



WEATHER DATA COLLECTION AND SHARING FRAMEWORK FOR AGRICULTURE

GAPS AND POSSIBILITIES PERTAINING TO IMD AND WINDS SCHEME



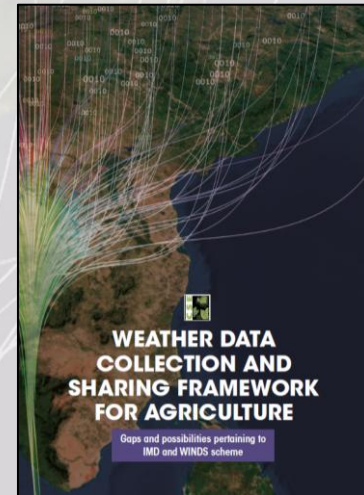
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Research Methodology

Report based on research conducted with experts from different stakeholder groups:

- a) **State and Centre agricultural department**
- b) **Central departments like IMD, MNFCC, DST, NIC**
- c) **Civil society**
- d) **Weather forecasting companies**
- e) **State Agricultural Universities**



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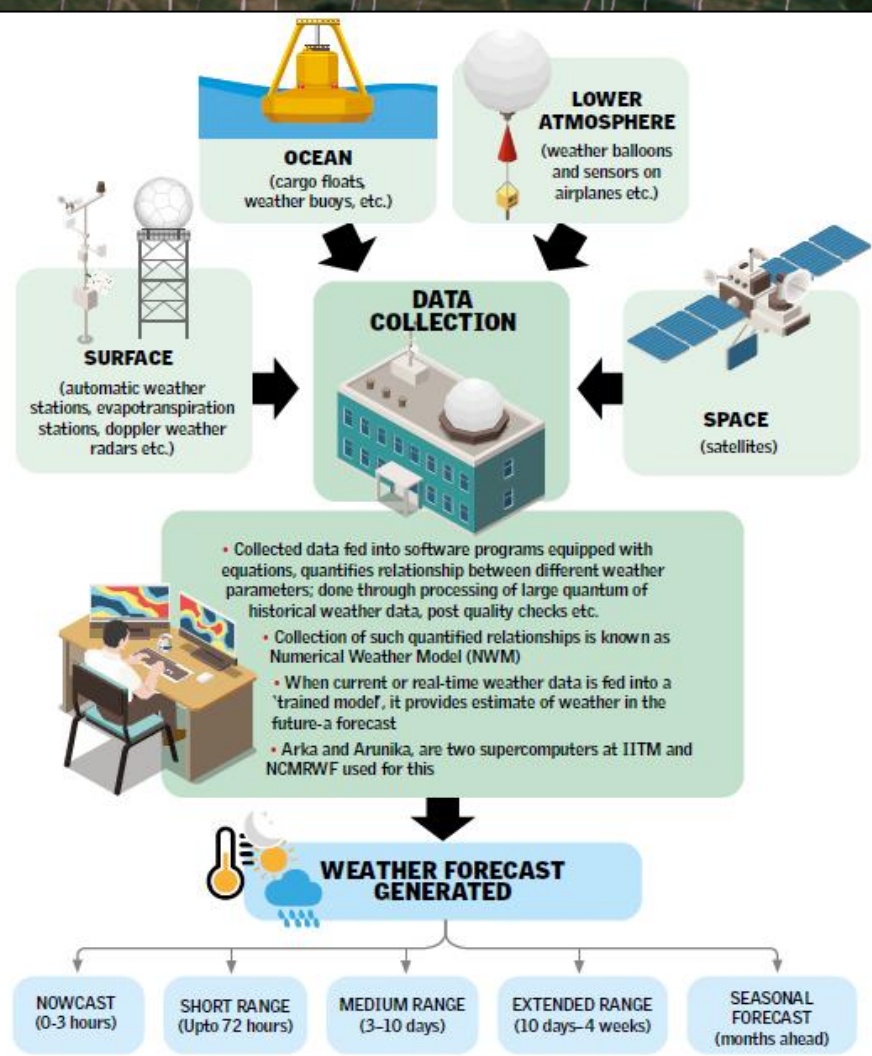
DATA COLLECTION AND SHARING BY THE MINISTRY OF EARTH SCIENCES, GOI





Data Collection & Forecast Generation

- IMD is face of weather forecasting; IITM NCMRWF also involved in data collection and modelling
- Data collected over land surfaces, oceans, lower atmosphere, space
- Several private, academic, and NGOs involved in data collection and/or creating forecasts





Sharing of Collected Data & Generated Forecast: Policy Framework

IMD MANDATE

- To take meteorological observations and to provide current and forecast meteorological information for optimum operation of weather-sensitive activities like agriculture, irrigation, shipping, aviation, offshore oil explorations, etc.
 - To warn against severe weather phenomena like tropical cyclones, norwesters, duststorms, heavy rains and snow, cold and heat waves, etc., which cause destruction of life and property.
 - To provide meteorological statistics required for agriculture, water resource management, industries, oil exploration and other nation-building activities.
 - To conduct and promote research in meteorology and allied disciplines.
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- National Data Sharing and Accessibility Policy (NDSAP), 2012
 - World Meteorological Organisation guidelines also expected to be followed, helps data to be made public





Sharing of Collected data & Generated Forecast: Operational Framework

a) Alerts and forecasts

Mausam (website and mobile application)

Mentions sub-district level alerts and warnings, realised weather and specialised forecasts (thunderstorm, flash flood, etc.) as well as high-resolution animations from Indian National Satellite System (INSAT) satellites and Doppler Weather Radars (DWR). It hosts links for services like agromet advisory, aviation, geospatial, and cyclone warnings.



Mausamgram (website and mobile application)

Specialised platform for hyperlocal, village-level weather forecasting (available on an hourly, three-hourly, and six-hourly basis up to next ten days); has real-time localised alerts and warnings for severe weather events as well.

IMD Agrimet (website)

Provides agromet advisories (national, state, and district) which include weather forecast; also has specialised agromet products like NDVI (Normalised Difference Vegetation Index) and VCI (Vegetation Condition Index), etc.



Meghdoot (mobile application)

Provides crop advisories, current weather information, and past weather data for last seven to ten days and forecasted weather information of five days.

DAMINI (mobile application)

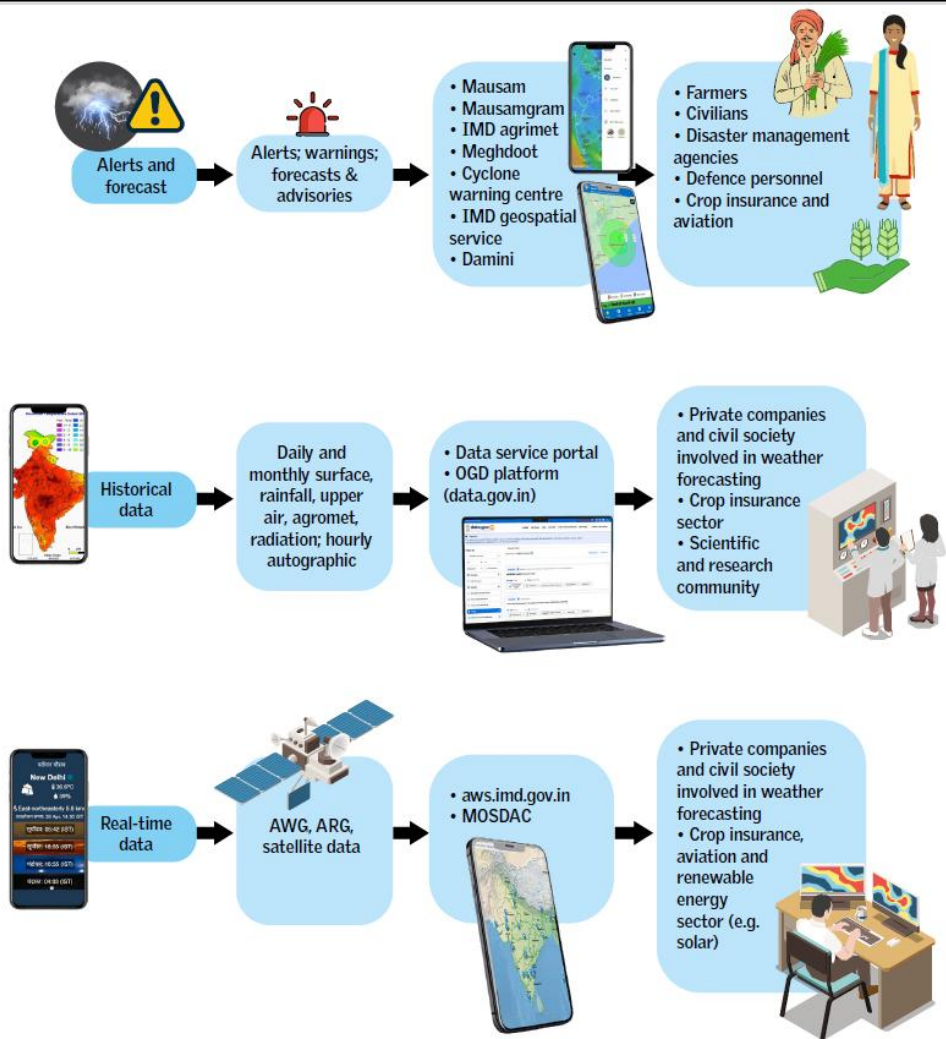
Specialised mobile tool to monitor lightning activity across India; provides GPS based, real-time alerts within a 20–40 km radius, offers three-hour advance warnings, displays live lightning maps, and includes safety instructions.



Sharing of Collected data & Generated Forecast: Operational Framework

b) Historical data sets

c) Real-time data





Gaps & Possibilities in Weather Data Sharing Framework

1. Clarity is needed on sharing data other than related to weather forecasting

Does not have similar guidance in public domain for historical/real time data

2. Reach and accuracy of alerts and weather forecasts (such as those for farmers) needs to be improved

3. Real-time observation data should be available in the interest of end-user

Not sold ,largely accessible to senior government officials; if available in required format could be useful for small-medium scale intermediaries

4. Historical data sets need not be cost-prohibitive

5. Open-source data, commonly used as a substitute, can compromise forecast accuracy

May not capture local observations comprehensively; IMD repository can potentially provide a comprehensive base





WEATHER INFORMATION NETWORK AND DATA SYSTEM (WINDS)

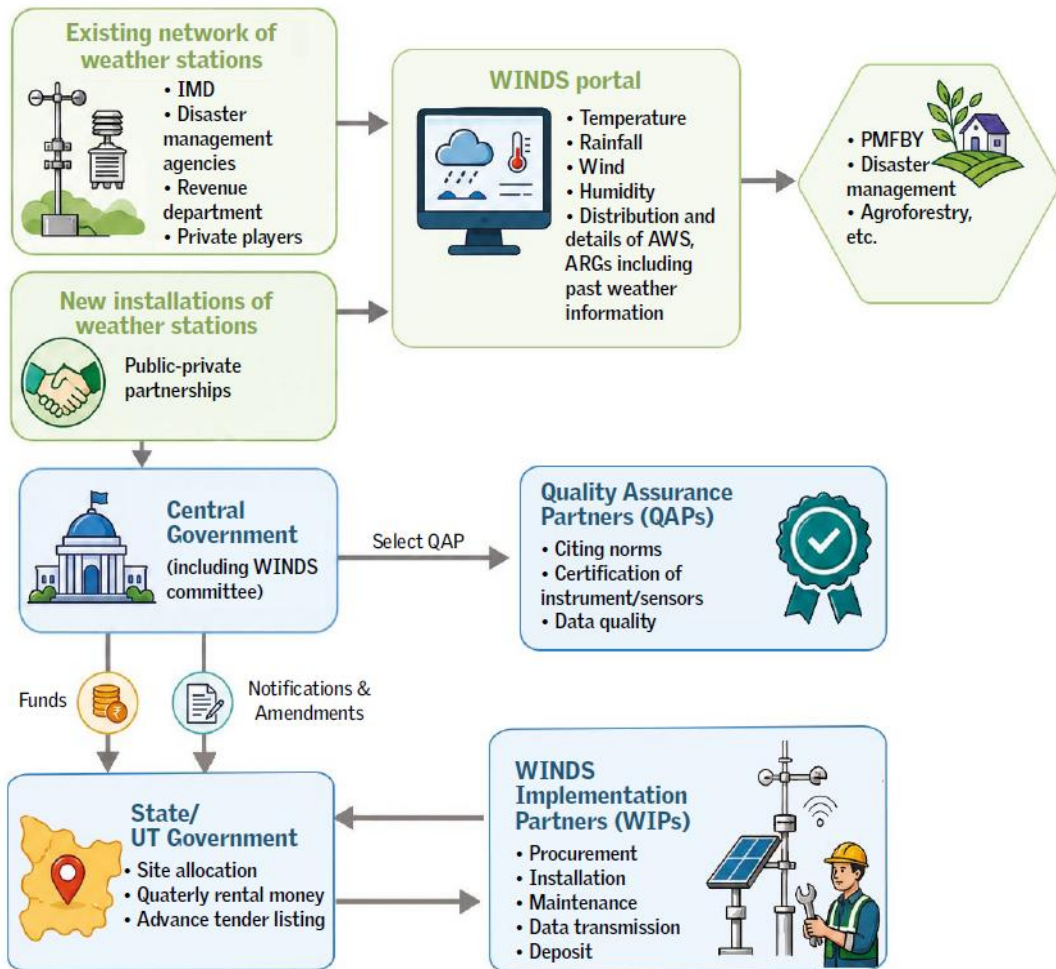




Data Collection Framework

Public-private partnership

- Aims to install ARG in each gram panchayat and AWS in each block/ tehsil in country
- MoU signed between respective state agriculture dept & WIP for 5-7 years



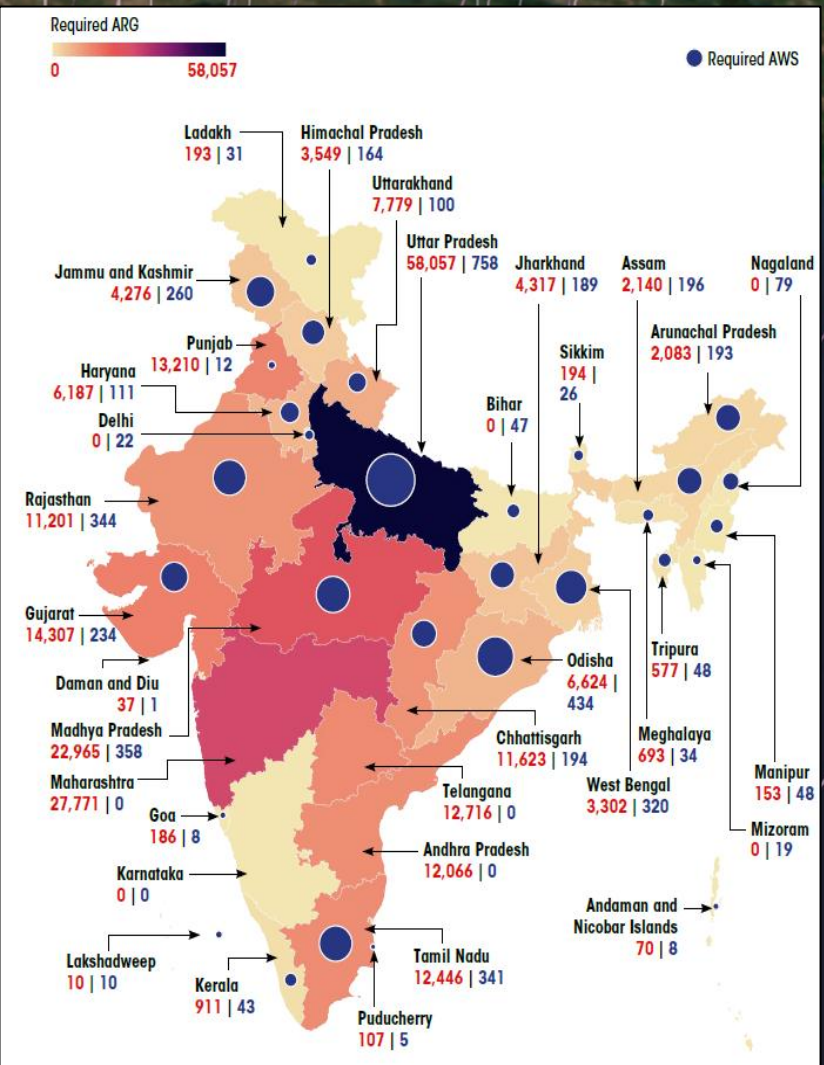
Source: Developed by the research team of this report based on research inputs





Status: WINDS implementation

- **10 states/UTs** where >10,000 ARG to be installed; **15 states/UTs** > 100 AWS planned
- Till March 2026, WINDS portal captured data from **14,097 installations (ARG+AWS)**
- Currently operational in few states. As of October 2025:
 - Ongoing surveys or installations: **6 states/UT**
 - WIPs selected: **4 states**
 - WIP selection process ongoing: **2 states**
 - GAP analysis ongoing: **2 states**





WINDS implementation in Uttar Pradesh

- Skymet Weather Services & Obel Systems, 2 selected WIPs, given contract to install similar number of weather stations
- Tender budget of installations about **Rs 800 crore**, evenly spread between the two WIPs

	Established by Revenue board	Established by IMD	Installations required as per WINDS	Total
AWS at blocks	450	68	308	826
ARG at Gram Panchayat	2000	132	55570	57702

Source: Official document shared by UP state agriculture department

- Average cost of AWS, ARG installation around **Rs 2 lakhs & Rs 1.3 lakh** respectively. Installation cost of 157 AWS , 27,487 ARG therefore comes out to be Rs 360 crore
- Often sites allocated by the state governments being rejected by WIPs as they do not fulfil criteria mentioned in WINDS manual for installation; **No QAP onboarded yet**





WINDS implementation in Kerala

- INGEN Technologies, subsidiary of Weather Risk Management Services Pvt. Ltd (WRMS), is WIP for **5 implementation plan (2024–2029)**
- Allocated budget of about **Rs 16 crore**
- **No QAP has been onboarded yet**

Kerala	Blocks	Panchayat	Existing network (IMD)		Required network	
			ARG	AWS	ARG	AWS
	152	941	30	109	911	43

Source: WINDS manual





Data Sharing Framework: WINDS manual

Clause in the WINDS manual	Stakeholder concerns
<p>‘Government of India (GoI) shall facilitate the operationalisation of AWS/ARG network under WINDS with private player participation on the basis of ‘renting of data’ i.e., final payment shall be linked to the data received at the WINDS portal, maintained by DA&FW. Data generated from AWS/ARGs under WINDS shall be directly sent to the WINDS portal as per the data and information sharing policy of WINDS.’</p>	<ul style="list-style-type: none">• The ownership of the installed equipment rests with WIP.• The payment to be made by the government is subject to the quality of the data generated. The average monthly rent for AWS data is Rs 3,000 and for ARG data is Rs 2,500.• There is no clarity on data sharing after five years (or seven years), as the WIP needs to share data only for the contract duration.• As of March 2026, the data and information sharing policy— which was proposed to be developed in the WINDS manual— is not yet ready. It creates a gap in interpretation of this and other clauses, dependent on the upcoming policy.





Data Sharing Framework: WINDS manual

Clause in the WINDS manual	Stakeholder concerns
<p>‘The WIPs can explore the commercial potential of the weather data generated through AWS/ARG network installed and maintained by them under WINDS.’</p>	<ul style="list-style-type: none">• One of the potential ways in which private WIP can use this raw data is to feed into their own numerical weather models/ modelling, thereby generating a hyperlocal forecast, which can be sold to end-users like farmers or companies of other sectors. They can also create weather-based advisories based on this forecast to sell these.• Another way is to sell this data (raw or in a desired format) to another forecasting company or any other company or organisation in a sector for which the data/forecast is useful.





Data Sharing Framework: WINDS manual

Clause in the WINDS manual	Stakeholder concerns
<p>‘However, WIPs shall not provide any data to any entity specifically restrained by the GoI. Further, data of stations/area notified by the IMD or any other Government body as classified, shall also not be shared by the WIPs. The same shall be described in the data and information sharing policy of WINDS, to be notified separately by the WINDS Committee.’</p>	<ul style="list-style-type: none">• There is a possibility that the WIP can still share the forecast or any other product generated from this data, if not the raw data.• As of March 2026, the data and information sharing policy— which was proposed to be developed in the WINDS manual— is yet not ready. It creates a gap in interpretation of this and other clauses, dependent on the upcoming policy.
<p>‘The GoI and the State/UT Governments shall have the liberty to use the data generated under WINDS for public purposes, including but not limited to, implementation of welfare and development schemes, research and development works, developing weather advisory/agro-meteorological advisory, disaster management or for any other purpose involving larger public interest through Central/State/UT Government bodies or any other public institution including IMD, etc.’</p>	<p>So far, it appears that the sole purpose of this data is to help PMFBY. There seems to be some discussion around developing an integrated platform (beyond WINDS) to bring all weather data on one portal.</p>



Data Sharing Framework: WINDS manual

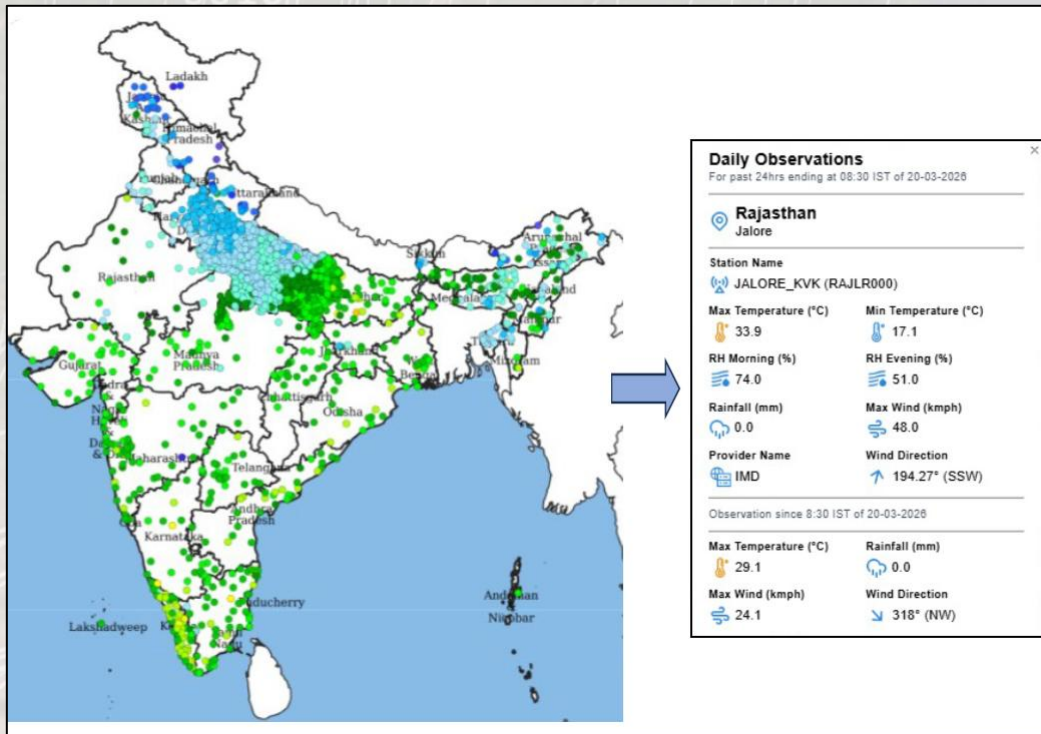
Clause in the WINDS manual	Stakeholder concerns
<p>‘The WINDS data shared by Gol with any entity shall not be used for any other purpose or shared with any third party or monetised by such entities.’</p>	<p>The Government of India wants to be sure about who uses this data and how it is utilised. It aims to prevent situations wherein the data shared by any other entity may be misinterpreted or misused. The Gol also prefers to retain control over its dissemination.</p>
<p>‘The weather data generated through AWS/ARG network under WINDS shall be hosted on an access controlled WINDS portal and shall be shared with the concerned stakeholders, free of cost, as per the data and information sharing policy of WINDS, to be notified separately by the WINDS Committee.’</p>	<p>Data on the WINDS portal can be accessed by individuals free of cost. However, it is not available in the format which an intermediary can utilise.</p>





Data Sharing Framework: WINDS portal

- Provides real-time data from AWS, ARG, and, in some states Agro-AWS ;publicly accessible to all
- Gives access to data from **previous days**
- Portal is **constantly being updated**





Gaps and Possibilities in Data Collection and Sharing

1. Data and information sharing policy is yet to be developed and notified

Clear delay in the development of this policy and notification, even as WINDS infrastructure is being set up & data is being shared on the portal

2. Clauses in the WINDS manual can be misinterpreted in the interim

Clauses contain certain open ends that may be subject to varying interpretations, affect access, accountability, quality, ownership of data generated

3. Limited number of WINDS implementation Partners

As observed in UP & Kerala, only 1 or 2 WIPs in entire state, which also helps them in accessing weather data of a large or entire part of state

4. Quality of incoming data from WINDS could be a concern

Factors such as the installations of stations not being in line with global standards and the non-appointment of QAPs to check quality of data





CONCLUSION AND WAY AHEAD





1. IMD should be responsible for ensuring the quality and integration of weather data generated in the country

- IMD should be closely involved in **ensuring quality** of WINDS data generated
- IMD should also **lead integration** of all weather data
- The MoES, through IMD, should be assigned overall responsibility with final authority, on matters related to **both quality & integration** of weather data generated
- Dissemination of such data can be led by different ministries, along with respective local counterparts and collaborators





2. Accurate and timely weather data should reach end-users, like farmers and citizens, at no cost

- Access to data for **public good**
- IMD, at the central level and through its regional and local centres, should continue to strengthen its efforts to **improve the accuracy** of weather data
- The IMD should also ensure the **timely dissemination** of alerts, warnings, and forecasts for farmers
- The issue of **cost barrier** on the historical data sets of the IMD, as well as the access control on real-time data, needs to be addressed by the IMD
- IMD should put together the guidance it follows, related to data and information sharing and put out in the **public domain**





3. The upcoming 'data and information sharing' policy as per the WINDS manual should secure farmers' interests

- MoAFW should **expedite the development & notification** of this policy in consultation with relevant stakeholders & close involvement of IMD
- Policy should **ensure generation of quality data** which should be integrated with other such data in country
- Should ensure private players or intermediaries **do not misuse** this data or monetise it in a way that jeopardises the interest of farmers, whether directly or indirectly





Thank You

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