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Amrit Mahotsav



# Annual Report

2022-23

INDIA  
**CHEM**  
2022



**Government of India**  
**Ministry of Chemicals & Fertilizers**  
**Department of Chemicals & Petrochemicals**





सत्यमेव जयते

# Annual Report

2022-23

**Government of India**  
**Department of Chemicals & Petrochemicals**  
**Ministry of Chemicals & Fertilizers**



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## CHAPTER – 1

### INTRODUCTION

- 1.1 Department of Chemicals and Petrochemicals (DCPC) aims:
- i. To formulate and implement policy and programmes for achieving growth and development of the chemical and petrochemical sectors in the country; and
  - iv. To foster the spirit of public-private partnership for overall development of above- mentioned sectors of the industry.
- 1.2 The Department has the mandate to deal with the following broad subject matters:
- i. Insecticides (excluding the administration of The Insecticides Act, 1968 (46 of 1968);
  - ii. Dye-stuffs and Dye-Intermediates;
  - iii. All organic and inorganic chemicals, not specifically allotted to any other Ministry or Department;
  - iv. Planning, development and control of, and assistance to, all industries dealt with by the Department;
  - v. Bhopal Gas Leak Disaster-Special Laws relating thereto;
  - vi. Petrochemicals;
  - vii. Industries relating to production of non-cellulosic synthetic fibres (Nylon Polyesters, Acrylic etc.);
  - viii. Synthetic Rubber; and
  - ix. Plastics including fabrication of plastic and moulded goods.
- 1.3 The Department has six major divisions viz. Chemicals, Petrochemicals, Administration, Statistics & Monitoring (S&M), Economic Division and Official Language Division. The Integrated Finance Division is common to the three Departments in the Ministry of Chemicals and Fertilizers.
- 1.4 There are three Central Public Sector Undertakings (CPSUs) in the chemical sector namely Hindustan Organic Chemicals Ltd. (HOCL), HIL (India) Limited and Hindustan Fluorocarbons Limited (HFL), which is a subsidiary of HOCL. Two autonomous institutes namely Central Institute of Petrochemicals Engineering & Technology (CIPET) and Institute of Pesticides Formulation Technology (IPFT) function under this Department.
- 1.5 Dr Mansukh Mandaviya is the Minister for Chemicals and Fertilizers. Shri Bhagwanth Khuba is the Minister of State for Chemicals and Fertilizers and Shri Arun Baroka is Secretary of the Department.

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## CHAPTER – 2

## AN OVERVIEW OF CHEMICAL AND PETROCHEMICAL INDUSTRY

**Vision Statement 2024, Department of Chemicals and Petrochemicals**

- 2.1 To seize the opportunity to establish India as a leading chemicals & petrochemicals manufacturing hub,
- With a thrust on reduction in import dependency.
  - By attracting investments for manufacturing quality products.
  - Using cutting-edge technologies.
  - In specified clusters.
  - With focus on sustainability and contribute to Manufacturing sector.

**Chemical and Petrochemical Industry**

- 2.2 The chemical industry is a knowledge intensive as well as capital intensive industry. It is an integral constituent of the growing Indian industry. It includes basic chemicals and its products, petrochemicals, fertilizers, paints, varnishes, gases, soaps, perfumes, toiletry and pharmaceuticals. The diversification within the chemical industry is large and covers more than eighty thousand commercial products. This Industry occupies a pivotal position in meeting basic needs and improving quality of life. The industry is the main stay of industrial and agricultural development of the country and provides building blocks for several downstream industries, such as textiles, papers, paints, varnishes, soaps, detergents, pharmaceuticals, etc.
- 2.3 As per National Industrial Classification (NIC) 2008, Manufacture of Chemicals and Chemical Products are covered under the division 20. The description of product groups at 4-digit level under this division is given below:

**Table I: Description of Product Groups**

Class	Description
2011	Manufacture of basic chemicals
2012	Manufacture of fertilizers and nitrogen compounds
2013	Manufacture of plastics and synthetic rubber in primary forms
2021	Manufacture of pesticides and other agrochemical products
2022	Manufacture of paints, varnishes and similar coatings, printing ink and mastics
2023	Manufacture of soap and detergents, cleaning and polishing preparations, perfumes and toilet preparations
2029	Manufacture of other chemical products n.e.c.
2030	Manufacture of man-made fibers

- 2.4 According to National Accounts Statistics (NAS) 2022, brought out by the National Accounts Division (NAD) of National Statistical Office (NSO), Chemicals and Chemical products sector (industry division 20 of NIC 2008) accounted for 1.42% of the GVA for all economic activities in 2020-21 at constant prices (at 2011-12 prices), compared to 1.22% in 2019-20. The share of this sector in the GVA of manufacturing sector (at 2011-12 prices) was 7.98% during 2020-21 as compared to 7.11% in 2019-20. Share of Chemical and Chemical products sector including pharmaceutical sector (industry division 20 and 21 of NIC 2008) accounted for 2.75% of the GVA for all economic activities (at 2011-12 prices) in 2020-21, compared to 2.33% in 2019-20. The share of this sector in the GVA of manufacturing sector at 2011-12 prices was 15.39% during 2020-21 as compared to 13.61% in 2019-20. The size of the Indian Chemical industry (industry division 20 of NIC 2008) in terms of value of output in the year 2020-21 was Rs.9,87,644 crore at current prices & Rs.8,35,570 crore at constant prices (2011-12), while size of the Indian Chemical industry including Pharmaceutical (industry division 20 and 21 of NIC 2008) in terms of value of output in the year 2020-21 was Rs.14,31,617 crore at current prices & Rs.11,74,740 crore at constant prices (2011-12). The Index of Industrial Production (IIP) for the Chemicals and Chemicals product (industry division 20: NIC 2008) during the period 2017-18 to 2021-22 was hovered between 116 to 121.
- 2.5 The production of selected Major Chemicals and Petrochemicals during the years 2017-18 to 2022-23 (up to September 2022) is given in Table-II. The production of Total Major Chemicals and Petrochemicals in 2022-23 (up to September 2022) is 26570 thousand MT. CAGR in production of Total Chemicals and Petrochemicals during the period 2017-18 to 2021-22 is 4.61%.

**Table II: Production of selected Major Chemicals and Petrochemicals**

(Figures in 000'MT)

GROUP	2017-18	2018-19	2019-20	2020-21	2021-22	CAGR	2022-23 (up to Sep., 2022)
Alkali Chemicals	7631	8043	8457	7776	9041	4.33	4745
Inorganic Chemicals	1058	1064	1063	978	1052	-0.16	529
Organic Chemicals	1799	1884	1847	1906	1953	2.08	904
Pesticides	213	217	192	255	299	8.92	138
Dyes & Pigments	367	382	384	327	398	2.03	171
<b>Total Major Chemicals</b>	<b>11069</b>	<b>11589</b>	<b>11943</b>	<b>11243</b>	<b>12743</b>	<b>3.58</b>	<b>6487</b>
Synthetic Fibre	3625	3601	3893	3185	4040	2.75	1999
Fibre Intermediate	4711	4657	5359	5059	5482	3.86	2515
Polymers	9276	10040	12404	12144	12471	7.68	5708
Synthetic Rubber	308	351	358	353	383	5.60	175
Synthetic Detergent Intermediates	743	687	715	736	780	1.24	330
Performance Plastics	1719	1589	1672	1520	1698	-0.31	859

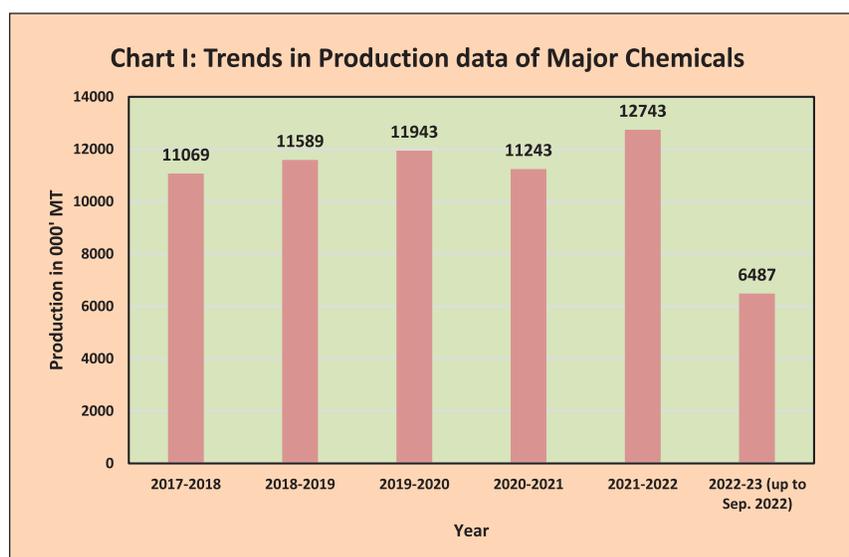
(Figures in 000'MT)

GROUP	2017-18	2018-19	2019-20	2020-21	2021-22	CAGR	2022-23 (up to Sep., 2022)
Olefins	9013	8857	11835	12039	12527	8.58	5598
Aromatics	5339	5543	4925	4805	4677	-3.25	1679
Other Petrochemicals	2080	2192	2364	2318	2531	5.03	1220
<b>Total Major Petrochemicals</b>	<b>36813</b>	<b>37519</b>	<b>43524</b>	<b>42159</b>	<b>44589</b>	<b>4.91</b>	<b>20083</b>
<b>Total Major Chemicals and Petrochemicals</b>	<b>47882</b>	<b>49108</b>	<b>55467</b>	<b>53402</b>	<b>57332</b>	<b>4.61</b>	<b>26570</b>

**Note:** The total basic Chemicals and Petrochemicals production is aggregated based on monthly production returns from manufacturers under large and medium scale units only. Product-wise and Group wise details of installed capacity and production for major Chemicals and major Petrochemicals are given in Annexures - I & II respectively.

### Chemical Sector- Production Trends

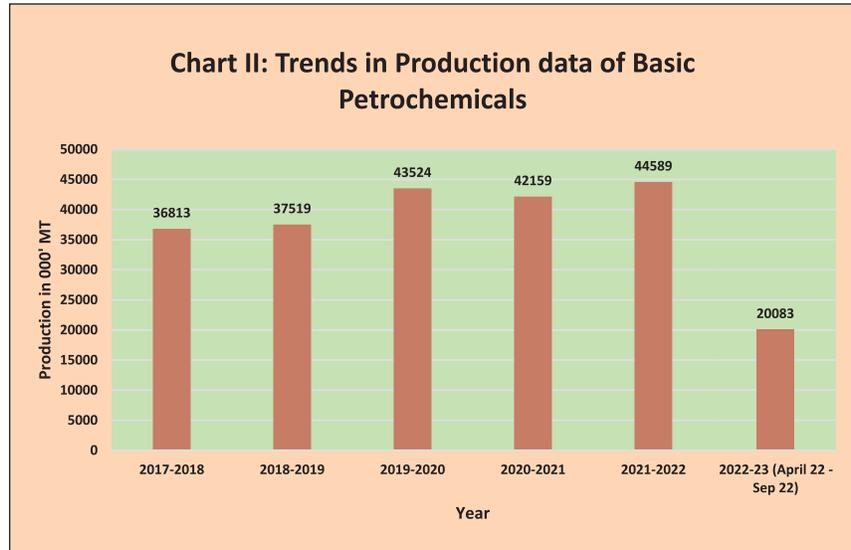
- 2.6 The production of Major Chemicals in 2022-23 (up to September 2022) is 6487 thousand MT. The CAGR in production of Total Major Chemicals during the period 2017-18 to 2021-22 was 3.58%. The trend in the production of selected major chemicals is depicted in Chart I.



### Petro chemical Sector- Production Trends

- 2.7 Petrochemicals, which comprise of plastic and a host of other chemicals, are downstream hydrocarbons derived from crude oil and natural gas. The value additions in the petrochemicals chain offer immense possibilities and cater to the need of textiles and clothing, agriculture, packaging, infrastructure, healthcare, furniture, automobiles, information technology, power, electronics and telecommunication, irrigation, drinking water, construction and a host of other articles of daily and specialized usage amidst other emerging areas.

- 2.8 The production of Major Petrochemicals in 2022-23 (up to September 2022) is 20083 thousand MT. The CAGR in production of Major Petrochemicals during the period 2017-18 to 2021-22 was 4.91%. The trend in the production of Major Petrochemicals has been depicted in Chart II.



### Index of Industrial Production

- 2.9 The weight of chemical and chemical products (industry division 20 of NIC 2008) is 7.87 out of 100 in manufacturing for the Index of Industrial Production (Base Year: 2011-12). The General Index for the month of September, 2022 stands at 134.0, as compared to 129.5 in the same month of last year i.e. September, 2021. The General Index of IIP was recorded lowest at 115.1 in May, 2021 and achieved highest at 148.8 in Mar, 2022. The Index of Industrial Production for the manufacturing sector in the month of September, 2022 stands at 134.8, as compared to 131.9 in September, 2021. The Index of Industrial Production for the Chemicals and Chemical products during September, 2022 stands at 132.3, as compared to 124.3 during September, 2021. The Index of Industrial Production in manufacturing sector was lowest at 111.5 in May, 2021 which was increased to 145.3 in March, 2022. The Index of Industrial Production of Chemical & Chemical products achieved record to 137.2 in July, 2022 as against the lowest value of 109.1 recorded in May, 2021. The month-wise Index of Industrial Production from October, 2020 to September, 2022 is given in Table III.

**Table III: Index of Industrial Production**

Index of Industrial Production		(Base : 2011-12=100)	
Period	Chemicals and chemical products	Manufacturing	General
Weight	7.87	77.63	100.00
Oct-20	128.0	132.0	129.6
Nov-20	120.4	128.5	126.7
Dec-20	131.8	139.0	137.4

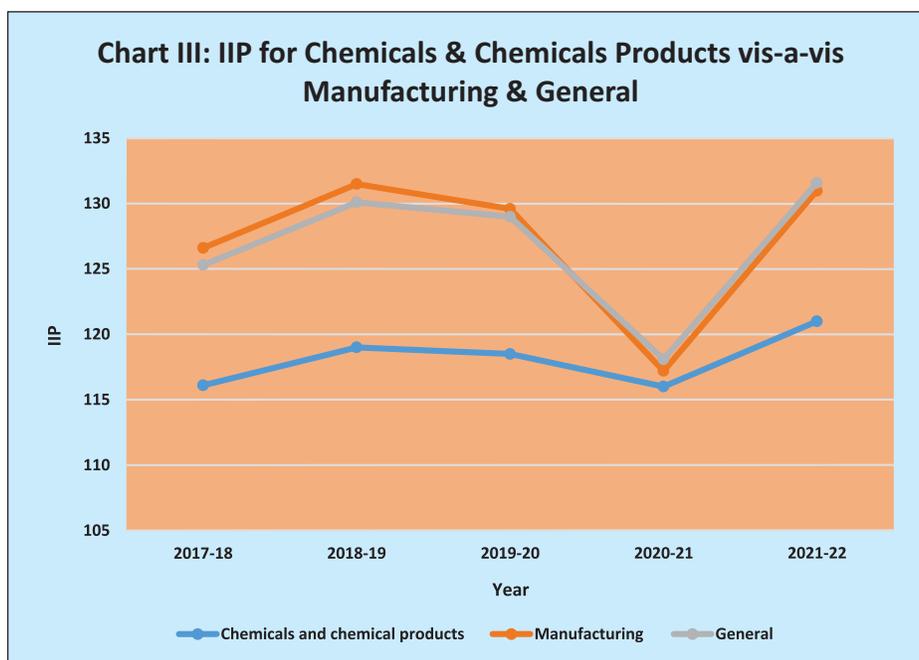
Index of Industrial Production		(Base : 2011-12=100)		
Period	Chemicals and chemical products	Manufacturing	General	
Jan-21	131.6	136.6	136.6	
Feb-21	119.0	129.7	129.9	
Mar-21	127.9	143.3	145.6	
Apr-21	118.1	124.6	126.1	
May-21	109.1	111.5	115.1	
Jun-21	116.3	121.2	122.8	
Jul-21	128.0	131.0	131.5	
Aug-21	124.8	131.9	132.4	
Sep-21	124.3	131.9	129.5	
Oct-21	125.9	136.4	135.0	
Nov-21	118.1	128.9	128.0	
Dec-21	125.9	139.8	138.8	
Jan-22	124.9	139.2	139.3	
Feb-22	115.3	129.9	131.4	
Mar-22	121.1	145.3	148.8	
Apr-22	123.3	131.6	134.5	
May-22	135.6	134.6	137.8	
Jun-22	133.5	136.8	138.3	
Jul-22	137.2	135.0	134.4	
Aug-22	132.1	131.3	131.5	
Sep-22	132.3	134.8	134.0	

Source: National Statistical Office (NSO), Ministry of Statistics and Programme Implementation

2.10 The behaviour of IIP of Chemicals and Chemical Products vis-à-vis general IIP and IIP of manufacturing from 2017-18 to 2021-22 is depicted in Table IV and Chart III.

**Table IV: Annual Average (April-March) Indices of Industrial Production** (Base: 2011-12 =100)

Particulars	Weight	2017-18	2018-19	2019-20	2020-21	2021-22	CAGR
Chemicals and Chemical Products	7.87	116.1	119.0	118.5	116.0	121.0	1.04
Manufacturing	77.63	126.6	131.5	129.6	117.2	131.0	0.86
General	100.00	125.3	130.1	129	118.1	131.6	1.23



### Wholesale Price Index (WPI)

2.11 The annual rate of inflation based on monthly WPI (Base Year: 2011-12) released by the Office of the Economic Advisor, for 'all commodities' stood at 10.6% in the month of September, 2022 over September, 2021. The index increased by 11.0% for 'Food Articles' group, it increased by 6.1% for 'Manufactured Products' and 11.4% for 'Chemicals & Chemical products' during the same period. The weight of Chemicals & Chemical products in the WPI is 6.47 out of all commodities weight of 100. The month-wise Index of WPI from October, 2020 to September, 2022 is given in Table V.

**Table V: Annual Average (April-March) Indices of Industrial Production**

(Base Year: 2011-12 =100)

Month	All Commodities	Food Articles	Manufactured Products	Chemicals & Chemical Products
Weights	100.00	15.26	64.23	6.47
Oct-20	123.6	171.5	120.4	116.8
Nov-20	125.1	170.1	121.6	118.2
Dec-20	125.4	161.1	123.3	119.7
Jan-21	126.5	155.8	125.3	120.8
Feb-21	128.1	157.5	126.0	123.1
Mar-21	129.9	156.4	127.9	125.6
Apr-21	132.0	161.6	129.9	128.0
May-21	132.9	159.6	131.5	128.4
Jun-21	133.7	160.5	131.6	128.3
Jul-21	135.0	161.5	132.3	129.3

(Base Year: 2011-12 =100)

Month	All Commodities	Food Articles	Manufactured Products	Chemicals & Chemical Products
Aug-21	136.2	161.7	133.2	130.3
Sep-21	137.4	164.1	134.0	131.1
Oct-21	140.7	171.6	135.9	134.3
Nov-21	143.7	178.3	136.6	136.4
Dec-21	143.3	176.7	136.5	136.8
Jan-22	143.8	172.0	137.2	137.5
Feb-22	145.3	170.4	138.9	139.2
Mar-22	148.9	169.6	142.3	142.3
Apr-22	152.3	175.3	144.7	145.7
May-22	155.0	178.4	145.0	147.0
Jun-22	155.4	182.5	143.9	148.3
Jul-22	154.0	178.9	143.2	147.8
Aug-22	153.2	182.0	143.2	146.6
Sep-22	151.9	182.2	142.2	146.0

Source: Office of the Economic Advisor (<http://eaindstry.nic.in>)

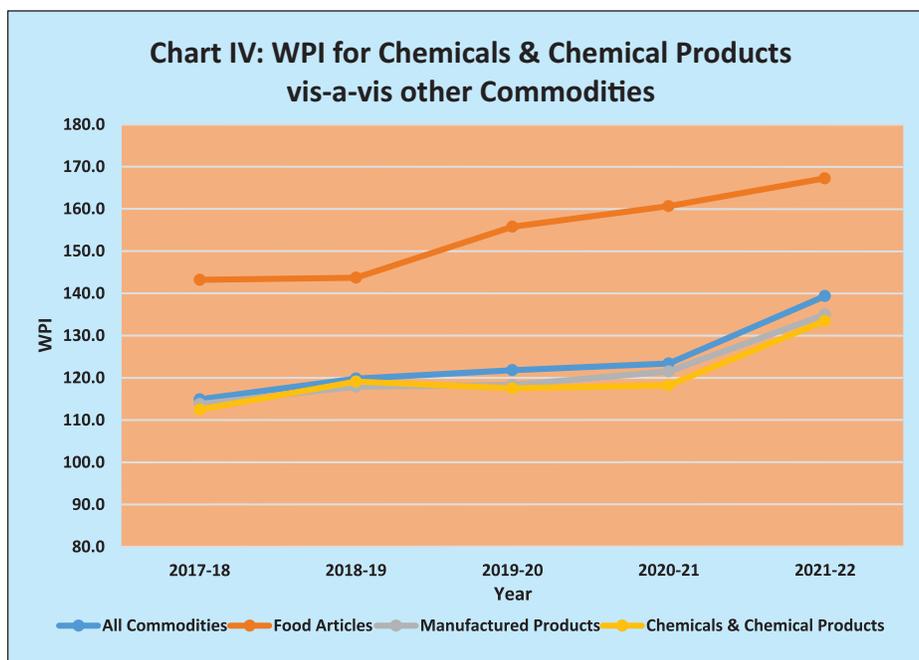
2.12 Table VI and Chart IV below show the annual WPI for Chemicals & Chemical products vis-à-vis all commodities, food articles and manufactured products during the years 2017-18 to 2021-22. The compounded average growth rate(CAGR) during the period 2017-18 to 2021-22 was 4.4% for manufactured product based on WPI while it was 4.4% for Chemicals and Chemical Products.

**Table VI: Annual Average (April - March) Indices of Wholesale Price**

(Base Year: 2011-12 = 100)

Description	Weights	2017-18	2018-19	2019-20	2020-21	2021-22	CAGR(%)
All Commodities	100.00	114.9	119.8	121.8	123.4	139.4	4.95
Food Articles	15.26	143.2	143.7	155.8	160.7	167.3	3.97
Manufactured Products	64.23	113.8	117.9	118.3	121.5	135.0	4.36
Chemicals & Chemical Products	6.47	112.5	119.1	117.5	118.2	133.5	4.37

Source: Office of the Economic Advisor (<http://eaindstry.nic.in>)



2.13 Table VII shows WPI of different commodity groups within Chemicals & Chemical Products group during the years 2017-18 to 2021-22.

**Table VII: WPI of Chemicals & Chemical Products**

(Base year: 2011-12=100)

Description	Weights	2017-18	2018-19	2019-20	2020-21	2021-22
Chemicals and Chemical Products	6.47	112.5	119.1	117.5	118.2	133.5
Basic Chemicals	1.43	111.2	125	119.9	118.6	143.8
Fertilizers and Nitrogen Compounds	1.48	117.1	121.1	123.1	123.6	129.6
Plastic and synthetic rubber in primary form	1.00	113	117.6	112.4	116.7	140.3
Pesticides and Other Agrochemical Products	0.45	115.3	120.2	122.6	124.4	132.1
Paints, Varnishes and Similar Coatings, Printing Ink and Mastics	0.49	108.6	112.7	114.7	114.9	130.4
Soap and Detergents, Cleaning and Polishing Preparations, Perfumes and Toilet Preparations	0.61	115.2	116.8	118.6	120.6	128.1
Other Chemical Products	0.69	110.1	116.6	114.2	115.1	130.3
Man-Made Fibres	0.30	97.5	104	97.9	93.7	106.6

Source: Office of the Economic Advisor (<http://eaindstry.nic.in>)

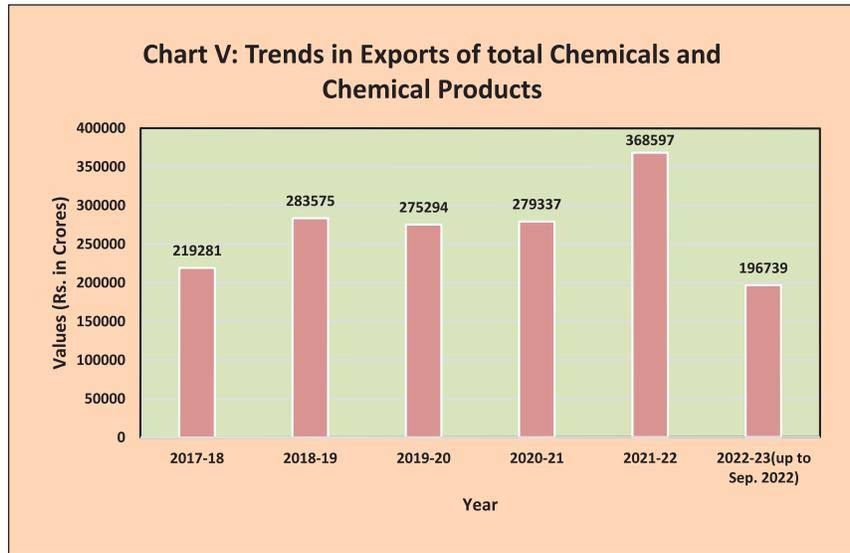
## International trade

2.14 Trends in exports and imports of Chemicals and Chemical Products (excluding Pharmaceutical Products and Fertilizers) during 2017-18 to 2022-23 (up to Sep., 2022) are given in Table VIII (A & B) and Chart V and Chart VI.

**Table VIII: Exports and Imports-Chemicals and Chemical Products  
(excluding Pharmaceutical Products and Fertilizers)**

A. Exports		(Value in Rs. Crore)						
HS Code	Commodity	2017-18	2018-19	2019-20	2020-21	2021-22	CAGR (%)	2022-23 (up to Sep., 2022)
	Total National Exports	1956515	2307726	2219854	2159043	3147021	12.62	1818554
28	Inorganic Chemicals	11175	14056	12512	12301	19800	15.37	13041
29	Organic Chemicals	95381	127855	124195	133637	164815	14.65	88620
32	Tanning or Dyeing	18951	23124	24409	22660	29513	11.71	14334
38	Miscellaneous Chemical Products.	25080	32397	35663	37886	52416	20.24	31922
39	Plastic and Articles Thereof.	40928	56079	48970	51004	67440	13.30	3304
4002	Synthetic Rubber and Factice	571	739	759	821	1141	18.92	537
54	Man-Made Filaments.	13984	16018	16962	11470	18070	6.62	7981
55	Man-Made Staple Fibres.	13212	13308	11824	9559	15402	3.91	7256
<b>A:</b>	<b>Total Chemicals and Chemical Products</b>	<b>219281</b>	<b>283575</b>	<b>275294</b>	<b>279337</b>	<b>368597</b>	<b>13.86</b>	<b>196739</b>
	<b>% Share in Total Export</b>	<b>11.2</b>	<b>12.3</b>	<b>12.4</b>	<b>12.9</b>	<b>11.7</b>		<b>10.8</b>

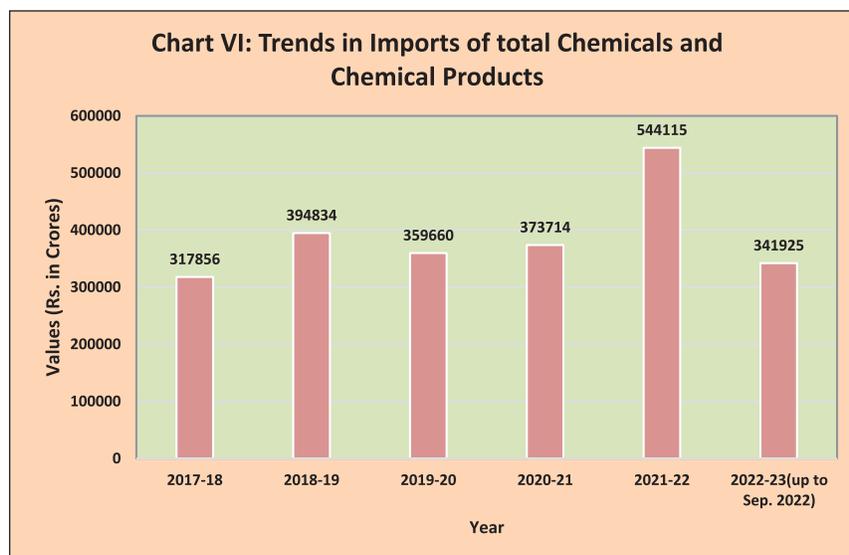
Source: Directorate General of Commercial Intelligence and Statistics (DGCIIS), Kolkata.

**B. Imports**

(Value in Rs. Crore)

HS Code	Commodity	2017-18	2018-19	2019-20	2020-21	2021-22	CAGR (%)	2022-23 (up to Sep., 2022)
	Total National Exports	3001033	3594675	3360954	2915958	4572775	11.10	2954839
28	Inorganic Chemicals	38927	53237	45045	50955	76356	18.34	54803
29	Organic Chemicals	123761	156552	140205	145830	212615	14.49	124950
32	Tanning or Dyeing	12995	15460	14518	14036	19431	10.58	10893
38	Miscellaneous Chemical Products.	35521	41748	39069	45324	58634	13.35	36525
39	Plastic and Articles Thereof.	89768	106591	100607	98392	149067	13.52	95934
4002	Synthetic Rubber and Factice	6687	7896	6079	6269	9154	8.17	6334
54	Man-Made Filaments.	5538	6843	7351	6727	11144	19.10	6954
55	Man-Made Staple Fibres.	4658	6508	6785	6180	7714	13.44	5533
<b>A:</b>	<b>Total Chemicals and Petrochemical Products</b>	<b>317856</b>	<b>394834</b>	<b>359660</b>	<b>373714</b>	<b>544115</b>	<b>14.38</b>	<b>341925</b>
	<b>% Share in Total Import</b>	<b>10.6</b>	<b>11.0</b>	<b>10.7</b>	<b>12.8</b>	<b>11.9</b>		<b>11.6</b>

Source: Directorate General of Commercial Intelligence and Statistics (DGCIS), Kolkata.



- 2.15 As per Export and Import figures, Exports of Chemicals and Chemical products (excluding pharmaceutical products and fertilizers) contributed 11.7% of total export in the year 2021-22 compared to 12.9% in the year 2020-21. It contributed 10.8% of total export in the year 2022-23 (upto September, 2022). Imports contributed 11.9% of total imports in 2021-22 as against 12.8% in the year 2020-21. It contributed 11.6% of total imports in 2022-23 (upto September, 2022). CAGR in Export of total Chemicals and Chemical products (excluding pharmaceutical & fertilizer products) during the period 2017-18 to 2021-22 was 13.86% while CAGR of total national export was 12.62%. CAGR in Import of total chemicals and chemicals products (excluding pharmaceutical & fertilizer products) during the period 2017-18 to 2021-22 was 14.38% while CAGR of total national import was 11.10%.

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## CHAPTER - 3

## SCHEMES OF THE DEPARTMENT

- 3.1. The Department of Chemicals and Petrochemicals is implementing two Central Sector Schemes, namely, New Schemes of Petrochemicals (Scheme for setting up of Plastic Parks, Scheme for setting up of Centres of Excellence & National Petrochemicals Awards Scheme which has been reviewed/revised & renamed as Petrochemicals Research & Innovation Commendation Scheme from January, 2023) and Chemical Promotion & Development Schemes (CPDS).
- 3.2. In addition, the Department is also implementing other schemes for funding its Secretariat expenses; support to Central Institute of Petrochemicals Engineering & Technology (CIPET), which is engaged in academic, technology support, research and skill development activities; Institute of Pesticides Formulation Technology (IPFT) and Bhopal Gas Leak Disaster (BGLD).
- 3.3. The larger objective of the Plastic Parks scheme is to contribute to the economy by increasing investment, production, exports in the Petrochemicals sector along with generation of employment.
- 3.4. Schemes of Centres of Excellence provides Grant-in-aid to identified research institute(s) with the aim of improving the existing petrochemicals technology and research in the country and to promote development of new applications of polymers and plastics.
- 3.5. Under the Chemicals Promotion Development Scheme (CPDS), the Department extend soft support in the form of Grants-in-Aid (General) to various organisations/ industry associations, etc. to conduct workshops, seminars, studies, etc. to obtain necessary inputs for enabling the Department to firm its views on various policy matters relating to the Chemical and Petrochemical sector
- 3.6. The Department provides budgetary support to CIPET for strengthening its civil and technical infrastructure, research and development capacities and academic and training initiatives and also for construction of hostels and setting up new CIPET centres.
- 3.7. IPFT, located at Gurugram is an autonomous body under the Department of Chemicals and Petrochemicals with mandate to develop environment and user friendly pesticides formulation technologies for a safer environment and also develop methods for the detection and analysis of pesticides and their residues.
- 3.8. Office of the Welfare Commissioner of Bhopal is entrusted with the work of disbursement of compensation to Bhopal Gas victims. Budget is provided for settlement of ex-gratia cases.
- 3.9. Expenditure under Secretariat head is of contingent nature for payment of salaries and office expenses etc. of the Department.

Table No. IX: Scheme-wise Outlay

(₹ in crore)

Sr. No.	Name of the Scheme	BE 2022-23	RE 2022-23	BE 2023-24
<b>I</b>	<b>Central Sector Schemes</b>			
1.1	Other New Schemes of Petrochemicals	48.50	29.00	22.00
1.2	Chemical Promotion & Development Scheme (CPDS)	3.00	3.00	Merged with NSP from 01.04.2023
	<b>Total</b>	<b>51.50</b>	<b>32.00</b>	<b>22.00</b>
<b>II</b>	<b>Other Central Expenditure (Sectt/BGLD/ABs/PSUs)</b>			
2.1	Secretariat/Economic Services	21.35	21.00	22.55
2.2	Central Institute of Plastic Engineering & Technology (CIPET)	100.24	63.81	92.88
2.3	Institute of Pesticides Formulation Technology (IPFT)	11.50	11.04	12.62
2.4	Hindustan Organic Chemicals Ltd.(HOCL)	0.00	0.00	0.00
2.5	HIL (India) Ltd. (HIL)	0.00	0.00	
2.6	Hindustan Fluorocarbons Ltd (HFL)	1.33	0.00	0.00
2.7	Bhopal Gas Leak Disaster (BGLD)	23.08	22.83	23.40
	Total	157.50	118.68	151.45
	Grand Total	209.00	150.68	173.45

Table X: Expenditure 2020-21 &amp; 2021-22

(₹ in crore)

Sl. No.	Schemes	BE 2021-22	RE 2021-22	Exp 2021-22	% of Exp w.r.t. RE (2021-22)	BE 2022-23	RE 2022-23	Exp as on 31.12.2022	% of Exp w.r.t. RE (2022-23)
<b>I</b>	<b>Central Sector Schemes</b>								
1.	New Schemes of Petrochemicals	53.73	51.13	51.12	99.98	48.50	29.00	24.22	83.51
2.	Chemical Promotion & Development Schemes (CPDS)	3.00	3.60	3.58	99.44	3.00	3.00	1.25	41.66
	<b>Total of I</b>	<b>56.73</b>	<b>54.73</b>	<b>54.70</b>	<b>99.95</b>	<b>51.50</b>	<b>32.00</b>	<b>25.47</b>	<b>79.59</b>
<b>II</b>	<b>Other Central Expenditure (Sectt./BGLD/ ABs/PSUs)</b>								
1.	Secretariat	20.97	19.73	19.46	98.63	21.35	21.00	16.69	79.47
2.	Bhopal Gas Lead Disaster (BGLD)	22.06	18.53	18.12	97.79	23.08	22.83	16.29	71.35
3.	Central Institute of Plastic Engineering & Technology (CIPET)	117.88	102.34	102.34	100.00	100.24	63.81	63.81	100.00

(₹ in crore)

Sl. No.	Schemes	BE 2021-22	RE 2021-22	Exp 2021-22	% of Exp w.r.t. RE (2021-22)	BE 2022-23	RE 2022-23	Exp as on 31.12.2022	% of Exp w.r.t. RE (2022-23)
4.	Institute of Pesticides Formulation Technology (IPFT)	12.00	11.50	11.50	100.00	11.50	11.04	7.20	65.21
	<b>Total of II</b>	<b>172.91</b>	<b>152.10</b>	<b>151.42</b>	<b>99.55</b>	<b>156.17</b>	<b>118.68</b>	<b>103.99</b>	<b>87.62</b>
<b>III</b>	<b>Loan to PSUs</b>								
1.	Hindustan Fluoro carbon Ltd. (Capital)	3.50	2.17	2.17	100.00	1.33	0.00	0.00	0.00
	<b>Grand Total (I+II+III)</b>	<b>233.14</b>	<b>209.00</b>	<b>208.29</b>	<b>99.66</b>	<b>209.00</b>	<b>150.68</b>	<b>129.46</b>	<b>85.91</b>

Note: Rest of the figures will be provided in due course.

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## CHAPTER - 4

## PETROLEUM, CHEMICAL AND PETROCHEMICAL INVESTMENT REGIONS (PCPIRs)

### Background

- 4.1 Four Petroleum, Chemical and Petrochemical Investment Regions (PCPIRs) are being implemented in the States of Andhra Pradesh (Vishakhapatnam), Gujarat (Dahej), Odisha (Paradeep) and Tamil Nadu (Cuddalore and Nagapattinam) to promote investment and industrial development in these sectors under the PCPIR Policy, 2007.
- 4.2 The PCPIRs are conceptualized in a cluster approach to promote Petroleum, Chemical and Petrochemical sectors in an integrated and environment friendly manner on a large scale. Government of India formulated the PCPIR policy in April, 2007 to give a boost to this sector.
- 4.3 Each PCPIR is a specifically delineated investment region having an area of about 250 sq. km (with around 40% of the area earmarked for processing activities). It is not mandatory for the State Government concerned to acquire the entire area comprising the PCPIR, but they have to notify the area under the relevant area planning and zoning law.
- 4.4 The concerned State Governments carry out Environmental Impact Assessment (EIA) and lead the project implementation. Government of India ensures the availability of external physical infrastructure linkages to the PCPIR including connectivity through Railways, Roads, Ports, Airports and Telecom etc. through Public Private Partnership projects to the extent possible. The Central Government also provides necessary funding to make such projects viable, in the form of Viability Gap Funding (VGF), as well as budget support for creation of these linkages wherever required.
- 4.5 The policy provides that each PCPIR would have a refinery / petrochemical feedstock company as an Anchor Tenant.
- 4.6 The State Government notifies a nodal Department or agency for coordinating the linkages. A Management Body constituted by the State Government for each PCPIR, under relevant legislation, is responsible for the development and management of the PCPIR.
- 4.7 Once fully established, these four PCPIRs are expected to attract investment of around Rs. 7.63 lakh Crore. As per data available from State Governments, investments worth Rs. 2.27 lakh Crore (approximately) have been made / committed in these regions. The four PCPIRs are expected to generate employment for around 33.83 lakh persons. Around 4.21 lakh persons have been employed in direct and indirect activities related to PCPIRs.
- 4.8 The status of implementation and execution of these projects is as follows:

Indicator Gujarat	Andhra Pradesh	Odisha	
Location/ Region	Dahej, Bharuch	Vishakhapatnam – Kakinada	Paradeep
Date of Approval	Feb, 2009	Feb, 2009	Dec, 2010
Date of MoA07.01.2010	01.10.2009	03.11.2011	
Total Area (Sq. kms.)	453.00	640.00	284.15
Processing Area (Sq.kms.)	248.00	270.00	123.00
Anchor Tenant	ONGC Petro Additions Limited (OPaL)	Yet to be finalized	Indian Oil Corporation Ltd. (IOCL)
Refinery / Cracker capacity in MMTPA	Cracker: Ethylene: 1.1 Propylene: 0.6	Yet to be finalized	15 (Greenfield refinery).
Anchor Project Status	Commissioned in March, 2017	Yet to be finalized.	Commissioned in February, 2016.
Amount of approved infra. projects (Rs. crore)*	NA	18,731.00	13,634.00
Gov share in form of VGF (Rs. crore)*	--	1206.80	716.00
Total proposed investments (Rs. crore)*	50,000	3,43,000.00	2,77,734.00
Investments made (Rs. Crore)	1,24,363	15,081	47,000
Projected employment (No.)*	8,00,000	11,98,000	6,48,000
Employment generated (No.)	2,38,000	1,39,627	40,000
Status of Master Plan notification	Development Plan sanctioned.	Field Studies, village level consultations completed. Once the Anchor unit finalizes location, configuration and capacity of the Cracker Complex etc., Master Plan will be finalized.	Preparation of Master Plan is in process.
Status of EIA	Environmental Clearances Coastal Region Zone received	Environmental Clearances, EIA Studies, Collection of Baseline Data etc completed. Once the Master Plan finalized based on location, configuration and capacity of the Cracker Complex the public hearing will be conducted and will be processed for Environmental Clearance.	The draft EIA & EMP Report has been prepared based on the fresh ToR issued by MoEF&CC and same has been submitted to Odisha SPCB for the conduct of hearing in Jagatsinghpur & Kendrapara District. Public hearing for both the districts has been completed and preparation of the Final comprehensive EIA & EMP Report is progress.

\* At the approval stage of the projects.

## Status of Implementation of PCPIRs

### 4.9 Gujarat PCPIR:

- Gujarat PCPIR has been notified under the Gujarat Special Investment Region (GSIR) Act, 2009. It is strategically positioned to the east of Delhi-Mumbai Industrial Corridor (DMIC) and near the western coastline of India.
- The Gujarat Infrastructure Development Corporation (GIDC) has made an investment of around Rs.17,317 crore for infrastructure development in the PCPIR.
- The Anchor Tenant, viz. M/s ONGC Petro additions Ltd. (OPaL), has set up a dual feed cracker complex at Dahez SEZ with a production capacity of 1.1 million ton/ annum (MMTPA) ethylene and 0.6 MMTPA of propylene, along with the matching capacities downstream polymer processing unit (polyethylene and polypropylene). The proposed investment by Anchor Tenant-OPaL is Rs.27,110 crore. The Anchor tenant has incurred an amount of INR Rs.30,826 crore so far project execution and commissioning. The project has been commissioned in 1st week of March, 2017.
- Ministry of Environment, Forest and Climate Change (MoEF&CC) has granted Environment and Coastal Region Zone (CRZ) clearance on 14.09.2017 for an area of 44445.18 hectare for development of Gujarat PCPIR.

### Following important activities has been proposed to be performed in year 2022-23:

- i. Draft Town Planning (T.P.) Scheme no. 5 & 14 have been sanctioned by GIDB/Apex Authority.
- ii. Construction of 1st phase of Town Planning Scheme roads of T.P. No 1 & 2 is commenced
- iii. Town Planning officer is appointed for finalization of Draft TP Scheme No 1, 2, 5 & 14.
- iv. Tentative proposals of preliminary T. P. Scheme No. 2B & 14 has been approved by the Apex Authority/GIDB.
- v. GIDB/Apex Authority has issued consultation for proposal before award declaration for preliminary T. P. Scheme No. 1 & 2A
- vi. Demarcation of Final plots has been completed of T. P. Scheme No. 2A.
- vii. Agency has been appointed for preparation of Detailed Project Report (DPR) for implementation of 150 mt and 120 mt escape route and implementation of infrastructure development of Draft T. P. Scheme No. 1, 2, 5 & 14. Draft DPR has been submitted for 150 MT and 120 MT escape route.
- viii. Action plan for conservation of mangroves and mudflats as a part of Environmental Clearance has been prepared.

### 4.10 Andhra Pradesh PCPIR:

- Special Development Authority (SDA) was formed by Government of Andhra Pradesh in May, 2008 to develop the AP PCPIR.
- AP PCPIR covers 6 existing SEZs. The committed investment in AP PCPIR is around Rs.51,481 crore. Investment of Rs.1948.61 crore approx. has been made on infrastructure development.

- Hindustan Petroleum Corporation Limited (HPCL) and GAIL have conducted pre-feasibility study. Discussions are going on between Government of Andhra Pradesh and M/s HPCL & GAIL on Viability Gap Funding and other support / incentives.
- Road, rail link, water supply, effluent treatment and marine outfall projects are under different stages from study to implementation.

#### **4.11 Odisha PCPIR:**

- Detailed Master Plan for industrial development of PCPIR area shall be prepared by PCPIR Authority. Preparation of Master Plan and Zonal Plans for the Paradip PCPIR in reference to the Odisha Development Authorities Act, 1982, is under progress. Preliminary site assessment by identifying the existing status of development and infrastructure, all field survey/demand assessment, stakeholders consultation, base map for PCPIR in 1:20000 scale combining all village maps, vision and Conceptual Master Plan is completed. Draft Master Plan shall be finalized after notification of the Final Master Plan.
- Indian Oil Corporation's is the anchor tenant (MOA signed with Government of Odisha in 2011) having developed 15 MMTPA crude oil refinery (already operational) integrated with petrochemical complex for production of paraxylene, polypropylene, MEG and petcoke.
- Detailed Environmental Impact Assessment (EIA) is being undertaken by Environmental Protection Training and Research Institute (EPTRI), Hyderabad. This study will ascertain the actual number of displacement. Accordingly, rehabilitation will be taken up as per Odisha Resettlement and Rehabilitation Policy, 2006. Terms of Reference (ToR) have been received from Ministry of Environment, Forest and Climate Change (MoEF&CC). The draft EIA & EMP report has been prepared based on the fresh ToR issued by MoEF&CC submitted to Odisha State Pollution Control Board for public hearing.
- Public hearing for both the districts i.e. Jagatsinghpur and Kendrapara has been completed and preparation of the final comprehensive EIA & EMP report is in progress. After completion of the final comprehensive EIA & EMP report, the same will be submitted to MoEF&CC for obtaining Environment Clearance.

#### **4.12 Tamil Nadu PCPIR**

- An area of about 23,000 Hectares of land covered in 45 villages in Cuddalore and Nagapattinam Districts were declared as "Local Planning Area" for the proposed PCPIR, vide Govt. G.O. (Ms) No.108, H&UDD, Dated 20.06.2017.
- Government of Tamilnadu has cancelled the declaration of "local Planning Area" vide Govt. G.O. (Ms) No 36, H&UDD, Dated 21.02.2020 and the same has been published in Tamil Nadu Govt., Gazette dated 21.02.2020.

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## CHAPTER – 5

## NEW SCHEMES OF PETROCHEMICALS

The Department of Chemicals and Petrochemicals is implementing the following schemes under the National Policy on Petrochemicals:-

- i. Setting up of Plastic Parks
- ii. Setting up of Centres of Excellence in Polymer Technology
- iii. National Petrochemicals Awards reviewed/revised & renamed as Petrochemicals Research & Innovation Commendation Scheme from January 2023

#### Setting up of Plastic Parks

- 5.1 The scheme aims at setting up of need based plastic parks, an ecosystem with state-of-the-art infrastructure and enabling common facilities through cluster development approach, to consolidate and synergize the capacities of the domestic downstream Plastic Processing Industry. The larger objective of the scheme is to contribute to the economy by increasing investment, production, export in the sector and also generation of employment.
- 5.2 Under the scheme, the Government of India provides grant funding up to 50% of the project cost, subject to a ceiling of Rs.40 crore per project. The remaining project cost is funded by the State Government or State Industrial Development Corporation or similar agencies of State Government, beneficiary industries and loan from financial institutions.
- 5.3 Under the Scheme, 10 Plastic Parks have been approved in the States of Madhya Pradesh (two), Odisha, Jharkhand, Tamil Nadu, Uttarakhand, Chhattisgarh, Assam, Uttar Pradesh and Karnataka. These parks are under various stages of implementation as per following details:

Location of Plastic park	Final Approval	Land area (Acre)	Total Project Cost (Rs cr)	Total Gol grant-in-aid approved for project (Rs cr)	Gol grant-in-aid released till December, 2022 (Rs. Cr)	Total no. of plots
Tamot, Madhya Pradesh	09.10.2013	122	108.00	40.00	35.90	155
Jagatsinghpur, Odisha	09.10.2013	120	106.78	40.00	36.00	80
Thiruvallur, Tamil Nadu	05.09.2019	240	216.92	40.00	22.00	65
Tinsukia, Assam	21.02.2014	173	93.65	40.00	35.73	104
Deoghar, Jharkhand	20.12.2018	93	67.33	33.67	30.30	107
Bilaua, Madhya Pradesh	20.12.2018	93	68.72	34.36	30.91	107

Location of Plastic park	Final Approval	Land area (Acre)	Total Project Cost (Rs cr)	Total Gol grant-in-aid approved for project (Rs cr)	Gol grant-in-aid released till December, 2022 (Rs. Cr)	Total no. of plots
Sitarganj, Uttrakhand	03.12.2020	40	67.73	33.9	18.64	45
Sarora, Chhattisgarh	13.04.2021	47	42.09	21.04	4.21	55
Ganjimutt, Karnataka	21.01.2022	112	62.78	31.38	NIL	53
Gorakhpur, Uttar Pradesh	13.07.2022	88	69.58	34.79	NIL	92

### Setting up of Centres of Excellence (CoE) in Polymer Technology

- 5.4 The scheme aims at improving the existing petrochemicals technology and research in the country and to promote development of new applications of polymers and plastics. In phase-I of the Scheme implemented up to the 2017, the Government of India provided financial support to the extent of maximum of 50% of the total cost of the project subject to an upper limit of Rs.6 Crore over a period of 3 years. The Scheme was extended upto year 2020 with modified guidelines in 2016-17, which aim at promoting applied research and technology transfer from Lab to Industry.
- 5.5 So far, 13 Centres of Excellence (CoE) within the premises of reputed educational/research institutes approved and established as per following details:-

S. No	Name of the institute where Centre of Excellence (CoE) has been established	Title of Centre of Excellence	Total Project Cost (Rs in crore)	Gol grant-in-aid approved (Rs in crore)
1	National Chemical Laboratory, Pune	Sustainable Polymer Industry to research & innovation	12.00	6.00
2.	Central Institute of Plastics Engineering & Technology, Chennai	Green Transport Network (GREET)	18.98	6.00
3.	Central Institute of Plastics	Engineering & Technology, Bhubaneswar Sustainable Green Materials	15.045	6.00
4.	Indian Institute of Technology, Delhi	Advanced Polymeric Materials	12.00	6.00
5.	Indian Institute of Technology, Guwahati	Sustainable Polymers (Sus-Pol)	14.74	6.00
6.	Indian Institute of Technology, Roorkee	Process Development, Wastewater Management in Petrochemical Industries	13.13	4.40
7.	Central Institute of Plastics Engineering & Technology, Bhubaneswar	Bio-engineered Sustainable Polymeric Systems	10.01	5.00

S. No	Name of the institute where Centre of Excellence (CoE) has been established	Title of Centre of Excellence	Total Project Cost (Rs in crore)	GoI grant-in-aid approved (Rs in crore)
8.	National Chemical Laboratory, Pune	Specialty Polymers for Customized Additive Manufacturing	5.60	2.80
9	CSIR-IICT, Hyderabad	Polymer Coatings for Decorative, Protective and Strategic Applications	9.72	4.86
10	CSIR-NEIST Jorhat- Assam	Polymers, Their Composites and Polymeric Membranes for Sustainable Development of Petroleum Industries	24.75	4.99
11	CIPET, Chennai	Manufacturing of Next Generation Bio-Medical Devices	10	5
12	IRMRA, Thane	Design and Development for Value added Toys of Rubber and Allied Finished Products	9.86	4.93
13	IIT, Guwahati	Sustainable & innovative Design and manufacturing of polymer-TOYS (SUNDAR - TOYS)	10.59	5.00

#### 5.8 Petrochemicals Research & Innovation Commendation Scheme

In accordance with the decision taken during the meeting held in connection with "Transformation and Decoration of Awards" on 13.10.2022 under the chairmanship of Union Home Secretary, with the consent of the Hon'ble Minister (Chemicals & Fertilizers), the scheme of "National Petrochemical Awards" has been reviewed/ revised. The name of the scheme has been changed from "National Petrochemicals Award" to "Petrochemicals Research and Innovation Commendation Guidelines" scheme. The salient changes are as below:

Clause	Old Guidelines	Revised Guidelines
Name of the Scheme	National Petrochemicals Award	Petrochemicals Research & Innovation Commendation Guidelines
Cash Prize	Rs.3 lakhs each for Winners & Rs.1 lakh each for Runner-Ups	No Cash awards will be given and instead only a Citation & Memento will be provided
Expert Committee & Its Chairperson	The Expert Committee would be headed by Director General, CIPET	The Committee will now be known as the Screening Committee with Joint Secretary (PC) as its chairperson and DG/Director of the implementing institute as Member Secretary
Prize Awards Committee (PAC) & Its Chairperson	The PAC would be headed by JS (PC)	The Committee will now be called as the Commendations Approval Committee (CAC) and it will be chaired by the Secretary (C&PC)
TA/DA to awardees	No TA/DA will be provided to the recipients	The expenses related to the travelling and boarding & loading of the recipients will be provided by the implementing agency

Clause	Old Guidelines	Revised Guidelines
Category for Lifetime achievement	A separate Special Award (of Rs.5 lakhs cash award along with memento and citation) for the life time achievement in Petrochemicals and allied sectors.	The category has been dropped along with the category for best employer in Petrochemicals Sector

In the revised scheme two categories have been excluded namely (i) Lifetime Achievement (ii) Best Employer. The cash prizes are also discontinued. The Guidelines of "Petrochemicals Research and Innovation Commendation" are available at the website <http://chemicals.gov.in>.

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## CHAPTER – 6

## INTERNATIONAL CONVENTIONS AND TREATIES

**Chemical Weapons Convention (CWC)**

- 6.1 India is a signatory and party to the Chemical Weapons Convention (CWC) administered by Organization for the Prohibition of Chemical Weapons (OPCW) with headquarter at The Hague, Netherlands. The Convention is a universal, non-discriminatory, multi-lateral, disarmament treaty which prohibits the development, production, stock-piling and use of chemical weapons and monitors its elimination in order to secure chemical weapons free world. India signed the treaty at Paris on 14th January, 1993. India, pursuant to provisions of the Convention enacted the Chemical Weapons Convention Act, 2000. As on date, 193 countries are parties to the Convention. India was the First State Party to secure the distinction of chemical weapon free state Party by destructing all its stockpile of its chemical weapons amongst all State Parties of the Convention.
- 6.2 The Department of Chemicals & Petrochemicals is the administrative Department for CWC Act, 2000. Chemical Weapons Convention Act, 2000 is in force in the country w.e.f. 1st July 2005. The National Authority for Chemical Weapons Convention (NACWC) has been set up as an office of the Cabinet Secretariat, Government of India in 1997 to fulfil, on behalf of the Government of India, the obligations under the Chemical Weapons Convention and to act as the national focal point for effective liaison with the Organization for the Prohibition of Chemical Weapons (OPCW) and other State Parties on matters relating to the Convention.
- 6.3 Three Schedules of the chemicals which have been annexed to the Convention are required to be declared and are given as follows:
- Schedule-1 Chemicals (16 Chemicals) (i.e. Chemical Weapons);
  - Schedule-2 Chemicals (14 Chemicals) (i.e. precursors to Chemical Weapons);
  - Schedule-3 Chemicals (17 Chemicals) (i.e. dual use chemicals).

**Rotterdam Convention**

- 6.4 Rotterdam Convention on Prior Informed Consent Procedures (PIC) that entered into force on 24th February, 2004, is a legally binding instrument, which was adopted on 10th September 1998 by a Conference of Plenipotentiaries in Rotterdam. India acceded to the Convention on 24.05.2006.
- 6.5 The Convention seeks to promote shared responsibility and cooperative efforts among state parties in the international trade of certain hazardous chemicals in order to protect human health and the environment from potential harm. It also seeks to contribute to the environmentally sound use of these hazardous chemicals by facilitating information exchange about their characteristics, providing for a national decision making process on their import and export, and by disseminating these decisions to the Parties.
- 6.6 Each Party is required to designate a National Authority for performing the administrative

functions required under the Convention. Department of Chemicals and Petrochemicals is the Designated National Authority (DNA) for industrial chemicals and Department of Agriculture and Farmer's Welfare is the DNA for pesticides.

- 6.7 There are a total of 54 chemicals listed in Annexure-III, 35 pesticides (including 3 severely hazardous pesticide formulations), 18 industrial chemicals, and 1 chemical in both the pesticide and the industrial chemical categories (**list is enclosed as Annexure-III**). The parties are required to communicate their import policy for these chemicals to the PIC Secretariat. The exporting Party has to provide the export notification to the importing Party in respect of banned or severely restricted chemicals in the importing country. The export notifications received from other Parties for industrial chemicals are examined by Department of Chemicals and Petrochemicals, being the DNA for industrial chemicals, and acknowledgment/ reply is sent to the DNA of the exporting country. In the year 2022 Department of Chemicals and Petrochemicals has processed nearly 125 export notifications received under Rotterdam Convention.

### Stockholm Convention

- 6.8 The Stockholm Convention, ratified by India on 13.01.2006, is a global treaty to protect human health and environment from Persistent Organic Pollutants (POPs). POPs are chemicals that remain intact in the environment for long periods, become widely distributed geographically, accumulate in the fatty tissue of living organisms and are toxic to human beings and wildlife. POPs travel globally and can cause damage wherever they travel. The Convention that entered into force on 17th May, 2004, lays down that in its implementation, Governments will take measures to eliminate or reduce the release of POPs into the environment.
- 6.9 The Stockholm Convention seeks the elimination or restriction of production and use of all intentionally produced POPs (industrial chemicals and pesticides). The Convention also seeks the continuing minimization and wherever feasible, ultimate elimination of the releases of unintentionally produced POPs such as dioxins and furans. At present, 35 chemicals are covered under the Stockholm Convention, of which use of DDT is restricted in India. Use of DDT is banned for agricultural purposes; it is produced in a restricted manner for use in vector control only, as India has obtained exemption for use of DDT for vector control.
- 6.10 Stockpiles and wastes containing POPs must be managed and disposed of in a safe, efficient and environmentally sound manner, taking into account international rules, standards and guidelines. Each country is required to develop a plan for implementing its obligations under the Convention. A Global Environment Facility (GEF) has been set up as an interim financial mechanism, to assist the developing countries in implementation of the Convention.
- 6.11 For the chemicals under review of Stockholm Convention, this Department put forwards its stand to Ministry of Environment & Climate Change for further stand in Convention.

### Special Chemicals, Organisms, Materials, Equipment and Technologies (SCOMET)

- 6.12 In Foreign Trade Policy, dual-use items have been given the nomenclature of Special Chemicals, Organisms, Materials, Equipment and Technologies (SCOMET). Export of dual-use items and technologies under India's Foreign Trade Policy is regulated. Special Chemicals, Organisms, Materials, Equipment and Technologies (SCOMET) shall be permitted only against an export

authorisation issued in this behalf unless export is prohibited or is permitted without authorisation subject to fulfilment of conditions, if any, as indicated under/against any specific category or item. Export Policy relating to SCOMET items is mentioned in Appendix 3 of Schedule 2 of ITC (HS) Classification and Paragraph 2.49 of Hand Book of Procedures Vol. –I, 2009-14.

- 6.13 Directorate General of Foreign Trade under Ministry of Commerce and Industry, is the nodal organization for handling the matters related to SCOMET. Department of Chemicals and Petrochemicals is amongst the Inter-ministerial Working Group members for providing inputs/comments on applications filed under SCOMET items specifically related to Chemicals.
- 6.14 In the list of Special Chemicals, Organisms, Materials, Equipment and Technologies (SCOMET) items as appearing in Appendix 3 of Schedule 2 of ITC (HS) Classification, SCOMET items are listed under eight (8) categories as follows:

**Category 0: Nuclear materials, nuclear-related other materials, equipment and technology**

- 0A Prescribed Substances
- 0A1 Source Material
- 0A2 Special Fissionable Material
- 0A3 Other Materials
- 0B Prescribed Equipment
- 0C Technology

**Category 1: Toxic chemical agents and other chemicals**

- 1A Prohibited chemicals
- 1B Chemicals permitted only to States party to the Chemical Weapons Convention
- 1C Chemicals permitted also to States not party to the Chemical Weapons Convention
- 1D Other Chemicals

**Category 2: Micro-organisms, toxins**

- 2A Bacteria
- 2B Fungi
- 2C Parasites
- 2D Viruses
- 2E Rickettsials
- 2F Toxins

- 2G Plant pathogens
- 2H Genetically Modified Organisms

**Category 3: Materials, Materials Processing Equipment and related technologies**

- 3A Materials
  - 3A1 Special materials
  - 3A2 Structural materials
  - 3A3 Rocket propellants and constituent chemicals
  - 3A4 High explosives
  - 3A5 Stealth materials
- 3B Materials processing and production equipment, related technology and specially designed components and accessories therefor.
- 3C [Reserved]
- 3D Chemical and biomaterial manufacturing and handling equipment and facilities

**Category 4: Nuclear-related other equipment and technology, not controlled under Category 0**

- 4A Equipment, assemblies, components including test and production equipment
- 4B Equipment, assemblies, components including test and measurement equipment usable in development of nuclear explosive devices
- 4C Technology

**Category 5: Aerospace systems, equipment, including production and test equipment, related technology and specially designed components and accessories therefor.**

- 5A Rocket systems
  - 5A1 Systems
  - 5A2 Production and test equipment
  - 5A3 Technology
- 5B Unmanned aerial vehicles
- 5C Avionics and navigation systems
- 5D Manned-aircraft, aero-engines, related equipment and components
- 5E Micro-light aircraft and powered 'hang-gliders'

**Category 6: Munition List**

**Category 7: Electronics, computers, and information technology including information security**

- 7A Electronics
- 7B Electronic test equipment
- 7C Computers
- 7D Information technology including information security
- 7E [Reserved]

**Category 8: Special Materials and Related Equipment, Material Processing, Electronics, Computers, Telecommunications, Information Security, Sensors and Lasers, Navigation and Avionics, Marine, Aerospace and Propulsion.**

During the year 2022, Department of Chemicals and Petrochemicals has given its recommendations to DGFT on 80 SCOMET applications so far.

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## CHAPTER – 7

## BHOPAL GAS LEAK DISASTER

- 7.1 On the intervening night of 2nd and 3rd December, 1984 "Methyl Iso-cynate " (MIC), a lethal gas stored in two tanks of Union Carbide Pesticide Factory at Bhopal Leaked in the atmosphere resulting in industrial mass disaster unparalleled in its magnitude and causing serious injuries to a large number of population of Bhopal city, also resulting in immediate death toll of thousands of human lives. Various relief and rehabilitation measures initiated immediately after the disaster are still continuing.

**Adjudication of Compensation Claims**

- 7.2 Several suits were filed for compensation and damage in different Courts in India, prosecution was launched. The Government of India enacted Bhopal Gas Leak Disaster (Processing of Claims) Act, 1985. The Act came into force on 20th February, 1985. It empowered the Union of India to take over the conduct of all litigation in regard to claims arising out of gas disaster and to award compensation to the victims and affected persons. Under this Act, the Government has framed a scheme known as the Bhopal Gas Leak Disaster (Registration and Processing of Claims) Scheme, 1985 for registration, processing determination of compensation to each claim and appeals, if any, arising therefrom. Under this Act, the Office of the Welfare Commissioner, Bhopal Gas Victims, was set up by the Government of India for speedy adjudication and award/disbursement of compensation to the survivors and families of the victims of the gas leak disaster.
- 7.3 Looking to the magnitude of the human suffering that occurred due to BGLD, Hon'ble Supreme Court of India passed a settlement order dated 14th and 15th February, 1989 directing the Union Carbide Corporation to pay a sum of US\$ 470 million, which was deposited by the Company with the Registrar of the Supreme Court of India, in 1989.

**Original Compensation**

- 7.4 The actual disbursement of the compensation started from 1992 and the Office of the Welfare Commissioner awarded/disbursed Rs.1549.33 Crore as compensation in settled cases of 5,74,393 claimants belonging to the categories of death, permanent disability, temporary disability, injury of utmost severity cases, minor injury, loss of property/PSU and loss of livestock till December, 2022.

**Pro-rata Compensation**

- 7.5 The Supreme Court vide order dated 19th July, 2004, had directed the Welfare Commissioner to disburse the balance amount of approximately Rs.150000 crore, which had accumulated with the Reserve Bank of India on account of accrual of interest and exchange rate variation, on pro-rata basis (in the ratio of 1:1 of Original Compensation) to the claimants whose cases had been settled. The distribution of pro-rata compensation started from November, 2004. A sum of Rs.1517.93 Crore as Pro-rata Compensation has been awarded in 56,3132 cases till December, 2022. The work of disbursal of Pro-rata Compensation is continuing.

## Disbursement of Ex-gratia

- 7.6 On the recommendations of the Group of Ministers (GoM) constituted on Bhopal Gas Leak Disaster, the Government took certain decisions to provide further relief and rehabilitation to the gas victims in the year 2010. One of the major decision taken by the Government was to pay Ex-gratia to the following categories of gas victims:

**Categories of Ex-gratia payments to Gas victims**

Category	Scale of Ex-gratia
Death	Rs.10 lakh (less amount already received)
Permanent disability	Rs.5 lakh (less amount already received)
Injury of utmost severity	Rs.5 lakh (less amount already received)
Cancer	Rs.2 lakh (less amount already received)
Total Renal Failure	Rs.2 lakh (less amount already received)
Temporary disability	Rs.1 lakh (less amount already received)

- 7.7 An amount of Rs.940.50 Crore has been approved by the Government for disbursement of Ex-gratia amongst the above categories of victims. The Office of the Welfare Commissioner has commenced disbursal of Ex-gratia to the Gas Victims on 19th December, 2010. A total No. of 63,917 cases have been decided and an amount of Rs.875.79 Crore has been disbursed in awarded cases till December, 2022.

## Rehabilitation of Bhopal Gas Victims (Action Plan)

- 7.8 An amount of Rs.102 crore was sanctioned by the Government of India for relief, rehabilitation and financial assistance to victims of gas tragedy from 1985 to 1989.
- 7.9 In 1990, Government of India approved 5-years Action Plan of the State Government of Madhya Pradesh with a capital outlay of Rs.163.10 Crore for the Medical, Economic, Social and Environmental rehabilitation of the Bhopal Gas victims. The outlay was subsequently revised upwards to Rs.258 crores. It was decided that the Action Plan was to be shared by the Government of India and State Government of Madhya Pradesh (GoMP) in the ratio of 75:25 and implemented by the GoMP. The Action Plan was implemented from 1990 to 1999 this involved creation of infrastructure for providing relief and rehabilitation to the gas victims against this approved plan, GoMP spent an amount of Rs.1229.37 crore. The major component of the Action Plan was Medical Rehabilitation which included establishment of six full-fledged Gas Relief hospitals and also dispensaries for free treatment of gas victims.
- 7.10 Further, in April, 2006, an amount of Rs.14.18 Crore was provided by Government of India under Jawaharlal Nehru National Urban renewal Mission (JNNURM) for supply of piped drinking water to 14 localities around UCIL plant site where the ground water is not potable.
- 7.11 GoMP had submitted to Group of Ministers (GoM) in April 2008, a new Memorandum on New Plan of Action with an outlay of Rs.982.75 crore for various rehabilitation measures to be taken for

Bhopal Gas Victims. On the recommendations of the GoM, the Government approved a sanction of Rs.272.75 crore shared between the Central Government and GoMP in the ratio of 75:25 for implementation of New Plan of Action, 2010. A sanction of Rs.272.75 Crore was released by the Ministry of Finance, Department of Expenditure to the GoMP on 08/07/2010 'On Account' payment of Additional Central Assistance (ACA) for other projects (Grant Component) for State's Annual Plan 2010-2011.

- 7.12 GoMP is in the process of implementation of various rehabilitation schemes as approved in the New Plan of Action 2010. The GoMP has apprised that an amount of Rs.139.10 crore has been utilized against the approved plan of Rs.272.75 crore.

### **Social Rehabilitation**

- 7.13 Government of India allocated an amount of Rs. 30.0 Cr. for providing a pension of Rs.1000 per month to 5000 Widows of Gas Victims for a period of five years. GoMP extended this scheme for another 2 years on account of the interest earned on this amount. GoMP has disbursed widows' pension to 4,995 beneficiaries.
- 7.14 GoMP had provisioned an amount of Rs.5.40 Crore in financial year 2021- 2022 for Rs.1000 per month of kalyani widow pension from the State budget. An amount of Rs.5.30 Crore was incurred during the year 2021-22. During the year 2022-23, an amount of Rs.5.40 Crore has been allocated for the purpose, out of which an amount of Rs.2.10 Crore has been incurred till September 2022.

### **Medical Rehabilitation**

- 7.15 Out of Rs.272.75 Crore, a sum of Rs.33.55 Crore was allotted for Medical Rehabilitation. The work of construction and renovation of Hospital Buildings were completed. GoMP had utilized a fund of Rs.16.32 Crore and sought an administrative approval to utilize the unspent balance fund of Rs.17.23 Crore under Medical Rehabilitation for execution of certain new items of work such as Renovation of Civil work for modular OT for four Hospitals namely Indira Gandhi Mahila evam Balya Chikitsalaya, Khan Shakir Ali Khan Hospital, Jawahar Lal Nehru Hospital & Kamla Nehru Hospital, Establishment of central oxygen supply plant for Jawahar Lal Nehru Hospital, Shakir Ali Khan Hospital & Indira Gandhi Mahila evam Balya Chikitsalaya, Reconstruction of Polyclinic/Dispensary at Rukama Bai, Ashokagarden, Ibrahimganj and Bagumrao Dulha, Replacement of Two number of passenger at Kamla Nehru Hospital and One number of lift at Indira Gandhi Mahila evam Balya Chikitsalaya, Gas Rahat, Bhopal and construction of Bone Marrow Transplant centre and Procurement of equipment at Kamla Nehru Hospital.
- 7.16 Renovation of Civil work for modular OT at Indira Gandhi Mahila evam Balya Chikitsalaya (financial provision for the same is Rs.1.33 Crore), Shakir Ali Khan Hospital (financial provision for the same is Rs.1.19 Crore) and Jawahar Lal Nehru Hospital (financial provision for the same is Rs.1.37 Crore) is completed. Work order for Renovation of Civil work for modular OT at Kamla Nehru Hospital has been issued. Financial provision for the same is Rs.2.81 Crore.
- 7.17 Establishment of central oxygen supply plant at Indira Gandhi Mahila evam Balya Chikitsalaya (at 113 oxygen bed), Jawahar Lal Nehru Hospital (at 71 oxygen bed) and Shakir Ali Khan Hospital (at 60 oxygen bed) has been completed. The financial provision for these facilities is Rs. 1.11 Crore.

- 7.18 Work order for reconstruction of Polyclinic/Dispensary at Rukma Bai and Ashoka Garden is issued. Letter of acceptance (LOA) for reconstruction of Ibrahimganj and Bagumrao Dulha Dispensary is issued. The financial provision for these facilities is Rs.4.39 Crore.
- 7.19 Two new lifts has been installed at Kamla Nehru Hospital. The financial provision for these facilities is Rs.68.00 lakh. Installation of one lift at Indira Gandhi Mahila evam Balya Chikitsalaya is completed. The financial provision for these facilities is Rs.34.00 lakh.
- 7.20 Out of unspent amount of Rs.17.23 Crore issued under Medical Rehabilitation program, an amount of Rs.7.81 Crore is utilized in Gas Relief hospital upgradation and renovation work.
- 7.21 During Financial year 2021-22, work order for reconstruction of 4(four) Polyclinic/ Dispensary at Rukma Bai and Ashoka garden is issued. Letter of Acceptance (LOA) for reconstruction of Ibrahimganj and Bagumrao Dulha Dispensary is issued. The financial provision for these facilities is Rs.4.39 Crore.

### **Economic Rehabilitation**

- 7.22 For ensuring employment to the gas victims, GoMP had selected 21 institutes through a transparent procedure, for providing training in different trades to the gas victims. The State Government had provided training to 12,355 gas victims beneficiaries under different traits. Initially, this programme was successful but later on it has not been resultant as desired. As the scheme was not attractive, GoMP has submitted a proposal seeking approval for an amount of Rs.25.12 Crore from the unspent balance of Rs.85.87 Crore under Economic Rehabilitation scheme, for the purpose of providing self-employment to the beneficiaries of gas victims under "Mukhyamantri Swarojgar Yojna" (Chief Minister Self Employment scheme) which include Rs.1.00 crore for component of appropriate/relevant training. Necessary administrative approval in this regard was accorded by the Department to the GoMP to implement the scheme.
- 7.23 An amount of Rs.1.00 core has been disbursed to 108 beneficiaries of "Mukhyamant Swarojgar Vojna" (Chief Minister Self Employment scheme).

### **Environmental Rehabilitation**

- 7.24 Out of Rs.50 crores allocated for providing clean drinking water to the gas victims, GoMP utilized the entire fund for providing safe drinking water in Gas affected area.

### **Environmental Remediation of the erstwhile Union Carbide India Ltd. (UCIL) Plant site.**

- 7.25 An industrial disaster occurred in the night of 2nd/3rd December, 1984 when Methyl Iso-cyanate (MIC), a lethal gas stored in two tanks of Union Carbide India Limited (UCIL)'s pesticide unit at Bhopal, leaked into the atmosphere causing thousands of deaths and injuring a large number of people.
- 7.26 The erstwhile Group of Ministers (GoM) constituted to examine all the issues related to the Bhopal Gas Leak Disaster, in the meetings held during 18th to 21st June, 2010, made comprehensive recommendations on all aspects including remediation and disposal of 350 MT (approx.) hazardous waste lying at the premises of former Union Carbide India Ltd. (UCIL) factory at Bhopal.

- 7.27 As per Union Cabinet's decision taken in the year 2010, the Govt. of Madhya Pradesh (GoMP) is responsible for undertaking disposal of hazardous wastes and remediation of the erstwhile UCIL plant at Bhopal. As per cabinet's decision, an Oversight Committee was constituted in the Ministry of Environment, Forest and Climate Change to provide oversight and support to the GoMP in taking the necessary remedial actions. As per the direction given by the Hon'ble Supreme Court in the matter of SLP (Civil) No. 9874 of 2012 Uol vs. Alok Pratap Singh and Others, 10 MT of erstwhile UCIL waste was successfully incinerated at common Hazardous Waste Incinerator at Pithampur, Madhya Pradesh by Central Pollution Control Board (CPCB) during August 13-18, 2015.
- 7.28 In February, 2022, Govt. of Madhya Pradesh (GoMP) floated tender for disposal of remaining 337 MT (approximate) of hazardous waste lying at UCIL factory site. After the technical and financial evaluation of the tender, GoMP has forwarded the proposal for disposal of toxic waste to Department of Chemicals & Petrochemicals. As per the decision of Cabinet, the proposal is to be endorsed by the Oversight Committee before requesting Department of Expenditure for release of funds. The proposal received from GoMP has been forwarded to M/o EF&CC on 30th March 2022 for consideration and endorsement by Oversight Committee. The proposal is under consideration of the Oversight Committee.

#### **Status of Curative Petition**

- 7.29 On the direction of the Cabinet, a Curative Petition No.345-347 was filed in December 2010 by Union of India v/s Union Carbide Corporation (UCC), USA, Dow Chemicals, USA and Others claiming enhanced compensation from UCC and/or successor companies of UCC, by seeking a review of the Court's earlier judgment of 1989, settling the compensation amount at US \$470 million. The compensation claimed in the Curative Petition is due to the difference between the number of cases assumed by the Hon'ble Supreme Court at the time of passing the orders for settlement in 1989 and the actual number of cases awarded by the Office of the Welfare Commissioner, Bhopal Gas victim, Bhopal. The petition also claims reimbursement of costs incurred by the Government of India for various rehabilitation measures for victims and the amount required for environmental remediation. The matter is sub-judice. The case was listed on 11.10.2022. The Hon'ble Supreme Court has sought a joint compilation by the parties by 06.12.2022. The next date of hearing of the case is 10.01.2023.

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## Chapter – 8

**IMPROVING THE QUALITY OF CHEMICALS & PETROCHEMICALS  
& TRADE INTELLIGENCE****Mandatory BIS Standards for Chemicals & Petrochemicals**

- 8.1 Chemicals & Petrochemicals produced domestically and imported may contain impurities & may be hazardous to human health, safety & environment. These products while in use may not be meeting technical characteristics prescribed in the BIS Standards, presently being voluntary in nature for most of the products. It is, therefore, of paramount importance to improve quality of Chemicals/Petrochemicals produced in the country as well as to monitor the imported chemicals. With this objective, the Department initiated an exercise to make the Standards of Chemicals/Petrochemicals as mandatory to ensure that both the importers of such Chemicals to the country and domestic manufacturers meet the Bureau of Indian Standards (BIS) quality parameters. Such Chemicals/Petrochemicals shall bear the Standard Mark under a license to be obtained from BIS. This mechanism shall help in improving quality of these products as some countries may be dumping poor quality and spurious Chemicals/Petrochemicals into the country, which may not meet the quality parameters laid down by BIS Standards as at present.
- 8.2 Hence, this Department has initiated steps to make Standards as mandatory for major Chemicals/Petrochemicals, under Section 16 of the Bureau of Indian Standard Act, 2016 in the public interest or for:
- (i) Protection of human, animal or plant health
  - (ii) Safety of the environment
  - (iii) Prevention of unfair trade practices
  - (iv) Protection of National Security
- 8.3 With these measures, manufacturers and importers have to comply with BIS (Conformity Assessment) Regulations, 2018. Any person who contravenes the provisions of this Order is punished under the provisions of section 29 of the BIS Act, 2016. As per the provisions of mandatory Standards, the manufacturers of above Chemicals must conform to BIS Standards and bear the Standard Mark under license from BIS. This includes any imported material, for which the exporter based on foreign country has to apply for BIS license under Foreign Manufacturers Certification Scheme (FMCS).
- 8.4 Therefore, Department Chemicals & Petrochemicals has notified 61 Quality Control Orders (QCOs) (i.e. 33 for Chemicals and 28 for Petrochemicals) so far to make BIS Standards as mandatory under Bureau of Indian Standards Act, 2016.

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## CHAPTER – 9

## PUBLIC SECTOR UNDERTAKINGS

## HINDUSTAN ORGANIC CHEMICALS LIMITED (HOCL)

- 9.1 Hindustan Organic Chemicals Limited (HOCL) was incorporated on 12th December, 1960 as a Government company with the objective of setting up manufacturing capacities for chemicals / intermediates required for production of dyes, dyes–intermediates, rubber chemicals, pesticides, drugs and pharmaceuticals, laminates, etc. The company had two manufacturing units located at Rasayani (Maharashtra) and at Kochi (Kerala). The Rasayani unit (Chemical Complex) started production from 1970-71 and the Kochi Unit (Phenol Complex) commenced production from 1987-88. The Kochi unit has plants to manufacture Phenol, Acetone and Hydrogen Peroxide. After the implementation of restructuring plan for HOCL that was approved by the Government of India on 17.05.2017, Rasayani unit has been closed down except the strategically important Concentrated Nitric Acid (CNA)/ Di-nitrogen Tetroxide (N<sub>2</sub>O<sub>4</sub>) plant which has been transferred to the Department of Space/ISRO. The CNA/ N<sub>2</sub>O<sub>4</sub> plant is the only facility for production of N<sub>2</sub>O<sub>4</sub> in India which is used exclusively by ISRO in its rocket launching programme. HOCL has a subsidiary company, namely Hindustan Fluorocarbons Limited (HFL), located at Rudraram, Telangana, details regarding which are given further in this chapter.
- 9.2 HOCL's authorised and paid up share capital is Rs.370 crore and Rs.337.27 crore [comprising of Rs.67.27 crore equity and Rs.270 crore preference shares] respectively. Govt. of India holds 58.78% of the equity of the company and the preference shares in full. HOCL is listed on the Bombay Stock Exchange (BSE).
- 9.3 Following globalization and liberalisation of the Indian economy in the early 1990's resulting in competition from international players, HOCL incurred losses for the first time in 1997-98. Due to continued losses leading to negative net worth by 2003-04, the company was referred to erstwhile Board for Industrial & Financial Reconstruction (BIFR) in February, 2005. Based on the recommendations of Board for Reconstruction of Public Sector Enterprises (BRPSE), Govt. approved a revival package for the company in 2006.
- 9.4 However, the company again suffered losses in 2008-09 and 2009-10 mainly due to recessionary trend in the market as an effect of global meltdown. Though it earned profit during 2010-11, the situation worsened thereafter with losses during 2011-12 and 2012-13 mainly due to withdrawal of anti-dumping duties on its main products phenol and acetone. In order to enable the company to tide over its liquidity problems, the Govt. on 1st August, 2013 approved postponement of redemption of Rs.270 crore preference shares issued to the Govt. of India (date of allotment 24.01.2008), which was due for redemption from 2011-12 onwards, to 2015-16 onwards. The Govt. guarantee of Rs.100 crore was also further extended up to August, 2017.
- 9.5 Further, Govt. guarantee of Rs.150 crore was provided to HOCL in July, 2014 for issue of bonds by the company for meeting its working capital requirement and payment of liabilities towards raw material suppliers, employee dues, etc. This enabled the company to restore manufacturing operations at its Kochi and Rasayani units. However, the global fall in the prices of petroleum

products at that time caused severe crash in the prices of Phenol and Acetone and the company faced difficulties in selling the products at profitable rates and generating adequate working capital. This led to frequent shutting down of operations at both Kochi and Rasayani units thereby further aggravating the financial crisis of HOCL. Due to continuous losses and shortage of working capital, the company was not able to pay regular salary and statutory dues to the employees during 2015 to 2017. Following implementation of restructuring plan for HOCL, the plant operations of Rasayani unit have been closed down. The Phenol/Acetone plant at Kochi unit resumed operations from July, 2017 and is being operated regularly since then. HOCL Kochi unit received Suraksha Puraskar from National Safety Council Kochi among the large chemical industries category for the year 2020 and 2021.

## Financial Performance

- 9.6 Financial performance of HOCL in terms of turnover and net profit / loss for the last 5 years and net worth as on 31.3.2022 are given below:

(Rs. in crore)		
Year	Turnover	Net Profit / (Loss)
2017-18	242.33	(203.45)
2018-19	471.99	70.88
2019-20	300.01	(94.75)*
2020-21	411.57	15.97*
2021-22	433.67	(23.24)

*Net-Worth (as per new accounting standard Ind AS which includes revaluation of land and other assets) as on 31.03.2022: (+) Rs.53.23 Crore.*

*Net-Worth as per the Companies Act (excluding revaluation of land and other assets) as on 31.03.2022: (-) Rs.901.96 Crore.*

\*Re-stated as per Ind AS.

During the year 2021-22 the Company registered an increase of 8 % in Revenue compared to last year. The Phenol Plant at Kochi achieved a capacity utilization of 62 % during the year, as against 90% achieved in the previous financial year 2020-21. The Phenol Plant at Kochi was under shutdown during the period from 27.3.2021 to 25.07.2021 for change of Catalyst and from 16.11.2021 to 26.12.2021 due to unfavourable market conditions impacting the Turnover and Profit of the Company during the year. During 2022-23 (up to September, 2022), the company achieved turnover of Rs.263.76 crore.

## Covid Impact

- 9.7 There was no considerable financial impact on account of Covid-19 pandemic during the year ended 31.03.2022.

## Restructuring plan for HOCL

- 9.8 The Government of India on 17.05.2017 approved a restructuring plan for HOCL involving closing down operations of all the non-viable plants at Rasayani unit of HOCL, except N2O4 plant to be

transferred to ISRO on 'as is where is' basis, with about 20 acres of land and employees associated with the plant. The N2O4 plant is of strategic importance as it is the only indigenous source of N2O4 which is used as liquid rocket propellant by ISRO in the space launch vehicles. Financial implication of the restructuring plan is Rs.1008.67 crore (cash) which is to be met partly from sale of 442 acres HOCL land at Rasayani to Bharat Petroleum Corporation Ltd. (Rs.618.80 crore) and the balance through bridge loan from the Govt. The funds are to be used to liquidate the various liabilities of the company, including payment of outstanding salary and statutory dues of employees and repayment of Govt. guaranteed bonds of Rs.250 crore, and for giving VRS/VSS to the Rasayani unit employees except those retained as skeletal staff. The bridge loan amount, along with other Govt. liabilities of the company, is to be repaid to the Govt. from the disposal of remaining unencumbered land and other assets of Rasayani unit.

9.9 Status of implementation of restructuring plan of HOCL (as on 05.01.2023) is as follows:

- All plants of Rasayani unit, except N2O4 plant, have been closed down and disposed of. Closure of the unit under the provisions of Industrial Disputes Act, 1947 has also been approved by the Ministry of Labour & Employment.
- N2O4 plant has been transferred to ISRO along with 20 acres land and 131 employees associated with plant. The plant is being entirely operated by ISRO.
- Out of 442 acres land at Rasayani to be sold to BPCL, 289.69 acres have been sold for which HOCL received Rs.401.50 crore (net of TDS).
- Sale of 85.27 acres out of the additional 242 acres (+/- 10%) land approved by the Govt. for sale to BPCL has also been completed for consideration of Rs.135.81 crore (net of TDS).
- Lease transfer of 0.25-acre plot at Kharghar to NALCO completed for consideration of Rs.12.96 crore (net of TDS).
- Sale of 0.386 acre of land at Rasayani to IOCL for its Petrol Pump for consideration of Rs.74.25 lacs (net of TDS)
- BPCL has submitted Expression of Interest for the remaining 250+ acres unencumbered land at Rasayani but final offer is awaited. Mumbai Metropolitan Region Development Authority (MMRDA) vide their letter dated 9th September, 2020 have submitted their EoI for purchase of land at Rasayani and Panvel.
- Panvel land (7acres) was put up for e-auction on 24.4.2019 but no bid/offer was received. Further action will be taken by HOCL after NOC for sale of the land is received from State Govt.
- All the 10 flats at Nestle Apartments (Mumbai), closed down plants and utility blocks have been successfully e-auctioned through MSTC.
- Partially completed tank farm at JNPT has been handed over to JNPT and HOCL has received Rs.16.38 crore from JNPT.
- All the Rasayani unit employees have been separated through VRS/VSS except skeletal staff (7) for HOCL's corporate office. 23 employees who did not opt for VRS were transferred to the Kochi unit.

The outstanding salary and statutory dues of the employees of both Rasayani and Kochi unit have been cleared.

- Bridge loan of Rs.360.26 released by the Govt. in Aug.-Sept. 2017 has been utilized by HOCL to redeem the two Govt. guaranteed bonds totalling Rs.250 crore and for part payment of priority statutory dues (Rs.110.26 crore).
- 9.10. After implementation of restructuring plan, phenol / Acetone plant at Kochi unit, resumed regular operations from July 2017. This enabled HOCL Kochi unit to achieve net turnover of Rs.472 crore during 2018-19 (Rs.223 crore in 2017-18) a net profit of Rs.22 crore during 2018-19 (net loss of Rs.65.24 crore in 2017-18). HOCL has repaid outstanding Govt. of India loans (principal) of Rs.26.85 crore during 2019-20 and Rs. 15.56 crore during 2020-21 and Rs.14.04 crore during 2021-22.
- 9.11. In order to prevent dumping, the domestic phenol manufacturers, including HOCL, have represented to the DGTR, M/o Commerce & industry, for imposition / continuation of levy of anti-dumping duty / safeguard duty as per WTO Guidelines. Ministry of Commerce vide Gazette Notification ADD-(OI)02/2020 dated 20th August, 2020 has recommended imposition of provisional anti-dumping duty on import of phenol from USA and Thailand. However, it is informed that Ministry of Finance have not considered levying of provisional anti-dumping duty on import of phenol from USA and Thailand. After completion final hearing, Ministry of Commerce vide Gazette Notification dated 28th January, 2021 had recommended landed value of products from Thailand to be 990.83 US \$ and no Anti-dumping Duty against imports from USA. However, Ministry of Finance have rejected the recommendation of Commerce Ministry regarding Anti-dumping Duty on imports from Thailand. The Anti-dumping Duty on Acetone imports from Singapore, South Africa, USA and European Union has been extended upto 24th March, 2024. During the year 2021-22, the turnover was increased to Rs.412 crore and earned a net profit of Rs.15.97 crore. The turnover during the year has increased to Rs.434 crore during the year 2021-22 but incurred a loss of Rs.23.24 crore. This was due to the shutdown of Phenol plant from 27.3.2021 to 25.07.2021 for change of Catalyst and from 16.11.2021 to 26.12.2021 due to unfavourable market conditions. Even then, Profit earned before interest on GoI loan (taken for clearing old dues of Rasayani unit) was Rs.28.10 crore.
- 9.12. Rasayani unit has been successfully closed down as per the approved restructuring plan of HOCL, significant progress has also been made in the implementation of other aspect of the restructuring plan as given above. However, disposal of unencumbered land assets of HOCL at Rasayani have been delayed due to various reasons. So far out of total of approx. 684 acres of land approved by the Govt. for sale to BPCL, sale & registration of only about 375 acres have been completed. Sale of balance approx. 309 acres land has been affected by law & order situation due to protests by the local villagers to fencing of the purchased land by BPCL and their demand for compensation. The Committee under Divisional Commissioner, Konkan, constituted by the Maharashtra Govt. to address the concerns and demands of villagers in respect of HOCL land sale to BPCL has submitted its report to State Government. Govt of Maharashtra had granted permission for construction of compound wall on the land registered in favour of BPCL. It has been informed by BPCL that they have completed 98% of the work related to construction of compound.

A meeting held on 12.11.2021, between Secretary, MoPNG, Secretary, DCPC and Chief Secretary,

Govt. of Maharashtra regarding issues related to sale of HOCL land at Rasayani to BPCL and payment of compensation to villagers. On the meeting held on 12.11.2021, Collector Raigad had called a meeting on 17.11.2021, which was also attended by Hon'ble Guardian Minister, Govt. of Maharashtra, Hon'ble Member of Parliament, Principal Secretary (Relief & Rehabilitation) Govt of Maharashtra, representatives of farmers & villagers and HOCL officials. During the meeting it was discussed and decided that 12.5% will be paid as ex-gratia to the farmers doing cultivation on 219 acres of land and Rs.5 lacs per house along with plot for resettlement or Rs.14.17 lacs as full cash package to be paid to the 150 scattered houses within HOCL land. Accordingly, based on the meetings held on 12.11.2021 and 17.11.2021, Principal Secretary (Relief & Rehabilitation), Govt. of Maharashtra vide letter dated 22.12.2021 to Secretary Deptt. of Chemicals & Petrochemicals, Govt. of India have submitted their recommendation for payment of ex-gratia of 12.5% of Rs.1.42 crore per acre to the farmers who are doing farming in approximately 250 acres of land and Rs.5 lacs per house along with plot for resettlement or Rs.14.17 lacs as full cash package to be paid to the 150 scattered houses within HOCL land may be accepted by HOCL Board and Govt. of India.

The proposal for payment of amount to encroachers on HOCL land – farmers / villagers and payment towards relocation of scattered houses was put up to HOCL Board in its meeting held on 28th January, 2022. The Board after detailed discussions approved the proposal, subject to approval from Administrative Ministry and also subject to getting hindrance-free, peaceful advance possession of the entire 533 acres of Rasayani land of HOCL and construction of fence / compound wall along with adequate security to ensure that no encroachment on the said land takes place in future.

Sale of balance land approx. 250 acres will be taken up only after the above issues are resolved. NOC for the sale of 7 acre of Panvel land is awaited from Maharashtra Government.

DCPC vide Office memorandum dated 08.06.2022 had constituted a committee comprising Secretary DIPAM, Secretary DPE, Secretary DCPC, Chief Secretary / representative of Govt. of Maharashtra, CMD HOCL, CMD BPCL and CMD NBCC to address the land issue of HOCL Rasayani and to take necessary action required for disposal of land. The first meeting of the committee was held on 17th August, 2022. Based on the minutes of the meeting, CMD (HOCL) had discussion with BPCL officials on 06.10.2022 to know whether BPCL can take over the entire balance land of HOCL at Rasayani. However, BPCL had informed that they are interested only in the already allotted 684 acres of land (this includes the already registered 375 acres). Further course of action will be decided in due course.

Government of Maharashtra vide letter No LUC-2022/C.R.95/A-2 dated 07.10.2022 had informed that for issuing NOC for sale of the Panvel land, HOCL should pay 40 % of the land valuation calculated as per the rates mentioned in the Annual Statement of Rates published by Inspector General of Registration, under the Maharashtra Stamps (Determination of Real/Market Value of properties) Rules 1995 and Revised Rules 2017 of the Government of Maharashtra. The company has written to the Government for permission to sell the Panvel land after payment of the premium of 40 % to the State Government. 40 % as a premium for sale and change of use of this land comes to Rs.6,38,83,624/- as per the annual statement of Rates published by IG Registration.

Regarding the sale of balance land of HOCL at Rasayani, a meeting was conducted under the chairmanship of Secretary C&PC on 09.12.2022 wherein BPCL was requested to explore the possibility of purchase of the balance 235 acres of land available with HOCL at Rasayani and give a

feedback on the same at the earliest. During the meeting, Acting CMD, BPCL agreed to examine the possibility of utilization of the remaining 235 acres of land and requested for certain time for the same.

#### HINDUSTAN FLUOROCARBONS LTD (HFL)

- 9.13 Hindustan Fluorocarbons Ltd. (HFL), a subsidiary company of Hindustan Organic Chemicals Ltd. (HOCL), was incorporated on 14.07.1983. It is located at Rudraram, P.O, Kandi Mandal, District Sangareddy, Telangana. The company started production in the year 1987 and is engaged in the manufacture of Poly Tetra Fluoro Ethylene (PTFE) and of Chloro Di Fluoro Methane (CFM-22). PTFE is extensively used in chemical, mechanical, electrical and electronic industries and has strategic applications in defence and aerospace sectors. CFM-22 is sold directly as a refrigerant gas and also as feed stock for production of PTFE.
- 9.14 Authorized and paid up share capital of HFL is Rs.21crore and Rs.19.61crore respectively. HOCL (Promoter Company) holds 56.43% of the equity share capital and balance is held by the public (39.13%) and Andhra Pradesh Industrial Development Corporation (4.44%). HFL is listed on the Bombay Stock Exchange (BSE).
- 9.15 HFL started making losses from its inception in 1987-88 resulting in erosion of its net worth and reference to erstwhile BIFR in 1994. A rehabilitation package for HFL under the operating, agency M/s IDBI was approved by BIFR on 03.12.2007. Total cost of rehabilitation package was Rs.19.28 crore which did not involve infusion of any Govt. funds. Following implementation of the rehabilitation package, HFL made marginal profits from 2007-08 to 2012-13. However, the company did not come out of BIFR as its net worth remained negative. HFL again suffered loss of Rs.24.82 crore in 2013-14 mainly on account of provisioning for 1997 and 2007 wage revision arrears and reduction in sales realization. Thereafter, the company has continued to suffer losses mainly on account of reduction in sales realisation. Despite the 2007 rehabilitation package, net worth of the company has remained negative.

#### Financial Performance

- 9.16 Financial performance of HFL in terms of turnover and net profit/loss for the last 5 years and net worth as on 31.3.2022 are given below:

(Rs. in crore)

Year	Turnover	Net Profit / (Loss)
2017-18	36.85	(0.77)
2018-19	38.87	1.70
2019-20	31.32	(3.63)
2020-21	3.67	(24.83)#
2021-22	0.00	(6.13)

*Net worth (as per Ind AS which includes revaluation of land and other assets as on 31.3.2022. (Rs.78.81) crore*

*#This amount includes an amount of Rs.18.05 Cr for VRS expenditure during the year*

9.17 During the year 2022-23 (up to September, 2022), the company did not have any sales as the manufacturing activities have been stopped. The reduced turnover and increase in losses is due to the shutting down of plant/unit as per the CCEA decision dated 22.01.2020 for closure of the company as given in the following paragraphs.

#### **Closure of HFL**

9.18 HFL was earlier manufacturing CFM-22/HCFC-22 and sold most of it directly as refrigerant gas since its conversion to PTFE is not financially viable for the company due to uneconomic plant capacity and old technology. For the calendar year 2020, HCFC-22 production quota of only 283 MT was allotted by Minister of Environment, Forest & Climate Change (MoEF) as per the requirements of Montreal Protocol, with the reduced HCFC-22 quota in 2020, HFL's operations would have become unsustainable and it would have been forced to shut down the plant after April-May, 2020.

9.19 In view of the poor financial situation and non-viability of HFL's existing operations, the CCEA at its meeting on 22.01.2020 approved this Department's proposal for shutting down the operations of the plant/unit of HFL and closure of the company.

#### **In brief, salient features of the approved closure plan of HFL are as follows:**

- All employees (except skeletal staff) to be separated through VRS/VSS as per DPE guidelines; non-VRS opting employees to be retrenched as per Industrial Disputes Act.
  - GoI interest free loan of Rs.77.20 crore to be given to HFL for settling immediate closure related liabilities, including VRS/VSS expenditure, and to meet administrative expenses of skeletal staff.
  - Appointment of NBCC as Land Management Agency to facilitate land disposal subject to Telangana Govt.'s decision to purchase the land.
  - Appointment of MSTC for disposal of plant/machinery and movable assets through e-auction.
  - Loan of Rs.77.20 Cr. and other GoI dues of HFL are to be repaid from sale proceeds of land and other assets; loans/dues remaining unpaid due to insufficient sale proceeds to be written off/waived.
  - Tentative timeline for completing all closure related formalities is 400 days. The timelines are delayed due to Covid-19, non-receipt of NOC from TSIIIC/TS Government.
- 9.20 After receipt of interest free loan of Rs.73.70 crore as advance from the Contingency Fund of India (CFI) sanctioned by the Ministry of Finance in May, 2020, and Rs.2.17 crores in March 2022 for settlement of immediate closure related liabilities of HFL, necessary action was initiated for closing down the company's operations. As on 30.09.2022, all employees except 5 employees retained as skeletal staff have been relieved on VRS/VSS or have superannuated after payment of their terminal and outstanding dues. As per directions received the 5 regular employees have been transferred on the rolls of HOCL from 3rd September, 2022 and non-regular employees have been relieved on 23rd September, 2022 by paying VSS compensation. The company has cleared the outstanding sum in the cash credit account with SBI and also settled water supply dues. The settlement of other dues of suppliers/contractors/electricity is under progress. While regular plant operations have been stopped since July, 2020, final shut down was undertaken during December, 2020 and plant was cleaned and kept ready for disposal.

- 9.21 For disposal of HFL's land at its plant site (approx. 126 acres), it was decided in a joint meeting held between this Department and Telangana Govt. on 18.10.2019 that feasibility of transfer of the land to TSIIC at the rate/value determined by Collector, Sangareddy, will be considered by the State Govt./TSIIC. If TSIIC is not interested in taking over the land, then State Government will give NOC to HFL for disposal of the land as per GoI guidelines for industrial purposes only. It is understood that valuation of HFL's land has been submitted by the District Collector to the State Government in November, 2019. However, despite DO letters written by Hon'ble Minister of Chemicals & Fertilizers to Hon'ble Chief Minister Telangana and from Secretary (C&PC) to the Chief Secretary, Telangana for expediting the State Government's decision, no reply has been received with reference to State Government of Telangana decision for disposal of HFL Land.

In this connection it is further mentioned that Chairman HFL, had also met Principal Secretary to Chief Minister and regular follow-ups by officials of HOCL and HFL is made with the State authorities concerned, however, no response has so far been received from the State Government. In this regard Secretary(C&PC) had a meeting with Principal Secretary to Hon'ble Chief Minister on 9th April, 2021 in Hyderabad and subsequently a DO letter dated 12-Jul-2021 was sent by Hon'ble Secretary (C&PC) to Hon'ble Chief Secretary, TS and Principal Secretary, Hon'ble Chief Minister, Telangana State and requested for NOC for sale of land of HFL. Hon'ble Minister for Chemicals & Fertilizers and New & Renewable Energy, Govt. of India vide letter dated 08.06.2022 had requested the Hon'ble Chief Minister of Telangana to expedite the issue of NOC for sale of HFL land. Decision of the State Govt. is awaited. Matter is being followed up by this Department at the highest levels with the Telangana Govt. for expediting their decision.

- 9.22 In the case of Rockwell Industries Limited vs. HFL, the High Court vide Order Dated: 04.11.2020 (Case No. COM.C.A. 16/2020) has directed HFL (Appellant) not to dispose or transfer or to create a third party right with regard to its assets. HFL is in the process of vacating the stay on disposal of assets. The High Court vide order dated 04.11.2022 had vacated the stay on disposal of plant and machinery. Accordingly, for the disposal of Plant and machinery, HFL had invited tenders on 08.12.2022 for awarding the work of revaluation and the work order has been awarded to M/s Earth Engineers, Surat. The revised value of Plant and machinery will be put up to HFL's Board scheduled to meet on 30.01.2023 for fixing the base value and will be auctioned through MSTC.

#### **HIL (INDIA) Ltd.**

- 9.23 HIL (India) Ltd., formerly known as Hindustan Insecticides Limited (HIL), was incorporated in 1954 in New Delhi for manufacturing and supply of DDT (Dichloro Diphenyl Trichloroethane) for Malaria Eradication Programme of Government of India. In the year 1957, the company set up a second factory at Udyogamandal, Kerala, for manufacturing of DDT. HIL set up another factory in 1977 at Rasayani, Maharashtra, for manufacturing DDT and Malathion, an insecticide. The another manufacturing unit of the company for product formulation was set up at Bathinda, Punjab, in 2003 by shifting its erstwhile Delhi Factory had to be closed in 1996 in pursuance of order of Hon'ble Supreme Court directing closures of all polluting industries in Delhi. Rasayani and Udyogmandal Plants have both DDT and agrochemical manufacturing facilities while Bathinda has only formulations manufacturing and packaging facility. The company has also diversified its business in to seeds and fertilizers sectors also. The company has 5 Regional Sales Offices across India and a wide network of dealers for marketing and distribution of its products across India.

- 9.24 The company acquired the new name of HIL (India) Ltd. with effect from 20.03.2018 as the old name viz. Hindustan Insecticides Ltd., was not reflecting the entire gamut of diversified business activities of the company. At the same time, the new name retains the association with its established brand name of HIL.
- 9.25 The authorized and paid up share capital of HIL is Rs.100 crore and Rs.91.33 crore respectively. 100% of its shares are held by the Govt. of India.
- 9.26 HIL is the sole supplier of DDT to the National Centre for Vector Borne Disease Control (NCVBDC) of the Ministry of Health and Family Welfare, Government of India. The company diversified into agrochemicals in the late 1970s to ensure supply of quality pesticides at reasonable prices to the agricultural sector. Today it has a range of technical and formulation grade pesticides to meet the varied requirements of the farming community.
- 9.27 To further consolidate its position, HIL in 2012-13 ventured into seed production and marketing business. The company has been recognized as a national level seed agency by the Ministry of Agriculture and Farmers Welfare for production and marketing of certified seeds for crops and vegetables. The company actively participated in seed production and supply of seed minikits of high yielding varieties under National Food Security Mission (NFSM), National Mission on Oil Seeds and Oil Palms (NMOOP) and Mission on Integrated Development of Horticulture (MIDH) as National Level Seed Agency. With the sincere efforts of the management and support from Ministry of Agriculture & Farmer's Welfare, company could achieve a seed turnover of Rs.54.90 Cr. in 2020-21. To further increase the seed production & distribution share of the company, company could achieve a seed turnover of Rs.36.50 Cr. in 2021-22. To make reach of HIL's Seeds to more States, the dealers network and manpower in seed sale to strengthening the distribution HIL (India) Limited has not entered in North Eastern State (Assam, Tripura etc) also.
- 9.28 In order to strengthen the seed infrastructure, HIL has set up a seed testing laboratory at its R&D complex, Gurugram, and is constructing seed godowns and seed processing plant at Bhatinda unit with financial assistance from Ministry of Agriculture & Farmers Welfare, which will be additional income avenue for the company in near future. In near future, the seed testing laboratory will be upgraded for commercialized benefits apart from in house seed testing.
- 9.29 In 2015-16, with a vision to become one stop shop for all the agricultural inputs needs of farmers, HIL further diversified into fertilizers trading business. It has been inducted by the Department of Fertilizers as an agency to import fertilizers under Nutrient Based Subsidy Scheme. After the successful commissioning of water soluble fertilizer (NPK 19:19:19) plant of 1800 MTPA at Bathinda in 2016-17 under brand name 'HILGOLD', the company has started commercial production of HILGOLD at the other two units (Rasayani and Kochi) also with capacity of 3000 MTPA each. During the financial year 2021-22, the Company has done business of about Rs.210 Crore (Provisional – subject to audit) and expanded the network to North East States also.

#### Financial Performance

- 9.30 Financial performance in terms of turnover and net profit /loss for the last 5 years and net worth as on 31.03.2022 are given below, (2021-22 figures based on unaudited financials):

(Rs. in crore)

Year	Turnover	Net Profit / (Loss)
2017-18	414.39	3.41
2018-19	456.09	3.62
2019-20	401.02	0.59
2020-21	387.90	1.15
2021-22	359.56	2.21

*Net worth as on 31.03.2022: Rs.107.79 Cr.*

- 9.31 The company's operations were adversely affected during 2021-22 due to production loss following COVID-19 Impact related nationwide restrictions. During the period, Company's financials was badly affected leading to a situation of huge liquidity crunch, our plant's capacity utilisation reduced significantly. The reductions in DDT order quantity by NCVBDC due to restriction imposed in Stockholm Convention. The Stockholm Convention on Persistent Organic Pollutants (POPs) has categorised DDT as one of the POP chemical. India being the signatory to the convention is committed to reduce reliance on DDT for the vector control programme. HIL has also taken certain initiatives to phase out DDT as per the directives. The performance of the Company has been impacted due to COVID-19 lockdown related restrictions and war of Russia with Ukraine.

### Exports

- 9.32 HIL achieved exports of Rs.6.50 crore in FY 2021-22. The company exported DDT, Malathion Technical and Agrochemicals to countries in Africa and Latin America during the year. In the current FY 2021-22, the export sales has been declined due to non-availability of major indigenous/imported raw material and liquidity crises faced by company. HIL is striving to give more emphasis to exports in the coming years.

### New initiatives and projects of HIL

- 9.33 With a view to widen the product profile and reduce the company's dependence on DDT revenue, several new initiatives and projects have been taken up / planned by HIL to diversify its operations. Some of these initiatives/projects are given below:
- HIL has signed MoUs with other public sector fertilizer companies namely National Fertilizers Limited (NFL), FACT, BEC Fertilizers and IFFCO for supply of neem coated UREA, DAP and NPK to HIL's business network across the country. The company has also entered into marketing tie-ups with Single Super Phosphate (SSP) manufacturers in the country for the supply of SSP to the company's business network.
  - HIL has entered into MoU with UNIDO and IPFT for scaling up the commercial production of neem based products like coil, cream, suspension concentrate etc. with the financial support of UNIDO (USD 1.00 million i.e. Rs.7.16 Crore). During the FY 2021-22, technology transfer was completed and demonstration of pilot plant production was also accomplished. Now, HIL is looking forward to start the commercial production.

- iii. Board has approved the BT Larvicide under UNIDO assistance of USD 1.83 million (Rs.13.7 crore). Commercial production of “Bio Pesticide Trichoderma viride” and Bio Pesticides Pseudomonas fluorescens” will be commissioned soon as the Technology transfer of large scale commercial production for these Bio-Pesticides has been completed during the FY 2021-22.
- iv. The company has set up a Long Lasting Insecticidal Nets (LLIN) manufacturing facility at its Rasayani Unit with an initial capacity of 50 lakh nets per annum with the support of UNIDO’s project “Development and Promotion of Non-POP alternative to DDT”, which shall be scaled up to 10 million per annum
- v. HIL is in the process of taking up Financing Agrochemical Reduction and Management (FARM) Project with the financial support of UNIDO for the setting up of Bio Pesticides Plants in India..
- vi. In view of the COVID-19 pandemic, HIL has launched products for hand hygiene like alcohol based sanitisers and is in process of further diversifying into sanitisation activities and long-term disinfectant/anti-microbial solutions in the market.
- vii. HIL is making efforts to enter into Joint Venture with Indian agrochemical companies for making the industry self-reliant and self-dependent in line with the
- viii. Govt’s “MAKE IN INDIA” initiative and “ATMANIRBHAR BHARAT ABHIYAN” through indigenous production of intermediates and agrochemicals and to reduce import dependency and dependence on any single market.

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## CHAPTER – 10

## AUTONOMOUS INSTITUTIONS

Central Institute of Petrochemicals Engineering & Technology (CIPET)

- 10.1 Central Institute of Petrochemicals Engineering & Technology (CIPET) (formerly known as Central Institute of Plastics Engineering & Technology) is a centrally funded technical higher education institution under the Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Government of India, and fully devoted to Skill development, Technology Support, Academic & Research (STAR) activities for the growth of Petrochemical & allied industries in the country. CIPET has 46 centers spread across the country which includes 8 Institute of Plastics Technology (IPTs), 31 Centers for Skilling and Technical Support (CSTS), 03 School for Advanced Research in Polymers (SARP), 4 sub-centers.
- 10.2 Apart from the above, CIPET is also in the process of establishing 2 more Centers at Ayodhya & Sanand. CIPET Centers have state-of-the-art infrastructural facilities in the area of Design, CAD/CAM/CAE, Tooling & Mould manufacturing, Processing, Testing and Quality Control to cater to the needs of polymer and allied industries.

#### I. ACADEMIC AND SKILL DEVELOPMENT PROGRAMS

(a) Long term Professional Skill development Programs:-

- 10.3 CIPET conducts the following long term training programs (i.e., Diploma, Post Diploma, Post Graduate Diploma, Undergraduate and Post Graduate) with varying level of entry qualification and Ph.D. program.
- Ph.D in Material science & Engineering, Polymer Science & Technology, Plastics Engineering, Physics & Chemistry.
  - M.Tech. in Plastics Engineering/Technology (2 years)
  - M.Tech. in Polymer Nanotechnology (2 years)
  - M.E. in CAD/CAM (2 years)
  - M.Sc.in Bio Polymer Science (2 years)
  - M.Sc.in Polymer Science (2 years)
  - M.Sc. in Applied polymer Science (2 years)
  - M.Sc. (Tech.) in Material Science Engineering (5 years, integrated program)
  - B.Tech. in Plastics Engineering/Technology (4 years)
  - B.E./B.Tech. in Manufacturing Engineering/Technology (4 years)
  - B.Tech in Petrochemicals Engineering (4 Years)

- B.Tech in Mechanical Engineering (4 Years)
- Post Graduate Diploma in Plastics Processing & Testing (PGD-PPT) (2 years)
- Post Diploma in Plastics Mould Design with CAD/CAM (PD-PMD)(1 ½ years)
- Diploma in Plastics Technology (DPT) (3 years)
- Diploma in Plastics Mould Technology (DPMT) (3 years)

10.4 The Undergraduate, Postgraduate & Doctoral programs are offered at CIPET:IPTs in affiliation with respective State Technical Universities. Admission to UG/PG/Ph.D. programs are carried out as per the norms and guidelines of respective state affiliating university. Diploma level programs are offered at CIPET: CSTSs and students for these programs are admitted through all India CIPET Admission Test 2022 (CAT-2022).

10.5 Semester examinations for final year and running batches of Diploma/Post Diploma/Post Graduate Diploma courses were conducted offline mode (after COVID-19). Semester examinations for the final year and running batches of UG & PG programmes were conducted as per the schedule of Affiliating University of respective states.

10.6 Ms. Pooja S.P. of CIPET: IPT - Chennai (2017-21 batch) has secured First Rank in Anna University under the category of Affiliated Colleges in the programme – B.E. Manufacturing Engineering. She has received Gold medal from **Shri Narendra Modi, Hon'ble Prime Minister of India in the august presence of Shri R.N. Ravi, Hon'ble Governor and Shri M.K. Stalin Hon'ble Chief Minister of Tamil Nadu** during the convocation held at Anna University on 29th July, 2022. The photograph of the same is depicted below:



10.7 The Academic year for 2022-23 has been commenced from 22nd August 2022 for the newly admitted students and running batches has been commenced from 16th August 2022. The Student Induction Programme (SIP) for the newly admitted (First year) students of Diploma Level Programme has been organized for 5 days from 22nd to 26th August 2022. The SIP includes English Language Skill Test, Placement Orientation and Industrial Visit.

- (b) Short Term Vocational Skill development Training Programs
- 10.8 In line with the “Skill India Mission” of Govt. of India, CIPET also focuses on Skill development training programs in the entire gamut of Plastics Engineering & Technology. In line with National Skills Qualifications Framework (NSQF) norms & guidelines, at present CIPET is conducting 37 National Skills Qualifications Committee (NSQC) approved programs in the field of Plastics Engineering & Technology. The broader range of programs offered at CIPET includes:
- Employment linked, sponsored skill development programs
  - Up-skilling and re-skilling programs
  - Short term industry specific programs
  - Tailor made programs for industries
  - In plant training for students from various colleges and universities.
- 10.9 These programs with duration ranging from 16 hours to 960 hours are aimed at enhancing Skill and competency level of participants in the relevant domains of plastics.
- 10.10 Majority of the skill development programs are sponsored by various State / Central Govt. departments / agencies with the sole objective of uplifting the living standards of underprivileged / unemployed youth through gainful employment in leading plastics & allied industries in India and abroad. During the year 2022-23 (upto September, 2022), CIPET has trained 18,612 candidates through short term skill development programmes.
- 10.11 CIPET has signed the Agreement with National Council for Vocational Education and Training (NCVET), Ministry of Skill Development & Entrepreneurship (MSDE), Govt. of India during July 2022 for recognition of Awarding Body (AB) for conducting NSQF aligned and NSQC approved Skill Development Training Programme at its centres.

## II Technology Support Services

- 10.12 CIPET offers Technology Support Services (TSS) in the entire spectrum of Petrochemical Engineering & Technology. TSS forms an integral portfolio of CIPET and highlights its technical competency by offering high quality services to customers in the areas of Design and Manufacturing of Moulds & Dies, CAD/CAM/CAE services, Tooling, Plastics Processing & Testing, inspection & quality control.
- 10.13 During the year 2022-23 (upto September, 2022) 52391 nos. of technical support assignments were undertaken which include job works, mould orders, testing and consultancy services. Pre delivery inspection (PDI) of Plastics products as well as metallic pipes (CI/DI/ GI/ MS etc.) and fittings are also undertaken by CIPET.
- 10.14 The Major Activities / Assignments undertaken by CIPET- Technology Support Services (TSS):-

Development of the component Thread Gauge by cast nylon–CIPET: IPT-Bhubaneswar;



5870+2310 Design development and supply of single cavity Injection Mould for BIN 15 – CIPET:IPT, Chennai



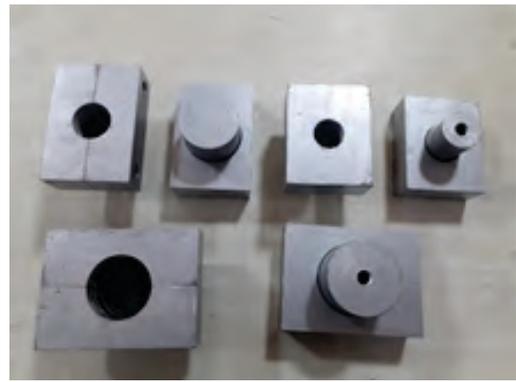
Design and development of Pitch Gauge material stainless steel by IPT: Bhubaneswar



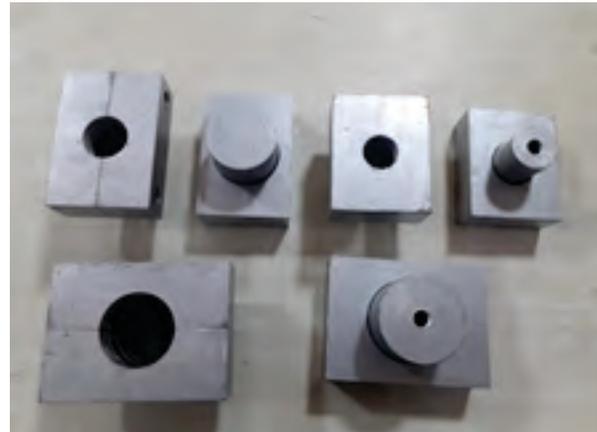
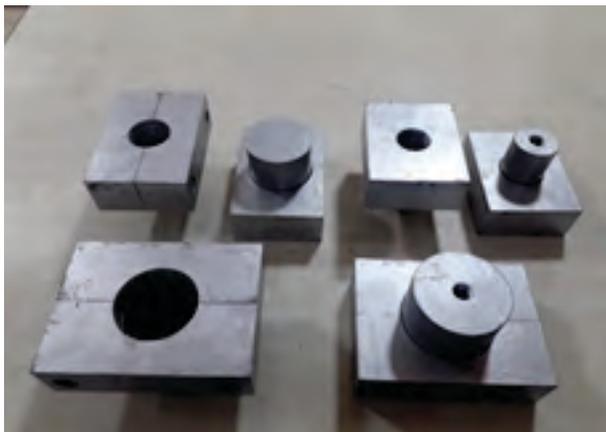
Design & Development of single cavity blow mould for 100ml bottle



Design & Development of Two cavity injection mould for Test Specimen (Tensile, Flexural, Impact), IPT: Chennai



Various sizes End Fittings as per IS & ASTM standard, used for Hydrostatic Testing of HDPE/PVC pipes EN-31 Steel, C-45 Steel CSTS: Bhopal



CIPET IPT: Bhubaneswar



Design and development of Boss,  
Part No- 104.01.24.095  
Material- Titanium Alloy



Design and Development of Insert, Copper



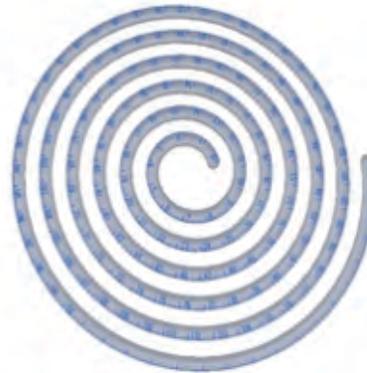
Cam Levers Right Handed (RH)



Cam Levers Left Handed (LH)



Two plate single impression Injection  
mould divisions.



Final Component with different flow rates

**Design & Development of Core & Cavity plates machining of Hand Injection mould for Helmet Rivet washer**



Helmet Rivet washer



Cavity Plate



Core Plate

**Manufacturing of aluminum profile plates Aluminum Used in PCB Milling Machine.**



**Manufacturing of Spline Hub Shaft, EN-24 Steel used in Automobile Assembly**



3 Impression Die Set for 90 ml Clay Glass 3 Impression Die Set for 70 ml Clay Glass

Manufacturing of 3 Cavity Die Set for Clay Glass 70 ml & 90 ml

Material Used : EN-31 Steel, C-45 Steel



20 mm threaded adaptor

Laser Engraving of PET Bottle/ Jar Mould Bottom Inserts for M/s. Godavri Plastech Pvt Ltd, Jalna



**Development of 150 x 50 mm (Two Cavity) Die Plate for Ceramic Liner for  
M/s. Prabhu Rockshape Machinery Pvt Ltd, Solapur**



**Prototype of Base cover for Water Purifier –  
M/s. APDDL, Bengaluru**



**Prototype of Lower Fairing (Automobile Part) –  
M/s. Altem Technologies, Bengaluru**



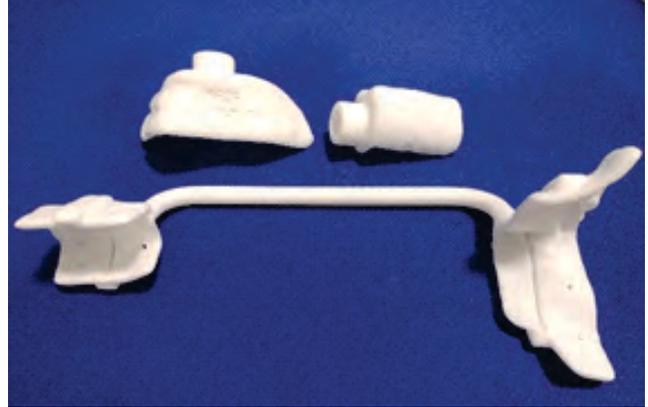
**Prototype of Aeroplane Model for  
Exhibiting in Defence Expo -  
M/s. Altem Technologies, Bengaluru**



**Prototype of Aeroplane Model for  
Exhibiting in Defence Expo -  
M/s. Altem Technologies, Bengaluru**



**Prototype of Automobile Parts of  
M/s. Tata Motors, Pune – M/s. Redington, Chennai.**



**Prototype of Distal Drill Guide/Femur Resection  
Guide/Prox Drill Guide – Mockup model before  
surgery – M/s. Jajal Medical, Pune**



**Prototype of Mansub for  
Navigational Buoy – M/s. NIOT, Chennai**



**Prototype of SEAT BASE FOR SCOOTER –  
M/s. ALTEM Technologies (P) Ltd., Bengaluru.**



**Prototype of ROTOR FOR  
NAVIGATIONAL BUOY (Aluminium) –  
M/s. NIOT, Chennai**



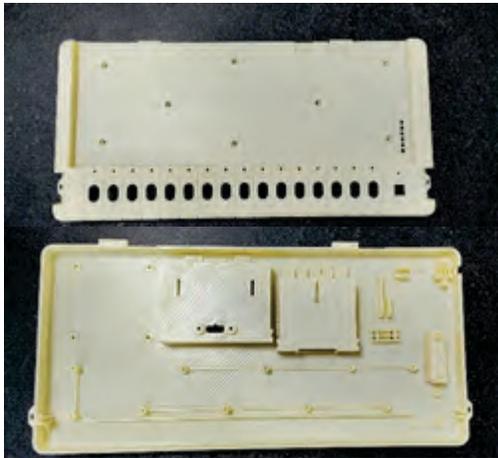
**Prototype of Stator for  
NAVIGATIONAL BUOY (Polycarbonate) –  
M/s. NIOT, Chennai**



Prototype of Hair Dryer –  
M/s. Arc Document Solutions, Chennai



Prototype of Automobile Parts of  
M/s. Tata Motors, Pune – M/s. Redington, Chennai.



Prototype of Electronic Voting Machine for  
M/s. ECIL, Hyderabad –  
M/s. ALTEM Technologies, Bengaluru



Prototype of Synroplangi Socket for  
Artificial Limb – M/s. ALTEM Technologies



Prototype of Housing – Top & Bottom Cover –  
M/s. Lucas TVS, Pondicherry

- 10.15 Exposure training on Metallic Pipes has been given to CIPET Officials in-line to expanding the scope of inspection in the field of metallic products. Total 10 Nos. Officials have been trained.

Sl. No.	Nos. of Officials	Duration	Location
1	10 Nos.	09.05.2022 to 13.05.2022	CSIR-NML, Jamshedpur

### III RESEARCH & DEVELOPMENT ACTIVITIES:

- 10.16 Three well established R&D wings of CIPET: School for Advanced Research in Petrochemicals (SARP) viz., (i) Advanced Research School for Technology & Product Simulation (ARSTPS) at Chennai, (ii) Laboratory for Advanced Research in Polymeric Materials (LARPM) at Bhubaneswar and (iii) Advanced Polymer Design & Development Research Laboratory (APDDRL) at Bengaluru have been consistently contributing in applied research for industries.

- 10.17 During the year 2022-23 (upto September, 2022), 33 nos. of Research Projects have been undertaken and 26 Research Publications in scientific peer-reviewed have been published in International Journals; 03 New Innovative Technologies have been patented and Technologies have been transferred.

- 10.18 The major Research & Developmental projects undertaken are given below:

- Capacity Building for reducing Plastic & Chemical Pollution in India (INOPOL), NIVA, Norway.
- Centre of Excellence on “Bio-Engineered Sustainable Polymeric Systems (CoE-III), Department of Chemicals & Petrochemicals (DCPC), Govt. of India.
- Competency Enhancement of System Houses and Micro, Small and Medium Enterprises in the foam manufacturing sector for ensuring smooth and sustainable phase out of HCFC-141b, UNDP.
- Centre of Excellence on “Additive Manufacturing” (CoE-AM), Ministry of Electronics and Information Technology (MeitY), Govt of India
- Centre of Excellence on “Manufacturing of Next generation Biomedical Devices” (CoE-IV), Department of Chemicals & Petrochemicals (DCPC), Govt. of India.
- Environment Friendly Recycling Technology and Value Addition of Medical Waste Plastics obtained from PPE Kit used during COVID 19 situation, Department of Science & Technology-Waste Management Technologies (DST-WMT), Govt. of India.
- Assessment of plastic waste recycling/end of life disposal sector, United Nations Environment Programme (UNEP).
- Scaling up alternatives for identified single use plastic items or products in India, United Nations Environment Programme (UNEP).
- To develop a high barrier compostable film for cigarette pack overwrapping application, M/s. ITC Limited, Bengaluru.
- Superabsorbent of bio-based material for feminine hygiene Application, DST-Inspire Ph.D. Fellowship, Govt. of India.

- Development of new generation Acetabular Socket Liner and Femoral Head Prototypes with unique 3D microstructures and better fracture resistance for Osteoporosis and Osteoarthritis treatment, DST-SERB, New Delhi (Scheme: IMPRINT).
- Design & Development of Water Valves – Metal to Plastic Conversion (Valve, Cover & Upper Part). M/s. Danfoss Industries Pvt. Ltd., Chennai.
- Development of Paper based Colorimetric device to detect pathogen for the diagnosis of Urinary Tract Infection UTI - DST, New Delhi (Scheme: Biomedical Device and Technology Development (BTD))
- High performance nanofiber based Zwitter ionic polymer electrolytes for safe all solid state lithium ion battery applications – DST, New Delhi (Scheme: INSPIRE Faculty)
- DST-Storage MAP (3D Printed Solid-state Battery) – DST, New Delhi. (Scheme: IC-MAP)
- Rationally Designed Flexible Three-Dimensional Interconnected Piezoelectric Composites Foam for Highly Efficient Mechanical Energy Harvesting – DST, New Delhi (Scheme: Scheme for Young Scientists and Technologists (SYST))
- Development of High-Performance Flexible Thin Film Supercapacitors Based on Transition Metal Nitrides – UGC- DAE CSR.

#### Research Publications:

S.No	Author	Title	Journal name	Publisher
1	S. Thanigaivel, A.K. Priya, K. Dutta, S. Rajendran & Y. Vasseghian.	Engineering strategies and opportunities of next generation biofuel from microalgae: A perspective review on the potential bioenergy feedstock.	<i>Fuel</i>	Elsevier
2	Ritesh Kumar & Smita Mohanty	Current advances in Hydroxyapatite for tissue engineering: A review	Journal of Inorganic and Organometallic Polymers and Materials.	Springer New York
3	Rikarani Choudhury, Jaydevsinh M Gohil Akshaya K. Palai & Smita Mohanty	Studies on composite proton exchange membranes made from poly(vinyl alcohol -co-styrenesulfonic acid) /non-woven fabric for direct methanol fuel cell	Express Polymer Letters	Budapest University of Technology and Economics
4	Debasmita Mohanty, Marven Krishnan Kanny, Smita Mohanty, Pooja Priyadarsini, & Manoranjan Biswal	Highly transparent castor oil-derived polyurethane/silica nanocomposite coating synthesized by in situ polymerization		Wiley

S.No	Author	Title	Journal name	Publisher
5	Sumit Gupta, Smita Mohanty & Sanjay K.Nayak	Development and characterization of ester modified endospermic guar gum/polyvinyl alcohol (PVA) blown film: Approach towards greener packaging	Industrial Crops and Products	Elsevier
6	Shubasmita Rout, Sukanya Pradhan & Smita Mohanty	Evaluation of Modified Organic Cotton Fibers Based Absorbent Article Applicable to Feminine Hygiene	Journal of Natural Fibers (2022)	Taylor & Francis
7	Manmath Parida, Aruni Shajkumar, Smita Mohanty, Manoranjan Biswal & Sanjay K. Nayak	Poly(lactic acid) (PLA)-based mulch films: evaluation of mechanical, thermal, barrier properties and aerobic biodegradation characteristics in real-time environment	Polymer Bulletin (2022)	Springerlink
8	Mohanty, D., Kanny .K K., Mohanty, & Nayak, S.K.	Ecofriendly automobile base coats derived from castor oil: evaluation of nano silica reinforcements on the performance characteristics of coatings	Pigment & Resin Technology,	Emerald Publishing Limited
9	V. B., A., Mohanty, S. & Nayak, S.K.	Synergic effect of PVP and PEG hydrophilic additives on porous polyethersulfone (PES) membranes: preparation, characterization and biocompatibility	<i>J Polym Res</i> (2022)	Springer
10	Sudheer Kumar, Sukhila Krishnan & Smita Mohanty	Book Chapter in "Applications of elastomer blends and composites"	Elastomer Blends and Composites Principles, Characterization, Advances, and Applications	Elsevier
11	Nidhin Divakaran, Jyoti Prakash Das, Ajay Kumar P V, Smita Mohanty, Ananthakumar Ramadoss & Sanjay Kumar Nayak	Comprehensive review on various additive manufacturing techniques and its implementation in electronic devices	Journal of Manufacturing Systems	Elsevier
12	S Arun Kumar, B Saravanakumar, Smita Mohanty, & Ananthakumar Ramadoss	Design of open-porous three-dimensional starfish-like Co <sub>3</sub> O <sub>4</sub> /Ni forest electrode for efficient energy storage devices	Journal of Alloys and Compounds	Elsevier
13	Shishir Sinha and G.L. Devnani	Natural Fibre Composites	Book	Taylor & Francis

**Patents:**

- Lignocellulosic Composite based Thermoplastic Composition and a process for its Preparation (Filed)  
Application No. 202241049962, dated 01.09.2022
- Solar online EV (Electrical Vehicle) battery charging system, Indian Patent (Filed) Application No.: 2022 41008961.
- Rotational motion conversion scheme for traveling smart free charger, Indian Patent (Filed) Application No.:2022 41008963.

**Technology Transfer:**

The following Technologies have been transferred to various Industries:

S.No	Name of Technology Transferred	Inventors	Name of the Industries to whom Technology was transferred	Year
01.	Microplastics Analysis in Shower Gels	Mr. Girija Prasad Mr. Pinaki Chatterjee Dr. Smita Mohanty	M/s ITC Limited, Kolkata	2022
02.	Development of polymer materials & preparation of specification for Lubricating Oil Bottles	Dr. Smita Mohanty Mr. Pinaki Chatterjee Ms. Haripriya Naik	M/s ENOC, UAE	2022
03.	Indigenous PVC Compound development for Transparent Medical Tubing	Himalaya Vardikar, Dr. Smita Mohanty	M/s. Manali Petrochemicals	2022
04.	Development of high performance Polypropylene for Engineering application in Automobile sector	Dr. Smita Mohanty Dr. Manoranjan Biswal Mr. Ashish Raghavan	MRPL-ONGC, Mangalore	2022

**10.19 Accreditation:**

- CIPET: SARP-LARPM is Accredited by NABL as per ISO: IEC 17025:2017 for Mechanical, Chemical Testing & Calibration Laboratories under Mechanical, Thermal & Dimensional scope.
- CIPET: IPT Lucknow is Accredited by NABL as per ISO: IEC 17025:2017 for Mechanical Testing of metal pipes.

**Recognition**

- Centre for Technology & Entrepreneurship Facilitation (CTEF) INNOVEX Cell has been recognised by MSME, Govt. of India, Start-up India & Start-up Odisha.

**10.20 Conference / Webinars Details:**

- Photophysical Study of D1-A-D2-A Architectural DPP based terpolymer for Dye Sensitized Solar Cell  
*Symposium on "Polymers & Advanced Materials for Coatings & Energy" (SPACE 2022), September 28–29, 2022*  
Pransulla Panigrahi, Manoj Kumar Mallick, Smita Mohanty, Akshaya Kumar Palai
- Influence of Aluminum Trihydrate (ATH) particle size on Mechanical, Thermal, Flame retardancy and Combustion behaviour of Polypropylene Composites.  
*Symposium on "Polymers & Advanced Materials for Coatings & Energy" (SPACE 2022), September 28–29, 2022*  
Malaya Ranjan Parida, Smita Mohanty, Manoranjan Biswal, Sanjay K. Nayak, Suchita Rai
- Molecularly Imprinted Conjugated Polymers for Bio-Sensing Applications  
*Symposium on "Polymers & Advanced Materials for Coatings & Energy" (SPACE 2022), September 28–29, 2022*  
Chinmayee Mohapatra, Akshaya Kumar Palai, Smita Mohanty
- Plastic reclaimed from Medical Waste and Value Added Product made therefrom  
*Symposium on "Polymers & Advanced Materials for Coatings & Energy" (SPACE 2022), September 28–29, 2022*  
Satyabrata Sahoo, Wadilal Rathod, Himalaya Vardikar, Manoranjan Biswal, Smita Mohanty, Sanjay K. Nayak
- Evaluation of the physico-chemical properties of coconut Shell-derived activated carbon and its application in DSSC (Poster Presentation & Poster Contest Awarded)  
*International e-Conference on APA Bioforum 2022, July 14–16, 2022*  
Manoj Kumar Mallick, Pranshula Panigrahi, Akshaya Kumar Palai, Smita Mohanty
- Synthesis and properties enhancement of Poly(glycerol sebacate)(PGS) for Vascular graft application (Poster Presentation)  
*International e-Conference on APA Bioforum 2022, July 14–16, 2022*  
Tusharkanta Nayak, Akshaya Kumar Palai, Smita Mohanty
- Fabrication of PLA/natural hydroxyapatite composite scaffold for tissue engineering application (Oral Presentation)  
*International e-Conference on APA Bioforum 2022, July 14–16, 2022*  
Ipsita Pattanayak, Ritesh Kumar, Pragyana Aparajita Dash, Smita Mohanty
- A green synthesis of Modified Cellulose Acetate membrane for the absorbency of biofluids (Oral Presentation)  
*International e-Conference on APA Bioforum 2022, July 14–16, 2022*

Roshni Pattanayak, Sukanya Pradhan, Smita Mohanty

- Attended ISO/TC 61 Meeting on 27.09.2022 & 28.09.2022 by Dr. Smita Mohanty, Director & Head (Principal Scientist) through virtual mode.
- Attended Project Review Meeting of CIRCOT Project on 23.09.2022 by Dr. Smita Mohanty, Director & Head (Principal Scientist), Shri Trilochan Parida, Asst. Officer (Fin) & Shri Manmath Parida, Jr. Research Fellow.
- Attended a Ph.D Viva-voce Examination on 26.09.2022 of Mrs. Debasmita Mohanty at Durban University of Technology (DUT), South Africa by Dr. Smita Mohanty, Director & Head (Principal Scientist) as Co-Guide through virtual mode.
- Attended a Special Meeting on “Working Group on Additive Manufacturing” at MeitY, Govt. of India on 19.09.2022 by Dr. Smita Mohanty, Director & Head (Principal Scientist) through virtual mode.
- Attended ISO/TC 61/SC 1 Terminology Meeting on 06.09.2022 by Dr. Smita Mohanty, Director & Head (Principal Scientist) through virtual mode.
- Attended a meeting on "Issuance of Certificate to Manufacturers / Sellers of Biodegradable Plastic Carry Bags and Commodities and tentative Indian Standard for biodegradable Plastics” on 31.08.2022 with MoEF&CC, Govt. of India through virtual mode by Dr. Smita Mohanty, Director & Head (Principal Scientist) & Testing Team
- Attended Second Meeting of ‘Working Group on E-Waste and Circular Economy’ on 29.08.2022 through virtual mode by Dr. Smita Mohanty, Director & Head (Principal Scientist).
- Attended 2nd ERC meeting on 27-08-2022 at AMTZ through virtual mode by Dr. Smita Mohanty, Director & Head (Principal Scientist)
- Attended 3rd Expert Review Committee Meeting of the project entitled “Centre of Excellence on Additive Manufacturing” on 10.08.2022 by Dr. Smita Mohanty, Director & Head (Principal Scientist).
- Attended a online Third Committee Meeting in compliance of Hon'ble NGT order in the matter of O.A. No. 251 of 2022 on 05.08.2022 by Dr. Smita Mohanty, Director & Head (Principal Scientist).
- Presentation on container specification review (1 Lit & 5 Lit) of ENOC & EPPC on 05.07.2022.
- Attended a online Committee Meeting in compliance of Hon'ble NGT order in the matter of O.A. No. 251 of 2022 on 27.07.2022 by Dr. Smita Mohanty, Director & Head (Principal Scientist)
- Attended & delivered a talk by Dr. Smita Mohanty, Director & Head (Principal Scientist) on Startup Odisha Incubators Meetup - June 22 – AIKYAM at Odisha Startup Incubation Centre (O-HUB), Bhubaneswar on 22.06.2022
- Invited Chair of Dr. Smita Mohanty, Director & Head (Principal Scientist) on the topic “Biopolymers & Applications” for the International e-Conference on Biopolymers (APA Bioforum 2022) July 14-16, 2022
- Online presentation by Dr. Smita Mohanty, Director & Head (Principal Scientist) at UNEP during

inception meeting on the project entitled “To assess the plastic waste Recycling / end of life disposal sector in India and scaling of alternative for identified Single Use Plastic (SUP) items or products in India” on 06.07.2022.

- Development of Anticorrosion, Heat insulating and Weather Resistant External Coatings for Storage Tanks - HPCL, Bengaluru.
- Molecularly Imprinted Polymers (MIPs) based Electrochemical Biosensors for Selective Bio-analyte Detection -DBT, New Delhi (Scheme: INSPIRE – Faculty).
- Perovskite Solar Cell from Lead acid battery waste - M/s. Nordische Technologies Pvt. Ltd., Bengaluru
- Technology for Aberration free Polymer Bi-aspheric lens for Indirect Ophthalmology, DST-SERB, New Delhi
- Technology for Efficient Power Generation through Floating Solar Photovoltaics at High Latitude Locations, DST, New Delhi
- Plastics Waste Management - Strategies & Technologies - Presented on "National Webinar on Science and Technology for Sustainable Future" Organized by Rajus College, Rajapalayam on 11th May 2022.
- PVDF-KNN Composite-based Flexible Piezoelectric Foam for Energy Harvesting Applications; Swatishree Muduli, Alekhika Tripathy, Ananthakumar Ramadoss – Presented in the International Online Conference on Nano Materials (ICN 2022), 12-14 August 2022, Mahatma Gandhi University, Kottayam, Kerala, India

#### IV FINANCIAL PERFORMANCE:

- 10.21 During the financial year 2022-23 (Upto September, 2022), CIPET has generated estimated revenue of Rs.140.24 Crores. CIPET has enriched the civil & technical infrastructure facilities which has resulted in ensuring consistent growth in all the domains of Petrochemicals Engineering & Technology viz., Skill Development, Technology Academic and Research & Development and had been operating on self-sustainable mode since 2008-09 onwards.

#### V SEMINAR / WORKSHOPS

##### **Awareness Program on “Responsible Use of Plastics and Plastics Waste Management Rules 2021”:**

- 10.22 2- Day workshop on “Transition to Alternatives to SUP in-line to Implementation of Plastic Waste Management (PWM) Rules: 2021 (Amendment) in MSME Units” with the support of CPCB, New Delhi has been conducted by CIPET Centers at 14 different locations across the country for the benefit of around 400 participants from various MSMEs.

The Workshop was organized by IPT Ahmedabad, IPT Lucknow, IPT Murthal, IPT Kochi, CSTS Aurangabad, CSTS Jaipur, CSTS Mysuru, CSTS Madurai, CSTS Bhopal, CSTS Hyderabad, CSTS Haldia, CSTS Baddi, CSTS Ranchi & CSTS Guwahati. Speakers from State Pollution Control Board, Indian Institute of Packaging, Plastics Manufacturing Association and CIPET Faculties delivered talk covering the following topics:

- Challenges & Issues in PWM
- PWM Rules – 2016, and amendments in 2019 & 2021
- Single Use Plastics (SUP) and its alternatives
- Opportunities for effective utilization of plastic waste

**List of MoUs**

CIPET Head office and Centres have signed 35 numbers of Memorandum of Understanding with various reputed educational institutions and Industrial organisations during April to September 2022 to provide Skill development Training, Technical Support services, Faculty/student exchange and collaborative R&D programmes and projects.

**VI INAUGURATIONS**

**1. Inauguration of CIPET: Vocational Training Centre (VTC) at Bhavnagar, Gujarat:**

10.23 Inauguration of CIPET: Vocational Training Centre (VTC) at Bhavnagar, Gujarat by Dr. Mansukh Mandaviya, Hon'ble Minister of Health & Family Welfare and Chemicals & Fertilizers, Government of India on 31-05-2022.



**2. Foundation Stone laying ceremony of Technology Centre at CIPET, Chennai:**

Foundation Stone laying ceremony of Technology Centre at CIPET, Chennai by Dr. Mansukh Mandaviya, Hon'ble Minister of Health & Family Welfare and Chemicals & Fertilizers, Government of India on 26-06-2022 in the august presence of Shri Ma. Subramanian, Hon'ble Minister of Health and Family Welfare, Govt. of Tamil Nadu and Dr. Tamizhachi Thangapandian, Hon'ble Member of Parliament, Chennai South Constituency.



**3. Inauguration of Tinkering Lab and Incubation Lab at CIPET:SARP ARSTPS, Chennai**

1. Shri Bhagwanth Khuba, Hon'ble Minister of State for Chemicals & Fertilizers and New & Renewable Energy, Government of India Inaugurated the (i) Tinkering Lab and (ii) Incubation Lab at CIPET:SARP ARSTPS on 22.08.2022.



**VII OTHER VISITS;**

10.24 Dr. Mansukh Mandaviya, Hon'ble Minister of Health & Family Welfare and Chemicals & Fertilizers visited the facilities of CIPET: SARP ARSTPS, Chennai on 26.06.2022



**Study Tour of the Parliamentary Standing Committee on Chemicals & Fertilizers:**

Study Tour of the Parliamentary Standing Committee on Chemicals & Fertilizers to Srinagar, Pune, Mumbai and Ahmedabad scheduled from 10.06.2022 to 15.06.2022. The Committee chaired by Smt. Kanimozhi Karunanidhi, Hon'ble Member of Parliament, Tuticorin Constituency along with committee members visited Srinagar and held Informal discussion with representatives of the Department of Chemicals and Petrochemicals, Government of Jammu & Kashmir and CIPET regarding the feasibility of setting up of CIPET Centres and Plastic Waste Management Centre in Jammu & Kashmir on 11.06.2022.



**Industry Interaction Meet:**

Industry Interaction Meet was organized at CIPET: SARP ARSTPS to showcase the state-of-the-art infrastructure/facilities as well as understand & meet the industry's needs and expectations, possible collaborations etc. in terms of Research & Development and Technical Support Services. Around 35 participants from various leading Govt. / Private organization / industries actively participated in the meets.



Industry Interaction Meet organized on 28.06.2022



Industry Interaction Meet organized on 30.09.2022

## VIII Swachhta Pakhwada

10.25 CIPET, Head Office and its centres have organized Swachh Bharat Abhiyan activities on monthly basis. The students and staff have undertaken cleanliness activities in the Institute premises including shop floor, hostel premises & surrounding areas and also, organized awareness rallies in the adjoining areas highlighting the importance of hygiene and cleanliness.

10.26 CIPET Head Office and its Centres observed Swachhta Pakhwada Fortnight from 01.09.2022 to 15.09.2022. During Swachhta Pakhwada Fortnight, the following activities / programs were organized by CIPET:

- Administering of Swachh Pledge.
- Pledge taken for creating awareness among the employees about cleanliness.
- Display of Swachhta message on the CIPET website
- Displayed Banners / Posters at prominent places of Institute Premises as well surrounding areas nearby Institute. Also distributed Dustbins (solid / Liquid Waste).
- Distribution of Mask, Sanitizers, Soap and other safety products towards the Preventive measures to control COVID-19.
- Curb the use of Single-Use Plastic (SUP) and discourage the use of plastic in the office Viz:-
  - a. Avoiding plastic carry bags, plastic / thermocol disposable cutlery, cups, bowls spoons etc. at office.
  - b. Discourage use of artificial flowers, flex banners, flags, flower pots, PET bottles and other plastic material at office.
- Use of Social Media (Facebook, Twitter, Instagram, YouTube etc.) to generate awareness on Swachhta.
- Tagging the Swachh Bharat handles when posting over Social Media.
- Twitter: @Swachhbharat, Facebook: SBMGramin, Instagram: Swachhbharatgrameen.
- Upkeep and cleaning of inside & outside of Institute premises.
- Online Competition for students viz. Slogan writing & Essay writing Competition for students on Swachhta.
- Upkeep and cleaning of inside & outside of Hostel premises and surrounding areas for the importance of hygiene and cleanliness.
- Organized Competition for students viz. Debate & Drawing Competition for students on Swachhta.
- Sapling of trees at Institute premises for clean and green environment.



Inaugural Function



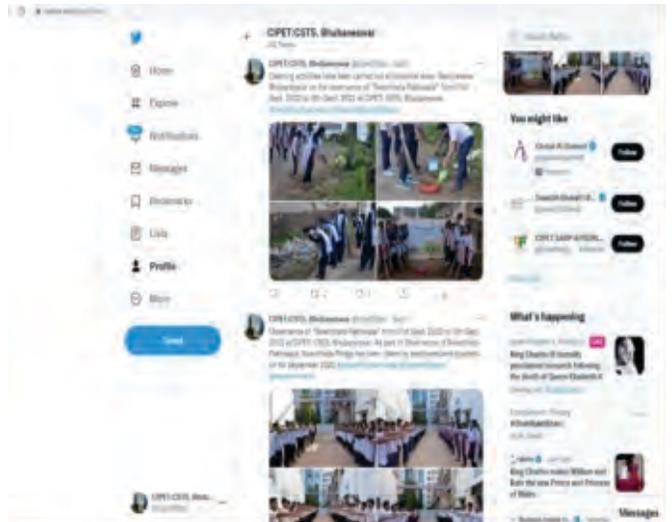
Administered Swachhta Pledge



Cleanliness Drive at Public places / schools



Distribution of Dustbins (Solid / Liquid Waste) to the people located nearby villages and Govt. Schools for the importance of hygiene and cleanliness





Use of Social Media for Swachh Bharat activities (Facebook, Twitter, Instagram, YouTube) etc



Organised Competition for students viz. Slogan writing & Essay writing, Debate, Drawing



Sapling of trees at Institute premises for clean and green environment.



Awareness Rally on Swachhta for creating awareness for the importance of hygiene and cleanliness among general public



Prizes Distributed To Students

## IX Hindi Pakhwada:

10.27 Hindi Diwas on 14.09.2022 and Hindi Fortnight (Pakhwada) from 14.09.2022 to 28.09.2022 was organized at CIPET Head Office and at its Centres. During the Pakhwada various competitions were organized i.e., Slogan and Poster Competition, Debate Competition and Essay Writing Competition. Prizes were distributed among the winners on the concluding day of Hindi Pakhwada.



## Institute of Pesticide Formulation Technology (IPFT)

### Introduction:

10.28 Institute of Pesticide Formulation Technology (IPFT) is a registered Society under the Societies Registration Act - 1860 under the Department of Chemicals & Petrochemicals, Ministry of Chemicals & Fertilizers, Government of India, located at Gurugram Haryana. IPFT is the only Institute of its kind devoted to the development of state of art user and environment friendly new generation pesticide formulation technologies. The institute has established a healthy rapport with the Indian Agrochemical Industries and has been able to successfully transfer technologies for safer, efficient and environment friendly formulations. IPFT is helping the industries in generation of data as per CIB&RC guidelines for bioefficacy, phytotoxicity and pesticide residues, both for agriculture and household formulations. IPFT undertakes both in-house and external funded R & D projects.

### Objectives of the Institute

- Development and production of state-of-the-art user and environment friendly new generation pesticide formulation technology.
- Promotion of efficient application technologies suiting the existing requirements of the newer formulations.
- Information dissemination of safe manufacturing practices, quality assurances, raw material specifications and sources.
- Analytical and consultancy services.
- Fostering the improvement in the qualifications and usefulness of pesticide scientists working in the agrochemical area.
- Continuing education through specialized training for pesticide personnel.

### Purpose to Setup

- 10.29 To minimize the risks and disadvantages of conventional formulations, IPFT was set-up to develop various user & environment friendly new generation pesticide formulations and related activities for safety of user, farmers and environment. IPFT is the only Institute of its kind in the country for helping the Indian Agro-chemical Industries in the field of pesticide formulations development. It has emerged as a reputed institute among the pesticide formulation and analytical R & D Centres of India. IPFT has always been at the forefront of developments in pesticide formulations and analytical technologies.
- 10.30 Pesticides in pure chemical form (technical grade) cannot be applied directly because of very high toxicity and complex physico-chemical properties. The technical grade pesticides are converted into a ready to use state (formulation), in which they can be diluted with water and small quantity may be homogeneously distributed over large target area. The formulated products are suitably applied by practical methods to produce desired efficacy on the target pests.

## Organizational Setup

10.31 IPFT has a well-defined Organizational structure comprising of a Governing Body which is the supreme decision taking body. Governing Body meets annually and takes critical policy decisions related to the Projects, Budget, Manpower and General Management of the Institute. Governing Body is headed by Secretary(C&PC), DCPC, New Delhi. For day-to-day financial and administrative control, the Institute has a Finance & Administrative Committee (F&AC) headed by Additional Secretary & Financial Advisor, Ministry of Chemicals & Fertilizers. The Committee meets as and when required to clear the issues related to Finance & Administration of the Institute. The Institute has a Research Advisory Board to undertake new projects and it is headed by ADG (PP), DAC, New Delhi.

## Functional Division

10.32 IPFT is served by four major Functional Divisions, namely, Formulation Division, Analytical Division, Bio-Science Division and a Pilot Plant Division. The Institute carries out In – house, Grants–In–Aid and industry sponsored projects.

## Formulation Division Activities

10.33 The main objective of this Division is to develop user & environment friendly new generation pesticide formulations. Having the required expertise and infrastructural facilities, Formulation Division is working on the advancement of pesticide formulation technology development. This Division has developed more than 80 formulation technologies, most of which have been successfully transferred to pesticide industries in India and abroad for commercialization.

10.34 The Division assists the pesticide industry personnel in producing safe and environment friendly pesticide formulations by enhancing their knowledge through training and seminars. The Division provides consultancy services to the industries on pesticide formulations. Division also has developed various bio-botanical pesticide formulations as a safe alternative to synthetic pesticides.

## Analytical Division Activities

10.35 The Analytical Division is an accredited laboratory under ISO/IEC 17025:2005 and is a core division associated with all the activities of the institute. The Division is accredited for chemical testing of pesticides (Technical & Formulations), Pesticide residues in various food matrices and chemical warfare agents and their precursors and degradation products.

10.36 The Laboratory is fully equipped with the state-of-the-art analytical instrument such as GC, HPLC, GC-MS, LC-MS/MS, UV-VIS, GC-MS/MS and Semi-Preparative HPLC for undertaking the analysis of pesticides, their formulations and residues in various matrices. The Laboratory is also recognized/certified by BIS for the testing of pesticide formulations as per IS specifications. The institute participates in the Proficiency testing programmes for the analysis of CWC related compounds conducted by the OPCW (Organization for the Prohibition of Chemical Weapons), The Hague, The Netherlands.

### **Biosciences Division Activities**

10.37 The major thrust of the division is to evaluate the different pesticide formulations developed by this institute for their commercial viability, as in house services, through well equipped bio-assay laboratory and experimental field trials. Additionally, the division is also actively engaged in developing registration data packages of various pesticides as per Central Insecticide Board-Registration Committee protocols for the pesticide industry for their new formulations through sponsored projects. The division is recognized by Central Insecticide Board-Registration Committee for generation of data on bio-efficacy, phytotoxicity, compatibility, effect of pesticides on natural enemies of pests and residual aspects of pesticides.

### **PILOT PLANT DIVISION ACTIVITIES**

10.38 The Pilot plant division has the infrastructure and equipments to scale-up the process of the pesticide formulations to semi commercial level production. The process of formulations developed by Formulation Division is scaled -up in Pilot Plant.

### **ACHIEVEMENTS**

#### **Technologies Developed**

#### **Development and Transfer of Technology of Botanical Anti- microbial Agents Based Hand Sanitizer:**

10.39 For prevention from pathogenic microorganisms hand sanitizers are generally used. The long term use of these sanitizers containing chemical antimicrobial agents may pose the hazards like development of resistance in microbes, adverse effect on human skin. To minimize the disadvantages of chemical based products, IPFT has developed Hand Sanitizer using botanical antimicrobial based formulations under a project sponsored by United Nations Industrial Development Organization (UNIDO). This formulation is suitable for prevention from various communicable diseases and COVID-19. The Pilot Plant scale technology has been developed and transferred to UNIDO for commercialization.

#### **Technology of Fungicide combination formulation**

10.40 The technology of water Dispersible Granules formulation of combination of fungicides developed. This formulation provides broad spectrum bio-efficacy against wide range of fungal pathogens in different crops. The technology has been transferred to pesticide industry IFFCO-MC Crop Science. Ltd. for commercialization.

The technology of Fungicide combination Suspo-emulsion formulation developed. For management of fungal pathogens in different agricultural crops. The technology has been transferred to pesticide industry J.U. Agri Sciences Ltd. for commercialization.

#### **Achievements**

#### **NABL Audit (as per ISO/IEC: 17025: 2017)**

- 10.41 Analytical division has state-of-art laboratories and is fully equipped with sophisticated analytical instruments such as GC, HPLC, Semi-Preparative HPLC, GC-MS, GC-MS/MS, LC-MS/MS, LC-HRMS (LC/Q-TOF), LC-ICP-MS, NMR, Simultaneous DSC-TGA, FTIR, Automated Abel Flash point apparatus, Karl Fisher, UV-VIS Spectrophotometer, etc. for undertaking various research studies.
- 10.42 The laboratory had faced NABL audit as per ISO/IEC– 17025: 2017 on 25th , 26th June-2022 for the testing of pesticides (scope of 145) Technical & Formulations, pesticide residues (scope of 280 pesticide molecules) in various food matrices and CWC related chemicals.

### Good Laboratory Practices (GLP) Audit

- 10.43 At present no Government lab is GLP certified for Physico-Chemical testing of pesticides. Only two Government labs namely National Institute of Pharmaceutical Education and Research (NIPER), Mohali and Indian Institute of Toxicology Research (IITR), Lucknow are GLP certified for toxicological studies. Therefore, establishment of GLP facilities for physic-chemical studies, pesticides residues and five batch analyses is very much important for government. Analytical Division of IPFT has faced final inspection by National GLP Compliance Monitoring Authority (NGCMA) on 29th and 30th July-2022. IPFT had successfully faced the post-assessment for the process for the implementation of OECD compliance for the quality management systems in the laboratory. Now Analytical Division of IPFT is recognized as GLP laboratory for the pesticides physico-chemical studies, pesticide residue analysis and five batch analysis.

### Training Provided

- Basic/Advanced training on techniques of analysis of Pesticide residues, Formulations and Heavy metal provided to Scientist, Executives from Fare Pvt Ltd. Gurugram, Micro Engineering and Testing laboratory, Sonipat and Tea Research Institute Kolkata. Also Ph.D students/ trainees from ICAR and other institutes/universities take training during the time.
- Pesticide Formulations Development training provided to Scientist and Ph.D student from ICAR-Indian Agriculture Research Institute , New Delhi from 25 to 29 April, 2022
- Summer training on Integrated Pest Management (06th June to 03rd July, 2022) was given to Mr. Rajat Srivastava from Amity University, Noida.
- Summer training on Integrated Disease Management (06th June to 03rd July, 2022) was given to Mr. Kishan Jha from Amity University, Noida.
- Summer training on Integrated Pest Management (06th June to 03rd July, 2022) was given to Miss. Kanak Ratnam from Galgotia's University, Noida.
- One month training on Integrated Pest Management (01st Sep. to 30th September, 2022) was given to Mr. Lalit Saini.

### Grant-in-Aid Projects

Monitoring of Pesticide Residues at National Level” sponsored by Department of Agriculture & Cooperation, Ministry of Agriculture, Government of India

10.44 IPFT is serving as one of the 32 centres of the above entitled national level project. As per the mandate of the project a total no. of 62 samples comprising of Cereals, Vegetables, Fruits, Milk and Water are collected from three locations of Haryana (Faridabad, Bahadurgarh & Palwal) in monthly frequency. Analysis results show an average contamination percentage of 10%, out of which approximately, 1-2% of samples were found to be above the documented FSSAI (MRL).

Quality Checks including Accelerated Storage Stability study of Alpha-Cypermethrin 5% WP samples procured by Central Medical Services Society (CMSS) for Disease Control and Welfare Programs of the Ministry of Health & Family Welfare, Govt. of India

10.45 The W.P formulations are tested for various physico-chemical parameters as per CIPAC method. The formulations were tested for active ingredients, foam test, wettability, sieve test, pH and suspensibility parameters in the samples before and after accelerated storage stability.

#### **Nuclear Magnetic Resonance Services**

10.46 NMR is a type of spectroscopy by which we can determine the quality and purity of a sample and the molecular structure of a compound. The following activities are going on daily basis which are as follows.

- i. Data generation for Pharma Industries i.e. Sunpharma Industries etc.
- ii. Data generated for CIL Faridabad
- iii. Data generation for Academia etc.

#### **Long Lasting Insecticidal Net (LLIN):**

10.47 LLINs are much more effective than untreated mosquito nets because they are produced with netting that contains a WHO-recommended insecticide. LLIN Net is tested for the presence of alpha-cypermethrin as per CIPAC method. Analytical division is testing samples from HIL India Ltd., Mohinder Knitting Pvt Ltd. etc for the active ingredients.

#### **In House R&D**

10.48 In House R&D, GLP, NABL and Analysis Work:

- (i) Development of Botanical based formulation for controlling stored grain pests

The experimental work for development of granular formulation of botanical based Calamus oil and thuja orientalis extract formulation for controlling stored grain pests is on progress. The formulations are being developed as safer alternative to synthetic chemical pesticides.

- (ii) Development of oleoresin combination formulation against cotton white flies

Nano emulsion formulation of Oleo Resin in combination with Imidacloprid is being developed for controlling the white flies of cotton crop.

- (iii) Development of formulations for management of Orobanche weed in Mustard crop

The Orobanche weed causes huge losses in the yield of rapeseed and mustard crops. It is a serious problem being faced by farmers in northern & western part of India. In collaboration with ICAR-Directorate of Rapeseed Mustard Research, Bharatpur, Rajasthan, three combination weedicide formulations have been developed for management of Orobanche weed. The bio-efficacy studies results are being conducted.

(iv) Development of user & environment friendly and bio-botanical pesticide formulations

Nano-emulsion formulations of synthetic insecticides in combination with kairomones are being developed for bio-efficacy enhancement and dose reduction of synthetic pesticides in crop protection

Experimental work has been initiated for developing Neem based polymeric water soluble films for mosquito larvae control applications.

(v) Development of Bio-botanical pesticide formulation for controlling pest of Seed Spices

The formulation development work for controlling pests of seed spices in collaboration with ICAR-National Center for Seed Spice Research (NRCSS), Ajmer is in progress. The bio-pesticide formulations from Gaur seed (Cluster Beans) extract and Aak (*Calotropis gigantea*) extract, Trarmira seeds extract, and *Hirsutella thompsonii* have been developed for controlling pests of seed spices. The bio-efficacy studies are on progress.

(vi). Evaluation of bio-efficacy, phyto-toxicity and effect of natural enemies of new formulation of Imidachlorpid, Emamectin benzoate and Deltamethrin on chilli crop

The project was formulated by formulation division of our institute. The major objective of this experiment is comparative evaluation of new insecticide formulation of Imidachlorpid, Emamectin benzoate and Deltamethrin in respect of its bio-efficacy to its market variants. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. Further, population count of the natural enemies and the detrimental effects of the product, if any, are required to be checked and reported. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for eight different treatments. For each treatment three replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

(vii). Isolation of impurities of hexaconazole, azoxystrobin, pendimethlin for the performing GLP five batch studies.

(viii). Also purification of pesticide technical to reference material from prep-LCMS for future addition of accreditation for becoming reference material producers as per ISO 17034.

(ix). Performing GLP study for residue analysis and pesticide formulation physic-chemical analysis.

(x). Method Development of GC, HPLC, GCMS and LCMSMS methods for sample analysis.

- (xi). Calibration of instruments and intermediate check of instrument/standards stock.
- (xii). Maintenance of instruments/equipments of the division.
- (xiii). Preparation of Technical SOP, Performing GLP Study as per OECD guideline.
- (vix). Participate in inter lab and PT Programme conducted by NIPHM, Hyderabad.
- (xv). Analysis of developed new formulations of Formulation Division.

#### **R & D SUPPORT SERVICES TO THE AGROCHEMICAL INDUSTRIES:**

##### **Bio-efficacy Field Trials:**

10.49 The following Industry sponsored projects were conducted at IPFT Experimental Research Farm and experimental data were analysed and reports are under preparation. Some of the work is ongoing/completed and their study reports have been completed/submitted to the sponsoring industry.

- i. Studies on the Residues of the product Carfentrazone Ethyl 40% DF in Wheat (grain, straw, husk)-

The project was sponsored by M/s Crystal Crop (India). Carfentrazone Ethyl 40% DF belongs to a novel class of chemistry, the aryl triazolinones, which provides 'best in class' control of broad leaf weeds by inhibiting the Protoporphyrinogen Oxidase (PPO) enzyme in the target weeds. In the project harvest wheat samples were analysed for pesticide residue. QuEChER method was followed for sample preparation using acetonitrile for extraction and cleaning of matrices by primary secondary amine, C18 and anhydrous magnesium sulphate. Method development and recovery studies were conducted for extraction of Carfentrazone Ethyl 40% DF in wheat. LC/MS/MS was used for the study using C18 column with positive and negative ionisation mode. Recoveries of the method for pesticides were found above 80%. Calibration curve of the instrument was plotted at six concentration level. The coefficient of regression is greater than 0.99. The method development, linearity and recovery study, for the analysis has been completed. All the samples were analysed, data interpretation and report has been completed and submitted to the sponsor.

- ii. Development of Water Dispersible Granules formulation of combination of two fungicides sponsored by IFFCO-MC Crop Science Pvt. Ltd.
- iii. Development of Sups-Emulsion formulation of Combination of three fungicides sponsored by J.U. Agri Sciences Ltd.
- iv. Evaluation of bio-efficacy, phyto-toxicity and effect of natural enemies of WCPL 410 against Fall Army worms, Shoot Borer, Shoot fly and Thrips on Maize crop.

The project was sponsored by M/s. Willowood Chemicals Pvt. Ltd. The major objective of the project is to evaluate the insecticide formulation of WCPL 410 in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. Further, population count of the natural enemies and the

detrimental effects of the product, if any, are required to be checked and reported. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for eight different treatments. For each treatment three replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

**v. Evaluation of bio-efficacy, phyto-toxicity and effect of natural enemies of WCPL 410 against Aphids, Jassids, Thrips, Whiteflies, Bollworms and Pink bollworms on Cotton crop.**

The project was sponsored by M/s. Willowood Chemicals Pvt. Ltd. The major objective of the project is to evaluate the insecticide formulation of WCPL 410 in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. Further, population count of the natural enemies and the detrimental effects of the product, if any, are required to be checked and reported. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for eight different treatments. For each treatment three replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

**vi. Evaluation of bio-efficacy, phyto-toxicity and effect of natural enemies of WCPL 39 against Aphids, Jassids, Thrips & Whiteflies on Cotton crop.**

The project was sponsored by M/s. Willowood Chemicals Pvt. Ltd. The major objective of the project is to evaluate the insecticide formulation of WCPL 39 in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. Further, population count of the natural enemies and the detrimental effects of the product, if any, are required to be checked and reported. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for eight different treatments. For each treatment three replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

**vii. Evaluation of bio-efficacy and phyto-toxicity of WCPL 4075 against Fruit borer, Thrips, Mites, Fruit Rot and Mildew (powdery & Downy) on Chilli crop.**

The project was sponsored by M/s. Willowood Chemicals Pvt. Ltd. The major objective of the project is to evaluate the insecticide formulation of WCPL 4075 in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for eight different treatments. For each treatment three replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

**viii. Evaluation of bio-efficacy, phyto-toxicity and effect of natural enemies of Lufenuron 5.4% EC on cauliflower crop**

The project was sponsored by M/s. Rainbow Agrosience Pvt. Ltd. The major objective of the project is to evaluate the insecticide formulation of Lufenuron 5.4% EC in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. Further, population count of the natural enemies and the detrimental effects of the product, if any, are required to be checked and reported. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for eight different treatments. For each treatment three replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

- ix. Evaluation of bio-efficacy, phyto-toxicity and effect of natural enemies of Lufenuron 5.4% EC on chilli crop

The project was sponsored by M/s. Rainbow Agrosience Pvt. Ltd. The major objective of the project is to evaluate the insecticide formulation of Lufenuron 5.4% EC in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. Further, population count of the natural enemies and the detrimental effects of the product, if any, are required to be checked and reported. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for eight different treatments. For each treatment three replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

- x. Evaluation of bio-efficacy and phyto-toxicity of GEHNA SUPER Biostimulant on maize crop

The project was sponsored by M/s. Meenakshi Agro Chemicals. The major objective of the project is to evaluate the insecticide formulation of GEHNA SUPER Biostimulant in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for six different treatments. For each treatment four replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

- xi. Evaluation of bio-efficacy and phyto-toxicity of GEHNA SUPER Biostimulant on tomato crop

The project was sponsored by M/s. Meenakshi Agro Chemicals. The major objective of the project is to evaluate the insecticide formulation of GEHNA SUPER Biostimulant in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for six different treatments. For each treatment four replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

- xii. Evaluation of bio-efficacy and phyto-toxicity of HOTSPOT Biostimulant on maize crop

The project was sponsored by M/s. Meenakshi Agro Chemicals. The major objective of the project is to evaluate the insecticide formulation of HOTSPOT Biostimulant in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for six different treatments. For each treatment four replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

xiii. Evaluation of bio-efficacy and phyto-toxicity of HOTSPOT Biostimulant on tomato crop

The project was sponsored by M/s. Meenakshi Agro Chemicals. The major objective of the project is to evaluate the insecticide formulation of HOTSPOT Biostimulant in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for six different treatments. For each treatment four replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

xiv. Evaluation of bio-efficacy, phyto-toxicity and effect of natural enemies of Cyantraniliprole 10.26% OD on chilli crop

The project was sponsored by M/s GSP Crop Science Pvt. Ltd. The major objective of the project is to evaluate the insecticide formulation of Cyantraniliprole 10.26% OD in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. Further, population count of the natural enemies and the detrimental effects of the product, if any, are required to be checked and reported. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for eight different treatments. For each treatment three replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

xv. Evaluation of bio-efficacy, phyto-toxicity and effect of natural enemies of (Candidate product: Hmb 01/1DD/21) against insect pests of cotton crop

The project was sponsored by M/s. Heranba Industries Limited. The major objective of the project is to evaluate the insecticide formulation of Hmb 01/1DD/21 in respect of its bio-efficacy. Simultaneous effect of phyto-toxicity i.e. harmful effects of the product on the growth of the plants, are required to be evaluated. Further, population count of the natural enemies and the detrimental effects of the product, if any, are required to be checked and reported. The field trial for the study is being conducted and currently the trial is on-going. Trial plots were designed following Randomized Block Design (RBD) for eight different treatments. For each treatment three replication plots were maintained. Periodic observations were recorded before and after the spray. The product was found effective till now with no visible phyto-toxicity effect.

- Evaluation of bio-efficacy, phyto-toxicity and effect on natural enemies of ETOXAZOLE 10% SC formulation against Red spider Mite on Brinjal crop

The project was sponsored by M/s Best Crop Sciences Pvt. Ltd. The major objective of the project is to evaluate the bio-efficacy along with phyto-toxicity and effect on natural enemy. The field trial for the study is being conducted and currently the trial is on-going.

- Evaluation of bio-efficacy and phyto-toxicity of Azoxystrobin 18.2% + Cyproconazole 7.3% SC against disease complex of Wheat crop

The project was sponsored by M/s Rainbow Agrosciences Pvt. Ltd. The major objective of the project is to evaluate the bio-efficacy along with phyto-toxicity. The field trial for the study is being conducted and currently the trial is on-going.

- Evaluation of bio-efficacy and phyto-toxicity of Pyraclostrobin 133 g/l + Epoxiconazole 50 g/l SE against yellow rust of Wheat crop

The project was sponsored by M/s Rainbow Agrosciences Pvt. Ltd. The major objective of the project is to evaluate the bio-efficacy along with phyto-toxicity. The field trial for the study is being conducted and currently the trial is on-going.

- Evaluation of bio-efficacy, phyto-toxicity and effect on natural enemies of BAL 175 formulation against Shoot & Fruit borer on Brinjal crop

The project was sponsored by M/s Seedling India Pvt. Ltd. The major objective of the project is to evaluate the bio-efficacy along with phyto-toxicity and effect on natural enemy. The field trial for the study is being conducted and currently the trial is on-going.

- Evaluation of bio-efficacy, phyto-toxicity and effect on natural enemies of BAL 2325 formulation against insect-pests of Chilli crop

The project was sponsored by M/s Seedling India Pvt. Ltd. The major objective of the project is to evaluate the bio-efficacy along with phyto-toxicity and effect on natural enemy. The field trial for the study is being conducted and currently the trial is on-going.

#### **Residue studies and Pesticide sample analysis:**

10.50 Pesticide formulation and R&D samples are being received from industries on regular basis for their analysis. More than fifty different products have been tested and test reports have been issued.

#### **PUBLICATIONS:**

1. ShubhamYadav, Samsul Alam, Ajin S. Anil, Lalitesh K. Thakur, Jitendra Kumar. Development and Single Laboratory Validation of Ultra-Fast Liquid Chromatography Method for Quantification of Bispyribac sodium and Diafenthiuron in Bispyribac sodium Suspension Concentrate (SC) and Diafenthiuron Wettable Powder (WP) Formulations, (Accepted in Indian Journal of Chemistry).

2. Dissipation of Lambda-cyhalothrin 5% EC on Brinjal Fruit Grown in Gurugram, Haryana, S. Mishra, V.K. Pandey, S. Bansal, Vikash, M. Singh, S. Alam, L.K. Thakur 10.18805/BKAP505 (Accepted).
3. Sudeep Mishra, Vikash, Mahesh K. Saini, Mukesh K. Singh, Shubham Bansal, Vineet K. Pandey, Ajay Singh, Samsul Alam, Irani Mukherjee, Lalitesh K Thakur and Jitendra Kumar Dissipation of Azoxystrobin 23% SC Residue In/On Chilli Fruits and Soil. (ARJ-3671, Accepted).
4. Sudeep Mishra, Mahesh Kumar Saini, Mukesh Kumar Singh, Samsul Alam, Lalitesh Kumar Thakur, Irani Mukherjee and Jitendra Kumar.Temporal assessment of crop protection agents in water bodies of Northern India. (Communicated in Agriculture Science Digest).
5. Nusrat Iqbal, Dipak Kumar Hazra, Saurabh Dubey, Megha Pant, Satyawati Sharma, Kusha, Roy, Abhishek Sharma, and Reeta Chaudhary, Formulation Engineering of Biowastes as Green Insecticide for Successful and Safe Control of German Cockroaches (*Blattella germanica* (L.)) and Possible Waste Management, ACS Agric. Sci. Technol. 2022, 2, 2, 302–310.
6. Nusrat Iqbal, Dipak Kumar Hazra, Alope Purkait, Amrish Agrawal, Jitendra Kumar Bioengineering of neem nano-formulation with adjuvant for better adhesion over applied surface to give long term insect control, Colloids and Surfaces B: Biointerfaces 209 (2022) 112176.
7. Smriti Kala, Chetan Jawale, Nish Sogan, Amrish agrawal, Krishna Kant, B.K. Mishra, Jitenda Kumar (2022) Analogous Foliar uptake and leaf to root translocation of micelle nano particles in dicot plants of two diverse families. Nano Impact (Accepted 27 September, 2022).

### Book Chapters

- i. Nusrat Iqbal, Saurabh Dubey, Manmeet Kaur, Samsul Alam, Amrish Agrawal, Irani Mukherjee & Jitendra Kumar (2022). Nanocomposites Application in Sewage Treatment and Degradation of Persistent Pesticides Used in Agriculture. In: Pandey, L.M., Hasan, A. (eds) Nanoscale Engineering of Biomaterials: Properties and Applications. Springer, Singapore. [https://doi.org/10.1007/978-981-16-3667-7\\_232](https://doi.org/10.1007/978-981-16-3667-7_232).
- ii. Nusrat Iqbal, Saurabh Dubey, Reeta, Amrish Agrawal, Jitendra Kumar 2002, Medicinally important natural bioactive Compounds for leishmaniasis treatment: efficient alternate of toxic drugs” Editor(s): Atta-ur-Rahman, Studies in Natural Products Chemistry, Elsevier, Volume 74, ISSN 1572-5995, ISBN 9780323910996, <https://doi.org/10.1016/B978-0-323-91099-6.00001-3>.

### Accreditation, Certification and Recognitions

#### NABL Accreditation (as per ISO/IEC: 17025: 2017):

- 10.51 Analytical labs of IPFT are continued to maintain its NABL accreditation with 280 no. pesticides residues in cereals, pulses, food grains, fruits, vegetables, spices, milk etc. Analytical labs are also accredited for 145 pesticide Formulation/Technical analysis and CWC related chemicals analysis.

#### CIB & RC Recognition:

- 10.52 Analytical division is recognized by CIB & RC for pesticide residue data generation.

**GLP accredited laboratory:**

10.53 IPFT had successfully faced the post-assessment by National GLP Compliance Monitoring Authority (NGCMA) on 29, 30 July-2022 for the process of implementation of OECD compliance for the quality management systems in the laboratory. Now Analytical Division of IPFT will be recognized as GLP laboratory for the physico-chemical studies, pesticide residue analysis and five batch analysis.

**APEDA recognition:**

10.54 Analytical division is also recognized by APEDA for organic exports.

**Skill Development & Training:**

10.55 IPFT conducts skill development and other training courses for various stakeholders in chemical and agrochemical sector. Some of the courses offered at IPFT are: Basic Techniques of Pesticide Formulations; QA/QC of pesticides and their formulations; pesticide application technology; pesticide residue analysis; basic principles of GC, HPLC, GC-MS, GC-MS/MS, LC-MS/MS; Advanced Training on GC, HPLC, GC-MS, GC-MS/MS, LC-MS/MS, LCHR-MS, Biotech application in biological pesticides, laboratory and field evaluation of new molecules and pesticides for agriculture and public health sectors; and integrated pest management. IPFT contributes towards farmer's field days and farmers meetings with significant impact under development of rural agriculture and intensive crop management. Research scholars, students and executives from Indian universities, pesticide industries come to IPFT for taking hands on training in the above mentioned areas. During the period of report, four executives from Haryana Horticulture Department attended training course on pesticide analysis.

10.56 Students & Faculties from MMH College Ghaziabad, visited Institute of Pesticide Formulation Technology to see our facilities. Scientists & Project Associates working at IPFT interacted with the professors & students & explained about the functions of sophisticated equipments like-

- Particle Size Analyser
- NMR 500MHz
- HPLC
- GC-MS; GC-MS/MS
- GC-FID/ECD/NPD/FPD
- LC-MS/MS
- LC-ICP/MS
- RT-PCR, etc.

- 10.57 The faculties & professors of MMH College also discussed about the collaborative projects & opportunities for students to do Ph.D. jointly.

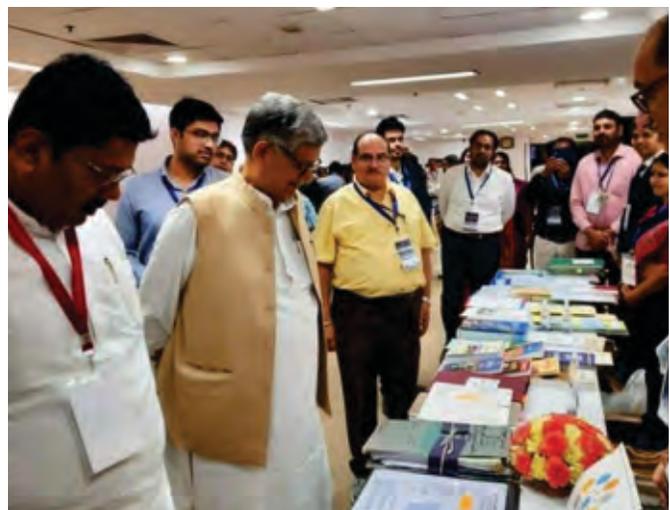


#### Awareness and Extension Activities:

- MoU signed between IPFT, Gurugram and CSIR-IITR, Lucknow for Scientific collaboration at the celebration of world environment day at CSIR-IITR, Lucknow, on 4th June 2022.



- 8th International Day of Yoga celebration conducted at IPFT, Gurugram, in collaboration with HIL India, CIPET & DCPC.
- More than 200+ people marked their presence at the event & attended the Live Telecast of Address by Hon'ble Prime Minister on IDY2022
- Officials & Staff of IPFT, DCPC, HIL India & CIPET joined the special yoga session organized at IPFT, Gurugram and performed yoga with great enthusiasm



- Second prize in Hindi at Hindi Salahkar Samiti Meeting, chaired by Honourable Minister Mansukh Mandaviya.
- Executives from Syngenta Global :-
- Mr. Mike Bean (Global Head of Product Technology & Engineering)
- Mr. Neal Bird (Global Product Technology & Engineering Manager)
- Mr. Sunil Kurchania (Head - Crop Protection Development)
- Mr. Rajendra Hosmani (Head - Analytical & Product Chemistry)
- Mr. Manoj Kumar (APAC Formulation Process Lead)
- Mr. Rajesh Dhawan (Head - CP Reg India & Senior Regulatory Expert)

visited the facilities at Institute of Pesticide Formulation Technology (IPFT) and discussed future opportunities & collaboration on agrochemical Research & Development.



- Officials from IPFT attended the seminar on “Safe use of Chemicals” organized by Department of Chemicals & Petrochemicals in association with International Labour Organization at FICCI, New Delhi On 27th July 2022



- Officials from IPFT attended the Webinar on “GIS Based Applications using AI for effective Land Management”, held on 04 August 2022.



- In honour of the Azadi Ka Amrut Mahotsav celebration & in order to raise awareness of the Har Ghar Tiranga campaign, Director-IPFT distributed Tiranga & encouraged the employees to hoist Tiranga at home.



- To mark the occasion of 76th Independence Day of India & to celebrate Azaadi Ka Amrut Mahotsav a flag hoisting ceremony was conducted at IPFT, Gurugram.



IPFT has been creating awareness and doing extension activities for farmers through the following activities:

- Identifying and adopting villages for educating the farmers in Pesticide Application Technologies.
- Conducting survey and obtaining feedback on latest pests problems.
- Educating farmers about organic farming and propagating the use of indigenous techniques/ traditional knowledge.
- Dissemination of information among farmer community for judicious use of pesticide through various platforms.

#### Activities under Swachh Bharat Mission:

##### Swachhta Pakhwada

10.58 Swachhta Pakhwada was celebrated by IPFT from 1-9-2022 to 15-9-2022. Dr. Jitendra Kumar, Director, IPFT administered Swachhta Oath to officers & staff as part of Swachhta Pakhwada being observed at Institute of Pesticide Formulation Technology.



## Rajbhasha activities:

### Celebration of Hindi Divas

10.59 Hindi Divas was celebrated by IPFT on 14th September 2022. Dr. Amrish Agrawal, Head Formulation, delivered lectures on importance of Hindi to motivate the employees and promote the use of Hindi in the office. Hindi quiz was organised on the occasion. The staff members participated in the quiz and cash prizes were given to the top 5 contestants.



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## CHAPTER-11

## PROMOTIONAL ACTIVITIES AND MAJOR EVENTS

**India Chem 2022**

- 11.1 To promote the Indian Chemicals and Petrochemicals Industry, Department of Chemicals and Petrochemicals in collaboration with FICCI organizes the “India Chem” event biennially since 2000. These events provide a platform to the Indian Chemical and Petrochemical Industry to showcase its potential to an international audience.
- 11.2 Chemical industry in India is a diversified industry, covering more than 80,000 commercial products. The chemical industry is the mainstay of industrial and agricultural development of the country and provides building blocks for several downstream industries such as textiles, papers, paints, soaps, detergents, pharmaceuticals, vanish etc.
- 11.3 The most important objective behind organizing the India Chem series is to highlight the investment possibilities in the country’s chemical industry and to promote “Make in India” initiative of the Government of India. Leading companies from all over the world predominantly from Iran, China, Japan, United Kingdom, Spain, USA, Germany, Italy, Brazil, Turkey and South East Asian countries are participating as exhibitors, delegates and visitors in the event.
- 11.4 Keeping in view that India Chem is India’s largest composite event of Chemicals, Petrochemicals, and Technologies, Process Plant Machinery, Controls & Automation System Industry, Department of Chemicals and Petrochemicals (DCPC) in association with the Federation of Indian Chambers of Commerce and Industry (FICCI), organized the 12th edition of India Chem during 2nd -3rd November, 2022 at Pragati Maidan, New Delhi. The theme of the event was “Vision 2030: Chemicals and Petrochemicals Build India”.
- 11.5 The event was inaugurated by Dr Mansukh Mandaviya, Hon’ble Minister of Health & Family Welfare, Chemicals & Fertilizers, Government of India in the presence of Mr Bhagwanth Khuba, Minister of State for Chemicals & Fertilizers and New & Renewable Energy, Government of India, Mr Gudivada Amarnath, Minister of Industries, Infrastructure, IT & Electronics, Government of Andhra Pradesh and industry representatives.
- 11.6 The Key Highlights of the event are as under:
- Exhibitors: 126
  - Participation from 57 countries
  - Partners States: Odisha, Rajasthan, Maharashtra, West Bengal, and Andhra Pradesh
  - State Delegations from 16 States
  - Foreign Delegates: 613
  - Foreign Missions: 32
  - Business Visitors: 6283
  - B2B & B2G Meetings: 724

**CHEMICAL PROMOTION DEVELOPMENT SCHEME (CPDS)**

- 11.7 Chemical Promotion Development Scheme (CPDS) is being implemented since 1997 in the Chemical Division of DCPC under Plan Head of Account. The objective of CPDS is to facilitate growth and development of Chemicals and Petrochemicals Industry by creation of knowledge products through studies, survey, data banks, promotional material etc. and dissemination of knowledge through conduct of seminars, conferences, exhibition etc. to facilitate development of these sectors. The Scheme also aims to incentivize research and innovation by awarding outstanding efforts in the field of chemicals and petrochemicals.
- 11.8 The aim of the Scheme is to extend soft support in the form of Grants-in-Aid (General) to various organisations/ industry associations, etc. to conduct workshops, seminars, studies, etc. to obtain necessary inputs for enabling the Department to firm its views on various policy matters relating to the Chemical and Petrochemical sector.
- 11.9 Industry Associations, PSUs and Autonomous Bodies viz. DMAI, AMAI, FICCI, CII, ICC, CIPET, IPFT, HIL etc. organise small events on the themes which are useful for the development of Indian Chemical & Petrochemical Industry. Few small programmes periodically organised on Plastic waste management, Green Chemistry, chemical safety and security rating system, safe handling of Chlorine and Chlorine containers, status of implementation of Health, Safety, Security and Environment in MSME sector, Chlor-Alkali Industry etc. are some of the noteworthy events. Mega events such as India Chem, Conference on Advancements in Polymeric Materials (APM), National Awards, PCPIR Conference are organised under CPDS.
- 11.10 The funds utilized under CPDS since 2018-19 are as under:

Year	Fund Utilized (Rs. in Crore)
2018-19	2.38
2019-20	2.93
2020-21	2.80
2021-22	3.59
2022-23	1.25*
<i>*up to December, 2022</i>	

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## CHAPTER – 12

### GENERAL ADMINISTRATION

#### Organisational set up of the Department

- 12.1 The main activities of the Department are policy making, sectorial planning, promotion and development of chemical and petrochemical industries. The administrative and managerial oversight of Public Sector Undertakings engaged in the manufacture of various chemicals and petrochemicals, as well as Autonomous Bodies engaged in these sectors are some of the other major functions of the Department.
- 12.2 The Department is headed by a Secretary to the Government of India who is assisted by an Additional Secretary & Financial Adviser, three Joint Secretaries, One Economic Adviser, one Deputy Director General and one Chief Controller of Accounts (Organisation chart at Annexure IV).

Employment of Scheduled Castes/ Scheduled Tribes/ Physically Handicapped in the Main Secretariat of the Department

- 12.3 The status of employment of Scheduled Castes/Scheduled Tribes/Physically handicapped in the main Secretariat of the Department, as on 31.12.2022 is as under:

Group	Total No. of posts	Scheduled Castes	Scheduled Tribes	Physically Handicapped
A	36	2	3	0
B	72	8	0	0
C	74	7	4	1
<b>TOTAL</b>	<b>182</b>	<b>17</b>	<b>7</b>	<b>1</b>

- 12.4 Officers in Group 'A' include officers on deputation from All India Services, Central Services, officers belonging to Central Secretariat Service and Technical posts of the Department. Placements in posts of Group B and C is done on the basis of nominations made by the Department of Personnel & Training, Department of Official Language and Ministry of Statistics & Programme Implementation.

#### RECORD MANAGEMENT

- 12.5 The Parliament has enacted "The Public Records Act, 1993" to regulate the management, administration and preservation of public records of the Central Government. The Central Government has also made rules to carry out the provisions of the Act. In terms of the provisions contained in Section 6(1) of the Act, the Under Secretary in-charge of General Administration has been nominated as Records Officer in the Department. A modernized Record Room of the Department is located in Udyog Bhawan.

#### Use of Hindi in Official Work

- 12.6 Official Language Division, Department of Chemicals and Petrochemicals ensures compliance with the Statutory Provisions & Presidential Orders on the Official Language Policy of the Union

Government in its Headquarter, PSUs and autonomous offices. The work of Official Language Division is being supervised by Deputy Director (OL) under the overall guidance of Deputy Director General.

- 12.7 Hindi Pakhwada was organized in the Department from 14th to 28th September, 2022. During the Pakhwada, five competitions on Hindi Essay Writing, Noting & Drafting, Translation, and Hindi Poetry Recitation & Hindi Essay Writing exclusively for MTSs were held. Also, a Hindi Workshop on the subject “हिन्दी टंकण के विकल्प” was organised on 14.9.2022.



- 12.8. Departmental Official Language Implementation Committee's meetings were held under the chairpersonship of Joint Secretary/Deputy Director General on 29.03.2022, 22.06.2022 and 27.09.2022 and 29.11.2022. The progress made in the use of Hindi in the Department was reviewed in these meetings and suggestions for further improvement were adopted for implementation. In these meetings status of Hindi correspondence including noting in Hindi were also discussed.
- 12.9. Official language related inspection of IPFT and CIPET Murthal were carried out by the division on 18.02.2022 and 03.03.2022 respectively. Suggestions were given to the officers/officials present

during the inspection for increasing and improving the use of Hindi.



- 12.10 Documents like Annual Report, Performance Budget, Demand-for-Grants, Parliament Questions & Assurances, Papers of Department related Parliamentary Standing Committee & Report of Comptroller and Auditor General, Cabinet notes, papers of updating the Departmental website etc. were issued in bilingual form as per the Section 3(3) of the Official Language Act, 1963. All letters received in Hindi were replied to in Hindi as per the Rule 5 of the Official Language Rules, 1976. Efforts were made to progressively increase the use of Hindi in day-to-day official work as laid out in the Annual Programme of the Department of Official Language.
- 12.11 During the year, Quarterly Progress Reports of Hindi were compiled on the basis of the inputs received from different Sections of the Department & were sent to the Department of Official Language for inclusion in their database. Reports received from attached and subordinate offices were reviewed and shortcomings found therein were suggested for rectification.

#### Activities of the Vigilance Set up

- 12.12 The Department has a Chief Vigilance Officer (CVO) to look into the complaints against the employees of the Department as well as Board Level Officers of the Public Sector Undertakings (PSUs) and other organisations under its administrative control. Presently, the Joint Secretary (Administration) is holding the charge of CVO in the Department and assisted by an Under Secretary and a Vigilance Section.
- 12.13 'Vigilance Awareness Week' 2022 was observed in the Department during the period 31st October, 2022 to 6th November, 2022 with the theme "भ्रष्टाचार मुक्त भारत-विकसित भारत" "**Corruption free India for a developed Nation**". The observance of the Vigilance Awareness Week commenced with administering the Integrity Pledge for Citizens at 1100 hrs on 31st October, 2022 by the Secretary (C&PC) in his Chamber to all the officers of and above the level of Under Secretary, and by the respective Section Officers to the staff of their Sections.
- 12.14 To encourage officers and staff of the Department as well as general public to take e-pledge, a

hyperlink was provided for the relevant link on the CVC website, on the Departmental website.

- 12.15 Pursuant to the directions of the Central Vigilance Commission, a three month campaign (from 16.08.2022 to 15.11.2022) was carried out as a precursor of the Vigilance Awareness Week, 2022 during which examination of pending Annual Property Returns, Record management, website maintenance and its updation, disposal of pending complaints, were taken up.
- 12.16 With a view to highlight the importance of the Theme of the Vigilance Awareness Week, 2022 i.e. “**भ्रष्टाचार मुक्त भारत-विकसित भारत**” "Corruption free India for a developed Nation", a Workshop was organised by the Department on “Preventive Vigilance: The Role of each Employee” on 04.11.2022 at 1500 hrs, in a hybrid mode wherein the Departmental officers and staff participated physically and the officers and staff of the Autonomous Bodies and PSUs participated via online mode. A Talk was delivered by Shri A. K. Kanoujia, Additional Secretary in CVC on the subject issue and the Secretary, C&PC also addressed the participants of the workshop.
- 12.17 PSUs and Autonomous Organisations under the administrative control of the Department also organized ‘Vigilance Awareness Week’ starting with undertaking the Integrity Pledge by their officers and staff.

### Gender Equality

- 12.18 In compliance of The Sexual Harassment of Women at Workplace (Prevention, Prohibition and Redressal) Act, 2013 the Department has constituted an Internal Complaints Committee for redressal of complaints relating to sexual harassment of women. The Committee is functional since June 2002. Constitution of the ICC on Sexual Harassment of Women at Workplace was uploaded on the website of the department in order to spread awareness about the Committee. One complaint box has been placed at 2nd Floor, A Wing near Gate No. 2 for the convenience of women employees.

### Rights of Persons with Disabilities

- 12.19 The Rights of Persons with Disabilities Act, 2016 aims to uphold the dignity of every person in the society and prevent any kind of discrimination. All efforts are made that persons with disabilities have easy access to the physical environment and other facilities and services. The Information and Facilitation Centre of the Department has been set up specifically on the ground floor in Shastri Bhawan enabling easy and obstacle free accessibility for such persons. Senior officers of the Department are available to attend to the problems of persons with disabilities.
- 12.20 Department of Chemicals & Petrochemicals is the cadre controlling authority in respect of 06 Technical posts in Group ‘A’, 5 posts of Staff Car Driver, 1 post of Dispatch Rider and 41 posts of Multi-Tasking Staff (MTS) in Group ‘C’. The post of MTS Group ‘C’ in this Department has been identified for the post suitable for following categories of disabilities covered under Section 34(1) of the RPWD Act, 2016 :
- Blindness (B) and low vision (LV)
  - Deaf (D) and Hard of hearing (HH)
  - Locomotor Disability (OA, OL, OAL, BL, BA) including leprosy cured (LC), cerebral palsy (CP), dwarfism (Dw), acid attack victims (AAV) and muscular dystrophy (MDy).

- d. Autism, Intellectual Disability, ASD (M), specific learning disability (SLD) and mental illness (MI).
- e. Multiple Disabilities from amongst (a) to (d)

### Observance of 'Swachhata Pakhwada' in the Department

12.21 During the Swachhata Pkhwada-2022, which was observed from 01.09.2022 to 15.09.2022, the Department of Chemicals & Petrochemicals and the PSUs/Autonomous Bodies under its administrative control undertook various swachhata activities like cleaning of office complexes / factories / labs / toilets / premises. Banners and posters on cleanliness were displayed. Various competitions like Essay Writing, Poetry Recitation, Drawing Competitions etc. were organised during the Pakhwada. A VC meeting was also held with all PSUs / ABs under administrative control of the Department to review preparedness of the swachhata activities. The officers and staff members of the Department also carried out Shramdaan activity. Photographs of the event carried out during the Pakhwada were uploaded on social media platforms and were tagged on Swachh Bharat handles.





### Celebration of International Day of Yoga

12.22 International Day of Yoga is observed every year. This year the 8th International Day of Yoga fell in Azadi ka Amrit Mahotsav year and it was observed at 75 iconic sites across the country for India Branding. This programme was organized by the Department of Chemicals & Petrochemicals at IPFT Centre, Gurugram on 21.06.2022. Officers and officials of Department of Chemicals & Petrochemicals and all PSUs/ABs under its administrative control participated this event of international repute. All employees were encouraged to practice yoga as a routine affair to get health benefits.



### Celebration of Constitution Day

- 12.23 26th November is celebrated as Constitution Day to commemorate the adoption of the Constitution of India. Officers and staff members of Department of Chemicals & Petrochemicals and PSUs/ABs under its administrative control took active participation in celebration of Constitution Day. Preamble to the Constitution was read collectively offline. There was active participation in the online events viz. "Reading Preamble to the Constitution" and Online Quiz on India – the Mother of Democracy /भारत-लोकतंत्र की जननी. Visuals of the activities were shared on social media handles suitably. This year Constitution Day was observed in the Department with great enthusiasm.
- 12.24 The following days/week were observed in the Department on the respective dates. Secretary of the Department administered pledge to the officers on these occasions:

Sadbhavana Day Pledge	18th August 2022
Swachhta Pakhwada	1st-15th September 2022
Hindi Pakhwada	14th – 28th September 2022
Swachhta Special Campaign	2nd October 2022
Vigilance Awareness week	31st October- 6th November 2022
Rashtriya Ekta Divas	31st October 2022
Constitution Day	26th November 2022

### Procurement through Government E-Market (GEM)

- 12.25 The Department made full utilization of the Government's E-procurement platform by procuring items it consume through GeM. As a result, the value of goods procured through GeM for the period from 01.04-2022 till 31.12.2022 is Rs.259.81 Lakh against the procurement value of Rs.297.02 Lakh during the previous Financial Year.

### Special Campaign 2.0 for Disposal of Pending Matters

- 12.26 Special Campaign was observed in the Department from 2.10.2022 to 31.10.2022. Shri Arun Baroka, Secretary, DCPC launched the Special Campaign 2.0 for Disposal of Pending Matters in the Department of Chemicals and Petrochemicals on 2.10.2022.
- 12.27 The Department took up the campaign all over the country through the active and enthusiastic participation of various centres of organisations such as Central Institute of Plastic Engineering and Technology (CIPET), Institute of Pesticide Formulation Technology (IPFT), Hindustan Organic Chemical Limited (HOCL), HIL (India) Limited (HIL), and Hindustan Fluorocarbons Limited (HFL).
- 12.28 Apart from the Pan-India coverage, the campaign was taken up in historically important sites such as Samadhi Sthal of Jhansi ki Rani-Laxmi Bai, in Gwalior; public places such as Inter State Bus Terminal in Bhopal, Railway Station in Lucknow and Jorbag Metro Station in New Delhi; market places such as Bodhjungnagar market in Agartala and Bankiya Market in Agartala; parks such as Corporation Children Park in Chennai and Public Park in Jaipur; religious places such as Paleswar Temple in Hajipur, Shirkanchandi Temple in Bhubaneswar and outside Shri Jagannath Temple,

Bhubaneswar; educational institutions such as FACT Eastern UP School in Eloor Kochi, Sinduvighopa LP School and Dhopatari Silbharal High School in Guwahati, Govt. Upper Primary School in Ernakulam Women Polytechnic College in Gwalior, Oriental College in Imphal.

- 12.29 The message of mainstreaming swachhata activities to normal everyday life was thus spread to various sections of the citizens far beyond the boundary of office campuses.

#### **Observation of Cyber Jagrookta (Awareness) Diwas**

- 12.30 Considering the widespread prevalence of Cyber Crime i.e. criminal activity that either targets or uses a computer network or a networked device and the risk it posed to national assets, the Department organised two Cyber Awareness Webinars 1st on 13.5.2022 and 2nd on 6.10.2022 on various topics relating to Cyber Jagrookta (Awareness).

#### **Hosting Of National Flag at Homes under “Har Ghar Tiranga” Campaign**

- 12.31 Indian National Flag is a symbol of national pride for the entire nation. Under the aegis of Azadi Ka Amrut Mahotsav (AKAM) a campaign “Har Ghar Tiranga” programme was launched to encourage the citizens to hoist the National Flag of India in their homes during the period 13th – 15th August, 2022.
- 12.32 To generate momentum and make Har Ghar Tiranga programme a people-centric movement with maximum Jan Bhagidari, all the Officers and staff members of the Department as well as all PSUs/ABs under the administrative control of the Department were encouraged to make the campaign a resounding success.
- 12.33 The National Flag was provided to all employees of the Department with the instructions to accord due honour as per Flag Code of India, 2022. Photographs taken on the occasion were shared by the employees on Department’s dashboard that were further uploaded on social media platforms.

#### **Conduction of COVID Vaccination Camp in Department of Chemicals & Petrochemicals**

- 12.34 Under the aegis of ‘Azadi Ka Amrut Mahotsava’, a Special Vaccination Camp was organized by the Department of Chemicals & Petrochemicals on 21.09.2022 for administration of precaution dose to all eligible beneficiaries. All officers and staff members who were eligible and willing to avail the facility got themselves vaccinated in the Camp.

#### **Activities of the Vigilance Set up**

- 12.35 The Department has a Chief Vigilance Officer (CVO) to look into the complaints against the employees of the Department as well as Board Level Officers of the Public Sector Undertakings (PSUs) and other organisations under its administrative control. Presently, the Joint Secretary (Administration) is holding the charge of CVO in the Department and assisted by a Dy. Secretary and a Vigilance Section.
- 12.36 ‘Vigilance Awareness Week’ 2022 was observed in the Department during the period 31st October, 2022 to 6th November, 2022 with the theme “भ्रष्टाचार मुक्त भारत-विकसित भारत” "Corruption free India for a developed Nation". The observance of the Vigilance Awareness Week commenced with administering the Integrity Pledge for Citizens at 1100 hrs on 31st October, 2022

by the Secretary (C&PC) in his Chamber to all the officers of and above the level of Under Secretary, and by the respective Section Officers to the staff of their Sections.

- 12.37 To encourage officers and staff of the Department as well as general public to take e-pledge, a hyperlink was provided for the relevant link on the CVC website, on the Departmental website.
- 12.38 Pursuant to the directions of the Central Vigilance Commission, a three month campaign (16.8.2022 to 15.11.2022) was carried out as a precursor of the Vigilance Awareness Week, 2022 during which examination of pending Annual Property Returns, Record management, website maintenance and its updation, disposal of pending complaints, were taken up.
- 12.39 With a view to highlight the importance of the Theme of the Vigilance Awareness Week, 2022 i.e. “भ्रष्टाचार मुक्त भारत-विकसित भारत” “**Corruption free India for a developed Nation**”, a Workshop was organised by the Department on “Preventive Vigilance. The Role of each Employee” on 04.11.2022 at 1500 hrs, in a hybrid mode wherein the Departmental officers and staff participated physically and the officers and staff of the Autonomous Bodies and PSUs participated via online mode. A Talk was delivered by Shri A. K. Kanoujia, Additional Secretary in CVC on the subject issue and the Secretary, C&PC also addressed the participants of the workshop.
- 12.40 PSUs and Autonomous Organisations under the administrative control of the Department also organized ‘Vigilance Awareness Week’ starting with undertaking the Integrity Pledge by their officers and staff.

#### Department New website

- 12.41 The Department has developed and publish a new website which is more users friendly, contains more and updated material with a pleasant aesthetic look. Built on a higher version of DRUPAL 9.4 than the previous one DRUPAL 7.x, the new website is designed and data organized so as to facilitate convenience of searching.

#### Departmental Dashboard

- 12.42 The dashboard of the D/o Chemicals & Petrochemicals has been created with individual User – ID and Password for all the officials of the Department and its Public Sector Undertakings (PSUs) & Autonomous Bodies (ABs) for respective indicators so that monthly information may be updated for each indicator by the concerned Divisions/ABs/PSUs. To avoid the delay in updating the data by the concern divisions the dashboard is technically linked with the websites of PSUs and ABs with the help of web – services so that the monthly updating will be reflected automatically on the Departmental dashboard.

#### Redressal of Public Grievances

- 12.43 Internal grievances redressal machinery functioning under the Department, attends all the public grievances. During the period between 01.01.2022 to 31.12.2022, 482 public grievances were received and they all were attended promptly. The rate of redressal of Public Grievances in this Department is about 97%. The Economic Advisor has been nominated as Nodal officer of Public Grievances of the Department. The name, designation, room number, telephone number, etc. of the Nodal Officer in Public Grievances has been displayed on the website of the Department (<http://chemicals/gov.in>). A public Grievance Officer has been nominated in each Division as the

Nodal Officer to monitor the Progress of the redressal of public grievances in respective Divisions.

### **Right to Information Act, 2005**

- 12.44 Under the provisions of the Right to Information Act, 2005, a RTI Cell has been set up in the Department to coordinate the RTI-related work. This Section collects, transfers the application seeking information under the RTI Act, 2005 to the Central Public Information Officers / Public Authorities concerned with the subject matter and submits quarterly returns regarding receipt and disposal of the RTI applications/appeals to the Central Information Commission.
- a) All Under Secretary/ Section Officer level officers have been designated as Central Public Information Officers (CPIOs) under section 5(1) of the Act, according to the subjects being handled by them.
  - b) All Director /Deputy Secretary level officers have been designated as Appellate Authorities in terms of section 19(1) of the Act, in respect of Under Secretaries/Section Officers working as CPIOs with them.
  - c) To facilitate the receipt of applications under the RTI Act, 2005, a provision has been made to receive the applications at the Reception Counter of the Department. The applications so received are further forwarded by the RTI Cell to the CPIOs/Public Authorities concerned.
  - d) During the year 2021-22 i.e from 01.01.2021 to 31.12.2022, 255 RTI applications and 24 RTI First Appeals were received in this Department. These were promptly transferred / forwarded to the concerned public authorities/CPIOs for providing information to the applicants.
  - e) As per para 1.4.1 of DoPT's guidelines issued vide their O.M. No. 1/5/2011-IR dated 15.4.2013, this Ministry has been disposing all RTI applications, appeals and replies of CPIOs and appellate authorities through the portal.

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## Annexure I

## PRODUCT-WISE INSTALLED CAPACITY &amp; PRODUCTION OF MAJOR CHEMICALS

(Figures in 000'MT)

MAJOR GROUPS / PRODUCTS	INSTALLED CAPACITY			PRODUCTION					CAGR (%)
	2019-2020	2020-2021	2021-2022	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>1. ALKALI CHEMICALS</b>									
SODA ASH	3614.00	3614.00	3614.00	2989.57	3048.19	3069.43	2638.12	3078.90	0.74
CAUSTIC SODA	3700.34	3898.20	4150.83	2742.31	2925.35	3136.94	2964.08	3462.77	6.01
LIQUID CHLORINE	2774.73	2961.23	3124.41	1899.41	2069.11	2250.43	2174.26	2499.33	7.10
<b>Total</b>	<b>10089.07</b>	<b>10473.43</b>	<b>10889.24</b>	<b>7631.30</b>	<b>8042.65</b>	<b>8456.80</b>	<b>7776.46</b>	<b>9041.00</b>	<b>4.33</b>
<b>2. INORGANIC CHEMICALS</b>									
ALUMINIUM FLUORIDE	25.60	25.60	25.60	7.51	5.70	5.05	3.70	8.91	4.35
CALCIUM CARBIDE	112.00	112.00	112.00	87.30	83.17	81.34	86.78	98.62	3.10
CARBON BLACK	696.00	696.00	696.00	530.36	546.39	500.15	384.78	456.49	-3.68
POTASSIUM CHLORATE	28.60	28.60	28.60	0.35	0.70	16.18	17.08	17.68	167.16
SODIUM CHLORATE	0.00	22.32	22.32	0.00	0.00	0.00	17.92	21.14	
TITANIUM DIOXIDE	82.50	82.50	82.50	57.82	57.06	49.49	51.22	56.96	-0.37
RED PHOSPHORUS	1.68	1.68	1.68	0.88	1.03	1.03	1.07	1.15	6.80
HYDROGEN PEROXIDE	218.63	218.63	221.77	157.02	156.45	122.84	139.90	143.49	-2.23
POTASSIUM IODATE	1.20	1.20	1.20	0.00	0.00	0.56	0.54	0.58	
CALCIUM CARBONATE	371.55	371.55	383.55	217.25	213.33	286.83	274.79	246.78	3.24
<b>Total</b>	<b>1537.75</b>	<b>1560.07</b>	<b>1575.21</b>	<b>1058.48</b>	<b>1063.83</b>	<b>1063.47</b>	<b>977.78</b>	<b>1051.78</b>	<b>-0.16</b>
<b>3. ORGANIC CHEMICALS</b>									
ACETIC ACID	142.05	142.05	142.05	157.07	153.80	167.86	154.76	166.59	1.48
ACETIC ANHYDRIDE	119.18	119.18	119.18	97.09	95.47	74.15	75.09	78.43	-5.20
ACETONE	47.14	47.14	47.14	32.87	40.74	36.27	39.03	36.12	2.39
PHENOL	76.75	76.75	76.75	53.45	65.39	57.85	61.27	58.16	2.13
METHANOL	474.30	474.30	474.30	260.49	271.93	176.05	234.03	167.71	-10.42
FORMALDEHYDE	411.30	397.80	451.78	248.23	226.61	260.41	244.66	293.07	4.24
NITROBENZENE	129.45	126.45	126.45	71.41	68.80	61.14	76.09	82.85	3.78

(Figures in 000'MT)

MAJOR GROUPS / PRODUCTS	INSTALLED CAPACITY			PRODUCTION					CAGR (%)
	2019-2020	2020-2021	2021-2022	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>3. ORGANIC CHEMICALS</b>									
MALEIC ANHYDRIDE	7.66	7.66	7.66	3.31	4.56	5.02	5.38	6.33	17.57
PENTAERYTHRITOL	15.76	15.76	17.40	14.10	14.99	15.21	11.65	16.33	3.75
ANILINE	54.10	54.10	54.10	41.88	37.85	25.44	33.53	39.66	-1.35
CHLORO METHANES	279.25	330.99	345.99	222.43	285.53	296.91	326.95	340.82	11.26
ISOBUTYLBENZENE	16.80	16.80	16.80	8.95	9.70	9.44	12.72	8.52	-1.23
ONCB	30.00	30.00	30.00	24.90	23.70	19.84	23.27	26.69	1.74
PNCB	48.40	48.40	48.40	37.78	36.07	31.90	38.89	43.71	3.71
MEK	10.00	10.00	10.00	6.40	7.00	9.83	8.00	8.85	8.45
ACETALDEHYDE	151.01	151.01	151.97	65.74	61.89	77.10	55.97	72.51	2.48
ETHANOLAMINES	17.76	27.00	27.00	13.20	16.70	15.39	16.70	20.98	12.29
ETHYL ACETATE	562.06	562.06	575.06	411.49	440.56	473.39	453.13	445.43	2.00
MENTHOL	33.65	33.65	33.65	13.68	6.24	7.44	7.48	10.30	-6.86
ORTHO NITRO TOLUENE	44.80	44.80	44.80	14.39	16.89	25.98	27.67	29.95	20.11
<b>Total</b>	<b>2671.41</b>	<b>2715.89</b>	<b>2800.47</b>	<b>1798.85</b>	<b>1884.42</b>	<b>1846.62</b>	<b>1906.27</b>	<b>1953.00</b>	<b>2.08</b>
<b>4. PESTICIDES AND INSECTICIDES</b>									
D.D.T.	6.34	6.34	6.34	1.27	1.37	1.10	0.57	0.66	-15.08
MALATHION	3.80	3.80	3.80	3.29	4.39	3.79	3.84	3.29	-0.05
DIMETHOATE	1.45	1.45	1.45	1.18	1.26	1.45	1.45	1.39	4.11
D.D.V.P.	33.62	33.62	33.62	8.13	9.14	0.00	0.94	0.42	-52.26
QUINALPHOS	2.20	3.40	3.40	1.18	0.89	0.86	1.06	2.45	19.99
MONOCROTOPHOS	13.94	13.94	13.94	5.50	5.30	5.82	7.92	7.49	8.02
PHOSPHAMIDON	2.00	2.00	2.00	0.11	0.00	0.00	0.00	0.00	-100.00
PHORATE	12.40	12.40	6.60	7.02	5.85	0.00	0.00	0.00	-100.00
ETHION	2.80	2.80	2.80	2.38	1.32	2.13	2.22	2.79	4.08
FENVALERATE	4.96	4.96	4.96	0.74	0.70	0.67	0.49	0.68	-2.20
CYPERMETHRIN	23.83	23.83	24.73	8.25	10.95	10.87	12.29	16.48	18.90
ACEPHATE	20.50	20.50	20.50	18.27	19.63	21.08	29.59	29.56	12.78
CHLORPYRIPHOS	13.60	13.80	13.40	7.98	7.14	6.50	8.53	7.62	-1.16
TRIAZOPHOS	3.36	3.36	3.36	1.54	0.89	0.00	0.00	0.00	-100.00
TEMEPHOS	0.25	0.25	0.25	0.10	0.08	0.15	0.15	0.00	-100.00
DELTAMETHRIN	0.79	0.79	0.85	0.55	0.68	0.69	0.59	0.71	6.43

(Figures in 000'MT)

MAJOR GROUPS / PRODUCTS	INSTALLED CAPACITY			PRODUCTION					CAGR (%)
	2019-2020	2020-2021	2021-2022	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>4. PESTICIDES AND INSECTICIDES</b>									
ALPHAMETHRIN	0.48	0.50	0.60	0.32	0.34	0.44	0.54	0.51	12.14
PROFENOFOS TECHNICAL	10.50	10.50	17.30	9.95	12.45	12.36	16.08	16.25	13.06
PRETILACHLOR TECHNICAL	4.24	4.24	4.24	3.60	3.63	3.07	3.59	3.22	-2.75
LAMBDA CYHALOTHRIN	2.85	3.20	3.15	1.14	0.62	2.30	1.68	2.70	23.95
PHENTHOATE	0.90	0.90	0.90	1.32	1.53	1.41	1.35	1.83	8.45
PERMETHRIN TECH	1.80	1.80	1.80	1.53	1.86	1.22	1.66	2.49	12.98
IMIDACALOPRID TECH	0.15	0.15	0.15	0.34	0.10	0.02	0.03	0.03	-47.57
CAPTAN & CAPTAFOL	3.43	3.43	3.43	1.76	1.93	1.46	1.46	1.90	1.85
ZIRAM(THIO BARBAMATE)	0.70	0.70	0.70	0.72	0.76	0.63	0.88	0.67	-1.67
CARBENDZIM (BAVISTIN)	0.78	0.78	0.78	0.03	0.02	0.00	0.00	0.00	-100.00
MANCOZAB	84.70	119.80	121.80	70.25	69.33	60.88	97.43	118.67	14.01
HEXACONAZOLE	1.70	1.70	2.82	0.59	0.50	0.75	0.81	1.28	21.44
METCONAZOLE	0.75	0.75	0.50	0.40	0.34	0.21	0.20	0.19	-16.98
2, 4-D	27.00	27.00	30.00	25.83	24.24	22.56	27.05	40.00	11.55
BUTACHLOR	0.50	0.50	0.50	0.00	0.00	0.00	0.00	0.00	
ETHOFUMESATE TECHNICAL	1.65	1.65	1.65	1.29	1.04	0.79	0.43	0.73	-13.16
THIAMETHOXAM TECHNICAL	4.55	5.10	5.10	3.28	5.57	6.15	5.21	6.56	18.91
PENDIMETHALIN	6.00	5.80	6.60	3.78	2.82	2.75	3.64	4.76	5.95
METRIBUZIN	1.95	2.52	2.87	0.88	1.92	2.65	3.19	2.00	22.70
TRICLOPYR ACID TECH	0.30	0.30	0.30	0.15	0.13	0.13	0.00	0.38	25.54
ISOPROTURON	6.00	6.00	6.00	0.00	0.00	0.00	0.00	0.00	
GLYPHOSATE	12.92	12.92	12.92	6.29	6.68	5.91	6.13	5.72	-2.35
DIURON	6.00	6.00	6.00	3.26	3.62	3.40	3.42	2.33	-8.12
ATRAZIN	1.20	1.20	1.20	2.25	1.48	1.73	1.61	1.69	-6.91
ZINC PHOSPHIDE	1.92	1.92	1.92	1.40	1.26	1.32	1.47	2.02	9.68

(Figures in 000'MT)

MAJOR GROUPS / PRODUCTS	INSTALLED CAPACITY			PRODUCTION					CAGR (%)
	2019-2020	2020-2021	2021-2022	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
ALUMINIUM PHOSPHIDE	4.74	4.74	4.74	4.77	4.91	4.91	7.61	9.90	20.03
DICOFOL	0.15	0.15	0.15	0.08	0.05	0.01	0.00	0.00	-100.00
<b>Total</b>	<b>333.69</b>	<b>371.48</b>	<b>380.11</b>	<b>212.70</b>	<b>216.70</b>	<b>192.15</b>	<b>255.09</b>	<b>299.34</b>	<b>8.92</b>
<b>5. DYES AND PIGMENTS</b>									
AZO DYES	21.14	21.14	21.14	11.04	9.05	8.54	6.62	9.15	-4.59
ACID DIRECT DYES (OTHER THAN AZO)	40.90	40.90	40.90	21.15	24.13	22.75	20.22	23.97	3.18
DISPERSE DYES	75.01	77.93	77.93	46.72	55.24	61.94	51.79	65.94	9.00
INGRAIN DYES	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
OIL SOLUBLE (SOLVENT DYES)	3.60	3.60	3.60	2.07	2.29	2.41	0.44	0.67	-24.46
OPTICAL WHITENING AGENTS	67.68	67.68	67.68	23.21	29.30	20.74	18.18	22.54	-0.72
ORGANIC PIGMENT	88.36	88.36	88.36	73.34	73.94	75.08	67.27	74.34	0.34
PIGMENT EMULSION	5.41	5.41	5.41	10.16	9.78	9.69	8.60	9.31	-2.17
REACTIVE DYES	195.73	196.33	197.53	151.91	151.38	156.71	132.13	161.94	1.61
SULPHUR DYES (SULPHUR BLACK)	8.25	8.25	8.25	7.32	7.54	7.45	5.09	8.58	4.07
VAT DYES	2.86	2.86	2.86	1.65	1.78	2.13	1.99	2.32	8.83
SOLUBILISED VAT DYES	0.13	0.13	0.13	0.02	0.00	0.00	0.00	0.00	-100.00
FOOD COLOURS	0.00	0.00	0.00	0.78	0.79	0.67	0.49	0.71	-2.46
NAPTHOLS	0.90	0.90	0.90	0.00	0.00	0.00	0.00	0.00	
INORGANIC PIGMENTS	18.05	18.05	18.05	17.88	16.29	16.12	14.64	18.55	0.93
<b>Total</b>	<b>528.02</b>	<b>531.54</b>	<b>532.74</b>	<b>367.25</b>	<b>381.51</b>	<b>384.22</b>	<b>327.46</b>	<b>398.02</b>	<b>2.03</b>
<b>Total CHEMICALS (1+2+3+4+5)</b>	<b>15159.94</b>	<b>15652.41</b>	<b>16177.76</b>	<b>11068.57</b>	<b>11589.11</b>	<b>11943.25</b>	<b>11243.05</b>	<b>12743.14</b>	<b>3.58</b>

**Source:** The source of Production and Installed Capacity of Chemicals and Petrochemicals products (which are monitoring by Statistics & Monitoring Division (S&M) of DCPC) is MPRs received from manufacturers under large and medium scale units only.

**Note:** Some Pesticides and Dyes manufacturing units supply combined Installed Capacity.

## Annexure II

## PRODUCT-WISE INSTALLED CAPACITY &amp; PRODUCTION OF MAJOR PETROCHEMICALS

(Figures in 000'MT)

MAJOR GROUPS / PRODUCTS	INSTALLED CAPACITY			PRODUCTION					CAGR (%)
	2019-2020	2020-2021	2021-2022	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	
<b>A. BASIC MAJOR PETROCHEMICALS</b>									
<b>1. SYNTHETIC FIBRE</b>									
ACRYLIC FIBRE	107.00	107.00	107.00	90.97	99.45	102.90	77.02	66.68	-7.47
POLYESTER STAPLE FIBREFILL	69.00	69.00	69.00	51.33	52.99	49.89	40.30	39.04	-6.61
NYLON FILAMENT YARN	58.52	58.52	66.58	40.01	46.62	48.29	33.27	46.19	3.66
NYLON INDUSTRIAL YARN/TYRE CORD	152.02	152.02	165.70	107.59	109.55	99.75	90.29	115.47	1.78
POLYESTER FILAMENT YARN	2719.79	2727.37	2661.15	2283.41	2316.43	2520.33	1997.93	2560.79	2.91
POLYESTER STAPLE FIBRE	1350.46	1350.46	1350.46	1005.30	931.44	1027.49	909.38	1160.48	3.65
POLYPROPYLENE FILAMENT YARN	3.60	3.60	3.60	3.15	2.36	2.52	2.17	2.81	-2.83
POLYPROPYLENE STAPLE FIBRE	30.93	30.93	29.73	22.24	20.74	18.82	15.34	21.25	-1.14
POLYESTER INDUSTRIAL YARN	21.50	21.50	21.50	15.04	14.83	14.73	12.36	14.39	-1.10
Elastomeric/ Spandex Filament Yarn	8.50	8.50	8.50	6.18	7.08	8.06	6.60	12.90	20.23
<b>Total</b>	<b>4521.31</b>	<b>4528.88</b>	<b>4483.22</b>	<b>3625.20</b>	<b>3601.48</b>	<b>3892.78</b>	<b>3184.65</b>	<b>4040.01</b>	<b>2.75</b>
<b>2. POLYMERS</b>									
LINEAR LOW DENSITY POLYETHYLENE (LLDPE) *	No separate Capacity			185.66	193.05	613.29	616.61	583.04	33.12

(Figures in 000'MT)

PRODUCTS	INSTALLED CAPACITY			PRODUCTION					CAGR (%)
	2019-2020	2020-2021	2021-2022	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>2. POLYMERS</b>									
LINEAR LOW DENSITY POLYETHYLENE (LLDPE)	No separate Capacity			1290.05	1581.22	2994.03	2958.92	2914.12	22.60
HIGH DENSITY POLYETHYLENE (HDPE)	No separate Capacity			1578.38	1597.68	1897.57	1910.04	1915.77	4.96
LLDPE/HDPE (Combined) *	5158.10	5158.10	5158.10	2868.42	3178.90	4891.59	4868.96	4829.89	13.91
LOW DENSITY POLYETHYLENE	560.00	610.00	610.00	185.66	193.05	613.29	616.61	583.04	33.12
POLYESTYRENE (PS)	471.00	471.00	471.00	301.58	292.86	291.72	217.45	247.94	-4.78
POLYPROPYLENE (PP)	4933.80	4933.80	4933.80	4350.20	4779.02	4982.82	4919.10	5240.70	4.77
EXPANDABLE POLYESTYRENE	133.30	133.30	147.10	103.91	108.27	110.68	87.39	97.22	-1.65
POLY VINYL CHLORIDE	1498.00	1493.00	1500.00	1466.08	1488.40	1513.59	1434.12	1471.87	0.10
<b>Total</b>	<b>12754.20</b>	<b>12799.20</b>	<b>12820.00</b>	<b>9275.85</b>	<b>10040.50</b>	<b>12403.69</b>	<b>12143.62</b>	<b>12470.65</b>	<b>7.68</b>
<b>3. SYNTHETIC RUBBER</b>									
STYRENE BUTADIENE RUBBER	271.00	277.00	271.00	193.97	228.64	227.83	212.91	237.47	5.19
POLY BUTADIENE RUBBER	100.00	100.00	100.00	113.63	122.23	130.25	128.55	132.82	3.98
ETHYL VINYL ACETATE	15.00	15.00	15.00	0.00	0.00	0.00	0.00	0.00	
NITRILE BUTADIENE RUBBER	25.30	13.70	13.70	0.05	0.00	0.00	11.88	12.34	296.36
<b>Total</b>	<b>411.30</b>	<b>405.70</b>	<b>399.70</b>	<b>307.66</b>	<b>350.87</b>	<b>358.08</b>	<b>353.34</b>	<b>382.63</b>	<b>5.60</b>
<b>4. SYNTHETIC DETERGENT INTERMEDIATES</b>									
LINEAR ALKYL BENZENE	544.79	544.79	544.79	451.53	454.82	413.50	457.07	462.30	0.59
ETHYLENE OXIDE	135.00	135.00	135.00	291.30	232.34	301.18	279.37	318.09	2.22
<b>Total</b>	<b>679.79</b>	<b>679.79</b>	<b>679.79</b>	<b>742.82</b>	<b>687.16</b>	<b>714.68</b>	<b>736.44</b>	<b>780.39</b>	<b>1.24</b>
<b>5. PERFOR MANCE PLASTICS</b>									
NYLON-6 **	No separate Capacity			19.47	20.50	40.84	55.39	68.33	36.87
NYLON 6,6 **	No separate Capacity			1.08	1.02	0.73	0.00	0.00	-100.00

(Figures in 000'MT)

MAJOR GROUPS / PRODUCTS	INSTALLED CAPACITY			PRODUCTION					CAGR (%)
	2019-2020	2020-2021	2021-2022	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>5. PERFORMANCE PLASTICS</b>									
NYLON-6, NYLON (6,6), PBT and POLYCARBONATE (Combined)	68.50	83.50	83.50	20.56	21.52	41.57	55.39	68.33	35.03
ABS RESIN	210.00	213.00	199.00	145.23	148.18	136.46	121.94	122.78	-4.11
POLYMETHYL METHACRYLATE	3.90	3.90	3.90	0.02	0.00	0.00	0.00	0.00	-100.00
STYRENE ACRYLONITRILE	148.00	167.00	167.00	114.69	131.76	133.79	118.61	121.75	1.50
POLYESTER CHIPS/ PET CHIPS	2468.50	2558.55	2558.55	1424.60	1271.09	1344.70	1208.99	1365.93	-1.05
POLYTETRAFLUOROETHYLENE (PTFE)	20.30	20.30	20.30	13.72	16.24	15.11	14.64	18.90	8.33
<b>Total</b>	<b>2919.20</b>	<b>3046.25</b>	<b>3032.25</b>	<b>1718.81</b>	<b>1588.79</b>	<b>1671.63</b>	<b>1519.57</b>	<b>1697.68</b>	<b>-0.31</b>
<b>TOTAL BASIC MAJOR PETROCHEMICALS</b>	<b>21285.80</b>	<b>21459.82</b>	<b>21414.96</b>	<b>15670.34</b>	<b>16268.79</b>	<b>19040.86</b>	<b>17937.61</b>	<b>19371.36</b>	<b>5.44</b>
<b>B. INTERMEDIATES</b>									
<b>1. FIBRE INTERMEDIATE</b>									
ACRYLONITRILE	24.00	24.00	24.00	0.00	0.00	0.00	0.00	0.00	
CAPROLACTUM	120.00	120.00	120.00	85.97	92.56	84.06	80.41	108.17	5.91
MONO ETHYLENE GLYCOL	1868.10	2210.60	2210.60	1132.65	1159.76	2007.78	1981.98	1990.16	15.13
PURIFIED TEREPHTHALIC ACID	3873.00	3873.00	3873.00	3492.44	3404.93	3267.07	2996.76	3383.34	-0.79
<b>Total</b>	<b>5885.10</b>	<b>6227.60</b>	<b>6227.60</b>	<b>4711.06</b>	<b>4657.25</b>	<b>5358.91</b>	<b>5059.15</b>	<b>5481.67</b>	<b>3.86</b>
<b>2. BUILDING BLOCKS</b>									
<b>(I). OLEFINS</b>									
BUTADIENE	552.00	552.00	552.00	332.38	385.76	481.01	458.80	477.40	9.47
ETHYLENE	7147.30	7147.30	7147.30	4222.68	3831.89	6466.75	6364.89	6414.52	11.02
PROPYLENE	5190.38	5190.38	5190.38	4457.91	4639.53	4887.62	5215.76	5635.10	6.03
<b>Total</b>	<b>12889.68</b>	<b>12889.68</b>	<b>12889.68</b>	<b>9012.97</b>	<b>8857.18</b>	<b>11835.39</b>	<b>12039.45</b>	<b>12527.02</b>	<b>8.58</b>

(Figures in 000'MT)

MAJOR GROUPS / PRODUCTS	INSTALLED CAPACITY			PRODUCTION					CAGR (%)
	2019-2020	2020-2021	2021-2022	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>(ii).AROMATICS</b>									
BENZENE	1721.35	1884.35	1884.35	1318.03	1414.56	1346.24	1407.87	1427.55	2.02
MIXED XYLENE	898.33	898.33	898.33	271.35	249.05	269.63	146.68	160.87	-12.25
ORTHO-XYLENE	420.00	511.00	511.00	447.76	406.30	386.39	522.12	511.15	3.37
TOLUENE	288.27	288.27	288.27	106.94	141.14	140.16	113.99	115.66	1.98
PARAXYLENE	3131.70	3821.70	3821.70	3194.52	3331.81	2782.33	2614.21	2461.94	-6.30
<b>Total</b>	<b>6459.65</b>	<b>7403.65</b>	<b>7403.65</b>	<b>5338.60</b>	<b>5542.87</b>	<b>4924.74</b>	<b>4804.86</b>	<b>4677.17</b>	<b>-3.25</b>
<b>TOTAL INTERMEDIATES</b>	<b>25234.43</b>	<b>26520.93</b>	<b>26520.93</b>	<b>19062.62</b>	<b>19057.29</b>	<b>22119.04</b>	<b>21903.46</b>	<b>22685.86</b>	<b>4.45</b>
<b>C. OTHER PETRO-BASED CHEMICALS</b>									
<b>OTHER PETROCHEMICALS</b>									
DIETHYLENE GLYCOL	132.90	170.90	170.90	105.70	107.41	167.74	172.33	173.71	13.22
DIACETONE ALCOHOL	9.50	9.50	9.50	0.21	4.07	6.04	2.93	5.66	128.40
ETHYLENE DICHLORIDE	593.20	593.20	593.20	282.35	339.20	345.29	326.24	366.96	6.77
BUTANOL	26.00	26.00	176.00	17.39	21.69	16.44	20.29	38.29	21.81
2-ETHYL HEXANOL	55.20	55.20	110.20	56.64	58.89	48.75	49.67	91.26	12.66
VINYL CHLORIDE MONOMER	541.30	541.30	541.30	777.98	803.62	874.47	799.22	813.08	1.11
PBT**	No separate Capacity			0.58	1.29	6.25	6.09	7.55	90.17
POLYCARBONATE**	No separate Capacity			0.09	0.12	0.11	0.00	0.00	-100.00
PROPYLENE OXIDE	36.00	51.00	51.00	36.00	35.12	34.56	44.42	49.92	8.52
PROPYLENE GLYCOL	20.00	22.00	22.00	17.64	19.13	19.51	19.71	20.54	3.88
POLYVINYL ACETATE RESIN	17.34	12.00	12.00	0.00	0.00	0.00	2.96	7.35	
UNSATURATED POLYESTER RESIN	34.00	34.00	34.00	0.00	0.00	16.44	12.88	16.55	
METHYL METHACRYLATE	4.38	4.38	4.38	2.83	3.99	1.71	0.00	0.00	-100.00
ISO-BUTANOL	2.80	2.80	9.80	2.23	2.21	1.71	2.07	3.97	15.53
C4-RAFFINATE	291.60	291.60	291.60	339.20	380.26	413.33	433.42	444.57	7.00
PHTHALIC ANHYDRIDE	401.91	401.91	401.91	290.01	275.07	269.64	292.96	339.62	4.03

(Figures in 000'MT)

MAJOR GROUPS / PRODUCTS	INSTALLED CAPACITY			PRODUCTION					CAGR (%)
	2019-2020	2020-2021	2021-2022	2017-2018	2018-2019	2019-2020	2020-2021	2021-2022	
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<b>C. OTHER PETRO-BASED CHEMICALS</b>									
<b>OTHER PETROCHEMICALS</b>									
VINYL ACTATE MONOMER	30.00	30.00	30.00	0.00	0.00	0.00	0.00	0.00	
ISOPROPANOL	70.20	70.20	70.20	71.83	58.27	60.51	55.31	65.13	-2.42
POLYOL	146.76	142.03	148.53	79.43	82.13	81.75	77.83	87.15	2.35
Total	2413.09	2458.01	2676.51	2080.10	2192.46	2364.23	2318.32	2531.29	5.03
<b>TOTAL PETROCHEMICALS (A+B+C)</b>	<b>48933.31</b>	<b>50438.76</b>	<b>50612.40</b>	<b>36813.06</b>	<b>37518.55</b>	<b>43524.13</b>	<b>42159.38</b>	<b>44588.52</b>	<b>4.91</b>

**Source:** The source of Production and Installed Capacity of Chemicals and Petrochemicals products (which are monitoring by Statistics & Monitoring Division (S&M) of DCPC) is MPRs received from manufacturers under large and medium scale units only.

**Note: 1.** \* Combined Installed Capacity of both LLDPE & HDPE.

2. \*\*Combined Installed Capacity of Nylon-6, Nylon (6,6), PBT and Polycarbonate.

## Annexure III

## Hazardous Chemicals under Rotterdam Convention

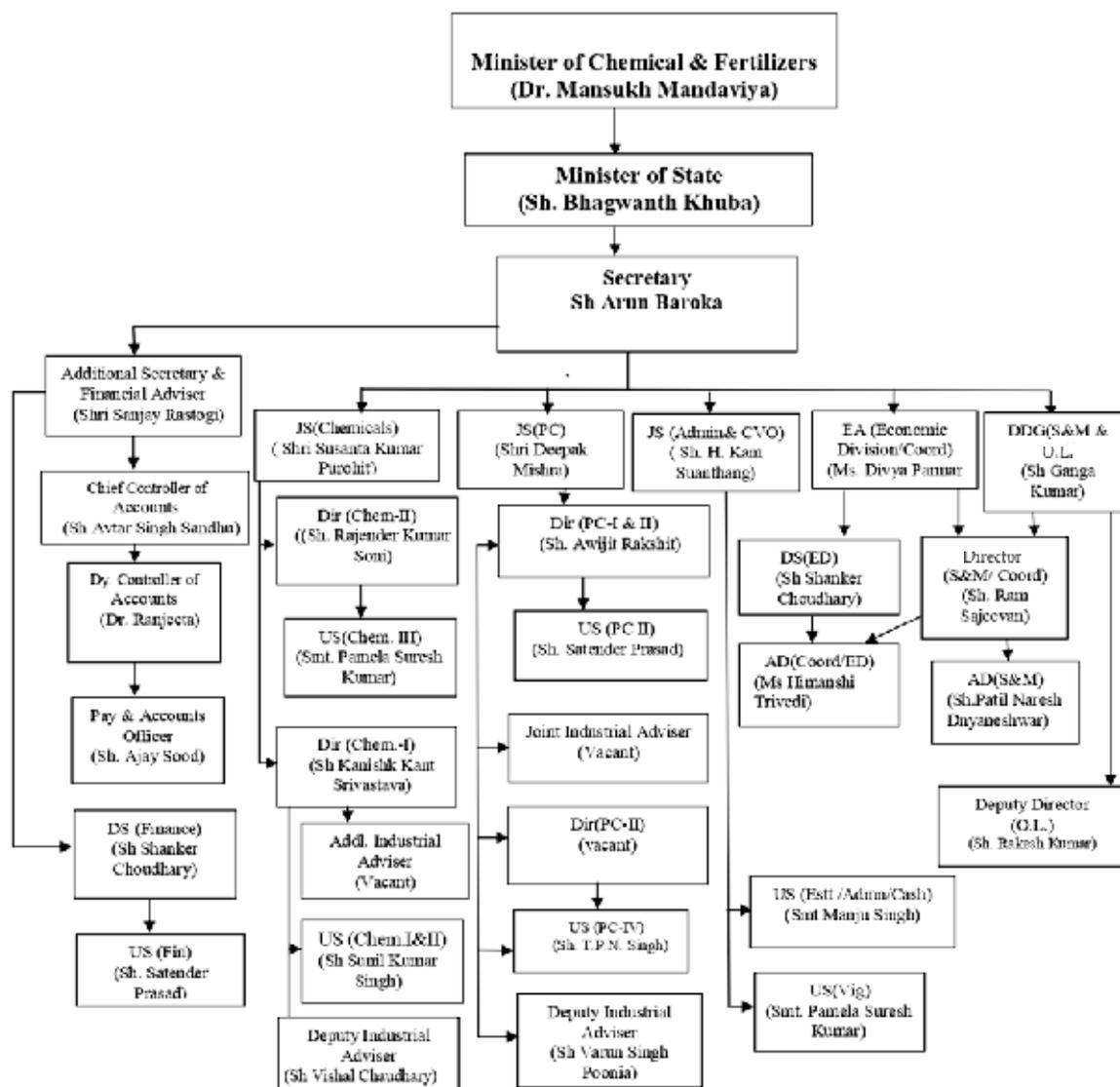
There are a total of 52 chemicals listed in Annex III, 35 pesticides (including 3 severely hazardous pesticide formulations), 16 industrial chemicals, and 1 chemical in both the pesticide and the industrial chemical categories.

Sr. No.	Chemical	Category
1.	2,4,5-T and its salts and esters	Pesticide
2.	Alachlor	Pesticide
3.	Aldicarb	Pesticide
4.	Aldrin	Pesticide
5.	Azinphos methyl	Pesticide
6.	Binapacryl	Pesticide
7.	Captafol	Pesticide
8.	Carbofuran	Pesticide
9.	Chlordane	Pesticide
10.	Chlordimeform	Pesticide
11.	Chlorobenzilate	Pesticide
12.	DDT	Pesticide
13.	Dieldrin	Pesticide
14.	Dinitro-ortho-cresol (DNOC) and its salts (such as ammonium salt, potassium salt and sodium salt)	Pesticide
15.	Dinoseb and its salts and esters	Pesticide
16.	1,2-dibromoethane (EDB)	Pesticide
17.	Endosulfan	Pesticide
18.	Ethylene dichloride	Pesticide
19.	Ethylene oxide	Pesticide
20.	Fluoroacetamide	Pesticide
21.	HCH (mixed isomers)	Pesticide
22.	Heptachlor	Pesticide
23.	Hexachlorobenzene	Pesticide
24.	Lindane (gamma-HCH)	Pesticide
25.	Mercury compounds including inorganic mercury compounds, alkyl mercury compounds and alkyloxyalkyl and aryl mercury compounds	Pesticide
26.	Monocrotophos	Pesticide
27.	Methamidophos	Pesticide
28.	Parathion	Pesticide

Sr. No.	Chemical	Category
29.	Pentachlorophenol and its salts and esters	Pesticide
30.	Phorate	Pesticide
31.	Toxaphene (Camphechlor)	Pesticide
32.	Tributyl tin compounds	Pesticide/Industrial
33.	Trichlorfon	Pesticide
34.	Dustable powder formulations containing a combination of : benomyl at or above 7 per cent, carbofuran at above 10 per cent, thiram at or above 15 per cent	Severely hazardous pesticide formulation
35.	Methyl-parathion (Emulsifiable concentrates (EC) at or above 19.5% active ingredient and dusts at or above 1.5% active ingredient)	Severely hazardous pesticide formulation
36.	Phosphamidon (Soluble liquid formulations of the substance that exceed 1000 g active ingredient/l)	Severely hazardous pesticide formulation
37.	Actinolite Asbestos	Industrial
38.	Anthophyllite asbestos	Industrial
39.	Amosite Asbestos	Industrial
40.	Crocidolite asbestos	Industrial
41.	Decabromodiphenyl ether (decaBDE)	Industrial
42.	Commercial octabromodiphenyl ether (including Hexabromodiphenyl ether and Heptabromodiphenyl ether)	Industrial
43.	Commercial pentabromodiphenyl ether (including tetrabromodiphenyl ether and pentabromodiphenyl ether)	Industrial
44.	Hexabromocyclododecane	Industrial
45.	Perfluorooctanoic acid (PFOA), its salts and PFOA-related compounds	Industrial
46.	Perfluorooctane sulfonic acid, perfluorooctane sulfonates, perfluorooctane sulfonamides and perfluorooctane sulfonyls	Industrial
47.	Polybrominated biphenyls (PBBs)	Industrial
48.	Polychlorinated biphenyls (PCBs)	Industrial
49.	Polychlorinated terphenyls (PCTs)	Industrial
50.	Short Chain Chlorinated Paraffins (SCCP)	Industrial
51.	Tetraethyl lead	Industrial
52.	Tetramethyl lead	Industrial
53.	Tremolite asbestos	Industrial
54.	Tris (2,3 dibromopropyl) phosphate	Industrial

## Annexure IV

### ORGANISATIONAL CHART OF DEPARTMENT OF CHEMICALS & PETROCHEMICALS (As on 03.01.2023)



Chem: Chemicals  
 PC: Petrochemicals  
 Coord: Coordination  
 S&M: Statistics & Monitoring  
 Vig: Vigilance  
 O.L.: Official Language





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**Government of India**  
**Ministry of Chemicals & Fertilizers**  
**Department of Chemicals & Petrochemicals**