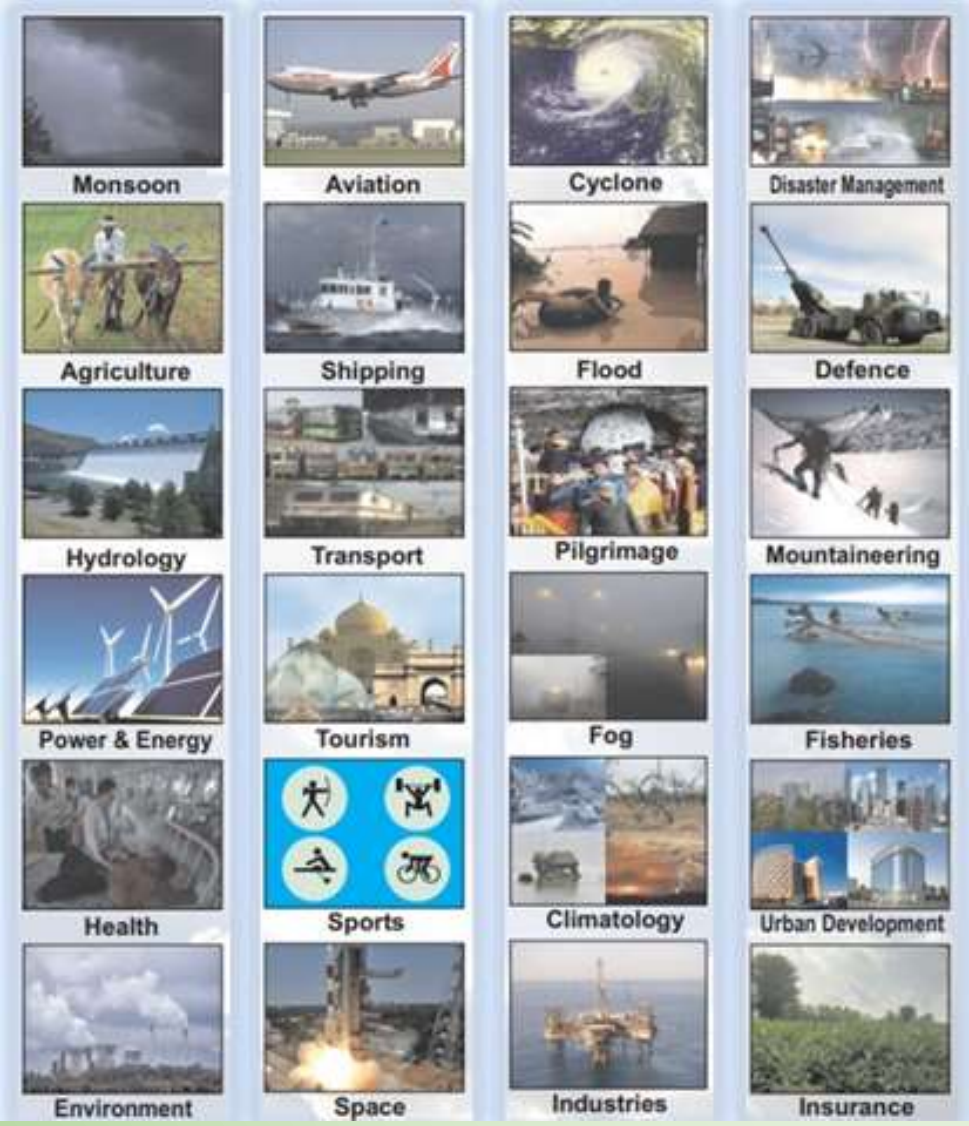
Government of India
Ministry of Earth Sciences

India Meteorological Department

Evolution of India Meteorological Department



IMD in the service of Nation since 1875

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Evolution of India Meteorological Department

IMD is the principal government agency of Government of India for all weather and climate services. It functions under Ministry of Earth Sciences (MoES) with its headquarter at Mausam Bhawan, Lodhi Road, New Delhi. IMD is proud to be manned by more than 4000 scientific personnel and is a house to advanced meteorological instruments, state of the art computing platforms, weather and climate prediction models, information processing and forecasting system and warning dissemination system.

IMD works in a coordinated manner with headquarters at Delhi and 6 Regional Meteorological Centers (RMCs) catering to 6 different regions of the country. These RMCs are further assisted by 26 Meteorological Centers (MCs) at state level that are specialized for observing and disseminating information, advisories and warnings about regional weather. The different dedicated divisions in IMD headquarter like National Weather Forecasting Center (NWFC), Numerical Weather Prediction (NWP), Satellite Meteorology Division, Upper Air Instrument Division, Hydrology division and Information System & Services Division (ISSD) and Climate Research & Services Division of IMD Pune support the overall forecasting, monitoring and dissemination services of IMD.

IMD since its foundation has undergone several phases of evolution and has been a testament of progress, glory and service to the nation since 1875. The salient features of the evolution of IMD in different phases are described below:

1. Upto 1875 (Birth of India Meteorological Department)

The importance of weather and climate was understood by the human civilisation in the very beginning, as we can find out the description highlighting the importance of weather & climate and attempt for it's prediction since ancient era as mentioned in Vedas and Epics. Upanishads are found to deliberate on the reasons of cloud formation, rain and seasonal cycles. During past few centuries also, India has been in forefront of scientific knowledge with respect to meteorology and allied subjects. It is followed by the attempt in Medieval Era as mentioned in Kalidas Meghdoot and the Chanakya's Artha Shastra, highlighting the importance of weather and climate and attempt for the prediction. In terms of infrastructure, India has some of the oldest Meteorological Observatories of the world. However, the instrumental

era of Science and Meteorology in India commenced with the establishment of 1st Meteorological and Astronomical Observatory in Madras in 1793. While the number gradually increased since then, the standards of instruments, the time of observations was not fixed and the observations could not be utilised for predicting purpose. While on the other hand, the first war of independence was being fought by the Indians as first war of independence, popularly known as the “Sepoy Mutiny” in 1857, a group of Scientists in Asiatic Society of Bengal was also following up a Scientific revolution to establish a national meteorological Committee for standardising the instruments, exchanging data and utilising data for cyclone & flood disaster management and find out the relationship between the diseases and weather in India.

Accordingly, the Asiatic Society of Bengal represented to the Governor General in 1857. It was followed up by the formation of Sanitation Committee in 1860 and finally the Meteorological Committee at Provincial level was set up. Considering the limitations of provincial committees as the data were not exchanged and no guidance was generated in all India level and there was no uniformity and standardisation, Asiatic society of Bengal again reiterated the need of National Meteorological Committee. Finally, Governor General Council agreed to form the National Committee. The India Meteorological Department was established in 1875 with HF Blanford as Meteorological Reporter.

2. 1875-1890 (Nascent age)

With establishment of IMD, all meteorological work in India was brought under its ambit. First seismological activity started in India with establishment of first observatory at Alipore, Kolkata in 1877

Major breakthroughs came in the form of

(i) Integration of Meteorological observations
(ii) Standardisation of observations
(iii) Exchange of observations, not only in India, but also with World

As the Scientists at that time understood that weather and climate has no boundary. Hence to monitor & predict weather & climate, they realised that

observations should be taken across the globe. IMD became a member of World Meteorological Organisation.

The communication was key to the success of above initiative, with first postal service for collection of observation on daily basis implemented in 1876 and telegraphic weather code in 1878, telephone switch board in 1882 and Introduction of express telegram (XXW) in 1887.

By the end of 1886, system of port warning which commenced for Kolkata Port in 1865 was extended to all Indian ports.

IMD became Rainfall Registration Authority and adoption of common type of rain gauge was carried out in 1890 with a resolution passed by Government of India.

3. 1891-1946 (Growth before independence)

Major breakthroughs towards the end of 19th century included:

(i) Preparation of first chart in 1877
(ii) Preparation of first Daily Weather Report in 1878
(iii) Preparation of climatology based on long term observational data

As the world was moving towards a conflicting era, with the World War I during 1914-19 and World War II during 1939-1945, everybody felt the need of weather information from upper atmosphere for managing the war. It gave a boost in understanding weather & climate, development of climatology, analogues, statistical method. The observations from upper atmosphere commenced with release of Pilot Balloon in 1905 from Shimla. By 1905 upper air observations began using theodolites for tracking of balloons. Surface instruments Division was established in 1920 to ensure maintenance of instruments. The first aviation forecast was issued from Shimla in 1921. Aviation service expanded with establishment of many aviation forecasting centres due to World War I & II. RS/RW observations commenced in 1930 in India. Thus, India had three-dimensional information about weather by 1930.

The first climatological data in the form of meteorological atlas of the Indian Seas was published in 1908. Atlas of storm tracks in the Bay of Bengal and Arabian Sea was prepared in 1925.

The communication technology also improved with the adoption of radio communication for collection of data from ships and transmission of warnings through coastal radio stations at Karachi and Mumbai in 1912 and wireless exchange of weather information in 1929. All India Radio started broadcasting the weather bulletin in 1936.

To give special emphasis on Agriculture meteorology a separate Division in 1932 was carved out within IMD to cater to Agromet research activities. Farmer's Weather bulletins from Regional Meteorological Centres and Coordinated Crop Weather Watch Scheme commenced in 1945.

During this period the IMD HQ shifted from Kolkata to Shimla in 1905, to Pune in 1928 and to Delhi in 1944. 7 Regional Meteorological Centres were established at New Delhi, Bombay, Madras, Nagpur, Kolkata, Karachi and Lahore.

On the other hand, it was also felt necessary to monitor the earth environment. The first observation of total column ozone was taken in 1928 from Kodaikanal.

4. 1947-1959(Commencement of Radar age & Flood Met. Services)

With country's independence, the progress of meteorology accelerated in the country with many interventions. Major breakthroughs are given below:

(i) IMD saw a quantum jump in its observational infrastructure with introduction of Radars to support aviation services and for tracking of storms in 1954. First wind finding Radar was established in Dum Dum in 1954 followed by indigenous radar at Safdarjung Delhi in 1958 from the remnants of the 2nd World War. Scientists of IMD under the leadership of then DG IMD, Dr. LS Mathur developed this indigenous radar for detecting the winds and thunderstorms.

(ii) The 1950s also saw the beginning of advanced Numerical Weather Prediction research and development activities in the department under the leadership of Dr. P. K. Das, Former DG IMD.

(iii) During this period another new service started for management of floods and the reservoirs. Damodar Valley Corporation Meteorological Unit was established in 1949 for Dam safety measures. Policy statement on flood was adopted by Govt

of India in 1954. First High Level committee on floods recommended flood plain zoning, flood forecasting and warning for management of floods in 1957.

(iv) Following up the environmental monitoring initiated in previous period, first atmospheric turbidity monitoring network was established in 1957. IMD also started emphasis on the environmental meteorology with the setup of first ozone measurement in 1957.

(v) Another chapter was added to the services of IMD with establishment of Positional Astronomy Center at Kolkata which publishes the Panchang in 1955.

5. 1960-1970 (Commencement of Global Satellite Era)

The USA launched TIROS-1 satellite in April, 1960. A receiver was provided to IMD Colaba to receive the satellite imagery from this Polar Orbiting satellite. This was the dawn of an era when the missing of cyclones over the Bay of Bengal and the Arabian Sea could be minimized with better estimation of location, intensity and the study of structure of cyclone as well as the monsoon, clouds and circulation features. IMD started using the satellite images provided through US satellites since December, 1963. The first cyclone detection radar (CDR) was set up in Visakhapatnam in 1970.

First Precipitation Chemistry Network for monitoring rainfall quality, self recording rain gauge (SRRG) were established in 1970. First Indian surface ozone recorder was established in 1966. First runway visual range was established in 1966 to measure visibility along the runway.

A radio tele-type link was established between India and Moscow on 1st January 1960 and with Tokyo in 1961 creating New Delhi as one of the Northern Hemispheric Exchange Center (NHEC) of the world for WMO. 1961 also saw the establishment of a directorate of seismology and a Northern Hemispheric Analysis Centre (NHAC). New Delhi became Area Forecast Centre alongwith Tokyo, Cairo, Melbourne and Moscow to prepare and transmit actual and forecast charts for international use in Aviation. Directorate of telecommunication was established in 1970 alongwith high speed switching computers in 1970 and Delhi became the Regional Telecommunication Hub.

To augment the numerical modeling of weather, first NWP research group was set up in Delhi in 1969.

The services of IMD further expanded. The Storm Analysis Unit was established in 1963 to support flood forecasting. Marine Weather Service commenced in 1966. Crop weather diagram was prepared in 1961 to provide crop weather advisories to farmers and crop weather forecasting commenced in 1967. Study commenced on drought climatology over India in 1967.

Capacity building was another important initiative during the period with establishment of RS/RW Meteorological Training Centre in 1962 and commencement of Training to Naval and Air Force Officers in 1963. 1st training for foreigners commenced in 1967. The training Directorate was established in Pune in 1969.

6. 1971-1983 (Global monitoring and better forecasting upto 24 hours)

Major breakthroughs during the period are as follows:

Bhola cyclone killed 300,000 people in Bangladesh in 1970, 10,000 people died in Andhra Pradesh in the same year and another 10,000 in Odisha in 1971 due to cyclones. A Cyclone Disaster Mitigation Committee under the Chairmanship of Cabinet Secretary was formed in 1971 which recommended an institutional mechanism, like establishment of Cyclone Warning Centres in addition to Area Cyclone Warning Centres. Specific cyclone warnings could be provided for all coastal states. 11 Cyclone Detection Radar were established by 1974 to cover entire east and west coasts. Hence no landfalling cyclone for India went undetected since 1974. First indigenous X band radar was installed in Delhi in 1975

A directorate of satellite was created in 1971. The geostationary satellite images from foreign satellites commenced in 1974. IMD could receive satellite based cloud images every three hours covering entire globe. Thus, since 1974, the technology enabled IMD could detect all the synoptic scale (100 km to 1000 km diameter) weather systems and could provide better accuracy 24 hours forecast. First time ceilometer was established to estimate height of base of cloud in 1975. INSAT Series of satellites commenced in 1982 and monitoring of cyclones by Indian satellite in 1983. INSAT provided a Geostationary platform for remote sensing of the

atmosphere and automatic data collection in 1982. 100 data collection platforms were established in 1980s.

Alpha numeric data exchange commenced in 1974 with the advent of message switching Computer in 1974 (2400 BPS speed). Numerical modelling which commenced in 1956 and under the leadership of Dr. P K Das, got a major boost and India started running the models providing forecast upto 24 hours. With the advent of Computer in 1974 (2400 BPS speed), the National Centre for Medium range Weather Forecasting was established in IMD campus.

This period also saw a major expansion in organisational network. In 1971, IMD came under the Ministry of Tourism and Civil Aviation. IMD established Hydrometeorology Division in 1971, Cyclone Warning Research Centre in 1972, WMO recognised regional Meteorological Centre (RMC) for Tropical Cyclones in 1973 and a number of Meteorological Centres at LKN, HYD, TRV, BBN, Bengaluru, Patna, AHD, Bhopal, Chandigarh, Sri Nagar during 1972-1981. Nine Flood Meteorological Offices were established during 1973-1980 to improve flood forecasting. First quantitative precipitation forecast for river sub basin commenced in 1975.

The environment monitoring further expanded with establishment of first ozone sonde in Dakshin Gangotri, Antarctica in 1982. Environmental monitoring for Mathura commenced in 1981. First Indian expedition to Antarctica commenced in 1981. IMD also expanded its wings in the polar research with the establishment of First Meteorological station at Antarctica was in 1983.

IMD also placed lot of emphasis in upgradation of human resources and for this purpose meteorological training facility created in 1942 was upgraded to directorate in 1969 and is now functioning as Regional Meteorological Training center of WMO. A Regional Area Forecast Center (RAFC) was created at NHAC in 1971 to cater to the needs of south Asia. 1977 saw the establishment of National Data center at Pune for scrutinizing and archiving of all meteorological data.

7. 1984-1990 (Indian Satellite era)

Regular reception of satellite images commenced in 1984 from Indian satellites. Further, the derived products from satellites including wind, precipitation, sea surface temperature commenced during 1984-86.

In the environmental monitoring front, total column ozone was observed in Antarctica in 1987, Met Station Maitri was established in Antarctica in 1989, Radio Theodolite was developed in 1989. Vertical distribution of ozone commenced in 1990. For better monitoring of rainfall and hence floods, droughts in high spatial resolution, district wise rainfall monitoring commenced in 1989.

National Centre for Medium range Weather Forecasting (NCMRWF) was established in 1988 and Super computer came to India in 1989.

There was further re-organisation of IMD as IMD came under Ministry of Science and Technology in 1985. Global role of IMD in providing daily tropical cyclone advisories got enhanced with Regional Meteorological Centre (RMC) Tropical cyclones, New Delhi becoming Regional Specialised Meteorological Centre (RSMC) in 1988. Cyclone Warning Centre was established in Ahmedabad in 1988 to provide warnings to Gujarat, Daman and Diu. Total number of Area Cyclone Warning Centres (ACWCs) and Cyclone Warning Centres (CWCs) became six to provide cyclone warnings for entire east and west coasts of India.

Cyclone Warning Directorate was established in 1990 in Delhi to bring uniformity in cyclone warning work in the country and to carryout national and international coordination.

8. 1991-2005 (Commencement of Automatic of observations)

- First dedicated meteorological satellite Kalpana was launched in 2002
- 127 Automated Weather Stations (AWS) were established in 2005
- To improve environmental monitoring, Aerosol Optical Depth monitoring commenced in 2004
- Considering the fact that land-ocean-atmosphere interact together, leading to weather & climate variations, Govt. of India launched the Data Buoy Programme through Department of Ocean Development in 1997. The computing system also improved.
- The failure to provide accurate and timely forecast for the Odisha Super Cyclone in 1999 led to intervention of new tools & technology like first Doppler

Weather Radar in Chennai in 2002. By 2006, there were 4 doppler weather radars along the east coast.

- Resolution of Limited Area Model increased to 150 km and lead period increased to upto 2 days by end of 2005.
- The services of IMD got further expanded and improved during the period. Hydrology Project was taken up by Government of India with participation of IMD and Ministry of Water Resources to better monitor the rainfall and manage floods & droughts in 1996. Mountain Weather Services for Himalayan region started in 1998.
- Tropical Cyclone Advisory for International Civil Aviation commenced in 2003 from IMD New Delhi and it acted as one of the seven Tropical Cyclone Advisory Centre (TCAC) as per the requirement of ICAO.
- Naming of Cyclones over the North Indian Ocean commenced over North Indian Ocean in 2004 and the first name was ONIL for the cyclone over the Arabian Sea in September, 2004.
- VSAT system for communication was introduced in 2000
- The Organisation further expanded with establishment of Regional Meteorological Centre (RMC), Guwahati in 1997. Meteorological Centres were established in Jaipur, Dehradun, Raipur, Shimla, Ranchi, Gangtok and Agartala during 2001-2003 to provide State Level Weather & Climate Services.

9. 2006-13 (Age of Modernisation of IMD)

Major breakthroughs during this period are highlighted below:

(i) In 2006, IMD came under the umbrella of Ministry of Earth Sciences (MoES) with an ambition that Earth, Ocean, Atmosphere should be considered in an integral manner to improve the weather & climate services.

(ii) Modernisation programme of IMD was taken up during 2007-12 which paved way for transition from analogue & subjective to an objective method of forecasting & warning services equipped with a Decision Support System (DSS) in a digital platform. The forecasters could compare, comprehend and

analyse the observations and the model guidance to provide the forecast for next 3 days by the end of 2009 and 5 days by 2013.

(iii) No. of models increased for short to medium range forecast upto five days from a single model to 5 models through bilateral cooperation with countries like USA, UK, Europe, Japan and France.

(iv) Monsoon Mission was taken up to improve the forecast in all spatial and Temporal scales.

(v) Workstation of 600 GB data exchange was established in 2009.

(vi) The High Power Computing System (HPCS) was installed in 2010. Dynamical Statistical Modeling of tropical cyclones, Ensemble Prediction systems, Multi Model Ensemble were introduced during 2009-11.

(vii) The digitisation helped in introduction of new services like Online Aviation Meteorological Briefing System in 2007, electronic Atlas of cyclonic disturbances in 2008, Web Atlas in 2011, District Level Agrometeorological Advisory Services in 2008, Multi-hazard Early Warning System (MHEWS) in 2009, Gramin Krishi Mausam Sewa (GKMS) in 2012, SMS service in 2009 to disaster managers, to fishermen and farmers by 2013.

Major breakthrough came during cyclone Phalin which hit Odisha coast on 12th October, 2013 near Gopalpur. Entire world went wrong and India proved right, when the Extremely Severe Cyclonic Storm, Phailin hit the Odisha coast on 12th October, 2013. India wrought the history. It was monitored and predicted under the leadership of Dr. M. Mohapatra, Director Cyclone warning Division. Entire World appreciated IMD and IMD emerged as a global leader in tropical cyclones monitoring and forecasting.

10. 2014-23 (Rapid advancement in observation, communication and modeling facilities, paradigm shift in forecasting accuracy and Services)

There was significant improvement in all fronts including meteorological observations, communication, modelling and infrastructure. Accordingly, there was rapid enhancement of weather and climate services and also the forecast accuracy improved by 40-50%.

From the modest beginning in 1875 to at present, IMD boasts of 39 Doppler Weather Radars for better observation and prediction of extreme events across the country by 2023, along with INSAT 3D/3DR dedicated weather satellites providing every 15 minutes cloud imagery. About 200 Agro-Automated Weather Station (Agro-AWS), 806 Automatic weather stations, 1382 Automatic Rain gauges, 83 lightning sensors along with 63 Pilot balloon upper air observation stations serve as the backbone of weather observation services of IMD throughout the country.

Development of new monitoring and forecast products including rapid assessment of severe weather through satellite in 2015, rapid scanning of cyclones every 6 minutes from 2018, every 15 minutes products from INSAT 3D/3D(R) since 2016, sea surface winds from scatterometer from SACTSAT-1 in 2016, Ocean Sat-3 in 2023 are some of the major interventions. Installation of Multi Mission Data Reception & Processing System (MMDRPS) in 2017 and upgraded system in 2021. Deployment of 25 Global Navigation Satellite System (GNSS) for total columnar water vapour management.

Numerical Weather Prediction modelling capabilities of IMD have also reached new heights with improved dynamical models operationally run in a seamless manner from nowcast for a few hours to long range weather predictions with forecast upto a season. There was the introduction of 12 km resolution global model in 2016, ensemble prediction model in 2018, extended range forecast system in 2017, dynamic MMCFS for seasonal forecasting in 2017 followed by multi model ensemble based seasonal forecasting model in 2021 were the major backbone improvement for weather & climate forecasting. Introduction of ocean atmosphere coupled cyclone specific model (HWRF) in 2017 & 2019. Meso-scale WRF Model with 3 km resolution in 2019. WRF Polar Model for Antarctica in 2019. Hy-SPLIT Model for trajectory forecasting in 2021. Nowcast model High Resolution rapid Refresh (HRRR) 2 km resolution in 2021 and Electrical WRF (EWRF) for lightning prediction in 2022, integrated urban flood warning system in 2020, South Asia Flash Flood Guidance system in 2020, Severe Weather Forecasting System in 2016 were the major interventions for regional and location specific forecasting.

The introduction of multi-model ensemble in 2022 for cyclone and other severe weather events in 2022 at high resolution helped in decision making and improving the forecast accuracy.

Indigenous development of the GIS platform and Decision Support System alongwith impact based forecasting technique enabled IMD to enter into a new era of service.

The lead period of the forecast for river catchments increased from 3 days to 5 days in 2020, and to 7 days in 2023. The lead period of cyclogenesis forecast improved from 24 hours to 3 days in 2014, to 5 days in 2018 and 7 days in 2023. The pre-genesis track & intensity forecast was issued in 2022 and extended range forecast valid for 2 weeks was introduced in 2018. The daily weather forecast validity increased from 5 days to 7 days in 2023.

The forecast accuracy for all types of severe weather events increased by about 50% in 2023 as compared to 2014. The 5 day ahead forecast accuracy in 2023 is same as 1 day forecast accuracy in 2017. There is an increase in lead period by 4 days in recent 5 years. While there has been pin pointed forecast accuracy for landfall point of the cyclones with zero error in most cases (20 km in 24 hours ahead forecast). The 24 hours forecast accuracy for heavy rainfall is about 80%, thunderstorm 86%, heat wave & cold wave about 88%.

The period was witnessed with Digital India Programme launched in IMD in December, 2014 with SMS service to farmers, public & disaster managers in 2014, launching of dedicated website for cyclone in 2014, for severe weather over South Asia in 2016 & website for public in 2019, customised rainfall information at district, state, river catchment at All India level on daily, weekly, monthly and seasonal scale from 2015, Social media implementation in 2016, observed and forecast products in GIS platform in 2020 and other weather parameters in 2021, Dynamic Risk Atlas for Cyclones in 2021, climate hazards in GIS in 2021, introduction of Mobile App in 2021, Automatic Programme Interface in 2022, introduction of audio visual forecast message in 2021. As a part of digital India programme, various reports and weather charts including report on cyclonic disturbances since 1990 were digitised. Climate Data Portal was developed in 2020. Climate Data Supply Portal for easy access and availability of Climate Data in 2020.

IMD with its extensive network of observatories, telecommunication systems and newly added forecasting offices provide weather data for nation building activities, issues forecasts and warnings for prevention of any loss to life and property and also helps in optimum planning for economic development of the country. IMDs

forecasting reach has now increased significantly covering almost all sectors of life in one way or the another. IMD services have expanded enormously during this period be it Agriculture, Aviation, Shipping, General Weather, Hydrology, Power, Health, Transport etc. It won't be an exaggeration for IMD services if we say that it symbolizes Har-Har Mausam; Har-Ghar Mausam.

At present, IMD is providing the nowcast for about 1200 stations, city forecasts for about 1200 stations apart from district level and sectoral forecast and warning services throughout the country. IMD is not only catering to the Indian region but also provides Cyclone forecast and warning services to 13 north Indian ocean countries along with forecast and warning services to SAARC nations. IMD has helped the growth and development of different sectors of the country by making them weather ready and climate smart by providing them timely and skilled forecast and warning services. Farmers use Agro-met advisories for weather information-based management like sowing, irrigation, fertilizer and pesticide application, and harvest. The IMD also provides support for an integrated flood warning system for Mumbai and Chennai, flash flood guidance services for India, Bangladesh, Bhutan, Nepal and Sri Lanka, winter fog forecasts for IGI airport, New Delhi etc.

IMD introduced, customised location specific forecast for offshore & onshore industries, airports, ports, Indian Air Force, Indian Oil corporation, Nuclear Power Corporation of India, marine weather forecast, cyclone forecast, heatwave forecast, thunderstorm forecast in text, graphic & GIS platform with socio economic attributes, hazard & impact modelling as well as risk assessment in 2021.

The Agro-met services were extended to block level reaching upto 3 crore farmers during the period. Guidance could be provided for all types of floods including riverine, urban and flash floods. Urban meteorological services were extended to 1200 cities and towns with 150 cities being provided geospatial services with sub-city forecast.

Collaboration with Power Sector and provision of forecast enabled to improve Power Sector Economy and harnessing of renewable energy. The service to the health sector commenced during the period for implementation of Heat Action Plan in 23 Heat wave prone states and UTs and guidance for vector borne diseases like Malaria & Dengue. The air quality forecast commenced during the period alongwith the monitoring.

The aviation sector got massive extension under the Govt of India project like UDAAN and Green Field Projects. Accordingly, IMD provided aviation services to more than 100 air ports with instrumental observations and forecast.

In view of the Blue Economy, IMD extended it's Marine Weather Services catering to the needs of all service providers and providing impact based forecast. The Indian railways and National Highways were also provided specific forecast during this period. IMD worked with Incredible India Programme to provide forecast for tourism in the country.

The IMD's focus on impact-based forecasting has opened a new vista for disaster risk reduction by providing impact-based information. The dynamic composite risk information in case of Tropical Cyclones have helped disaster managers to plan and execute timely action for disaster responses. IMD's affinity with the latest technologies has enabled the shifting of forecast products to newer platforms like Geographic Information Systems (GIS) leveraging the technologies for benefit of mankind.

To make weather services omnipresent, IMD has leveraged technology to bring out innovative solutions like dynamic Meteogram "**MAUSAM GRAM**" which provides weather information at all locations at any time (Har Har Mausam, Har Ghar Mausam).

IMD as an organisation also expanded during this period with the establishment of Meteorological Centres in Amravati in 2014, Shillong in 2018, Leh in 2021, Port Blair, Imphal, Kohima & Aizawl in 2023.

IMD's history has been a story of precision and continuous progress. The IMD has come up a long way with unprecedented improvements in its forecast accuracy, lead time and spatial & temporal resolutions which also reflects in the demands and aspirations of general public. IMD is looking forward to develop its capabilities further and play a very important and constructive role in the nation building by transforming India into a Weather Ready & Climate Smart nation, disaster resilient society and a Global Leader in meteorological science and service to the society.

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