FICCI

Study On
Sub - Standard, Spurious/Counterfeit
Pesticides in India
2015-REPORT








Knowledge and Strategy Partner

TATA STRATEGIC MANAGEMENT GROUP

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Acknowledgement

The Chemical industry is critical for the economic development of any country, providing products and enabling technical solutions in virtually all sectors of the economy. Agrochemicals are an important input for the agriculture sector used to improve crop performance. With increasing population, demand for food grains is increasing at a faster pace as compared to its production. Scope for further increasing cultivable land is limited. This indicates the important role of the agrochemicals industry. India has fairly well developed crop protection chemicals industry which not only caters to the domestic demand, but also undertakes substantial exports.

With nearly a 1.2 billion population, India requires a robust, modernized agriculture sector to ensure the food security for its population. Scope for further increasing cultivable land is limited. In order to meet the food grain requirements of the nation, the agricultural productivity and its growth needs to be sustained and further improved. Judicious usage of pesticides /agrochemicals, is very important for the sustained growth of Indian agriculture and economy.

There is a significant share of non-genuine pesticides in the Indian market, which can be counterfeit, spurious, adulterated or sub-standard. These products are inferior formulations which are unable to kill the pests or kill them efficiently. Some such products do perform but leave by products which may significantly harm the soil and environment. The damage through such products is multifold. Apart from crop loss and damage to soil fertility, use of non-genuine products leads to loss of revenue to farmers, agrochemical companies and government. Some of the key reasons for use of non-genuine products are lack of awareness amongst the farmers, difficulty in differentiating between genuine and non-genuine products, supply chain inefficiencies, law enforcement challenges and influencing power of distributors/retailers.

The issue of spurious/Counterfeit pesticides as also its adverse impact on the national economy needs to be highlighted and for this purpose FICCI in association with Tata Strategic Management Group has undertaken a "Study on Menace of Spurious/Counterfeit Pesticides in India". This study would not have been possible without cooperation of all our stakeholders.

We have been fortunate in receiving excellent guidance for undertaking the study from many incl: Shri U. K. Singh, Joint Secretary (PP), in Department of Agriculture and Cooperation, Dr. A. J. V. Prasad, Joint Secretary (Chemicals), in Department of Chemicals and Petrochemicals, as also Dr. J. S. Sandhu, Agriculture Commissioner to the Government of India, Dr. Gurbachan Singh, Chairman ASRB, Dr. B. S. Phogat many more incl. those from IPFT, RENPAP etc. and farmer associations i.e. Rashtriya Kisan Sangathan, Borlaug Farmer's Association for South Asia, and Bhartiya Krishak Samaj.

Our sincere thanks go to the study partners TSMG and team, for developing this study highlighting a very important issue. This would not have been possible without sincere and dedicated efforts of the project team. FICCI Crop Protection Chemicals sub committee under the able guidance of Dr. Ram K. Mudholkar, Chairman as also Mr. V. S. Mathur, Dy Secretary General, FICCI, have been very able guides for this study, giving it the right direction in a very professional manner and facilitating its timely finalization.

Our special thanks to Crop life team, for contributing immensely on the knowledge content for the study as also facilitating this project. We would also like to thank Dhanuka Agritech Ltd. and PI Industries for their valuable support for the study.

On behalf of FICCI we would like to thank each one who has contributed to this report in any manner and without your support this would not have come out in an excellent manner as this. We would like to thank Sunrakshan Foundation for volunteering to print this important study.

In the end, we would like to thank you all for your continuous guidance and support in bringing together this study. We look forward to taking forward the results and recommendations of the Report in a manner which is beneficial to the Indian economy as also the environment at large.

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Dr Jyotsna Suri
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MESSAGE

With nearly a 1.2 billion population, India requires a robust, modernized agriculture sector to ensure the food security for its population. Scope for further increasing cultivable land is limited. In order to meet the food grain requirements of the nation, the agricultural productivity and its growth needs to be sustained and further improved. Judicious usage of pesticides /agrochemicals, is very important for the sustained growth of Indian agriculture and economy.

There have been reports about increasing share of non-genuine pesticides which can be counterfeit, spurious, adulterated or substandard. This is a major problem area having serious implications. It is not only the farmer who is cheated, but the low yield also impacts the national economy as also the environment.

I am pleased to know that Federation of Indian Chambers of Commerce and Industry (FICCI) has undertaken a "Study on Sub-standard, Spurious / Counterfeit Pesticides in India". I do hope appropriate steps are initiated by all concerned to control this menace.

Jyotsna Suri

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RAM K MUDHOLKAR
Chairman - Crop Protection Chemicals Sub Committee



MESSAGE

Sale of sub-standard and spurious as also counterfeit pesticides is a major problem area having serious implications for the farmers, Indian agriculture, Indian society and the economy at large. The farmer feels cheated as not only he loses his money buying such spurious products but also suffers from crop damage and loss of valuable yield due to poor pest control from such products. Loss of valuable crop leads to larger issues of the overall food security effort of the government and national agricultural economy. Further, the government loses valuable income as most of these products are sold illegally without having to pay taxes. And last but not the least , the impact of such spurious and substandard products on the soil, water, environment and their safety to applicators is a serious issue and severely impacts the grow safe food efforts of the government and other stake holders.

To understand the menace of spurious, substandard pesticides and its impact, this study was conducted. It reveals that the menace of non-genuine / illegal pesticides constitute almost **~25%** by value and **~30%** by volume and if the problem is not addressed it can reach to even higher proportions.

It is evident that the situation is grave and needs to be addressed collectively by farmer associations, industry players, government and pesticide regulatory bodies in a time bound manner to curb further proliferation.

Ram K Mudholkar

Dr. J. S. Sandhu
Deputy Director General
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Indian Council of Agricultural Research
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MESSAGE

Pesticides are recognized as an essential input for increasing agricultural production and preventing crop loss before and after harvesting. Indian agrochemical industry has contributed significantly towards increased agricultural output and improved public health. Besides catering to domestic requirement it is also export oriented and makes substantial exports even to the developed countries.

The sale of sub-standard, spurious and also counterfeit pesticides is a major problematic area with serious implications for the farmers. Indian agriculture, Indian society and economy at large. These products not only fail to take care of pests but also inflict damages on crops and the environment. The resultant loss is multiple. It is not only the farmers who are cheated, but lower yields also impact the national economy.

I am happy to note that FICCI has conducted a study on spurious counterfeit pesticides, which will facilitate in controlling this problem and immensely help students, teachers and researchers working on pesticides & pesticides residues alike.

(J.S. Sandhu)

Date : 16 April 2015
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MESSAGE

Agriculture sector is one of the key drivers for growth of Indian economy. With the burgeoning population, country needs more & more food, but today the agriculture sector is facing several challenges such as reduction in arable land due to urbanization & industrialization, decrease in farm size due to family devision, climatical shifts, proliferation of non-genuine/illegal agro-chemicals etc. Keeping the above challenges in mind and the stress on agricultural productivity, we need to produce more & more per unit land area for sustainable increase in productivity, which can only be obtained with improvement in soil health and deployment of improved production technology. Agrochemicals are one of the most important inputs for increasing agricultural production and productivity by preventing pre and post-harvest crops losses. But we need to ensure that good quality and genuine agro-chemicals are made available to the farmers.

It gives me immense pleasure to learn that Federation of Indian Chambers of Commerce and Industry (FICCI) in association with Tata Strategic Management Group (TSMG) has conducted a nationwide study to understand the current situation about the menace of non-genuine, counterfeit, sub-standard & spurious pesticides and its direct impact on agriculture productivity, this study shall be very helpful in future planning for tackling this issue.

06th May, 2015

Dr. B.S. Phogat

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Dated: May 18, 2015

Message

Plant protection chemicals constitute one of the most reliable and potential arsenals that has contributed significantly to the National food security. Together with chemical fertilizers these chemical pesticides played a pivotal role in ushering the era of green revolution during sixth decade of 20th century. Insecticides form the largest segment accounting for 65% of the total pesticides in India followed by that of herbicides (16%), fungicides (15%) and rest constituting 4% of other pesticides. India is the 4th largest producer of chemical pesticide after USA, Japan and China with a production of 91,200 MT during year 2014-15. One of the greatest concern facing Indian Agriculture during the 21st century is that 40% of the pesticides used in India are spurious. It is estimated that out of the total of Rs. 13,000 crores domestic market of pesticides, spurious pesticides account for about Rs. 5000 crores.

Counterfeit pesticides are the Inferior formulations which fail to kill pest and cause damage to crops. Such illegal pesticides which include herbicides, insecticides, fungicides etc. are now being manufactured stealthily and distributed globally by organised crime for big returns. Fake manufacturers are using similar sounding names of popular brands to cheat farmers which are openly sold in the country. Reduction in the apple production by 50 per cent in Indian state of Jammu & Kashmir during the year 2014 is attributed to use of spurious fungicide for control of apple scab. This is just one of the innumerable instances where extensive losses have occurred due to use of fake pesticides. Unlike registered products, which undergo rigorous independent testing before being placed on the market, illegal pesticides are neither tested nor suitable for use. Nothing guarantees that a counterfeit product contains what is described on the label.

Besides negatively impacting revenue of organised sector, such Illegal trade and counterfeit pesticides affect by endangering crops and human health, cause harm to the environment, economic damage to governments, food-value chain and plant-protection industry and of all, trust of the farmers and consumers towards a potential technology. The above-described outcomes from the illegal manufacture and trade of counterfeit pesticides undermine economic growth and job creation and stifle innovation and competitiveness, which would undermine any knowledge-based economy and create investment deterrent. The gist of all this is that unauthentic or counterfeit pesticides today have become a significant global menace that if continued to proliferate would serve to paralyze the food security and sustainability of our country through crippling a potential technology.

Various reasons exist for the unchallenged proliferation of this global menace. These include non-recognition of the problem by politicians, weak national enforcement system, inadequate judicial frameworks and penalties, challenges of quantifying the problem, increasingly easy to operate across international. Serious efforts by the Agriculture Department officials under the Insecticides Act, 1968 and Insecticide Rules, 1971 and Legal Metrology Act, 2009 for rigorous sampling at retailer's shops should become a standard practice. Besides, the New Pesticide Management bill pending in the Parliament has to ensure serious punitive measures for such cognisable offence.

I am glad at this stage when Plant protection industry is seriously challenged by the onslaught of phony or sham pesticides, FICCI is bringing out a special bulletin on this serious issue, based on a study conducted in association with Tata Strategic Management Group. I am confident that the publication would serve to enlighten the consumers, authorities, politicians, law enforcing machineries as also the fake manufacturers and perpetrators of such heinous acts about public awareness of their illegal activities. I Congratulate FICCI for this timely and much needed invaluable resource of information.

P.K. Chakrabarty

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Agriculture with a human touch

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Message

The sale of sub-standard and spurious as also counterfeit pesticides is a major problem area having serious implications for the farmers, Indian agriculture, Indian society the economy and the environment at large. Bhartiya Krishan Samaj has been consistently raising its voice so that this problem is controlled.

I am very happy to note that FICCI has conducted a study which gives focus to this problem area and look forward to actions to control this menace of spurious/counterfeit pesticides. Same will have full support of Bhartiya Krishak Samaj.

Krishan Bir Chaudhary

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MESSAGE

Indian agriculture is basically a story of success. The chemical industry for agriculture has developed at par with world standards to cater the needs of agriculturists. To achieve an impressive growth rate of 4.8 per cent during the eight plan, but at the same time agriculture saw a down turn towards the beginning of ninth plan upto 10th plan. The natural calamities, the problems of spurious chemicals/pesticides/ insecticides/weedicides is increasingly impacting the growth and entrust of Indian agriculture besides harbouring the environment.

We are happy to note that FICCI has undertaken a study which brings to the table the menace of spurious agricultural chemicals/counterfeit chemicals/pesticides. This is a problem which needs urgent and immediate attention throughout the country.

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Sunrakshan Foundation

(Preserving Today's Past and Present for Our Future Generations)



Message

Pesticides had played an important role in the success of the First Green Revolution and helped not only in making India increase its Food Production, but also attain Food Security. Over time new and safer pesticides have evolved and been introduced in the country. Apart from protecting our crops from a large spectrum of pests and disease, have also reduced in the quantity of pesticides used per acre.

However, with the increase in manufacturers and importers of pesticides, a new threat became a concern : Spurious & Counterfeit's ! These kind of pesticides not only leave the farmer cheated, but also pose a threat to our health and environment. Therefore, it is essential to understand the current spectrum of such pesticides in the country.

Study on Sub-standard, Spurious / Counterfeit's : Pesticides in India conducted by FICCI & TSMG is welcomed and if I may say so, very timely. In a time when the Ministry of Agriculture, Government of India too is promoting the Grow Safe Food campaign, it becomes necessary to highlight such an issue. It not only has a social, and economic impact on our country's development, but also threatens our very own well being.

We congratulate FICCI conducting such a study and look forward to further assist FICCI in its endeavor to counter such concerns in Indian Agriculture.

Mandeep Saini
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Acknowledgement

Spurious/Non-genuine pesticides are harming the interest of Indian agriculture as also the farmers and national economy. There is a significant share of non-genuine pesticides which can be counterfeit, spurious, adulterated or sub-standard. These products are inferior formulations which are unable to kill the pests or kill them efficiently. Some such products do perform but leave by-products which may significantly harm the soil and environment. The damage through such products is multifold. Apart from crop loss and damage to soil fertility, use of non-genuine products leads to loss of revenue to farmers, agrochemical companies and government.

It is good that FICCI has undertaken a study which brings focus to this problem. Rashtriya Kisan Sangathan congratulates FICCI for this initiative and we look forward to good follow-up actions so as to control this problem.

For Rashtriya Kisan Sangathan
(Punjab & Haryana unit)

Puneet Singh Thind

Foreword



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TATA Strategic Management Group (TSMG) has been regularly tracking the trends in the agrochemical industry and supporting companies, both big and small, across various verticals to achieve business excellence. The same knowledge and experience gives us an additional advantage to realize this report.

The rising population, increasing food demand, shrinking agriculture land area and loss of crops due to the attack of pests and diseases have made the crop protection chemicals all the more important in today's world. However there is an increasing concern about the menace of spurious agrochemicals. Our study **reveals that, non-genuine products worth INR 3,475 Cr p.a. are sold in the Indian market.**

Based on insights gained from crop care federation on global best practices and on-ground insights from extensive primary interactions, the TSMG study has made the following key recommendations to control this menace:

1. **Farmer associations** should appoint well informed farmers at block level as 'Khet Doot' to advice on market practices and right products.
2. **Industry** should continue Investing in Farmer Education programs by collaborating with other stakeholders and make distributors realize the importance of use of branded genuine products.
3. **Government** should amend and pass the Pesticides Management Bill 2008 immediately. Extension of soil health card to pesticide use and recommendations will benefit farmers.

We sincerely thank all industry leaders whose valuable inputs have helped in building this report.

We are grateful to FICCI for collaborating and choosing TATA Strategic to prepare this resourceful report. As always it was an insightful experience for Tata Strategic Chemicals team to materialize this report. We hope it acts as a guiding light both for the players and the consumers of crop protection products.

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Executive summary



This report on **"Study on sub-standard, spurious/counterfeit pesticides in India"** is prepared by FICCI with support of TATA Strategic Management Group (TSMG) to highlight the proliferation of non-genuine / illegal pesticides in Indian agriculture including unregistered and counterfeit pesticides and provide recommendations to stakeholders to curb the same.

For the purpose of this study, non-genuine / illegal pesticides include spurious products (products not registered under C.I.B & R.C, pesticides having low / incorrect active ingredients and products containing banned substances in India), counterfeits (trademark infringed products, misbranded), and products laced with chemicals/toxic solvents allegedly sold as products of natural origin /bio-products. For the purpose of clarity, all such products have been categorized as "*Non-genuine / illegal*" products in the entire study.

The contribution of the Indian agriculture sector in the Indian GDP has declined from 19.34% in 2001-02 to 15.79% in 2013-14[1] . This reduction in percentage contribution to GDP can be attributed to structural changes in the economy and increased opportunities in manufacturing and services sector. Moreover, as per census 2011, India has approximately 119 million[2] cultivators and this number is decreasing by approximately 2,000[3] every day. This trend is worrying and will create a **natural stretch** on the agriculture sector in the future.

[1] Planning Commission, Govt. of India, Data

[2] The Hindu, Online columns, 11th Aug, 2014

[3] The Hindu, Online columns, 2nd May, 2013

Besides this, National food security bill 2011 aims to provide subsidized food grains to approximately two thirds of India's 1.2 billion people that is approximately 800 million people, which will also add a **significant stretch** to the agriculture sector. Therefore, going forward, it is clear that India will need to produce more food from each farmland in order to continue to maintain self-sufficiency in country's food requirement. It will also need to maintain its export crops as part of GNP as otherwise there is a threat to entire export opportunity due to possible buyer bans.

While the country needs more food, there are several challenges which the agriculture sector is facing today such as reduction in arable land, decreasing farm size, consumption shift towards animal products, heavy dependence on monsoons, proliferation of non-genuine / illegal agro-chemicals, and low awareness of farmers on identifying non-genuine / illegal crop protection products. Keeping the above challenges in mind and the stretch on agricultural yield, it is imperative that crop protection products have to be judiciously used.

The Indian crop protection industry is estimated to be **~ INR 25,000 Cr**[4] **(~ USD 4 Billion)** in FY'14 and is expected to grow at a **CAGR of 12%** to reach **~ INR 45,000 Cr (~ USD 7.4 Billion)** by FY '19. Out of this, the domestic market is **~ INR 13,000 Cr. (~ USD 2.1 Billion)** in FY '14. However, the harm of non-genuine / illegal pesticides and their proliferation in recent years is becoming a key deterrent to make the most effective use of agrochemicals and improve our agriculture yields.

To understand this menace and to assess its impact, FICCI in association with TATA Strategic Management Group (TSMG), conducted a nationwide study to understand the current situation of non-genuine / illegal products. Our study reveals that non-genuine / illegal pesticides constitute **~ INR 3,200 Cr (~ USD 525 Million)** in 2013. This is **~25%** by value and **~30%** by volume of domestic pesticide industry in 2013.[5] Our study also indicates that this market is expected to **grow at approximately 20% per year** in value terms and if the problem is not addressed it can reach to approximately **40%**[6] **share by value** in the pesticide industry by FY'19 in India. It also unravels that U.P, Jharkhand, M.P, erstwhile Andhra Pradesh, Haryana, Maharashtra, West Bengal, Karnataka and Tamil Nadu are the states which are highly affected with non-genuine / illegal products.

[4] Report on Agrochemicals for ensuring food and nutritional security for the nation by FICCI and TSMG

[5] Industry reports, primary interviews, news articles and Tata Strategic analysis

[6] Industry response, analysis by Tata Strategic

It is evident that the situation is grave and needs to be addressed collectively by farmer associations, industry players, government and pesticide regulatory bodies in a time bound manner to curb further proliferation. If actions are not taken, the consequences can be disastrous because it's not just the industry which is suffering from image and revenue loss, all key stakeholders including farmers will face loss in their personal and regional reputation and their respective revenues. Especially the farmers will bear the brunt of the presence of non-genuine / illegal pesticides due to crop damages and low productivity. The impact of non-genuine / illegal pesticides can be as follows -

i) Overall yield for farmers across the country in case of 25% non-genuine / illegal products prevailing can reduce by ~4%[7]. **This implies ~10.6 million tons of food production loss in the current year.**

ii) Irreversible damage to environment by use of unmonitored toxic ingredients in non-genuine / illegal products due to -

   a. Degradation of soil through unknown illegal chemicals, thereby rendering it useless for cultivation of succeeding crops

   b. Ground and surface water contamination caused by unknown toxic chemicals and heavy metals

   c. Imbalance of natural flora and fauna and negative health impacts on humans and animals

iii) India's position as one of the leading food grain exporter in the world is fully at stake as the possibility of rumors or sabotage by other countries or rejection of Indian exports food items from developed importing countries would increase. In such a scenario, export of ~29 million tons of food grains worth **~ INR 1, 578 Billion**[8] (~ USD 26 Billion) is at stake

iv) Apart from Food grains, export of ~ 3 million tons of fruits and vegetables worth ~ INR 88 Billion (~ USD 1.43 Billion) is also at stake due to non-genuine / illegal pesticides.[9]

[7] Analysis by Tata Strategic

[8] Department of agriculture and cooperation, Government of India statistics

[9] Government sources (APEDA)

To address the menace of non-genuine / illegal pesticides, Tata Strategic Management Group proposes the following key recommendations for stakeholders:

Key Recommendations	
Farmers and farmer associations	Farmers should utilize customer care telephone number written on the packaging to validate the authenticity of the product
	Farmer community at village level should identify authorized retailers and encourage farmers to ask for a receipt after each purchase
	Farmers should continue to attend awareness trainings organized by Government and the agro chemical companies
	Farmers association should distribute written material/leaf-lets containing information / warning against non-genuine / illegal products.
	Farmer associations should appoint an educated/well informed farmer at block level as 'Khet Doot', who can advise on market practices & right products, handle complaint against non-genuine / illegal products and follow up with authorities
Industry	Invest in farmer education programs for identifying authentic products and educate ill effects of non-genuine / illegal products
	Publicize success stories of farmers
	Track the end retailers by modifying the procedure of issuance of principal certificates from distributors to retailers
	Make distributors realize the importance of use of branded genuine products for farmers ("Know Your Supplier") Provide special helpline telephone numbers to resolve farmer's queries
Government	Amend and pass the pesticide management bill-2008 immediately
	Reward a person who gives correct information about an illegal activity
	Launch programs for 'empty Container management' at farmer level
	Formulate an anti-counterfeiting committee to coordinate the problem of non-genuine / illegal pesticides between the stakeholders

Key Recommendations	
	Mandate a minimum educational requirement to qualify as pesticide retailer
	Make it mandatory for the pesticide inspectors to report back their on field findings about whether the pesticide is genuine or non-genuine / illegal
	Empower the village Panchayat to identify genuine retailers & take action against people dealing in non-genuine / illegal pesticides
Farmers and farmer associations	Customs: • Ask for C.I.B &R.C registration & details of the company importing the consignment at the customs. Verify import companies details by calling the companies and in case of discrepancy, seize the consignment • Custom officers should be trained to identify fake products with the help of technology. For e.g. portable FTIR[10]
	C.I.B & R.C : • List the prescribed pesticides, target pests, usage on crops and dosage on a portal • Appoint nodal officers who will verify the licenses of distributers and retailers, seize samples and inspect the manufacturing sites and make this information public

With all these factors into consideration, the onus of embarking an approach to address the issue of non-genuine / illegal pesticides lies on Government of India, State governments, regulatory bodies and industry. A collaborative and comprehensive approach is needed to overcome the menace of non-genuine / illegal pesticides in the Indian agriculture sector, thereby ensuring food and nutrition security for the nation and export crops for the national economy.

[10] Fourier transform infrared spectroscopy

1. Need for study on proliferation of non-genuine / illegal pesticides



At 1.2 billion, India is the second most populous country after China in the world. According to United Nations statistics, by 2028, India will surpass China to become world's most populous country. As the mouths to be fed increase, there is a need to increase the total yield of food grains in India. Currently, this is one of the most important tasks ahead of the government. However, Indian Agriculture is facing a critical challenge of maintaining food and nutrition security for the burgeoning population. The goal of food security can be achieved by increasing the farm yield considerably and hence, importance of crop protection products is felt immensely.

However, the farmers and agro-chemical industry today faces the menace of non-genuine / illegal pesticides. These non-genuine / illegal pesticides pose serious threats to the farm yield, reputation of industry and government, health of farmer and the end user. They also cause damage to the soil and ground water reserves which can compromise the quality of future crops.

This report aims to study the impact of non-genuine / illegal pesticides on all the stakeholders i.e. farmers, government, agro-chemical industry and environment, key growth drivers of non-genuine / illegal pesticides in the market and also propose recommendations to each stakeholder, **environmentalists** and industry associations.

Methodology & Approach: FICCI in association with TATA Strategic Management Group (TSMG), conducted a nationwide study to understand the current situation of non-genuine / illegal products. The secondary research was conducted based on industry reports, government publications, inputs from FICCI and public information from CropLife International

Interviews were conducted with key agrochemical companies, regulatory bodies, CropLife International, and CropLife India. A detailed questionnaire and a data collection sheet were sent to the agro chemical companies with the help of FICCI. Field visits were also conducted (with the help of key agro chemical companies) to interview distributers, farmers and regional sales managers of respective companies. During the course of the study, other stakeholders such as government pesticide testing laboratories, companies' procurement department and custom clearing agents (for pesticide import) were also interviewed.

2. Introduction



Crop protection Industry and products used in India

Agrochemicals are used to improve crop performance, yield or control pests. Agrochemicals are substances manufactured through chemical or biochemical processes containing the active ingredient in a definite concentration along with adjuvants which improve its performance and increase safety.

The Indian crop protection industry is estimated to be **~ INR 25,000 Cr. (~ USD 4.1 Billion[11]) in FY '14** and is expected to grow at a **CAGR of 12%** to reach **~ INR 45,000 Cr. (~ USD 7.37 Billion) by FY '19**. Out of this, the domestic market is **~ INR 13,000 Cr. (~ USD 2.13 Billion).** There are broadly 5 categories of crop protection products:

Insecticides: Insecticides protect crops by killing insects or by preventing their attack. Insecticides may attack a particular type of insect or could be broad spectrum insecticides. Insecticides are used to manage the pest population below the economic threshold level.

Fungicides: They are used to prevent the deterioration of crops due to fungi infestation. Fungicides are classified as protectants or eradicants. Protectant fungicides are active on plant surfaces where they form a chemical barrier between the plant and fungus. There is no movement of the fungicide into the plant.

Eradicant (curative) fungicides control existing infections, are not phytotoxic and xylem mobile, so protect new foliage appearing after treatment. Protectant fungicides are usually multi-site inhibitors whereas eradicants only inhibit one step in a metabolic pathway

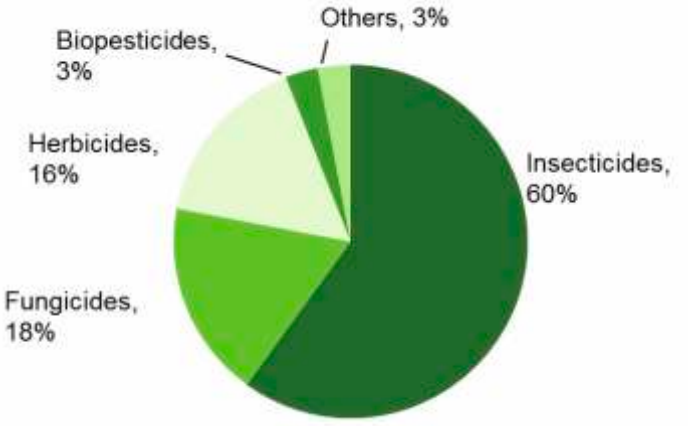
[11] *All values in USD is based on current exchange rates*

Herbicides: Herbicides or weedicides are used to prevent the growth of unwanted plants in a crop field. Herbicides could be selective, which kill the unwanted plants without any harm to the crop, or non-selective which kill all the plants. E.g. Glufosinate ammonium, a broad-spectrum contact herbicide, is used to control weeds after the crop emerges or for total vegetation control on land not used for cultivation.

Bio-pesticides: These are derived from natural substances like plants, animals, bacteria and certain minerals and control pests by nontoxic mechanisms. They could be classified as microbial pesticides, plant incorporated protectants and biological pesticides. Neem based pesticides, Bacillus thuringiensis, Nuclear Polyhedrosis Virus and Trichoderma are some of the major bio pesticides produced and used in India.

Others (Nematocides, Rodenticides etc.): Fumigants and rodenticides are used to prevent the attack of pests during storage of crops. Plant growth regulators control or modify the plant growth process and are most commonly used in cotton, rice and fruits.

Figure 1: Crop protection market split, India, FY14[12]



Insecticides form the largest segment of the domestic crop protection chemicals market accounting for 60%[13] of the total market. **Herbicides are the largest growing segment** and currently account for 16% of the total crop protection chemicals market. Sales are seasonal, owing to the fact that weeds flourish in damp, warm weather and die in cold spells. Rice, soybean and wheat crops consume the major share of herbicides. Increasing cost of farm labor will drive sales of herbicides

[12] Industry reports, analysis by Tata Strategic

[13] Report on Agrochemicals for ensuring food and nutritional security for the nation by FICCI and TSMG

going forward. Fungicides, accounting for 15% of the total crop protection market, are used for fruits and vegetables and rice. Farmers moving from cash crops to fruits and vegetables and government support for exports are increasing the fungicides usage. Bio pesticides include all biological materials organisms, which can be used to control pests. Currently, bio pesticides represent only 3% of the overall pesticide market in India and are expected to exhibit an impressive annual growth rate of about 10% in the coming years owing to government support and increasing awareness about use of, environment friendly pesticides. The pesticide management bill 2008 categorically mentions that the legal use of bio-pesticides will be promoted in the future.

The role of crop protection chemicals is not limited to protection but they also help in yield enhancement. Use of crop protection chemicals can increase crop productivity up to 50%, which helps mitigate crop loss from pest attacks by 40%. Thus, crop protection chemicals are essential to ensure food and nutritional security.

Definitions as per the Pesticide Management Bill 2008

The Pesticide Management Bill 2008 aims to replaces the Insecticides Act, 1968 but is still pending in the parliament (Annexure 1). It defines pesticide as a substance used to destroy or control the spread of pests in agricultural commodities or animal feed.

The Bill establishes a procedure to **license manufacturers, distributors and retailers** of pesticides, to be administered by state governments. Pesticide inspectors shall inspect facilities and collect pesticide samples while pesticide analysts shall test the samples collected.

According to the "Pesticide Management Bill"-2008, a clear definition of spurious, misbranded and substandard pesticides has been stated.

Spurious pesticides

A pesticide shall be deemed to be spurious if

- It is not registered or licensed in the manner required by or under the Act
- On test or analysis it shows active ingredient higher or lower even beyond the limits prescribed

- It is an imitation of, or is sold under the name of, another pesticide
- The container bears the name of the person or company purporting to be the manufacturer of the pesticide, which is either fictitious or counterfeit
- The chemical composition as approved by the Registration Committee is not adhered to or is modified or changed by adding or substituting any ingredient or substance
- It has outlived its shelf-life, as evident by the date of manufacture and the date of expiry as printed on its label, and displayed for sale, distribution, and use or caused to be used or not disposed of.
- Its import, manufacture, use or sale is prohibited and it is found to be imported, manufactured, stocked, distributed, transported, sold or exhibited for sale

Misbranded pesticides

A pesticide shall be deemed to be misbranded if

- Its label or leaflet contains any statement, design or graphic representation relating thereto which is false or misleading in any material particular, or if its package is otherwise deceptive in respect of its contents; or
- Its label does not contain a warning or caution which may be necessary and sufficient, if complied with to prevent risk to human beings or animals; or
- Any word, or statement or other information required by or under the Act to appear on the label is not displayed thereon in such conspicuous manner as the other words, statements designs or graphic matter have been displayed on the label in such terms as to render it likely to be read and understood by any ordinary individual under customary conditions of purchase and use; or
- It is not packed or labeled as required by or under the Act; or
- The label contains any reference to registration other than the registration number; or
- The date of manufacture and the date of expiry printed on its label is at variance with the shelf-life as approved by the Registration Committee

Substandard pesticides

A pesticide shall be deemed to be sub-standard if

- It does not conform to the active ingredient test approved for it by the Registration Committee and its active ingredient is within five percent of the nominal value when applied beyond the upper and lower limits prescribed for conforming to the test, provided that no tolerance limit shall apply in case of pesticides, which are registered on minimum purity basis; or
- It does not conform to other tests specified or approved for it by the Registration Committee while granting registration

Definitions as per the Insecticides Act 1968

The insecticides act 1968 only mentions the definition of Misbranded pesticides

An insecticide shall be deemed to be misbranded if-

- Its label contains any statement, design or graphic representation relating thereto which is false or misleading in any material particular, or if its package is otherwise deceptive in respect of its contents; or
- It is an imitation of, or is sold under the name of, another insecticide; or
- Its label does not contain a warning or caution which may be necessary and sufficient, if complied with to prevent risk to human beings or animals;
- Any word, statement or other information required by or under this Act to appear on the label not displayed thereon such conspicuous manner as the other words, statements, design or graphic matter have been displayed on the label and such terms as to render it likely to be read and understood by any ordinary individual under customary conditions of purchase and use; or
- It is not packed or labeled as required by or under this Act, or
- It is not registered in the manner required by or under this Act; or
- The label contains any reference to registration other than the registration number; or
- The insecticide has a toxicity which is higher than the level prescribe or is mixed or packed with any substance so as to alter its nature or quality or contains any substance which is not include in the registration;

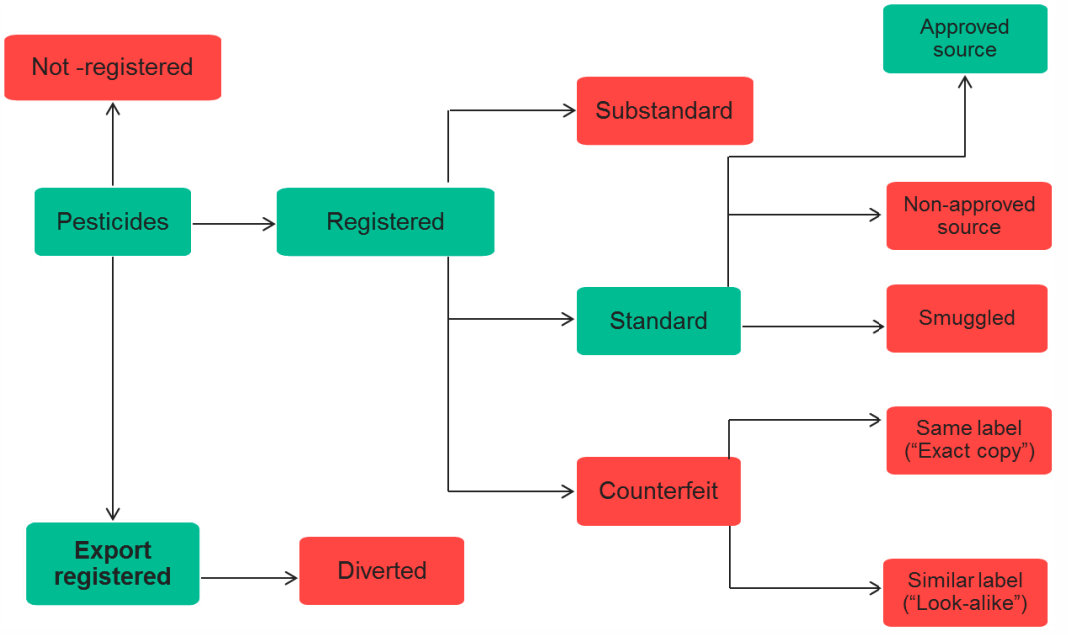
Terminology usage in India

There is a common practice of using the terms spurious, counterfeit, misbranded, illegal, sub-standard, and others interchangeably and this often creates confusion in the industry. Spurious and counterfeit pesticides are the two major words used to describe all kind of anomalies in the pesticides. Hence, there is a need to adopt:

- A term under which all the spurious, counterfeit, misbranded or substandard can be accounted
- A clear understanding of these anomalies and differences between them.

According to the diagram below, the red represents the non-genuine / illegal pesticides. The chemically laced bio products will fall under the category of 'Not-registered'.

Figure 2: Non-genuine / illegal pesticide identification, India[14]



[14] Provided by Dow AgroSciences India Pvt. Ltd.

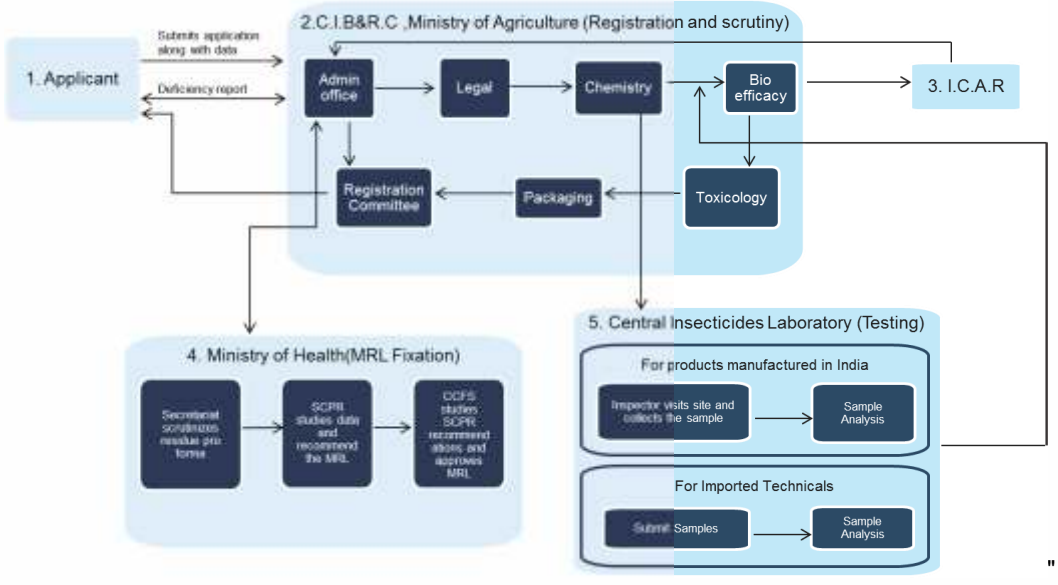
3. Current registration process of pesticides in India: A glance



All the registrations for pesticides are done under the supervision of C.I.B & R.C and there is a rigorous procedure followed. The registration can be of a new formulation, a "me-too" registration or an import registration

New formulations registration

Figure 3: Pesticide registration procedure, India[15]



[15] *Source: Regulatory perspective of agrochemicals in India, Agro News article*

The above flowchart represents the whole registration procedure for a new formulation in India. As indicated, a new registration passes through multiple channels and requires approval of various agencies involved. As it stands today, registration process for new formulation is cumbersome and takes a minimum of 1 to 3 years.

When compared to pharmaceutical industry, new drug registration takes only~ 12-18 months.

This long time frame in pesticide industry to obtain registration for a new formulation disappoints the new players in the market who then look for other channels to enter the market.

"Me-too" Registration

As soon as a new formulation gets registered successfully, large numbers of Me-too registrations are obtained. Me-too registrations are applicable for pesticides that have the same chemical composition to a currently registered pesticide. **Me-too registration does not require the same kind of rigorous procedure as in case of a new registration.**

This provides an advantage to the me-too registrants. In contrast to a new applicant, they **do not have to spend large amounts of money** on rigorous tests in different climates zones. Moreover, it takes only 6 months to register Me-too products.

Import Registrations

Any insecticide which is to be imported in the country has to be compulsorily registered by the Registration Committee constituted under Section 5 of the insecticides Act. The registration of a pesticide is to be granted after the Committee is satisfied with the efficacy and safety of the product. The procedure is similar to that of the registration process of new formulations.

4. Current scenario of non-genuine / illegal pesticides in India



A pesticide is formulated by **mixing specific chemicals with an active ingredient/technical grade.** The technical grade/active ingredient materials are **highly toxic and hazardous liquids.** More than 60 technical grade pesticides are manufactured in the country. The formulation market comprises of ~10 multinational companies in the country and several other small and medium enterprises.

As the market of registered pesticide and legitimate authentic brand grew in India, the growth of non-genuine / illegal pesticides business was also witnessed. Currently, the business of non-genuine / illegal pesticides is growing even in the relatively developed rural markets. Illegal imports of technical grade chemicals having no C.I.B&R.C registration has also lead to the formulation of non-genuine / illegal pesticides locally.

Apart from the counterfeits of products of market leader companies, a new practice has also emerged by which counterfeiters are selling insecticides in the name of 'bio products' so as to avoid rigorous registration procedure and hence, formulating it in illegal and untested manner. Figure 4 below shows examples of local brands which claim to be 'bio products' but actually are insecticides.

Figure 4: Non-genuine / illegal brands selling chemical pesticides in the name of bio-pesticides, India[16]





Currently, the market is filled with products having a low percentage of Active ingredients as compared to what it is registered for, thus substandard and ineffective. For instance, in Jan 2009, various products were picked up from the market by Bhartiya Krishak Samaj and sent for analysis to the Institute of pesticide formulation technology. It was found that 20 samples out of 26 had failed the test.[17]

Our study reveals that the current market of non-genuine / illegal pesticide is ~ INR 3,200 Cr (~ USD 525 Million) ***which constitutes ~25% by value and ~30% by volume of the total domestic market of agrochemicals in India.[18]***

States affected by non-genuine / illegal pesticides in India

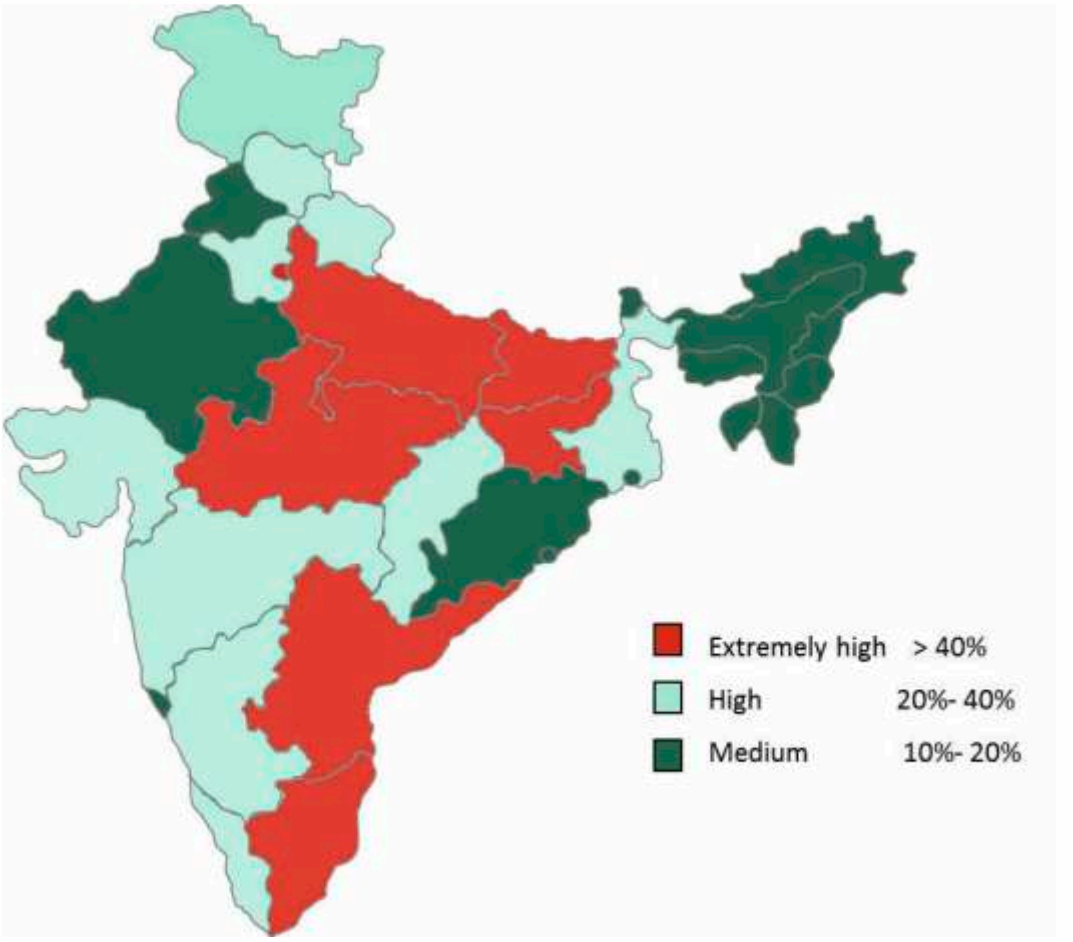
For the purpose of capturing the spread of non-genuine / illegal pesticides across the country, Tata Strategic approached top agrochemical players in the market. Based on the responses received and field visits conducted in various states, following is the proliferation of non-genuine / illegal pesticides across the country.

[16] On field research by Tata Strategic

[17] Based on information provided by a leading agro chemical company

[18] Industry reports, primary interviews, news articles and Tata Strategic analysis

Figure 5: States affected by non-genuine / illegal pesticides, India-FY14[19]



The problem of non-genuine / illegal pesticides has spread across India with hardly any region that is not affected. UP, Bihar, MP, Jharkhand, Karnataka, Haryana, Maharashtra, Tamil Nadu and erstwhile Andhra Pradesh are most affected by the menace of non-genuine / illegal pesticides.

Technical grades most affected by non-genuine / illegal pesticides in India

Generally, famous brands of reputable companies are targeted because of the large customer base. The following table represents the products used by reputed companies which have been targeted.

[19] Questionnaire responses and analysis by Tata strategic

Table 1: Active ingredients affected by non-genuine / illegal pesticides, India, FY14[20]

Technical name	Genre Of Pesticide (Insecticide/ Herbicide/ Fungicide)	Percentage Volume of Non-Genuine product in market
Copper Oxychloride	Fungicide	25-30%
Fipronil	Insecticide	20-25%
Buprofenzin	Insecticide	20-25%
Imidacloprid	Insecticide	20-25%
Flubendiamide	Insecticide	20-25%
Chlorantraniliprole	Insecticide	20-25%
Hexaconazole	Fungicide	15-20%
Emamectin Benzoate	Insecticide	15-20%

Source : Industry response, analysis by Tata Strategic

As indicated in the table, insecticides are the most affected genre of pesticide. Our study indicates that insecticide constitute ~70% of non-genuine / illegal pesticides market followed by fungicides which constitute ~20% of the market in India. Moreover, Copper Oxychloride, Buprofenzin and Fibronil are some of the active ingredients where percentage of non-genuine / illegal pesticides is highest.

[20] Industry response, analysis by Tata Strategic

5. Implications of non-genuine / illegal pesticides on stakeholders



The non-genuine / illegal pesticide market is dominated by products which have not been registered with CIB&RC and hence, effect on various parameters like soil fertility, environmental degradation, non-target organisms, residue etc. are not quantified. Moreover, our on field research indicates that as compared to genuine pesticides, non-genuine / illegal pesticides have a low or no impact on pests and hence, a lower yield than expected is obtained by the farmer.

Implications on end users/farmers

Due to the untested nature of the non-genuine / illegal pesticides and possible imbalance of active ingredient or no active or wrong active, these products pose danger to the farmer's health. Apart from health implications, the farmer would also suffer economically because even though the non-genuine / illegal pesticides cost less at the time of purchase, the overall price paid by the farmer for these products in the entire season is more. This is primarily because of higher dosage requirement and more frequent application compared to a genuine pesticide.

The yield of the farm can reduce to more than half to nil because of the use of non-genuine / illegal pesticides and the farmer is oblivious to the reason of crop loss due to dependence of crops on environmental factors and vulnerability to human error.

Since there no antidotes available for farms, usage of non-genuine / illegal products destroy the fields and harvests forever. In case of large scale destruction, it could lead to poverty and social unrest in the rural sector.

Implications on industry

The crop protection industry faces loss of sales, patent & trademark infringement, damage to reputation and problems in stewardship activities.

Due to the presence of "look alike"[21] and "exact copies"[22], the farmer loses faith in honest companies and hence, the industry loses customer trust. The direct loss which happens when a farmer purchases a non-genuine / illegal product in spite of branded product is one of the major concerns for the industry.

Non-genuine / illegal pesticides can also cause **resistance in pests** and hence, the manufacturers have to come up with a newer technology to replace the older product. New pesticide registration takes a lot of time.

Many smaller indigenous companies may lead to loss of exports in case the image of Indian pesticide exports gets tarnished in outside countries.

Implications on government

The government loses its share in the tax coming from the pesticide market **(12% excise and 5% VAT)**. Additionally, these products pose a risk to current production of ~ 29 million ton of food grains worth **~ INR 1, 57,794 Cr.**

In 2013-2014 India exported **~ 3 million tons** of fruits and vegetables worth **~ INR 88 Billion (~ USD 1.43 Billion)** and in case the export consignments gets caught in countries, this export is in danger.

For instance, farmers in Indore district have reported cases of non-genuine / illegal pesticides, often sold as bio-pesticides, hampering their crops. Farmers suspect they are supplied with fake and illegal pesticide. Soybean, a major crop in the area which is exported, will also be at the risk of higher scrutiny and even rejections as **importing countries insist on use of legal pesticides.** Apart from financial loss to the farmers, rejection of exports will also impact the government's image at international platforms.

Moreover, the overall yield of food grains across the country in case of 25% non-genuine / illegal products prevailing can reduce by **~4%.** This means that government's opportunity cost is **~ 10.6 million ton** of food grains due to the sale of non-genuine / illegal pesticides.

[21] Product similar to a genuine authentic brand in terms of packaging and trade name. e.g. Figure-10

[22] Product exactly same as a genuine authentic brand in terms of packaging and trade name.

The spread of these non-genuine / illegal products also puts a question mark on the efficiency of law enforcement agencies but provides opportunities on where to reallocate enforcement resources to combat non-genuine / illegal pesticides. Hence, the government is a major stakeholder which should bring control on these products by taking strong measures.

Implications on Public

The inclusion of non-genuine / illegal pesticides in the food chain either directly from the crop or via livestock feeding on the crops and later consumed by humans as meat, can cause serious health problems for the society. It can jeopardize the food security of the nation and can also create a negative impression in the minds of the citizens about the working of the government machinery.

Spraying of non-genuine / illegal pesticides can lead to absorption of harmful contaminants by the soil and polluting the ground water.

In future, if the menace is not controlled then there can be a large scale wastage or prohibition of consumption of food grains due to which the consumers might face large scale price fluctuations.

Implications on environment

Non genuine pesticides which claim to be "bio-products" often contain unknown chemicals which have not been tested for environment safety. These products can reduce the soil fertility, degrade the ground water reserves and also impact some useful pests in the long run. They may also **cause resistance** in pests which has environmental implications and economic implications on the industry.

These non-genuine / illegal pesticides can leave unknown untested residues in soil that could be detrimental to subsequent crops and can affect natural habitats of flora and fauna.

6. Key Drivers of non-genuine / illegal pesticides



There exists a variety of reasons/drivers that leads to the proliferation of the non-genuine / illegal market. Some of these drivers are discussed below:

Low Pricing & High Margin

- Price of the non-genuine / illegal product may be up to 30-40%[23] lower than the authentic brand which attracts farmers to use these non-genuine / illegal products.
- Margin on non-genuine / illegal products is very high (as much as 25-30%) as compared to 3%-5%[24] in branded products. This incentivizes retailers to push non-genuine / illegal products.

Pesticide registration

- New product registration takes 1-3 years in India and such a time consuming process acts as a virtual entry barrier. On the contrary a "me-too" registration is granted in ~6 months from the date of application.

[23] On field analysis by Tata Strategic

[24] On field analysis by Tata Strategic

Table 2: Me-too registration timeline Vs. Fresh registration, India-FY14[25]

Activity	Me too registrations	Fresh registration
Documentation and verification of forms	0.5 month	1 months
CIB & RC	1-3 month	6-12 months
Sample submission & analysis	2-6 month	2-6 months
MRL fixation (Ministry of health)	1-2 month	3-12 months
Registration certificate issuance	2 month	2 months
Overall process	Minimum 6 months	Minimum 12-36 months

Source: Regulatory perspective of agrochemicals in India, Agro News article

- According to our findings, long and burdensome registration process for fresh registration is a major restraint to the market and due to this reason many counterfeiters in high non-genuine / illegal pesticide states like U.P, erstwhile A.P and others have started formulating non-genuine / illegal products in their illegal factories.
- Recent survey by a National Pesticide Manufacturers Association has indicated there are multiple bio products being sold in the market. As there is no mention of the word "Bio-products" in the insecticides act or even in the new pesticide management bill-2008, these products do not have any registration certificate number issued by CIB & RC. These products are laced with unknown chemicals and are totally untested for any kind of health, environmental or performance parameters.

Influences in Supply chain

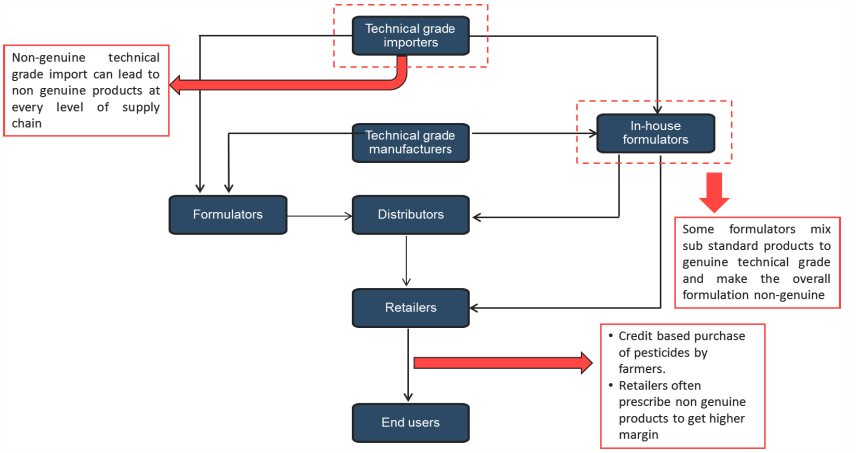
Some distributers and retailers mix packets of original branded pesticide with the "exact copies" of the packaging and make a bigger carton. Hence, it becomes extremely difficult for the customer to differentiate between authentic and non-genuine / illegal product.

Supply side feeders

The above figure depicts the supply chain model for pesticide market in India. Major problem lies at the top and bottom of the supply chain. If the technical grade is non-genuine / illegal, it trickles down the entire supply chain from formulators to the end users.

[25] *Source: Regulatory perspective of agrochemicals in India, Agro News article*

Figure 6: Supply chain of crop protection products, India-FY14[26]

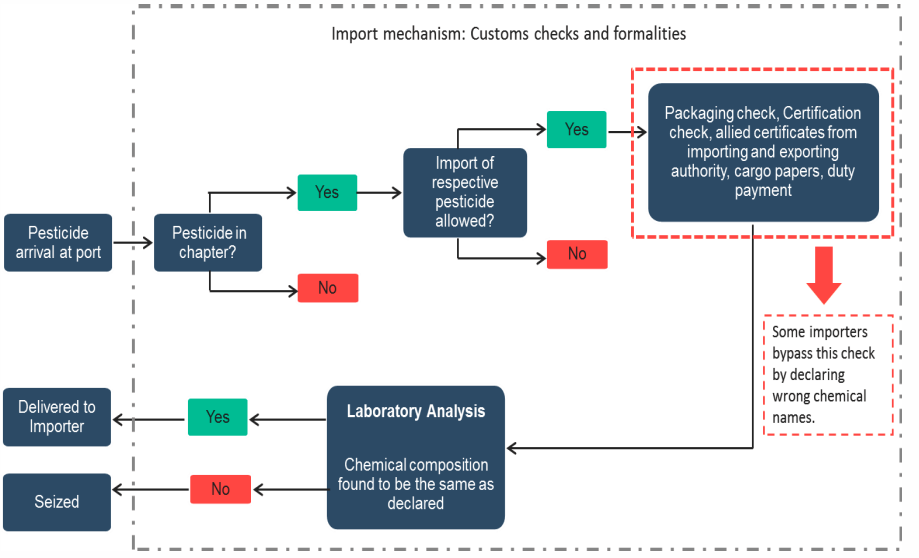


At the bottom, the retailers can obtain non genuine products via multiple parallel channels and because of higher margin, they prescribe these products to the farmers.

Import supplies

Our study indicates that illegal imports constitute **~30%**[27] of non-genuine / illegal pesticides in India. Either the total formulation or active ingredient is imported from organized crime rackets in outside countries to organized crimes in the country.

Figure 7: Import mechanism of pesticides, India[28]



[26] Analysis by Tata Strategic

[27] Primaries with trade agents & procurement department of a leading agro-chemical company, Tata Strategic Analysis

[28] Primaries with procurement department of a leading agro-chemical company, Tata Strategic Analysis

Some unscrupulous importers illegally import pesticides under various headings of harmonized tariff by declaring their chemical names instead of both common and chemical names.

In case of imported items like chemicals and pesticides, it is necessary to properly declare basic information like complete description of goods, common name and chemical name, grade, specification, etc. If an importer fails to furnish the complete details then penal action may be warranted.

The imports and exports handled by the customs are bifurcated into various chapters. For e.g. Chapter 28 and Chapter 29 include inorganic and organic chemicals whereas Chapter 38 includes miscellaneous chemicals such as insecticides, rodenticides, herbicides, fungicides, anti- sprouting products and plant growth regulators, disinfectants and similar products The traders often declare the pesticide in chapter-28 or 29 instead of chapter 38. Many a times Risk Management System (R.M.S) is applied to the chemicals in chapter 28, R.M.S was introduced to simplify the import and export mechanism and to make the process more liberal. Because of this, the custom officials release the consignment without doing stringent checks and hence, these illegal pesticides enter the Indian market

Fly by night operators

Often representatives of companies manufacturing non-genuine / illegal pesticides visit villages to **purchase genuine, branded empty bottles from the farmers.** They offer prices as high as 25%[29] of the M.R.P written on the bottle. This way the counterfeiters put substandard ingredients into the bottle and resell it.

According to our on field research, the inflow of non-genuine / illegal products is mainly caused by some fly by night operators who dump the non-genuine / illegal products in the market just before the start of the season.

Regulatory mechanism

- The existing Insecticide Act 1968 is not being implemented by the Law Enforcing Machinery i.e., State Agriculture Functionaries in its true spirit.
- Our field research indicates that the pesticide inspector visits the shops in the allotted area only once a month even in the peak season. It is often noticed that

[29] On field analysis by Tata Strategic

the schedule of his visits are already known to the distributers and retailers and the counterfeiters are able to hide their non-genuine / illegal products. Moreover, most distributers and retailers convince the pesticide inspector with unethical means to draw samples only from products of reputed companies.

- Moreover, if the companies are issued show-cause notices and their quality-control heads are asked to explain the deficiencies in their products, they adopt "delaying tactics" by asking for a re-test from the Central Laboratory. In majority of cases, the samples pass the re-test. This testing information is not posted publically and therefore access to information is limited.

Working of pesticide testing laboratories

Figure 8: Pesticide testing Laboratories, India[30]

Sl. No.	State/UTs	Number of Laboratories	Target/Capacity per annum
1	Andhra Pradesh	7	7500
2	Arunachal Pradesh	1	--
3	Assam	1	200
4	Bihar	1	600
5	Chhattisgarh	1	500
6	Gujarat	2	2200
7	Haryana	4	3300
8	Himachal Pradesh	1	500
9	Jammu & Kashmir	2	850
10	Karnataka	6	6800
11	Kerala	1	2000
12	Madhya Pradesh	1	1500
13	Maharashtra	4	5000
14	Manipur	1	30
15	Mizoram	1	--

[30] Directorate of plant protection quarantine & storage, Government of India

Sl. No.	State/UTs	Number of Laboratories	Target/Capacity per annum
16	Odisha	1	1100
17	Puducherry	1	500
18	Punjab	3	3900
19	Rajasthan	6	3500
20	Tamil Nadu	15	21850
21	Tripura	1	160
22	Uttar Pradesh	4	5000
23	Uttarakhand	2	600
24	West Bengal	1	650
25	Kanpur (regional)	1	1100
26	Chandigarh(regional)	1	1100
27	Faridabad (central)	1	1600
		71	~ 72,000

Source : Directorate of plant protection quarantine & storage, Government of India

- According to the above figure, the government has currently 68 state pesticide testing laboratories, 2 regional pesticide testing laboratories and 1 central pesticide testing laboratory.
- The pre-registration testing of pesticides is done at the central insecticides laboratory, (C.I.L) Faridabad. The state pesticide testing laboratories deals with the investigatory samples and provides its report to the C.I.L. If the state pesticide testing laboratory has failed a sample, the party from whom the sample is seized can take it up to the C.I.L. Both the state and the central laboratories together can take up to ~ 3 months to analyze a sample. This much amount of time allotted to 1 sample is quite long. A much less time for sample analysis is needed as it will encourage the pesticide inspectors to draw more investigatory samples. To shorten time, two levels of testing can be adopted, first cut via FTIR followed by a detailed test
- The C.I.L also sends some samples to other associated laboratories in case of unavailability of machinery and hence, this procedure also consumes time.

- The C.I.L has a target of testing ~ 1600[31] samples in a year. Often the total number of samples tested is ~ 1300-1400. This indicates that the CI.L can accommodate some extra investigatory samples.
- The total capacity of State pesticide testing laboratory (S.P.T.L) is ~ 68,000 samples per year. According to our study, this number is low and also there is a shortage of manpower in the S.P.T.L's.[32]

Awareness amongst farmer and buying process

- There exists a lack of education and awareness at the farmer level. Only 25-30% of the farmers are aware of the use of pesticides and they don't exactly know what to spray in their fields. For example, most farmers don't ask for specified chemical or brand and often ignore if specified details are not available on products. Hence, most farmers can't make out the authenticity of the pesticides they are buying
- Farmers are largely dependent on Adhtiyas (commission agents), who (or his family) normally runs seed and pesticide retail shop. They extend credit to farmers through a written-slip to buy seed or pesticide. Therefore, farmers become bonded to buy which is available with Adhtiyas. Our study indicates that 50%-60%[33] of the farmers purchase the pesticides on credit. Therefore, it is not in their interest to refuse the product which is offered by these agents /retailers who often refuse to provide credit on branded products.
- In case a farmer notices less impact of purchased pesticide on the pests and complains to retailer, the retailer blames the farmer instead stating reasons such as low dosage, improper usage of fertilizer and others
- The farmers usually refrain from sharing their good and bad experiences within the community due to competition and public shame respectively. This can be fixed by using hotline numbers, POS material, and product stewardship

Prevalent practices of counterfeiters

According to our on field research the following key observations were made:

- There is a tendency to use kerosene oil as the solvent and other inferior ingredients as spreader. This affects the quality of the pesticide even if it contains necessary percentage of the active chemical ingredient.

[31] Directorate of plant protection quarantine & storage, Government of India

[32] Primary interviews with officer in Regional pesticide testing laboratory and Pesticide referral laboratory

[33] On field analysis by Tata Strategic

- In a "look alike" or a local unregistered product, the place of manufacturing written is either fake or totally absent.
- The branded products come with an instruction manual whereas the counterfeits do not provide a manual and usually the retailer prescribes the dosage. Even the expiry date and ingredients mentioned on the packaging are fake or totally absent. Some products mention such an active ingredient which is banned in India.

The below figure is an example of an unregistered brand which does not mention the place of manufacturing.

Figure 9: Unregistered product with incomplete packaging, India-FY14[34]



- Name of the product may sound similar to the brand that is famous in the region. In the below figure, the bottle on the left is a branded genuine product. The one in the right is a "look –alike" product imitating the name and features of the branded product.f an unregistered brand which does not mention the place of manufacturing.

[34] On filed analysis by Tata Strategic

Figure 10: Original Vs. Misbranded pesticide sample, India-FY14





7. Global response against non-genuine / illegal pesticides



The proliferation of non-genuine / illegal pesticides has been observed in many other economies such as Brazil, China, Poland, European Union, Kenya and others. These countries have implemented stringent laws to fight against this menace. Due to their strict implementation the counterfeiters are finding it hard to pass over it. For e.g. the samples are being taken and checked at the spot itself and if the quantity of Active Ingredient is found low or high, the lot is seized and further course of action is followed. Some of such success stories are described below.

Brazil:

Several farms in the south region of Mato Grosso do Sul receive visits from the Environmental Military Police of Mundo Novo as part of a four-day operation. On the highway, a policeman busted a farmer who was keeping 56.5 kilograms of agrochemicals with no demonstrated origin. A fine worth R$100,000 was issued against the farmer.

70 arrest warrants and around 80 search and seizure warrants were issued, and 350 federal police agents participated in operation in approximately 25 municipalities in the States of São Paulo (SP), Paraná, Mato Grosso and Mato Grosso do Sul. The arrested persons included three Mato Grosso do Sul military policemen as well as farmers accused of buying illegal agrochemicals.

Five people accused of smuggling agrochemicals were arrested during an operation coordinated by the Federal Police. According to the Police, not only did the indicted smuggle agrochemicals into the country, they also adulterated fungicides and insecticides bearing famous Brazilian brands with colorants and other junk substances. These substances were formulated in a small plant. They are now

accounting for smuggling, disappearance, counterfeiting, racketeering, crime against public health, trademark and patent crime, and environmental crime. The imposed penalties can be 20 years in prison.

The Santa Catarina State Integrated Agricultural Development Agency (CIDASC) and the Brazilian Institute of the Environment and Renewable Natural Resources (IBAMA) led the efforts in 20 municipalities in Santa Catarina searching for illegal agrochemicals. 68 farmers and 12 businessmen were indicted for using or marketing smuggled or counterfeit agrochemicals.

China:

According to the ministry of agriculture, they seized 39,000 tons of counterfeit agricultural products in China for the year 2013. There are steps taken by the department of agriculture to curb the illegal imports/exports.

The Joint Announcement 1452 issued by the Ministry of Agricultural and the General Administration of Customs stipulated that clearance notification for the Import/Export of Pesticide from the ICAMA is required, prior to the customs formalities which contains the name, volume, HS code, CAS No., toxicity, manufacturing, exporter/importer, exporting/importing country, use of the pesticide.

Customs are responsible for field inspections, checking the information on the Custom Notification for the imported pesticides. Thus, the identity and authenticity of the pesticide is ensured as ICAMA can verify the registration status before each release of the pesticide.

European Union:

European Crop Protection Association (ECPA) is working extensively on increasing awareness and improvement in the law enforcements to reduce illegal imports. ECPA regularly collaborates with customs and enforcement agencies around Europe.

A website (http://www.illegalpesticides.eu/) has been established by the E.U countries which compile the problems, solutions and information about counterfeit pesticides. There is a provision on the website to "report suspicious activities" and contacts of authorities in various countries are also given.

The EU held a three day workshop attended by almost 200 regulators, law enforcement, judges, to train them specifically on counterfeit pesticides.

GERMANY

In 2010, working with ECPA, German customs seized 28 tons of counterfeit pesticides at Hamburg Harbor before they entered the German market.

SPAIN

During the summer of 2014 Spanish police seized 25 tons of counterfeit pesticides.

Paraguay:

In April 2008, the regulators and police worked in cohesion to conduct a raid on an illegal pesticide factory. In November 2008, the custom authorities after getting information from the pesticide authority seized multiple non-genuine / illegal active ingredient consignments.

Poland:

On 16 May 2014, OLAF (European anti-fraud office) received information about an illegal import consignment. The importer was not registered to trade such products in Poland.

OLAF decided to track the shipment on its journey and along with Polish customs authorities intercepted the shipment at the customs. They discovered 10.5 tons of pesticides not authorized for the EU market as well as 10.5 tons of insecticide in cans without labels, but packed in boxes bearing brands of well-known pesticide producers. The analysis revealed that the chemicals contained unregistered or illegal active Ingredients.

Kenya:

A steering committee was formed comprising the Agrochemical Association of Kenya, government officials and non-governmental organizations to spearhead the drive to eliminate counterfeits

India:

In October 2013, officials seized non-genuine / illegal pesticides and fertilizers - meant for sale in different markets in Madurai and the southern districts. The seized goods, which had no license or approval from the government was valued at INR 75 lakh.

The Collector after following complaints from farmers during a farmers' grievance redressal meeting decided to take some strict actions. A team of officials led by Joint Director (Agriculture) was formed and the team fanned out to different locations under the guise of farmers and procured the goods from local outlets and the counterfeiters were caught red-handed.

After the operation, the Collector advised the farmers not to get lured by discount offers and cheap prices quoted by unauthorized retailers. He appealed to farmers to share information about non-genuine / illegal farm products on the market with agriculture department officials.[35]

In a surprise check at a private building in Cumbum in Theni district, Agriculture Department officials seized fake pesticides and some chemical sprays worth INR 10 lakh. Following a complaint from a farmer in Theni district, Director of Agriculture formed two special teams headed by Joint Director (Agriculture) from Madurai and Deputy Director from Chennai to conduct checks at a specific place.

The teams went to a building and interrogated the suspected fake pesticide distributor. The officials found a huge stock of labels used on the micro-nutrient packs, containers in different sizes with some chemical compound.

According to the confession given by the offender, the chemical compound was supplied by a fake pesticide manufacturer in Sellur, Madurai. The fake pesticides were supplied to the vegetable cultivators in this region, who complained to the officials that the pests could not be controlled by using the pesticide.

There are a numerous programs & sessions organized by FICCI on the issue of non-genuine / illegal pesticides. Some of these are:

- 3rd National Agrochemicals conference held on 30-31 July, 2013 at New Delhi with a focused session on Spurious pesticides.
- Seminar on safe and judicious use of agrochemicals and applications of green chemistry held on 10 March 2014 at Pune covering issue of spurious pesticides
- Quarterly meetings of FICCI Agro sub committee where the issue of spurious pesticides is given special focus
- 4th National conference on Agrochemicals held on 25-26 August 2014 at New Delhi with a focused session on spurious pesticides.

[35] The Hindu, Online article, 12th Oct 2013

CropLife's projects:

Uganda CropLife Uganda launched an intensive campaign in northern Uganda to spread awareness among farmers, agro-dealers and extension workers about the risks of counterfeit pesticides. Through the use of radio jingles and videos, the campaign educated the target audience on the types of counterfeit products found in the market and how they can harm humans, crops and the environment.

A "4 day" training of the Field Coordinators and staff of member companies was organized and the participants underwent both, a pre, and post evaluation.

A special pilot project in Uganda led by International Fertilizer Development Centre in partnership with CropLife Africa Middle East was introduced and tested successfully the special security packaging concept. The specially marked packs were sold out within a few weeks and their market share almost doubled during the pilot period. The project continued the sensitization campaign in West Africa and gained support from additional important stakeholders.

Côte d'Ivoire CropLife Côte d'Ivoire organized training sessions for customs and inspectors from the Ministry of Commerce and Ministry of Agriculture who then conducted raids and seized tons of illegal pesticides.

8. Select cases of law enforcement across industries in India



The problem of non-genuine / illegal products is prevalent in almost all successful industries such as Pharmaceuticals, Cosmetics, automotive parts, Clothing & Accessories, Food & Beverages and Electronics & Software. Multiple actions have been taken by the stakeholders across the industries to curb the menace and create deterrence. Some of the examples of law enforcement are as follows-

Police Force

The Police force is empowered to deal with counterfeiting matters and acts on complaints filed by individuals. The police also provide assistance in civil raids on counterfeiters.

- In June 2009, the police conducted raids at three places in South Mumbai and seized counterfeit spin oil filters and other products.
- In June 2009, large quantities of counterfeit turmeric powder were seized from a spice mill in the Vishakarma area of Jaipur city.
- In November 2009, the Chandigarh police during a raid recovered medicines worth ~INR 2 lacs
- In May 2010, India's Central Bureau of Investigation arrested the heads of two drug companies for allegedly manufacturing counterfeit medicines. CBI agents raided facilities from May 12 to 19, 2010, in New Delhi, Nagpur and Chennai. The agents also made 62 surprise visits to facilities.

- In August 2010, South district police of New Delhi arrested a person and recovered tablets in packets bearing falsified trademark of its producers.

Custom Authorities

The Customs authorities are empowered to seize all Intellectual Property infringing goods at the point of entry itself.

- In June 2009, fake spark plugs were seized at the Chennai port by the Customs.
- In July 2009, counterfeit cosmetics and mobile phone batteries of popular brands were seized by customs. Total value was worth over INR 6 Cr for these fake products
- In Oct, 2009 the Chennai Seaport Customs seized a consignment of spurious baby care products and herbal shampoo worth over INR 20 lacs. All the products were packed in look-alike containers of leading FMCG companies such as Johnson & Johnson, P&G and others
- In another incidence, counterfeit products worth INR 1.5 Cr was confiscated by Customs

Health department/DGCI and Food & Drugs Administration (FDA)

- Between 2009 and 2010, sleuths of the drug control wing of the health department conducted multiple raids in different cities across Uttar Pradesh and Bihar to confiscate spurious drugs worth over INR 12 lac.
- On the similar note, FDA of each state was also empowered to deal with spurious drugs and tackle the menace. For example, in 2009, FDA in Uttar Pradesh seized such counterfeited drugs worth INR 1.3 Cr from various cities such as Muzaffarnagar, Varanasi and Lucknow

Private sector & copyright owners:

Members of the Private Sector have realized the value of their IP and fight counterfeiters.

- In May 2010, Hewlett Packard conducted raids with the help of local police in Bangalore, Delhi and Gandhidham and seized over 12,000 counterfeit products that included various ink & toner packages, more than 5,000 additional production items and around 79,000 toner security labels.

- Similarly, with the support of Dabur India, fake personal care and healthcare products, as well as medicines were seized in West Bengal, Ghaziabad and Rajasthan. Total value of these products was more than INR 1.5 Cr.

- In 2010, the Confederation of Indian Industry (CII) organized a Seminar on "Combating Counterfeiting & Piracy" at the erstwhile Andhra Pradesh Police Academy with the aim of creating awareness among officers about the laws regarding Counterfeiting and Piracy.

- Hindustan Unilever Limited (HUL), in the year 2009 carried out about 141 raids on retailers, wholesalers & manufacturers and counterfeit goods worth over ~INR 37 lacs were seized. HUL also issued **"a concise guide on Intellectual property protection"** a booklet for educating Customs formations all over the country, in order to help them detect counterfeits that were entering the country through imports.

Case study: Indian pharmaceutical industry

The Indian pharmaceutical market (IPM) was valued **at ~INR 72,069 Cr.[36] (~USD 11.8 Billion)** in 2013. The problem of non-genuine / illegal goods is also prevalent in the pharmaceutical industry. According to the industry estimates, the fake drug market is ~ 20 % in value which amounts to **~ INR 14,000 Cr. (~USD 2.36 Billion)** In case of Pharmaceutical industry, the government has realized that this menace has to be dealt with strong regulatory measures.

In late 2008, the parliament **increased the penalties** for those who were dealing in the manufacturing and trading of fake drugs from a minimum of five years to a minimum of ten years and increased the minimum fine for such offenses from INR 10,000 to INR 10 lacs. The health ministry later also **proposed a "whistle blower" policy** that would handsomely reward both the public and the officers who inform and help seize spurious, adulterated and misbranded drugs, cosmetics and medical devices.

The Government of India also requested the State Governments to **designate a Nodal Officer** in its respective State to deal with enforcement issues. The Nodal Officers were to be Senior Officers of the police at the rank of Superintendent of Police/ Inspector General of Police etc.

[36] Pharma industry going through a challenging time, PwC report

In 2010 the Government organized a Training Seminar on Intellectual Property Rights at the National Police Academy for Police Officers in order to sensitize them towards IP issues in general and dealing with counterfeiting in particular.

Inspections/raids are carried out by the Drug Inspectors appointed by the States to ensure compliance of the conditions of licenses. Samples are drawn by Drug Inspectors to check the quality of drugs marketed.

According to the Drugs and Cosmetics (amendment) Act, 2008 the following measures were taken:

- In the case of detection of manufacture **and/or** sale etc. of spurious drugs, the offence shall be considered cognizable and **non-bailable.**
- The State Drug Control Departments shall constitute screening Committees comprising **at least three senior officers** to examine the investigation reports.
- Co-ordination between regulatory authorities is a key to success in taking timely action in cases of violation of the provisions of the Drugs and Cosmetics Rules.
- The State Drug Control Organizations shall create a **rapid alert system** so that any vital information is passed on to the appropriate authorities quickly
- The Drug Control Organization in the States are needed to be strengthened by providing **additional manpower,** infrastructure, technical capabilities and financial resources for having continuous vigilance about the quality of drugs moving in the market.

Although there have been a lot of measures taken by the government to reduce non-genuine / illegal drugs in the pharmaceutical industry, yet the problem is still prevalent. Dealing with non-genuine / illegal products in any industry requires collaboration at national, regional and international levels between the law providers, enforcement agencies, manufacturers and suppliers. The government should involve all the stakeholders and create such holistic mechanisms by which the entire supply chain can be monitored and cleaned.

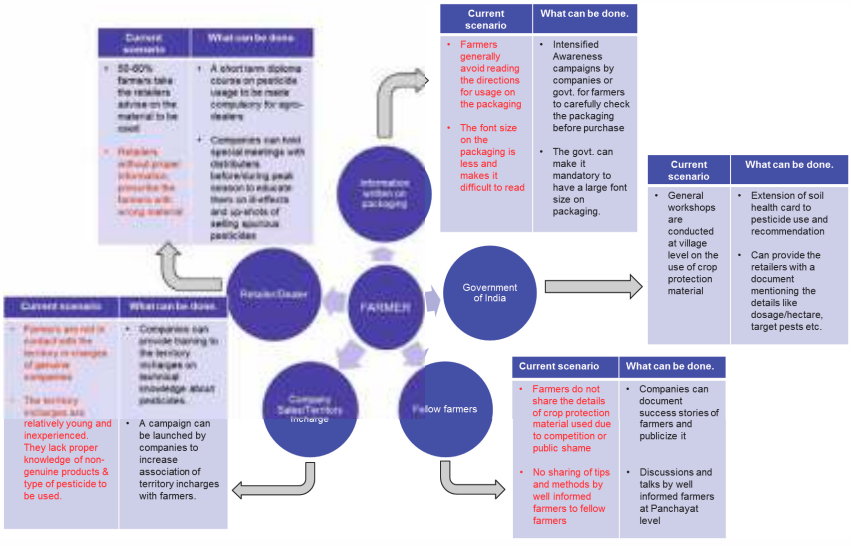
There can be numerous recommendations possible for the problem but the key is to effectively execute the recommendations at various stages of the market.

9. Recommendations for key stakeholders



During the course of the study, it was realized that the farmer is the weakest link in the pesticide value chain. Due to a farmer's lack of information on pesticide use, he seeks advice from various sources. However, the chances of getting the correct information remain very bleak. In the flowchart below, with farmer at the core, the role of various stakeholders in providing information to the farmer is represented. The points in red represent the current practices which are not helping the farmer.

Figure 11: Farmer's advice seeking mechanism and recommendations, India-FY143[37]



[37] Analysis by Tata Strategic

Various recommendations have been drawn based on the interactions with the multiple stakeholders. This study incorporates the suggestion and course correction suggested by stakeholders such as famers associations, government bodies, industry, crop care association and others. These recommendations have been laid out based on the entity involved.

Recommendations for Farmers & Farmers Association

Immediate Term:

- Farmers should always buy pesticides from reputable suppliers whom they know and trust. "Know your supplier" must be followed by farmers.
- Farmers should never buy from small suppliers or suppliers who are unknown in their area
- Farmers should always get a receipt of their purchase
- The farmer should adopt the recommended dose and directions of use as written on the branded packaging. He should always contact the customer care number to validate the authenticity of the product.
- Generally, counterfeiters do not pay attention to the weight of the package. A pesticide buyer can weigh one carton and then a suspicious carton to see if there is a difference.
- Farmer community at village level should identify authorized retailers and encourage farmers to ask for a receipt after each purchase.
- Farmers should always attend the awareness trainings conducted by the government and agro chemical companies to learn about pest management.
- Farmers should destroy the pesticide bottles as per the directions written on the booklet provided in the packaging.
- Farmer should analyze the total amount spent in the entire season based on the dosage amount, dosage frequency and price of the product prescribed versus the original branded product.

- Farmers association could launch campaign against counterfeiters and highlight them through print and electronic media. Association could organize district wise farmer events in the form of Kisan Mela.

- Farmers Association could distribute written material/leaf-lets which contain information / warning against fake products and can show example of a devastated field after using non-genuine / illegal products.

  Private sector companies could help such efforts through financial assistance as part of their CSR initiatives

- Farmer association should encourage the farmers to report instances of wrong doings to the authorities

Medium Term:

- Farmer Association could help in promoting 'Farmer Producer Companies (FPOs)' in different states.

  FPO should buy pesticides collectively. This way there is a lower chance of getting non-genuine / illegal product

- Farmer Associations could appoint an educated/well informed farmer at block level as Khet Doot, who will keep an eye on all market practices, advice farmer on right products, handle complaint against fake products and follow up with authorities

Long term:

- Farmers should maintain a farm record which illustrates the crop protection material used, total expenses, problems caused etc. for every season. This can help the farmers in the long run to realize any trend or a particular practice which is good/bad for their crops.

The following table represents the recommendations for the farmers and the ones in the box are the most important:

Figure 12: Recommendation to farmers, India



Recommendations	Practicality	Affordability	Ease of implementation	Overall
Farmers and farmer associations				
1. Utilize help line number written on the packaging to validate the batch number written on the same				
2. Farmer community should identify authorized retailers & encourage farmers to ask for a receipt after each purchase.				
3. Farmer associations to appoint an educated/well informed farmer at block level as 'Khet Doot', who can advice on market practices & right products, handle complaint against fake products and follow up with authorities				
4. Attend awareness camps organised by Government and companies				
5. Farmers association to distribute written material/ leaf-lets containing information/ warning against fake products.				
6. Weigh one carton and then a suspicious carton to see if there is a difference				
7. Maintain farm record on crop protection material for every season				
8. Well informed farmers to discuss and talk on good agricultural practices at panchayat level				
9. Collective buying of pesticides by farmer groups and associations				

Recommendations	Practicality	Affordability	Ease of implementation	Overall
10. Farmer associations to launch campaign against counterfeiters and highlight cases through print and electronic media				
11. Farmer associations to organize district wise farmer events like 'Kisan Mela'				
12. Farmer association to promote 'Farmer Producer Companies (FPOs)' in different states.				
13. Analyze money spent based on the dosage, frequency and price of the product versus original branded product at the time of purchase				

Recommendations for Industry

Immediate Term:

- Companies should directly reach the farmers with the help of radio programs. For e.g. a leading consumer goods maker has come up with a free radio-on-demand service called Kan Khajura Tesan to reach out to villagers in remote areas.
- Various product stewardship programs have been launched by companies such as Syngenta, DuPont, Dow and others in association with CropLife. More such programs should be launched specially in high infected states

Medium Term:

- Companies should keep track the end retailers through which their products is reaching the farmers. Many a times the same retailers who sell genuine products sell non genuine pesticides too. Companies should maintain a database of retailers or should modify the procedure of issuance of principle certificate from distributer to retailer.
- Companies can continue their training to territory/regional sales in-charges about spreading awareness among farmers regarding non-genuine / illegal products.

- During our on field research, a number of farmers indicated increased farm output after they shifted from locally made non-genuine / illegal pesticides to branded quality products. Such success stories could motivate other farmers and hence, require intervention by the Industry to promote publicity of such stories.

  For e.g. a farmer named Bapu Dalpat Patil a resident of Pachora area in Jalgaon district of Maharashtra testified that his cotton yield has jumped from 7-8 Quintal/acre to 10-12 Quintal/acre after he switched to branded genuine products. Such stories could be published in local newspapers and agricultural magazines.

- Companies should organize awareness camps for farmers and farmer associations to spread knowledge about non-genuine / illegal products prevailing in the market. At these camps, pesticides can be distributed at subsidized rates to the farmers to showcase the benefits.

- Companies should invest in farmer education programs for identifying authentic products and educate ill effects of non-genuine / illegal products

Long Term:

- Special helpline numbers can be provided to the farmers to resolve their queries about the pesticide usage such as dosage and frequency of application

- Companies often have a local distributors meeting to promote their products. Companies can target specific market areas at specific time of the year and utilize these meetings to make the distributors realize the importance of use of branded products for a farmer. The companies can even launch a program to teach the distributers basic principles of "know your supplier"

- Companies can also tie up with regional colleges and universities having agriculture related programs to promote awareness campaigns on non-genuine / illegal pesticides and also to increase their distribution reach to current non-users in nearby villages and districts.

The following analysis represents the recommendations for the Industry and the ones in the box are the most important.

Figure 13: Recommendation to crop protection industry, India

Most Attractive/Lowest Implementation Issues Least Attractive/Highest Implementation Issues

Recommendations	Practicality	Capital intensiveness	Labor intensiveness	Implementation period	Overall
Industry					
1. Track the activities of their distributers and subsequent retailers					
2. Publicize success stories of farmers					
3. Make distributors realize the importance of use of branded products for farmers. ("Know Your Customer")					
4. Provide special helpline numbers to resolve farmer's queries					
5. Train territory/regional sales in-charges to spread awareness among farmers					
6. Tie up with regional colleges and universities to promote awareness campaigns and increase distribution reach to current non-users					
7. Organize knowledge camps and distribute pesticides at subsidized rates to showcase the benefits.					
8. Reach the farmers with the help of radio programs. For e.g. 'Kan Khajura Tesan' to reach out to villagers in remote areas.					

Source : Analysis by Tata Strategic

Recommendations for Government

Immediate term:

- The pesticide management bill 2008 is still pending in the parliament. The bill seeks to regulate the manufacture, inspection, testing and distribution of pesticides and also establishes a system of licensing as well as the setting up of a registration committee to register pesticides. The bill also mentions the penalties on people indulging in the manufacture and distribution of spurious, mis branded and sub standard pesticides.

  However, the bill should also define "bio-products" and state penalties on companies which supply chemical pesticides in the name of bio products.

  Therefore, it is very important that the bill gets amended and thereby gets passed as soon as possible.

  The Pesticide Management Bill 2008 does not allow data submitted along with an application to be reused by another applicant for 3 years without permission. The Parliamentary standing Committee recommended that this data protection period be raised to 5 years.

Medium term:

- The Government can formulate **single anti-counterfeiting committee / body** to deal with all the matters related to spread of non – genuine pesticides. This committee would play the crucial role of coordinating efforts of various stakeholders such as farmers, industry, agriculture departments, law enforcement agencies and laboratories.
- The government should launch programs to address the issue of empty pesticide containers. Empty pesticide containers pose the risk of being reused to package non-genuine / illegal pesticides. These containers are sometimes used to store food items and thus threaten the health of the consumer.

  For instance, in July 2013,at least 23 students died and dozens more fell ill at a primary school in the village of Dharmashati Gandaman in the Saran district of the Indian state of Bihar after eating a Midday Meal which was cooked in oil that was kept in old pesticide container.
- The government can make a short term diploma course on pesticide usage mandatory for agro-chemical retailers & also train the agro-dealers on dealing with non-genuine / illegal products. There are about 150000 agro dealers of which 10% are estimated to be qualified. The Pesticide Management Bill which is pending in the parliament for many years is expected to take care of the issue, but

in the meanwhile there is requirement of basic skilling which would be undertaken by NSDC

- The government should make it compulsory for pesticide inspectors to report back their findings (whether genuine or non-genuine / illegal pesticide) in the field to the concerned authorities.
- **A portal can be developed** where the list of distributors, their subsequent suppliers are listed. This will help the end users as well as quality control inspectors to identify the authorized distributors and retailers.
- Government should include non-genuine / illegal products in the **training manual** / syllabus provided by Bureau of Police Research & Development
- Government should **empower village panchayats** to take actions against retailers / agents selling non-genuine / illegal products.

Long term:

- The **government can reward** a person who gives correct information about an illegal activity. The reward value can be extracted from the offender.
- The government can extend the services of soil health card to the usage of pesticides.
- The government loses **~ INR 500 Cr[38] (~ USD 82 Million)** in Excise Duty and VAT due to non-genuine / illegal products. Once the government is able to control the menace of non-genuine / illegal pesticides, it can utilize the same amount to upgrade the existing infrastructure of the 71 pesticide testing laboratories across the country.

  This is a sustainable mechanism which can serve two purposes at a time i.e. curbing non-genuine / illegal pesticide market and improving the existing infrastructure.
- The government should also set up **more state laboratories** and increase the number of samples collected by the pesticide inspector on the field. Uttar Pradesh for instance has only 4 state pesticide testing laboratories despite its large geographical area and being the most notorious in non-genuine / illegal pesticides.

The following table represents the recommendations for the Government and the ones in the box are the most important

[38] Industry response, analysis by Tata Strategic

Figure 14: Recommendation to Government of India

Most Attractive/Lowest Implementation Issues Least Attractive/Highest Implementation Issues

Recommendations	Practicality	Capital intensiveness	Labor intensiveness	Implementation period	Overall
Government					
1. Amend & Pass pesticide management bill-2008 as soon as possible	●	●	●	●	●
2. Formulate an anti-counterfeiting committee to coordinate the problem of non genuine pesticides between the stakeholders	●	●	●	◔	●
3. Launch a mandatory short term diploma course for the agrochemical dealers	◑	●	●	●	●
4. Launch programs for 'empty pesticide container management' at farmer level	●	◔	●	◔	●
5. Empower village panchayat to take action against sellers of non genuine products	●	●	●	◑	●
6. Formulate a procedure by which pesticide inspectors have to report back their on field findings about quality of pesticide	◔	●	●	◔	●
7. An online portal to list all the authorized distributors and their subsequent suppliers. C.I.B & R.C to list all the prescribed pesticides and dosage on this portal.	◔	●	●	●	●
8. Reward a person who gives correct information about an illegal activity.	◔	●	●	◔	◔

Recommendations	Practicality	Capital intensiveness	Labor intensiveness	Implementation period	Overall
9. Extension of soil health card to pesticide use and recommendation					
10. Upgrade existing pesticide testing laboratories and establish new state pesticide testing laboratories					

Source : Analysis by Tata Strategic

Recommendations for Regulatory Bodies

Immediate term:

- Raids should be planned immediately with the help of special task force which includes a pesticide inspector and a police officer in high non-genuine / illegal pesticide zones like New Delhi, U.P, and Bihar. Even a small number of raids with media coverage will send a strong message to the counterfeiters and it can act as a deterrent.

  The surveillance team can also raid the local suppliers of bottles & labels and check if they are supplying to illegal manufacturers or their supplies are much greater than what they are registered for.
- The custom officials should ask for the C.I.B & R.C registration as well as the details of the company importing the consignment, plus Icama information if import is from China. Custom officers should mandatorily verify the import companies details by **calling these companies** and in case of any discrepancy should seize the consignment and take necessary actions against the importers
- The officers have to be made aware that the traders import pesticides in the name of chemicals in chapter 28 to avoid the stringent checking procedure. Customs should analyze historical import data to determine future suspicious imports
- Custom officers should be trained to utilize technology to identify fake products. For eg: portable FTIR which is used in pharma industry worldwide for similar purpose
- Aggressive monitoring should be done on products which are laced with chemicals but claim to be "Bio-products". Their entire supply chain should be under severe surveillance.

Medium term:

- **C.I.B & R.C can list all the prescribed pesticides and dosage on the portal** (Refer to recommendation to Government on portal). This can help **farmers who use internet** to get precise information and pass on the useful information to other farmers.

- C.I.B & R.C should increase the number of investigatory samples to be collected by the pesticide inspector and send it directly to the C.I.L to utilize its full potential. Currently, the C.I.L tests ~ 1300-1400 samples in a year whereas its capacity is ~1600 samples/year

Long Term:

- Over a lakh of **registration** certificates are issued for pesticides (including bio pesticides) but no mechanism exists to **re-verify** them. Similarly licenses have also been granted to bio-pesticide manufacturers but there is no mechanism to know their current business activity. The government can appoint nodal officers who are of higher ranks in police or other law enforcement agencies. These nodal officers will verify the licenses of distributers and retailers, seize samples and **inspect the manufacturing sites**. These surprise operations can be done frequently with a different team each time. This way a re-verification mechanism can be structured in place.
- In order to prevent fake pesticides from entering the Indian market, customs officials must be empowered and greater cooperation is needed between pesticide regulators and customs officials.

The following analysis represents the recommendations for the regulatory bodies and the ones in the box are the most important.

Figure 15: Recommendation to regulatory body, India

Most Attractive/Lowest Implementation Issues Least Attractive/Highest Implementation Issues

Recommendations	Practicality	Labor intensiveness	Implementation period	Overall
Regulatory Bodies				
1. Include special clauses in employment contracts of pesticide inspector and pesticide analyst.	●	●	●	○
2. Ask for C.I.B & R.C registration & details of the company importing the consignment at the customs. Verify import companies details by calling the companies and in case of discrepancy, seize the consignment	●	●	●	○
3. Appoint nodal officers who will verify the licenses of distributers and retailers, seize samples and inspect the manufacturing sites.	●	●	◔	○

Recommendations	Practicality	Labor intensiveness	Implementation period	Overall
4. List the prescribed pesticides and dosage on a portal				
5. Aggressive monitoring on products which are laced with chemicals but claim to be "Bio-products".				
6. Immediate raids by special task force which includes a pesticide inspector and a police officer in high non-genuine pesticide zones like New Delhi, U.P, and Bihar etc.				
7. Increase the number of investigatory samples to be collected by the pesticide inspector and send it directly to the C.I.L to utilize its full potential.				
8. Create awareness to customs officials about the menace of non-genuine pesticides. Provide special training to identify genuine Vs. non-genuine agrochemicals.				

Source : Analysis by Tata Strategic

Recommendations for crop care associations:

A Crop care association can ensure the quality of products with a unique Label. The label can even be for companies outside the association that fulfill the quality rules. This way a different channel of quality check can be placed in the market without dependence on government measures. Through a unique code visible on the label, the authenticity of every single pack can be confirmed on a SMS platform or on the internet

Recommendations for industry associations/FICCI:

Industry associations can act as a bridge between the farmers and the government in the issue of non-genuine / illegal pesticides. The government should be made aware of the menace by proving the misery of the farmers and the long term consequences of using non-genuine / illegal pesticides.

These organizations should launch specialized campaigns especially in areas with high non-genuine / illegal pesticide. With the help of media they can work on specific cases and hence submit the findings to the government.

10. Conclusion



The domestic crop protection industry in India currently stands at ~ INR 13,000 Cr. (~ USD 2.1 Billion) and is expected to grow at a CAGR of 8-9% p.a. to reach ~ INR 20,000 Cr. (~ USD 3.3 Billion) by FY19. However, the industry faces a major problem of non-genuine / illegal pesticides. The market of non-genuine / illegal pesticides in India today have reached an alarming level of ~30% by volume and ~25% by value of the domestic crop protection industry and if the status quo remains, it is expected to reach ~40% by value of the market by FY19.

Some of the key growth drivers for the same are - lacing of Bio-pesticides with chemicals, inadequate raids conducted on distributers, retailers and manufacturing units, lack of awareness at the farmer level, lack of proper method and implementation plan to monitor the activities of the registered manufacturers of pesticides.

Going ahead, a phased strategy needs to be developed. However, it is critical that all the stakeholders - the government, regulatory bodies, companies and the farmers collaborate together to overcome the menace of non-genuine / illegal pesticides. Some of the key recommendations are-

Key Recommendations	
Farmers and farmer associations	Farmers should utilize customer care telephone number written on the packaging to validate the authenticity of the product
	Farmer community at village level should identify authorized retailers and encourage farmers to ask for a receipt after each purchase
	Farmers should continue to attend awareness trainings organized by Government and the agro chemical companies
	Farmers association should distribute written material/leaf-lets containing information / warning against non-genuine / illegal products.
	Farmer associations should appoint an educated/well informed farmer at block level as 'Khet Doot', who can advise on market practices & right products, handle complaint against non-genuine / illegal products and follow up with authorities
Industry	Invest in farmer education programs for identifying authentic products and educate ill effects of non-genuine / illegal products
	Publicize success stories of farmers
	Track the end retailers by modifying the procedure of issuance of principal certificates from distributors to retailers
	Make distributors realize the importance of use of branded genuine products for farmers ("Know Your Supplier")
	Provide special helpline telephone numbers to resolve farmer's queries
Government	Amend and pass the pesticide management bill-2008 immediately
	Reward a person who gives correct information about an illegal activity
	Launch programs for 'empty Container management' at farmer level
	Formulate an anti-counterfeiting committee to coordinate the problem of non-genuine / illegal pesticides between the stakeholders
	Mandate a minimum educational requirement to qualify as pesticide retailer

Key Recommendations	
	Make it mandatory for the pesticide inspectors to report back their on field findings about whether the pesticide is genuine or non-genuine / illegal
	Empower the village Panchayat to identify genuine retailers & take action against people dealing in non-genuine / illegal pesticides
Regulatory Body	Customs: • Ask for C.I.B & R.C registration & details of the company importing the consignment at the customs. **Verify import companies details** by calling the companies and in case of discrepancy, seize the consignment • Custom officers should be trained to identify fake products with the help of technology. For e.g. portable FTIR[40]
	C.I.B & R.C : • List the prescribed pesticides, target pests, usage on crops and dosage on a portal • Appoint nodal officers who will verify the licenses of distributers and retailers, seize samples and inspect the manufacturing sites and make this information public

[40] Fourier transform infrared spectroscopy

11. ANNEXURE



Annexure-1

Photographs from field trips and company sources

1. On field photographs; Jalgaon (Maharashtra)



Farmer spraying pesticide on field





Interviews of agrochemical product distributors



Interviews of farmers

2. On-field photographs; Meerut, Muradnagar, Modinagar, Hapur (U.P)



Interviews of retailers

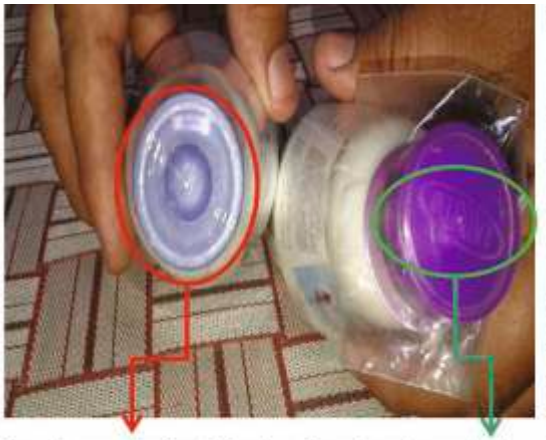


Interview of an agro-chemical products retailer



Interview of a group of farmers

3. Photographs provided by a leading agro-chemical product manufacturer



"Exact copy" of original product with no logo

Genuine branded product with logo



"Exact copy" of original product

Genuine branded product



"look-alike" of a genuine product

Genuine product





Local brands selling chemical pesticides in the name of bio-pesticides



Product with no place of manufacturing written.

Annexure-2

Detection of chemical pesticides in Bioproducts

Dr. C.D Mayee launched a campaign against fake pesticides in early 2014.He collected samples of products claiming to be bio pesticides but actually laced with chemicals. The following table contains the name of the company, the brand name and the respective chemical detected in the brand.

Avermectin B1 a, Avermectin B1 b, Acetamiprid and Thiamethoxam are the most common chemicals found.

Table 3: Chemical pesticides detected in bio products of various companies[41]

Company	Brand	Pesticides detected
Zeion Crop Care	Super Claim	Avermectin B1 a
		Acetamiprid
		Dimethomorph
		Imidacloprid
		Thiamethoxam
		Avermectin B1 b
	Super Power	Buprofezin
		Thiamethoxam
Sai Pratibha Technologies	Rockstar	Avermectin B1 b
		Acetamiprid
		Avermectin B1 a
	Super Coma	Avermectin B1 a
		Avermectin B1 b
		Acetamiprid
		Imidacloprid
S.I Industries	Plantak Gold	Avermectin B1 a
		Thiamethoxam
Sri Bio Life Sciences	Calstar	Avermectin B1 a
		Thiamethoxam

[38] Data provided by FICCI

Company	Brand	Pesticides detected
Gita Agritech Private Limited	Censor	Avermectin B1 a
		Avermectin B1 b
Gupta Biotech (P) Limited	Alishan Power	Avermectin B1 a
		Dichorvos
		Thiamethoxam
Srikar Biotech Pvt. Ltd.	Royal 5	Avermectin B1 a
		Avermectin B1 b
		Thiamethoxam
K K crop Sciences Pvt. Ltd	Kildare +	Avermectin B1 a
		Chlorantraniliprole
		Thiamethoxam
We Care Agritech	Ankush	Acetamiprid
		Chlorantraniliprole
		Fepyroximate
		Thiamethoxam
Himalaya Bio Care	Rifle Bio Power	Avermectin B1 a
		Avermectin B1 b
		Carbendazim (including Benomyl)
		Chlorantraniliprole
		Diafenthiuron
		Imidacloprid
		Metalaxyl & Metalaxyl -M
		Thiamethoxam
		Thiophanate-methyl
Geolife	Best	Avermectin B1 a
		Avermectin B1 b
		Chlorantraniliprole
		Diafenthiuron
Ned Gene Agri	Gene Ghost	Thiamethoxam
Bianica Bio Science	Terror ++	Avermectin B1 a
		Avermectin B1 a
		Acetamiprid
		Buprofezin
		Chlorantraniliprole
		Imidacloprid
		Thiamethoxam

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About FICCI (Federation of Indian Chamber of Commerce and Industry)

Established in 1927, FICCI is the largest and oldest apex business organization in India. Its history is closely interwoven with India's struggle for independence, its industrialization, and its emergence as one of the most rapidly growing global economies. A non- government, not for- profit organization. FICCI is the voice of India's business and industry. FICCI draws its membership from the corporate sector, both private and public, including SMEs and MNCs; FICCI enjoys an indirect membership of over 2, 50,000 companies from various regional chambers of commerce. For more information please log on to www.ficci.com

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14. About Tata Strategic Management Group



Founded in 1991 as a division of Tata Industries Ltd, Tata Strategic Management Group is the largest Indian own management consulting firm. It has a 50 member strong consulting team supported by a panel of domain experts. Tata Strategic has undertaken 500+ engagements, with over 100 clients, across countries and sectors.

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