceed demand by more than 7%. This is especially important for developing countries like Bangladesh in order to account for the following factors:

1. Fertilizer losses.
2. Safety stock.
3. Stock with speculating dealers.
4. Fertilizer in pipeline.
5. Shutdown of fertilizer plants.
6. Late arrival of imported fertilizer.
7. Fertilizer movement across borders.

These factors reduce effective fertilizer supply, i.e., reduce fertilizer availability in local markets for purchase by farmers, especially in the peak fertilizer demand months. However, the relative importance of these factors as well as the optimum size of fertilizer stocks may vary from one country to another. Lack of an effective market communication and infrastructure, which is prevalent in most developing countries, further reinforces the need for efficient supply management, proper planning, and floating stocks.

Buffer Stock Policy

In the OMS, BADC buffer-stock policy in Bangladesh implied sales-to-inventory ratio of 2.4 at the national level (5 month stock or 42% of target sales) and 4.0 at the district level (3 month stock or 25% of target sales). According to Moots (1982), in the NMS efforts are being made to maintain sales-to-inventory ratios of 3.1 at the national level and 3.0, 4.4, 2.9, and 2.3 in Dhaka, Chittagong, Rajshahi, and Khulna divisions, respectively. These buffer stocks, which appear rather large and expensive to maintain, are expected to ensure adequate fertilizer availability in Bangladesh. Seasonality in fertilizer consumption creates an additional economic burden on the fertilizer marketing system in the form of a need for large fertilizer stocks.

Fertilizer Transportation

According to Moots (1982) and BADC sources, fertilizer transportation modes included the following:

<u>Transport Mode</u>	<u>Up To District</u>	<u>Within District</u>
	(%)	
Rail	37	<5
Water	21	30-35
Road	42	60-65
Total	100	100

Many different modes of transport, except rail, were used to carry fertilizer from PDP or TSC to dealer stores. Finally, as reported in Table 4.5, 67%-82% of the farmers carried their fertilizer from dealer stores to the farms themselves.

BADC has limited control of fertilizer movement since it is transported by other government agencies and by the private sector. As a result, sometimes it takes several weeks for fertilizer to arrive at dealer stores. Fertilizer transport is cheapest by water and most expensive by road. Proper planning and adequate allocation of boats and railcars for transporting fertilizer would not only expedite fertilizer movements but would also lower transportation costs.

Fertilizer Storage

According to BADC (1984) the total fertilizer storage capacity available to BADC as of May 1, 1984, was as follows:

<u>Type</u>	<u>Transit</u>	<u>PDP</u> ('000 mt)	<u>TSC</u>	<u>Total</u>
Own	36.5	264.1	18.5	319.1
Rented	7.9	92.7	20.0	120.6
<u>Total</u>	<u>44.4</u>	<u>356.8</u>	<u>38.5</u>	<u>439.7</u>

The PDP storage capacity will increase substantially when the construction of all the proposed warehouses is complete. This is expected to remove one of the primary constraints on timely fertilizer availability to dealers.

Loose Fertilizer Sales

As reported in Table 4.6, approximately 80% of urea, 90% of TSP, and 100% of MOP sales are in loose form, and the rest in bags. As a result, there is a possibility for adulteration, underweighing, and deterioration of fertilizer. There is, albeit limited, evidence that these problems do exist in Bangladesh. However, not enough is known about violations in fertilizer quality control. One way to reduce such problems is to use small-size bags. This will increase bagging cost, but the standardization of quality and the convenience of carrying smaller bags as head load may compensate for the added cost.

Source of Information

One of the functions of an efficient marketing system is to provide technical and market information to farmers. As reported in Table 4.7, approximately 80% of the farmers receive no information about fertilizer. About 10% of the farmers receive information from the dealers. Clearly, it is possible to improve the information base and its transfer so that farmers are in a better position to make decisions with respect to purchase and use of fertilizer. Dealers are one logical source of such information and, if properly trained, can support the extension service in developing and disseminating information related to efficient and economical fertilizer use.

Market Development

Under the OMS, the lack of effective sales promotion and farmer technical assistance programs seriously limited the expanded use of fertilizer. Promotion of fertilizer use rested mainly with the Ministry of Agriculture's extension service, which was and is underfunded, understaffed, and generally

unable to serve the needs of Bangladesh's 12 million small farmers. At that time BADC's role in market development was also limited by lack of staff and funding support. BADC local level staff members responsible for working with fertilizer dealers and farmers lacked the technical skills, informational material, time, and means of transport to cover their assigned areas. The fertilizer dealer's potentially crucial role in promoting fertilizer use was likewise restricted by his limited knowledge of the agronomic aspects of fertilizer use and his lack of skills and resources in organizing and conducting fertilizer promotion and farmer assistance programs.

Cognizant of the dealer and farmer knowledge-related constraints to fertilizer use expansion, the NMS made fertilizer dealers the focal point of BADC's market development program. Accordingly, a dealer development and training unit was established within the BADC organization with the express purpose of building dealer's fertilizer use knowledge and developing his sales promotion skills and farmer assistance capabilities through an organized continuing nationwide dealer training effort. Training in various facets of business management is also offered to dealers as part of this program.

A cadre of BADC dealer training officers has been trained and to date about 17,000 dealers have participated in training programs conducted in each of the country's 21 districts. A large volume of training and sales promotion literature has been prepared and distributed to dealers and farmers. A third party evaluation of BADC's dealer development and training program confirmed the soundness of the approach and the successful implementation of the program. Its continuation was recommended. The BADC dealer training effort has proved to be a cost-effective way of transferring fertilizer use and crop production technology to farmers.

Human Resource Development

In Bangladesh, as in most developing countries, improvement in the operational efficiency of the marketing system can be affected by strengthening the management and operating skills of personnel involved in the conduct of the various marketing functions.

To overcome these personnel-related deficiencies training was made an integral component of the NMS implementation process. Over 200 individuals, mostly of senior- and middle-management rank, were provided training opportunities in in-country and overseas training programs and marketing study tours

arranged by IFDC and other organizations. Topics covered a broad range of marketing-related activities including marketing management, procurement, data collection and analysis, physical distribution and handling, market development, dealer systems, bulk handling, use of microcomputers, and economics of fertilizer use. In several instances, these training activities were supported by short-term consultancies designed to aid BADC personnel in improving specific marketing activities.

New Marketing System

The overall objective of the NMS is to improve the operational efficiency of fertilizer marketing. This is being accomplished through (1) an improvement in economic efficiency in fertilizer marketing from supply source to farmer and (2) an increased availability of quality fertilizers to all classes of farmers in the country at competitive prices. The principal reforms under NMS include (1) expanded role of the private sector, (2) fertilizer price deregulation, (3) creation of additional fertilizer storage facilities, (4) streamlining fertilizer procurement through imports, (5) improving fertilizer marketing and distribution systems, and (6) dealer development and training. The underlying purpose for these reforms is to reduce marketing constraints, reduce fertilizer delivery costs, increase fertilizer availability in all areas and to all farmers, and increase opportunities for greater competition at all levels.

The more important improvements made in fertilizer marketing under the NMS are summarized in Table 4.8 which identifies and indicates the remedial actions taken to ameliorate the main marketing-related impediments to expanded fertilizer use. IFDC has been engaged in providing technical assistance to BADC on these and other facets of fertilizer marketing system improvement under the USAID-funded Fertilizer Distribution Improvement Project I (FDI-I).

USAID is in the early stages of implementing Fertilizer Distribution Improvement Project II (FDI-II) which will expand private-sector involvement in fertilizer marketing and distribution through the development of larger-scale private wholesalers operating on a national scale. To support the organization and facilitate the operation of these large-scale wholesalers, FDI-II will make funds available for (1) providing credit to wholesalers and retailers for the purchase and maintenance of inventories, (2) technical assistance in expanding

dealer development and training programs, and (3) infrastructure improvements to overcome constraints to the physical distribution of fertilizers. If required, funds from the dealer credit program may be used to purchase imported fertilizers. IFDC will be providing technical assistance to BADC under FDI-II also.

Table 4.1. Estimated Average Incidental Costs for Marketing and Distributing Fertilizer in Bangladesh During 1978/79^a and 1984/85

Cost Element	Incidental Costs, TK/mt			
	OMS (1978/79)		NMS (1984/85)	
	Cost	% of Total	Cost	% of Total
Movement/handling	316	43.8	329	64.4
Dealers' commission	157	21.7	- ^b	0.0
Stock losses	132	18.3	11	2.2
Overhead	17	2.4	75	14.7
Staff pay and allowances	40	5.5	48	9.4
Physical verification/bagging and dunnage	3	0.4	1	0.2
Warehouse rent	21	2.9	2	0.4
Establishment costs/repair	10	1.4	12	2.3
Publicity and training	1	0.1	1	0.2
Interest on working capital	20	2.8	16	3.1
Marine insurance	5	0.7	16	3.1
TOTAL	722	100.0	511	100.0

a. Private communication, R. D. Benton, June 1985.

b. Dealer commission was not included in incidental costs when retail fertilizer prices were deregulated. This partly explains a drop in incidental costs during 1984/85.

Table 4.2. Evolution of Commission for Fertilizer Dealers in the OMS in Bangladesh^a

Year	Effective From	Commission Tier (miles)	Commission		
			TK/md	TK/Long Ton	Average TK/Long Ton ^b
1973/74	June 1, 1973	0-2	1.15	31.30	45.00
		2-4	1.41	38.40	
		4-6	1.65	44.90	
		6-9	2.00	54.40	
		>9	2.52	68.60	
1974/75	March 27, 1974	0-3	1.75	47.60	60.00
		3-6	2.00	54.40	
		6-9	2.25	61.20	
		>9	2.52	68.60	
1975/76 ^c	January 7, 1975	0-3	3.50	95.30	119.00
		3-6	4.00	108.90	
		6-9	4.50	122.50	
		>9	5.00	136.10	
1976/77 ^d		- ^e	-	-	119.00
1977/78 ^f	January 1, 1978	0-6	4.00	108.90	141.00
		>6	6.00	163.30	

a. This table is based on information obtained from several BADC and non-BADC sources.

b. According to Benton (1979) from 1973/74 to 1977/78 the average reported commission was 44, 60, 116, 119, and 101 TK/long ton sold as compared to average estimated commission of 58, 70, 130, 130, 135 TK/long ton sold for the corresponding years.

c. Excluding Chittagong Hill Tracts where the commission was slightly higher, effective January 6, 1976.

d. Same as for 1975/76.

e. Information not available.

f. The cooperative sector was favored over private sector through higher commission.

Table 4.3. Evolution of Commission for Fertilizer Dealers in the NMS in Bangladesh^a

Year	Effective From	Commission at			
		PDP		TSC	
		TK/Long Ton	TK/mt	TK/Long Ton	TK/mt
1978/79	December 1, 1978	230.00		136.10	
1979/80	December 1, 1979	230.00		136.10	
1980/81	November 2, 1980	230.00	226.45	136.10	134.01
1981/82	December 7, 1981	280.00	275.68	163.33	160.80
1982/83	August 3, 1982 ^b	-	275.00	-	160.00
1983/84	As of April 1983 ^b	-	275.00	-	160.00

a. This table is based on information obtained from several BADC and non-BADC sources. Dealer pays all the freight and handling cost after fertilizer purchase.

b. In addition to commission, quantity discounts were given at PDP at TK 30/mt for lifting ≥ 15 mt, and TK 40/mt for lifting ≥ 25 mt.

Table 4.4. Fertilizer Dealer Discount (Commission) From Official Retail Fertilizer Price in Bangladesh During April 1983

Fertilizer	Official Retail Price ^c (TK/mt)	PDP Price Discount ^a		TSC Price Discount ^b	
		TK/mt ^d	% of	TK/mt ^d	% of
			Retail Price		Retail Price
Urea	3,970	275	6.9	160	4.0
GTSP	3,750	275	7.3	160	4.3
PTSP	2,950	275	9.3	160	5.4
DAP	3,970	275	6.9	160	4.0
MOP ^e	2,950	275	9.3	160	5.4

a. In addition, quantity discount was allowed at TK 30/mt if the quantity lifted at a time was at least 15 mt; and at TK 40/mt if the quantity lifted was at least 25 mt. Minimum quantity which a dealer must lift was 3.0 mt, except in Barisal, Faridpur, Patuakhali, and Khulna districts where the minimum requirement was 1.0 mt.

b. No such quantity discounts were allowed. Minimum quantity which a dealer must lift was 0.75 mt.

c. Effective July 1, 1982.

d. Effective December 7, 1981.

Table 4.5. Percentage of Farmers Using Different Modes of Fertilizer Transportation in Bangladesh

Mode of Transportation	Month/Year							
	1981	1982						
	December	January	February	March	April	May	June	July
				(%)				
Cart/tomtom	5.1	7.9	8.8	6.3	9.1	9.3	9.9	7.4
Head/kuli/laborer	81.6	75.5	72.7	78.1	73.8	68.5	68.2	66.9
Rickshaw	6.6	11.0	12.0	8.2	9.0	7.8	7.0	8.2
Boat/launch	4.4	2.6	3.2	2.6	2.5	5.8	6.0	12.3
Bus/motore	1.5	0.3	0.1	1.4	3.3	5.2	7.9	4.5
Bicycle	0.8	2.2	3.2	3.4	2.3	3.4	1.0	0.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of farmers surveyed	473	607	697	697	569	463	302	269

Table 4.6. Distribution of Loose or Bagged Fertilizer Sales in Bangladesh

Month/Year	Urea			TSPG			MOP		
	Bagged	Loose	Total	Bagged	Loose (%)	Total	Bagged	Loose	Total
<u>1981</u>									
December	13.0	87.0	100.0	5.4	94.6	100.0	1.1	98.9	100.0
<u>1982</u>									
January	20.9	79.1	100.0	6.4	93.6	100.0	2.2	97.8	100.0
February	34.4	65.6	100.0	13.0	87.0	100.0	2.7	97.3	100.0
March	25.6	74.4	100.0	6.7	93.3	100.0	2.0	98.0	100.0
April	20.4	79.6	100.0	7.7	92.3	100.0	- ^a	100.0	100.0
May	20.2	79.8	100.0	6.8	93.2	100.0	-	100.0	100.0
June	21.4	78.6	100.0	2.9	97.1	100.0	-	100.0	100.0
July	22.7	77.3	100.0	12.5	87.5	100.0	-	100.0	100.0
August	22.7	77.3	100.0	17.2	82.8	100.0	-	100.0	100.0
September	25.1	74.9	100.0	5.9	94.1	100.0	-	100.0	100.0
October	30.8	69.2	100.0	11.8	88.2	100.0	-	100.0	100.0
November	12.3	87.7	100.0	6.5	93.5	100.0	-	100.0	100.0
December	15.2	84.8	100.0	21.6	78.4	100.0	1.4	98.6	100.0
<u>1983</u>									
January	18.0	82.0	100.0	16.4	83.6	100.0	3.1	96.9	100.0
February	22.2	77.8	100.0	10.5	89.5	100.0	-	100.0	100.0
March	28.7	71.3	100.0	2.3	97.7	100.0	-	100.0	100.0
April	22.7	77.3	100.0	12.4	87.6	100.0	-	100.0	100.0
May	19.5	80.5	100.0	6.6	93.4	100.0	-	100.0	100.0
June	18.7	81.3	100.0	7.2	92.8	100.0	-	100.0	100.0
July	20.8	79.2	100.0	16.8	83.2	100.0	2.1	97.9	100.0

a. None of the quantity was bought in bags.

Table 4.7. Sources of Fertilizer Information to Farmers in Bangladesh

Source of Fertilizer Information	Month/Year																			
	1981					1982					1983									
	Dec.	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	July
Information not available	72.3	74.2	81.9	83.2	63.7	62.1	74.8	76.2	77.4	82.1	85.5	82.9	82.9	81.9	86.3	88.8	83.5	85.9	87.1	88.8
TAO ^a	18.8	19.9	16.7	13.1	13.5	15.1	12.0	7.0	3.6	2.8	2.1	2.8	4.3	7.6	5.4	2.9	3.3	3.8	3.1	1.4
Dealer	4.1	5.7	1.4	3.7	22.4	21.3	11.2	14.0	15.4	11.6	11.8	14.0	12.2	10.5	7.9	7.9	10.6	8.0	8.8	7.9
Radio/newspaper	0.2	0.2	-	-	0.2	-	0.9	1.4	1.8	-	0.3	-	-	-	-	-	-	-	-	-
Neighbor	0.2	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ideal farmer	4.0	-	-	-	-	1.5	1.1	1.4	1.8	3.5	0.3	0.3	0.6	-	0.4	0.4	0.8	0.6	0.8	1.4
School teacher	0.4	-	-	-	0.2	-	-	-	-	-	-	-	-	-	-	1.8	1.7	1.2	0.5	-
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
No. of farmers surveyed	469	612	697	696	570	465	349	358	279	319	339	392	351	437	467	518	491	477	510	429

a. Or other extension agency in the agricultural department.

b. No information was available.

Table 4.8. Principal Fertilizer Marketing Constraints and Remedial Actions Taken Under NMS in Bangladesh

<u>Fertilizer Marketing Constraint</u>	<u>Remedial Actions</u>	<u>Status</u>
Demand estimation	<ul style="list-style-type: none"> * Trained personnel * Improved forecasting techniques * Upgraded data base 	Continuing process
Supply availability	<ul style="list-style-type: none"> * Trained personnel * Improved procurement procedures for domestic and import purchases * Improved lifting procedures at local plants 	Implemented, continuing assessment
Procurement costs	<ul style="list-style-type: none"> * Reduced cost of imports by expanding imports in bulk form with in-country bagging 	Implemented
Storage infrastructure and costs	<ul style="list-style-type: none"> * Reduced number of intermediate warehouses * Formulated national warehousing plan * Constructed needed warehouses 	Implemented, under continuing review
Transport infrastructure and costs	<ul style="list-style-type: none"> * Identified costs by mode * Negotiated new movement contracts * Developed/implemented least-cost transport system 	Implemented, under continued review
Warehouse management/loss prevention	<ul style="list-style-type: none"> * Prepared warehouse management manual * Trained personnel * Instituted improved storage/handling procedures 	Implemented in part, under review
Inventory control	<ul style="list-style-type: none"> * Developed central inventory control and accounting system * Trained personnel * Instituted inventory control system 	Implemented, studying computerization of system
Marketing costs and points	<ul style="list-style-type: none"> * Estimated cost and cost components * Consolidated BADC dealer sales points from 400 TSCs to 100 PDPs 	Implemented, continued monitoring
Management information system	<ul style="list-style-type: none"> * Established monthly BADC fertilizer newsletter to monitor supply and sales performance * Instituted fertilizer monitoring system: monthly survey of farm-level prices, credit, and information sources 	Implemented, continuing
Fertilizer market information	<ul style="list-style-type: none"> * Commissioned IFDC/BARC to conduct comprehensive multi-year farm level surveys of agricultural production, fertilizer use, and equity 	Completed
Market research/planning	<ul style="list-style-type: none"> * Developed prototype for annual marketing plan 	Limited implementation
Sales promotion	<ul style="list-style-type: none"> * Organized BADC dealer development and training unit * Instituted countrywide dealer training programs * Organized fertilizer demonstrations and farmers' meeting * Prepared/distributed sales promotion literature and sales aids 	Implemented, continuing
Dealer incentives	<ul style="list-style-type: none"> * Eliminated cumbersome licensing requirements * Eliminated market territory restrictions * Deregulated retail price of fertilizer * Eliminated preferential treatment of cooperatives 	Completed, under continued review
Dealer credit	<ul style="list-style-type: none"> * Developed in-kind dealer credit program requiring bank guarantees * Proposed establishing BADC credit unit 	Limited use by dealers, program under review
Agronomic database	<ul style="list-style-type: none"> * Organized/conducted fertilizer use efficiency experiments to improve fertilizer recommendations 	Completed, under review for reactivation
Fertilizer policy development	<ul style="list-style-type: none"> * Organized IFDC/Bangladesh counterpart study of policy options for development of fertilizer sector * Evaluated fertilizer price deregulation 	Completed
Personnel development	<ul style="list-style-type: none"> * Arranged for participation of BADC management/marketing personnel in variety of training programs and study tours 	Continuing

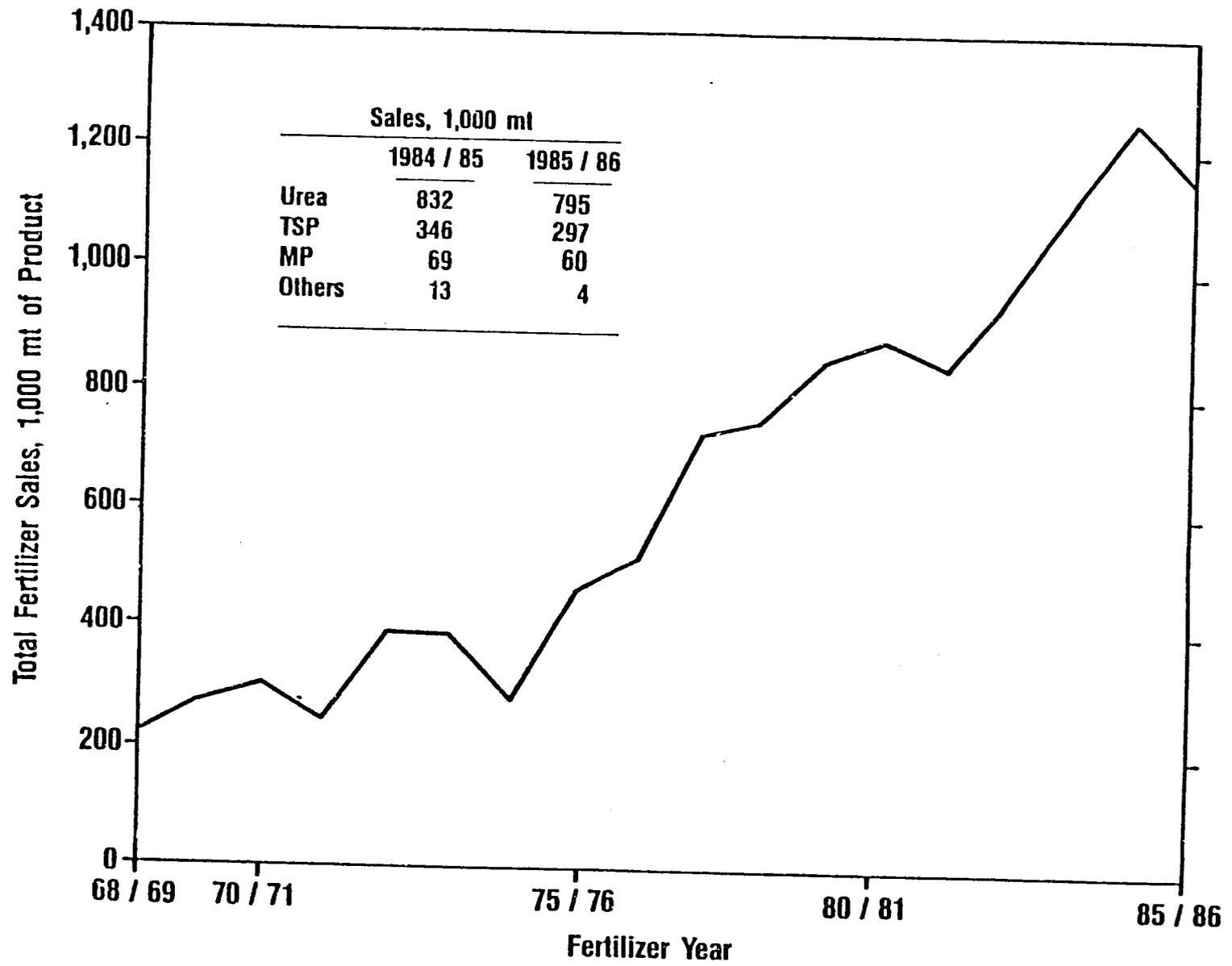


Figure 4.1. Evolution of Fertilizer Sales In Bangladesh.

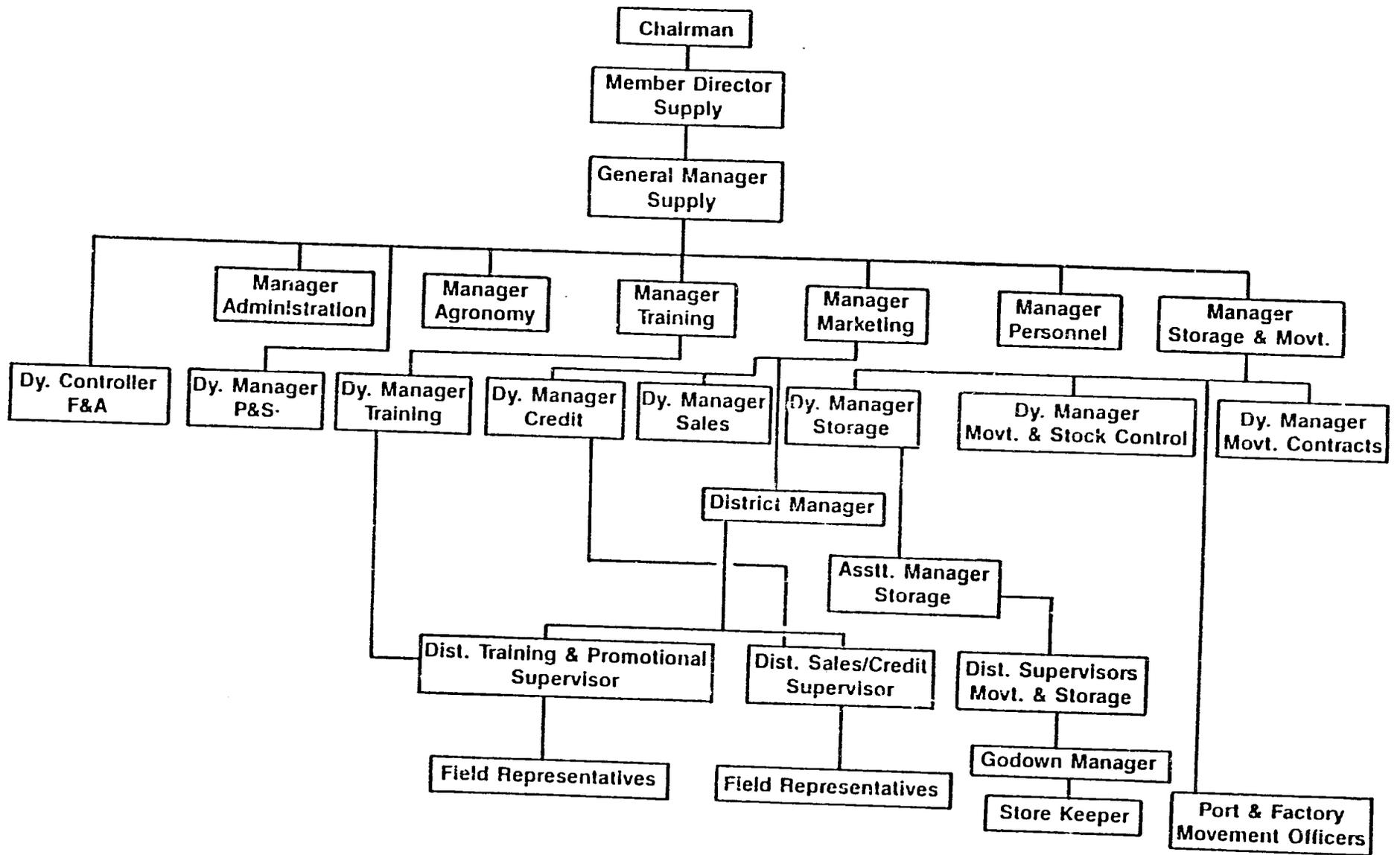


Figure 4.2. Proposed Organization BADC Supply Wing.

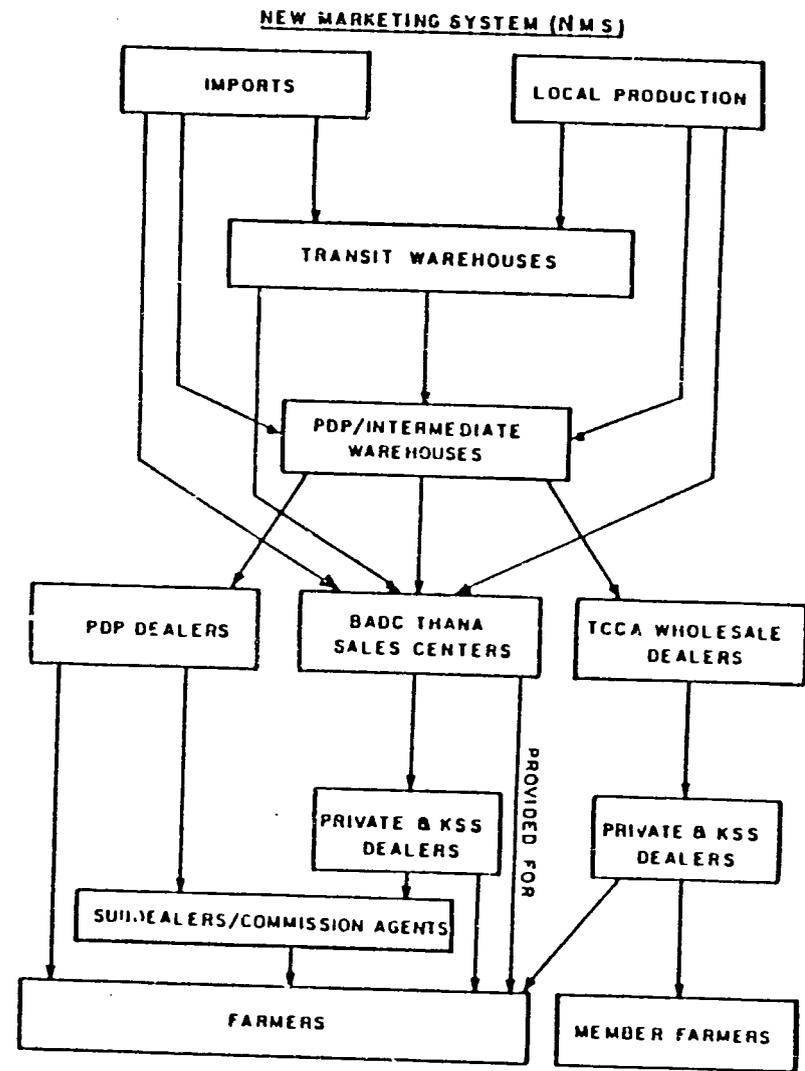
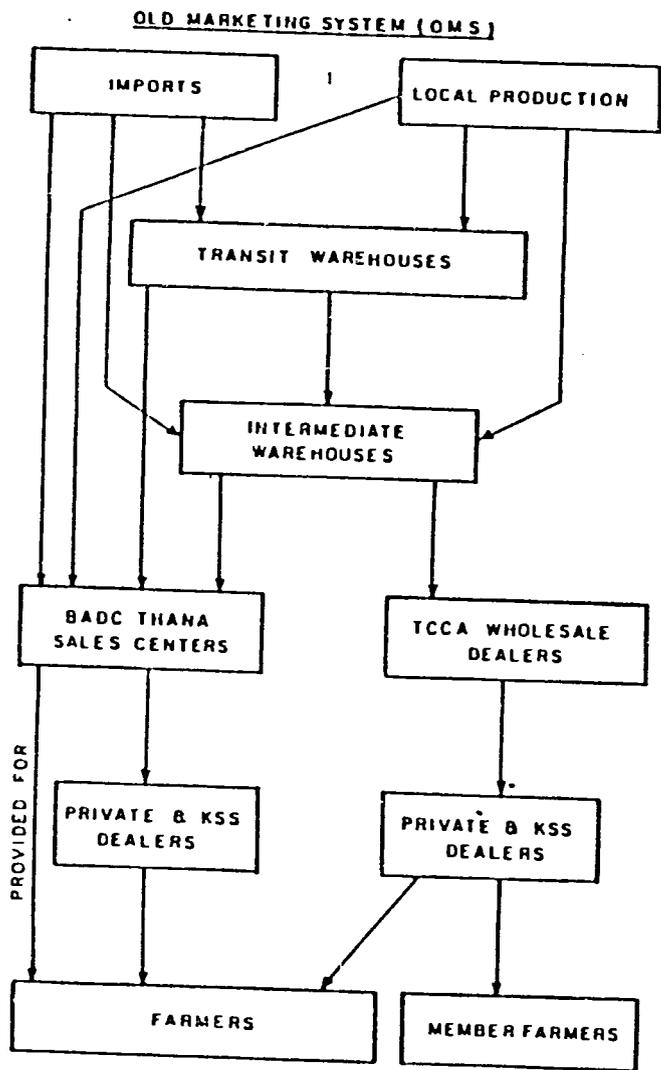


Figure 4.3. The Old and New BADC Fertilizer Marketing Systems in Bangladesh.

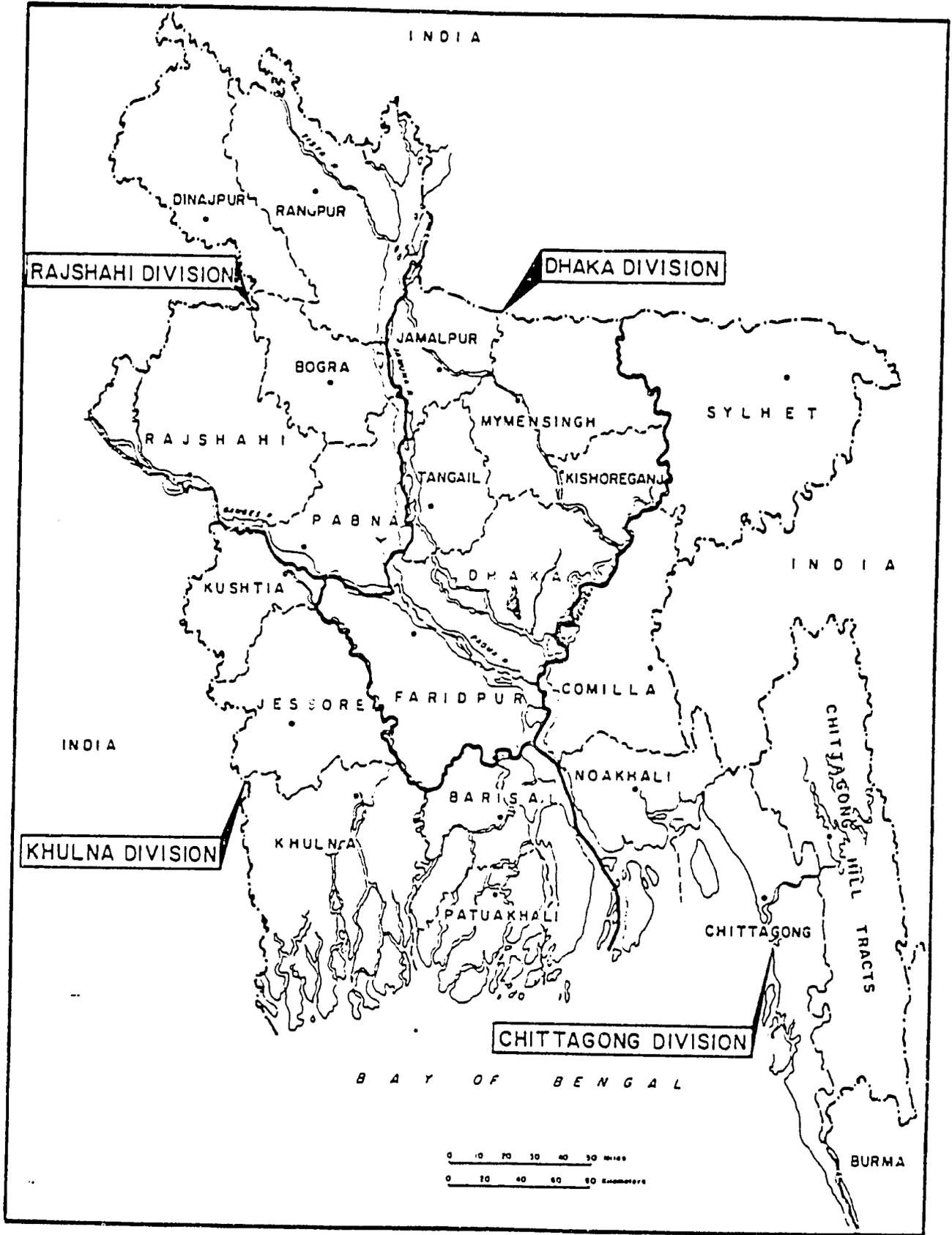


Figure 4.4. BADC Marketing Divisions in Bangladesh.

CHAPTER 5

IMPROVING THE EFFICIENCY OF FERTILIZER
MARKETING SYSTEMS

The efficiency of a fertilizer marketing system can be measured by the level of performance and cost effectiveness in making the right fertilizer available to farmers when and where it is needed and in generating an increased demand for fertilizer by providing the promotional and educational services required to maximize farmers' profits from its use. As noted in the preceding chapters, the country-specific nature of fertilizer marketing systems makes it difficult to offer a single prescription which will apply to improving fertilizer marketing systems in all developing countries passing through different stages of fertilizer use development. To make meaningful system improvement recommendations for a given country it will require an assessment of the supply- and demand-related constraints which serve as impediments to the cost-effective operation of the fertilizer marketing system in that country. Strategies and programs for ameliorating these constraints can then be developed.

It may not be possible to offer a set of uniform suggestions for improving the efficiency of fertilizer marketing systems in all, or even most, developing countries by drawing on information as to how marketing systems are organized and operated in a number of these countries. However, it is possible to delineate those marketing-related constraints which generally interfere with the effective performance of fertilizer marketing systems, to assign relative orders of importance to specific problems, and to suggest possible remedial actions. This chapter attempts to identify and offer approaches for overcoming some of the more pressing operational and government policy constraints to fertilizer marketing system based on the experiences of developing countries.¹

1. See Appendix I for listing of selected IFDC fertilizer marketing-related studies.

Fertilizer Marketing Operations and Costs

The effectiveness of a fertilizer marketing system is dependent on several factors: (1) stimulation of farmer demand for fertilizer, (2) timely and accurate assessment of projected demand for fertilizer, (3) provision of cost-effective fertilizer supply to meet projected demand, (4) development of cost-effective delivery systems to make fertilizers available at the right time and place, and very importantly, (5) the establishment of government policies and programs which are conducive to ensuring profitability of fertilizer use by farmers. The efficiency of the fertilizer marketing system will rest on how effectively these functions and policies are designed, implemented and integrated into a coordinated national marketing effort.

Stimulation of Fertilizer Demand

Government policy and fertilizer promotion programs should focus on improving the profitability of fertilizer use and on motivating and assisting farmers in making more efficient and profitable use of fertilizer. In most developing countries there is a need to organize and/or strengthen programs to generate, evaluate, codify, and disseminate crop response and fertilizer use information that is more responsive to farmer needs. The national agricultural research institutions, national extension service, and public and private sector marketing organizations have roles to play in stimulating demand for fertilizer. The types of programs which are needed and contributions of those organizations will depend largely on the stage of fertilizer use development in a given country.

The lack of an adequate agronomic database is often a major impediment to the expanded and more efficient use of fertilizer. Site-specific crop response data are needed to provide a basis for formulating fertilizer recommendations better attuned to localized soil characteristics, crop production conditions, and management practices. The generation of such data usually requires establishing and/or strengthening national coordinated soil fertility and fertilizer use programs involving appropriate government agricultural research institutes. Also, expanded experiment station and farm-level research programs are often required to determine nutrient needs and crop response functions for major crops under actual field conditions. These actions are especially important in the introductory stages of fertilizer use. To support increasing fertilizer usage, there is a need for refining economic optimum levels of fertilizer use

based on crop responsive tests, practical farm management conditions, realistic cost/benefit relationships, and realistic farmer risk and socioeconomic conditions.

Technology transfer is a central issue in developing farmer knowledge on efficient and profitable use of fertilizer as a means of stimulating demand. The national extension service provides the crucial link between fertilizer research and farmer use, particularly by the masses of small-scale farmers, at all stages of fertilizer use development. In most, if not all, developing countries there is an urgent need to expand and/or strengthen national extension service programs in terms of organization, facilities, and staff capabilities. As fertilizer usage increases, fertilizer marketing organizations, both public and private, can and should assume more prominent roles in promoting fertilizer use through enhanced market development programs. Fertilizer dealers, wholesalers, and retailers are uniquely positioned to influence farmers in their fertilizer use practices, but often lack the technical and sales promotion skills to reach and advise farmers on the proper and more profitable use of fertilizer. The institution of fertilizer dealer development and training programs are strongly encouraged to prepare dealers for assuming greater responsibilities in promoting expanded fertilizer use.

Fertilizer Demand Projections

Accurate and timely fertilizer demand and annual sales forecasts are essential in ensuring timely availability at the farm level and to avoid excessive and costly inventory accumulations. Long-term (about 5-year) demand projections are required by government agencies and the private sector to develop long-term supply strategies, involving expansion of local production capabilities and/or procurement planning.

The reliability of annual sales forecasts is affected by the nature of the forecasting process and the training and experience of those involved in their preparations. The most reliable forecasts are generally those built from information provided by sales personnel familiar with past usage patterns and conditions affecting future use in local market areas. In many developing countries, public and private marketing organizations lack the information base and organizational apparatus to plan, organize, and implement such a sales forecasting system and to perform the needed sales monitoring function. Sales forecasting and monitoring can be improved by organizing and institutionalizing a formal market research and planning activity in the fertilizer marketing system.

The preparation of long-term demand projections generally involves forecasting the future behavior of a number of economic variables and their effect on fertilizer demand. In many countries, the required historical use data are unavailable and forecasters lack the technical expertise and equipment needed to employ necessary analytical methods. Programs are needed to establish the fertilizer database, to provide necessary equipment, and to train personnel in the application of forecasting techniques.

Fertilizer Supply

From a national perspective, fertilizer supply improvement programs should be directed at increasing local production capability (provided the country has comparative economic advantage), lowering the cost of domestic production, and improving fertilizer import programs. From the fertilizer marketing organization's viewpoint, the focus should be on developing timely, reliable, and cost-efficient supplies of fertilizer products needed to meet sales forecasts and safety stock requirements. Basically this involves proper planning of supply needs, determining the most cost-effective sources of supply (domestic and/or import), and organizing and instituting efficient procurement programs and procedures.

Supply planning begins with the preparation of realistic sales forecasts. Suggestions for improving this process were covered in the preceding section. A properly organized market research and planning function will also provide needed information on indigenous and external supply sources, product prices, and transport and handling costs to serve as a basis for determining appropriate suppliers of individual fertilizers needed at various sales locations. The supply planning function also determines quantities to be made available through bilateral trade agreements, those to be supplied by donor organizations, and those which must be purchased from commercial sources.

In many countries the organization and management of the procurement function should be strengthened and supported by training of supply and purchasing managers and staff in regard to product types and properties, sources, prices, transport and handling techniques and costs, delivery lead times, shipping and receiving facilities. The need to train import procurement personnel in all aspects of international market operation is of particular importance, emphasis should be placed on preparing and evaluating international tenders, awarding supply contracts, and monitoring performance. Timely placement of

import orders is important because of the long lead times required to process such purchases and to arrange for availability of foreign exchange.

Fertilizer Delivery Systems

An efficient fertilizer delivery system is the key to making fertilizer available to farmers when and where it is needed. The physical distribution function is the predominant component of most government-controlled fertilizer marketing systems. It is also the costliest. Accordingly, improvements in the cost-effectiveness of activities involved in physical distribution should rank high in technical assistance programs for improving fertilizer marketing.

A national fertilizer distribution plan should be formulated to determine the number, locations, and capabilities of intermediate and local sales outlets required to accommodate present and projected sales volume, taking into account seasonal sales patterns and restocking schedules. New warehousing capacity may have to be built to supplement existing capacity. The performance and adequacy of the distribution system should be monitored and adjusted to conform to changes in demand.

Programs should be devised to determine transport and handling costs for each mode or combination of modes of transport available for delivering fertilizer to intermediate and local sales outlets. Based on this information, a least-cost transport system should be developed and implemented. Transport and handling costs should be monitored on a regular basis and changes made as necessary to ensure lowest delivery costs throughout the warehousing network.

To reduce storage and handling losses fertilizer warehouses should be regularly inspected to ascertain their suitability for fertilizer storage. A warehouse maintenance program stressing preventive maintenance should be developed. Standardized warehousing management practices should be devised and instituted and management and staff training programs conducted to improve operational efficiency and to reduce product losses and costs.

The stock control and accounting system should be strengthened, or one should be introduced if none exists, and personnel trained in its application as part of a general effort to improve the distribution information system to ensure adequacy of supplies throughout the distribution system.

Profitability of Fertilizer Use

Farmers in the developing world and elsewhere use fertilizer for the economic gains which they hope to derive from its use. Increased profitability is the overriding issue in expanding fertilizer use. The level of farmer profit depends on many factors, the main being crop prices, fertilizer prices, crop response to fertilizer, and costs associated with the use of fertilizer. Other factors which influence fertilizer use and profitability include farmer knowledge, risk, tenancy, credit, irrigation, and, very importantly, fertilizer availability. The degree of assurance of a market and satisfactory market prices for his output are also important considerations in the farmer's decision to use fertilizer.

Actions for relaxing the use information and farmer knowledge constraints to market development were touched on earlier, as were those factors related to improving availability and reducing farm-level costs through the development of more cost-effective distribution systems. Most of the other issues related to increasing the farmer's profitability of fertilizer use such as pricing policy, subsidies, and credit availability, generally fall within the purview of national fertilizer policy development and are discussed in the succeeding section.

The following observations are made in respect to pricing policies and practices as they impinge on the operation of the marketing system. Seasonal discounts can have a positive effect on improving availability and lowering distribution costs by encouraging off-season movement and reducing the burden on the transport system during the peak demand months. Volume discounts can lead to lower warehouse handling and transport costs by permitting larger unit shipment. They are also an important factor in furthering the development of wholesalers.

Fixed marketing margins should be reviewed regularly to ensure that they are high enough to provide sufficient incentive for wholesalers and retailers to conduct needed sales promotion and farmer services programs. Most fertilizer dealers are in need of credit to finance stocks and to invest in storage facilities and transport equipment. Access of fertilizer marketing organizations to institutional credit for these purposes is essential as a means of lowering operating costs and promoting improved availability.

Fertilizer Marketing Organization and Policy

Minimum Government Intervention

Government intervention in the fertilizer marketing systems in most developing countries, especially in Africa, is widespread. It varies from complete ownership, operation, and control to partial controls only. In the initial stages of fertilizer introduction and fertilizer use development government can play a positive role. As the fertilizer use increases and market expands government should serve as a regulator and limit its activities to providing incentives and services needed to improve the efficiency of fertilizer marketing systems. Governments should not be in the business of actually selling fertilizer which can be performed relatively more efficiently by the cooperatives and/or the private sector. Many countries, e.g., Bangladesh, are in the process of privatizing the fertilizer marketing system with favorable economic implications.

Competition in the Fertilizer Market

The goal of minimum government intervention is not to replace public monopoly with private monopoly in fertilizer marketing. Rather there is a need to increase competition at both wholesale and retail levels. This can be accomplished through increasing the number of marketing channels as well as the sales points. There should be no restrictions on entry or exit for fertilizer distributors, wholesalers, and retailers. Government regulations and regular monitoring of the marketing system should discourage collusion, hoarding, and price-fixing in order to protect the interests of the farming community, and the interest of the nation in general.

The role of government in retail trade needs to be reduced and limited to monitoring and regulating fertilizer availability, price, and quality. A multichannel approach to fertilizer marketing should be encouraged to increase competition. Private fertilizer dealers should be allowed not only to sell fertilizer but also to provide necessary services and transfer technical knowledge to farmers. The cooperative sector should be encouraged to participate in fertilizer marketing but not at the cost of the private sector.

The optimum mix of government and private participation is largely determined by the state of affairs in the particular country and by the degree of maturity of the agricultural sector as a whole, specifically the fertilizer

and transport sectors. In many cases the systems in use are quite dynamic and are constantly undergoing an evolutionary process. Therefore, at any given point in time, a system that works well in Bangladesh, for example, may not be appropriate for Cameroon or Brazil. For this reason, the transfer of fertilizer marketing and distribution concepts, methods, and technology should be undertaken with considerable care and caution and only after a thorough study of the short- and long-term site-specific conditions.

Marketing System Coordination

Lack of coordination among different marketing organizations, between fertilizer marketing organizations and the government agencies, among different ministries of the government is a serious constraint for efficient operation of fertilizer marketing system. This leads to delay in decisionmaking, conflict of interest, overlaps in responsibility, and lack of knowledge about market development and government policy. Effective coordination across different concerned agencies can improve the operational efficiency of the fertilizer marketing system and reduce fertilizer marketing costs.

Fertilizer Dealer--A Crucial Link

Irrespective of the nature and organization of fertilizer marketing system, the fertilizer retailer serves as an important link between the marketing system and the farmer. The fertilizer retailers should provide appropriate services to the farmer, including technical advice related to efficient fertilizer use. Of course, fertilizer retailers would not and cannot replace the agricultural extension service. Rather both should work in close collaboration with each other. The fertilizer retailer should be more than a stockist. However, the fertilizer retailer would not be in a position to provide needed services to the farmer unless he is fully trained and provided with appropriate incentives.

Fertilizer Quality Control

Most developing countries either do not have a fertilizer quality control law or it is not adequately enforced. There is evidence of fertilizer adulteration and underweighment but its occurrence varies from one country to another. There is a need for appropriate fertilizer quality control law and its adequate enforcement, irrespective of the nature and organization of fertilizer marketing system. Farmers generally perceive that the private sector, since it is interested mainly in profit motive, will do anything to make money, especially when

there is a scarcity of fertilizer. Fertilizer quality control law can remove some of these apprehensions about the private sector and protect the interests of the farmers.

Agronomic Fertilizer Research

Appropriate fertilizer research is an extremely important component of fertilizer sector development. This research should lead to development of crop- and soil-specific recommendations related to selected fertilizer types, fertilizer rates, and fertilizer management under varied agro-climatic conditions. Due to relatively small fertilizer market and potential spillover effects, the private fertilizer sector is not interested in making large investment in agronomic fertilizer research. As a result, government must take the lead and allocate needed resources to carry out both basic and applied fertilizer research designed to generate needed information for efficient operation of the fertilizer marketing system.

Fertilizer Information System

Appropriate information is essential to design and operate effective fertilizer marketing systems and fertilizer policies. Yet most developing countries do not have the very basic data needed to address these questions. Lack of appropriate information can result in policies which are ineffective or counterproductive in achieving the desired policy goals. The appropriate set of data must be reliable, complete, consistent, and timely. The policy information generated from sound economic analysis performed on poor quality data can be very deceptive and misleading. As a result, there is a need to establish a national fertilizer information system which should collect, analyze, and publish all the needed information on the fertilizer sector, including international fertilizer market trends. Such a system would also provide necessary data for fertilizer marketing research and planning. The developments in computer technology and easy availability of personal computers has greatly facilitated the organization and management of fertilizer information systems.

Monitoring and Evaluation Systems

The national fertilizer monitoring and evaluation system should be linked with the national fertilizer information system. This system should be designed to monitor fertilizer price, availability, and quality at the national

level, and evaluate various government programs and policies with respect to their performance and implications. Fertilizer monitoring and evaluation systems would diminish the alleged fear that the private sector might take undue advantage of farmers. It would provide "early warning signals" to the policymakers of any impending fertilizer crisis so that an appropriate and timely corrective action might be taken.

Provision of Fertilizer Credit

Fertilizer credit has been recognized as one of the important constraints to expanded fertilizer use by farmers (production credit) and to expanded participation in fertilizer marketing by the private sector (distribution credit). There is thus a need to expand fertilizer credit availability and increase access of small farmers and dealers to this credit. Fertilizer credit must be made available at commercial rate of interest but with less bureaucratic red tape. The underlying logic for such a credit policy is to facilitate expansion in fertilizer use and trade rather than to provide subsidies to the rich and well-to-do. The historical experience with subsidized credit schemes has not been very good. There have been credit defaults and poor repayment records. The fertilizer credit system needs to be linked with the proper monitoring system.

Fertilizer Price Policy

Appropriate fertilizer price policy is crucial for fertilizer sector development at all levels, including fertilizer production, procurement, marketing, and use. Producers must be given incentives to invest in fertilizer plants and operate them efficiently. Fertilizer dealers must be allowed reasonable margins to cover their costs and provide services to the farmers. The fertilizer price paid by farmers must be closely linked with crop prices received by them, and value/cost ratios of fertilizer use for different crops. A farmer will not use fertilizer unless it is profitable for him to use it. However, dual price schemes should be terminated.

Fertilizer Subsidy Policy

Every effort must be made to reduce fertilizer subsidies. However, there is a need for a more systematic approach to first quantify the cost of different subsidy components, determine their effectiveness, and establish

priorities. For example, subsidizing a particular fertilizer or nutrient may improve fertilizer use balance and hence fertilizer productivity. Subsidizing transportation in remote areas may keep prices low and encourage farmers in those areas to make use of it. Fertilizer subsidy schemes need to be administered more efficiently. Subsidizing high cost or inefficient fertilizer production, procurement, and marketing systems should not be confused with fertilizer subsidies to the farmer.

Needed Policy Research

There is a need for more in-depth analysis for one or two countries with broad experience in different aspects of the fertilizer sector and should focus on developing a model approach to fertilizer marketing, pricing, and subsidies. The study should be analytical, policy oriented, and result in specific policy recommendations for those countries which are still in the early stages of fertilizer sector development. Since the fertilizer sector provides a vital link between the agricultural and industrial sectors, the study should be comprehensive to enable an understanding of the various linkages and analyze the implications of different macroeconomic policies on the fertilizer sector.

Research and Technical Assistance Strategies

In the preceding chapters, the importance of the fertilizer sector in the economic development of low income countries has been analyzed. The role of marketing in fertilizer sector development was described and individual components of the fertilizer marketing system were examined. The importance of organizing and operating the fertilizer marketing system into an integrated and coordinated national marketing effort was stressed. Salient features of the fertilizer marketing systems in seven developing countries were compared. Detailed information was presented on the evolution of the fertilizer marketing system in Bangladesh. The varied and pervasive role of government in fertilizer marketing in most developing countries was highlighted. Based on this information principal constraints to fertilizer marketing improvements have been identified and alternative approaches for overcoming them have been presented. This section briefly summarizes selected policy issues and suggests research and technical assistance strategies for consideration of various national and international organizations.

National Fertilizer Policy

Issue

The need for clearly defined and coordinated national fertilizer supply, marketing, and use policies linked to and supportive of national agricultural development objectives and programs. Identification and prioritization of specific research and technical assistance programs for the development of fertilizer marketing systems in designated target countries.

Strategies

1. Employ rapid reconnaissance study format to select target countries for in-depth policy studies and to provide an overview of the fertilizer sector, especially fertilizer marketing system and policies, in a particular selected country.
2. Organize and conduct national level, comprehensive study to identify and assess fertilizer policy, supply, marketing, and use-related constraints to fertilizer sector development consistent with national agricultural development policies and programs. Develop recommendations for national policies and action programs for amelioration of key impediments to fertilizer sector development, emphasizing marketing system improvements.

Fertilizer Use

Issue

Lack of knowledge on the part of farmers, dealers, and policymakers on proper fertilizer management practices and potential economic benefits associated with fertilizer use. Deficiencies in agronomic research capabilities and agronomic database. Weakness in communicating information and providing technical assistance to farmers.

Strategies

1. Determine agronomic and economic research capabilities of agricultural research institutes. Provide technical assistance in establishing or upgrading facilities and programs. Establish training programs to strengthen staff capabilities.

2. Evaluate existing agronomic database. Provide technical assistance in developing research programs to generate information responsive to farmer needs.
3. Assess organization and performance of national extension service. Determine farmer technical assistance needs and information sources. Provide technical assistance and training to strengthen extension system and programs to improve services to farmers.
4. Employ fertilizer dealers to supplement technical assistance efforts of extension service. Provide technical assistance in formulating and implementing fertilizer dealer development and training programs to enable dealers to provide farmers with appropriate fertilizer use information. Train dealers in fertilizer market development and business management.
5. Organize fertilizer policy workshops, identify relevant fertilizer policy issues, conduct sound fertilizer policy studies, and communicate the potential economic consequences of various decisions to policymakers.

Fertilizer Supply

Issue

Lack of cost-efficient, timely, and adequate supplies of proper fertilizers at locations conveniently accessible to farmers.

Strategies

1. Provide technical assistance in developing historical database and suitable methods for making short and longer term demand projections by product, by location and by season.
2. Make technical assistance available, as needed, for improving fertilizer procurement planning, purchasing, and monitoring.
3. Provide assistance in developing cost-effective fertilizer warehousing network and least-cost transport and handling system by taking into account existing and anticipated market demand and currently available and improved road, rail, and water transport capabilities.
4. Develop and implement technical assistance programs for improving warehouse management, stock control, and cost accounting systems. Develop and implement personnel training programs as needed.

Prices and Subsidies

Issue

Lack of needed economic incentives for fertilizer use by farmers and provision of these incentives at minimum cost to the government.

Strategies

1. Design and conduct farm-level survey of fertilizer use and agricultural production. Determine price and value/cost relationships and the economics of fertilizer use by farm size groups and for major crops.
2. Carry out research to assess the cost and effectiveness of existing subsidy programs and subsidy components. Determine priorities for reducing subsidy based on opportunities for lowering farm-level cost through more efficient fertilizer production, procurement, and marketing system operation, improved subsidy program administration, and increased fertilizer productivity. Provide technical assistance, as needed, to implement subsidy reduction schemes which do not create a substantial economic burden on the treasury and do not unduly impair farmer incentives to use fertilizer.
3. Study current pricing policy and practices to determine level of dealer costs and margins. Provide assistance in developing government pricing policies and strategies which assure adequate incentives for dealers to engage in market development activities.

Fertilizer Finance

Issue

Amelioration of dealer distribution and farmer production credit constraints to expanded fertilizer use.

Strategies

1. Determine credit needs, sources, and costs of dealer distribution and farmer production credit. Provide technical assistance in developing credit delivery schemes which provide convenient access to institutional credit at reasonable interest rates.
2. Provide assistance in developing programs to inform farmers on the nature and availability of credit, to assist farmers in determining

credit needs, filing loan applications, and monitoring loan repayments to minimize defaults.

Fertilizer Information System

Issue

The need for reliable, timely, and consistent fertilizer market information to enable government policymakers and fertilizer-sector administrators to make better decisions in long range planning and day-to-day operation of the fertilizer sector.

Strategies

1. Provide technical assistance in developing, systematically maintaining, and reporting information on volume and value of local fertilizer production, imports, sales, and inventories by product, by location, by month. Publish and disseminate pertinent information in the form of monthly and annual fertilizer situation reports.
2. Provide assistance in developing a national fertilizer monitoring and evaluation system designed to systematically gather, codify, and evaluate changes in farm-level fertilizer and crop prices, availability, and quality.
3. Conduct studies which evaluate the potential economic consequences of alternative policy options and develop guidelines for formulating appropriate fertilizer policies and generating needed information.

Fertilizer Quality Control

Issue

To assure that farmers receive fertilizer products with prescribed quality.

Strategies

1. Conduct investigation of farm-level fertilizer sales practices in respect to possible product adulteration and weight discrepancies.
2. Provide technical assistance in developing consumer protection-oriented fertilizer control laws, establishing fertilizer sampling and testing organization and facilities, and preparing necessary legislation and enforcement agencies.

Program ImplementationIssue

The need to develop approaches for facilitating the implementation of fertilizer sector development programs.

Strategies

1. Conduct in-depth fertilizer sector study, alluded to earlier, to identify and assess problem areas and to recommend specific action programs for overcoming impediments to fertilizer sector development.
2. Obtain government commitment to affect recommended changes and to provide, to the degree possible, technical and financial support.
3. Determine and arrange for necessary incentives and engage experienced multi-national (or local) fertilizer organization to work with the government and interested donor agencies in developing and implementing agreed upon fertilizer market improvement programs.

To summarize, fertilizer marketing research and technical assistance activities need to be directed at (1) fertilizer policy studies and policy reforms, (2) accurate fertilizer demand forecasting, (3) creation of needed fertilizer infrastructure which requires large capital investments, (4) fertilizer finance for farmers and dealers, (5) education and training of farmers, dealers and policymakers, and (6) development of fertilizer information systems.

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APPENDIX I

SELECTED FERTILIZER MARKETING-RELATED STUDIES BY IFDC¹

1. West Africa Fertilizer Study (Volumes I-VII)
 - Volume I Regional Overview, 1977
 - Volume II Senegal, 1977
 - Volume III Mali, 1976
 - Volume IV Upper Volta, 1977
 - Volume V Niger, 1978
 - Volume VI Chad, 1977
 - Volume VII Mauritania, 1978
2. Economic and Technical Aspects of Fertilizer Production and Use in West Africa, 1977.
3. Bolivia Fertilizer Situation and Recommendations, 1979.
4. Mexico: The Fertilizer Industry, 1979.
5. Thailand Strategy for Fertilizer Development--A Prefeasibility Study, 1980.
6. Nigeria: Fertilizer Marketing Study, 1981.
7. Economic Evaluation of Fertilizer Supply Strategies for the ASEAN Region: Linear Programming Approach, 1981.
8. Venezuela: Fertilizer Supply Strategy 1981-90, Volumes I-IV, 1981.
9. Preliminary Appraisal of the Zimbabwe Fertilizer Sector, 1981.
10. A Fertilizer Strategy for Nepal, 1982.
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FERTILIZER MARKETING SYSTEMS
AND POLICIES IN
DEVELOPING COUNTRIES: REVIEW

by

Paul L. Farris
Department of Agricultural Economics
Purdue University

The paper on fertilizer marketing systems and policies in developing countries makes clear the high importance of the topic and the problems and challenges associated with improving performance of those systems. The paper includes a comparison of fertilizer marketing systems in selected developing countries and a more detailed examination of the system in Bangladesh. Several suggested approaches are made that are designed to overcome some of the more pressing operational problems and government policy constraints in fertilizer marketing.

As I read the paper, I was impressed by the numerous insightful aspects that the authors observed. These related especially to the general characteristics of fertilizer marketing, the considerable role of government intervention, the importance of infrastructure, the significance of finance and the compelling need for education at all levels.

Review of "Fertilizer Marketing Systems and Policies in Developing Countries" by Mohinder S. Mudahar and Edwin C. Kapusta, International Fertilizer Development Center, Muscle Shoals, Alabama 35662, November 1986.

A Key Role of Fertilizer in Economic Development

A major driving force affecting fertilizer marketing systems in developing countries is the great contribution that fertilizer is making to economic development. Developing countries generally recognize the importance of fertilizer in increasing the productivity of agriculture, which, in turn, leads to more food for the people, more labor for nonfarm sectors and other benefits that spread throughout their economies. The total fertilizer system is, therefore, much affected by the public interest. Governments in developing countries are generally aware of this, and they intervene in various ways in fertilizer production, procurement and distribution. Governments are also drawn in because of the substantial capital requirements and infrastructure investments associated with developing their fertilizer systems.

Fertilizer Marketing Characteristics

The paper identifies the salient components and functions in the fertilizer system. Because of the basic characteristics of fertilizer and its use, problems associated with fertilizer systems in different developing countries are remarkably similar. From the standpoint of improving economic performance of fertilizer marketing systems, policies and programs need to be concerned with uninformed farmers, uninformed dealers, lack of basic information about when and where different types of fertilizer may be needed, management skills at various levels in the fertilizer system, infrastructure development, and finance for developing production capacity, carrying inventories and farmer credit. The paper does an excellent job describing and highlighting the nature of these characteristics and in chapter 5, on improving the efficiency of fertilizer marketing systems, several suggested areas of focus are presented in a useful list.

Areas for Special Focus

In reflecting on the list of suggestions in chapter 5, I wondered about presenting fewer more inclusive topics that might include some implementation recommendations. To begin with I believe it is especially important to keep in mind that the fertilizer system is greatly interconnected and interwoven and there is great potential gain, particularly in developing countries, from increasing the overall performance of the system. Thus there is an important role for government. The difficulty seems to be that the substantial government involvement that one usually finds includes a number of things of the wrong type, things that are inhibiting rather than facilitating. And, as is noted in the paper, government decision making may be fragmented rather than coordinated, based on inadequate information, subject to delays in administrative procedures and possibly opportunities for manipulation to favor certain sectors or for fraud.

Approaches to Fertilizer System Improvement

To build on the information and findings reported in the paper, attention might be given particularly to the role of government, finance, education and forecasting for both the short and long run. Two major types of activities would seem desirable to improve fertilizer marketing in a developing country. One is research, and the other is implementation of a pilot operating system. Results from the research and pilot project might provide guidelines which could be extended to other countries, perhaps by employing some shortcuts.

Research Objectives

In the research, one basic objective would be to make aggregate projections of fertilizer needed by type, location and season. A simple

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model could be developed that could be elaborated as more information is acquired. As a first approximation, I would recommend basing this on agronomic information, productivity assumptions and demand projections. Some preliminary work would likely need to be done by agronomists and economists to develop the relevant input data.

Another research objective would be to identify the most important physical infrastructure barriers to efficient functioning of the system and evaluate the alternatives and costs of overcoming them. Results of the model recommended in the first objective should be useful for this purpose. These infrastructure needs might be bridges, roads, ports, warehousing or transportation equipment.

A third objective would be to develop information on finance. At least three major categories of finance should be considered: (1) Capital requirements for infrastructure investments; (2) financing of inventories, and (3) credit for farm borrowers. Ways would be sought to provide financing efficiently and without impairing system efficiency or operation of the pricing system. In servicing farmers, consideration might be given to a promotional type subsidy at very low or zero prices for a period.

The fourth objective would focus on educational needs and alternatives for farmers, retailers, wholesalers and government policy makers. It is clear from the paper that the requirements at all these levels are considerable. The research would emphasize particularly the kinds of education or training that seem to be needed at each level, ways to develop the information required and the types of educational delivery systems that would seem most appropriate in each case. Demonstration programs would seem to have a useful place. (In this connection, I think I would have some reservation about relying heavily on retail dealers to provide information



for farmers since the paper also observes that most dealers are not specialized, and they handle several different items. However, it could be that some brief rules of thumb might be prepared for dealers to help them avoid serious mistakes in advising farmers.)

Pilot Project

The second major activity would be the development of a pilot project that would involve joint participation by USAID, an outside or multinational fertilizer firm, the government of the country selected and the relevant parts of the private sector within the country. This would seem to be an extension of the idea mentioned in the paper about the USAID-funded Fertilizer Distribution Improvement Project II (FDI-II) in Bangladesh. This project, which is oriented toward large-scale wholesalers, involves credit, technical assistance for dealer development and training programs and infrastructure improvement.

But because of the interrelated nature of the entire system, I would propose a more encompassing project. I would further propose that such a project proceed in two stages. The first stage would involve a study team, including representatives from USAID, the multinational firm, the country's government and the country's private sector. The team would consider all aspects of fertilizer production or procurement transportation, storage, wholesaling, retailing and farmer purchasing. It would also consider data needs, training programs, financial requirements, government policies or interventions and any other relevant aspects of the project.

The second stage would build on the first and be an actual joint operating venture. The multinational firm would become a joint operating partner with local industries and the government of the country. USAID personnel and professional participants or collaborators would give special

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attention to incentives, rules, procedures, capital investment subsidies and any other matters concerned with performance of the pilot system. Arrangements would be incorporated for a gradual phase-out of the multinational firm after a reasonable period unless the country itself and its participants were to decide on their own to negotiate continuation arrangements.

The basic idea underlying a proposal like this is the assumption that the multinational fertilizer firm has a wealth of experience, technical expertise and managerial knowhow that would make it possible for it to help a country to develop its fertilizer system much more rapidly than if it were not a part of the team. When the new system is in place the outside firm may or may not continue to be needed and, if not, it could be withdrawn.

It is believed that the two types of activity suggested, research and operational, could proceed concurrently. After the experiment, an evaluation would be made and relevant findings determined for possible guidance in long term fertilizer system development and performance in the country and in other developing countries.

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COMMENTS ON THE PAPER BY MOHINDER MUDAHAR AND EDWIN KAFUSTA
ENTITLED "FERTILIZER MARKETING SYSTEMS AND POLICIES IN
DEVELOPING COUNTRIES"

By James D. Shaffer
Michigan State University

Prepared for Sigma One Corporation
Conference Presentation Nov. 18, 1986
Arlington, VA.

This is an informative and useful paper which describes many problems involved in getting the right amount of the right mix of fertilizer to the right place at the right time. The paper also makes a number of suggestions for improving the performance of fertilizer delivery systems. I say delivery systems rather than market systems because a large part of the systems they discuss make limited use of markets.

Particularly interesting are the data they present showing very significant differences in the prices of delivered fertilizer among countries. It would be useful to inquire into the reasons for these differences in more detail and to include a broader range of countries. Similarly it would be useful to associate the differences with the effects on farm level production.

The authors identify a very large number of research, policy and program action gaps. They create the impression that problems and needs of the fertilizer system in the third world countries would require a Ministry of Fertilizer with a large staff and budget. Perhaps the first priority would be to identify the most cost effective measures which could be adopted by governments in promoting an effective fertilizer system.

The paper leaves some confusion about the authors' conclusions concerning the proper role of government in the fertilizer system. They conclude in favor of minimum government intervention but leave a good deal of uncertainty about what that minimum is. They tell us, for example, that the optimum mix of government and private participation is largely determined by the state of affairs in the particular country and by the degree of maturity of the agricultural sector as a whole. They also give many examples of needed programs which in most LDCs would require government involvement. Perhaps this simply reflects the importance they place on being pragmatic. They do imply conclusions about the role of government which I would consider to be open for further examination.

A very serious problem in many areas of semi-arid rain fed agriculture in Africa is the lack of knowledge of response to fertilizers under the conditions of uncertainty prevailing in

these areas. The problem is complicated by the apparent expense of developing useable agronomic information. Research is needed to design the methodology for a system of on-farm trials to generate data which can be analyzed and made available in a form which is of practical value in farmer decisions at a cost consistent with the potential payoff.

The problem of coordination of supply with potential and effective demand is particularly difficult in the case of fertilizer, especially in areas of uncertain rain fall. The most effective institutional arrangements for coordination are not at all clear. The authors call for effective coordination across different marketing organizations and government agencies to improve the operational efficiency of the fertilizer marketing system. At the same time they favor private distribution with multiple competitive distribution channels. This raises two basic questions which need to be considered in determining an appropriate distribution system.

The first question concerns the economies of scale and scope related to the potential volume of commodities which might flow through the system. There appear to be substantial potential economies of scale in at least some aspects of an agricultural inputs distribution system. At the same time in many LDCs there is currently a very small market for these commodities. Is there sufficient volume to support multiple distribution channels? The scale economies involve more than transportation. Especially important, as pointed out by the authors, is the knowledge of the merchants as advisors to their farmer customers.

There are economies of scope to be considered, suggesting the desirability of multi-input distribution systems. This increases the importance of both management skill and knowledge of the products being sold. Counting on existing extension services to deliver the needed information about technical inputs to farmers may work in some LDCs but does not appear to be a cost effective alternative in many. There are advantages to having information delivered with the input.

Second is the problem of devising the mechanism of coordinating supply with effective demand in both the individual retail areas and the country as a whole. In uncertain environments it is difficult to estimate total effective demand. Having to estimate consequences of the decisions of competitors greatly complicates the problem. Failure to have sufficient supplies or to have significant

excess supplies of farm inputs are serious problems. There is plenty of evidence that monopoly parastatals make errors but what is the evidence for the success of multiple private distribution systems?

A number of countries are apparently in the process of privatizing aspects of the farm input delivery systems. They need help in determining which functions can be effectively privatized and which functions should remain with the parastatal. At the same time monitoring the experience should provide evidence about what works and what does not. The authors report interesting work along these lines in Bangladesh. Some research has been underway in Senegal within ISRA in cooperation with Michigan State University economists. It is impossible to arrange significant experiments in economics; thus it is important to learn from the natural experiments as they take place.

The authors note the problem of providing credit for fertilizer to get appropriate quantities used by small and poor farmers. This is an especially difficult problem where there is uncertainty of the ability to produce a crop which would provide a sufficient marketed surplus to repay the credit. It would appear that some institution is needed to make it possible to share the risk with the farmer. Studies of traditional traders playing this role might be instructive.

Similarly, studies comparing coordination performance of either private or parastatal export monopoly organizations with competitive market organization would appear to provide the basis for estimating some of the potentials from improving coordination. The export monopolies I have in mind provide inputs, including fertilizer, other chemicals, seeds, credit, information and tie all this to a requirement to sell the crop through the organization, thus assuring repayment of the credit. In case of a crop failure they may share the loss with the farmer.

Research and technical assistance dealing with fertilizer needs to deal with both the technological and institutional problems. Both should be concerned with innovation-- designing technology and institutions to improve performance. Innovative institutional arrangements to deal with the coordination problem in distribution of purchased agricultural inputs, including fertilizer, deserve special attention. Developing a distribution system which combines the individual care and initiative of private merchants with an over-arching organization for the planning and global coordination is needed. It may be that something important could be learned from the operations of large franchising

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organizations.

The institutional and technological problems involved in the transition from traditional agriculture are great and the resources for research and technical assistance are small, relative to the need. It is important to leverage the resources to get more for them. This suggests that inservice training be an important component to any agricultural marketing program.