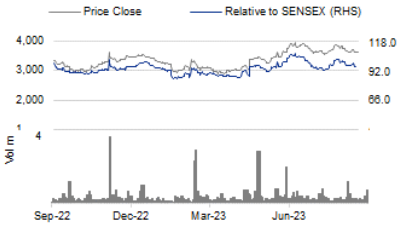
India

REDUCE *(no change)*

Consensus ratings*:	Buy 22	Hold 2	Sell 2
Current price:			Rs3,630
Target price:	▲		Rs2,872
Previous target:			Rs2,417
Up/downside:			-20.9%
InCred Research / Consensus:			-31.9%
Reuters:			PIIL.NS
Bloomberg:			PI IN
Market cap:			US$7,584m
			Rs550,706m
Average daily turnover:			US$16.5m
			Rs1197.1m
Current shares o/s:			138.0m
Free float:			53.3%

Source: Bloomberg



Source: Bloomberg

Price performance	1M	3M	12M
Absolute (%)	(1.9)	4.3	8.0
Relative (%)	(1.8)	(0.3)	(2.5)

Major shareholders	% held
Promoter & Promoter Group	46.8
ICICI Prudential	3.5
Axis Mutual Fund	2.5

PI Industries Ltd

Product pipeline is dull; reiterate REDUCE

- Pre-emergent pyroxasulfone, whose cost/ha is 6x vis-à-vis competitive post-emergent herbicides, will have difficulty getting accepted outside USA.
- The fungicide, fluindapyr, is also pre-emergent and 10x costlier compared to mancozeb (on soybean application), which makes us wary of its success.
- Growth expectations are too high, and our analysis of the product pipeline doesn't throw any potential winner. Reiterate our REDUCE rating on the stock.

Analysis of product pipeline doesn't provide enthusiasm

We have analyzed the samples sent to clients over the last 14 quarters to gauge the product pipeline of PI Industries. Out of 60 products, 30 are agrochemical and others have general chemical usage. Interestingly, PI Industries has sent some chemical samples which can be used as intermediates to anti-psychotic drugs. Most of the samples of chemicals, which can have other than agrochemical usage, were sent in early FY21 or FY22 and they haven't been commercialized till date. Among the commercialized chemicals, the street appears to be quite bullish on fluindapyr, a soybean, rice, and cereals fungicide, developed by FMC. FMC's annual report of 2022 stated that the company has sold the product, Onsuva, worth US$100m in 2022, which has fluindapyr as the base input. Please note that fluindapyr is a pre-emergent SDHI fungicide and compared to mancozeb, it is 10x costlier to use. It's extremely unlikely that farmers will adopt this product on a widescale basis for usage on the soybean crop in Latin America. Its usage on the rice crop is also extremely unlikely because of the high cost.

Higher pyroxasulfone reliance to pose problems in new geographies

PI Industries relies heavily on pyroxasulfone for its exports growth, accounting for 60% of its export revenue. In 1QFY24, the company exported nearly Rs9bn worth of pyroxasulfone, which has been a standout performer. However, the exports of other products have been lacklustre. While Japan and USA are prominent export destinations for PI Industries, replicating pyroxasulfone' s success in new markets may prove expensive due to its high cost at US$86-87/kg. The success in USA and Japan may not necessarily be replicated in countries like Brazil, Argentina, or India. Please note that pyroxasulfone is at least 6x costlier to use compared to post-emergent wheat and corn herbicides like clodinafop, metsulfuron, 2 4 D, fluroxypyr, glyphosate, etc.

Earnings expectations are too high; reiterate REDUCE rating

Given the fact that PI Industries lacks a strategic advantage in its generic product pipeline as well as relies heavily on pyroxasulfone for its export revenue, whose growth itself is in question, we expect the EPS to remain flattish in FY24F over FY23, and minor growth in FY25/26F (EPS CAGR 7% over FY23-36F). We reiterate our REDUCE rating on the stock with a revised target price of Rs2,872 (30x Sep 2025F EPS). Upside risks: A sudden increase in export demand for products other than pyroxasulfone. Although unlikely, the acceptance of pyroxasulfone in new geographies also poses an upside risk to our EPS.

Financial Summary	Mar-22A	Mar-23A	Mar-24F	Mar-25F	Mar-26F
Revenue (Rsm)	53,466	64,920	77,806	85,079	93,082
Operating EBITDA (Rsm)	11,895	15,421	18,528	20,329	22,311
Net Profit (Rsm)	8,909	12,295	12,775	13,905	15,184
Core EPS (Rs)	58.6	80.9	84.1	91.5	100.0
Core EPS Growth	12.0%	38.0%	3.9%	8.8%	9.2%
FD Core P/E (x)	61.89	44.85	43.16	39.66	36.31
DPS (Rs)	2.2	3.1	3.2	3.5	3.8
Dividend Yield	0.06%	0.09%	0.09%	0.10%	0.11%
EV/EBITDA (x)	44.68	33.66	28.42	25.45	22.48
P/FCFE (x)	165.64	82.30	(299.05)	56.85	34.51
Net Gearing	(32.6%)	(44.8%)	(29.5%)	(34.8%)	(51.2%)
P/BV (x)	9.01	7.66	6.54	5.65	5.65
ROE	15.5%	18.5%	16.4%	15.3%	15.6%
% Change In Core EPS Estimates			(1.34%)	(5.32%)	
InCred Research/Consensus EPS (x)					

SOURCE: INCRED RESEARCH, COMPANY REPORTS

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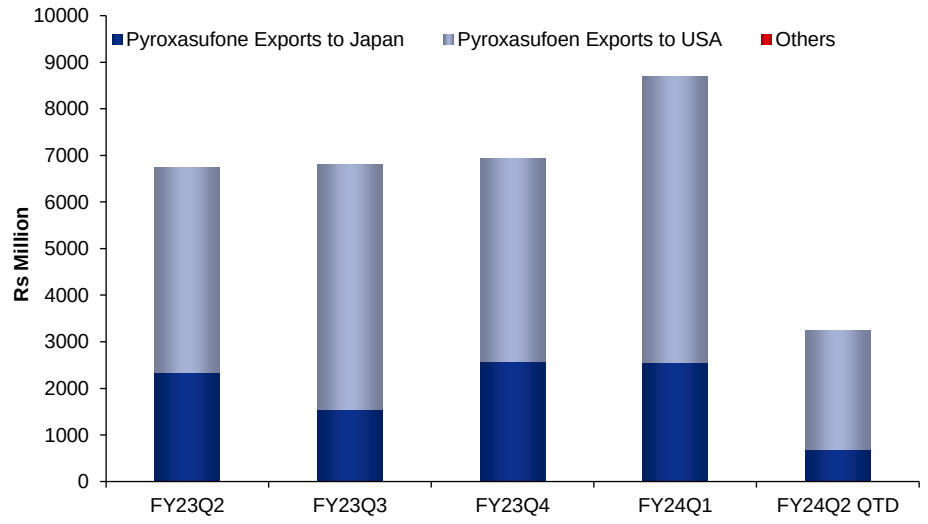
Product pipeline is dull; reiterate Reduce

In the last five quarters, PI Industries' exports to Japan and USA have increased significantly. The sudden jump in demand for pyroxasulfone and its increased imports by Kumiai of Japan helped PI Industries' performance in the last two quarters. Kumiai has launched the product in many regions in anticipation that this product will do well. Our analysis of pyroxasulfone indicates that it's unlikely that the highly costly and pre-emergent herbicide will achieve success in other parts of the world (apart from the developed countries like USA).

Pyroxasulfone has done remarkably well for PI Industries

PI Industries' pyroxasulfone exports pick up pace »

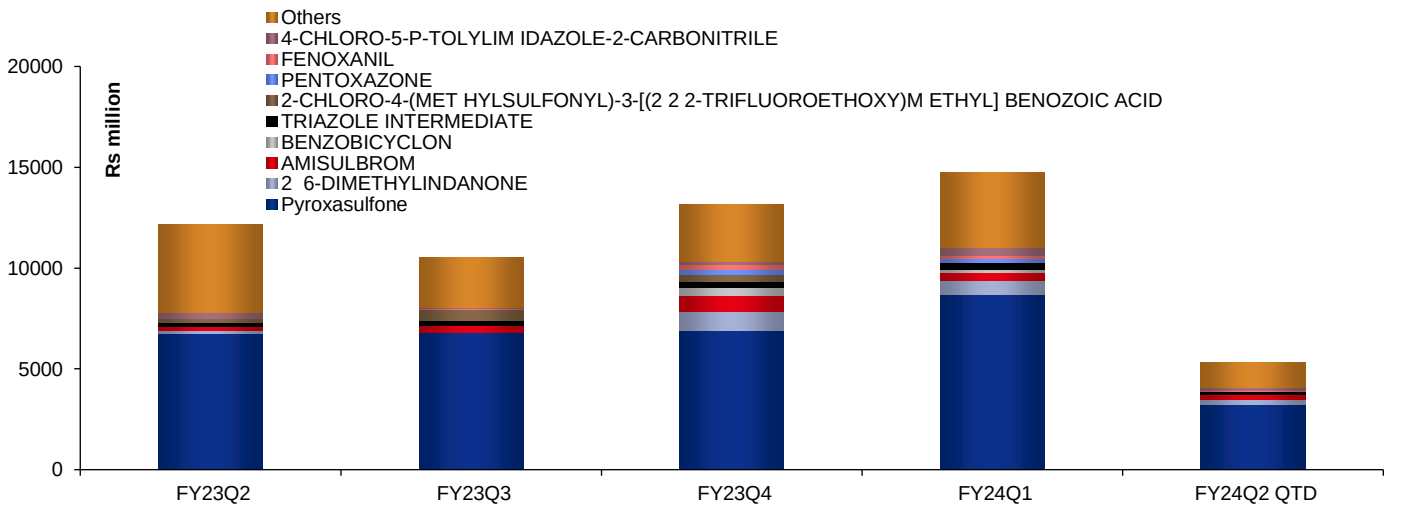
Figure 1: PI Industries exported nearly Rs9bn worth of pyroxasulfone in 1QFY24



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Exports of other products are not picking up at all »

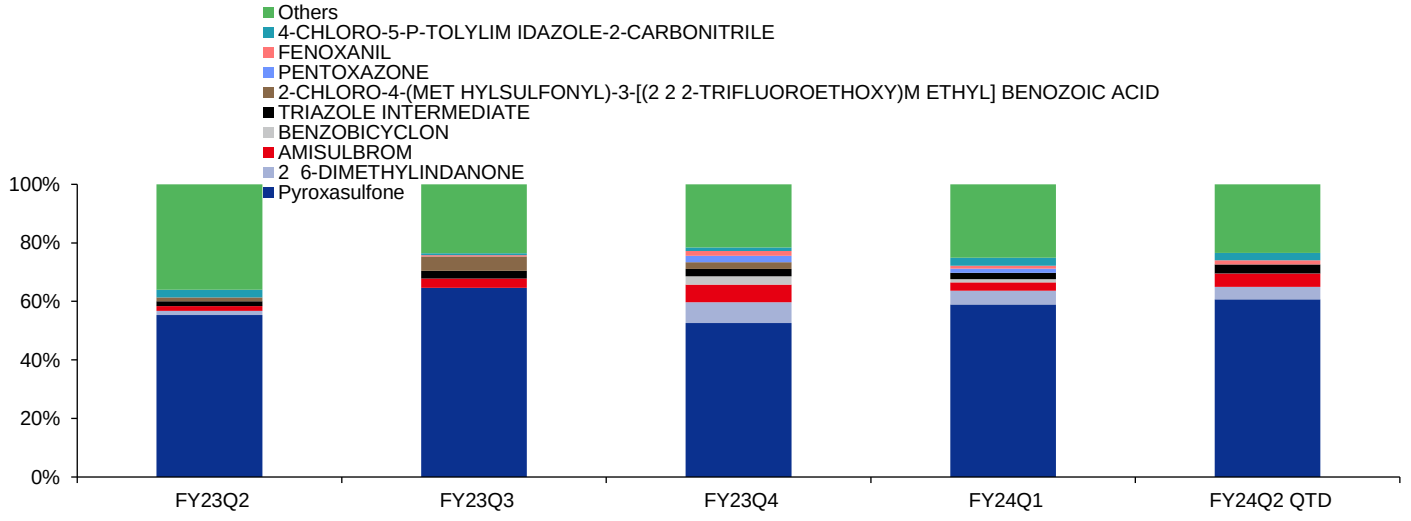
Figure 2: PI Industries' higher dependence on pyroxasulfone is depicted in the graph below



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Almost 60% of the exports are driven by pyroxasulfone ➤

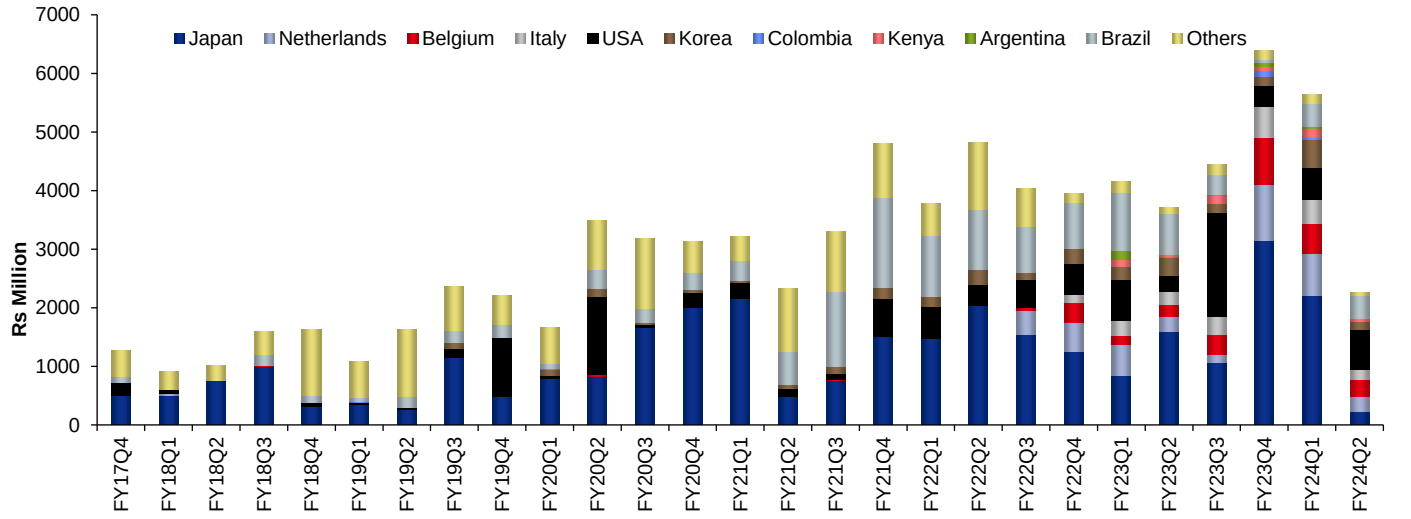
Figure 3: Pyroxasulfone drives almost 60% of PI Industries' exports



SOURCE: COMPANY REPORTS, INCRED RESEARCH

USA and Japan are the main export destinations ➤

Figure 4: Japan and USA are the main export destinations for PI Industries



SOURCE: INCRED RESEARCH, COMPANY REPORTS

The pipeline of new products is listed below ➤

Figure 5: The list of samples that has been sent to various customers is shown below; this sample list is of the last 14 quarters i.e., starting FY21. PI Industries has sent some samples of already established compounds to new customers and the same have been excluded from this list

Name	Usage
3 3 3 3-BIPHENYLTETRABOXYLIC DIANHYDRIDE (BPDA)	3,3',4,4'-biphenyltetracarboxylic dianhydride (BPDA) is a chemical compound with the formula C16H6O6. It is a white, crystalline solid that is soluble in organic solvents. BPDA is a monomer used in the production of polyimides, a class of high-performance polymers with excellent thermal, mechanical, and electrical properties.
3-(3-BROMO-6-FLUORO-2-M ETHYL-1H-INDOL-1-YL) SULFONYL) N N-DIMETHY L-1H 1 2 4-TRIAZOLE-1-SULFONAMIDE (ISTS)	3-(3-bromo-6-fluoro-2-methyl-1H-indol-1-yl) sulfonyl)-N, N-dimethyl-1H-1,2,4-triazole-1-sulfonamide, also known as amisulbrom, is a fungicide used to control late blight and downy mildew in potatoes. It is a member of the bromo indole class of fungicides.
5-AMINO-1-(3-CHLORO-4 5 6 7-TETRAHYDROPYRAZOLO (1 5-A) PYRIDINE-2 -YL) PYRAZOLE-4-CARBONITRILE	5-amino-1-(3-chloro-4,5,6,7-tetrahydropyrazolo[1,5-a] pyridine-2-yl) pyrazole-4-carbonitrile is a chemical compound with the formula C13H12ClN4. It is currently under investigation as a potential treatment for epilepsy and other neurological disorders.
1-(4-(CHLOROPHENOXY)-2-T RIFLUOROMETHYL) PHENYL) ETHANONE	The common name of 1-(4-(4-chlorophenoxy)-2-trifluoromethyl) phenyl) ethenone is clethodim. It is a selective herbicide that is used to control a variety of broadleaf weeds, including pigweed, lambsquarters, and crabgrass. It is also used as a pre-emergent herbicide, which means that it is applied to the soil before the weeds germinate.
1-(4-chlorophenyl)-1H-py razol-3-ol [CHP-H]	The compound was first synthesized in 1987 by a team of Japanese researchers. It was subsequently shown to have anticonvulsant activity in animal models of epilepsy. The compound has also been shown to protect neurons from damage caused by oxidative stress.
1,2-dimethyl-3-nitroisou	1,2-dimethyl-3-nitroisourea is a chemical compound with the formula C3H8N3O3. It is a colourless to yellow solid that is soluble in water and organic solvents. 1,2-dimethyl-3-nitroisourea is a derivative of isourea, and it has been shown to have antimicrobial and anticancer properties. The compound was first synthesized in 1968 by a team of Japanese researchers. It was subsequently shown to have antimicrobial activity against a variety of bacteria and fungi. The compound has also been shown to have anticancer activity in animal models of cancer.

1,4-diphenoxy-Hydroquinonew	1,4-diphenoxy-hydroquinone is a precursor to several other compounds, including the herbicide hexazinone and the fungicide benomyl. It is also used as a component in some plastics and resins. In cosmetics, 1,4-diphenoxy-hydroquinone is used as a skin lightener. It works by inhibiting the production of melanin, the pigment that gives skin its colour. However, it can also cause side effects, such as skin irritation and allergic reactions.
1-H Pyrrole-2,5 dicarboxylic acid	1-H pyrrole-2,5-dicarboxylic acid is a versatile compound that has been used in a variety of applications. It has been used as a precursor to other compounds, as a mordant in dyeing, and as a component in some pharmaceuticals.
2-(2,4-dichlorophenoxy) acetic acid	2-(2,4-dichlorophenoxy) acetic acid dimethylamine salt, also known as 2,4-D dimethylamine salt, is a chemical compound with the formula C8H11Cl2NO2. It is a white to off-white, crystalline solid that is soluble in water and organic solvents.
2-(3,5-dichlorophenyl) propionic acid	The chemical compound 2-(3,5-dichlorophenyl) propionic acid is also known as dichlorprop. It is a selective herbicide that is used to control a variety of broadleaf weeds, including dandelions, clover, and crabgrass. It is also used to control woody plants, such as trees and shrubs.
2-(chlorobenzyl)-5-isopropyl-3-methylpyrazol-1-ol	2-(chlorobenzyl)-5-isopropyl-3-methylpyrazol-1-ol is a potential herbicide that has been shown to be effective against a variety of weeds, including dandelions, clover, and crabgrass. It is also a potential fungicide that has been shown to be effective against a variety of fungi, including powdery mildew and rust.
2- {[(4 6-dimethoxypyrimi din-2-yl) carbamoyl] sulfamoyl}- N N-dim ethylpyridine-3-carboxamide	The common name of 2-{[(4,6-dimethoxypyrimidin-2-yl) carbamoyl] sulfamoyl}-N, N-diethylpyridine-3-carboxamide is nicosulfuron. Nicosulfuron is a member of the sulfonylurea family of herbicides, which are known for their herbicidal properties. The pyrimidine group is responsible for the herbicidal properties of the compound, while the sulfamoyl and dimethylamino groups are responsible for its solubility in water. Nicosulfuron is a selective herbicide, which means that it only kills certain types of plants. It is not harmful to most crops, but it can be toxic to animals and humans.
2-2-dichloro-1-(p-tolyl) ethenone	The common name of 2-2-dichloro-1-(p-tolyl) ethenone is vaniliprole. It is a synthetic pyrethroid insecticide that is used to control a variety of insects, including mosquitoes, flies, and cockroaches. Vaniliprole is a contact insecticide, which means that it kills insects when they encounter it.
2-ADAMANTANONE 2 ADN	2-adamantanone is used as a starting material for the synthesis of other compounds, such as pharmaceuticals and polymers. It is also used as a fragrance ingredient and in the manufacture of plastics.
2-Amino-3,4-difluorobenzonitrile	2-amino-3,4-difluorobenzonitrile is a potential herbicide, but it is not currently used in commercial products. It is also a potential precursor to other compounds, such as pharmaceuticals and polymers.
2-amino-4,6-dimethoxy-1,3,5-triazine	The common name of 2-amino-4,6-dimethoxy-1,3,5-triazine is atrazine. It is a herbicide that is used to control a variety of broadleaf weeds, including dandelions, clover, and crabgrass. It is also used to control woody plants, such as trees and shrubs.
2-arnino -2,3- dimethyl	The common name of 2-amino-2,3-dimethylbutanoic acid is valeric acid. Valeric acid has a variety of uses. It is used as a flavouring agent in food and beverages, as a solvent in the chemical industry, and as a starting material for the synthesis of other compounds.
2-chloro-4-methylsulfonylbenzoic acid [CMSBA]	2-chloro-4-methylsulfonylbenzoic acid (C8H7ClO4S) is a chemical compound with the common name sulcotrione. It is a herbicide that is used to control a variety of broadleaf weeds, including dandelions, clover, and crabgrass. It is also used to control woody plants, such as trees and shrubs. Sulcotrione is a selective herbicide, which means that it only kills certain types of plants. It is not harmful to most crops, but it can be toxic to animals and humans.
3 3-(BIPHENYL-4 4-DIYLBI S (OXY) DIPHTHALIC AQCID (BPOTA)	BPOTA is used as a flame retardant in a variety of applications, including plastics, textiles, and elastomers. It is also used as a precursor to other compounds, such as pharmaceuticals and polymers.
3 3-BIPHENOL DIANHYDRIDE (3 3-BPODA)	3,3-BPODA is a member of the biphenyl dianhydride family of compounds, which are used as intermediates in the synthesis of other compounds, such as polymers and pharmaceuticals. It is also used as a flame retardant in a variety of applications, including plastics, textiles, and elastomers.
3,5-diamino-1,2,4-triazole (guanazole)	The common name of 3,5-diamino-1,2,4-triazole is guanazole. Guanazole is used as an antifungal agent in a variety of applications, including agriculture, food, and pharmaceuticals. It is also used as a precursor to other compounds, such as pharmaceuticals and polymers.
3-((3-bromo-6-fluoro-2-methyl-1H-indole-1-yl) sulfonyl)-N, N-dimethyl-1H-1,2,4-triazole-1-sulfonamide (IMI)	The common name of 3-((3-bromo-6-fluoro-2-methyl-1H-indole-1-yl) sulfonyl)-N, N-dimethyl-1H-1,2,4-triazole-1-sulfonamide (IMI) is amisulbrom. Amisulbrom is a selective herbicide, which means that it only kills certain types of plants. It is not harmful to most crops, but it can be toxic to animals and humans.
3-(difluoromethyl)-1-methylcyclopropene	3-(difluoromethyl)-1-methylcyclopropene is a relatively new compound that is still under investigation. It is a potential fumigant, which means that it can be used to kill insects and other pests by releasing toxic gases.
3-CT (3-CHLOROTHIOPHENE)	The common name of 3-chlorothiophene is thiocresol. Thiocresol is used as an antimicrobial agent in a variety of applications, including agriculture, food, and pharmaceuticals. It is also used as a precursor to other compounds, such as pharmaceuticals and polymers.
3-phenoxybenzoic acid [3	The common name of 3-phenoxybenzoic acid is salol. Salol is used as an antiseptic agent in a variety of applications, including pharmaceuticals and cosmetics. It is also used as a preservative in food and beverages
4 4-BISPHENOL A DIANHYDRIDE (4 4-BPADA)	4,4'-bisphenol A dianhydride is a precursor to the production of polycarbonate plastics and epoxy resins. It is also used in the production of some flame retardants and lubricants.
4,4`-dicarboxydiphenyl ether	The common name of 4,4`-dicarboxydiphenyl ether is bisphenol F. It's used as a monomer in the production of polycarbonate plastics. It is also used as a flame retardant and in the production of some pharmaceuticals.
4-chlorophenyl hydrazine	4-chlorophenylhydrazine is a reagent used in organic chemistry to detect and quantify carbonyl compounds. It is also used in the synthesis of other compounds, such as pharmaceuticals and polymers.
4-METHYLACETOPHENONE	Melilotal is a naturally occurring compound that is found in a variety of plants, including sweet clover. It is also produced by some bacteria. The common name of 4-methylacetophenone is melilotal.
5-amino-l-(3-chloro-4,5-dimethyl-2-thienyl)-2-hydroxy-N-(2-pyridylmethyl) benzamide	The common name of 5-amino-l-(3-chloro-4,5-dimethyl-2-thienyl)-2-hydroxy-N-(2-pyridylmethyl) benzamide is metsulfuron-methyl. Metsulfuron-methyl is a selective herbicide, which means that it only kills certain types of plants. It is not harmful to most crops, but it can be toxic to animals and humans.
5-hydroxy-2-adamantanone	5-hydroxy-2-adamantanone is a synthetic compound that is used as a precursor to other compounds, such as pharmaceuticals and polymers. It is also used as a flavouring agent in food and beverages.
7-fluoro-2-(3-dihydro-1H-inden-1-yl)-1,1,3-trimethyl-1H-pyrazole-4-carboxamide (FDTM)	FDTM is a synthetic compound that is used as a herbicide. It is applied to the soil and kills weeds by interfering with their growth. FDTM is effective against a variety of weeds, including dandelions, clover, and crabgrass. It is also effective against woody plants, such as trees and shrubs.
AMINO SULFONE	Amino sulfone is a generic term for a class of compounds that contain an amino group and a sulfone group. Amino sulfones are used in a variety of applications, including: **Pharmaceuticals**: Amino sulfones are used as precursors to other pharmaceuticals, such as antibiotics and anti-inflammatory drugs. **Personal care products**: Amino sulfones are used as preservatives and foaming agents in personal care products, such as shampoos and soaps. **Industrial chemicals**: Amino sulfones are used as flame retardants, antioxidants, and corrosion inhibitors in industrial chemicals.
AMINOPYRIFEN [AMFN]	Aminopyrifen is a common name for the fungicide imazapic.Imazapic is used as a fungicide to control a variety of plant diseases, including powdery mildew, rust, and scab. It is also used as a wood preservative.
AMISULBORN TECH (ISTS)	The common name of amisulbrom is amibromdole. Amisulbrom is a fungicide that is used to control a variety of plant diseases, including late blight (Phytophthora infestans) and downy mildew (Plasmopara viticola). It is also used to control some other fungal diseases, such as powdery mildew and rust.
BENSULFURON-METHYL (BSM)	It is a herbicide that is used to control a variety of broadleaf weeds, including dandelions, clover, and crabgrass. It is also used to control woody plants, such as trees and shrubs.
BENZOBICYCLON	It is a herbicide that is used to control a variety of annual and perennial weeds in rice crops. It is a selective herbicide, which means that it only kills certain types of plants. It is not harmful to most rice crops, but it can be toxic to animals and humans.

CHP-H / 1-(4-chloropheny	CHP-H is a synthetic compound that is used as a precursor to other compounds, such as pharmaceuticals and polymers. It is also used as a solvent in the chemical industry.
CYCLOPROPYL	Cyclopropane is used as an anaesthetic in medicine. It is also used as a propellant in aerosol cans and as a solvent in the chemical industry.
CYCLOPYRANIL	Cyclopyranil is a synthetic compound that is used as a herbicide. It is applied to the soil and kills weeds by interfering with their growth. Cyclopyranil is effective against a variety of weeds, including dandelions, clover, and crabgrass. It is also effective against woody plants, such as trees and shrubs.
Dicloromezotiaz	Dicloromezotiaz is a synthetic compound that is used as an insecticide. It is a mesoionic insecticide, which means that it has both ionic and covalent bonds. This makes it more stable and less harmful to the environment than other types of insecticides.
DINOTEFURAN	Dinotefuran is used to control a variety of insect pests, including aphids, whiteflies, thrips, leafhoppers, leafminers, sawflies, mole cricket, white grubs, lacebugs, billbugs, beetles, mealybugs, and cockroaches. It is used on a variety of crops, including fruits, vegetables, ornamentals, and turf.
2-chloro-N-(2,6-diethylphenyl) benzamide	The common name of 2-chloro-N-(2,6-diethylphenyl) benzamide is benfuracarb.Benfuracarb is a systemic insecticide, which means that it is absorbed by the plant and moves throughout the plant. This makes it effective against pests that feed on the leaves, stems, and roots of the plant.
Ethyl 2-phenylacetoaceta	The common name of ethyl 2-phenylacetoacetate is glycidate. Glycidate is a flavouring agent that is used in a variety of food and beverages. It is also used in the production of perfumes and cosmetics.
Ethyl 4-chloro-2-fluoro- 5-[({[isopropyl(methyl)amino] sulfonyl} carbonyl] phenylcarbamate [PCM]	PCM is a flame retardant that is used in a variety of applications, including plastics, textiles, and electronics. It is also used as a pesticide.
PENTOXAZONE	Pentoxazone is a herbicide that is used to control a variety of annual and perennial weeds in rice crop. It is a selective herbicide, which means that it only kills certain types of plants. It is not harmful to most rice crops, but it can be toxic to animals and humans.
Methyl-2-sulfamoylmethyl	The common name of methyl-2-sulfamoylmethyl benzoate is metsulfuron-methyl. Metsulfuron-methyl is a herbicide that is used to control a variety of broadleaf weeds, including dandelions, clover, and crabgrass. It is also used to control woody plants, such as trees and shrubs.
N-(2-chloro-4-fluoro-5-(trifluoromethyl) phenyl)-2-nitrobenzamide	The common name of N-(2-chloro-4-fluoro-5-(trifluoromethyl) phenyl)-2-nitrobenzamide is imazapic. Imazapic is a herbicide that is used to control a variety of broadleaf weeds, including dandelions, clover, and crabgrass. It is also used to control woody plants, such as trees and shrubs.
N-(2-methylsulfinyl-1 1 -dimethyl-ethyl)-N`- {2-methyl-4-[1 2 2 2 - tetrafluoro-1-(trifluoromethyl) ethyl]	The common name of N-(2-methylsulfinyl-1,1-dimethyl-ethyl)-N`-{2-methyl-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl] phenyl} benzamide is flumioxazin. Flumioxazin is a herbicide that is used to control a variety of annual and perennial weeds, including barnyard grass, sedges, and grasses. It is also used to control weeds in orchards and vineyards.
N` -[2-chloro-4-fluoro-5-(trifluoromethyl) phenyl]-2-nitrobenzamide	The common name of N` -[2-chloro-4-fluoro-5-(trifluoromethyl) phenyl]-2-nitrobenzamide is imazamox. Imazamox is a herbicide that is used to control a variety of broadleaf weeds, including dandelions, clover, and crabgrass. It is also used to control woody plants, such as trees and shrubs.
N-ethylcaprolactam [NEC]	Caprolactone is a cyclic amide that is used to make nylon 6. It is also used as a solvent and a monomer in the production of plastics. The common name of N-ethyl caprolactam is caprolactone
OXAZICLOMEFONE	It is a new herbicide that is currently under development. Oxaziclomfone is a photosystem II inhibitor, which means that it blocks the production of a compound that is essential for photosynthesis. This causes the weeds to die. Oxaziclomfone is applied to the leaves of the weeds and is absorbed by the plant. It is then translocated to the roots, where it kills the cells.
PYRACLONIL	Pyraclonil is a selective herbicide that is used to control a variety of weeds in rice crop.
SSF 126 (METOMINOPSTROBI	It is a new herbicide that is currently under development.
SULFONATED POLYPHENYLENE	Sulfonated polyphenylene (SPP) is a synthetic polymer that is used in a variety of applications, including water treatment, oil and gas production, and electronics.
TRIKETONE	A triketone is an organic compound that contains three ketone groups. The simplest triketone is 2,3,4-pentanetrione, also known as dimethyl triketone or acetoacetic aldehyde. Triketones are used in a variety of applications, including: **Solvents**: Triketones are used as solvents for a variety of organic compounds, including resins, plastics, and dyes. **Flavours and fragrances**: Triketones are used to impart fruity, floral, and spicy notes to flavours and fragrances. **Chemical intermediates:** Triketones are used as intermediates in the synthesis of a variety of other chemicals, including pharmaceuticals, pesticides, and plastics. **Curing agents**: Triketones are used as curing agents for resins and plastics. **Esters**: Triketones can be used to make esters, which are used in a variety of applications, such as perfumes, flavours, and solvents.
TZOX-na dehydrate	TZOX-na dehydrate is a generic name for the herbicide, metsulfuron-methyl sodium. Metsulfuron-methyl sodium is a sulfonylurea herbicide that is used to control a variety of broadleaf weeds, including dandelions, clover, and crabgrass. It is also used to control woody plants, such as trees and shrubs

The agrochemicals present in samples and their sales over the last 20 years are shown below ➤

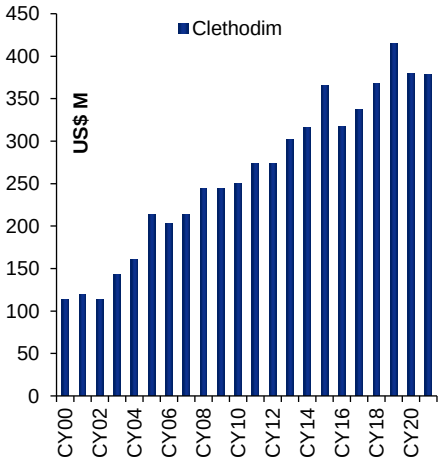
1. **1-(4-(4-chlorophenoxy)-2-trifluoromethyl)phenyl) ethenone**- Its common name is Clethodim. This is a pre-emergent herbicide.
2. **1,4-diphenoxy-hydroquinone** – Used to produce herbicide hexazinone apart from many other applications. However, the most possible usage by PI Industries' customers is to produce herbicide.
3. **2-(2,4-dichlorophenoxy)acetic acid** - It's a famous generic herbicide.
4. **2-(3,5-dichlorophenyl)propionic acid**- The chemical compound 2-(3,5-dichlorophenyl)propionic acid is also known as dichlorprop.
5. **2-(chlorobenzyl)-5-isopropyl-3-methylpyrazol-1-ol-** It's a potential herbicide (under research now).
6. **2-{[(4 6-dimethoxypyrimi din-2-yl) carbamoyl] sulfamoyl}- N N-dim ethylpyridine-3-carboxamide** - The common name of 2-{[(4,6-dimethoxypyrimidin-2-yl)carbamoyl]sulfamoyl}-N,N-diethylpyridine-3-carboxamide is nicosulfuron. Nicosulfuron is a member of the sulfonylurea family of herbicides.

7. **2-2-dichloro-1-(p-tolyl)ethanone-** The common name of 2-2-dichloro-1-(p-tolyl)ethanone is vaniliprole.
8. **2-amino-3,4-difluorobenzonitrile -** 2-amino-3,4-difluorobenzonitrile is a potential herbicide, but it is not currently used in commercial products.
9. **2-amino-4,6-dimethoxy-1,3,5-triazine -** The common name of 2-amino-4,6-dimethoxy-1,3,5-triazine is atrazine.
10. **2-chloro-4-methylsulfony lbenzoic acid**- 2-chloro-4-methylsulfonylbenzoic acid (C8H7ClO4S) is a chemical compound with the common name sulcotrione. It is a herbicide that is used to control a variety of broadleaf weeds.
11. **3,5-diamino-1,2,4-triazole (guanazole)-** The common name of 3,5-diamino-1,2,4-triazole is guanazole. Guanazole is used as an antifungal agent in a variety of applications, including agriculture, food, and pharmaceuticals.
12. **3-((3-bromo-6-fluoro-2-methyl-1H-indole-1-yl)sulfonyl)-N,N-dimethyl-1H-1,2,4-triazole-1-sulfonamide (IMI)-** The common name of 3-((3-bromo-6-fluoro-2-methyl-1H-indole-1-yl)sulfonyl)-N,N-dimethyl-1H-1,2,4-triazole-1-sulfonamide (IMI) is amisulbrom. Amisulbrom is a selective herbicide.
13. **5-amino-l-(3-chloro-4,5-dimethyl-2-thienyl)-2-hydroxy-N-(2-pyridylmethyl) benzamide**- The common name of 5-amino-l-(3-chloro-4,5-dimethyl-2-thienyl)-2-hydroxy-N-(2-pyridylmethyl)benzamide is metsulfuron-methyl. Metsulfuron-methyl is a selective herbicide, which means that it only kills certain types of plants.
14. **7-fluoro-2-(3-dihydro-1H-inden-1-yl)-1,1,3-trimethyl-1H-pyrazole-4-carboxamide** Fluindapyr is a synthetic compound that is used as a herbicide. It is applied to the soil and kills weeds by interfering with their growth.
15. **Aminopyrifen -** Aminopyrifen is a common name for the fungicide, imazalil.
16. **Amisulbrom**- The common name of amisulbrom is amibromdole. Amisulbrom is a fungicide that is used to control a variety of plant diseases.
17. **Bensulfuron- methyl-** It is a herbicide that is used to control a variety of broadleaf weeds, including dandelions, clover, and crabgrass.
18. **Benzobicyclon-** It is a herbicide that is used to control a variety of annual and perennial weeds in rice crops.
19. **Cyclopyranil-** Cyclopyranil is a synthetic compound that is used as a herbicide. It is applied to the soil and kills weeds by interfering with their growth.
20. **Dicloromezotiaz-** Dinotefuran is used to control a variety of insect pests.
21. **2-chloro-N-(2,6-diethylphenyl)benzamide-** The common name of 2-chloro-N-(2,6-diethylphenyl)benzamide is benfuracarb.
22. **Pentoxazone**- Pentoxazone is a herbicide that is used to control a variety of annual and perennial weeds in rice crop.
23. **Methyl-2-sulfamoylmethyl**- The common name of methyl-2-sulfamoylmethyl benzoate is metsulfuron-methyl. Metsulfuron-methyl is a herbicide that is used to control a variety of broadleaf weeds, including dandelions, clover, and crabgrass.
24. **N-(2-chloro-4-fluoro-5-(trifluoromethyl)phenyl)-2-nitrobenzamide**- The common name of N-(2-chloro-4-fluoro-5-(trifluoromethyl)phenyl)-2-nitrobenzamide is imazapic.
25. **N-(2-methylsulfinyl-1 1 -dimethyl-ethyl)-N`-{2-methyl-4-[1 2 2 2 - tetrafluoro-1-(trifluoromethyl) ethyl]-** The common name of N-(2-methylsulfinyl-1,1-dimethyl-ethyl)-N`-{2-methyl-4-[1,2,2,2-tetrafluoro-1-(trifluoromethyl)ethyl]phenyl}benzamide is flumioxazin.
26. **N` -[2-chloro-4-fluoro-5-(trifluoromethyl)phenyl]-2-nitrobenzamide -** The common name of N` -[2-chloro-4-fluoro-5-(trifluoromethyl)phenyl]-2-nitrobenzamide is imazamox.
27. **Oxaziclomfone** - It is a new herbicide that is currently under development.
28. **Pyraclonil -** Pyraclonil is a selective herbicide that is used to control a variety of weeds in rice crop.
29. **SSF 126 (METOMINOPSTROBI)**- It is a new herbicide that is currently under development.

30. **TZOX-Na dehydrate**- TZOX-Na dehydrate is a generic name for the herbicide metsulfuron-methyl sodium.

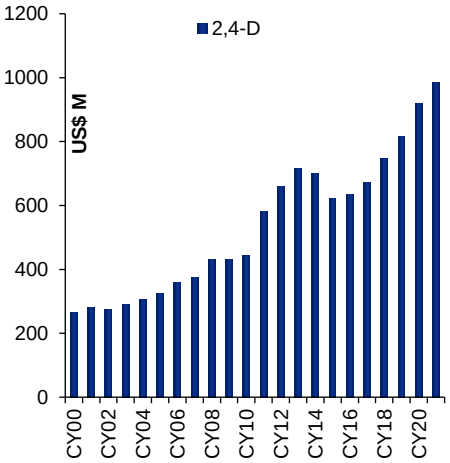
Out of these 30 agrochemicals, multiple chemicals are generic and PI industries is only a me-too supplier. The sales of all those agrochemicals for the last 20 years is shown in the graphs below.

Figure 6: Clethodim (herbicide) has shown an impressive 6% CAGR over the last 21 years



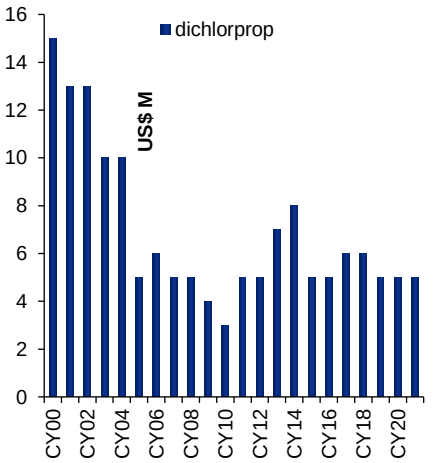
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 7: 2,4D has shown an impressive growth in sales (6% CAGR), but is highly competitive



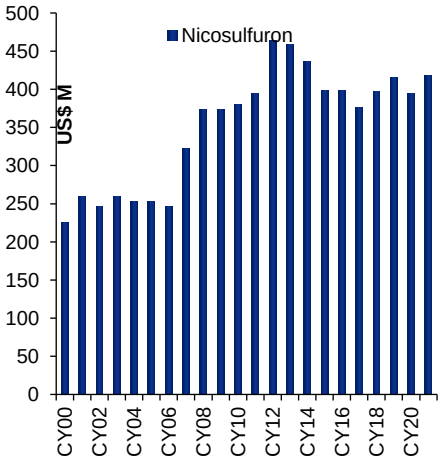
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 8: Dichlorprop (herbicide) sales never picked up



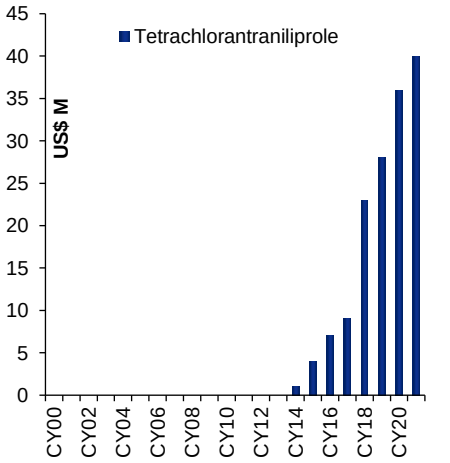
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 9: Nicosulfuron (herbicide) has shown anaemic growth, at a 3% CAGR, for the last 21 years



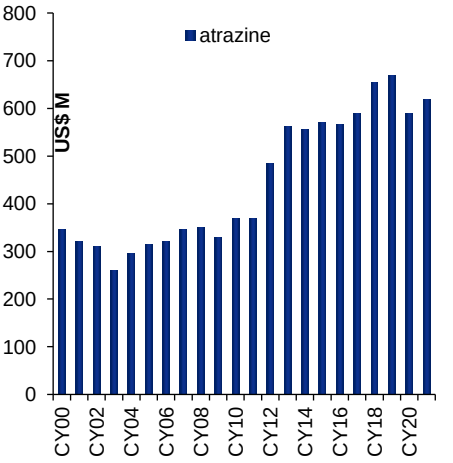
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 10: Tetrachlorantraniliprole (insecticide) sales have been insignificant



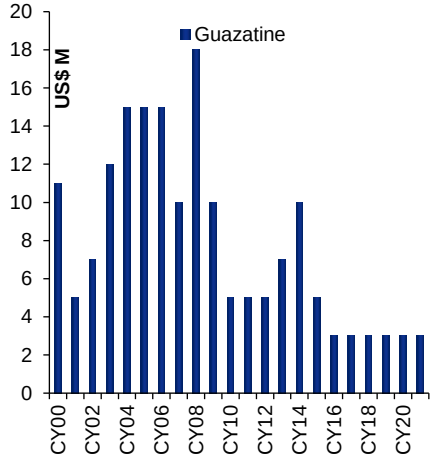
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 11: Atrazine is an old herbicide – registers sales growth, at a 3% CAGR, over the last 21 years



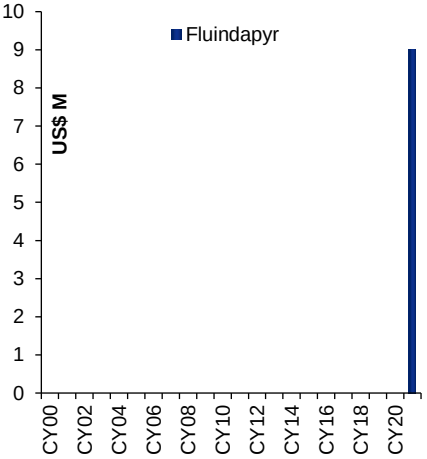
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 12: Gazatine (fungicide) sales have been insignificant



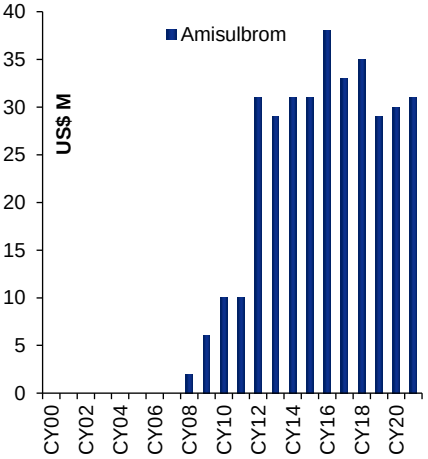
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 13: Fluindapyr (fungicide) is the market's hope for PI Industries



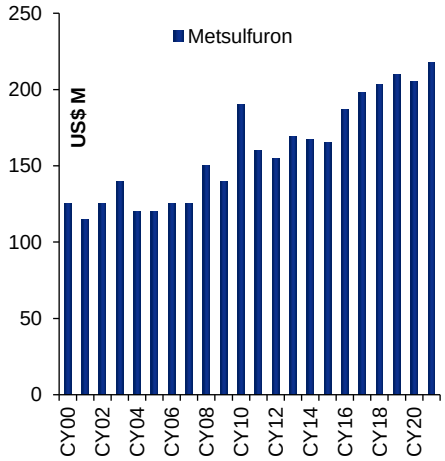
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 14: Amisulbrom (fungicide) sales have hovered around US$30m



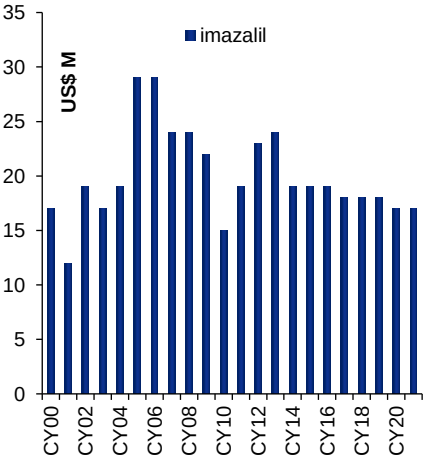
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 15: Metsulfuron (herbicide) sales have hovered around US$200m



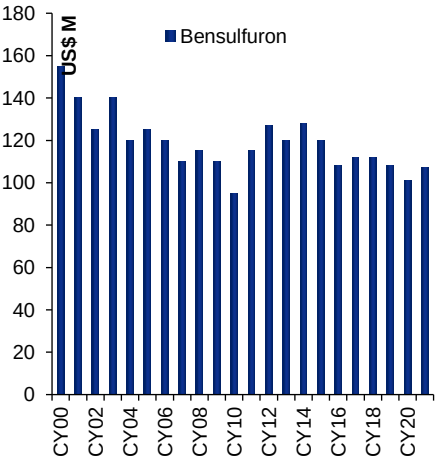
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 16: Imazalil (fungicide) sales have been stagnant and are insignificant for the last six-to-seven years



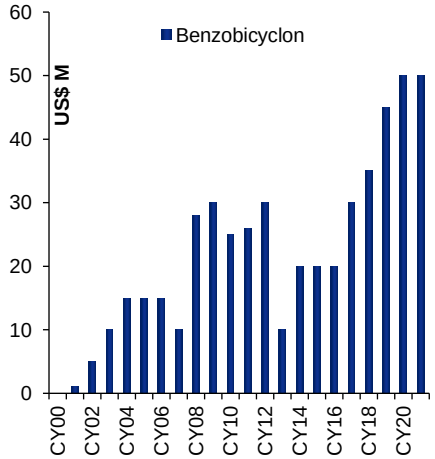
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 17: Bensulfuron is a declining herbicide



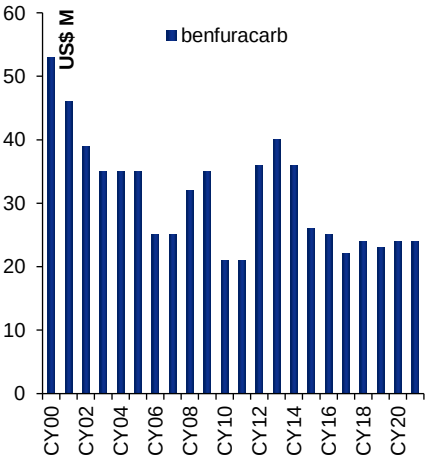
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 18: Benzobicyclon, with only US$50m in sales after 21 years of its launch, has not been successful



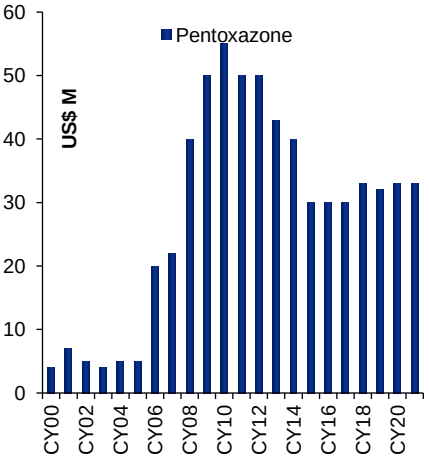
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 19: Benfuracarb (an insecticide) sales have been declining



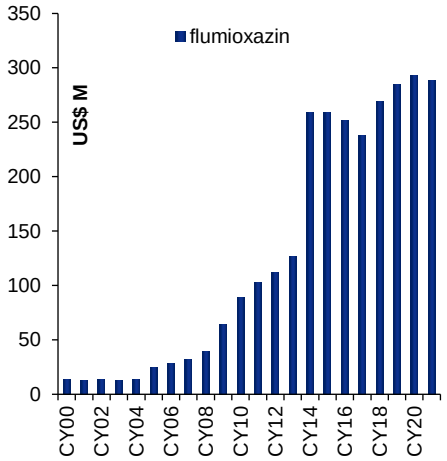
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 20: For the past few years, pentoxazone (insecticide) sales haven't been doing well



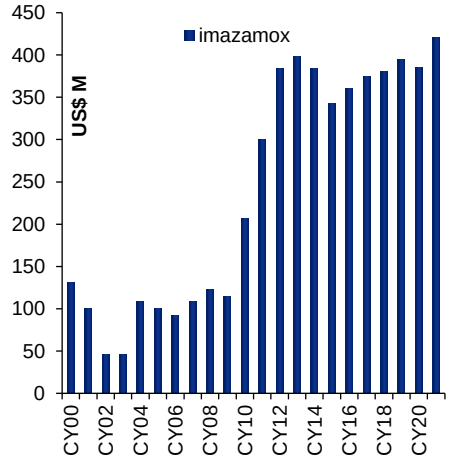
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 21: Herbicide flumioxazin sales have stagnated



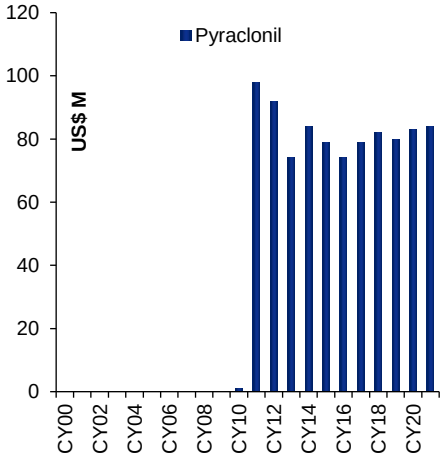
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 22: Imazomox herbicide is still doing well, although its growth is anaemic



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 23: Like many other herbicides, pyraclonil burst into the scene with great promise, but its sales have stagnated



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Fluindapyr is the hope for the street »

Fluindapyr has been developed by FMC and it appears that PI industries is trying hard to get a CRAMS contract for the same. In its 2022 annual report, FMC said that it sold a fluindapyr-based fungicide mixture for US$100m.

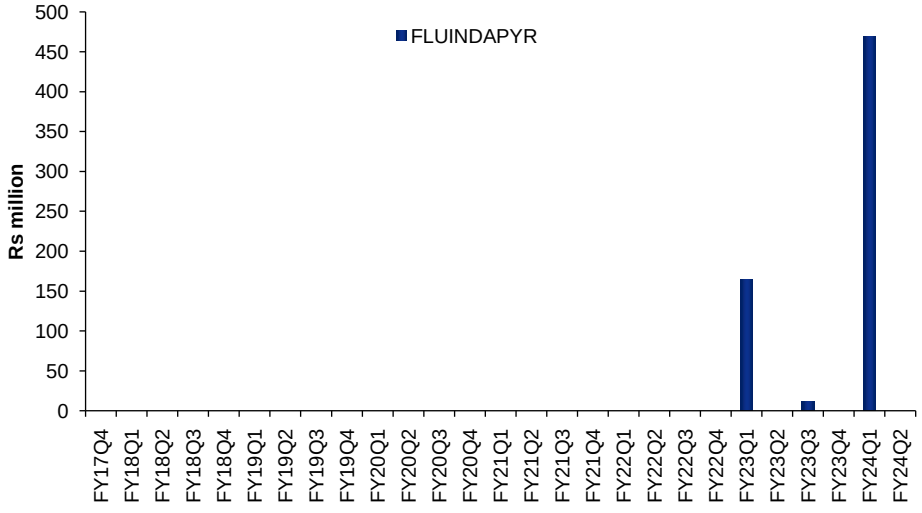
Figure 24: Onsuva - a fluindapyr-based fungicide's brand's sales accounted for US$100m in 2022 for FMC

from products launched in the last five years, representing 10 percent of the total revenue. In 2022, we had new product launches in Canada of Coragen® Max insecticide based on Rynaxypyr® active and in Brazil of Boral® Full, our new herbicide mixture product. We had new product launches in Argentina and Paraguay of Onsuva® fungicide based on our new Fluindapyr active ingredient. Products launched in 2022 accounted for approximately $100 million in sales. Our diamides, Rynaxypyr® and Cyazypyr® active ingredients, continued to be a significant part of our portfolio, representing approximately $2.1 billion in combined sales and approximately 36 percent of the total revenue in 2022. We also grew our Plant Health program, which includes FMC's biologicals platform, by 8 percent. Plant Health is now over $230 million in sales and outpacing market growth.

SOURCE: INCRED RESEARCH, FMC ANNUAL REPORT 2022

PI Industries has exported Rs460m of fluindapyr in 1QFY24 »

Figure 25: PI Industries' fluindapyr sales have been rising over the last 12 months



SOURCE: INCRED RESEARCH, COMPANY REPORTS

What is a fluindapyr fungicide? ➤

Fluindapyr is a fungicide that is used to control a variety of diseases in row crops, specialty crops, and turf. It is a SDHI (succinate dehydrogenase inhibitor) fungicide, which means that it works by blocking an enzyme that is essential for fungal growth.

In 2020, FMC Corporation (FMC) acquired the rights to fluindapyr from Isagro S.p.A., and the company expects to launch the fungicide in Paraguay in 2023, followed by USA, China, Europe, Argentina, Brazil, and other countries.

In Brazil, fluindapyr has been registered for use on a variety of crops, including soybean, corn, cotton, and grapes. The fungicide is also registered for use in Argentina, Mexico, and Colombia.

The registration of fluindapyr in Latin America is a positive development for farmers in the region. The fungicide offers a new and effective way to control a variety of diseases, and it could help to improve crop yield and quality.

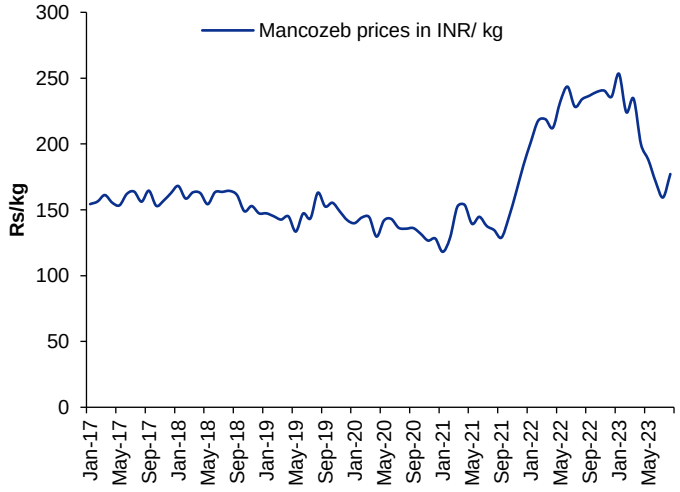
Some of the diseases that fluindapyr can control in Latin America:

- Soybean rust
- Corn smut
- Cotton leaf spot
- Grape powdery mildew
- Tomato late blight.

Can it become as sucessful as mancozeb? Too early to say, but human behaviour indicates it's difficult and fuindapyr is 10x costly compared to mancozeb ➤

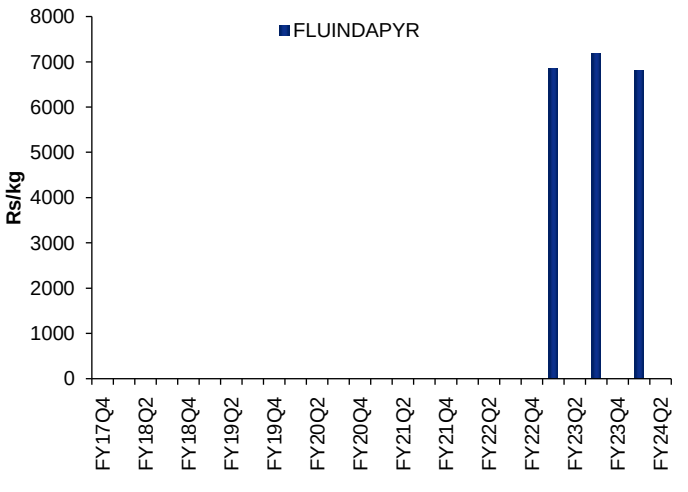
Fluindapyr is a pre-emergent fungicide while mancozeb is a post-emergent one. Please note that fluindapyr is much more costly than mancozeb. Using this costly fungicide as a preventive measure is not exactly in sync with the normal farmer behaviour in emerging markets. Pyroxasulfone's success in USA and Japan cannot be extrapolated in Brazil, Argentina or even India. Please note that pyroxasulfone never succeeded in India, and we are yet to see it if succeeds in Brazil, Argentina, etc. High-income countries can apply preventive herbicides and fungicides but that's not the case with the farmers in low-income countries.

Figure 26: Prices of mancozeb exported from India have been around Rs150/kg



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 27: However, fluindapyr prices are ~40 times that of mancozeb



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Funindapyr requirement per acre is only 4x lesser compared to mancozeb and hence, its usage is 10x costlier

1. The recommended application rate of mancozeb for soybean rust control is 2.2kg/ha (2.0 pounds/acre). This is equivalent to 1.36 pounds/1,000 sq. ft. The fungicide should be applied when the disease symptoms first appear and repeated at 7-to-10-day intervals while warm, rainy weather conditions prevail.

2. The recommended application rate of fluindapyr for Asian rust control is 1.25 fluid ounces/acre (0.375 L/ha or 0.5kg/ha). This is equivalent to 0.11 ounce/ 1,000 sq. ft. (0.29L/1,000 sq.m.). The fungicide should be applied when disease symptoms first appear and repeated at 7-to-10 day intervals while warm, wet weather conditions prevail.

As explained in the paragraphs above, fluindapyr requirement is 25% of the requirement of the mancozeb. Hence, it is 10x more costly than mancozeb. Added to it is the fact that it should be applied before the emergence of the fungus. May be fluindapyr will become successful in USA, Europe, etc, but we are doubtful that it will get success in India, China, Argentia or even Brazil.

How about pyroxasulfone's success in new geographies? It's very costly to achieve success in Brazil, India, etc. ➤

1. Pyroxasulfone is a pre-emergence herbicide that is used to control a variety of grass and broadleaf weeds in crops such as wheat, corn, soybean, and cotton. It works by inhibiting the production of an enzyme that is essential for cell division in weeds. Please remember that the cost of pyroxasulfone is exorbitant at US$86-87/kg.
2. Here are some post-emergent herbicides for wheat and corn:

Wheat

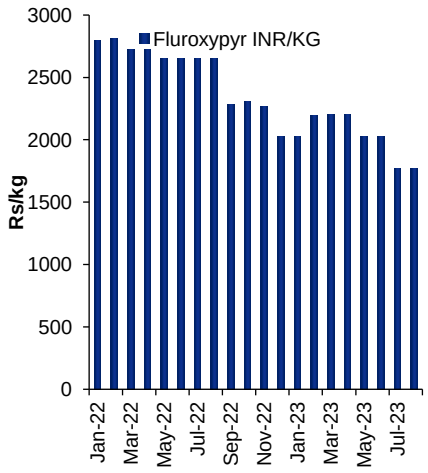
- **Clodinafop-propargyl + metsulfuron-methyl**: This herbicide is used to control a variety of broadleaf weeds in wheat, including lambsquarters, wild mustard, and volunteer canola.
- **Fluroxypyr**: This herbicide is used to control a variety of broadleaf weeds in wheat, including chickweed, dandelion, and henbit.
- **Imazapyr**: This herbicide is used to control a variety of weeds, including both grasses and broadleaf weeds, in wheat.
- **Sethoxydim**: This herbicide is used to control a variety of grass weeds in wheat, including crabgrass, foxtail, and quack grass.

Corn

- **2,4-D**: This herbicide is used to control a variety of broadleaf weeds in corn, including pigweed, lambsquarters, and velvetleaf.
- **Glyphosate**: This herbicide is used to control a variety of weeds, including both grasses and broadleaf weeds, in corn. It is important to note that glyphosate-resistant weeds are becoming increasingly common, and so it is important to rotate herbicides with other methods of weed control.
- **Topramezone**: This herbicide is used to control a variety of grass weeds in corn, including crabgrass, foxtail, and barnyard grass.

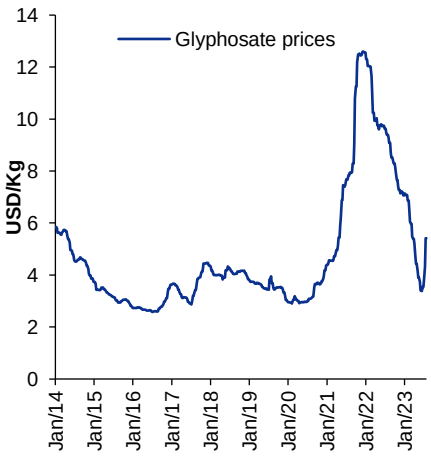
Last 18 months' prices of all these generic agrochemicals are given below:

Figure 28: Fluroxypyr price ~Rs2,000/kg



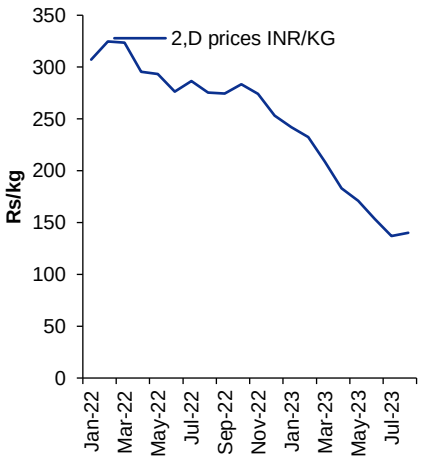
SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 29: Glyphosate costs ~Rs300/kg



SOURCE: INCRED RESEARCH, COMPANY REPORTS

Figure 30: 2,4, D prices are around Rs 150/kg



SOURCE: INCRED RESEARCH, COMPANY REPORTS

The application rate of proxasulfone doesn't account for the huge price differential (apart from topramezone)

1. **Pyroxasulfone application rate** - For wheat, the recommended application rate is 125 to 250 g a.i./ha (49 to 98 oz./A). This rate will provide good control of most annual grass weeds, including foxtail, barnyard grass, and green foxtail. It will also provide some control of broadleaf weeds, such as volunteer canola and mustard. For corn, the recommended application rate is 210 to 250 g a.i./ha (77 to 98 oz./A). This rate will provide good control of most annual grass weeds, including crabgrass, foxtail, and barnyard grass. It will also provide some control of broadleaf weeds, such as volunteer soybean and sunflower. *Hence, AI cost of pyroxasulfone for wheat works out to be Rs1,300/ ha and for corn Rs1,700/ha.*
2. **Clodinafop-propargyl + metsulfuron-methyl-** The recommended application rate of clodinafop-propargyl + metsulfuron-methyl for wheat is 60 g a.i./ha + 4 g a.i./ha, respectively*. Hence, AI cost of clodinafop-propargyl + metsulfuron-methyl for wheat works out to be Rs200/ ha.*
3. **Fluroxypyr -** The application rate of fluroxypyr varies depending on the specific weed species, the crop being treated, and the desired level of control. However, the following are some general guidelines:
   - For broadleaf weeds, the recommended application rate is typically 0.25 to 0.5 pound of active ingredient (a.i.) per acre.
   - For woody plants, the recommended application rate is typically 1 to 2 pounds of a.i. per acre.
   - For grasses, the recommended application rate is typically 0.5 to 1 pound of a.i. per acre.

   Hence, AI cost, on an average, for wheat works out to be Rs230-400/ha.
4. **2,4-D -** The application rate of 2,4-D varies depending on the specific weed species, the crop being treated, the desired level of control, and the form of 2,4-D being used. However, the following are some general guidelines:
   - For broadleaf weeds, the recommended application rate is typically 0.5 to 1.0 pound of active ingredient (a.i.) per acre.
   - For woody plants, the recommended application rate is typically 1 to 2 pounds of a.i. per acre.
   - For grasses, the recommended application rate is typically 0.5 to 1 pound of a.i. per acre.

   Hence, AI cost, on an average, for wheat works out to be Rs200/ha.
5. **Glyphosate -** The recommended application rate of glyphosate for wheat varies depending on the specific weed species, the stage of growth of the wheat crop, and the desired level of control. However, the following are some general guidelines:
   - For control of annual grasses in wheat, the recommended application rate is 0.75 to 1.0 pound of active ingredient (a.i.) per acre.
   - For control of broadleaf weeds in wheat, the recommended application rate is 1.0 to 1.5 pounds of a.i. per acre.
   - For control of both annual grasses and broadleaf weeds in wheat, the recommended application rate is 1.25 to 1.5 pounds of a.i. per acre.

   Hence, AI cost, at a maximum level, for wheat works out to be Rs500/ha.
6. **Topramezone -** The recommended application rate of topramezone for corn varies depending on the specific weed species, the stage of growth of the corn crop, and the desired level of control. However, the following are some general guidelines:
   - For control of annual broadleaf weeds in corn, the recommended application rate is 0.05 to 0.075 pound of active ingredient (a.i.) per acre.
   - For control of perennial broadleaf weeds in corn, the recommended application rate is 0.1 to 0.15 pound of a.i. per acre.

Hence, AI cost, at a maximum level (price of Rs12,000/ kg), for wheat works out to be Rs2,000/ha.

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