

VIS

Credit Rating Company Limited

FERTILIZER SECTOR REPORT

Table of Contents

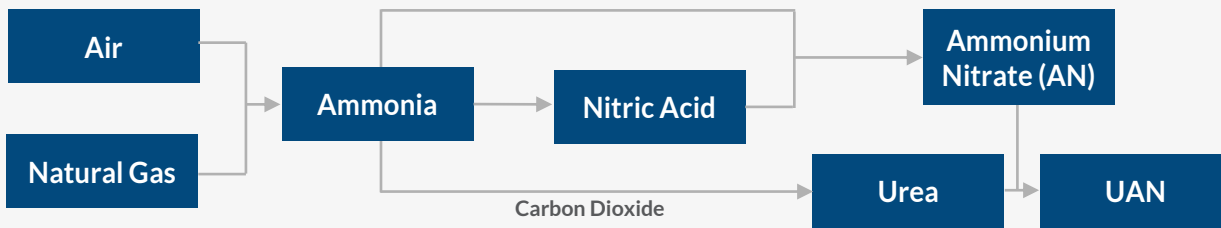
INTRODUCTION	3
GLOBAL PERSPECTIVE.....	4
REGIONAL ANALYSIS	5
SECTOR DRIVERS.....	6
RECENT DEVELOPMENTS	6
LOCAL PERSPECTIVE	7
DEMAND DRIVERS	7
MAJOR INDUSTRY PLAYERS	7
PRODUCTION CAPACITY & VOLUME.....	8
UREA	9
DAP	10
MAJOR COST COMPONENT.....	12
ESG SENSITIVITY	13
SECTOR DYNAMICS	13
SECTOR ISSUES.....	13
PROFITABILITY	13
SURVIVAL.....	14
TECHNOLOGY	14
SECTOR OUTLOOK.....	14
REFERENCES.....	14
RESEARCH & PUBLICATIONS.....	15

INTRODUCTION

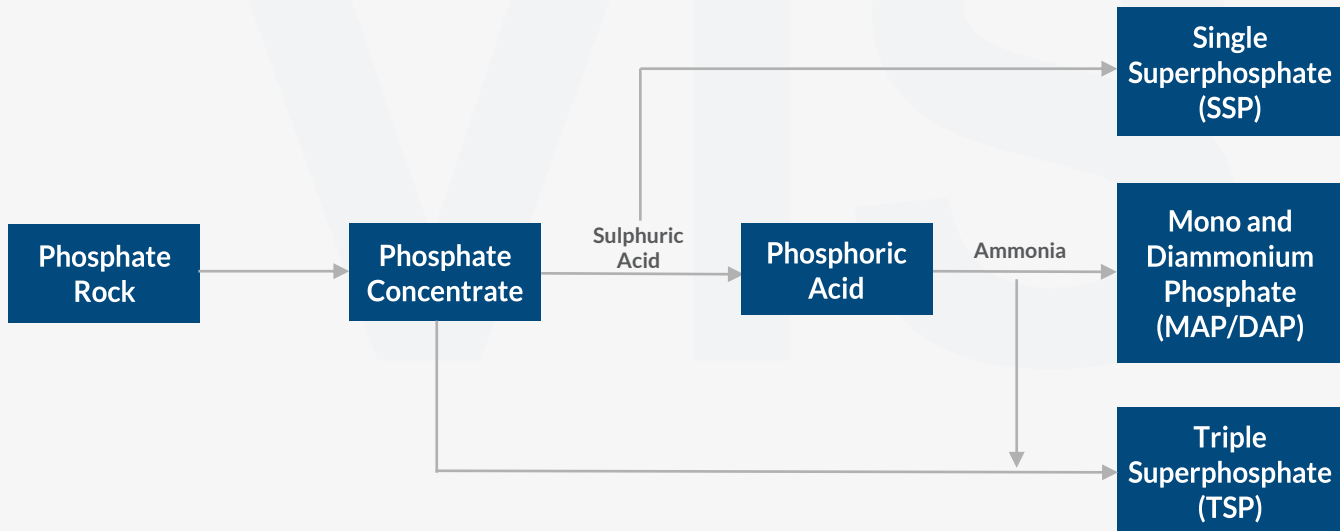
Fertilizers, natural or artificial, are substances that contain chemical elements which improve growth and productiveness of plants. Fertilizers enhance the natural fertility of the soil or replace chemical elements taken from the soil by previous crops. Crops absorb nutrients from the soil, leaving it nutrient deficient for the next planting cycle necessitating replenishment through fertilizers. If fertilizers are not used, over time the soil will become so nutrient deficient that crop yields will be affected thereby, putting global food security at risk.

As a predominantly agrarian nation, Pakistan heavily relies on fertilizers to enhance crop yields and ensure food security for its growing population. The fertilizer industry converts raw materials into products consisting of essential nutrients namely, Nitrogen, Phosphorus and Potassium. The sector comprises several major producers and a network of distributors, primarily focusing on the production and distribution of key fertilizers such as urea, diammonium phosphate (DAP), and nitrophos.

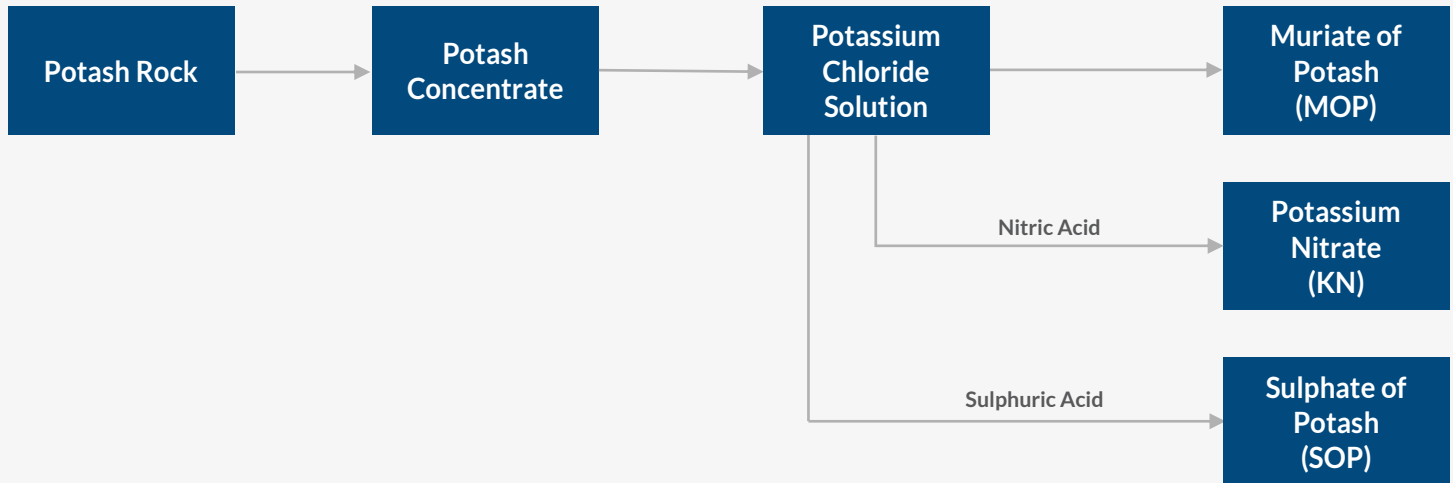
Nitrogen based fertilizers support the growth of plants, impart a green colour in leafy crops and promote lumpiness in cereal seeds. Nitrogen is produced by mixing air with hydrogen from natural gas at a high temperature and pressure to create ammonia. Nitric acid is produced through ammonia to make nitrate fertilizers e.g. ammonium nitrate. Urea is produced by mixing ammonia with liquid carbon dioxide. Urea and ammonium nitrate are mixed with water to produce a UAN solution, which is then sprayed in a granulator to produce granular urea.



Phosphorus based fertilizers promote seed and root development and plant maturation. They are produced from mined ores, phosphoric rock, which is treated with sulphuric acid to produce phosphoric acid, which in turn is treated with ammonia to produce Mono or Diammonium Phosphate (MAP/DAP) fertilizers.



Lastly, potassium-based fertilizers, also known as potash, enhance drought tolerance, improve root development and disease resistance. These too are produced from mined ores, potash rock, after which, through several chemical processes, are converted into fertilizers.



The different variety of products are as follows:

- Urea is the most widely used fertilizer in Pakistan, contributing significantly to the wheat and rice production due to its high nitrogen content and affordability.
- Di-Ammonium Phosphate (DAP) is essential for the cultivation of cereal and oilseeds with Pakistan importing substantial quantities to meet demand for phosphorus fertilizers.
- Calcium Ammonium Nitrate (CAN) is used for its dual properties of calcium and nitrogen which helps improve soil structure and crop yields.
- Nitrogen-Phosphorus (NP) is used to enhance the growth of leguminous crops that require a balanced supply of nitrogen and phosphorus.
- NPK is a three-component fertilizer consisting of Nitrogen-Phosphorus-Potassium, which is essential in precision agriculture as it provides customized nutrient solutions to maximize crop productivity and sustainability.
- Others: SSP, MAP, SOP and MOP hold an insignificant market share offtake wise in Pakistan. SSP and MAP both address phosphorus deficiencies whereas, SOP and MOP address potassium deficiencies.

Mainly Urea, DAP and CAN are manufactured in Pakistan with potassium products holding a marginal share. For this report the focus will be on Urea and DAP as they dominate the domestic fertilizer market.

GLOBAL PERSPECTIVE

The global fertilizer market was valued at USD 197 billion in 2022 rising by 2.5% to USD 202 billion in 2023. The projected CAGR for 2024-2032 is 2.7%. The global fertilizer market can be segmented on the basis of type of fertilizer, crop type, and geographical regions.

Global fertilizer demand decreased over 2022-23 mainly due to a rise in prices. Consumption of Nitrogen, the most consumed fertilizer (56%) has remained stable since 2020, standing at 109 MMT in 2022-23. Use of Phosphorus (24%)

on the other hand, dropped by 8% to 46 MMT followed by Potassium (20%) standing at 37 MMT a drop of 5% from 2021-22.

REGIONAL ANALYSIS

Largest Segment (2023)	Asia Pacific	North America	Europe	Africa
By Country	China	United States	Russia	Nigeria
By Product	Urea	Urea	Ammonium Nitrate	Urea
By Market Player	Sinofert Holdings Limited	CF Industries Holdings, Inc.	(2022) Yara International ASA	(2022) Yara International ASA

Source: Mordor Intelligence

Sinofert Holdings Limited, a Chinese company, is the major player in the Asia-Pacific region, while CF Industries Holdings Inc. leads North America and lastly, Norwegian, Yara International ASA dominates the European and African regions.

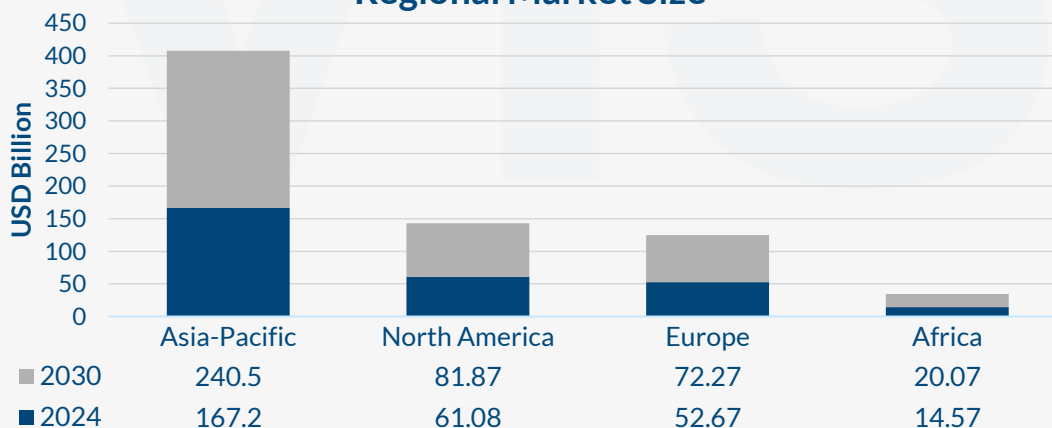
In 2023, the largest consumption of fertilizers by crop type was for field crops, due to intensive growth requirement to ensure food security. More use of fertilizers further depletes the soil nutrients, leading to more demand for fertilizers and the cycle continues.

Globally, urea is the most used fertilizer with the exception of Europe, where Ammonium Nitrate dominated the market due to its greater stability thus, preventing nitrogen loss. Regionally, the key agricultural players are China, United States, Russia and Nigeria for the Asia-Pacific, North American, European and African regions respectively. In 2022, China was the largest fertilizer producer and exporter, accounting for 25% of the global fertilizer production, with a consumption of 94.2 MMT, followed by India at 81.4 MMT.

United States and Mexico combined were the largest consumers of fertilizers in the American region due to vast areas under cultivation. Nigeria dominated the African fertilizer market accounting for 40.7% in 2023 though it had low consumption of fertilizers, standing at 20kg/hectare compared to 187.3kg/hectare in Europe. Lastly, Russia is the largest producer and highest consumer of fertilizers in Europe. However, exports from Russia were adversely impacted owing to economic sanctions imposed by the USA and Europe.

During the forecasted period of 2024-2030, the Asia-Pacific market with the highest CAGR of 6.24% is expected to grow to USD 240.5 billion, followed by Africa, at a CAGR of 5.49% to USD 20.07 billion; Europe at a CAGR of 5.41%, to USD 72.27 billion and with the least growth is the North American market at a CAGR of 5%, to USD 81.87 billion. Going forward, the rising world population and income levels will further push demand for food production and productivity, leading to an increase in fertilizer demand.

Regional Market Size



Source: Mordor Intelligence

SECTOR DRIVERS

The fertilizer market is driven by several factors but is primarily driven by the changes in the population which directly impacts the demand for food. The world population has grown by 0.91% over 2023-24 now standing at 8 billion; projected to grow to 8.5 billion by 2030 and will only continue to increase, hence more mouths to feed every year.

Moreover, as economies grow, level of education improves and income levels rise leading to improved dietary choices putting a pressure on the global food supply as demand for higher quality, diverse food increases.

As a result, modern agricultural practices aim to grow more food per unit of land through cultivating higher-yield crops and intensive farming to meet the growing demand for food. These two practices lead to soil degradation as nutrients are depleted due to which fertilizers become a vital ingredient in ensuring optimum soil health to meet the growing food demand by enabling sustainable agricultural productivity.

Price is the other major driver for fertilizer demand and supply. During 2021-2022 there was an energy crisis in Europe which led to a rise in natural gas prices due to geopolitical tensions, increasing fertilizer production costs and prices. As a result, some manufacturers reduced production leading to a decline in market supply of fertilizers. On the other hand, manufacturers with lower production costs supplied to the highly priced markets, thereby, securing higher profit margins and closing the supply gap. Furthermore, demand is influenced by prices, as high prices may reduce demand among farmers due to affordability issues leading to purchasing lower quantities or switching to cheaper alternatives. Going forward, price will remain an important determinant of demand.

RECENT DEVELOPMENTS

Geopolitical Tensions

Russia-Ukraine Conflict:

In February 2022, the Russia-Ukraine conflict led to a disruption in the supply of natural gas from Russia to Europe impacting the production cost of nitrogen-based fertilizers. Furthermore, the fertilizer prices became volatile leading to affordability issues for producers and farmers.

China Export Restrictions:

In 2023, China imposed export restrictions on fertilizers to protect the domestic Chinese market to ensure sufficient supply to meet their agricultural needs especially during their peak season. The aim was to prevent shortages and thereby, regulate domestic prices. Short supply led to steep price increase in international markets.

Climate Change

Massive Floods:

In 2022, Pakistan experienced massive floods during the monsoon season straining the farmers financially, due to crop losses and property damage leading to affordability issues in purchasing fertilizers for the next crop cycle.

LOCAL PERSPECTIVE

The agricultural industry is vital to Pakistan's economy as it contributed 24% to the GDP and employed around 37.4% of the total labour force in FY 2024, according to the recent Economic Survey. It is, therefore, important for Pakistan to focus on the fertilizer sector as well, as the two sectors are closely linked. The fertilizer industry ensures productivity of the agricultural industry thereby, ensuring food security.

The agricultural sector grew by 6.25% in FY 2024 which consequently led to a growth of domestic urea and DAP offtake by 2% Y/Y and 40% Y/Y, respectively in FY2024. Correspondingly, the production of urea and DAP increased by 9% Y/Y and 28% Y/Y respectively, in FY2024. The fertilizer sector is categorized as a Large-Scale Manufacturer (LSM) contributing 3.9% to the LSM growth during FY 2024. The total fertilizer offtake was approximately 9.5 MMT in 11MFY2024 compared to 8.5 MMT in 11MFY2023 and the market capitalization of the 5 major listed fertilizer players stood at Rs. 608 billion in 2024.

DEMAND DRIVERS

There are two major seasons of crops, Kharif and Rabi which significantly affect the demand of fertilizers as different nutrients are required for different types of crops. Kharif crops are dependent on the monsoon, e.g., rice, cotton, sugarcane, maize, pulses and their crop season is from April-July. Rabi crops are sown after the monsoon season in the winter from October-January e.g. wheat, barley, oilseeds.

During the Kharif season nitrogenous fertilizers e.g., urea is in high demand because it promotes leafy growth and early development. The demand for urea is majorly fulfilled through local production. Any deficit in demand and production is met through imports.

During the Rabi season phosphoric (DAP) and potassium (NPK & NP) fertilizers are in high demand as they promote root growth, flowering and overall health of the crops. As different types of fertilizers are in demand for the different seasons of the year, fertilizer companies plan their production accordingly.

MAJOR INDUSTRY PLAYERS

The sector is dominated by a few key players namely:

- Fauji Fertilizer Company Limited (FFC)
- Engro Fertilizers Limited (EFERT)
- Fauji Fertilizer Bin Qasim Limited (FFBL)
- Fatima Fertilizer Company Limited (FATIMA)

FFC

- Largest Urea manufacturer by production volume of 2.521 MMT in CY 2023.
- FFC had a shareholding of 49.88% in FFBL as of FY 2023.
- Manufactures Urea under the brand name 'Sona'.

FFBL

- Sole manufacturer of DAP.
- Meets Pakistan's ~50% demand of DAP.
- Pakistan Maroc Phosphore (PMP), a joint venture in Morocco between FFC, FFBL and Office Cherifien Des Phosphates (OCP) of Morocco.
- Imports DAP's raw material Phosphoric Acid from Morocco.
- Manufactures DAP under the brand name 'Sona'.

EFERT

- EFERT is the subsidiary of Engro Corporation.
- Second largest urea manufacturer by production volume of 2.313 MMT in CY 2023.
- Manufactures urea and imports DAP.

FATIMA

- The FATIMA Group has three plants:
 - Sadiqabad Plant - Fatima Fertilizer, a JV of Fatima Group and Arif Habib Group. It produces Urea, CAN, and NP, having a combined capacity of 1,280,000 MT.
 - Multan Plant- Pakarab Fertilizers Limited. It produces Urea, CAN and NP with a combined capacity of 846,500 MT.
 - Sheikhpura Plant - Dawood Hercules, produces Urea with a capacity of 445,000 MT.
- Sole manufacturer of CAN.
- Manufactures urea under the brand name 'Bubber Sher'.

PRODUCTION CAPACITY & VOLUME

Company	2021-2023	5MCY2024	2023		2022		2021	
Urea	Production Capacity (KT)	Production Volume (KT)	Production Volume (KT)	Utilization Rate (%)	Production Volume (KT)	Utilization Rate (%)	Production Volume (KT)	Utilization Rate (%)
FFC	2,048	1,082	2,521	123	2,404	117	2,507	122
FFBL	551	175	336	61	524	95	501	91
EFERT	2,275	846	2,313	102	1,955	86	2,105	93
FATIMA	1,045	462	979	94	1,093	105	801	77
AGRITECH	433	147	292	67	353	82	227	52
Industry	6,352	2,711	6,441	101	6,329	99	6,141	97
DAP - FFBL	650	321	660	102	848	130	790	122
CAN - FATIMA	870	204	840	97	867	99	792	91

Source: Company Annual Reports, NFDC

Note: The utilization rate has not been calculated for 5MCY2024.

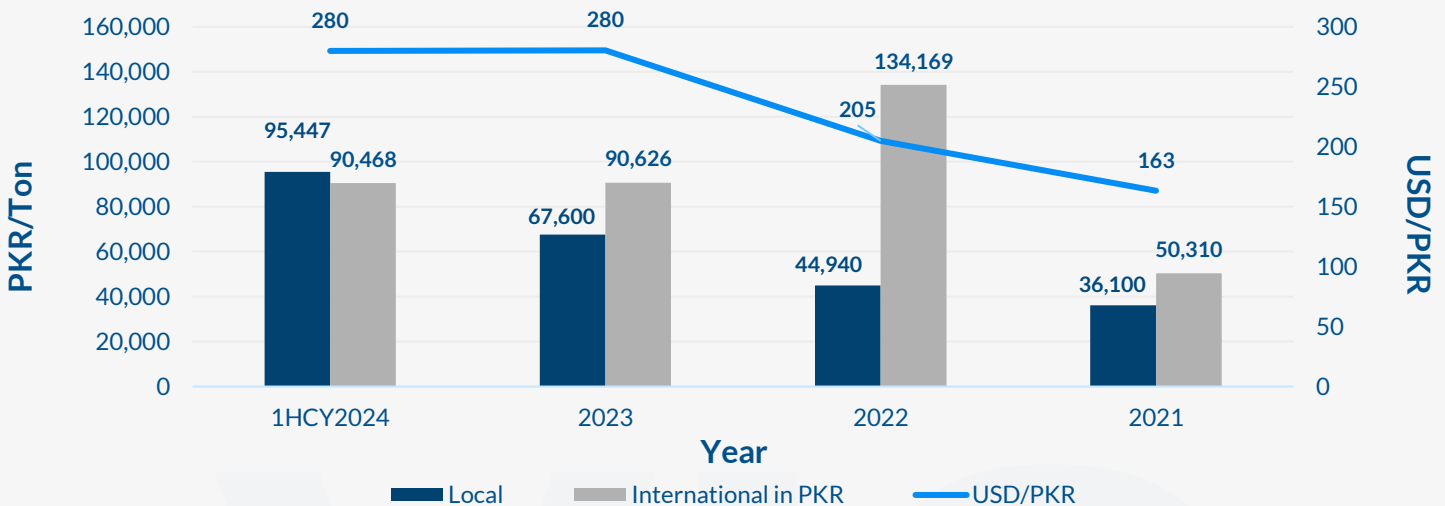
The production capacities throughout 2021-2023 remained unchanged for all the major fertilizer producers in the industry, however, production volumes fluctuated.

Overall, the industry utilization rate relating to urea increased by 2 pp (percentage points) Y/Y throughout 2021-2023 regardless, of the fluctuation in demand due to the suspension of gas and stretched maintenance period in case of some of the manufacturers. In case of DAP, the utilization rate improved in 2022 before dropping in 2023 by 22 pp. In comparison to urea, DAP production volume and therefore, utilization rate has fluctuated more due to variable demand and the industry's reliance on imports. A similar trend was observed regarding the production of CAN.

UREA

Local vs. International Prices

LOCAL VS. INTERNATIONAL UREA PRICES PKR/TON



Source: NFDC, VIS Database

Note: The international prices mentioned are excluding freight charges.

The Russia-Ukraine conflict significantly impacted international urea prices in 2022 leading to a rise of 44% from 2021 to a high of USD 700/MT. The geopolitical tension led to market uncertainties regarding the supply of urea which led to buyers securing supplies in the fear of a shortfall and influenced the currency exchange rates resulting in a rise in prices which was further exacerbated due to the rupee devaluation.

However, in 2023 the average international price fell significantly to USD 358/MT (2022: USD 700/MT). This fall is attributed to the limited demand for urea due to the buyers securing excess inventory in the previous year. The international prices in 1HCY2024 decreased slightly in comparison to the same period last year which is attributable to low demand and cheap exports from Egypt and Russia.

The local urea prices during 2021-23 averaged at Rs. 49,547/MT in comparison to Rs. 91,702/MT internationally. Local urea was cheaper due to local factors such as government subsidies and import policies however, international prices were relatively higher due to the rising cost of gas and supply chain issues resulting from the Russia-Ukraine conflict.

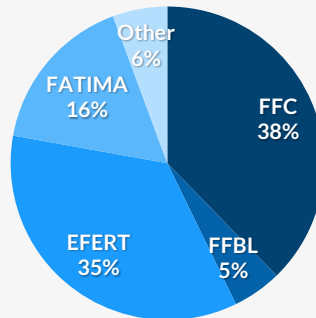
The local prices of urea increased by 50% from 2022-23 due to various reasons.

- **Restrictions imposed by China on export of fertilizers** influenced the Pakistani fertilizer industry as the limited supply of urea from China led to an increase in import costs, increasing the local urea prices.
- **Hoarding and cross border smuggling of fertilizers** is the other reason for the increase in fertilizer prices in the local market. Urea is being smuggled out of Pakistan, due to significant price differences with neighboring countries which also worsens local shortages. Urea is smuggled to countries where the prices are higher, e.g., Afghanistan.

During the 1HCY2024 urea price in the local market was almost at par with the international market. Increase in cost of production owing to the withdrawal of feedstock gas price subsidies (discussed in detail in the Major Cost Components section below) was the main reason for the rise in the price of urea.

Urea Market Share

UREA - 2023 OFFTAKE SHARES



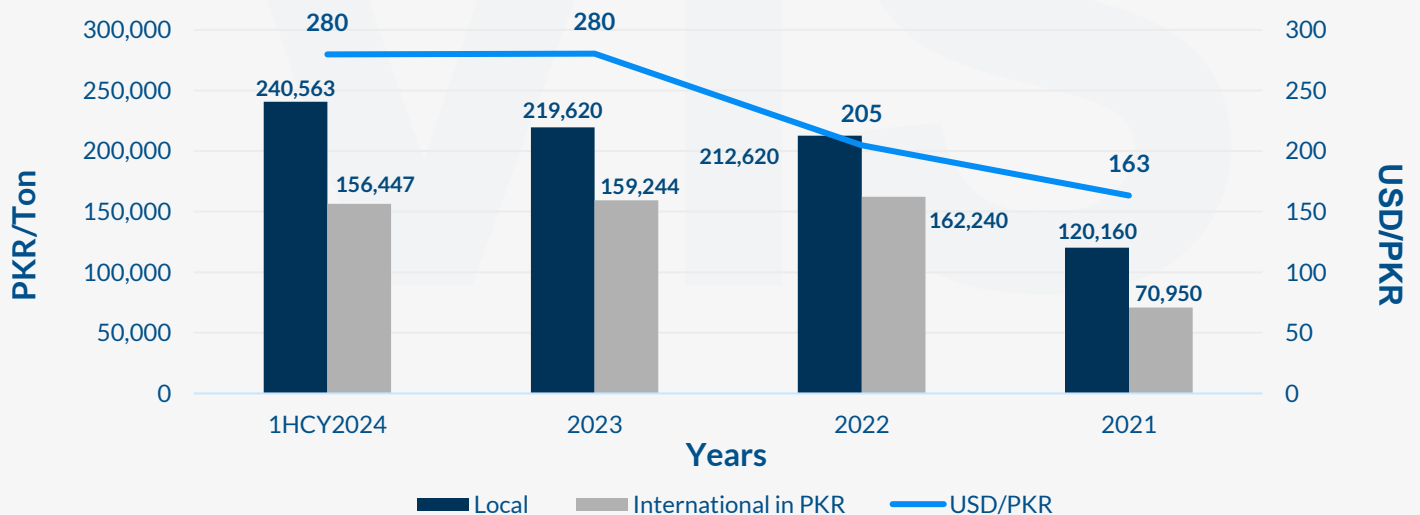
Source: Company Annual Reports 2023

From 2021-2023, FFC maintained its leading position in the urea market with an average market share of 38%, closely followed by EFERT as the second-largest player though in 2022 EFERT’s share had dropped by 7pp to 29% from 36% in 2021 due to prolonged maintenance and BMR activities at its plants.

DAP

Local vs. International Price

Local vs. International DAP Prices PKR/Ton



Source: NFDC, VIS Database

Note: The international prices mentioned are excluding freight charges.

DAP's international prices fluctuated throughout 2021-1HCY2024, due to varied demand, short supply of raw materials and rising energy costs. In 2022, DAP's international price increased by 28%, due to:

- The Russia-Ukraine conflict affected the supply of natural gas leading to an energy crisis which drove the prices higher.
- China's export restrictions led to shortage in supply of DAP's raw material, phosphoric acid.

In 2023, international prices decreased by 1.85% as demand for DAP was low resulting from affordability and availability issues.

During 1HCY2024, the international DAP prices were at par with the same period last year.

Local DAP prices increased from 2021-1HCY2024 (Y/Y) with the most significant increase being in 2021-2022 of 77% due to:

- Imported raw material
- Exchange rate fluctuations

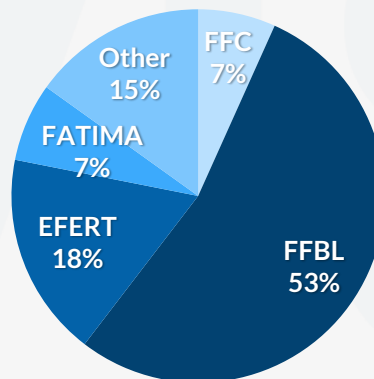
Almost half of the DAP demand is fulfilled locally whilst the rest is met through imports. Local manufacturing of DAP is also import dependent as phosphoric acid, a key raw material, needs to be imported. As a result, locally produced and imported DAP are both subject to exchange rate fluctuations. The average USD exchange rate increased by 25% leading to a steep rise in DAP's price in 2022.

In 2023, the average USD exchange rate increased by 37% however, the local DAP prices did not see a steep rise. This is attributable to DAP's high inventory leading to a reduced reliance on imports thereby, offsetting the adverse effects of the exchange rate.

In 1HCY2024, local DAP price was higher by 54% relative to international prices and 19% relative to local prices same period last year mainly due to increase in the feedstock gas prices.

DAP Market Share

DAP - 2023 OFFTAKE SHARES



Source: Company Annual Reports 2023

As the sole manufacturer of DAP, FFBL dominates the market with a 53% share of offtake. Combined with FFC, the Fauji Group holds 61% of the DAP market share. EFERT, FATIMA and FFC import DAP to meet the demand of the local market

with industry imports standing at 505 KT in 2023. The combined market share of the three companies is 32%, 22 pp below FFBL’s market share. This is due to difficulty in competing with locally produced DAP, as it holds a strong reputation among farmers.

MAJOR COST COMPONENT

Feed Gas, Fuel gas and others

The major raw material of the fertilizer industry is feedstock gas, a natural gas delivered through the pipelines. It is a primary raw material necessary for ammonia (an intermediate product), an essential component for nitrogen fertilizers. There are dominantly three gas suppliers that supply to fertilizer companies, the Sui Northern (SNGPL) and Sui Southern (SSGCL) Companies and Mari Petroleum (MPCL).

Gas being a vital raw material for fertilizer manufacturing, the government used to provide gas at a subsidized rate to support the agricultural sector ensuring fertilizers were available at a lower price. This also promotes local production as opposed to importing which could be costly and the supply also remained vulnerable to disruption due to geopolitical tensions. The subsidized gas led to manufacturers generating higher margins. However, in 2024 the government decided to eliminate the subsidy as the IMF demanded.

All figures are in PKR per MMBtu		Feedstock Gas		Fuel Gas	
Company	Gas Supplier	2024	2023	2024	2023
FFC	MPCL	580	580	1,580	1,580
FFBL	SSGCL	1,597	580	1,597	1,580
EFERT	MPCL	1,597	580	1,597	1,580
	SNGPL	1,597	580	1,597	1,580
FATIMA	MPCL	580	580	1,597	1,580
	SNGPL	1,597	510	1,597	1,500

Source: OGRA

As a result of the removal of the subsidy, the feedstock gas prices increased by 175% from Rs. 580 per MMBtu to Rs. 1,597 per MMBtu in 2024 from last year. However, FFC and Pak Arab Plant of Fatima Fertilizer still enjoy subsidized feedstock gas, which put the other fertilizer companies at a disadvantage.

As a result, the companies will increase the urea prices per bag to cover the extra cost. The unaffected companies are likely to increase their prices too thereby, enjoying a higher margin whilst they can.

Fuel Gas on the other hand, is crucial for energy generation in the fertilizer production process however, the prices have not varied significantly from 2023-2024.

Furthermore, Pakistan does not have significant phosphate rock reserves necessary to produce phosphoric acid. Consequently, the fertilizer industry relies heavily on imports of phosphoric acid, a critical component in the production of DAP to meet the demand locally. The top phosphate rock producing countries are China, Morocco, US, Russia and Jordan. As FFBL is the sole producer of DAP it is the sole importer of phosphoric acid for which it has entered a joint venture in Morocco. However, this reliance creates challenges related to supply chain logistics, exchange rate risks and geopolitical risks.

ESG SENSITIVITY

The increasing awareness towards ESG has led businesses changing the way they operate to mitigate environmental impacts. Companies are investing in their manufacturing facilities to improve operational efficiency leading to sustainable usage of scarce raw materials. Moreover, to conserve energy and reduce their carbon footprint the Fauji Group and EFERT are adopting renewable energy resources e.g. installing solar power units.

The fertilizer industry is energy-intensive and relies on natural gas which negatively impacts the environment as it contributes to greenhouse gas emissions and depletes non-renewable resources. Furthermore, fertilizers using nitrogen and phosphorus runoff into water bodies and contaminate the water which adversely affects aquatic life. With growing awareness for sustainability, this can become a serious issue for the industry. As a result, FFBL is focusing on launching Boron fortified DAP to increase yields and contribute to more sustainable agricultural practices by mitigating environmental impacts related to nutrient run-off.

SECTOR DYNAMICS

- **Rivalry amongst Existing Competitors:** The existing fertilizer industry mainly has 5 big players due to which it can be termed as oligopolistic in nature. The 3 companies although share the same product i.e. Urea, however, majority of the players have their own competitive edge in terms of sole producers of a certain product.
- **Threat of New Entrants:** The threat of new players in the market is low due to high capital requirement and limited supply of gas.
- **Threat of Substitute Products:** There is no substitute of fertilizers as such, therefore, threat of substitute products can be termed as low.
- **Bargaining Power of Buyers:** Buyers have limited control over the prices of fertilizers, as majority of the manufacturers set the prices of the products. The product is a necessity for the buyer therefore, they will continue to purchase it regardless of the price. For instance, urea has an inelastic average industry offtake of 6.028 MMT over a decade, despite the increase in prices.
- **Bargaining Power of Suppliers:** Gas is the primary raw material in the fertilizer industry, but its supply is frequently disrupted due to depleting natural gas reserves, increasing reliance on imported RLNG. The government may raise gas prices, adjust subsidies, or revoke them. However, manufacturers typically pass these cost impacts on to the end consumer through fertilizer prices.

SECTOR ISSUES

PROFITABILITY

The rising cost and supply disruption of natural gas has led to production halts and increasing costs which in turn affects profitability as only a partial impact of the increase is passed onto the farmers. As a result, competition from imported fertilizers is on the rise especially from areas where the production cost is comparatively lower e.g. China.

In addition, significant price differences also adversely affect profitability as it encourages black market activities leading to a shortage of fertilizers locally thereby, hindering agricultural activity endangering national food security.

SURVIVAL

Pakistan relies heavily on imports of raw material and the product DAP. Fluctuations in international prices, exchange rates and availability impact the local market.

Climate change e.g. the massive floods in 2022, disrupted agricultural activity thereby, the fertilizer industry, as it impacted the demand in the short-term. The industry needs disaster management strategies by implementing early warning systems to reduce overflow into fertile land.

TECHNOLOGY

Another issue is the high cost of technology e.g. precision agriculture technology is useful as fertilizers can be applied precisely to areas which require it the most, helping to reduce the amount of fertilizers required therefore, causing less damage to the environment. However, in Pakistan the adoption of this technology has been slow due to affordability issues.

SECTOR OUTLOOK

The outlook for Pakistan's fertilizer sector is marked by both challenges and opportunities. While the industry continues to play a vital role in supporting the country's agricultural productivity, it faces several issues. Persistent natural gas shortages may constrain domestic production capacity, potentially leading to increased reliance on imports. The sector is also grappling with the need to balance affordability for farmers with economic viability for producers, especially as the government reviews subsidy policies. Government policies on subsidies and pricing remain crucial factors influencing market dynamics. Environmental concerns and the push for more sustainable agricultural practices may drive a shift towards more efficient fertilizer use and alternative products. Despite these challenges, there's potential for growth through technological advancements, improved distribution networks, and possible expansion of production capacity. The sector may see consolidation and technological upgrades to improve competitiveness. Overall, while the sector remains vital for Pakistan's agriculture, its growth trajectory will depend on addressing structural issues and adapting to evolving market and regulatory landscapes.

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