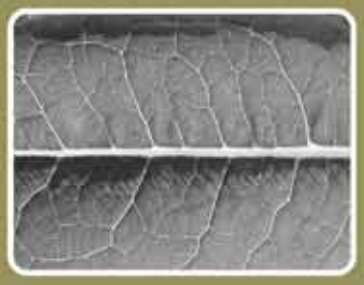
Competition assessment study of the fertilizer sector in Pakistan



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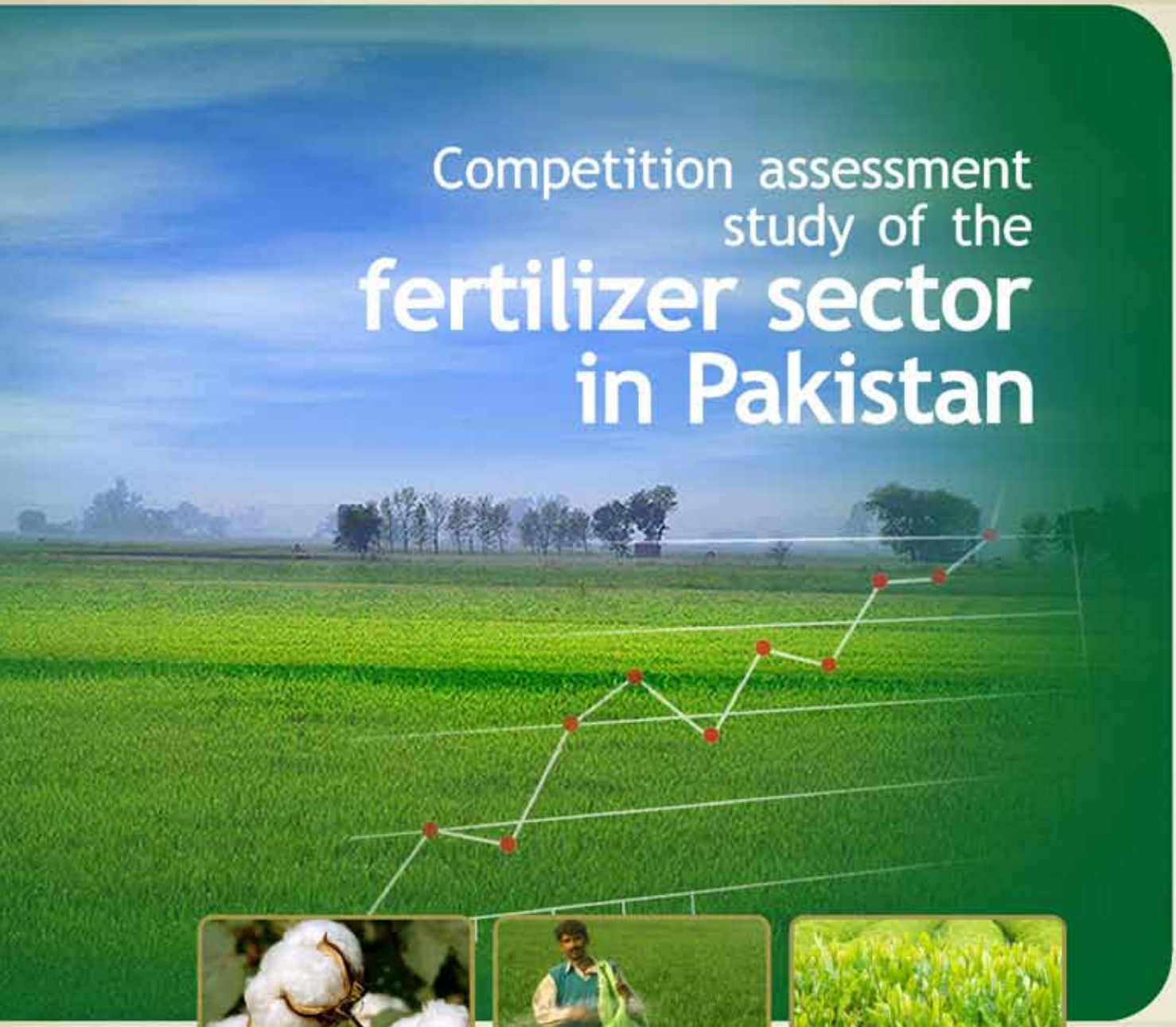

COMPETITION COMMISSION OF PAKISTAN
ISLAMABAD

Competition assessment study of the **fertilizer sector in Pakistan**

Competition Commission of Pakistan
Islamabad

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CHAPTER 1

Introduction and overview

Agriculture and economic growth

Pakistan has traditionally been categorized as primarily an agriculture-based economy, with agriculture making a contribution of 22 per cent to the country's GDP. In addition to meeting food requirements, the sector has also conventionally provided major industrial crops, principally cotton and sugarcane. Production of cotton over the years has paved the way for the development of a domestic textile industry, which is a major contributor to the country's overall exports (average 57%) and a large sugar sector. Being a labour-intensive sector, agriculture also provides extensive employment opportunities and as much as 45% of the total labour force of the country is engaged in the agriculture sector[1].

Considering the strategic economic importance of agriculture, the government has always provided support to it in various forms such as direct or indirect subsidies, soft credits and R&D support. Although agriculture output has increased over the years as a result of these initiatives (8-year CAGR of 4%), the sector still needs to counter production shortfalls which occur from time to time. Since the country has traditionally been a net importer of food crops, reducing imports or creating a sustained exportable surplus is critical if the country is to achieve durable economic growth. This is also crucial in terms of curbing inflation in the longer run. As far as the fiscal side is concerned, the argument remains whether a continuation of existing subsidies to agriculture will allow a narrowing of the fiscal imbalance in the coming years. The fiscal imbalance has put added pressure on prices and thereby contributed significantly towards domestic inflation, since food has a 40% weight in the country's headline inflation index (CPI). Despite being heavily dependent on agricultural output, the argument arises as to how effective the role of government interventions has been in raising agriculture productivity and production. Specifically, whether such interventions have actually provided enough support in terms of lifting productivity in line with demand growth and the degree to which the benefits of such interventions have been passed on to end-consumers.

[1] Federal Bureau of Statistics (2009)

An in-depth analysis is necessary to understand the role of subsidies and their impact on raising the general standard of living, in terms of per capita income and consumption. This analysis would reveal if the supposed benefits of these subsidies have been effectively reflected in terms of real per capita income and in bridging gaps within the supply chain. That analysis should also provide a preamble for a more transparent, competition-oriented policy that subsumes different market segments within a deregulated, free market framework.

The recent food crises in Pakistan and elsewhere and global commodity price surge have turned the economic fundamentals of food-importing countries on their head. Therefore, it is essential for countries like Pakistan to redouble their efforts towards self-sufficiency in food through other more specific measures of both a medium and long term nature. Higher agriculture growth, particularly for major crops, will counter the adverse movement of food prices in the country. Pakistan became a net importer of wheat in 2007/08, although it is the country's staple and one of the major crops of Pakistan. The disparity between domestic and international prices has resulted in smuggling and hoarding which has left the country with no option but to import wheat at higher prices. As a result, food price inflation has become endemic in the economy.

The government normally adopts price controls (support price and subsidies) to manage the phenomena of hoarding and shortages. Nevertheless, these phenomena persist. What is required is a long term policy shift from a focus on prices alone to enhancing growth through:

- Better utilization of water;
- Use of improved seeds;
- Balanced use of fertilizer;
- Enhanced agricultural credit;
- Improved agriculture technology;
- Education and awareness of farmers
- Enhanced farmer protection through crop insurance and mitigation of post harvesting losses; and
- Better administrative controls to prevent smuggling

It is important to examine how effectively government policies and measures in these areas can be eventually delivered to the farmers.

Though this preamble, the scope and importance of this study can be defined more clearly and an assessment of the current market structure of the fertilizer sector is crucial in this regard. For its part, the government is providing a subsidy on fertilizers to ensure its sustained availability at affordable prices throughout the country. It is therefore important to assess whether the industry participants are passing on the benefits of the subsidies to end-consumers.

Overview of the fertilizer sector

Being the backbone of agricultural productivity, the role of fertilizers will always remain crucial. Over the past few decades new capacity in urea has been set up in the country but the hope of balanced fertilization is still a far cry. There is little doubt that improved productivity can only be attained through better management of inputs, including fertilizers. Appreciating the pivotal role of fertilizers, successive governments have formulated policies to encourage private investment in

the sector so as to develop indigenous production capabilities. Additionally, subsidies have been provided to keep domestic prices low to enable the farmer to procure these inputs at affordable prices. This was done through subsidizing the cost of production by way of subsidy on gas. Side by side a system of support prices has been introduced to ensure farmer profitability and maintain incentives for farmers to invest in fertilizer use.

In recent years, the oil and commodity price surge has led to a scenario of high subsidies. This was in line with the global macro policy responses to provide protection against food inflation. Later, the global economic recession resulted in plummeting commodity prices. However, the risk of resurging commodity prices in the longer term remains. The need to raise productivity in agriculture is thus a central issue of concern both from the perspective of food security and to minimize imports and subsidies in the years ahead. The role of fertilizers needs to be assessed as part of a much wider agriculture growth strategy. In this regard, it should be noted that the Pakistani farmer still follows traditional methods of using seeds, fertilizers and irrigation and is often wasteful with regard to the latter two. What is required is that he should now be familiarized with more modern applications of these expensive inputs in order to make his efforts more productive and cost-effective.

Moreover, long term development initiatives should be fostered as far as possible by promoting market-based solutions. The role of government interventions should ideally be restricted to devising overall policy frameworks and advice but allowing market mechanisms to prevail. However, the complete elimination of such interventions is likely to remain a distant prospect, as price shocks within the fertilizer market would remain tied to the dynamics of global trends. Wide fluctuations in prices and production would require careful interventions on the part of the government so as to minimize the impact of price shocks while maintaining stability in production.

The need for balanced fertilizer use

The country's soil is deficient in nitrogen. This deficiency varies for other nutrients: 80-90% of the soil is deficient in phosphorus and 30% is deficient in potassium[1]. For this reason, the initial focus on fertilizer use has been towards catering to the nitrogen deficiency. Over the years, the country has shifted to a more desirable NP (nitro-phosphate) ratio. The ratio which stood at an average 5.82:1 during the 1970s came down to around 3.80:1 in recent years. However, this is still substantially more than the desirable limit of 2:1[2].

This being the case and against the backdrop of diminishing soil fertility, the need to promote phosphatic fertilizers such as DAP is high. Nitrogen deficiency is already widely catered to by urea. Keeping this in view, the government has taken the initiative to boost the utilization of phosphatic and potassic fertilizers and subsidized prices of both nutrients by Rs 250/bag in 2006/07. This resulted in a higher off-take for both fertilizers, by 15% and 60% respectively over 2005/06. Consequently, the country was able to achieve a record NP ratio of 2.7:1 in 2006/07 and balanced fertilization seemed possible for the first time ever. But continuity was lost immediately as in the very next year, international DAP prices increased dramatically. Consequently, the government enhanced the subsidy from Rs 250/bag to Rs 470/bag in 2007/08. Later, due to continuous surge in international DAP prices, the government was forced to cap DAP prices at Rs 3050/bag in 2008/09 based on a massive subsidy of up to Rs 2,200/bag. Despite all this, the much higher DAP prices eroded domestic

[1] Ministry of Finance (2009)
[2] NFDC (2009)

demand substantially, resulting in a decline of around 37% in the off-take of both phosphate and potash while urea sales surged. This substitution deteriorated the NP ratio to 4.64:1 in 2007/08 – the worst ever since 1996/97. Moreover, this ratio further deteriorated again to 4.68:1 in 2008/09, as urea off-take continued to grow while DAP off-take remained stagnant. This was mainly due to a price increase of 85% in DAP during January-October 2008 compared to urea which increased by only 25% during the same period. This phenomenon suggests the following two tendencies:

- Despite the government's intent to provide support to farmers so as to enhance the NP ratio, fiscal constraints limit its ability to provide such support.

- With even enormous support (based on a heavy subsidy of Rs 2,200 in 2008/09), farmers have opted to procure additional urea rather than opting for balanced inputs. In other words, there appears to be a tendency to substitute one nutrient over the other in an attempt to improve yields rather than use them as complements in prescribed NP ratios.

The direct impact of this substitution can be observed through the yield analysis of major crops. More specifically, wheat attained a record yield of 2,716 kg/hec during 2006/07 when NP ratio reached closest to the optimal level, but they reverted to historical averages in both 2007/08 and 2008/09 when DAP off-take declined relatively to urea. This was amidst a much higher wheat support price of Rs 950 per 40 kg bag, a significant increase in area under cultivation, timely rains during the wheat growing season and other supportive measures like setting higher wheat procurement targets for the public sector . A similar though less dramatic condition can be observed in crops such as cotton and sugarcane during the given years.

History and evolution

During the initial years, fertilizer demand was mainly met through imports. However, investment initiatives were taken by the private sector with foreign partnerships. The government established projects through joint ventures with regional and international players such as Pak Arab and Pak American fertilizers. At about the same time, the Fauji Foundation, an Army trust, also entered the industry as a major player. The sector as a whole has thereby evolved through public-private partnerships.

Nitrogen has remained the key fertilizer in the country, having a more than 90% contribution to the overall NPK (Nitrogen-Phosphorus-Potash) consumption basket throughout the 1950s and 1960s. Moreover, the country has had to fulfill local demand solely by way of imports. While still in its evolutionary phase, an investment of $ 43 million came into the sector from Esso Pakistan Fertilizer Company (which later became Engro Chemical Pakistan Ltd). The company had an initial capacity of 173,000 tons of urea and the investment was the single largest foreign investment by an MNC in the country at the time.

During the 1970s, the process of capacity addition started with the formation of the National Fertilizer Corporation (NFC) with the objectives of: i) keeping balance between demand and supply; ii) developing manufacturing capacities of different fertilizers; iii) ensuring the availability of fertilizers through an extensive marketing network; and iv) maintaining prices at a reasonable level throughout the country.

The NFC was the first major public sector initiative formed with the objective of keeping prices at reasonable and affordable levels. Later, the government took further initiatives to form joint ventures with regional partners. Pak Arab Fertilizers was formed in 1972 with NFC being the major shareholder. By the late 1970s, Fauji Fertilizer Company (FFC) was formed through a joint venture between Fauji Foundation (FF) and Haldor Topsoe A/S of Denmark. The company later evolved into a dominant player in the market. Later, the group expanded into DAP business by setting up Pakistan's first and the only DAP producer in the form of FFC-Jordan Fertilizer Company (FJFC) - later renamed as Fauji Fertilizer Bin Qasim (FFBL).

Profile of key players

The sector is dominated by four major firms, namely Fauji Fertilizer Company (FFC), Engro Chemical Pakistan Ltd (ECPL), Fauji Fertilizer Bin Qasim (FFBL) and Dawood Hercules Chemical Ltd. (DHCL). A brief overview and profile of these firms is presented below:

- *Fauji Fertilizer Company (FFC)*
  FFC was incorporated in 1978 as a private limited company. It was a joint venture between Fauji Foundation and Haldor Topsoe A/S of Denmark. The company commenced operations in 1982 with an annual urea capacity of 570,000 tons per year. As a result of a de-bottlenecking programme (DBN), plant capacity was increased to 695,000 tons per year. Production capacity was further enhanced in 1993 when the company established its second plant with a capacity of 635,000 tons per year. In 2002, FFC acquired the Pak Saudi Fertilizer Limited (PSFL) urea plant located in District Ghotki from NFC under the government's privatization programme. It had a capacity of 574,000 tons. This pushed the overall company capacity to 1.9 million tons, thus making it the largest urea producer in the country. Further DBN activities have enhanced the company's urea capacity to 2.048 million tons . Apart from manufacturing, the company also has an extensive marketing network comprising 3,258 dealers spread across the country . Presently, a 44% stake in the company is held by Fauji Foundation (FF).

- *Engro Chemical Pakistan Ltd (ECPL)*
  Engro is the second largest player, while also being the first company to establish a urea plant in the country. The company was initially established as Esso Pakistan Fertilizer Company Ltd. in 1965 with 75% shares held by Esso. With an initial investment of $ 43 million, the plant was established having a capacity of 173,000 tons. With Esso becoming Exxon, the company was renamed as Exxon Chemical Pakistan Ltd. In 1991, Exxon decided to divest its fertilizer business on a global basis, which resulted in an employee-led buyout of Exxon's 75% stake in the company. Since then, the company has evolved into a dynamic and well-diversified conglomerate. The holding company ECPL now has a urea capacity of 975,000 tons and an NPK capacity of 160,000 tons. The company is close to achieving the highest domestic urea capacity by way of its expansion of 1.3 million tons, costing over $1 billion, which is expected to start commercial production by mid- 2010. The company also has a share of 21% within the marketing segment. Currently, a 41% stake of the company is held by the Dawood group[1].

[1] ECPL Annual Report (2008)

- *Fauji Fertilizer Bin Qasim Ltd (FFBL)*
  FFBL is the only DAP producer in the country and also manufactures superior quality granular urea. The manufacturing complex was built at a cost of $ 68 million. Formed as a venture between FFC, FF and Jordan Phosphate Mines Co. (JPMC) in 1993, the company ran into a series of crises in its early years due to technical, financial and managerial reasons. As a result, its DAP plant was mothballed in 2001 due to accumulated losses of Rs 6.5 billion. In 2003, JPMC sold its stake and the company was renamed FFBL, having resumed production after a lapse of two years. The company currently has annual urea and DAP capacities of 551,000 tons and 445,000 tons respectively. The company's off-take is handled by FFC and, as such, FFC had a 44% share in DAP marketing during 2007/08. Presently, a 51% stake is held by FFC and 17% is held by FF[1].

- *Dawood Hercules Chemical Ltd (DHCL)*
  The company was incorporated in 1968 as a joint venture between the Dawood Group and Hercules Inc. USA. The plant had an initial capacity 345,000 tons of urea which was enhanced to 445,500 tons as a result of revamp activities during 1981-1991. DHCL markets its products through Dawood Corporation Ltd (DCL), though its activities are confined to Punjab and NWFP. During 2008, DCL maintained a share of 8.2% in the overall fertilizer marketing activities in the country. The company is primarily held by the Dawood Group while it also holds 38% stake in ECPL.

Analysis of the product mix

The fertilizer supply-chain can be classified into two distinct areas: manufacturing and marketing companies. However, an assessment of the product-mix is first of all essential so as to fully understand the market power within each area. Two major products, urea and DAP, are predominantly used in Pakistan to cater for nitrogen and phosphorus deficiencies in the soils of the country. While potash is also used, its proportion in the overall mix is fairly low (not more than 1%), in view of the relatively better potash fertility of the country's soil. Other fertilizers such as CAN, SSP, SOP and MOP are also used concurrently so as to provide certain micronutrients other than the macro NPK. Though some of these fertilizers are also manufactured by local producers, most of the demand is met through imported supplies. In the context of this review of the product mix, urea is the only market dominated by local manufacturers and is therefore subject to domestic pricing arrangements. On the other hand, prices of other fertilizers, including DAP, are primarily based on international dynamics. It is with this premise that the analysis of this sector is presented in the following section.

The situation of demand and supply

With respect to the global scenario, China is the biggest NPK consumer in the world, constituting nearly 30% of overall NPK consumption. Moreover, China is also the largest urea user, consuming 38% of world urea output while having a 30% share in world urea capacity. A similar condition prevails in DAP where China consumes nearly 31% of the total DAP produced. After China, the second largest driver of world urea and DAP demand is India, which consumes around 22% urea and 20% DAP of global output. As far as regional capacities are concerned, China holds the largest urea capacity followed by India[2].

[1] EBPL Annual Report (2008)
[2] Heffer and Prud'homme (2008), FAO (2008)

Pakistan expanded into urea manufacturing on the back of indigenous availability of its primary raw material, i.e. natural gas, which is used as feedstock in the urea manufacturing process. The country's current urea capacity stands at 4.48 million tons. Over the years, government policies and support of private investment has emerged both in fertilizer manufacturing and marketing. While local demand is mostly catered through local urea production, the country still imports additional urea (on average 4% during the last five years) to ensure its timely availability and to avoid any temporary shortages.

Pakistan still has to import phosphate due to a lack of raw material availability. More recently, the sole DAP producer in the country, Fauji Fertilizer Bin Qasim (FFBL), an associate company of the Fauji Fertilizer Company (FFC), has entered into a joint venture with Morocco to form Pak Moroc Phosphate (PMP), which should provide phosphoric acid to FFBL. Though the company entered into this agreement to improve its supply-chain as a result of backward integration, the country as a whole still remains deficient in phosphates and has to import on average 70% of its total DAP need.

Price mechanism

Since the urea market is highly concentrated and three big players (FFC, FFBL and ENGRO) hold 80% of the total urea capacity, local urea prices are largely determined by the market power of these players. Moreover, urea prices are a function of the subsidy on feed-gas rates, which keeps producer prices lower than imports. This has also been the central idea of fertilizer policies and a key reason for providing feed-gas at subsidized rates.
On the other hand, DAP prices remain dependant on international prices, since only 30% of the total demand is met by the sole DAP producer FFBL, while the rest is imported. This exposes domestic DAP pricing to both international price volatility and currency risks pushing the government to provide substantial subsidies. In 2008/09 the government had to provide DAP subsidy to the extent of Rs 21 billion. Nevertheless, demand could not pick up as local DAP prices were still 1.5 times higher on a year-on-year basis and farmers opted to procure more urea instead. This being the case, it is reasonable to assume that subsidies on DAP will remain integral in lifting the NP ratio of the country, given the volatility in international commodity prices coupled with the government's resolve to improve productivity in agriculture in the country.

The case of excess supply

With the major urea expansion of 1.3 million tons by Engro Chemical due to come on stream in 2010, Pakistan will have excess urea capacity and there will be a regional supply surplus situation as well since major capacity additions in China, Iran, Qatar and Saudi Arabia are due to become operational by 2011. Target markets for urea exports will be India, Bangladesh, Thailand and Vietnam. There is thus little doubt that markets will remain highly competitive due to excess supply. In the case of Pakistan, the existing subsidy on feed-gas would not apply to such exports, if at all it materializes, and manufacturers will have to market them at internationally competitive rates.

This factor should remain critical in driving exports as the sector may not achieve superior economies having become accustomed to subsidized production. Meanwhile, a domestic supply overhang will also put downward pressure on the sector's profit margins. This, in turn, is likely to result in one of the following tendencies:

Either excess supply would eliminate super-normal profits leading to price wars and to more competitive behaviour where the main players strive to capture each other's market share; or
It would result in an informal arrangement between players where predetermined supply quotas are assigned and prices are settled through informal discussions and consensus (effective cartelization).

The possibility of the second tendency to prevail is higher as the industry is highly concentrated towards two major players. If this is the case, it would be critical to monitor closely signs of anti-competitive behaviour in the sector.

Competition analysis

The country currently has a total urea off-take of 4.7 million tons and four-firm concentration is significantly high as 86% of the total industry off-take is concentrated in the top four firms. Moreover, the three top firms (FFC, ECPL and FFBL) hold 75% urea capacity which further signifies their control over market dynamics.

The Herfindahl index, which is a more precise measure, also portrays the same picture but with more stark results. The industry has an HHI of 2,660, significantly higher than the benchmark of 1,800. With such a high level of concentration, it is safe to presume that the level of control these firms can exercise over domestic prices is overwhelming. However, an important externality in the form of government subsidy on feed-gas may restrict these manufacturers from exercising complete control. Although, an HHI of 2,660 is high enough to raise competition concerns with respect to any industry, the case of the fertilizer industry may be considered to be different due to its strategic nature.

Theoretically, there are short term and long term effects of deregulation. Short term effects generally have an adverse impact on the industry's excess monopoly profits, since the industry has to go through numerous temporary adjustments, specifically in terms of a reduction of costs. However, in the case of fertilizer manufacturers, the government has already provided a cost incentive in the form of lower feed-gas rate.

While policy should ideally focus specifically on how to foster greater investment in the sector, typically to induce new entrants, it is essential to first understand some of the barriers to entry that currently prevail. First and foremost is the capital-intensive nature of the business, followed by the diminishing availability of indigenous natural gas. The most important barrier, however, would be the supply overhang in the urea market post 2009/10. On the back of major upcoming urea expansions (0.45 million tons by Fatima Fertilizer in November 2009, followed by 1.3 million tons by ECPL in October 2010), new investment in urea manufacturing becomes improbable. Therefore, decentralization in urea manufacturing purely on the basis of market mechanisms appears unlikely and the only reasonable way ahead appears to be constant monitoring by the country's competition agency.

While manufacturers appear to have significant influence as far as the urea market is concerned, the dynamics of the fertilizer marketing segment are somewhat different. Under this segment, the urea market is only a component of total fertilizer supplies (though still significant having a 65% share on an average) that are being marketed in the country. The segment is clearly classified as having both public and private domains. The sole public sector marketing company is National

Fertilizer Marketing Ltd (NFML), which is a subsidiary of NFC. This company has been handling the entire domestic production of NFC and falls under the jurisdiction of the Federal Government. Since NFC is in the process of being divested, with its PAFL urea plant and SSP Haripur plant having been purchased by Azgard 9 Ltd, NFML's role is now limited to the distribution of urea imported by the Trading Corporation of Pakistan[1].

Since the marketing segment was gradually decentralized, in the context of the limited role now being played by NFC and NFML, its market share as in 2007/08 only stands at under 2.5%. The remaining 97.5% of the supply is now being catered to by the private sector. Interestingly, the private sector is again heavily dominated by two major firms, FFC and ECPL, having a 70% share in the marketing of all products, including urea and DAP.

While both companies still contribute positively to the sector, not only in terms of providing for overall fertilizer demand, but also through appropriate research and development measures, it should be noted that their influence should alert the government and the CCP to the sector's competition dynamics. While deregulation itself has been favourable for the sector's competitiveness, the high level of concentration of the two top firms is alarming and potentially has anti-competitive implications. However, given the strategic nature of the sector, extreme measures remain unlikely. This gives rise to the argument related to the extent of government intervention for a balanced approach: i) addressing the need for free market mechanisms specifically in terms of providing benefit to the end-consumer; and ii) ensuring that oversight and regulation do not hinder fertilizer production and investment. Thus, the focus should specifically be put on how to moderate the implications of any likely collusion. The section pertaining to government policy and action specifically highlights this area while also providing general policy recommendations.

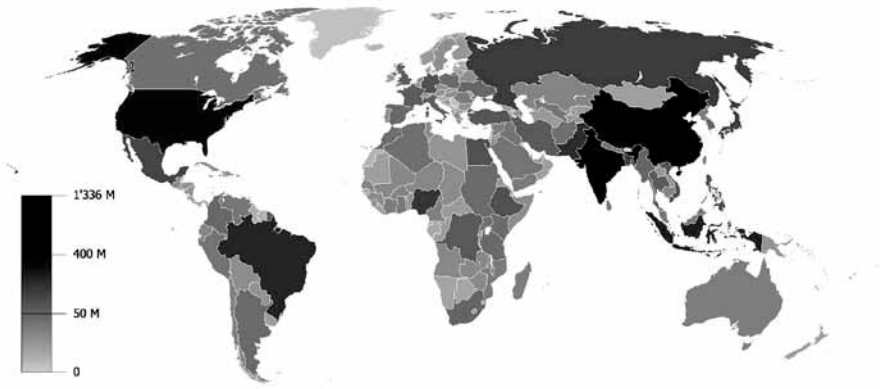
[1] NFDC (2009)

CHAPTER 2

Agriculture and economic growth

Pakistan is home to more than 170 million people and is the sixth largest country in the world in terms of population. The country has traditionally remained an agriculture-based economy because of the land, water and labour resources it possesses. The importance of agriculture can be gauged by the fact of its 22% direct contribution to GDP. Furthermore, in terms of major crops, Pakistan is the sixth and the fourth largest wheat and cotton producer in the world[1], two of the most valuable inputs that contribute towards ensuring food security, industrial growth and export earnings. However, with even these numbers, the dense population in parts of the country has pushed it into a relatively riskier category in terms of food security when compared to its neighbouring countries such as China and India. Combating food inflation and undernourishment in Pakistan is far more critical than in other countries of the region and has major implications for security issues in the country.

Figure 1 : World Population



Source: Wikipedia 2009

[1] FAO database (2009)

Part of the problem can be resolved through inducing better administrative measures in the food supply chain. This calls for a mixture of controls, protecting consumer interests through the enforcement of public health standards and possible restrictions on trade in order to ensure a stable domestic supply availability. Any administrative controls should be neither overly strict nor too loose and the need is to maintain a reasonable balance in terms of monitoring production and price trends and identifying price-fixing or other forms of collusive behaviour in the supply chain.

The purpose of this chapter is to describe, explain and justify the overall significance of this study. Agriculture is important because it is the sole consumer of fertilizer output; therefore the chapter becomes relevant within the ambit of this study. A general guideline is presented below, defined in competition assessment framework as designed by DFID (UKs Department for International Development). A competition assessment is justified if we were to consider the influence of the fertilizer sector in the economy at both the micro and macro levels[1]:

The sector is important to the *economy*, because:

- It makes a significant contribution to national income/production, or
- It has linkages with other sectors/industries as a provider of inputs and services, or
- It provides scope for wider gains through innovation, improved distribution and business processes, or
- Its nature and type gives it importance, such as being a public enterprise or a mixed public/private enterprise, or
- It is significant for investment and productivity levels

The sector is important to the *consumers*, because:

- It supplies goods or services that are essential, or
- That it accounts for a significant part of consumer spending; or
- It directly or indirectly affects the quality of life of the people

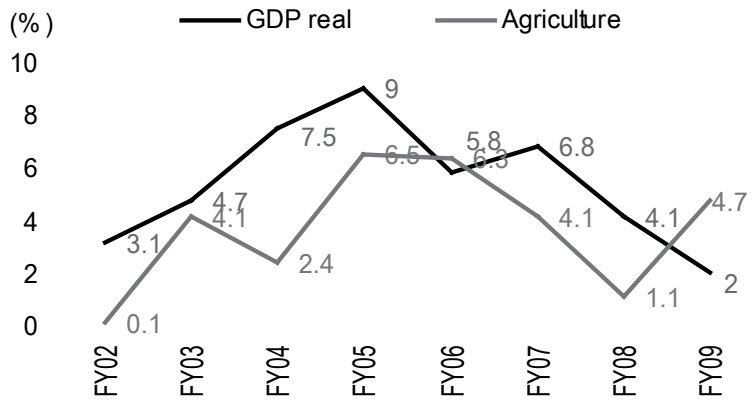
If the answers to the above are largely affirmative, the competition assessment is justified. The criterion is widely practiced by various regulatory agencies across the world and can be termed as a basis for carrying out competition assessment studies in various sectors.

A brief on the Pakistan economy

Pakistan's economic growth remained robust at an average rate of 6.6% in the period 2004 to 2008. However, some exogenous and domestic issues adversely affected the economy and consequently growth slowed to 2% in 2008/09. The lacklustre performance of the commodity producing sectors (agriculture and large scale manufacturing) was the primary reason for the slowdown. GDP growth is expected to revive to 3.3% in 2009/10 on the back of better crop yields and aided by support from manufacturing.

[1] DFID (2008)

Figure 2 : GDP Growth and Forecast



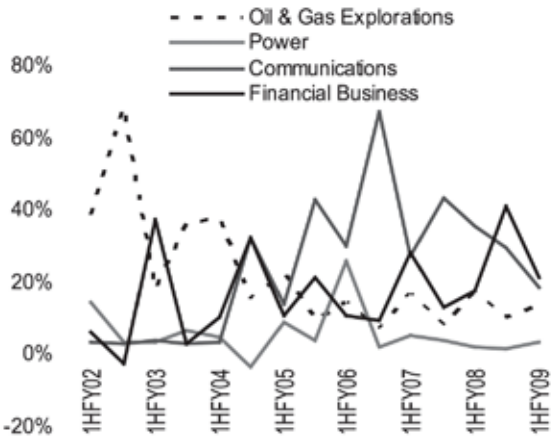
Source: Federal Bureau of Statistics

Output composition

In the recent past, the output composition of the economy has moved away from agriculture, towards the industrial sector, while the contribution of services sector continues to dominate. A significantly higher contribution of services to GDP is mainly attributable to the concentration of investment in this sector since the beginning of 2000. Capital formation analysis reveals that investment in services rose by 26% CAGR over six years while the commodity producing sector i.e. agriculture and manufacturing, accounted for investment growth rates of only 15% and 16% respectively. This development is further validated through phenomenal support in the country's external accounts where large inflows of foreign direct investment have been concentrated in the financial and telecommunication sectors.

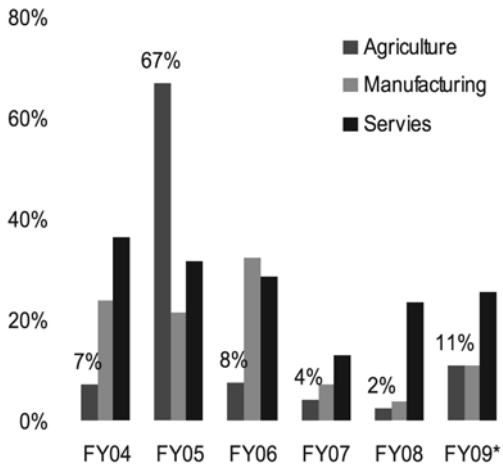
Figure 3 : Foreign Investment & Capital Formation

Sector-wise Contribution to FDI



Source: State Bank of Pakistan

Gross Fixed Capital Formation



Source: Federal Bureau of Statistics

Economic imbalances in 2008 – a call for revitalizing real sector growth

The overall economic growth in the recent past was financed mainly by foreign inflows, and this factor has also played a vital role in transmitting the global economic slowdown into Pakistan. After experiencing strong growth, Pakistan's economy encountered a full-scale economic crisis, which was primarily transmitted via the balance of payments abnormalities in 2007/08. This resulted in sizeable capital flight, weak investor confidence and raised concerns regarding the credibility of the country's financial commitments. This phenomenon was further aggravated through supply-side issues pertinent to energy and food, which took inflation to record levels. In fact, it disturbed the whole economic cycle as fiscal monetization caused inflation to emerge while the over- valued exchange rate and global economic slowdown hampered the external current account position. The deterioration in the trade balance was largely due to higher commodity prices, particularly oil, aggravated by a higher food import bill due to supply shortages of essential food items in the domestic economy.

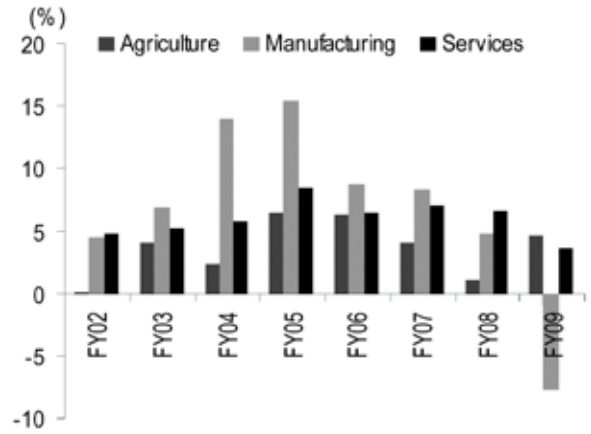
Agriculture – the single largest contributor to GDP

Considering the economic importance of agriculture, the government has always provided it support in various forms such as direct or indirect subsidies, soft agriculture credits, R&D support and keeping agricultural incomes free from taxation. Although agricultural output has increased over the years as a result of these initiatives depicting 4% CAGR over 8 years, its contribution to GDP has declined to 21.3% in 2008/09 as compared to 25.9% in 2000/01. The overall performance of the sector has remained subdued for several years. Both short term and long term factors have been at work. With regard to the former, changes in the annual rainfall pattern and shortages of key inputs are the primary causes while long term issues relate to looming water shortages, low productivity, low literacy and the chronic inability to upgrade technology and land management practices. Some of the measures being put in place to correct the situation include:

- Price incentives to the farmer to induce better production
- Encouraging balanced use of fertilizers
- Enhancing agri-credit targets and inducing the commercial banks to disburse the maximum available (SBP has announced agriculture refinance schemes for NWFP).

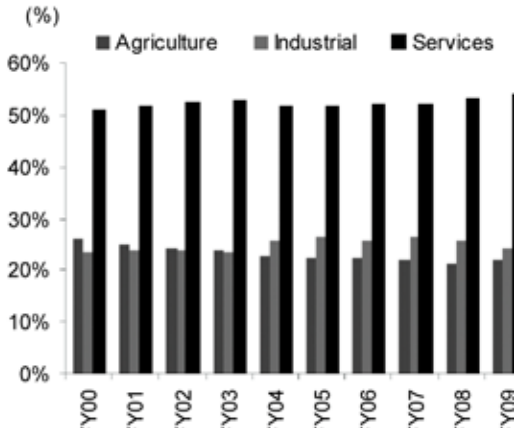
Figure 4 : Sector-wise Growth and Share in GDP

Growth



Source: Federal Bureau of Statistics

Share in GDP



The social features of agriculture

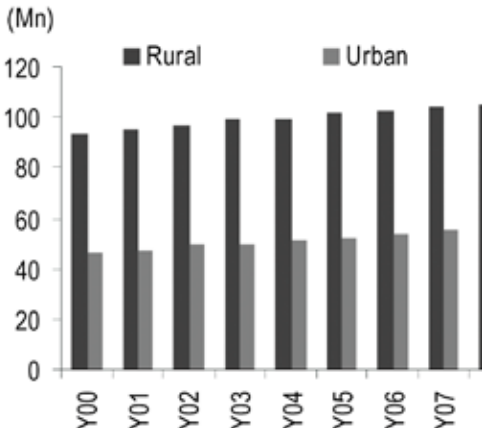
The process of rapid growth and changes in the structure of output as mentioned earlier, has also been accompanied by changes in the structure of employment, skills and the rate of urbanization in the country. Since 2000, higher activity in the industrial sector has increased urbanization resulting in an urban population growth of 3% CAGR over eight years as compared to 1% growth in the rural population and 2% in total population. However, the contribution of agriculture in the total labour force has remained at 70% during this period[1]. Being the largest contributor to the income stream due to the concentration of population in rural areas this phenomenon explains the acceleration in aggregate demand in the country.

Figure 5 : Employment & Population Distribution

Agri Labor

Source: Federal Bureau of Statistics

Population Distribution



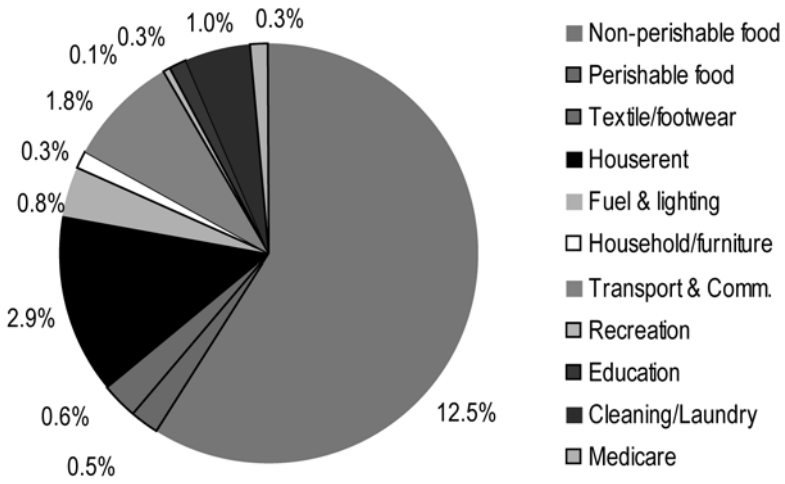
[1] Ministry of Finance (2009)

Since the majority of population is categorized as poor (i.e. in the bottom income quintiles), it is particularly vulnerable to food security issues due to lower agri-production and increasing food prices. This has been amply observed in the recent past when food shortages and higher prices have impacted the lives of both the rural and urban masses.

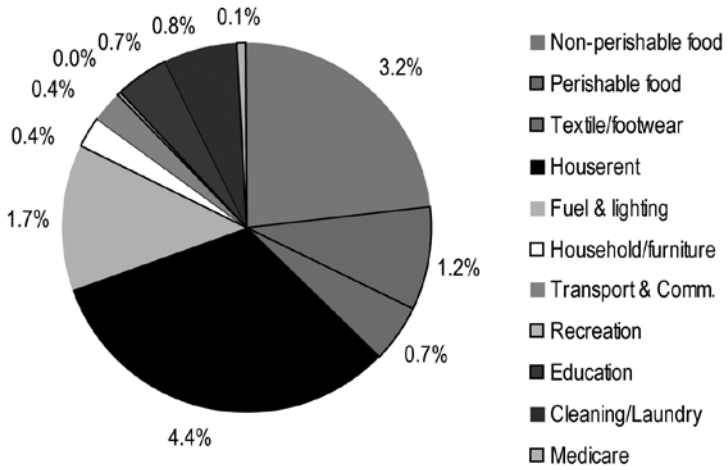
We have gauged the impact of food prices for the lower income groups for the years 2007 to 2009. During 2007/08, food contributed 12.5% to the total 21.5% inflation mainly due to supply issues but due to partial resolution of these in 2008/09 its contribution to inflation declined to only 3.2% to the total 13.1% inflation in 2008/09.

Figure 6 : Group wise Inflation Impact

CPI Inflation (Jun 08: 21.5%)



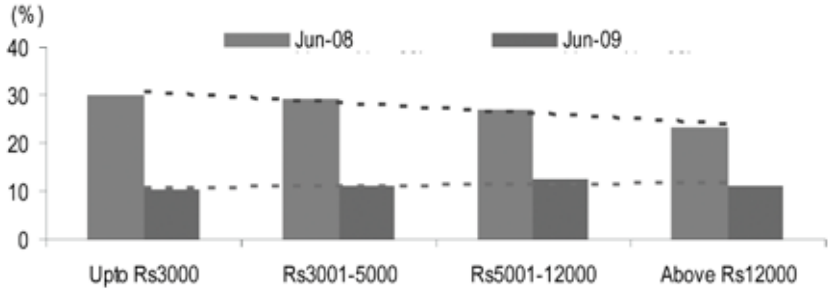
CPI Inflation (Jun 08: 13.1%)



Source: State Bank of Pakistan and Federal Bureau of Statistics

This phenomenon of higher impact is visible in an analysis of the impact of inflation on different income classes. Easing inflationary food pressures resulted in a muted impact on the lower income class level. This analysis further strengthens the argument that the lower income classes constituting a majority of the population are more vulnerable to imbalances in the agriculture sector.

Figure 7 : Income Group Inflation Impact



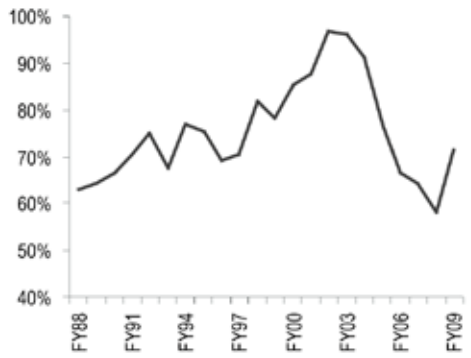
Source: Federal Bureau of Statistics

External trade

In economic terms if the country is running a persistent current account deficit, it implies that domestic consumption is exceeding the domestic production capacity or spending surpasses earnings, i.e that there is a savings deficit. In the case of Pakistan, the country has been running a current account deficit on a consistent basis stemming from an unfavourable trade account and a low savings rate. During the period 2003 to 2005, the current account posted a favourable balance on the back of significantly higher growth in home remittances. But the trade account remained in the negative zone since the capacity of exports to finance imports continued to decline. Due to the recent economic crisiss, the external account has again posted a record trade and current account deficit of $ 14.67 billion and $ 13.87 billion respectively in 2007/08 and 2008/09.

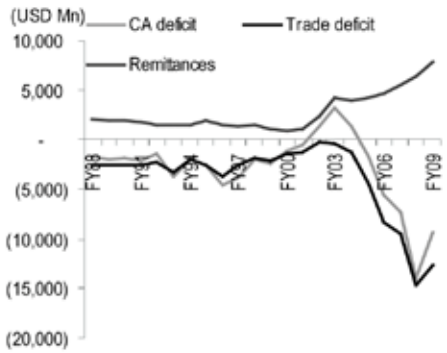
Figure 5 : External Trade

Export's Capacity to finance Imports



Source: State Bank of Pakistan

External Account

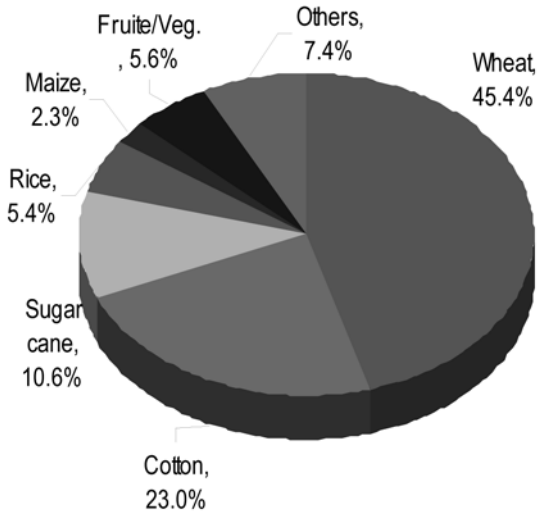


Many observers have highlighted the issues of significantly higher commodity prices, the domestic consumption pattern, limited domestic production capacity and trade policies as the factors responsible for the consistent deterioration in the country's external accounts. However, it is worth mentioning that the contraction in the commodity producing sectors, particularly in agriculture, has not only disturbed the supply chain domestically but also led to higher imports of essential items such as wheat and sugar. As concern for agriculture productivity has emerged, the share of edible imports in total imports has increased significantly. The situation has led to Pakistan applying to the IMF for support. Conventionally palm oil accounts for 36% of the total edible import bill. This, however, declined by 7% in 2008/09. The import of edibles also rose by 17% year-on-year in 2008/09 due to enhanced imports of sugar, wheat and other edibles which actually are major domestic agricultural products. It is a matter of concern that an agrarian-based economy has had to resort to large scale imports of essential food items causing an unprecedented escalation in the import bill.

Considering that textile accounts for more than 60% of the total exports of Pakistan, it is imperative that improvement in value added products in the sector should be fashioned somehow. Analysis of data reveals that exports of basic materials i.e. cotton and yarn have declined over a period of five years and the overall share of value added exports has remained stagnant. It is self-evident therefore that that two major fertilizer-dependent crops, wheat and cotton, have major implications for both the economy and the end- consumer in the country.

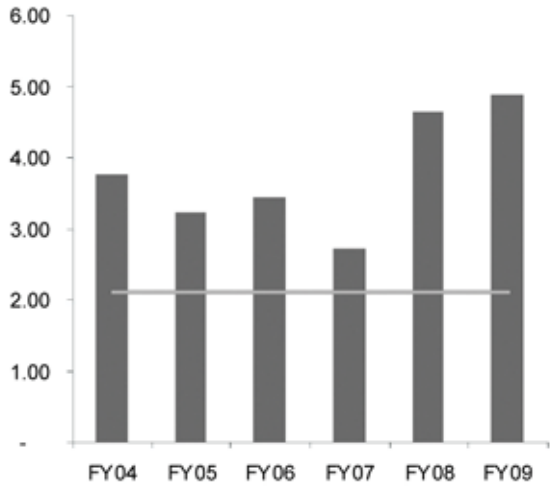
Figure 6 : Fertilizer Consumption

Fertilizer Use by Crop



Source: FAO – Fertilizer use by crops in Pakistan

NP Ratio in terms of Offtake



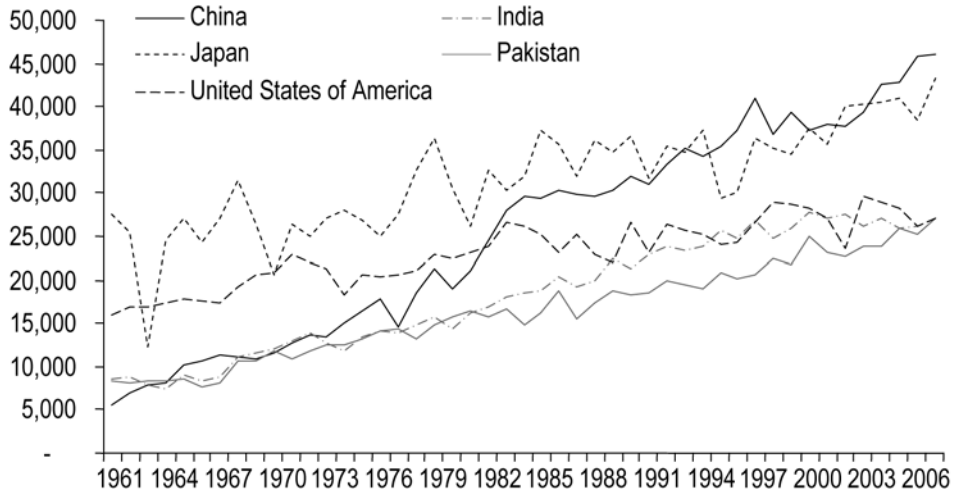
Source: Federal Bureau of Statistics

The above analysis highlights the strategic importance of agriculture and the fertilizer sector and their capacity to impact on other economic variables i.e. inflation, fiscal trends and the external account. Fertilizers are, in fact, an integral part of agriculture wherein subsidies in terms of import of urea and feed gas are provided to maintain local prices at lower levels compared to international prices.

Comparative crop yield analysis

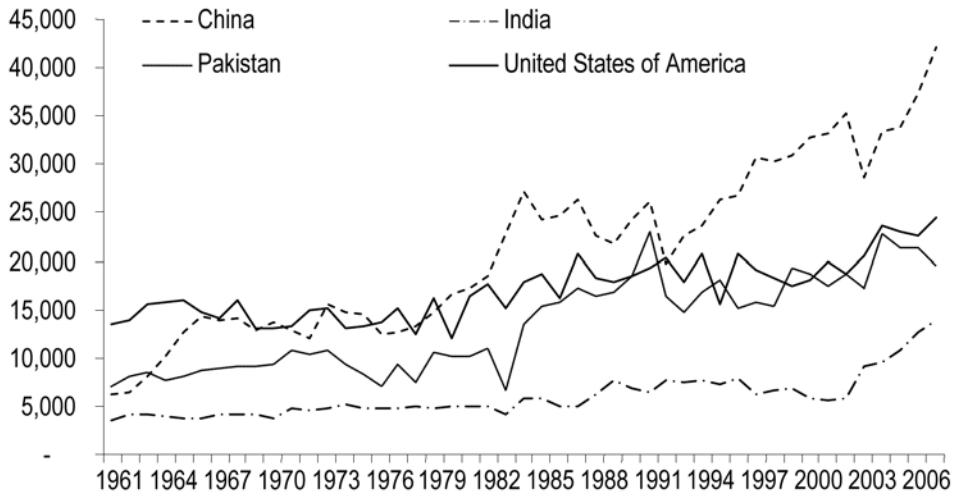
In order to justify the importance of both an increased and a more balanced use of fertilizers, an analysis of comparative yields of two major crops, i.e. wheat and cotton, is presented in figures 7-8. As the graphs shows, China has surpassed every major producer in the world and appears virtually unchallenged in terms of per hectare yields. China's yield for these two major crops was actually lower than Pakistan's during the early 1960s. The tremendous increase in China's yields can be attributed to both an increased and a more balanced use of fertilizers in the country. Figure 7 shows how China has succeeded in improving the per acre yields of wheat in relation to other wheat producing countries. Figure 8 depicts China's success in comparative cotton yields.

Figure 7 : Comparative Wheat Yield (Hg/Ha)



Source: FAO

Figure 8 : Comparative Cotton Yield (Hg/Ha)



Source: FAO

Box 1: How did China do it?

Fengrong Zhang Sr., Yan Xu, and Xiangbin Kong. Department of Land Resource Science, China Agricultural University, Beijing, China

Many soil scientists have reported that soil fertility declines continuously with cultivation. There is an on-going debate among soil scientists in China over whether soil fertility is a prerequisite for high crop yields. A case study was conducted in the North China Plain to investigate the relationship of soil fertility with production levels and crop yields. The sample soils were developed under the alluvial flood plain, with a warm and sub-humid climate. Data on soil nutrient content, amount of fertilizer input and crop yields were collected in 1982 and again in 2000.

It was established that before the early 1980s, fertilizer input was low. Land belonged to collective communes and farmers were not proactive in agri-production. Little mineral fertilizer was used due to its high cost and weak incomes. The small amount of fertilizer used was mainly compost with low N, P and K content. Thus, crop yields were very low, crop intensity was limited to one crop per year or three crops over a two-year rotation. The low soil fertility during 1980 to 1992 reflected a long history of low input cultivation. Thus, land use was characterized by low inputs, low outputs and low fertility.

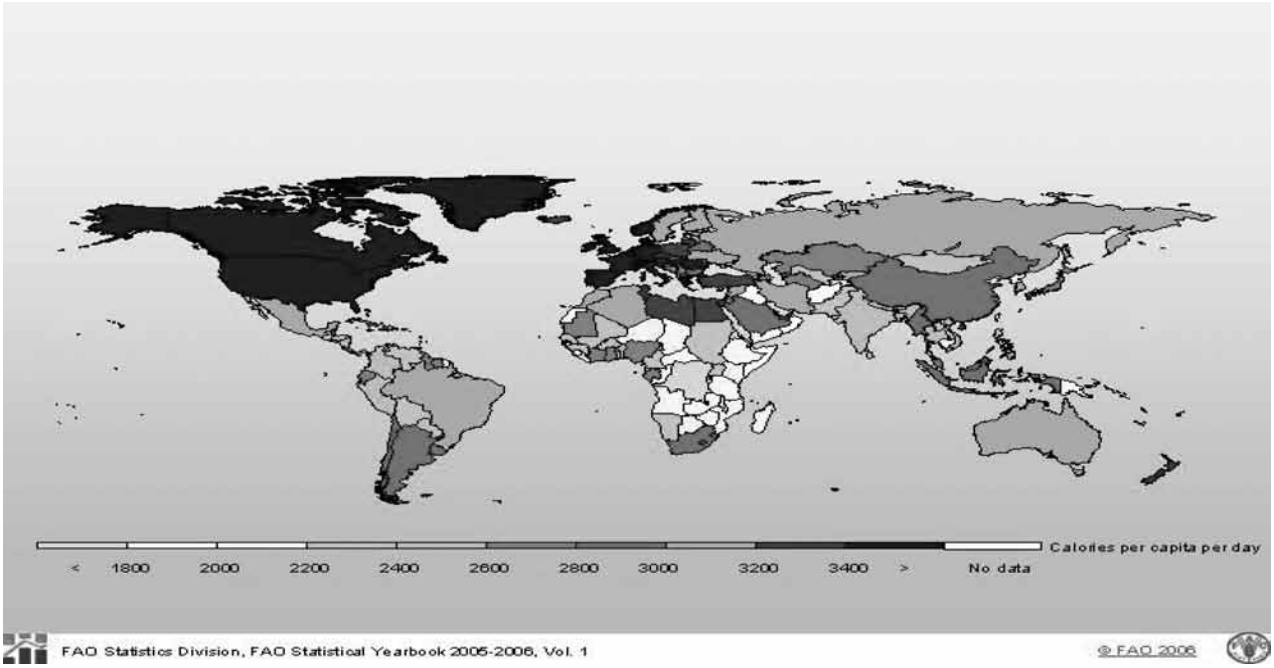
In the early 1980s, with land tenure reform, every farmer household got a piece of farmland. Farmers were given the legal right to use the farmland according to their wishes and the resultant output belonged to the farmers who managed the farmland. Thus, farmers were willing to increase production inputs. Cropping intensity also increased to two crops per year. Improved economic development made high input farming feasible. Results from the farmer survey indicated that increased rates of fertilizer were used and crop production yields were 3–8 times higher for wheat and corn than pre-1980. Soil fertility has also increased during the past 20 years. Thus, land use could now be characterized as higher inputs, high outputs and higher fertility. This case study shows that for maximizing crop yields it is not necessary to improve soil fertility beforehand; increasing mineral fertilizer input is an effective way to achieve higher crop yields and improve soil fertility simultaneously in low fertility soils. So, from that perspective, crop yield is the most important factor influencing farmland soil fertility. When fertilization is increased to obtain higher yields, it also improves soil fertility. China's large population and scarce arable land make high input applications and intensive agriculture a necessity for food production. There is no viable alternative. High fertilizer input agriculture is the only sustainable land use model in China. It is expected that soil fertility will increase continually with yields increasing in the future.

Source: 18th World Congress of Soil Science, 2006. International Union of Soil Sciences

The core issue of food security

One of the biggest challenges facing the world is that of food security. While the population growth rate is slowing down, even the lower rates of increase are still substantial when considering a population base of nearly 7 billion people worldwide. According to one estimate, world population is expected to increase by approximately 50%, from 6 billion at the end of 1999 to nearly 9 billion by 2040. Africa and Asia are estimated to comprise 20% and 60% of global population respectively by the end of 2050[1].

Figure 9 : Dietary Energy Consumption



Source: FAO Statistical Yearbook 2005-06 Vol. 1

According to another study, major challenges for global food security will include climate change, energy security, water scarcity and competition for land. Climate change is expected to result in an increase of undernourished people across the world[2] from 40 to 170 million. Energy security will continue to have an influence on food, fertilizer use and other input prices amid an increasing need to produce bio-fuels. Water scarcity will stem from overall climate change, increasing the burden of a growing population and unsustainable extraction from rivers, lakes and underground sources. Agriculture will remain particularly susceptible since it accounts for 70% of global fresh water consumption. Competition for land is expected to intensify in the next few decades as improving yields alone may not be enough to feed the additional mouths.

Food security in Pakistan, too, will be a matter of serious concern. It is unfortunate that in spite of being a large producer of food crops like wheat, an essential nutrition item, Pakistan is vulnerable to a high risk of food insecurity. According to statistics provided by Food and Agriculture

[1] Dunbar (2009)
2 Evans (2009)

Organization of the United Nations (FAO), Pakistan was ranked at 22 in the years 2003 to 2005 as far as food deficiency is concerned (with rank 1 being the one with the highest deficit). Meanwhile, the country's position actually deteriorated over the decades as it was ranked at 28 in 1990 - 1992, although it became less risky in 1995 - 1997, being ranked at 33.

Table 1: Food deficit of undernourished population (kcal/person/day)

	Rank	2003-05	1995-97	1990-92
Congo	1	440	360	270
Bangladesh	18	290	320	310
Pakistan	**22**	**280**	**260**	**270**
India	30	260	270	290
Sri Lanka	38	250	260	260
Viet Nam	40	250	270	280
China	44	240	250	260
Thailand	48	240	250	270
Indonesia	52	230	220	230
Russian Federation	128	150	160	150
South Africa	129	150	160	160
Japan	134	140	130	140
Malaysia	142	130	120	130
Saudi Arabia	145	130	130	140
United States of America	175	110	120	120
World Average		197	204	203

Source: FAO Food Security Statistics 2009

As shown in table 1, the situation marginally improved for Pakistan during 1995 to 1997 but deteriorated during 2003 to 2005. India, on the other hand, surpassed Pakistan and became marginally better[1]. Nevertheless, Pakistan, alongside its regional counterparts India and Bangladesh, stands in the risky zone, closer to the ranks of under-developed regions of Africa, where, unlike South Asia, drought and under-fertile land is a common problem (as can be observed in the global map provided in figure 9). On the other hand, China is better off despite having the largest population base in the world. This can be attributed to China's superior crop yields and comparatively better distribution and use of land and

[1] As per criteria define by FAO, the intensity of food deprivation is low when it is less than 200 kilocalories per person per day and high when it is higher than 300 kilocalories per person per day

water resources and it now stands at the low risk limit. Nevertheless, if the global food security issues highlighted above actually start materializing, it can be deduced with some certainty that, dismal as it may seem, Pakistan is expected to be highly sensitive to this overall global food risk if appropriate measures are not taken urgently.

While the coming challenges may extend for many years, if not decades, it is up to the policy makers to devise strategies that are able to address them. With fertilizers being key inputs in yield improvement, policy-makers should ensure that supplies are not disrupted and the process of capacity additions is carried out through encouraging new investment. Policy-makers should also ensure that consumer interests are well protected to meet broader food security challenges in the long run. With the critical nature of this sector well established, the need to monitor from both a policy-making and regulatory perspective is abundantly clear. Thus, a competition assessment in the sector is not only justified, it is critical that it be given priority over other sectors as competition is the process that will deliver a fertilizer sector that is both efficient and responsive to policy signals.

CHAPTER 3

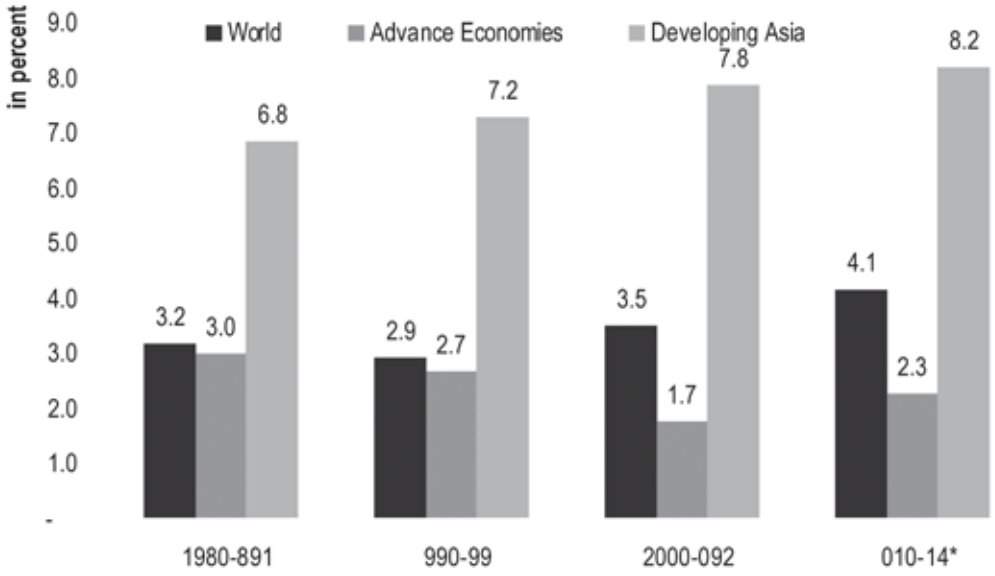
Global fertilizer markets

This chapter focuses on the fertilizer sector from the perspective of global and regional demand and supply scenarios. Further, an assessment of different markets and international pricing mechanisms is undertaken which should establish the basis of pricing in global markets. This is followed by domestic demand supply analysis which should help reveal the attributes of the local fertilizer industry. The assessment, therefore, is expected to provide grounds for the rationale behind the domestic pricing mechanism. Furthermore, it should also provide an assessment as to how sensitive domestic pricing is to trends in international prices, and thus signify the kind of intervention that would be required by the government.

Factors driving fertilizer demand

Conventionally, the demand for fertilizers has been directly influenced by factors such as population and economic growth in the broader perspective, narrowing down to factors such as agricultural production, prices and government policies. While these factors still have a major influence on pricing, there have been some developments in recent years that distinguish present price movements from past ones. The most prominent came in the form of integration of global commodity markets, which in turn strengthened the linkages between agricultural commodities and other markets. Moreover, record prices were achieved not at a time of scarcity but during abundance .

Figure 1 : Decade-wise GDP Growth and Forecast

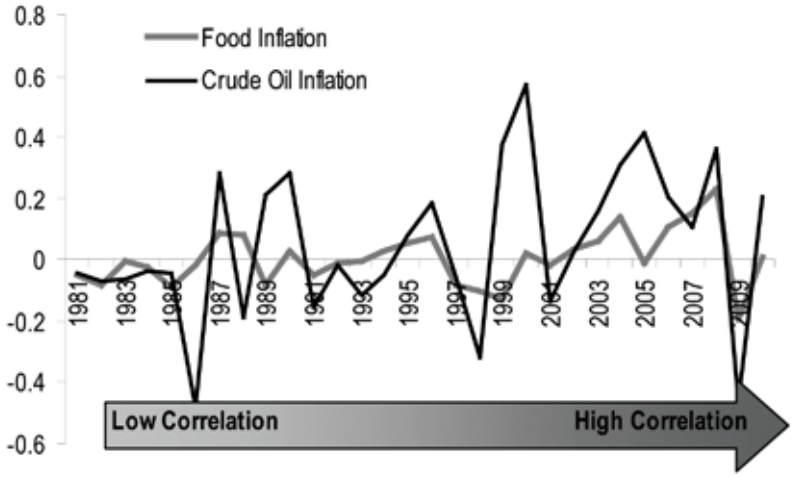


**Forecast*

Source: IMF data 2009

Thus the influence of conventional factors has combined with a tendency of 'investment optimism', which has led to an increased appetite for speculation. While the recent trend in international commodities is substantiated by underlying economic growth in the developing economies, the phenomena of better price responsiveness to aggregate demand can be a attributed in part to improved integration between regional and global markets over the last few years. These phenomena were more clearly observed during 2006 and 2007, which was followed by extreme volatility in 2008. This latter perspective is important to assess both current and future developments that are likely to take place in agriculture and more specifically in the fertilizer markets.

Figure 2 : Integration between Oil and Food inflation



Source: IMF data 2009

Another driving force behind the increase in demand for agricultural crops and an improved correlation between oil and food prices stems from the need to develop alternate fuels. Since the bulk of the demand for crude oil in recent years has come from the emerging economies, their dependence on a single source of fuel and the resultant hike in prices has left the rest of the world looking for alternative sources of fuel. This has created new markets for agricultural goods that can be utilized to manufacture bio-fuels, typically in the developed world. Still, the market mechanics of bio-fuel should not be gauged solely on the basis of oil price trends. Since the market for bio-fuels is still, by and large, at an early stage of development, there is considerable uncertainty as to how it might evolve over the long term. Nevertheless, to quote a tentative hypothesis conducted by the International Energy Agency (IEA), if bio-fuel demand grows by 50% over the next ten years, a net increase of 2.4 million tons in fertilizer consumption would follow, so as to make up for a loss in food production[1].

To sum up the above discussion, the following key demand drivers can be identified under the present scenario that are expected to remain critical in terms of an analysis of future growth in demand – primarily for agriculture and concurrently for fertilizers:

- Fundamental factors – such as economic growth and population
- Market integration – ascertained by globalization and better linkages between regional markets
- Development of fuel substitutes – so as to reduce dependence on conventional sources of fuel such as oil

Analysis of the product mix

The markets for chemical fertilizers can be classified in different ways. The choice of fertilizer to be used can depend on climatic conditions, soil fertility and choice of crop to be grown in that particular area. That choice will depend on more specific climatic factors such as moisture in the air, exposure to sunlight, water availability and economic factors such as price mechanisms and incentives for crops to be grown. Since the job of any chemical fertilizer is to provide specific nutrients to plants, the extent to which these nutrients are already present in the soil is important and is a key factor in determining which fertilizers are to be used and in what specific combinations or ratios. To put the product profile into perspective, table 1 presents a nutrient-wise breakup of leading fertilizer products.

Table 1: Nutrient wise Product mix

NITRGOEN	PHOSPHATE	POTASH	COMPLEX
Ammonia	MAP	MOP	NPK
Urea	DAP	SOP	NP
AN	TSP		NK
CAN	SSP		
AS			
UAN			
AC			

Source: IFA

[1] FAO (2008)

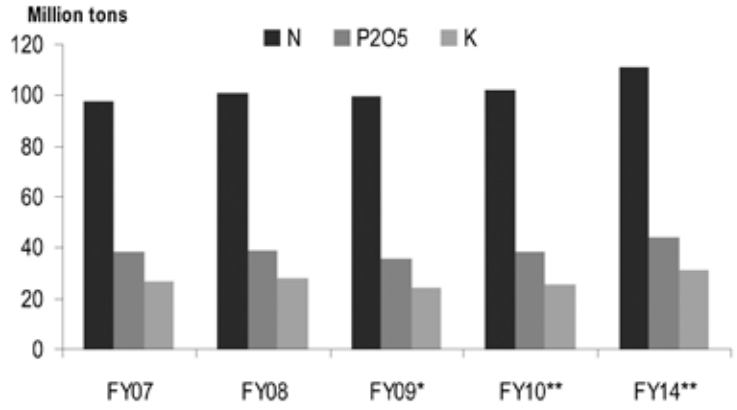
While nitrogen (N), phosphate (P2O5) and potash (K2O) are amongst the more common nutrients required by any conventional plant or crop, other macronutrients sometimes include sulphur and magnesium as well. Ammonia is the prime ingredient for all nitrogen-based fertilizers. Ammonia can be applied directly but a more common practice is to process ammonia into urea. Correspondingly, some of the products quoted above have elements of more than one nutrient (for example AS, which has contents from both nitrogen and sulphur).

To assess the primary demand for any product, the first step is to identify and analyze soil composition and fertility, determine deficiencies in terms of the listed macronutrients and then apply the appropriate product or products to cater to the deficiency. However, other factors such as pricing, availability of raw material, economies of scale, distribution flows and incentives from the government to promote a specific fertilizer play a vital role in influencing primary demand. Therefore, the actual product mix demand may vary greatly from the ideal one.

It is worth noticing that products within each nutrient category are complementary in nature. Nitrogen, which is sometimes labeled as the motor of plant growth, is one of the leading macronutrients required for plant growth and nourishment. Although nitrogen is heavily present in the atmosphere, only a small fraction is naturally converted by plants and whatever quantity is consumed is drawn from the soil rather than directly from the atmosphere; soil deficiencies in this regard are catered to through chemical fertilizers. On the other hand, phosphorus is required by plants for photosynthesis and cell distribution while potash activates certain enzymes which improve the plant's resilience towards disease, drought and salinity. Since these macronutrients address different needs for overall plant nourishment they cannot be treated as substitutes.

However, as mentioned earlier, various economic factors affect their actual use. An instance of this is the case of urea and DAP. These belong to two different classes of nutrients and are not direct substitutes of each other. These are, however, often treated as substitutes. Additional urea has been applied when DAP prices swelled beyond the purchasing power of an average consumer and it is still difficult to alter such perceptions because even though both products address separate requirements and are applied at different stages of cultivation, they are essentially procured by the same end-consumer, i.e. the farmer who tends to assume that they are substitutes rather than complements.

Figure 3 : Global Fertilizer Consumption (nutrients)



**Estimate*
***Forecast*

Source: IFA Fertilizer Outlook 2009-13

Outlook on world fertilizers

It is pertinent to note that the global markets were hit hard by the financial crisis that started in 2007/08. The crisis was aggravated as advanced economies plunged into recession. The downturn in world economic growth is expected to have a major influence on fertilizer demand, specifically via credit availability, high priced inventories in the pipeline, shift towards organic fertilizers and any perceived long term changes in fertilizer use by farmers (with respect to phosphate and potash mix). Meanwhile, the emphasis has shifted from food inflation and food security to dealing with economic crises.

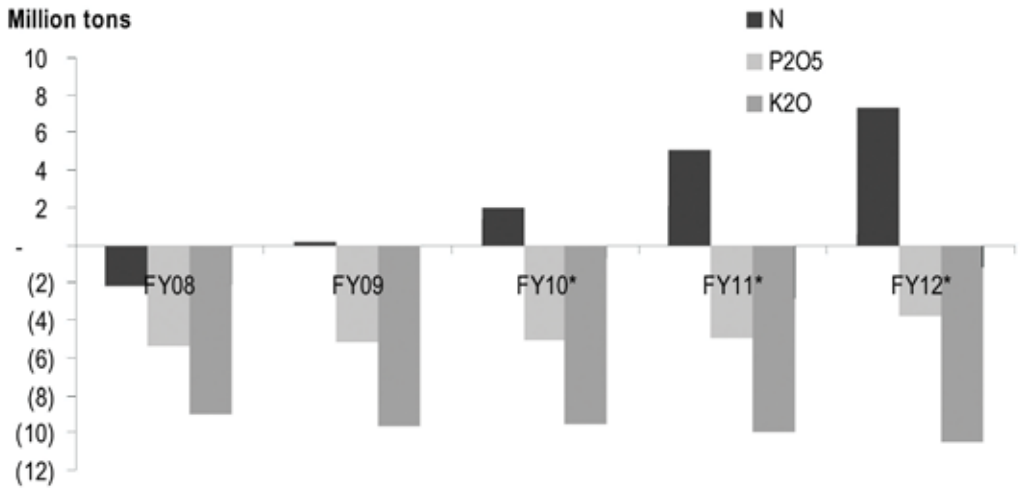
As far as the consumption pattern is concerned, 60% of world fertilizer production is composed of nitrogen, 23% phosphate and 17 is potash. In this manner, world fertilizer consumption ratio in terms of N:P2O5:K2O stands at 1.0:0.4:0.3. Similarly, nitrogen to phosphate (N:P) ratio stands at 2.8:1 as of 2009, which is expected to improve to 2.5:1 by 2014[1].

As per IFA estimates, fertilizer consumption declined by 5% in 2009 and a major decline is perceived to have occurred in phosphate and potash fertilizers (down by 7% and 14% respectively) with nitrogen declining by 2%. A less severe impact in nitrogen can be justified by the tendency to substitute one fertilizer with the other. Moreover, farmers are generally reluctant to forego nitrogen consumption because it could potentially have a more drastic impact on crop yields, contrary to phosphate and potash. This is estimated to have pushed the N:P ratio to 2.8:1 in 2009 compared to 2.6:1 during the previous two years. As per IFA forecasts, a recovery in fertilizer demand is expected in 2010, when it is expected to grow by 3.6% with a rebound in phosphate and potash fertilizers also expected. The trend is expected to continue onward as world economies recover from recession and an annual growth of 3% is expected up till 2014 (+2% in N, +4% in P and +6% in K).

Globally, a surplus in the supply of all the three major fertilizer nutrients is expected to persist and these surpluses are expected to grow particularly in the supply of nitrogen and phosphate. With additional supplies expected from China and Pakistan and the Middle East, the Asian region is expected to have a nitrogen surplus, but would continue to depend on imported phosphate and potash. Asia's contribution to total world supply of nitrogen is expected to increase from 55% in 2007/08 to around 58% by 2012. Within Asia, surplus supply of nitrogen from the Middle East is expected to go up to 10.3 million tons by 2012, a jump of 17% from current levels. South Asia is expected to witness a narrowing down of the deficit owing to major capacity increases in Pakistan. India, though, would still remain in deficit. Demand for nitrogen in Asia is forecast to grow at a consistent CAGR of 3%, with the bulk of the demand (more than 90%) coming from East and South Asia. Asia is also expected to remain the leading consumer of both phosphate and potash, currently having shares of 53% and 45% respectively in total world consumption.

[1]Heffer and Prud'homme (2009)

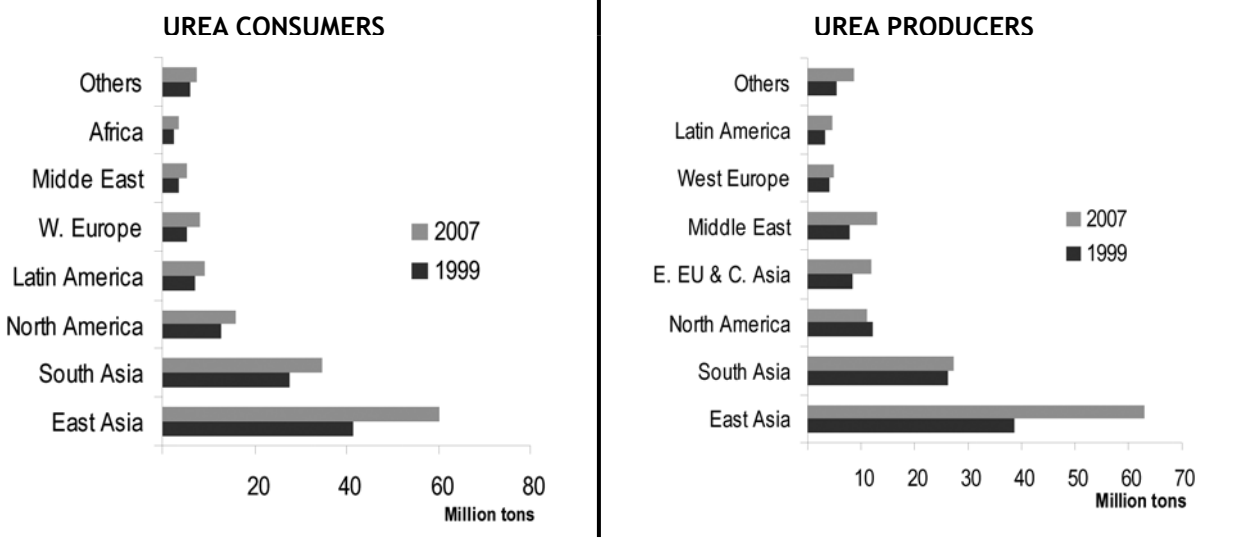
Figure 4 : Forecast of Supply Surplus/Shortfall in Asia



**Forecast*
Source: FAO Fertilizer Outlook

An examination of production and consumption patterns in terms of the product mix reveals that ammonia and urea are used across the world as the leading nitrogen fertilizers. As per IFA statistics, both ammonia and urea constitute approximately 80% of major nitrogen fertilizer products consumed across the globe while these cater to almost 90% of total nitrogen needs. Ammonia is also a major input for nearly all nitrogen based fertilizers and marginally for other fertilizer products. Excluding ammonia from the basket, urea occupies 65% of total fertilizer production and fulfills 75% of nitrogen needs; therefore it stands out as the dominant nitrogen-based fertilizer.

Figure 5 : Urea Demand & Supply across regions



Source: IFA

Of total world urea consumption, 10% is used in Europe, 17% in the Americas, 2% in Africa, 1% in Oceania and 69% in Asia. The continent can be further sub-divided into different regions viz., East Asia (China, Indonesia, Malaysia, Philippines, Thailand, Japan, Vietnam and Korea), South Asia (India, Pakistan, Bangladesh) and West Asia (Middle East). The supply shortfall is catered to by Eastern Europe, Middle East and Central Asia due to the existence of vast natural gas resources in these regions, which is the basic raw material in urea manufacturing.

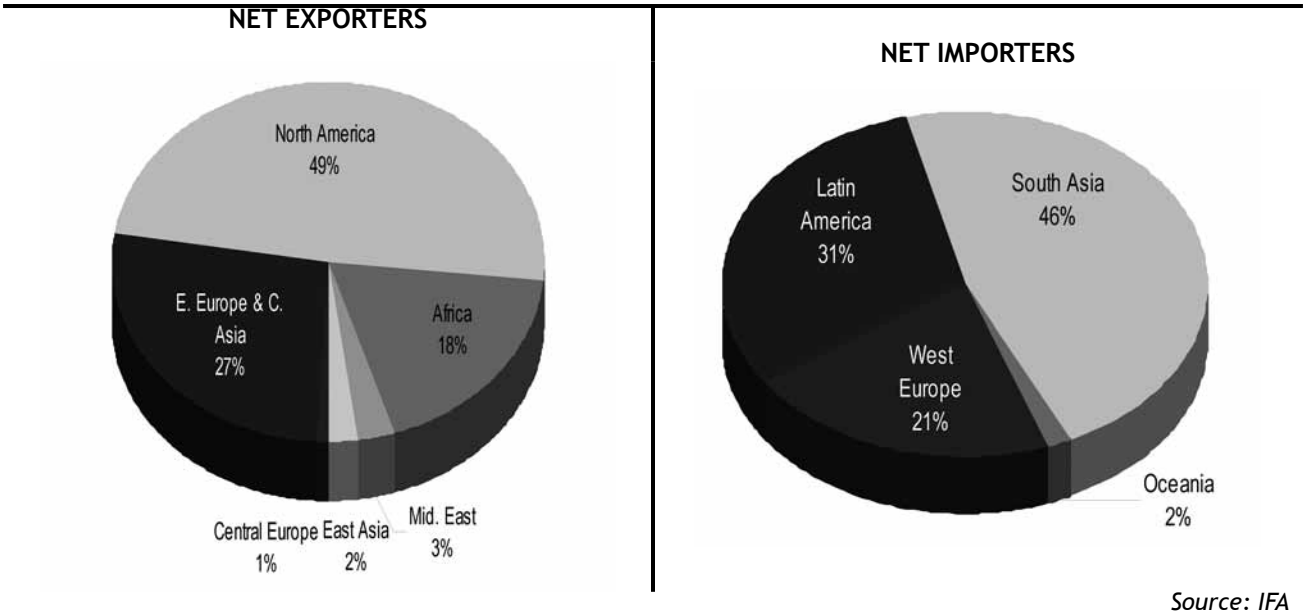
It is pertinent to note that while East Asia was a net importer of 2.74 million tons of urea in 1999, it turned into a surplus of 2.79 million tons in 2007 due to additional capacities that have come online mainly from China. On the other hand, the supply deficit in the South Asian region stretched from 1.36 million tons to 7.4 million tons during the same period as demand witnessed a CAGR of 3% while production increased by a CAGR of only 0.5%.

DAP is the leading phosphate fertilizer consumed across the world having a 50% share in total phosphate consumption. In phosphate production, East Asia has a major share (25%), followed by North America (21%) and Africa (16%). South Asia is the major deficit area which uses 18% of total consumption but produces only 3%. In terms of DAP off-take, 58% is consumed by South and East Asia and major consumers include China, India and Pakistan. On the production side, additional capacity from East Asia has reduced the region's dependence on imports. Phosphate supply is expected to grow from 10.6 million tons in 2008 to 13.4 million tons in 2012 (CAGR of 6%). Given a stable demand outlook, the region is going to turn from a deficit of 0.3 million tons to a surplus of 1.19 million tons in 2012. Unlike urea, DAP requires a lower proportion of ammonia and is manufactured by combining phosphate rock with sulfuric acid. Figure 6 provides an illustration of world phosphate rock reserves. As indicated, the major portion appears concentrated in USA, China and North Africa.

Figure 6 : Economic and Potentially Economic Phosphate Reserves in the World

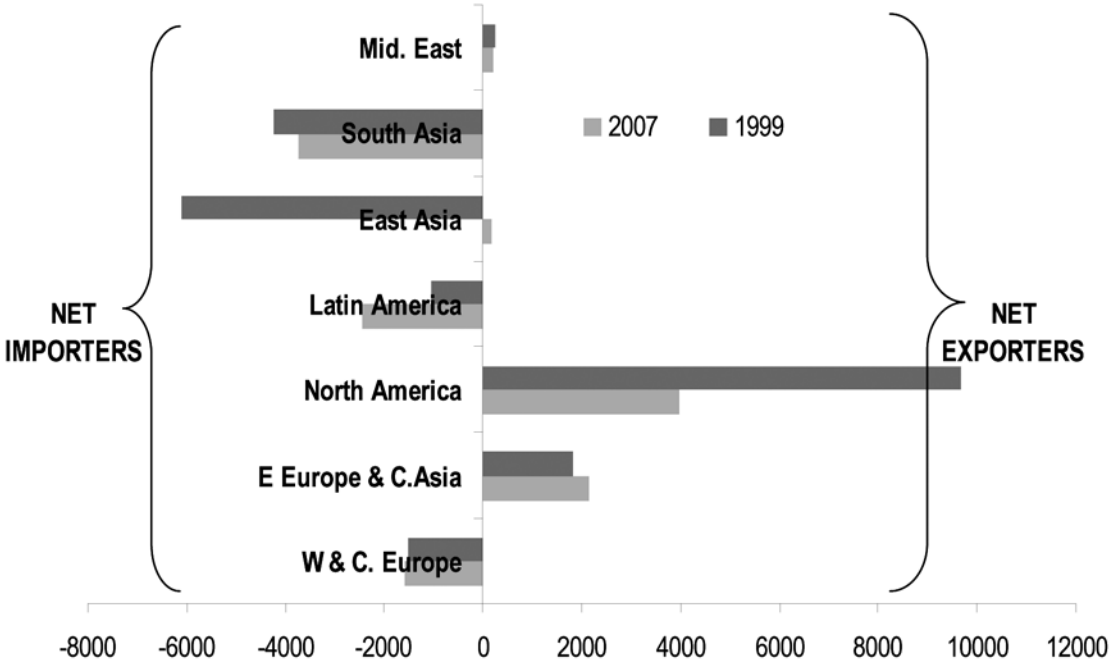
Source: FAO

Figure 7 : DAP Share in Total World Trade



Source: IFA

Figure 8 : DAP Trade flows over the years ('000 tonnes)



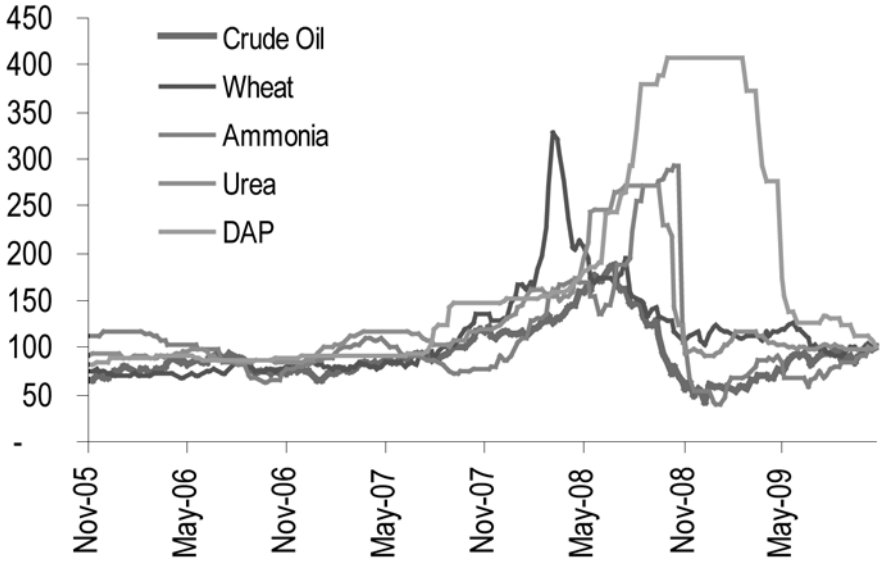
Source: FAO

The mechanics of price

As highlighted earlier, fertilizer prices closely tracked the global commodity markets, governed by a number of factors. A classification of such factors was made in terms of: (i) economic and population growth; (ii) integration of global markets; and (iii) development of fuel alternatives. However, judging by the nature of these factors, by and large, the forces that influence global fertilizer prices fall within the parameters of free market mechanics. This being the case, responsibility falls on the authorities to either regulate prices directly, provide subsidies or extend concessions in the process of production, primarily on feed-gas cost or allow the market to function. The degree to which each of these measures apply varies across countries, depending on the natural endowments each country (or region) possesses or the pressures that each country faces, the primary one being that of ensuring food security and combating inflation. It also varies between leading suppliers and consumers of fertilizer products and the availability of indigenous raw material also plays a vital role in how the fertilizer sector is organized in different countries.

In an attempt to draw comparisons between a leading commodity such as oil with agriculture and fertilizer prices, a graph is presented in figure 9. As can be seen, the bubble was created in nearly all leading fertilizers in tandem with the oil price rally. A deeper examination of the relevant factors is essential to grasp the supply side issues and how different factors eventually could have an influence on prices in the long run for different groups of commodities.

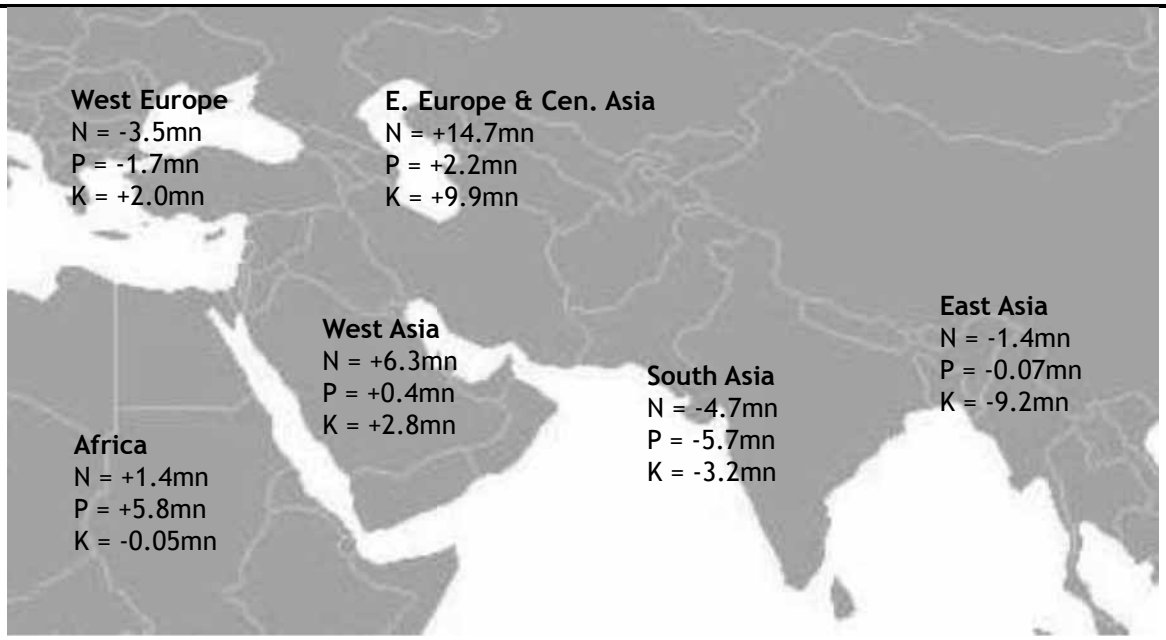
Figure 9 : Comparative prices of Oil vs Agri/Fertilizer commodities



Source: Bloomberg

To start with, a distinction between net producers and net consumers is necessary. While the existing demand-supply scenario across the globe was discussed earlier, an instance of net consumers and producers in the region is revisited in figure 10, to put the matter into perspective.

Figure 10 : Surplus/Deficit of Fertilizers in the Region*



**2008-09 estimate*
Source: FAO, Investcap

In the above context, gas pricing policies across different regions play a crucial role in determining what prices would eventually prevail in domestic markets, specifically for nitrogen-based fertilizers. Naturally, if the domestic pricing policy is favourable in the deficit region, prices of fertilizer would stay lower than the prevailing regional prices. If any incremental supply under this case is subject to this favourable policy, then prices in the region would come under pressure (e.g. when comparing gas price policy in Saudi Arabia, a leading fertilizer supplier from the Middle East, to that prevailing in India and Pakistan).

In the Middle East, gas is the main feedstock for the fertilizer industry, which takes up almost 80% of the overall raw material cost. In the case of Saudi Arabian Fertilizers Co. (SAFCO) which has a total annual ammonia and urea capacity of 2.30 and 2.60 million tons, the company entered into a long term supply contract with Saudi Aramco, the government-owned oil and gas company, for a term of 30 years to provide it feed-gas at the rate of $ 0.75/mmbtu from 1999[1]. This has enabled the company to enjoy a substantial competitive advantage over its rivals and has also enabled it to earn abnormally high margins. Table 2 illustrates the comparative operating margins earned by companies in various regions.

[1] Company reports, Bloomberg (2009)

Table 2: Profitability Comparison of Different Regions

	Net Margin*	Avg EBITDA Margin**	Avg ROE Margin**
SAFCO	82%	72%	30%
MENA excluding SAFCO	21%	23%	31%
Pakistan	11%	27%	33%
China	4%	19%	9%
India	12%	15%	16%
*Current year			
**average 2004-08			
Source: Bloomberg			

Note that SAFCO is far superior in terms of profitability with respect to its peers. However, Pakistani companies have also been better performers since similar gas concessions were provided to these companies in the early years of commissioning and for expansion. Currently, the feed-gas rate for existing plants is $ 1.23/mmbtu. Concessionary rates for new plants, however, are as low as $ 0.67/mmbtu, much in line with the Saudi counterpart. This shows that while SAFCO is far more profitable than any Pakistani company, the return on equity earned over time is still marginally stronger in Pakistan, although this is partly attributed to the higher leverage being utilized by Pakistani companies. Meanwhile, Indian gas rates are as high as $ 6/mmbtu, which render them far less competitive. Since India is expected to remain in deficit in all major nutrients, its ability to dictate prices is significantly lower. Reforms are now being undertaken in India and are directed to make the domestic sector more competitive and market based. A case of Indian fertilizer policy is separately provided in Box 1 to illustrate this in greater detail.

Box 1: Evolution of pricing and policy in India

India is a country of vast resources. Having a population of 1.1 billion people and nearly 50% of its area being arable, the country is one of the leading producers and consumers of agriculture outputs. Despite having ample water and land resources, the country has lagged somewhat when it comes to capacity increases in the fertilizer sector. With additional capacities in the Middle East, West Asia and Pakistan due to come online during 2008-2012 and India expected to remain in deficit due to lack of increase in its fertilizer capacity, it would remain an attractive market for surplus economies to export their excess output. This, however, exposes the country to an enormous price risk.

While there are strong reasons which have kept domestic supplies subdued, such as lack of availability of raw material and an emphasis on energy rather than on food, an equally important area has been that of government policy and active interventions, which have suppressed market forces and thereby restricted private sector investment. Though the

offsetting factor from the government's standpoint would clearly have been the assurance of greater food security through firm price controls and subsidies, this practice however has hampered fertilizer supply growth in the long run and also put a significant fiscal burden year after year.

A new fertilizer policy was devised and came into effect from 1st April, 2003. The aim of this policy is to encourage usage efficiency in line with international standards, induce investment in better technology and also ensure viable returns for investors. The pricing framework is more market driven and is focused to be keeping controls through efficiency measures and through economies of scale. The framework was designed to be implemented in three distinct phases and the phase-wise implementation itself indicated that there was a strong need to provide a smooth transition from the previous system to the new regime.

The Stage I of the new scheme was put in effect from 1st April, 2003 to 31st March, 2004. Under this, the focus was on initial measures to improve efficiencies. A concession was given to existing urea manufacturing units whereas units having low efficiency faced the challenge of sharply improving their production efficiencies. For units which had retention prices higher than their respective group, a one year adjustment phase was granted to address this issue. Stage II was put in place from 18th April, 2004 to 31st September, 2006. This stage was an extension of Stage I where decontrolling of urea was carried out, while the focus remained on improving efficiencies through tighter energy consumption practices. This stage was designed to induce consolidation in the sector so that weaker players could be phased out either by divestitures or through mergers.

Stage III was put into effect on 1st October, 2006 with a longer term view. The policy framework under this stage put forth a definite plan for conversion of non-gas based units to natural gas. A switching period of three years was devised for plants that were operating on FO/LSHS or naphtha while at the expiry of this term, non-gas units would not be entitled to the same level of subsidy. Moreover, prices were to be determined on import parity basis while units which could not convert to natural gas would have to resort to alternative sources such as coal gas.

The challenge for the implementation of this initiative remains the limited availability of natural gas. This is expected to improve post 2008/09 as additional supplies come on stream. High cost of conversion for plants operating on FO/LSHS is another major hurdle. To overcome this, the policy provided a one time capital investment assistance for a period of three years from implementation. Additionally, Stage III puts forth a package of other incentives, including benefits to units that operate at higher capacity utilization, subsidizing bagging costs and incentives in distribution. While the incentive system is attractive and the overall framework broad-based, the best part is possibly linking the mechanism with import parity and inducing a free market mechanism. How the country benefits from this change remains to be seen. The previous era of controlled prices, however, did not help in improving supplies in the country.

Source: Ministry of Fertilizers, India

The case of excess supply

If India is eventually able to reap the benefits of the incentives provided in the new policy, then cost efficiencies in the country would eventually give it room to lower prices. This being the case, its bargaining power would improve and would thereby keep regional prices lower, especially when excess supply is anticipated in the coming years. This surplus alone could leave very little room for a price boom of yesteryear to be repeated. While the Middle East North Africa region appears less sensitive to such price reductions due to the higher margins being enjoyed there, the Pakistani sector could end up with either a substantial reduction in subsidies or lower margins, since gas concessions for most companies have already expired.

The present surge in urea prices is being partly attributed to additional demand that is coming from Pakistan. As far as the local scenario is concerned, the recent surge in local urea demand (15% up during this year) is partly due to a one-time additional need for BT cotton harvest. This boom is expected to last till the next Kharif season, after which demand should normalize. Moreover, additional capacities are expected to come online by early Rabi season next year, after the boom ends. The excess supply afterwards will lead to lowered supplier power, after which either a price war could break out, or a mutually agreed arrangement could be the outcome. The argument is carried forward in the next chapter, where the dynamics of the domestic market are discussed in detail, with a specific focus on the degree of competitiveness that currently prevails in the sector.

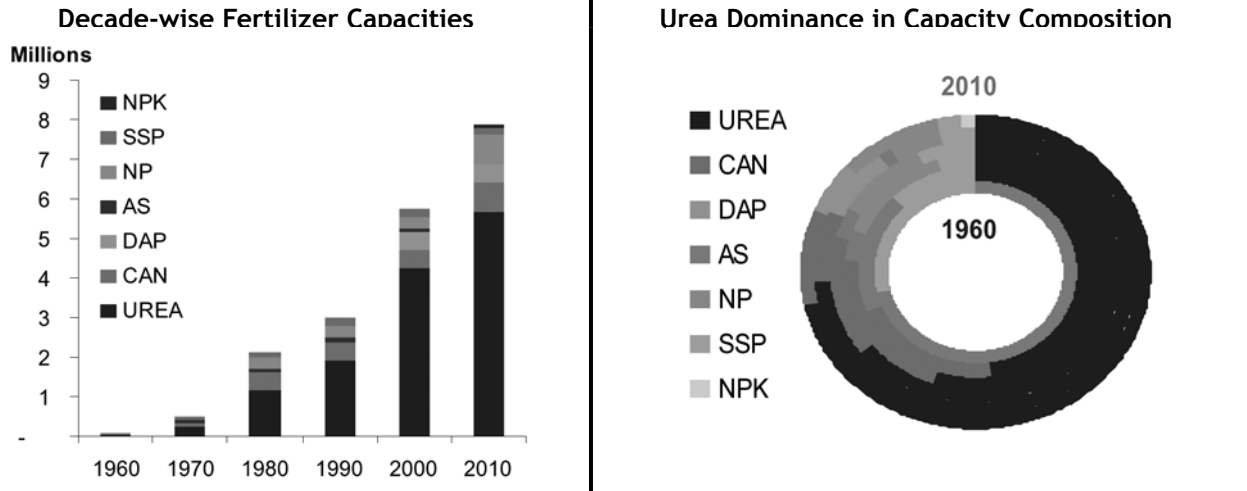
CHAPTER 4

Competition assessment of the fertilizer sector

Fertilizer evolution in Pakistan

In the 1960s the first initiatives were taken by the government to build indigenous fertilizer capacity in the country. Among the early initiatives, two joint ventures were formed under the names Pak American Fertilizer Ltd (PAFL) and Pak Arab Fertilizer Ltd under the umbrella of the National Fertilizer Corporation (NFC) to undertake production of fertilizers under different grades. However, the cornerstone for urea manufacturing was laid via the gas discovery at Mari in1957, which later resulted in the formation of the first private sector fertilizer enterprise – Esso Pakistan Fertilizer Company (EPFC) (now renamed Engro Corporation Ltd). Thus the early years of fertilizer manufacturing were marked by a duopoly, with NFC being a public enterprise and EPFC being a private entity. NFC still held the upper hand with a more than 60% share in total manufacturing, since it possessed the capacity to manufacture fertilizer products other than urea, including AS, CAN and SSP.

Figure 1 : Fertilizer Capacities over the decades



Source: NFDC Data

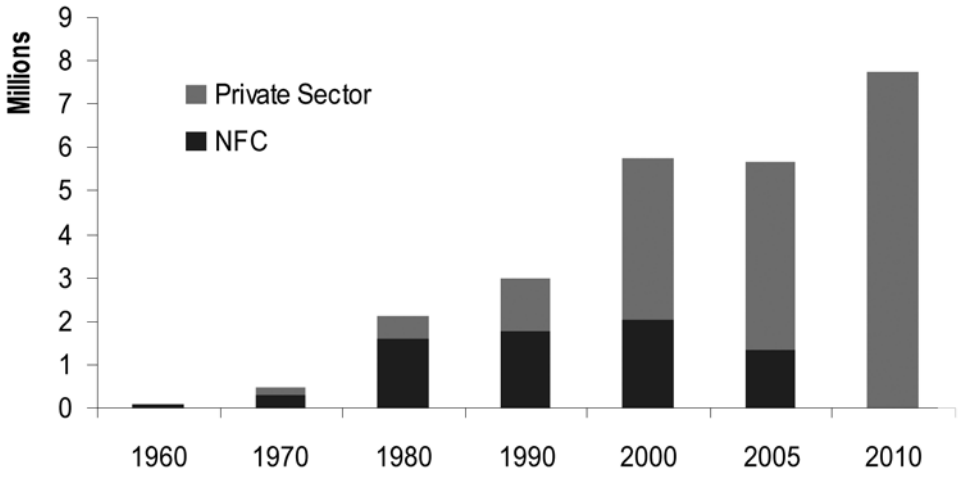
In 1968, the Dawood Group of industries had collaborated with US based Hercules Inc. to invest in urea production. The venture, named Dawood Hercules Chemicals Ltd (DHCL) and backed by World Bank funding, was commissioned in 1971 with an annual capacity of 345,000 tons, taking the country's total urea capacity to 579,000 tons. This resulted in reducing the share of imports in total nitrogen supply significantly, as it dropped from 60% to nearly 30%. NFC's market power also diminished as DHCL took a leading share of 42% in total fertilizer capacity, becoming the largest urea manufacturer in the country at that time. Even with this shift, the operating climate still largely remained regulated, with controlled prices, dominance of the public sector in manufacturing, marketing and imports, heavy subsidies and government quotas, since the era itself was that of nationalization in the country. Moreover, NFC again took control of the market by 1980, when its share in overall capacity reached 75% due to the commissioning of additional units such as Pak Saudi's urea plant at Mirpur Mathelo and expansion by Pak Arab. This regime continued till the mid-1980s when privatization was finally taken up in the country.

In 1982, Fauji Fertilizer Company (FFC) was formed through a joint venture between the Fauji Foundation (FF) and Haldor Topsoe A/S of Denmark. As a result, the country's urea capacity increased by 48% to 1.84 million tons. While NFC still enjoyed a lead, the years that followed were relatively fruitful for the sector as deregulation and a more private sector investment driven climate was promoted. The privatization process itself turned out to be fitful and NFC continued to hold on to its interests. However, the sector did witness rapid expansion and commissioning of new units during the 1990s. FFC expanded its existing unit in 1992 (increasing capacity by 125,000 tons) and the commencement of its unit II in Goth Machi in 1993 with a capacity of 635,000 tons. The first and only DAP plant in the form of FFC-Jordan Fertilizer Company (FJFC) was also commissioned by that time. On the other side, NFC entered into urea expansion through PAFL in 1998. Market driven practices in the meantime were introduced which lead to effective deregulation in the sector.

It was not until 2002 that the country took a fresh start towards privatization. Since the fertilizer market had already undergone deregulation, the next big leap was privatizing the units held by NFC. The process started with the acquisition of Pak Saudi Fertilizer Ltd. (PSFL) by FFC in 2002.

It reached its climax during 2005/06 when NFC's entire manufacturing portfolio was taken over by private entities. Two new notable players entered the market, with Azgard-9 taking over Pak American Fertilizer Ltd's (PAFL) Daud Khel urea plant and Fatima Group acquiring the Pak Arab's fertilizer complex. While the sector appeared to have entered a competitive era, an aspect of this shift is the high degree of concentration that now prevails, with FFC and ECPL enjoying relatively dominant positions in the sector.

Figure 2 : Decade-wise Capacities held by Public & Private sectors



Source: NFDC Data

Relevant product markets

A distinction is important to draw at this point to correctly perceive the product structure currently prevailing in the sector. One way to do this is to bifurcate existing fertilizer manufacturers under different product markets, categorized in terms of macronutrients i.e. nitrogen, phosphate and potash. Table 2 elaborates the nutrient content of each individual product and provides an insight as to why they are classified in this manner.

Table 1 : Nutrient wise Product mix

NITRGOEN	PHOSPHATE	POTASH	COMPLEX
Ammonia	MAP	MOP	NPK
Urea	DAP	SOP	NP
AN	TSP		NK
CAN	SSP		
AS			
UAN			
AC			

Source: IFA

Table 2: Product wise Nutrient content

PRODUCTS		N	P2O5	K2O
NITROGEN				
Ammonia	**AMMONIA**	82%		
Urea	**UREA**	46%		
Ammonium Nitrate	**AN**	34%		
Calcium Ammonium Nitrate	**CAN**	27%		
Urea Ammonium Nitrate	**UAN**	30%		
Ammonium Chloride	**AC**	25%		
Ammonium Sulphate	**AS**	21%		
PHOSPHATE				
Phosphate Rock			31%	
Phosphate Acid			100%	
Monoammonium Phosphate	**MAP**	11%	52%	
Diammonium Phosphate	**DAP**	18%	46%	
Triple Super Phosphate	**TSP**		46%	
Single Super Phosphate	**SSP**		15%	
POTASH				
Potassium Chloride	**MOP**			60%
Potassium Sulphate	**SOP**			50%
Potassium Magnesium Sulphate				22-30%
COMPLEX				
NPK	**NPK**	5-25%	5-25%	2-25%
NP	**NP**	15-25%	15-25%	
Nitrophos	**NP(23:23)**	23%	23%	

Source: IFA

Major players

The previous discussion described how the fertilizer evolution over the years has undergone changes in terms of pricing mechanics and the key players influence on the sector. It was also stated that the present structure is market based and key players are private enterprises, with the role of government now being limited to policy formulation and monitoring, while also intervening directly or indirectly so as to benefit the end consumer, through direct / indirect subsidies and support prices. The government no longer has any direct control over supplies. More recently, a slight divergence was observed when urea import was decided to be done through NFC's subsidiary, the National Fertilizer Marketing Ltd (NMFL). In this manner, the government is presently exercising control over imported urea supplies so as to ensure its timely availability to end-consumers at a time when there is a local supply shortfall. Despite this exception, which is only expected to last till additional capacities come online, both imported and local supplies are controlled by private enterprises. Profile of key players is provided below:

- **Fauji Fertilizer Company (FFC)**
  FFC was incorporated in 1978 as a private limited company. It was a joint venture between Fauji Foundation (FF) and Haldor Topsoe A/S of Denmark. The company commenced operations in 1982 with an annual urea capacity of 570,000 tons per year. As a result of de-bottlenecking program (DBN), plant capacity was increased to 695,000 tons per year. Production capacity was further enhanced in 1993 when the company established its second plant with a capacity of 635,000 tons per year. In 2002, FFC acquired the PSFL urea plant located in District Ghotki from NFC under the government's privatization programme. It had a capacity of 574,000 tons. This pushed the overall company capacity to 1.9 million tons, thus making it the largest urea producer in the country. Further DBN activities have enhanced the company's urea capacity to 2.048 million tons[1]. Apart from manufacturing, the company has an extensive marketing network comprising 3,258 dealers spread across the country[2]. Presently, a 44% stake in the company is held by FF.

- **Engro Corporation Ltd (ECPL)**
  Engro Corporation Ltd is the second largest player, while also being the first company to establish a urea plant in the country. The company was initially established as Esso Pakistan Fertilizer Company Ltd. in 1965 with 75% shares held by Esso. With initial investment of $ 43million, the plant was established having a capacity of 173,000 tons. With Esso becoming Exxon the company was renamed as Exxon Chemical Pakistan Ltd. In 1991, Exxon decided to divest its fertilizer business on a global basis, which resulted in an employee-led buyout of Exxon's 75% stake in the company. Since then, the company has evolved into a dynamic and well diversified conglomerate. The holding company ECPL now has a urea capacity of 975,000 tons and an NPK capacity of 160,000 tons. The company is near to achieving the highest domestic urea capacity by way of its expansion of 1.3 million tons, at a cost of over $ 1billion. This is expected to start commercial production by mid- 2010. The company also has a share of 21% within the marketing segment. Currently, 41% of the company is held by the Dawood group.[3]

[1] FFC Annual Report 2008
[2] NFDC (2009)
[3] ECPL Annual Report 2008

- **Fauji Fertilizer Bin Qasim Ltd (FFBL)**
  FFBL is the only DAP producer in the country and also manufactures superior quality granular urea. The manufacturing complex was built at a cost of $ 468 million. Formulated as a venture between FFC, FF and Jordan Phosphate Mines Co. (JPMC) in 1993, the company ran into a series of crises in its early years due to technical, financial and managerial reasons. As a result, its DAP plant was mothballed in 2001 due to accumulated losses of Rs 6.5 billion. In 2003, JPMC sold its stake and the company was renamed as FFBL, having resumed production after a lapse of two years. The company currently has annual urea and DAP capacities of 551,000 tons and 445,000 tons respectively. The company's off-take is handled by FFC which had a 44% share in DAP marketing in 2007/08. Presently, a 51% stake is held by FFC and 17% is held by FF[1].

- **Dawood Hercules Chemical Ltd (DHCL)**
  The company was incorporated in 1968 as a joint venture between the Dawood Group and Hercules Inc. USA. The plant had an initial capacity of 345,000 tons which was enhanced to 445,500 tons as a result of the revamp of its activities during 1981-1991. DHCL markets its products through Dawood Corporation Ltd (DCL), though its activities are confined to Punjab and NWFP. During 2008, DCL maintained a share of 8.2% in the overall fertilizer marketing activities in the country. The company is primarily held by the Dawood Group while it also holds 38% stake in ECPL.

- **Pak Arab Fertilizer Ltd**
  Pak Arab Fertilizers Limited (PFL) was established as a result of a protocol concluded and signed on November 15, 1972 between the governments of Pakistan and Abu Dhabi, as a step towards increased cooperation in the fields of petroleum industries and natural resources available in both countries. After signing the memorandum of understanding, a participation agreement emerged in 1973 to establish a joint venture for the expansion and modernization of a natural gas fertilizer factory at Multan. The company was incorporated on 12th November 1973. On July 14, 2005 Pak Arab Fertilizer was privatized and acquired by Reliance Exports Limited under the umbrella of Fatima Group and Arif Habib Group. The company's products include urea, CAN and NP.

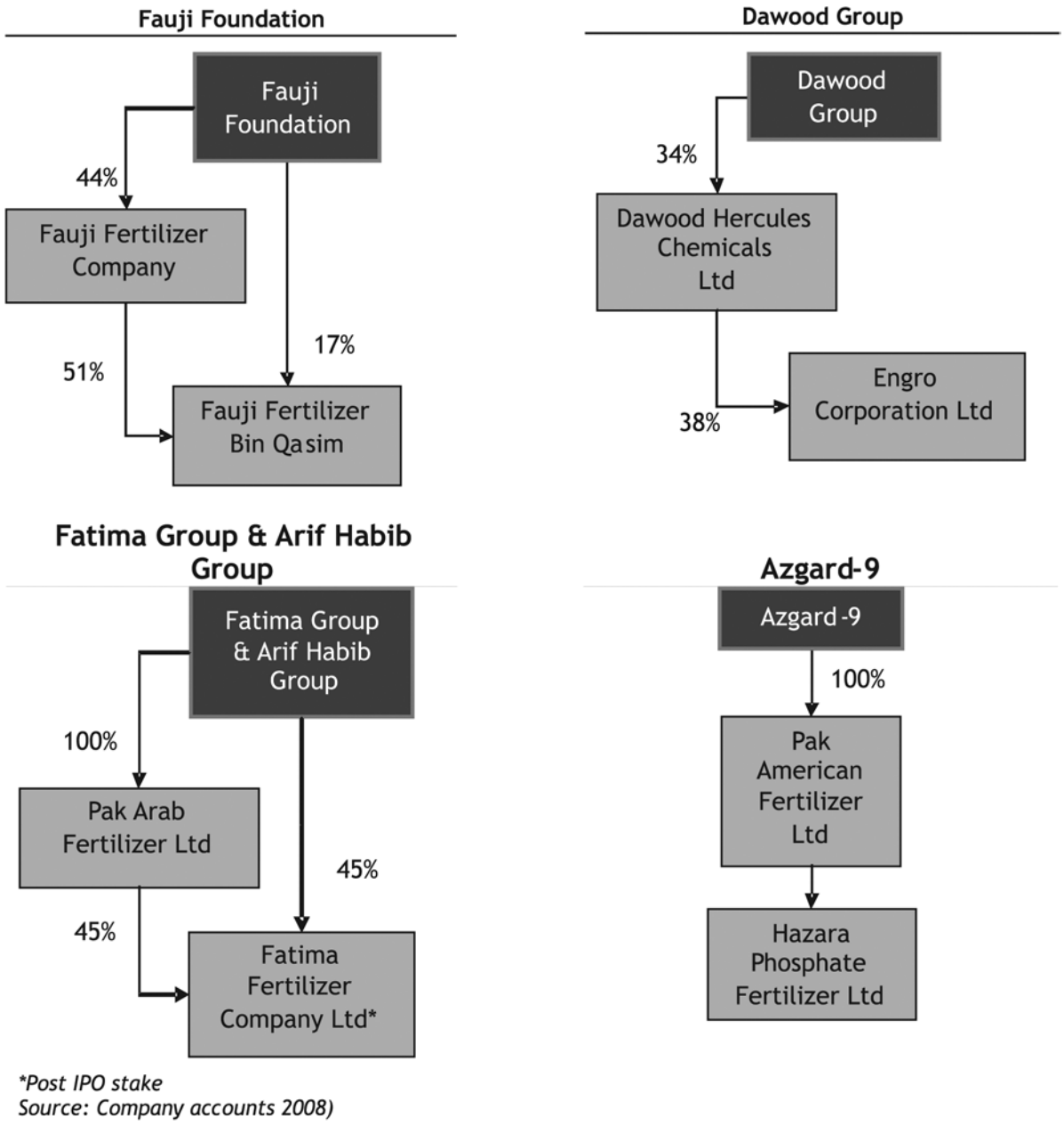
- **Pak American Fertilizer Company**
  Pak American Fertilizers Ltd. produces urea fertilizer. The company was founded in 1959 and is based in Mianwali, Pakistan. Pak American Fertilizers, Ltd. operated as a subsidiary of National Fertilizer Corporation of Pakistan (Pvt) Limited until it was privatized and fully acquired by Azgard-9 in 2006. Azgard-9 also acquired Hazara Phosphate Fertilizer Ltd. through Pak American, located in Haripur, NWFP and manufacturer of single super phosphate (SSP).

- **Fatima Fertilizer Company Ltd**
  Fatima Fertilizer Company Ltd (FFCL) is the newest player in the sector, about to enter the urea, CAN and NP markets during 2010 and 2011. With a total project cost of Rs59 billion, the company is jointly owned by the Fatima Group and Arif Habib Group, while Pak Arab Fertilizer holds a 50% stake in the company. The company will have a 500,000 thousand tons urea capacity while it is expected to become the market leader in CAN, NP and NPK production.

[1] FFBL Annual Report 2008

The ownership structure of these companies is presented in figure 3. This will help clarify key holding parties and their influence on the domestic fertilizer industry inter-locking interests in each company.

Figure 3: Ownership Structure



**Post IPO stake*
Source: Company accounts 2008)

Identifying competitors in relevant markets

Table 3 presents a classification based on macronutrient category, but with a slightly different perspective. Since nitrogen, phosphate and potash should appropriately be considered as complements of each other rather than substitutes, competition should primarily be assessed within each macronutrient category separately. Under this senario , FFC, ECPL, FFBL, DHCL, AZGARD, PFL and FFCL should be considered to be competing with each other within the nitrogen manufacturer's segment and the same should hold true for phosphate and potash (vertical assessment).

Table 3 : Nutrient-wise Fertilizer Manufacturers

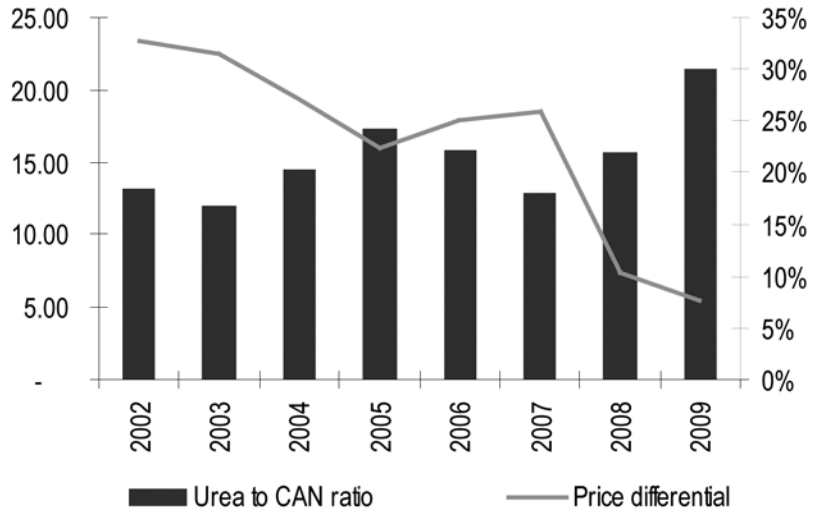
NITRGOEN	PHOSPHATE	POTASH	COMPLEX
FFC	FFBL	IMPORTED	ECPL
ECPL	AZGARD		PAK ARAB
FFBL	ALHAMD		FFCL
DHCL			
AZGARD			
PAK ARAB			
FFCL			

Source: InvestCap Research

It should be noted that some products (such as products under complex category) tend to compete with other product lines due to their attribute of having more than one nutrient content. Therefore, a product such as NP at times competes with phosphate-based products like DAP. Similarly, NPK products have wider appeal since having attributes of all three products and therefore sometimes compete with potash products which are not manufactured locally. Once this clarity is obtained, the next step would be to assess whether products under different categories also compete with each other (horizontal assessment).

Even then, the nutrient content presented in table 2 should be kept in mind. The price differential between different products should also establish whether substitution between products should occur. As an example, urea's nitrogen content is 1.7 times higher than that of CAN, the price differential between the two should also prevail in this range. A change in such differentials should rationally result in substitution in favour of one against the other. Over the years, CAN's usage compared to that of urea has gradually declined. This was typically the case as CAN continued to become pricier against urea in relative terms as shown in figure 4.

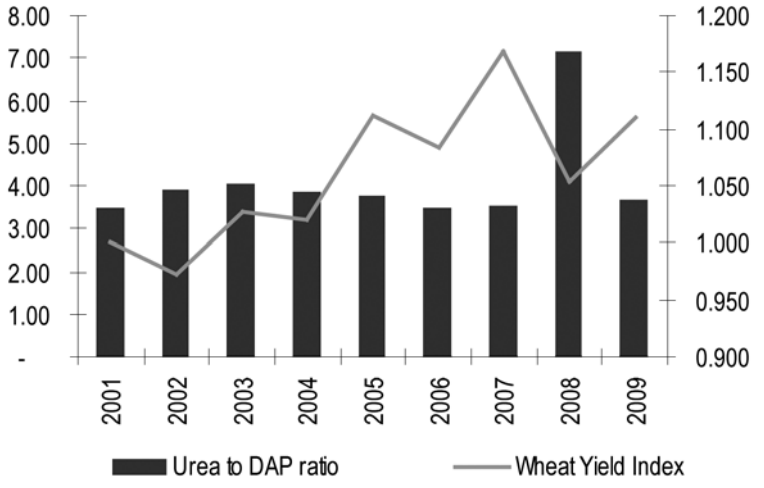
Figure 4 : Urea and CAN usage & price comparison



Source: NFDC Data

Another instance of possible substitution between products that cater to different needs can be observed in 2008, when prices of fertilizer rocketed internationally alongside major commodities such as oil. During this time, the price differential between urea and DAP also surged massively, leading the farmer to consume more urea in an attempt to replace phosphate deficiency catered through DAP. While this substitution did take place, it did not contribute towards crop yields positively. While the decline in yields can also be attributed to overall decline in fertilizer consumption, the role of a less balanced use of fertilizer was perhaps more significant. In this manner, substitution between complementary products is definitely undesirable.

Figure 5 : Balanced use against crop yield



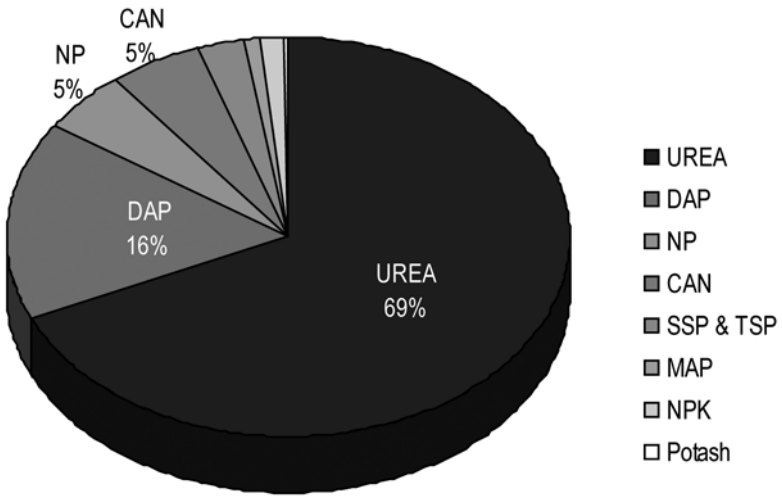
Source: NFDC Data

The only category that provides products that are potentially a substitute for all three macronutrient categories is that of complex fertilizers. These fertilizers often have attributes of more than one fertilizer and therefore can be considered as competitive to other categories. Nevertheless, the nutrient content should be carefully assessed in any case, so as to match products more appropriately. Price differentials between such products need to be carefully assessed so as to grasp whether such substitution would be justified in relative terms.

Assessing market power

For a better understanding of the market power of each player and the degree to which each player can influence a typical farmer, the consumption mix of each product is presented in figure 6. As is evident, urea dominates the consumption mix, followed by DAP. NP and CAN also hold reasonable proportions in the overall consumption mix. This understanding is important because it precisely points out that producers or suppliers of urea enjoy greater influence over a typical farmer due to a higher consumption of their product. Similarly, smaller urea or DAP players could still be influencing the farmer more than the bigger players in less visible products like CAN or SSP. This tendency is important and will be discussed in more detail later under the case of tie-in sales experienced in the sector and recently dealt with by the CCP.

Figure 6 : Product wise Consumption Mix *



**Average 2001-2009*
Source: NFDC Data

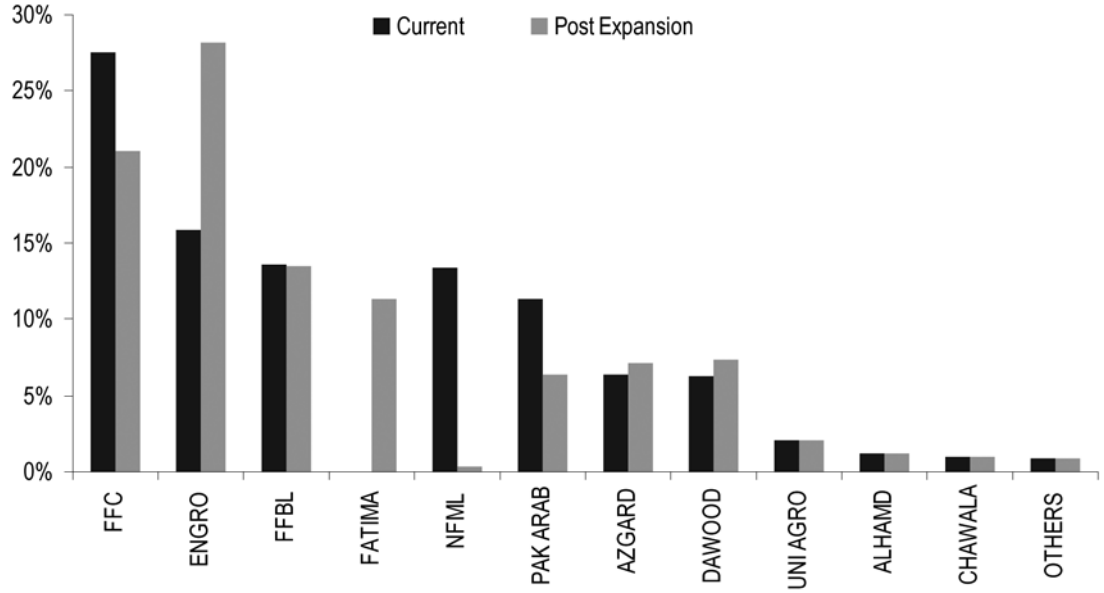
Table 4 : Post Expansion Expected Market Share*					
NITRGOEN		**PHOSPHATE**		**COMPLEX**	
UREA		**DAP**		**NP**	
FFC	30%	FFBL	45%	Pak Arab	47%
FFBL	10%	Imported	55%	ECPL	5%
ECPL	34%			FFCL	48%
DHCL	10%				
AZGARD	7%	**SSP**		**NPK**	
PAK ARAB	2%	AZGARD	51%	ECPL	25%
FFCL	7%	ALHAMD	49%	FFCL	75%
CAN					
FFCL	55%				
PAK ARAB	45%				

**Based on Capacities*

Source: NFC, Company Accounts

While table 4 provides an insight into what market shares each company would enjoy under different segments, adjusting the same according to consumption mix is vital. The same is presented in figure 7. Note that this adjustment does not incorporate imported fertilizers and only uses the domestic production capability of each player.

Figure 7 : Market Power of Participating firms



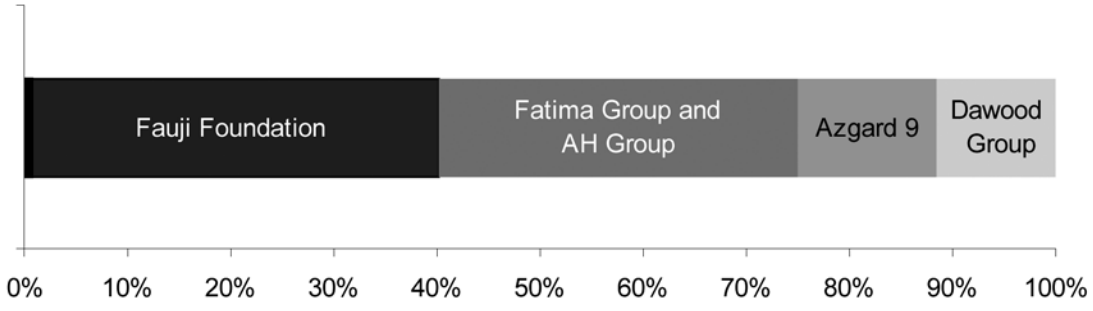
Source: NFDC Data

As is evident, FFC along with its group holding FFBL enjoy the highest market power when compared in terms of domestic production. If imports, such as DAP, are also incorporated, ECPL's influence would then surpass FFBL. However, imports tend to be volatile and import markets are fairly competitive in this respect. Meanwhile, the market share for such imports tends to vary over the years and seasons, so no importer can be singled out as exercising significant influence over imported supplies. Therefore, an assessment on the basis of productive capacity is more meaningful when the need is to observe a company's influence over the end-consumer solely because of its supply capability (such as FFBL having the productive capability to supply DAP).

The post expansion scenario is fairly different. ECPL would enjoy a lead over its peers FFC and FFBL. Yet, FFC and FFBL when combined would continue to enjoy a greater influence. Another emergent element is the inception of FFCL, a new player in the industry with a capacity to produce four products. FFCL's advent will enable the Fatima Group and Arif Habib Group to become significant players in the market of fertilizers.

Figure 8 presents the market power presented above in figure 7 further adjusted with each group's holding in the respective companies. While it does reveal some important elements, a significant limitation of this illustration is that it only incorporates the percentage holding of each group within the company (and could not incorporate the actual influence in the form of management control). As such, an entity holding 25% of any company can still run and make recurring business and financial decisions without day to day intervention from the remaining 75% shareholders. Nevertheless, it does indicate how closely held these companies are within their respective groups. In this manner, since FF holds a majority stake in FFC, which in turn is the majority holder of FFBL, it can be safely presumed that the group exercises a significant influence over both companies. This presumption is slightly difficult in the case of Dawood Group, which holds a 34% stake in DHCL, which in turn holds a 38% share in ECPL. Therefore the actual stake of the group in ECPL appears to be dilutive. Still, as pointed out before, the tangible holding in any company may not be fully reflective of actual control. The case is relatively straightforward when it comes to Fatima Group and Arif Group, as companies within their parameters are closely held (90% or more). Notice that it is difficult to distinguish between Fatima Group and Arif Habib Group as far as the fertilizer sector is concerned.

Figure 8 : Market Power of Groups



Source: NFDC Data

HHI and industry concentration

The above analysis should provide a reasonable insight into the prevailing industry structure and the influence that can be associated with each individual player or group. With this insight, a further assessment of the concentration ratios and Herfindahl-Hirschman Index (HHI) is carried out. As with the above analysis, it is important to come out with these indicators after adjusting for the individual product consumption mix. To recall, a company which is selling 30% of a product which has a 70% share in the overall consumption basket should essentially have the same market power as a company selling 70% of a product which has only a 30% share in the consumption basket. In this manner, smaller producers in the urea market are in a better position to influence a rational consumer /farmer compared to larger producers of NPK. A hypothetical and intuitive illustration is presented in table 5 to elaborate this concept further. In this case, only two products, urea and DAP are presented to simplify the illustration. Urea is assumed to have a 70% share in a farmer's consumption basket while DAP is assumed at having the remaining 30%. Under this illustration, hypothetical company A has the highest product adjusted share at 49% while company D stands at the lowest. Also note that company B and company C have the same market shares.

Table 5 : Hypothetical case to illustrate market share adjustment

		Market share	Adjusted Share
	Urea		
Company A	70%	70%	49%
Company B	70%	30%	21%
	DAP		
Company C	30%	70%	21%
Company D	30%	30%	9%

With this adjustment, the HHI index can be compared for both pre- and post-expansion scenarios alongside the cumulative impact of which company is gaining or losing influence.

Table 6 : Herfindahl-Hirschman Index

	Current	Post Expansion	Change	Cumulative Impact
FFC	759	444	(314)	(314)
ECPL	252	791	540	225
FFBL	186	181	(5)	221
FFCL	-	129	129	349
NFML	180	0	(180)	169
PFL	128	41	(87)	82
AZGARD	41	51	10	92
DHCL	40	54	14	106
UNI AGRO	4	4	-	106
ALHAMD	2	2	-	106

CHAWALA	1	1	-	106
JAFFER BROTHERS	1	1	-	106
KHALID JAVED & BROS.	0	0	-	106
GEN. TRADERS	0	0	-	106
	1,592	**1,698**	106	
4 firm concentration	**70%**	**74%**		

Interestingly, the HHI increases to 1698 under the post-expansion scenario. Also note that the concentration ratio also increases to 74% under the post-expansion scenario. This finding may be explained in the following manner:

ECPL's market strength is expected to enhance considerably owing to its 1.3 million ton expansion in the urea segment. This is expected to increase ECPL's urea market share from the present 15% to around 30-35%. The impact of this enhancement is expected to be evident on FFC, as its market strength will decline. Another addition is that of FFCL, which will also potentially have a dilutive impact on bigger players, owing to its ability to manufacture and market four distinct products including urea. FFCL's market power could further enhance if it is able to successfully market NP as a potential substitute of DAP.

NFML currently has a 19% share in overall urea off-take, since it is handling the entire supply of imported urea, which has increased its market power substantially. However, once new capacities come on stream and the shortfall of urea supply is bridged, NFML's role will again fade. Since ECPL and FFCL will play a vital role in bridging this gap, NFML's power is diluted in the post-expansion scenario and shared by these players.

As far as the above assessment is concerned, the expansionary scenario of urea is taken into account. However, it is pertinent to mention that DAP which constitutes 16-19% of the consumption basket would remain an important market for many players. Since FFBL is the only producer, it is expected to carry on with its share of around 45% in this segment. The remaining 55% will still be imported and this portion of the market will remain competitive in this regard. Any company which is able to grab an additional DAP import share will eventually gain noticeably in terms of market power. So far, ECPL has remained quite aggressive in capturing this import segment and its share has improved to 18% this year from last year's 14%. The share of other importers under the post-expansion scenario is maintained at current levels for the purpose of this study.

While the above assessment yields some interesting findings, a conventional analysis into separate product markets is also carried out to provide an alternative picture. Table 7 presents HHI and concentration ratios with the urea market on a stand-alone basis. The concentration is significantly higher as highlighted by both ratios, thereby suggesting that the urea market on a stand-alone basis is highly concentrated between a few firms.

Table 7 : HHI and Concentration Ratios in Urea market		
	Current	Post Expansion
HHI	2,387	2,370
4 Firm Concentration	84%	84%

Lastly, HHI and the concentration ratio are calculated on the basis of interlocking interests which were pointed out earlier. The result is possibly the most dramatic when the market share of companies representing the same group/owners are combined together.

Table 8 : HHI in terms of vested interests				
	Current	Post Expansion	Change	Cumulative Impact
FFC + FFBL	1,695	1,193	(502)	(502)
ECPL + DHCL	491	1,257	765	263
FFCL + PFL	128	314	187	450
AZGARD	41	51	10	459
NFML	180	0	(180)	279
Others	26	26	-	
	2,561	**2,840**	279	
4 firm concentration	**88%**	**88%**		

Irrespective of what basis is selected to calculate HHI and the concentration ratios, the results yield a high level of industry concentration. Table 6 clearly suggests that industry concentration enhances on a collective basis as new players enter the market. Table 7 further suggests individual product markets would still remain highly concentrated as the imported share of NFML is only split and spread across other players. Table 8 suggests that on a collective level, ECPL and DHCL would match FFC and FFBL in the post- expansion case and the sector would tentatively resemble a duopoly.

While this finding may be useful, it does not suggest that anti-competitive or collusive behaviour prevails in the sector. What it might suggest is that there appears to be space for fertilizer companies in Pakistan to become involved in collusive behaviour. This aspect will be discussed further towards the end of this chapter. For now, some of the other important elements which are necessary for a broader understanding, or those which could influence competition dynamics in the sector are discussed.

Seasonality

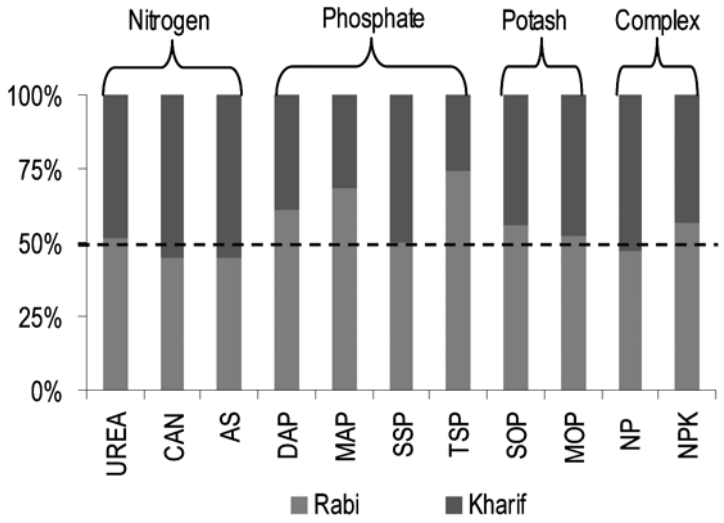
Seasonality plays a critical role in fertilizer sales. To provide a context, Pakistan follows the Kharif and Rabi cycles. The Kharif season can also be labeled as summer-autumn or monsoon harvest season in the subcontinent and includes major crops like rice, maize, cotton and sugarcane. The Rabi season entails the winter-spring crop cycle and major crops grown include wheat and barley. The following table provides an insight into this phenomenon.

Table 9 : CROP CALENDER

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Wheat												
Rice												
Cotton												
Sugar												
Maize												
Sowing												
Growing												
Harvest												

Source: Pakistan Meteorological Department

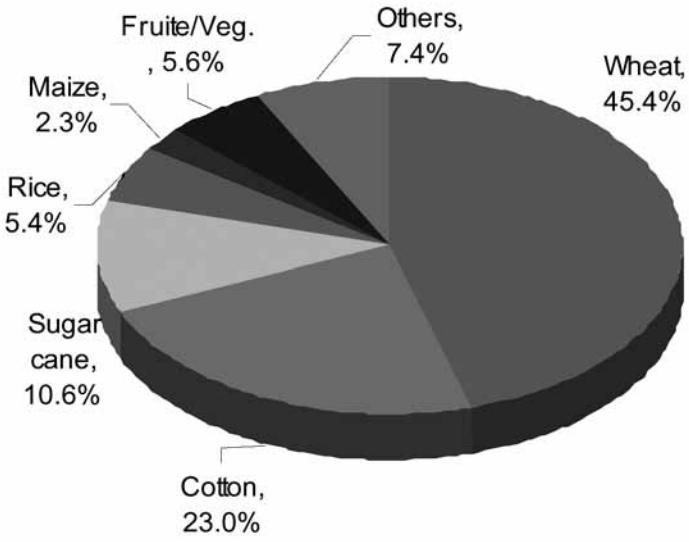
Figure 9 : Season wise off-take*



*Average of last 8 years
Source: NFDC Data*

Figure 9 further clarifies the use of different fertilizer products during the two cropping seasons of Rabi and Kharif. Nitrogen-based fertilizers such as urea, CAN and AS appear to have more balanced use during the two seasons. Urea usage is slightly distorted towards the Rabi season owing to high requirements for the cultivation of wheat. Figure 10 is replicated here to substantiate fertilizer usage by individual crops.

Figure 10 : Fertilizer Use by Crop



Source: FAO - Fertilizer use by crops in Pakistan

In a similar manner, prominent phosphate fertilizers like DAP, MAP and TSP have increased usage for Rabi's wheat crop. Another notable aspect is that usage of these fertilizers is highest during the month of November, when wheat sowing actually starts. This implies that phosphate fertilizer is used during the sowing of the crop and its application during the growth or harvest period appears limited. A divergence from this trend would therefore suggest pre-emptive procurement, such as in anticipation of rising prices.

Pricing mechanisms

The pricing of fertilizers, like for any other product, is based on various fundamental demand and supply side factors. The demand side in this case is influenced by seasonality and affordability of the relevant fertilizers during the cropping seasons. Since crop cultivation in Pakistan follows the typical Rabi and Kharif cycle, fertilizer demand for both seasons varies, based on the crops cultivated during each season. Meanwhile, affordability is a function of prices experienced by farmers during the preceding crop period. For instance, better prices realized by the farmer on cotton and rice crops will enhance their purchasing power for input procurement (including seeds and fertilizers) requirements for the wheat crop. Another means to improve farmers' purchasing power is through fixation of an attractive procurement/support price by the government, alongside assigning a procurement quota on such prices through an agency called the Pakistan Agriculture Storage and Services Corporation (PASSCO). This motivates a rational farmer to increase cultivation of the specific crop on the basis of the support prices fixed by the government.

It was further established by Quddus et al. (2008) that demand for nitrogen and phosphate fertilizer is relatively inelastic in relation to price movements while potash appears to be more elastic. The statistical inference drawn by the study revealed that a 10% increase in the relative price of fertilizer may lead to less than 2 to 3.5% decrease in the short run and about 4 to 7% decrease in the long run in the per hectare consumption of nitrogen and phosphorus fertilizers. The study further revealed that a shift in production technology also had a strong positive impact on the off-take of fertilizers[1].

On the supply side, raw material and fuel costs are the key components which drive the producer's overall manufacturing costs, which eventually determine the prices of the final product. For importers, the international pricing mechanics (as discussed in Chapter 3) are the critical factors. In terms of products, urea pricing is primarily dependent upon the cost of natural gas, which is produced domestically and priced in the light of the Fertilizer Policy 2001. Since domestic gas prices are regulated in Pakistan and are fixed by the government on a periodic basis, urea prices that manufacturers can charge can be deemed to be regulated indirectly, even though they are not directly determined by the government. In this manner, the government tends to control and keep urea prices lower than international prices in order to provide relief to domestic consumers. This is done typically by providing concessionary rates at which gas is utilized by fertilizer manufacturers for ammonia production. While domestic manufacturers tend to pass the impact of any gas price hike in their urea prices, they tend to keep it at uniform rates while maintaining their margins, independent of seasonal demand hikes.

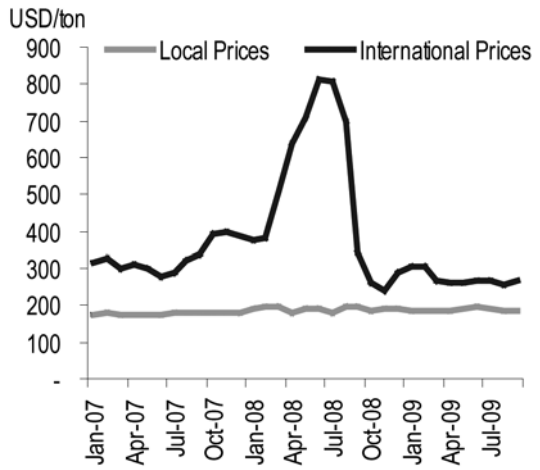
The above scenario is relevant for urea manufacturers. As far as DAP is concerned, phosphoric acid is the primary raw material, which is imported by FFBL through its subsidiary PMP. Since

[1] Quddus et al. (2008)

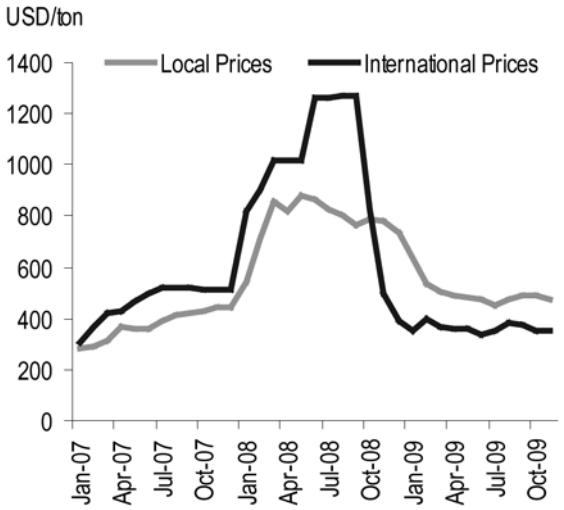
FFBL accounts for 40-45% of domestic supply, the remaining DAP is still imported thereby linking domestic pricing more closely to international pricing mechanics as well as to exchange rates. However, owing to FFBL's large market share in this segment, its brand often sells at a premium to other imported brands. The government tends to control domestic prices amid international price shocks through direct subsidies determined each year after assessing international pricing. Price variations in DAP are more evident due to rapid fluctuations in international markets; hence, margins tend to remain more erratic for both importers and manufacturers even when subsidies are provided. Therefore, the import markets and manufacturing units which rely heavily on imported raw material are more market-driven.

Figure 11 : Local and International Prices Comparison

Urea Price



DAP Prices



Source: Bloomberg, FBS

From the analysis of the above demand side and supply side factors which influence prices, it can be inferred that government intervention plays an active role, even though it still does not exercise direct control over supplies. This does restrict the free and full control over the market by key supply and demand side market forces. Therefore, any seasonal shortages and the resultant increase in retail prices fall on distribution channels.

Profitability analysis

A profitability analysis is imperative to assess whether the profit maximization motive of the participating firms is being fostered at the cost of hurting end-consumers. Profit maximization in itself is not harmful; in fact it drives efficiency and productivity of companies operating under the free market mechanism. The argument should be whether profits are maximized through harmful practices.

Here the analysis could be conducted in two ways. One, the profitability of participating firms should be assessed in comparison to companies operating in the other countries in the region. Two, a relevant assessment should be carried out through cost analysis to see whether an increase in domestic prices is justified through cost push inflation and whether abnormal margins are being earned through unjustified price increases.

As was presented above, the industry has a very high degree of concentration; therefore producers enjoy substantial pricing power. Meanwhile, there is a supply shortfall in case of urea and DAP, so price pass-on capability of the producers is increased. Typically in the case of urea, impact of any cost increment is often swiftly and smoothly passed on to end-consumers and is generally done across the board by all producers while the price itself is kept uniform by each producer. It also becomes easier for local producers to pass on the cost impact since domestic urea prices remain lower than international prices owing to the gas subsidy. Under this instance, it becomes rational to remove the impact of subsidy provided on feed-gas and then assess whether higher margins are enjoyed by local companies when compared with regional players.

Table 10 : Profitability Comparison of Different Regions

	Net Margin*	Avg EBITDA Margin**	Avg ROE **
Saudi Arabian Fertilizer Co (SAFCO)	82%	72%	30%
MENA excluding SAFCO	21%	23%	31%
Pakistan	11%	27%	33%
China	4%	19%	9%
India	12%	15%	16%
*Current year			
**average 2004-08			

Source: Bloomberg

Table 2 is replicated here to provide an insight into profitability. The following characteristics should be observed:

- Abnormally high margins are enjoyed by Saudi-based SAFCO. The company is provided natural gas at subsidized rates (around $ 0.6/mmbtu). Since it is an export oriented company, it takes the full benefit of higher regional prices while its cost remains at much lower levels.
- Pakistani companies have a similar cost structure when compared to SAFCO, as far as gas allocation to new companies and capacities are concerned. In this manner, ECPL's plant expansion and FFCL's new plant is going to have the same cost structure as far as feed-gas is concerned. However, since there is a supply shortfall and export is not allowed under the present case, local companies supply urea at discounted rates as compared to international prices, while keeping their margins at relatively stable levels. The EBITDA and ROE is still at a higher level when compared to China or India and remains in line with other MENA based companies.

If we normalize prices, then the company price still stays competitive compared to the region. Therefore, the higher margins enjoyed by the companies when compared to their peers from India and China are justified even at subsidized rates. The following table substantiates this conclusion.

Table 11 : Urea price comparisons

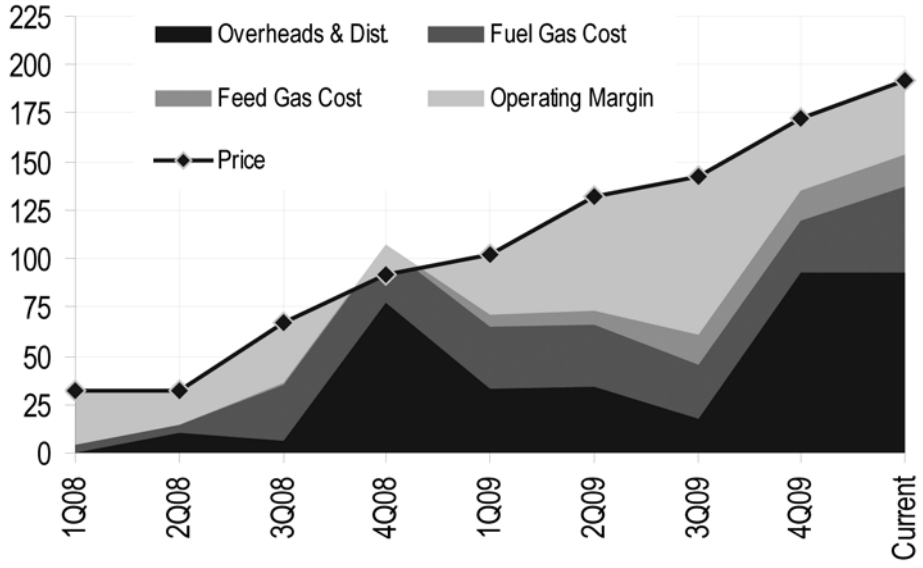
USD/ton	1Q08	2Q08	3Q08	4Q08	1Q09	2Q09	3Q09	4Q09
Local Prices								
Actual Urea Price	183	179	169	162	161	171	168	175
Normalized Price	247	240	249	237	238	246	235	241
International Prices								
Arab Gulf	380	710	700	240	305	260	254	310
Caribbean	370	700	630	190	275	240	256	315
Baltic	435	740	640	255	315	280	275	320
Western Europe	290	460	525	195	235	195	198	214
Asia/Oceania	435	740	640	255	315	280	275	320
Average Price	382	670	627	227	289	251	252	296

Source: Bloomberg, NFDC

Normalized prices reflect the impact of subsidy removal on the company price, keeping the margin constant. Since the normalized price is still at a competitive level with the regional price, the margin is justified. In this regard, the local companies are more comparable and closer in terms of their cost structure to Middle East-based companies.

The second part of the profitability analysis focus on how realistic the price increments are when viewed against cost inflation and whether margins are unrealistic against the cost structure. Figure 12 provide an appropriate picture of the matter. Table 12 further shows the trend in an absolute form.

Figure 12 : Urea price cumulative increase



Source: FAO - Fertilizer use by crops in Pakistan

Table 12: Urea price and cost increase			
Rs per bag	**2008**	**2009***	**Current****
Increase in Price	92	80	20
Total cost increase	107	29	18
Feed gas cost increase	1	15	-
Fuel gas cost increase	29	(2)	18
Overheads and Distribution Increase	77	16	N/A
Change in Operating Margin	(15)	51	2

**4th quarter overheads based on estimates*
***Increased right after18% increase in fuel gas rate*

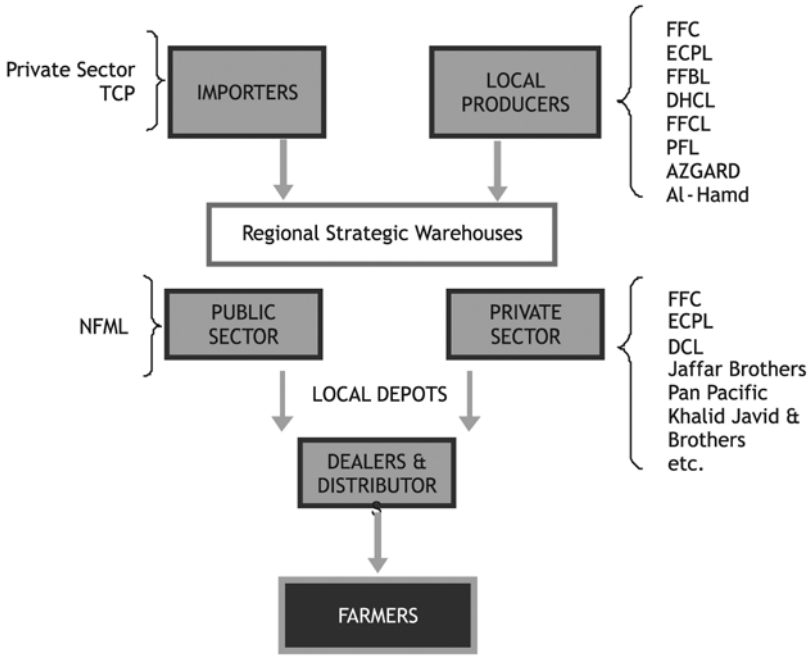
A few notable points are: firstly, prices are raised gradually over the period. During the fourth quarter of 2008, the increase in overheads and distribution played a vital role in pressing down the margins substantially, so much that the change in price was not adequate to cover the increase in costs. Meanwhile, prices were gradually increased during the fourth quarter of 2009 again due to higher overhead and distribution costs. The current increase in urea price stemmed from an increase of fuel gas rate by 18%. Per bag estimate of this increase comes out at Rs 18/bag while the urea price was increased by Rs 20/bag.

Analysis of the cost structure also points out only nominal windfall gains, which are often reversed when demand is not adequate or market conditions are unfavourable for producers (as was the case in 2008). Meanwhile, growth in volume dilutes the per bag impact of overheads and other fixed costs, therefore resulting in better profitability (to be observed during 2009). Excessive profiteering through unfair practices cannot be unequivocally substantiated in the local fertilizer industry based on the above assessment.

Fertilizer supply chain

While an assessment of fertilizer manufacturers appears relatively straightforward, it is important to assess how fertilizer distribution channels operate in order to fully grasp the impact on end-consumers with respect to fertilizer supplies and pricing. The following chart and table shows this clearly:

Figure 13 : Distribution Channels



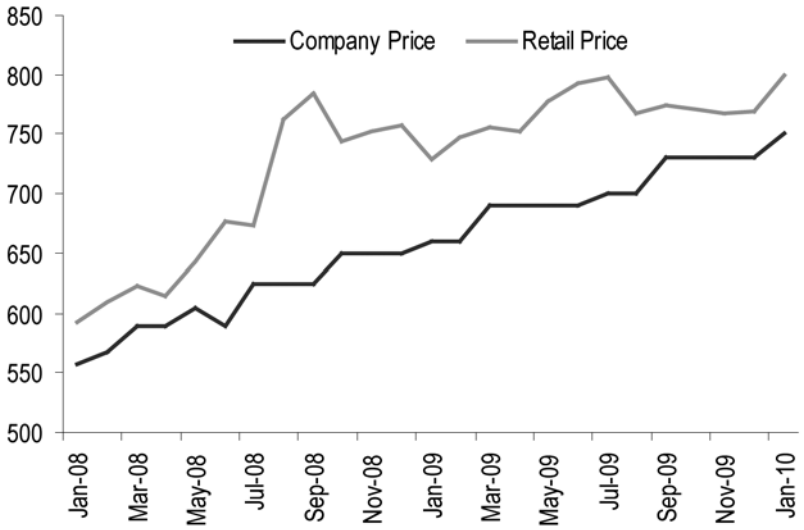
Source: NFC Fertilizer related statistics 2007

NFML represents the public sector in the supply chain. The company is a subsidiary of NFC and used to handle the entire NFC production. With NFC phased out as a result of privatization, NFML's role is now restricted to handling only the distribution of urea imported through the Trading Corporation of Pakistan (TCP).

The private sector comprises of major producers as well as smaller private players. FFC has the widest distribution penetration with nationwide coverage. FFC handles its entire production as well as that of FFBL, thereby making it the largest marketing company. On the other hand, ECPL has distribution penetration in Sind, Balochistan and Punjab while its NPK is better marketed in NWFP. As such, the companies provide their product, especially urea, from their strategic warehouses at standard uniform rates. The distribution cost associated with such provision is absorbed and reflected in the prices charged by these companies. Once the product is sold to licensed distributors (ultimate consumers for manufacturers), the retail prices are then influenced by how swiftly these products are sold to the true consumer (farmer). Historically, the differential between retail and company prices tends to fluctuate, which incorporates transportation and handling charges borne by the distributors alongside their own margins. Figure 14 points out this tendency. It is worthy of note that distributors' margins surged enormously during the peak season demand of 2008, which

was partly attributable to a shortage of supply and untimely availability of imports. Whatever the reason, the situation was solely capitalized by distributors in the chain. Meanwhile, instances of hoarding or smuggling to neighbouring Afghanistan have also been quoted time and again either through media or industry sources. The distribution margin eventually rationalized once urea fertilizer import was finally carried out by TCP and marketed through NFML (direct government intervention into supply).

Figure 14 : Urea retail price vs company price



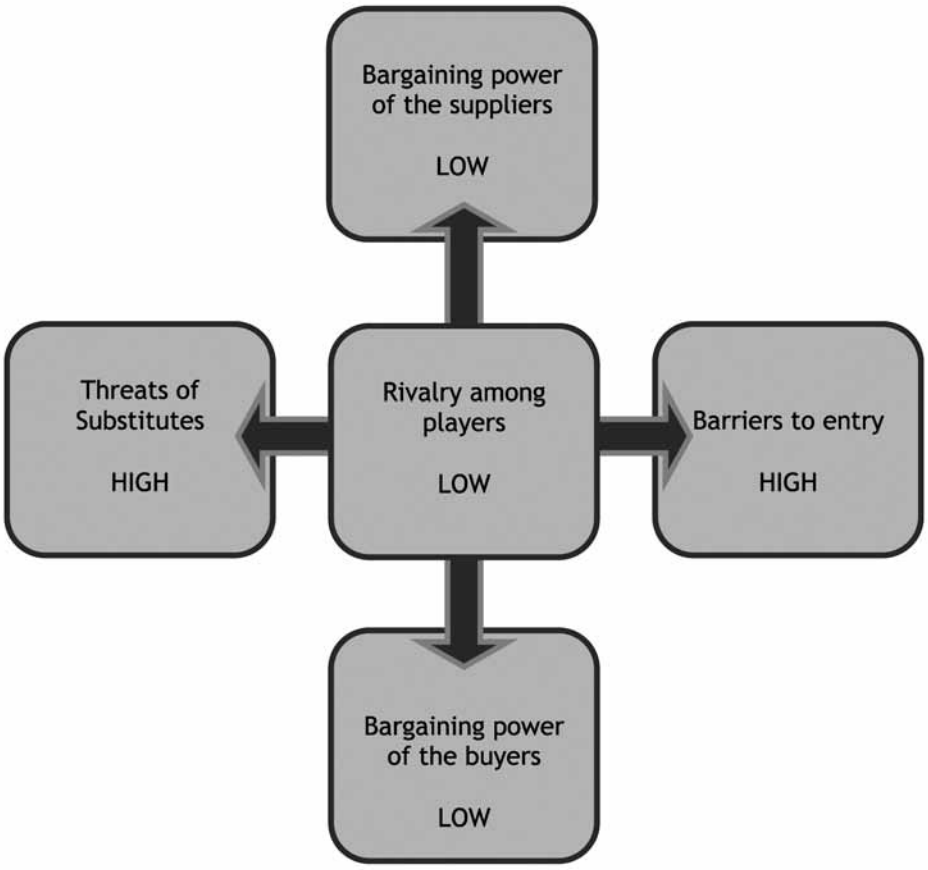
Source: NFDC,FBS, company management

While a competition assessment for larger players and producers is critical, the same is equally important for distribution channels. Notice that the farmer, who is the ultimate consumer and the prime factor subject to government protection and the sole agent responsible for agriculture output, is not in fact a customer of fertilizer producers, but rather a customer of fertilizer distributors. Even though supply policies and market practices of producers can be perceived to have a massive impact on distributors, the degree to which market practices of distribution firms influence and impact individual farmers is in principle equally important. However, the assessment in this area suffers from limitations due to lack of data availability, for example available data only reflects fertilizer off-take from the company to its distributors. The responsibility therefore lies on CCP to conduct appropriate inquiries into alleged cases of artificial shortages or the factor of smuggling (the incentive of which is ever present due to cheaper domestic urea in the country owing to indirect subsidy).

Porter's five forces

Once the above distinction between fertilizer manufacturers and distributors is clarified, Porter's five forces model is applied for both constituencies separately. This should help substantiate many of the findings that were presented in this chapter. Figure 15 presents the five forces model for domestic fertilizer producers.

Figure 15 : Porter's five forces - Fertilizer Producers



Bargaining power of suppliers - LOW

Prices and supply of key input like natural gas is regulated and is dedicated under contract.

FF has 40% ownership in Mari Gas Company. FF, FFC and FFBL also hold a stake in PMP under joint venture arrangement with Officie Cherifien Des Phosphates (OCP), the state owned Morocco-based phosphate giant.

Excess supply and large number of suppliers across region lowers bargaining power of international suppliers.

As far as raw material is concerned, ammonia is the key input for many of the fertilizers, including both nitrogen and phosphate fertilizers. The primary method used to manufacture ammonia is through ammonia synthesis and the Haber process is then used to produce urea. The key input in this regard is natural gas. Both supply and pricing of natural gas is highly regulated by the government. Meanwhile, supply is ensured through long term agreements. In case of bigger players like FFC and ECPL, gas supply is ensured through Mari Gas Company under long term contracts. FF also owns a 40% stake in Mari Gas therefore having increased influence over its decisions, such

as with respect to load management or seasonal outages. Others are supplied through SSGC and SNGPL systems but allocation is dedicated to them. Cost of switching for suppliers of natural gas is virtually meaningless as such is not only barred by contract, it could also require heavy capital expenditure by either the field operator or gas distribution companies. Therefore, the bargaining power of the supplier is low as far as urea manufacturers are concerned.

For other fertilizers which require other inputs like phosphoric acid or phosphate rock as in case of DAP or NP, the bargaining power of the supplier still remains low. FF, FFC and FFBL have invested in an offshore venture with the Moroccan government in a company that supplies phosphoric acid to FFBL. Therefore, the backward integration has enabled it to eliminate supplier risk and the switching cost for the supplier is again less meaningful. For other fertilizers that are imported, the global availability of suppliers thins their bargaining power, especially when bigger consumers like China and India continue to influence them.

Bargaining power of buyers - LOW

Each company has an adequate number of distributors under them.
Some of the bigger players like FFC have nationwide coverage as far as distribution is concerned.
Other producers like DHCL tend to restrict themselves to Punjab and NWFP.
With only a few producers having control over total supply, the bargaining power of distributors is low.

Switching costs for distributors are still low, given the generic nature of fertilizer products and a lack of differentiation thereby. Still, a large number of distributors compared to only a few producers keeps the bargaining power of customers at a low level.

Barriers to entry - HIGH

Diminishing availability of natural gas restricts new investment
Non-availability of locally produced phosphoric acid restrict new investment in DAP
Highly capital extensive nature restricts induction of new players
Government policies remain conducive towards investment, typically when a concessionary rate on gas is offered for a period of 10 years, therefore partially neutralize high entry barriers.

While Pakistan is rich in natural gas, the increasing demand and limited exploration activities in the past have resulted in a limit on the availability of this resource. Presently, the country is facing seasonal outages typically during winter. The situation may aggravate in the future as the country's energy requirements and industrial growth potential would require a much higher availability of this indigenous resource at a time when Pakistan's import bill is already oil-oriented and its balance of payments are threatened by future oil price shocks. Under this case, the fertilizer sector, which already consumes 16% of total gas[1], has limited potential to induce further investors, as far as mainstream products like urea is concerned. Non-availability of domestically produced phosphoric acid again restricts new investment in DAP.

The sector also requires high capital expenditure. Recent urea expansion for ECPL has cost $ 1.05 billion while Fatima fertilizer's project costs more than $ 700 million. In the meantime, regulatory

[1]HDIP (2009)

barriers are apparently low as fertilizer policy continues to remain conducive towards investment while concessionary rates on gas supplies are still being offered for capacity expansion and new plants.

Threats of substitutes - LOW

Chemical fertilizers have a much wider application and greater appeal as compared to organic fertilizers. Urea remains the dominant nitrogen-based fertilizer while DAP is the leading phosphate fertilizer. The tendency of other fertilizers to substitute these main products is limited.

While the tendency of substitution was discussed earlier in the chapter, it should be recalled that nitrogen, phosphate and potash cater for different nutrition needs. Therefore these should appropriately be considered as complementary products rather than substitutes. Meanwhile, chemical fertilizers themselves have a far wider appeal worldwide and are considered to be a key component in crop cultivation and growth.

Rivalry among players - LOW

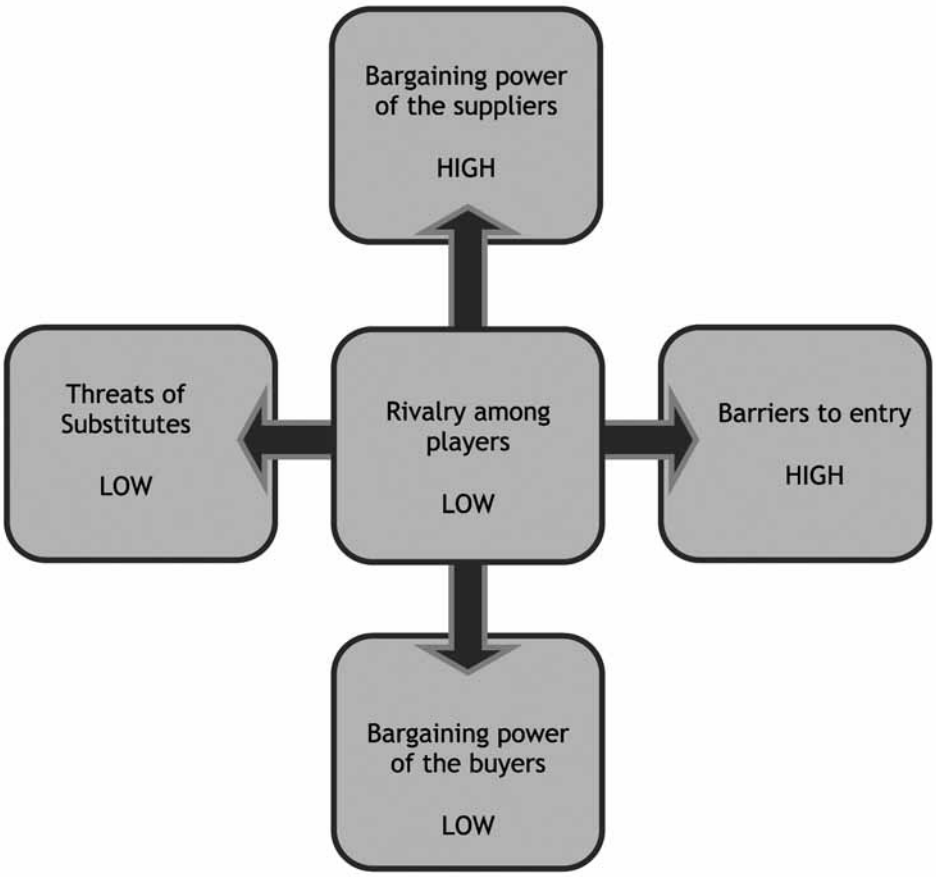
Producer prices for urea are generally set with mutual consensus, as evident by a standard uniform price across the sector.

Differentiation occurs within imported supplies since they are fairly linked with international prices.

Urea producers as a common practice fix prices at uniform rates. Factors such as hike in input costs, mainly for natural gas, play an important role in fixing and driving prices. Therefore there appears a mutual consensus over pricing of this fundamental product. This is also done to curtail volatility in urea prices and support farmers in this regard. Since an indirect gas subsidy is provided to the manufacturer, prices continue to remain at a much lower level compared to international prices. Rivalry in this regard in the form of price wars is non-existent as far as urea is concerned. Even under the case of excess supply which is expected to occur after 2011 and will likely prevail for a few years afterwards, the likelihood of a mutual quota-based supply system is greater than a price war; since only few producers participate in supply and a consensus appears to be more manageable owing to vested interests. This case will only occur if export of excess supply is not allowed by the government, which itself is very unlikely. Therefore the possibility of either a price war or a quota system for domestic supply can be ruled out during the excess supply situation, which itself is conjectured to last for not more than a few years due to growth in domestic demand.

For products which are more exposed to international pricing such as DAP, prices tend to fluctuate and price differentiation is often present. FFBL which controls 45% of domestic DAP supply often sells its brand at a premium to imported DAP. While prices are relatively more competitive for such fertilizers, the extent of rivalry is still lower as supply remains in excess in the region.

Figure 16 : Porter's five forces - Fertilizer Dealers



After applying Porter's five forces model on fertilizer producers, it can be rightly inferred that industry is highly concentrated and industry participants enjoy great influence on other factors. The circumstances thereby certainly favour domestic fertilizer producers as far as Porter's five forces model is concerned.

The situation is the opposite for fertilizer distributors. Unfavourable factors include high bargaining power of suppliers. Distributors remain under the heavy influence of a few large producers for products like urea. Meanwhile, producers reserve and exercise the right to induce their market practices over distributors and also the right to expel non-compliant distributors from their network.

Aspects which favour distributors include high barriers to entry due to an already saturated market. Low level of rivalry among distributors also prevails due to the limited area covered by each player. Fertilizer producers also provide prescribed retail prices to their distributors which further restrain the tendency of any rivalry.

Lastly, the only factor which favours both producers and distributors is that of the low bargaining power of the ultimate consumer, the farmer. Although government provides heavy support to this

consumer through a variety of budgetary and regulatory measures, it should be noted that adverse market practices exercised either by the producers or distributors potentially result in offsetting the massive government support. Therefore, it is imperative for the regulatory bodies to fully ensure that unfavorable practices be curtailed. As was pointed out at the beginning of this chapter, the profit maximization motive is part and parcel of the free market mechanism. Therefore, the regulators should strike a balance in terms of intervention. Another important element that needs to be pointed out here is that the domestic fertilizer sector does not and rightfully cannot function completely on a free market mechanism, owing to the active and persistent government intervention that is undertaken with the aim of eventually providing relief to the farmer. That being said, the sector should be assessed differently relative to other sectors which operate or should operate through the mechanism of free markets.

Box 1: The case of tying-in of sales

In mid-2009, CCP started receiving a series of complaints via the Government of Sindh, stating that fertilizer companies, specifically the bigger players, had been engaged in the practice of tying sales of urea with DAP. It was stated that as per policy, dealers were bound to purchase DAP or other expensive fertilizers with the purchase of urea in a prescribed ratio. As per the inquiry, the ratio varied from company to company, ranging in 3:1 to 4:1 urea:DAP.

It was alleged by growers that the practice of tie-in by fertilizer producing companies has been in vogue in the last three cropping seasons. Although there is no direct evidence of establishing the exact length of the period in which the tying took place, it was stated that urea and DAP were being tied together by the fertilizer producing companies. This is supported by the fact that the growers, dealers and even the district and provincial governments have brought to light the prevalence of this practice.

It was further pointed out in the inquiry conducted by CCP that the fertilizer companies had cancelled the dealership of some of the dealers who refused to buy urea with DAP in the required proportion. Another instance was referred to, which indicated that the fertilizer companies did not entertain booking orders for urea alone and asked the dealers to book the proportionate amount of DAP or other fertilizers.

While the link in this chain is associated with dealers, the stringent trade conditions as highlighted by the CCP inquiry rendered these dealers with little choice in passing on the same to the ultimate consumer – the farmer. With farmers often having limited purchasing power available to them for such procurements, the practice certainly put them in an adverse condition, solely as a result of a restrictive trade practice.

The tendency of this practice to prevail clearly rests as a result of the high concentration prevailing in the industry, further accompanied by restricted competition. It should be reiterated that the preceding chapters clearly highlight how important it is for the country to improve its agriculture output, which can be better achieved through improved fertility owing to the limited availability of land under cultivation. Balanced fertilization is definitely a more viable long term solution to address this issue. However, the means through which this can be achieved are also critical and certainly the objective should not be achieved through unfair practices.

A word on collusive behaviour

Collusive behavior may not persist for an indefinite period of time. In fact, it is theoretically prevalent when conditions are adverse for practitioners, and less likely when the conditions are favourable. It cannot be presumed that once a cartel has actually broken up it will never recur. In fact, a greater possibility exists for such collusive behavior to repeat itself once it becomes 'rational' to follow it. This has been observed in the case of domestic cement producers. Instances of a cartel breaking up and reorganizing in the cement sector can be clearly observed through media reports and industry sources.

The tendency of such behaviour to recur is present in other sectors, including fertilizers. Hence, there is a need for a long term solution to alter the prevalence of this behaviour in the country's corporate sector. Regulators should take actions that prevent such behaviour from repeating time and again, rather than only punishing specific instances of collusion. In this manner, the levying of penalties may show vigilance, but it does not alter the basic structure of an industry, nor does it address the tendency of resort to anti-competitive behaviour. There remains an increasing threat that participating firms could potentially come up with more creative practices in the future. The final chapter of this assessment study touches upon this subject.

CHAPTER 5

Policy recommendations and actions

There is little doubt that competitive markets make a vital contribution to economic growth, poverty alleviation and employment generation. They do this by driving innovation, productivity and increased efficiency in the economy. Competition itself can be defined as the process of rivalry between firms, as means to gain market share, improved sales and higher profits by using innovation and greater efficiency to this end.[1] However, the fact remains that competitive markets do not, by and large, exist in reality. Market failures, inefficiencies and structural weaknesses in this regard often lead to anti-competitive practices by the participating firms. Even then, a part of the problem lies with how effectively the government copes with such situations and whether its policy framework adequately prevents such practices. This issue is further underlined when considering the case of developing economies such as Pakistan. Since economic cycles tend to be more erratic and external shocks often have a deeper impact on fiscal and trade balances, the room for inefficient markets to thrive is thereby ever-present in the economy. Even when markets are reasonably competitive, this may not be reflected in outcomes. In this regard, the advent of the Competition Commission of Pakistan should be considered as an encouraging development. Initiation of competition assessments by the Commission for various sectors should also be a fruitful contribution towards phasing out anti-competitive practices, although the process itself is likely to be gradual owing to the presence of fundamental structural weaknesses in the economy of the country.

Over the last few years, investment liberalization, privatization and deregulation have made the private sector the engine of growth and have made greater competition the means whereby efficiency and innovation and an improved allocation of resources can be achieved. But such policy measures can never entirely assume that anti-competitive practices will cease to occur. Privatization and deregulation can be considered as the means to remove state-backed barriers to competition but monopolization by private enterprises can re-emerge, as not only cartels but market dominance can become widespread in many sectors where the minimum scale of production is large. This

[1] Godfrey (2008)

appears to be the case in Pakistan's fertilizer sector. The sector was deregulated and state- owned companies were handed over to private enterprise. However, the fruits of deregulation have not been forthcoming as a high degree of concentration in the sector prevails and could potentially intensify once additional capacities of existing players come on stream.

This phenomenon is reflected in that players such as ECPL and FFCL are positioning themselves to capture a bigger market share at a time when demand is in excess of supply. Nevertheless, it appears to be of little help to reduce industry concentration, as new capacities are only responding to the supply shortfall. Nevertheless, the tendency of existing players to cooperate or collude during times of excess supply remains a distinct probability. The same could be inferred through Porter's Five Forces analysis presented in the previous chapter.

Prioritizing poverty

For developing countries like Pakistan, where poverty is the main impediment in the development of the masses, the resources of the government are often directed towards reducing or alleviating the impact of poverty. However, implementation remains a key issue and defects in the political and bureaucratic structure often contribute towards the failure of many efforts in this direction. Due to such inherent limitations, deficiency of good governance often prevails and any putative benefits of competitive markets are gravely distorted.
The aspect of poverty alleviation becomes crucial and greatly relevant when farmers are brought into the analysis. For a country like Pakistan, where 45% of the labour force is employed in agriculture and farmers are an important constituent of this proportion, the discipline of competition may not be immediately relevant to the problems faced in this sector. Yet, by any standards, poverty alleviation has to take precedence over all other policy objectives and the intellectual case that competition is an important element in achieving it needs to be made with vigour.

Recapitulating competition assessment

Rationale for selection of the fertilizer sector
Since fertilizers are key inputs in improving crop yields, the regulators should ensure that supplies are not disrupted and the process of capacity addition is carried out through appropriate investment-oriented policies. Furthermore, food security is a fundamental issue in Pakistan and policy-makers should ascertain that farmers' interests are well- protected while meeting food security challenges in the long run. This makes the structure of the fertilizer sector critical in combating food and related development challenges. The need to ensure competition and monitor it from a regulatory perspective is heightened and a well-argued competition assessment of the fertilizer sector is not only justified but is critical.

Relevant markets
Identifying the relevant market was an essential step towards the assessment of competition in the sector. Simply stated, the classification based on different categories of fertilizer and their consumption mix essentially brought to light the distinction that should be made while assessing the role of the main players in the sector. It was also essential to underline the supply chain and fertilizer distribution channels currently in place. How these factors and forces eventually influence the farmer is of fundamental significance, as it is this constituent in the value chain who should be considered the prime beneficiary of competition in the sector.

With the perspective of different product markets established, classification of suppliers of these products in terms of domestic and foreign supplies, further strengthened the understanding of markets. The above-mentioned distinctions were necessary to arrive at the following conclusions:

For the farmer, the suppliers are primarily the distributors of fertilizers. However, it should be considered that the market power of these distributors is fairly diluted owing to the fact that their own bargaining is weak against the producers.

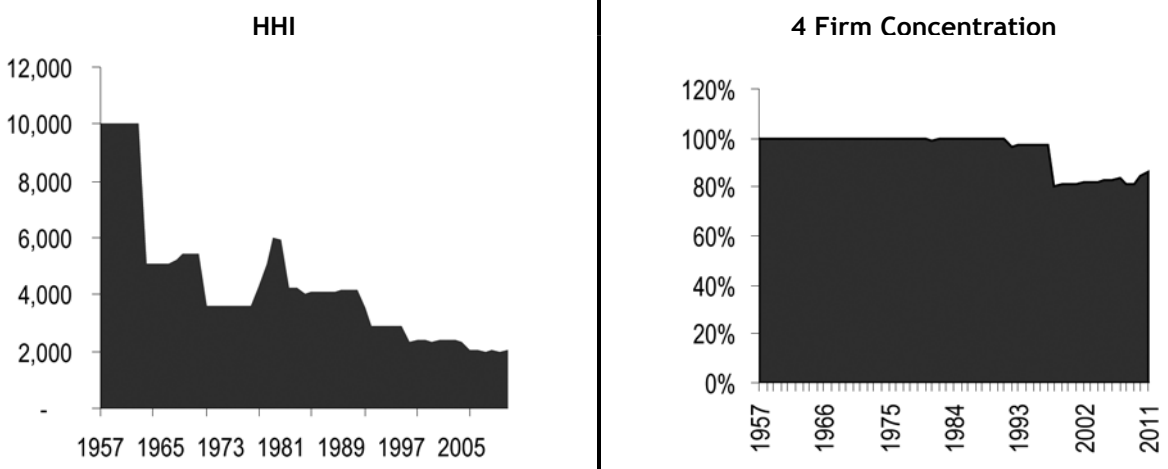
Given this, it is the fertilizer producers who can be termed as having a dominant position in the sector. According to competition law in Pakistan, a dominant position can be deemed to exist if participating firms have the ability to behave, to an appreciable extent, independently from competitors, consumers and suppliers and the position of an underlying firm is presumed to be dominant if its share of the relevant market exceeds 40%[1]. The CCP inquiry concluded that the fertilizer market can be considered as both a captive market[2] and a seller's market[3].
The farmer remains the ultimate buyer and user of fertilizer products. The role of distributors is clearly that of middlemen in the chain. The size of the producer and their market power discussed in the previous chapter is sufficient to indicate that farmers are directly and largely influenced by the producers rather than the distributors. However, distributors play a part in influencing farmers which should be assessed separately and independently.

Examining the market structure
The most important question associated with the examination of the market structure is whether it suggests that competition could somehow be limited. This indicates a significantly high degree of concentration in the sector. Still, high concentration itself is not an adequate indicator of high market power nor does it suggest a problem with competition. The issues that need to be considered are the following:

Whether the state of high concentration has substantially prevailed over a long period. The key is to find out whether high concentration itself has been sustained in the sector and whether this tendency will persist in the long term. In the case of the fertilizer sector, concentration has stayed high over many years, as indicated by figure 1. It should be noticed that after privatization took place, market shares switched from the public to the private domain and the sustainability of high concentration is, in fact, questionable over the long run. Meanwhile, the presence of competition cannot be established merely on the basis of the observation that new players or capacities have come into the market and both concentration and HHI have started to decrease from their historical levels.

[1]CCP (2009)
[2]**Captive markets** are markets where the potential consumers face a severely limited amount of competitive suppliers and their only choices are to purchase what is available or to make no purchase at all. Captive markets result in higher prices and less diversity for consumers. The term therefore applies to any market where there is a monopoly or oligopoly.
[3] A **seller's market** can refer to any type of market for goods or services where demand exceeds supply and a market which has more buyers than sellers.

Figure 1 : Fertilizer Capacities over the decades



Source: NFDC Data

New players or capacity expansions by existing players have not found it difficult to establish themselves. This was observed in the 1980s when FFC entered the market, which at that time was dominated by NFC, ECPL and DAWH. Later on, FFC was able to establish itself as a market leader. Meanwhile, after the privatization of NFC, Azgard9 or Fatima Group faced little difficulty in maintaining market shares of the acquired entities. One conclusion that can be drawn here is that the fertilizer market has mostly remained supply deficient, thereby giving room for new players to enter the market. Another aspect that comes forth is that existing players have not played a direct role in creating artificial entry barriers through undue control over supplies. The sheer size of existing players such as FFC and their vast distribution network has only come about after they had been in the market for a fairly long period of time. Since entry by new players over the decades has never been unsuccessful, a case of an anti-competitive market cannot therefore be plausibly made.

Lastly, the market power of existing suppliers may not have prevented other players from entering the market but there is ample evidence that it did suppress the bargaining power of the buyers to a considerable extent. Since large numbers of buyers exist in the market, with each having a negligible influence over their suppliers, the imbalance between buyers and sellers is substantial. Here, the opportunity for anti-competitive behaviour to prevail is significant. Such phenomena exist in other sectors of the economy as well and it is not clear how the situation can be effectively addressed at the policy level.

It is pertinent to note that while the market structure itself could not have given enough space for anti-competitiveness, the conduct of existing players or instances of such behaviour by these players still point towards such a tendency, typically when a large number of buyers have insufficient bargaining power against their suppliers.

Barriers to entry

Three forms of barriers should be carefully looked at in order to assess whether such barriers actually exist in case they do, whether they are sufficient to restrict competition:

Natural barriers: These often originate as a result of a cornered resource or technology that is potentially at the disposal of existing players, which newer players find difficult to access. Economies of scale often play a role, while a larger penetration or wider distribution network can also be a hurdle for new players. Running these tests with the fertilizer industry yields a limited degree of natural barriers. Although some of the bigger players happen to have wide distribution channels and enjoy economies of scale, it is still not sufficient to drive smaller players out of the industry, as they continue to operate successfully in their areas of activity.

Strategic barriers: While bigger players like FFC often remain aggressive when it comes to capacity enhancements, the growth in demand often resolves the case of excess supply to prevail over the long term. In fact, it has occurred more often in the past that robust demand has outperformed the supply overhang. This has been the case since the demand for fertilizer products is less responsive to cyclical changes in the economy and is relatively inelastic. The strength of strategic barriers, such as excess supply, is also less relevant in the case of the fertilizer sector.

Regulatory barriers: At times, the policy framework adopted by the government acts as a barrier to entry for new players. In the case of the fertilizer sector, the most obvious barrier is the allocation of natural gas to both new and existing players. While the diminishing availability of natural gas is a barrier itself, the government exercises significant regulatory authority over its distribution and allocation. The key input in fertilizer manufacturing is regulated and neither gas producers nor distributors can allocate gas in a truly competitive manner. However, it is crucial to understand the wider implications of government policy in the present context and how it affects or influences the domestic fertilizer industry.

Assessment of government policy

The evolution of the fertilizer markets in Pakistan was discussed in the preceding chapter. As mentioned before, privatization initiatives materialized during the previous decade as government divested its interest from NFC. A marked difference between the deregulation initiatives taken in the past and successful privatization that took place during this decade was there in the form of the fertilizer policy unveiled in 2001. While the element of capacity enhancement was present in the past, the pace was greatly enhanced and in a more competitive spirit owing to the involvement of private enterprises in the process. The policy itself can be described as investment conducive in which appropriate concessions on cost are provided to new players. A brief on the Fertilizer Policy 2001 is provided below:

- While the Fertilizer Policy announced in 1989 contributed towards keeping domestic prices lower than that of imports, the need to induce further investment in the fertilizer sector remained paramount, primarily due to the growing population and the flourishing cotton textile industry.
- The policy was reviewed and updated to encourage new and existing investors into further investment in the sector. The new policy came into effect from 1st July, 2001.
- A 10-year period was fixed for feed gas concession for players that undertook expansion.
- The essence of the concession brought relief to farmers through discounted fertilizer prices as compared to the region, thereby keeping farmer's input costs low.
- The policy lays down separate pricing parameters for both existing plants and new investments.

- The price of feed-gas for existing plant is set at $ 1.10 mmbtu or the prevailing Middle East price, whichever is higher. Currently, feed-gas to existing plants is provided at around $ 1.2/mmbtu
- The policy intends to provide a level playing field when compared to low cost producers from the Middle East. This is done by offering a gas rate to new plants in Pakistan that enables them to compete with fertilizer exporters from the Middle East. New plants in Pakistan are offered a feed gas rate of $ 0.77/mmbtu in line with the rates prevailing in the Middle East.
- Gas supply companies would build adequate safeguards in their Gas Sales Agreement to new plants which ensure that investors proceed with their plans within a given time so as not to lose out on the use of available gas to another investor.
- Concessions are provided under the policy regarding the import or local manufacturing of plant and machinery. Import of used plants is also facilitated through the concessions. Such concessions are applicable in terms of the tariff structure and payment terms.
- Expansion through de-bottlenecking or BMR is given the same concessionary treatment as new plants. Uniform treatment is ensured under the policy whether the producer is domestic or foreign, public or private, on all matters including commercial, fiscal, corporate and contractual matters.
- The policy further encourages indigenous production of phosphate fertilizers while production of complex fertilizer like NPK is encouraged through duty exemption on imports of input materials.
- Lastly, the price of fertilizer will remain deregulated on the understanding that while manufacturers allow free market forces to prevail, they will pass the benefits in the form of a lower price of fertilizer to the farmers[1].

The above review of the policy should provide an appropriate insight as to its investment -friendly nature. It should also reveal that as far as the government's policy framework for the fertilizer sector is concerned, regulatory barriers are fairly thin and no direct threat to entry prevails at least on the part of the government.

All the same, the response to this policy by existing and potential players should be given further attention. While policy by its nature suggests that it is open when it comes to encouraging investment in the sector, and it has also resulted in capacity expansions and entry of new players in a timely and competitive manner, the reform itself as such does not appear as wide-ranging as may have been initially envisioned. A lack of interest of foreign players is evident, whose induction could well have resulted in an improved competitive environment of the sector. To give an instance, the magnitude of competition which prevails in Pakistan's telecommunication sector after deregulation, breakdown of its monopolistic structure and the entry of foreign players, seems to be lacking in the fertilizer sector. This is in spite of the availability of human and capital resources, strong product demand, attractive returns, export potential and overall background of Pakistan being primarily an agriculture-based economy. Limited room for differentiation is also a hurdle since fertilizer products are fairly generic in nature. Even then, the tendency of substitution between products could very well suggest that competition between different product markets could still prevail.

Another element that should be considered is that while some of the key participants themselves are veterans in the industry, the structure of the industry has undergone significant change as

[1] Fertilizer Policy 2001

the government has phased itself out as a producer and supplier of goods and became a policy-maker. How effective this role remains in the long run cannot be assessed as there is ample room for structural change in the sector and it is the policy-mix that will facilitate or retard it. While it can be safely stated that the sector, for now, is heading in the right direction as far as the objectives of deregulation are concerned, the length of time it could take for the sector to become internationally competitive, however, remains an open question.

It should be kept in mind that while the sector has been deregulated, the price, typically that of urea, is still indirectly regulated through the feed-gas subsidy. The manufacturers often immediately pass on the impact of any hike in the gas price, which itself is regulated and periodically announced by the Oil and Gas Regulatory Authority (OGRA) and fertilizer producers tend to maintain their primary margin on urea. Since prices themselves tend to stay lower than their international level due to subsidy, it becomes easy for domestic producers to pass on the impact to end-consumers.

This gives credence to the fact that the market for domestically produced urea is in fact less competitive when compared to international markets, since the mechanism of price discovery resulting from the interaction of demand and supply is affected by the level of subsidy on the feed-gas price. To keep imports of urea competitive, the government, in turn, has to grant a direct subsidy on such imports. While this provides importers with a level playing field alongside domestic producers, hindrances in the mechanism, including the timing and transfer of such subsidy at times deter imports from competing more freely. Owing to this anomaly, the government took control of urea imports and barred the private sector from participating in such imports. The objective was to ensure a smooth supply of urea while the subsidy mechanism was manageable as it was carried out through the government-owned NFML. Additional capacities are expected to bridge the urea supply gap in 2011 and the scenario of excess supply is itself not expected to prevail much longer. Thus the need to bridge the gap through imports of urea would continue in the long term and the fate of an efficient free market will remain in question as long as the subsidy mechanism remains intact.

Anti-competitive conduct

Factors that can potentially limit or restrict competition can be considered within three broad headings (broadly based on the Competition Assessment Framework devised by UKs Department for International Development, DFID):

Abuse of dominance

A firm or group of firms can obtain a dominating position in the market simply by attaining a higher market share. In the case of Pakistan's domestic fertilizer sector, high concentration indicates a dominating position on the part of three or four players. Once this case is accepted, it should be assessed whether there is any *abuse* of their dominance that has resulted in reducing competition in the sector and in conduct that exploits consumers. A fairly common practice is to manipulate prices. Consumers can be exploited if prices are too high, while at the same time, smaller competing firms could potentially be hurt when prices are too low. Bigger players can exploit both avenues without being adversely affected due to the economies of scale they often enjoy and stronger financial resources.

Even when dominance of a few firms can be established in a straightforward manner, the case of price manipulation can still not be directly proved or even inferred. Predatory pricing to hurt competitors

cannot be substantiated in the sector as firms tend, by and large, to have convergence over pricing. Meanwhile, setting higher prices is also not viable as prices of locally manufactured fertilizer are linked with the gas price mechanism which is subject to subsidy, while imported fertilizers are based on international pricing, which could also be subject to subsidy by the government in case prices become too high. Overall, therefore, direct and active intervention by the government in the pricing mechanism considerably restrains the fertilizer producers to charge prices that are either too high or low.

Excessive profiteering can also not be established in the case of domestic fertilizer producers. As per policy, the pricing mechanism has been developed to keep the local price structure similar to that in the Middle East. Therefore, the profitability enjoyed by local producers is also quite similar to the companies operating in the Middle East, even though local companies enjoy better margins when compared to peers like India and China. Consequently, a case of exploitative pricing and excessive profiteering solely as a result of anti-competitive practice cannot be established for the sector, again due to the subsidy mechanism and policy interventions such as urea imports.

Perhaps the only instance that can be quoted is that of tie-in sales or 'bundling'. Clearly a result of dominance that firms in the sector enjoy, bundling can still hold when price manipulation cannot be easily done and cannot therefore be categorically classified as an abusive practice. As exploitation via pricing is less probable due to active government intervention, it would only be rational for participating firms to get involved in conduct that would still give them the benefit of their dominance.

In the case of the fertilizer sector, the bundled products happen to be complementary in nature (urea and DAP), thereby making it easier and more appealing to package them together. Moreover, the rationale that using these products in the prescribed manner would improve crop yields can justify producers to tie their sales together. Whatever motive is followed or incentive quoted, the case is, however, an exploitative practice that eventually results in compromising competition. Since the focus of all government support is actually the farmer abusive practices in this area are clearly welfare-reducing and need to be dealt with swiftly.

It is true that crop yields can be compromised if the products are not used in the prescribed manner. However, it should be noted that the same result would follow the implementation of policy initiatives on the part of the government, rather than imposed by suppliers. The recommendation section of this chapter gives some suggestions regarding appropriate policy measures that can be put in place by the government to foster more balanced fertilizer use by the farmers of Pakistan.

Collusion and cartels

The abuse of dominance can either be directed as predatory acts that can potentially hurt competitors in the market, or it can manifest itself in the form of collusion or cartelization. The existence of a cartel, however, is difficult to identify and often requires a high level of forensic skills to prove that it exists. Varying degrees of collusion also play a role in making it difficult to identify a cartel. At times, firms collude without directly contacting each other, but simply on the basis of the expectation of their competitor's responses to changes in their own behaviour. For example, a single firm could increase the price of its product without consulting other firms and could simply wait for others to follow suit. More often than not, other firms tend to respond positively to such changes and conform to the conduct of the firm that took the initiative. This form of collusion is

possibly the most common and also the most difficult to ascertain and prove. The same can be defined more appropriately in the context of the renowned 'game theory'.

Game theory implications

The situation defined above can be best described through non-cooperative games under game theory parameters. This area deals with how a rational supplier would interact with another in an effort to achieve its own goals. A hypothetical scenario can be considered where two players are operating in the industry and each player makes its decisions independently. The following matrix presents this situation with the underlying strategy of raising or lowering prices. Each player will act to increase or decrease prices independent of the other, under a given situation. The score can be defined in terms of the utility attained by each player through their actions.

Table 1 : Game theory 'Prisoner's Dilemma'

	Set a High Price	Set a Low Price
Set a High Price	5 , 5	-4 , 10
Set a Low Price	10 , -4	1 , 1

As indicated, if both players decide to increase prices, both will drive equal utility from this act and will benefit uniformly (a utility of 5 driven by each player as per the above matrix). At the other extreme, both players act together to lower the price (or refrain from increasing prices). Under this case, the utility is still positive (utility of 1) and benefit for each is the same, although it is significantly lower than in the first instance. These two instances depict conformance between players where they tend to collude in terms of raising or lowering prices. The first instance was a case of following the profit motive by each individual; the latter is when both act for a common good that is to benefit the end consumer.

The remaining two choices depict a case of rivalry among players. The player that decides to keep the price low (or refrains from increasing it when the other did), drives the maximum amount of utility at the expense of the other (negative utility under this case). A prominent feature of this game is that it changes in a significant way if the game is repeated, or if the players engage in a same situation again in the future. The outcome in the second case could differ significantly from that in the first as participants would base their new decision upon the decision taken by their rival in the first case. For instance, it would be rational for both players to increase prices again in conformance if they did it with success in the first instance (thereby driving utility of 5 each time or sharing the benefits equally). Meanwhile, there is also a possibility that one player could refrain from increasing prices again simply to drive higher utility during the second instance, given its experience from the earlier instance regarding the rival player's motive to increase prices. Lastly, both players could actually end up abstaining from an increase in prices under the impression that the other will take the initiative to increase them.

The matrix provides a good insight into pricing behaviour and can be considered while assessing price movements as a function of decisions made by rival players. Important implications that can be driven through the game theory example include the following:

- Despite the game being non-cooperative in nature, utility for each player is still positive when they act in conformance.
- As per the matrix, it is better for participating players to increase prices only when they act in conformance.
- Rivalry yields higher utility for one at the cost of the other.
- Conformance does not always adversely affect the end-consumer. Decreasing prices will still yield positive utility for individual players while benefiting consumers.
- On a collective basis, reducing prices (whether in conformance or rivalry) will always result in positive utility for one player independent of the other player's decision.
- The conflict between pursuits of individual goals backed by the self-serving motive and the common good remains at the heart of game theory problems.

The above implications should only serve as general guidelines rather than absolute rules. The idea was to provide an insight into pricing mechanisms in connection with individual players' behaviour. In practice, various instances can be tracked through media reports and management discussions that firms tend to conform in terms of price changes of their products, especially urea. Since urea prices are indirectly regulated via gas pricing, the motive to keep prices uniform can be justified. However, for products such as DAP, instances of price changes suggest a degree of rivalry prevalent in this segment.

Factors affecting cartels

Factors that foster the formation of cartels are cultivated and deep-rooted in the market structure, the structure of demand and the nature of the product. DFID's Competition Assessment Framework provides the following factors that could make collusion between competitors more likely:

- **Market structure:** more concentrated, limited or restricted entry owing to high barriers, similar costs and cross-ownership links between competitors
- **Structure of demand:** low buyer power, stable demand and regular orders
- **Nature of the product:** where there is very little differentiation between products of competitors, as is the case with commodities[1].

All three of the above attributes that can lead to the formation of a cartel are most visibly present in the domestic fertilizer industry. HHI and higher concentration ratios suggested that concentration is high. An analysis of the cost structure suggests that similar profitability is enjoyed by leading urea manufacturers. Cross-ownerships and vested interests can also be clearly identified. Meanwhile, demand remains stable and growing and farmer's purchasing power is generally low. The products themselves are generic in nature as a typical urea bag should have 46% nitrogen content, irrespective of the manufacturer or supplier, barring minor quality issues.

Hence, there is a clear incentive for the producers/suppliers to indulge in some form of cartelisation. The probability that such cartels already exist without getting noticed can also be ascertained, given the market structure, the demand structure and the nature of the product. To put it another way, the given circumstances actually favour such collusion in the domestic fertilizer sector. Whether such informal cartels are present is a matter of further inquiry, but as far as this assessment is concerned, the prevailing evidence and present structure of the sector should be enough to direct the regulators to take a closer look at the pattern of prices in the sector.

[1] DFID (2008)

Other disparities
Certain disparities can be observed through media reports or identification of such events by aggrieved parties. Some instances are given below:

- Distributors have tended to earn excessive profits during times of artificial shortages. The element of supply misappropriations, hoarding and smuggling can also not be ruled out entirely.

- Even though the extent of increase in fertilizer prices against increase in input or procurement cost do not indicate sufficient disparities, the timing is also fairly important. More specifically, suppliers and bulk importers often make huge inventory gains at the time of rising prices. As such, these suppliers tend to increase prices right after an increase in international input prices or the price of imported fertilizer, even though inventories of one to two months are often maintained. This instance was observed during the recent increase in DAP prices internationally, where domestic importers increased prices right after an increase in international prices while they maintained the inventory procured at lower prices. Still, this element should be carefully gauged as inventory losses also tend to accrue in case prices are falling, instance of which can be observed during 2008/09.

- Media reports time and again quote complaints against the shortage and high prices of DAP. One such report highlighted that dealers were stocking fertilizers and the district officers were also allegedly involved in black-marketing. It was further quoted that the District Co-ordination Officers (DCOs) were distributing fertilizers to influential landlords, depriving small growers of their share. Meanwhile, the Agriculture Department of the Sind government had time and again directed the DCOs to take disciplinary action against hoarders and profiteers.

Recommended action

Overall government fertilizer policy appears to be investment rather than competition- oriented. The process of privatization can be described as an attempt to reduce public dominance and facilitate the induction of private entities to thrive at a competitive level in the sector. However, privatization in the fertilizer has not so far yielded broad-based efficiency gains that might be attributed to greater competition. Costs of production have remained more or less unchanged and concentration ratios have only declined marginally.

Rationalizing cross-subsidies
The element of subsidy has been crucial in keeping urea prices lower than in international markets and has encouraged urea demand in the country. One of the most prominent negative aspects that the subsidy possesses is that it tends to promote inefficiencies among firms as they continue to rely heavily on its support. The same could also be a major regulatory hindrance to more effective competition as subsidies are an indirect price regulator. More importantly, the mechanism cannot be sustained indefinitely given the government's weak fiscal position. There is therefore a need to rationalize the use of subsidies in a phased manner.

One way to do this is to gradually minimize the difference between the feed-gas and fuel gas rates. The analysis in the previous chapter has already suggested that the price excluding this subsidy

still stays competitive as far as international markets are concerned. Since this support is directed towards fertilizer producers, who in turn pass the impact of lower cost to farmers in terms of lower prices, the mechanism tends to reduce price competition among firms.
The government could provide short term support to farmers via a continuation of the support price mechanism on crops to improve their financial position. At the same time, the government could make a positive contribution towards rationalizing urea pricing. The support to farmers should continue, but the objective should be to adopt a more direct approach when it comes to subsidies. The routing mechanism need not be the fertilizer producers. It should also be guaranteed that new investors would have an incentive in the form of concessionary rates so as to provide a level playing field for them when compared to existing manufacturers, who have already benefited from gas price concessions in the past.

Another significant improvement that this rationalization can yield is the balanced use of fertilizers. Since the case of bundling sales of complementary products is associated with the promotion of more balanced use, the government can effectively use subsidy rationalization as a tool to eliminate practices on the part of the producer at one end while inducing competitive prices of different fertilizers at the other. An illustration is provided in table 1, highlighting the impact of a reduction of subsidy on urea, while channeling the same to DAP.

Table 2 : Subsidy Rationalization

	Demand (mn bags)	Existing Price (Rs/ bag)	Revenue / (Subsidy) Rs/bag	Revised Price (Rs/ bag)	Revenue/ (Subsidy) Amount (Rs mn)
Urea	130	770	300	1,070	38,866
DAP	34	2,000	(800)	1,200	(27,059)
Net collection / (payment)					11,807
Price Ratio (DAP : Urea)		**2.60**		**1.12**	

The table reveals the following:

- **Enhanced revenue collection:** In the illustration, the government is able to collect a net Rs 11.8 billion as a result of price adjustment. This can be seen as a means to introduce additional revenue collection in the agriculture sector.
- **Balanced use of fertilizer:** The current pricing structure reveals that a farmer can procure 2.6 bags of urea at the price of 1 bag of DAP. Balanced fertilizer use is promoted by reducing this gap through subsidy rationalization. Under the revised pricing scenario, farmers would be able to procure a larger quantity of DAP against urea due to a reduced pricing differential between the two.
- **Alternate sources of support:** Any demand erosion due to reduced subsidy on urea can be made up through higher support prices and increased agriculture credit provided at discounted rates to the farming community. This support could act as a gradual transition to price rationalization.

These measures could also fall within the ambit of regulated fertilizer prices. One way to do this would be to use market smart subsidies. Market smart subsidies are basically temporary interventions that work singly or in a combination with lower prices and improved availability and at the same time promote private investment. The key differences between traditional subsidies and market-smart subsidies are that market-smart fertilizer subsidies are temporary, they do not distort the relative price of fertilizers to other inputs so as to encourage the excessive and economically inefficient use of fertilizers and they are designed to balance incentives enjoyed by buyers and sellers in ways that are consistent with the development of sustainable private markets[1].

With these measures, the following benefits should accrue in terms of making markets more competitive:

- Greater price competitiveness in the urea market
- Balanced fertilizer use thereby improving crop yields
- Long run benefits in terms of increasing cost efficiencies through modernization and use of modern technology
- Uncompetitive elements are factored out as costs are rationalized
- Government is able to enhance its revenue collection

Inducing corporate agriculture

It is a fact that policies conducive to investment have been in place as far as the fertilizer sector is concerned but there is a heightened need to introduce them in the core agriculture sector. This could typically be through effective land reforms and the induction of private enterprise in the area of farming. Introduction of corporate farming on a large scale will have varying implications for agriculture such as possible dispossession of marginal farmers. Such negative consequences would need to be addressed separately. But more private sector involvement in the form of corporate discipline in the rural areas could deliver the following benefits:

- Corporate farming via private enterprise should generate employment opportunities to existing farmers, who currently operate independently or under the terms of a landlord and often face serious social and economic problems.
- The phenomena should bring more efficiency in farming and result in better yields with the planned and efficient utilization of resources.
- Apart from enhancing efficiency, corporate farming should provide a secure platform for farmers which potentially results in the development of human capital through training and experience.
- The profit maximization motive of enterprises will drive them to avail an optimal utilization of resources, including fertilizer use and water consumption.
- The most important development that can occur in context of strengthening competition through corporate farming is the enhancement of the bargaining power of fertilizer-users. This might be the most effective way of fostering competition in the entire supply chain.
- Corporations which have better access to financing sources will eventually phase out the need to provide government support to farmers, thereby reducing the fiscal burden of government eventually. Agricultural taxation would also yield better results due to more systematic accounting and increased transparency. Such corporations will also have better awareness of the legal system and could approach the authorities more vigorously in case

[1]Morris et al. (2007)

of malpractices in the supply chain.
- Initiatives to promote investment in agriculture by large scale corporations are in fact critical to ensure food security challenges and policy sustainability over the long run.

As it appears, a lot of problems that were highlighted in this study can be adequately addressed through investment in the farming sector. Hurdles remain in the implementation of such initiatives owing to a lack of land reforms as well as various political and social issues that presently exist in the country. Nevertheless, the importance of such measures cannot be overstated and should be considered by the government and the concerned authorities. A possible but short term alternative could be to strengthen farmer cooperatives in the country.

Profitability checks

Although excessive profiteering cannot be established for fertilizer producers solely as a result of price manipulation, there is a need to keep them under scrutiny since the structure of the industry calls for higher vigilance. The case of excessive inventory gains during periods of rising prices should also be monitored closely. A mechanism can be derived by the government with respect to profitability netback tax, in case collusion is leading to excessive profits. Still, the implications of such a step could be negative for inducing future investment in case it is seen as a direct intervention in the sector that has an impact on profitability.

Broadening the role of public procurement

Another important element to enhance the efficacy of competitive forces is to broaden the role of public procurement agencies. While such agencies can be viewed as elements that are decreasing competition, their role could be utilised to minimize the potential of malpractices that tend to occur in distribution. A successful instance of this was observed in the role that was played by NFML in urea imports. The government-owned entity took control of the entire imported supply of urea and provided it on a timely basis and at prescribed prices.

The role can be broadened on the lines on which PASSCO operates in the country. A fertilizer procurement agency could procure a prescribed amount of key fertilizers from the producers and market it to farmers via its own distribution network at prescribed rates. This would result in effectively reducing the cross-subsidy via the producers and ensure a more direct benefit to farmers without involving producers.

A probable drawback in this approach which appears is the government's own budgetary constraints to finance such procurements on a regular basis. Moreover, this approach is unlikely to contribute to a substantial reduction of market prices and some feed-gas subsidy would still be required. What this approach would still be successful at is ensuring a timely supply to farmers while minimizing artificial supply shocks.

An important aspect of such a practice is that this might decrease competition if practiced over a long period. The role of procurement by a public agency should be restricted to addressing potential seasonal shocks, without distorting the supply chain over the long run. Meanwhile, the procurement process itself should ensure transparency and fairness in a manner that the concerned agency does not discriminate between suppliers of fertilizer. In addition, it should also have a nationwide supply network. Bundling distribution rationalization with temporary but proactive price subsidies can result in adequate support to farmers without distorting competition in the sector.

Deregulating inputs

The oil and gas market has been systematically deregulated over the years and the current price structure closely tracks international prices. There remains, however, room to enhance the allocation of natural gas to various sectors in the country and among various producers of fertilizers on a more rational basis. Even though the limited availability of natural gas in the system severely restricts the potential for new players to enter the market, enhanced transparency in the system of gas allocation could still attract new players. A distinction should be drawn between capacity enhancement by existing players and entry by new players, since the present fertilizer policy does not differentiate between them in terms of concessions. New players should be given additional incentives so that they can enter the market, essentially for products that remain supply deficient. This would prove fruitful as a policy matter in reducing the strength of concentration in the sector, in case additional gas becomes available in the system through future discoveries. Alternative sources of fuel could also be developed to cope with the problem of a natural gas shortfall in the coming years. The overall criteria used for the allocation of hydrocarbon resources in the fertilizer sector would appear to be a fruitful line of enquiry for the CCP.

Awareness programmes

Lastly, the need to launch awareness programmes through the media is also very important. This should be considered an ongoing practice and should seek to provide information so as to help farmers make informed and timely decisions. Similarly, it is important to develop a culture of competition where firms themselves participate in bringing harmony by creating awareness. Most of the bigger players participate in research and development activities and contribute through soil testing labs, promotional and encouragement programmess for farmers, active demonstrations, farmer meetings and seminars, literature distribution and general awareness programmes facilitating the ability of farmers to utilize fertilizers on a cost-effective basis. Such contributions should not be ignored. Indeed, such programmes could be broadened to include awareness regarding the role of competition and how farmers might benefit from it. An industry code of best practice could also be introduced. Awareness programmes concerning distributors are necessary and positive media campaigning can also increase competitive behaviour in the sector.

Conclusions

This report has attempted to shed light on the key issues in the fertilizer sector while assessing competition vulnerabilities in the sector. The analysis has been done against the background of the fact that food security in Pakistan is a matter of serious concern. Despite the fact that Pakistan is primarily an agriculture-dependent economy and is also a big producer of food crops like wheat and sugarcane, the challenge of food security in the face of a growing population would have to be faced through well-designed policy responses. While the challenge may extend over a period of years, if not decades, it is up to the policy-makers to devise strategies that will help the country in facing it in a manner that does not negatively impinge on other development objectives. Moreover, food production shortfalls often result in food inflation which lead to severe negative consequences both socially and in terms of deflecting attention from a focus on development. With fertilizers being key inputs in yield improvements and higher production, the regulators should ensure that their supplies are not disrupted and the process of capacity expansion is sustained by way of policies which encourage new investment in the sector. Policy-makers should ensure that that consumer interests are well protected to meet broader food security challenges in the long run.

With the critical nature of this sector very well established, the need to monitor it from a regulatory perspective is self-evident and as such this study has been well justified.

It was further emphasized in this study that poverty remains a major burden on the country and has to take precedence over all other policy objectives. While subsidies on fertilizers are one way to deal with, say, rural poverty in the short run, there is no doubt that they tend to lead to distortions over the long term. Likewise, the system of free trade brings with it the gains accrued through comparative advantage. The end result is a more efficient utilization of global and regional resources, a cornerstone of free and fair competition. Implementation, however, remains a key issue and defects in the political and bureaucratic structure in the country often contribute towards increasing hurdles within a particular value chain. Due to such inherent limitations, deficiency of good governance often prevails and advantages of competitive markets are whittled away.

To end this study, it should be clarified that collusive behaviour should considered as an effect in the first place before considering it as a cause. Factors which result in collusive behaviour were identified in this study while their tendency to exist in the fertilizer sector was also underlined. Prevailing conditions in the form of high concentration alongside strong cross-ownerships and vested interests enhances the possibility of collusion. Any collusion can remain dormant when market conditions are favourable for suppliers in the sector. However, when conditions turn less favourable, the sector could resort to collusive arrangements. This is precisely why cartels form and then break up at regular intervals. The importance of long term solutions to alter the concentrated industry structure in the sector, hence, should not be minimized.

Finally, the answer to the question whether genuine competition prevails in the sector or not cannot be given as a definite ‘yes’ or ‘no’. What can be concluded here is that there is a strong need to improve competition in the sector. The report has presented both sides of the argument and it is of the view that greater competition would be beneficial for the farming community of this country. With their lack of organization and lack of access to information they remain vulnerable to exploitation at various points in the supply chain. Administrative measures are useful as stop-gaps but ultimately suppliers need to be incentivised through the forces of competition to cater to the long term interests of the country’s farmers, be it lower prices, assured and timely availability and freedom from practices such as tying-in of sales.

It should also be stressed here that *ad hoc* short term corrective measures in the form of government interventions in response to political pressures should be avoided. Such measures do not address issues of the long-term structure of the sector. Policy-makers need to combine term corrective measures with long term policy initiatives so as to improve competition in the most cost-effective manner in the sector. Competition itself needs to be benchmarked against the welfare of the farmers of the country.

Abbreviations and Acronyms

AC	Ammonium Chloride
AN	Ammonium Nitrate
AS	Ammonium Sulphate
BMR	Balancing modernization
CAGR	Compound average growth rate
CAN	Calcium Ammonium Nitrate
CCP	Competition Commission of Pakistan
CPI	Consumer Price Index
DAP	Diammonium Phosphate
DBN	De-bottlenecking
DCL	Dawood Corporation Limited
DCO	District Co-ordination Officer
DFID	Department of International development United Nation
DHCL	Dawood Hercules Chemical Limited
EBITDA	Earning before interest taxes depreciation amortization
ECPL	Engro Chemical Pakistan Limited
EPFC	Esso Pakistan Fertilizer Company
FF	Fauji Foundation
FFBL	Fauji Fertilizer Bin Qasim Limited
FFC	Fauji Fertilizer Company
FFCL	Fatima Fertilizer Company Limited
FJFC	FFC-Jordon Fertilizer Company
FO	Furnace Oil
GDP	Gross Domestic Product
HHI	Herfindahl-Hirschman Index
IEA	International Energy Agency
IFIs	International financial institutions
K2O	Potash
JPMC	Jordon Phosphate Mines Co.
LSHS	Low Sulphur Heavy Stock

LSM	Large scale manufacturing
MAP	Monoammonium Phosphate
MENA	Middle East North Africa
MNC	Multinational Company
MOP	Muriate of Potash
N	Nitrogen
NFC	National Fertilizer Corporation
NFML	National Fertilizer Marketing Limited
NK	Nitrogen Potash
NP	Nitrophosphate
NPK	Nitrogen Phosphate Potash
NWFP	North West Frontier Province
OCP	Officie Cherifien Des Phosphates
OGRA	Oil and Gas Regulatory Authority
P2O5	Phosphate
PAFL	Pak American Fertilizer Limited
PASSCO	Pakistan Agriculture Storage & Services Corporation
PFL	Pak Arab Fertilizer Limited
PMP	Pak Moroc Phosphate
PSFL	Pak Saudi Fertilizer Limited
ROE	Return on equity
SAFCO	Saudi Arabian Fertilizer Company
SNGPL	Sui Northern Gas Pipelines Limited
SOP	Sulphate of Potash
SSGC	Sui Southern Gas Company
SSP	Single Super Phosphate
TCP	Trading Corporation of Pakistan
TSP	Triple Super Phosphate
UAN	Urea Ammonium Nitrate

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