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The Indian Agricultural Landscape and Its Impact on Agrochemical Consumption

A Look Toward 2030

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Introduction

This report attempts to identify the key trends that will shape the Indian agricultural landscape and that are likely to evolve over the next few years, up to 2030. It will also examine the resulting agrochemical consumption patterns that are likely to unfold.

Identification of Key Trends

India has the most arable land in the world. Since more than half of India’s population lives in rural areas and depends on agriculture for their livelihood, the Indian government continues to focus on the growth and development of Indian agriculture. Moreover, the Covid-19 pandemic has also served as an eye opener: agriculture was the only sector of the economy that performed well among the other lackluster segments. This makes it all the more imperative for the government to support agriculture with a view to improving rural incomes, which will benefit the overall development of the Indian economy.

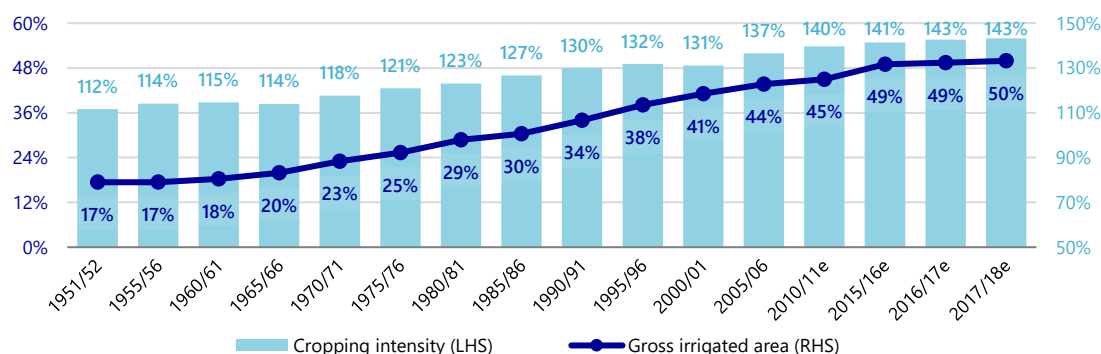
Sweeping changes are taking place in Indian agriculture. We have identified the effects of these changes on agrochemicals, as well as the resulting potential changes in agrochemical consumption patterns. These changes can be classified under different headings, as follows.

Mega Trends

Increase in irrigated area

India has one of the highest irrigated areas in the world. Thanks to the government’s continued efforts to make water available for irrigation, irrigation rates have increased substantially, from 17% in 1951/52 to 50% in 2017/18 (see Figure 1). Each year, around 0.5m hectares of irrigated land are added. This is likely to continue as the government pursues an integrated policy for water management and efficient use of water resources through ‘more crop per drop’ policies. Such policies will lead to an increase in cropping intensity (number of crops cultivated in a year on the same field) and hence in gross cropped area, which will enhance production and raise farmers’ incomes. This will boost farmer confidence, resulting in increased farm input consumption. As a result, agrochemical consumption is likely to increase by 2%.

Figure 1: Increase in irrigated area in India, 1951/52-2017/18e



Source: Directorate of Economics and Statistics, Ministry of Agriculture and Farmers Welfare, Government of India 2018

Government support to improve agricultural ecosystem

The pandemic has helped to reinforce the role of the agricultural sector in the Indian economy. Despite all odds, agriculture is the only sector that is flourishing and capable of generating employment opportunities for India's huge rural population. The government's support for agriculture has been remarkable in several respects, both in terms of expenditure and policy. Expenditures have been made to increase farmers' incomes, boost agricultural infrastructure – such as cold storage and warehouses – strengthen Farmer Producer Organizations (FPOs) through aggregation, and facilitate digital infrastructure for agriculture. All of these measures should help to plug gaps in the agricultural ecosystem, for example, by addressing information asymmetry, reducing waste, and encouraging the construction of cold storage facilities and logistics infrastructure to further develop the cultivation of fruits and vegetables to ensure higher incomes for farmers. While there have been some hiccups in the implementation of policies such as the new farm laws, these will eventually be overcome. Numerous government initiatives (both from the central and state governments), like the extension of the minimum support price for fruits and vegetables in the state of Kerala, will also move the process forward. Such trends are likely to continue. The expected possible increase in agrochemical consumption is 5% to 10%.

Labor availability

Labor availability will be one of the major considerations governing Indian agricultural practices in the years to come. As other parts of the Indian economy develop, the dependence of the Indian population on agriculture for employment is expected to decrease, as a result of the shift in labor from agriculture to other sectors (see Table 1). This will result in an increase in agrochemical consumption of herbicides, as less labor will be available for weeding and farm maintenance. The low availability of labor will also boost farm mechanization in the future. A possible increase in herbicide consumption of about 10% is expected.

Table 1: Percentage of Indian working population engaged in full-time agriculture (cultivators and agricultural laborers)

| Year | 1999 | 2011 | 2020f | 2031f |
|------------|------|------|-------|-------|
| Ag workers | 60% | 50% | 44% | 25% |

Source: 2011 Census of India, Rabobank 2021

Changes in Consumer Behavior

Changing food and consumption trends

The Indian palate is changing. Fruits and vegetables are making up an increasingly larger portion on Indian consumers' plates. The rise in consumption of fresh fruits and vegetables can be attributed to increasing affluence, which offers consumers the opportunity to improve eating habits and switch to eating more fresh food, which is perceived as healthy. The increased distribution and availability of a wide variety of fruits and vegetables grown in India also contributes to this. Moreover, the introduction of exotic fruits and vegetables from other countries makes the composition of the food basket more interesting for Indian consumers.

These trends will cascade down to farmers who are willing to adopt more advanced cultivation practices to command a premium for such produce. This is a small segment to start with, but it is expected to lead to an increase in agrochemical consumption of about 2% to 3%.

Increasing preference for organic foods and shift away from toxic chemicals

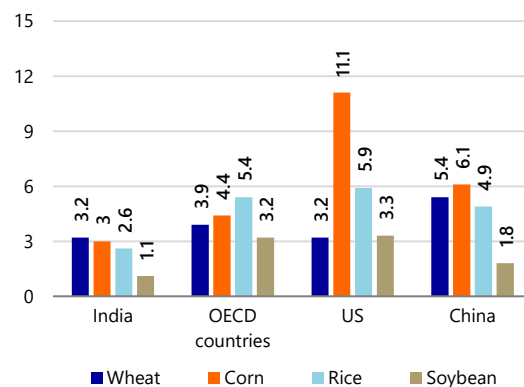
Universal concern about pesticide residues in food is causing a shift toward organic food. Not only consumers, but also farmers are concerned about their safety, prompting them to move away from the use of toxic chemicals. This shared concern will drive the future of agriculture and farming around the world. Usage of biological pesticides will become the major agricultural trend in the coming years. With the current level of scientific development, it is difficult to fully replace chemical pesticides, but technological development is expected to be able to meet future challenges. Other than pest control, biological pesticides also have other functions, such as regulating plant growth, combating stress, etc. Even though it is only a small segment today, in the coming years, biological pesticides will be the largest growth segment within agrochemicals. With a growth of about 15% to 20% per year, it will have a negative effect on traditional pesticides of 2% to 5%.

Evolution of Cultivation Practices

Intensive use of farm inputs

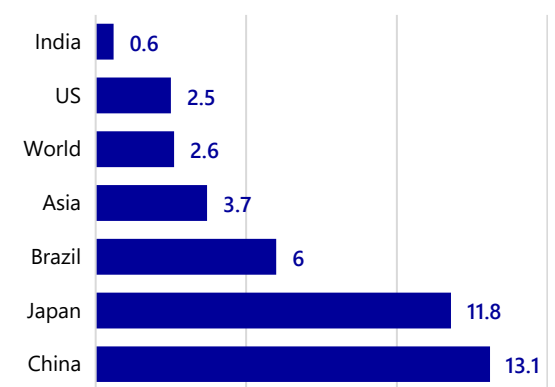
India's agrochemical consumption is one of the lowest among the major agricultural economies in the world (see Figure 3). With the application of scientific methods and the evolution of farming practices, agrochemical consumption is likely to grow due to the increase in area treated. We foresee a possible increase of 10%.

Figure 2: Yield comparison of major crops with major producers (metric ton/ha), 2019



Source: Organisation for Economic Cooperation and Development 2019

Figure 3: Pesticides consumption by country (kg/ha), 2017



Source : FAOSTAT 2017

Changes in cropping patterns and practices

Shifts in cropping toward horticultural crops (fruits and vegetables), which are more profitable but perishable, are likely to occur in line with other development trends such as infrastructure improvement. Similarly, shifts in cropping practices, such as paddy cultivation changing from transplanted rice to direct seeding, will facilitate cultivation practices while reducing water consumption and labor. In this scenario, demand for agrochemicals, such as herbicides, is likely to increase by about 10%.

Global warming and climate change

Global warming and climate change will affect pest infestation load on crops. With each additional degree of overall temperature rise of the planet, the metabolic rate of pests is expected to go up by 20%. This will lead to greater proliferation of pests and insects and, therefore, cause greater yield losses of agricultural produce. The increase in locust infestations in India stemming from Central Asia in recent years is one example of increased pest attacks attributable to climate change. In such a scenario, the use of pesticides to prevent crop infestation is likely to intensify and hence the consumption of pesticides, especially insecticides, is likely to rise by 5% to 10%.

Pesticide resistance and the emergence of new pest segments

The shift from conventional chemicals to high-value chemicals remains one of the key trends in the agrochemical industry. The occurrence of pests is dynamic and often unpredictable. New invasive pests, such as fall army worms, locust attacks, etc., often require the application of new pesticides to control them. In addition, pesticide resistance can be observed in many pests, after repeated application of the same chemical. Thus, more advanced chemicals will be required to combat the same pest, as the previous ones become ineffective over time. This will lead to a shift toward high-value chemicals and more intensive agriculture. For example, in paddy cultivation, there has been a switch from buprofezin (INR 400/acre) to penoxlum (INR 1400/acre) for brown plant hopper control. While the quantity of pesticides applied is decreasing, the value of their application is increasing. These developments justify an increase of about 15% in the agrochemical market.

New technologies and services

There has been a lot of focus on integrated pest management, using methods other than agrochemicals. There are quite a few agtech startups promoting technologies such as AI-based applications, drone applications, etc. As for genetically modified seeds, while these have been accepted in the past for crops like cotton, consumers and farmers are still reluctant to use them in food crops. There are many technologies that are under development, but changes in agrochemical consumption as a result of these technologies will be difficult to determine. For example, while the increased use of drones will, on the one hand, reduce the consumption of agrochemicals due to more specific and targeted applications, the overall number of pesticide applications will increase because of the ease with which pesticides can be applied to better control pests ([read Rabobank's report on drone use in Indian agriculture here](#)). A possible 5% decrease may be observed.

Farming services will evolve into a new segment to deploy new technologies. Consolidation of smaller farms is necessary, since small farms would otherwise prevent quick adoption of such technologies. Although farm aggregation is probably the best way forward, FPOs, cooperatives, and corporates are also likely to come up with new solutions in the future.

Agrochemical Market in 2030

Based on the trends we identified above, we expect the Indian agrochemical market to continue to grow between 5% and 6% through 2030. Biological chemicals will witness the highest growth of ~15%. Within biological chemicals, the herbicides segment is likely to see the highest growth (see *Table 2*).

Table 2: Indian agrochemicals market size, 2019-2030f

| <i>Category</i> | <i>Market size 2019*</i> <i>(USD million)</i> | <i>Projected growth</i> | <i>Market size 2030</i> <i>(USD million)</i> |
|-----------------|--|-------------------------|---|
| Insecticides | 1481.06 | 4% | 2280.02 |
| Fungicides | 353.76 | 5% | 605.05 |
| Herbicides | 578.61 | 7% | 1217.89 |
| Others | 94.23 | 15% | 438.39 |
| TOTAL | 2507.66 | 5.50% | 4541.36 |

Source: *AgbiolInvestor, Rabobank 2021

Conclusion

The outlook for agrochemical consumption in India through 2030, at a CAGR of 5.5%, is expected to be the highest among the world's leading agricultural countries. This will help attract the attention of farm input companies on various fronts, for example, to bring in investments for technology and develop new business models to capitalize on these trends.

Imprint

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