Weather and Agro Advisory Services to Farmers and Its Benefits

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Introduction

- Climate change could hurt farmers' income by up to 20%-25%

- Extreme weather events a threat govt's agenda of doubling farmers' income.

- Agriculture accounts for 50% of the country's employment and 18% of its GDP.

- 80% of farmers are small land holders

- Climate change trend shows average temp are rising, Annual rainfall is declining.

Broad Spectrum of Weather Advisory

- Helps in enhanced preparedness and thereby increased adaptive capacity
- Sowing/ transplanting of kharif crops based on onset of monsoon.
- Fertilizer application based on wind conditions.
- Delay in fertilizer application based on intensity of rain
- Irrigation at critical stage of the crop.
- Quantum and timing of irrigation using meteorological threshold.
- Advisories for timely harvest of crops
- Location specific block level weather advisories

Objective

- To inform and guide the farmers in advance to undertake various farming activities based on the expected weather in the intervention areas to reduce losses and lowering input costs in agriculture.
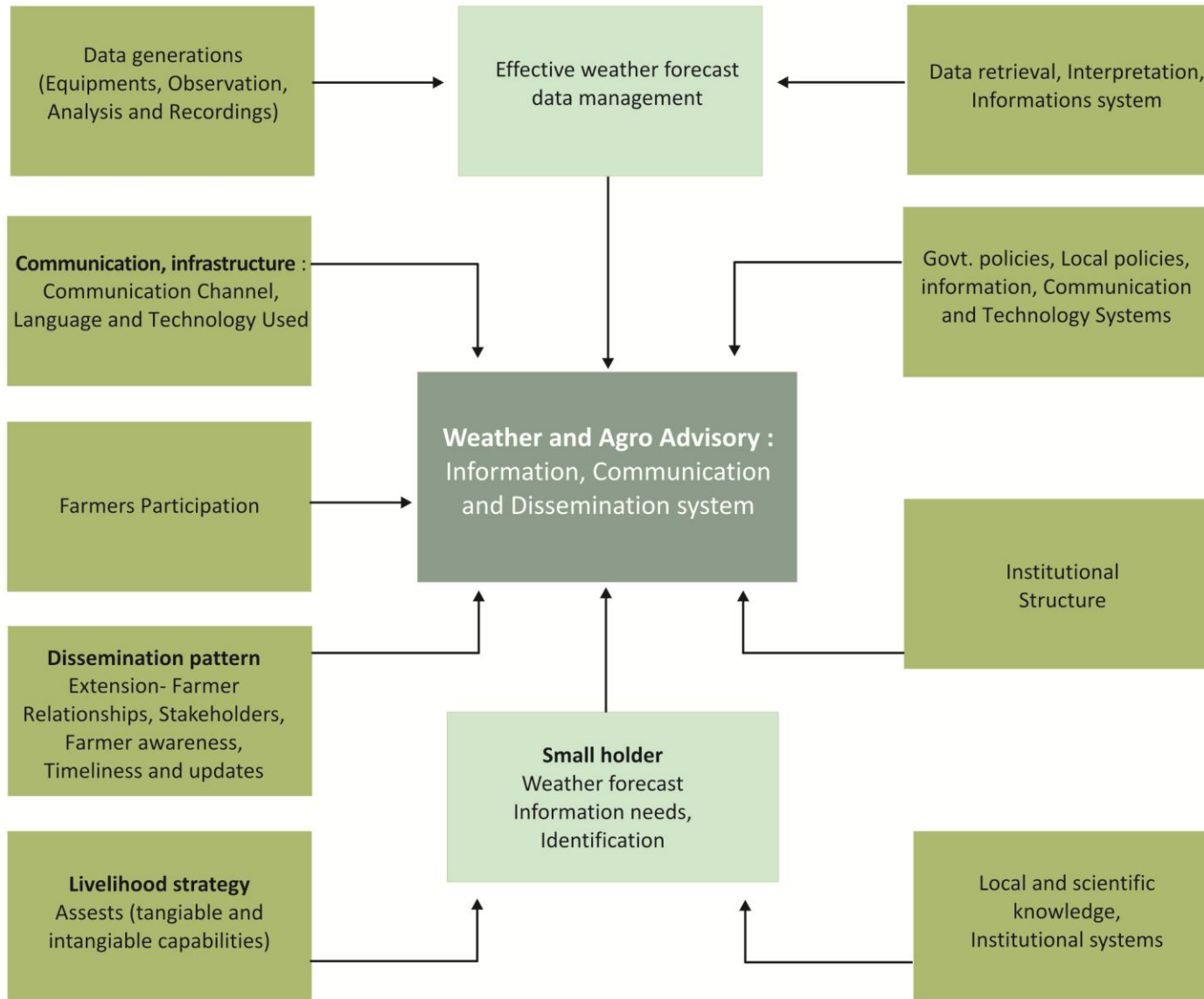
Intervention Area of West Bengal
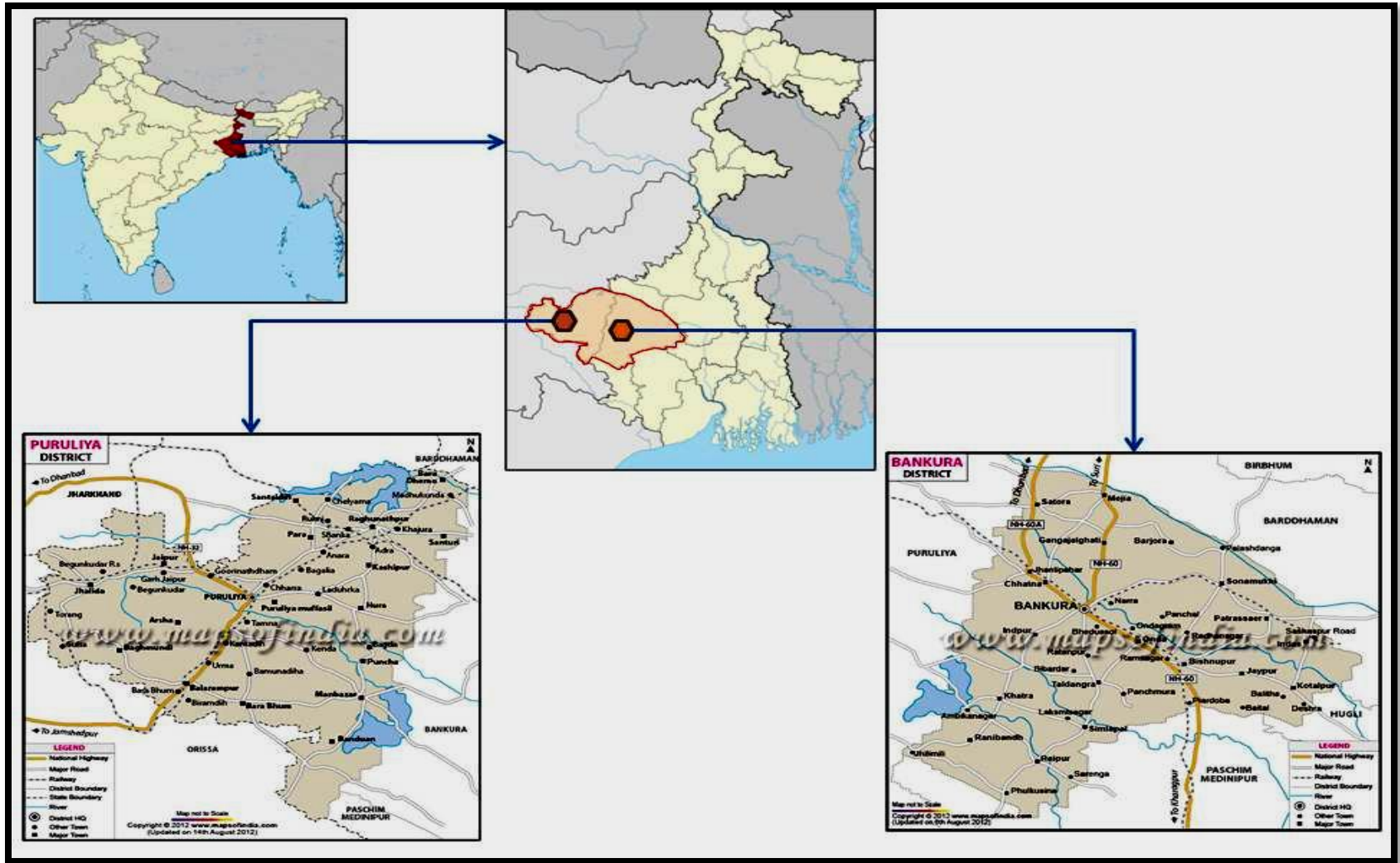
Methods

- DRCSC has established Six Automatic Weather Station
- 12 rain gauges with conventional forecasting system
- WRF weather model for assimilation and forecasting System.
- This mainly consists of three components
- Data Processing,
- Quality Control,
- Objective Analysis,

Process Mechanism

- **Step.1:** Collection of weather data and synoptic situation from the available sources

- **Step.2:** DRCSC generating meteorological products at block level on five days' basis, with mathematical model (WRF) & conventional forecasting system.

- Weather forecast crop advisory obtained from agriculture university and suggested by in house agriculture expert for five days using organic methods.

- **Step.3:** These advisories are location specific (block level) and advisories prepared in local language.

- The advisories also served as an early warning function, alerting producers.

Data generations (Equipments, Observation, Analysis and Recordings) → Effective weather forecast data management ← Data retrieval, Interpretation, Informations system

Communication, infrastructure : Communication Channel, Language and Technology Used

Govt. policies, Local policies, information, Communication and Technology Systems

Weather and Agro Advisory : Information, Communication and Dissemination system

Farmers Participation →

Institutional Structure

Dissemination pattern Extension- Farmer Relationships, Stakeholders, Farmer awareness, Timeliness and updates

Small holder Weather forecast Information needs, Identification

Livelihood strategy Assests (tangiable and intangiable capabilities)

Local and scientific knowledge, Institutional systems

Conceptual framework for enhancing access to and utilization of weather and agro advisory information

Information Flow Diagram
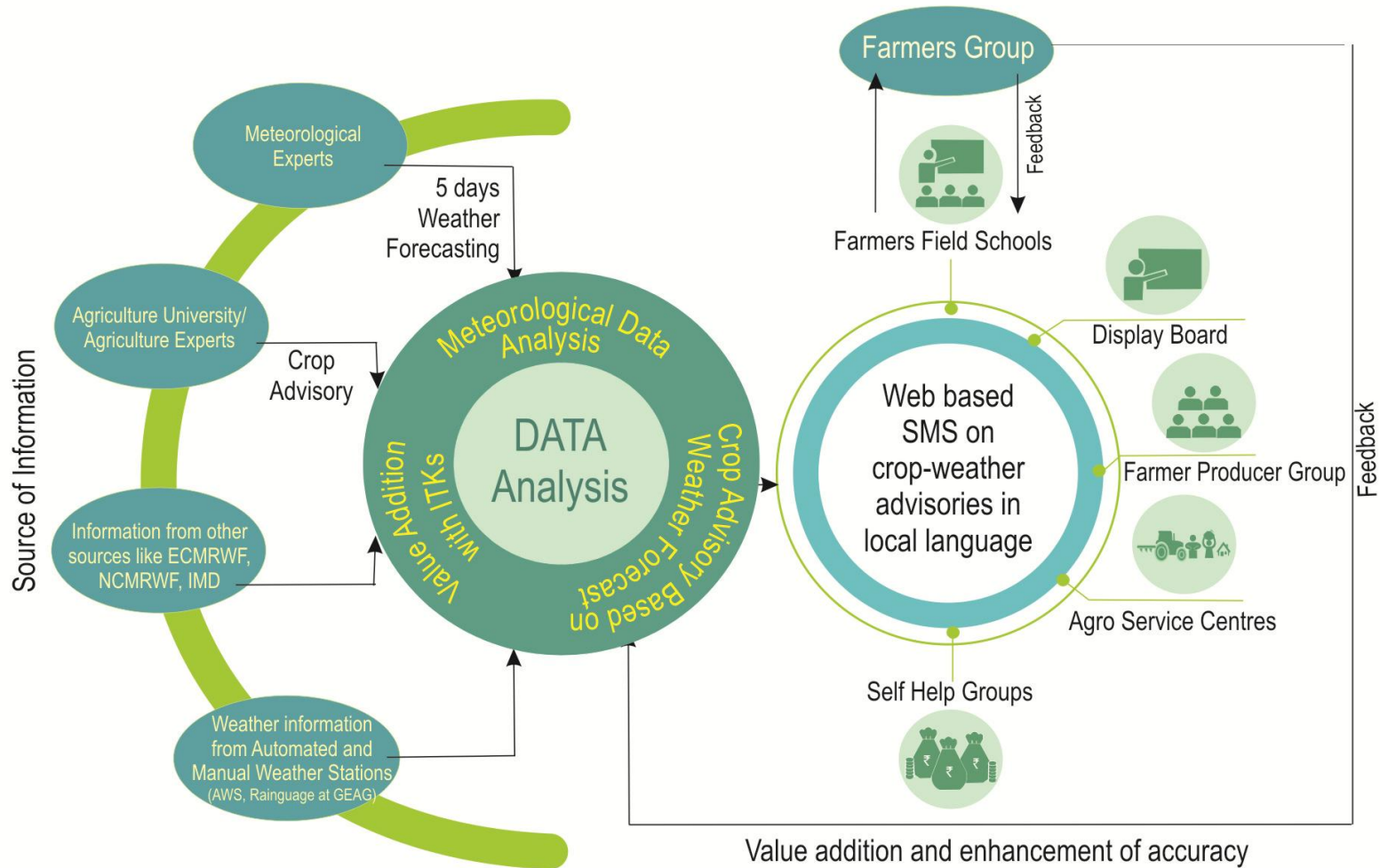
Feedback and Awareness of Weather Services

- Periodic feedback on worthiness of forecast and usefulness

- Feedback is obtained weekly, monthly & annually.

- Documentation on whether farmers have adjusted day-to-day farming ops in response to the advice

- Annual review meetings held at different locations

Data Recorded by Field Staff and AWS Maintained by Field Villager

Weather Information Dissemination Through Display Board by farmer and Discussion F.F.S.

Onsite Data Recorded by Farmer and weather advisory received by a farmer in the filed
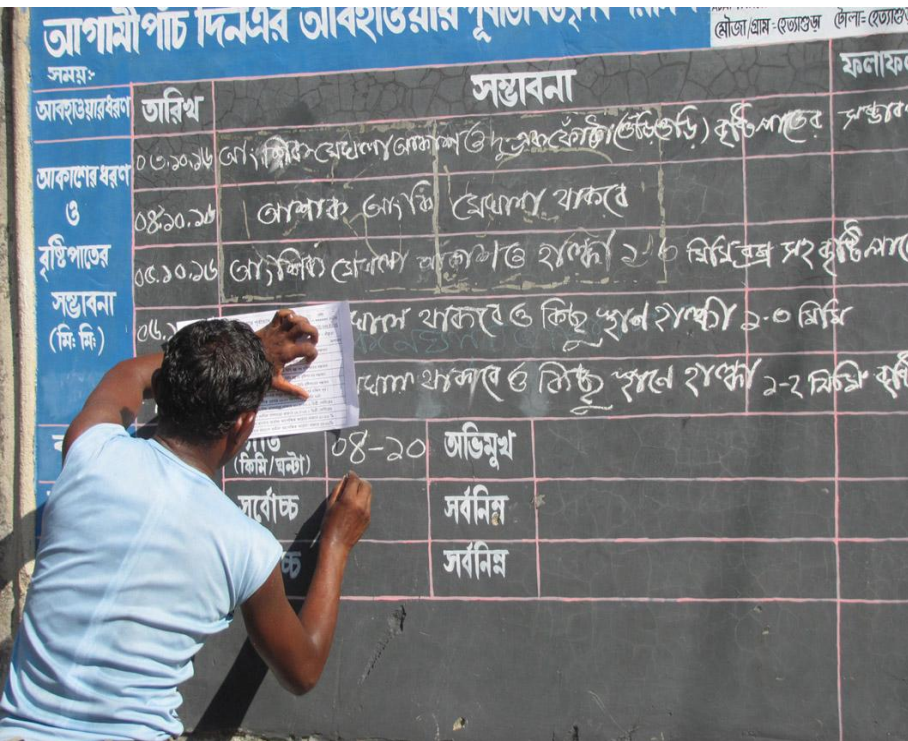
Inclusive Group

District	Number of Blocks	Number of Villages	Male Farmers	Female Farmers
Bankura	1	22	8770	5121
Purulia	1	18	3292	1516
Total	2	40	12062	6637

Assessment of the Weather Advisory Services

- Analysis of the agro-meteorological services work was carried out in the intervention areas.

- It included structured interviews and group discussions with farmers and staff from fields. as well as direct consultations with communities involved focus group discussions and visits to community-managed interventions as planned using participatory vulnerability and capacity assessment.

- A focus on agro-met services was prioritised although this was more explicit in the both the districts. All types of communities were interviewed in both the blocks including women farmers ranging from small and marginal to middle and high level farmers.

Climate Perceptions and Spontaneous Adaptation

- There was a high degree of continuity in the perceptions of changes in climate over the past 5 to 10 years from all villages.

- Summer temperature and particularly heat waves are perceived to have increased. While total amounts of rainfall are either not thought to have changed or declined slightly, the rainfall pattern was cited as most significant change, with the monsoon starting 15 – 30 days later and rainfall less regular, more intense and with longer dry spells in between.

- Some respondents feel that all seasons had shifted forward and the duration of the winter season had declined. Others added that while summer temperatures were higher, winter temperatures had been lower in recent years.

- The main spontaneous adaptation measures have been to delay nursery development and transplanting for rice, using earlier maturing varieties for both wheat and rice in order to cope with a shrinking winter season and a later monsoon onset respectively.

Results and Discussion

- Adjusting sowing times to cope with later/more variable monsoon onset dates, in particular when to establish rice seedling nurseries and transplant seedlings so that planting can be synchronised with the reliable onset of rain as well as direct planting of e.g. wheat, potatoes.

- Irrigation management – to avoid either unnecessary irrigation (and therefore irrigation costs) prior to rainfall or damaging a crop with excess moisture if irrigation is followed by heavy rain.

- Timing of pest control measures, using humidity and wind speed and direction information to decide bio-pesticide application e.g. applying chilli spray to mustard with an east wind.

- Timing of frost damage control using irrigation and smoke to mitigate forecast frost episodes.

Results and Discussion cont:d

- Compost/fertiliser application timed to maximize effects on crop growth and yield e.g. avoiding application prior to heavy rainfall to mitigate fertility loss through soil erosion.

- Vegetable nursery development based on temperature forecasts, for chillies, onions & seasonal leaf vegetables.

- Timing the harvest so as to increase the likelihood of grain being stored at optimal moisture content.

- Respondents, especially women, also cited a number of decisions about household welfare that forecasts had also assisted. Focus on childcare to mitigate risks of colds and other disease. Adjust any travel decisions based on the forecast. Take pre-emptive maintenance to avoid e.g. a leaking roof causing problems within the house.

Number of Farmers Receiving Informations

Number of Farmers (y-axis)

Year (x-axis)

Year	Number of Farmers
2015	4500
2016	9800
2017	14568
2018	18699

Farmers using Information Into their Agricultural Practices in %

use of Information in % (y-axis)

Year	use of Information in %
2015	21.5
2016	37.5
2017	52
2018	68.5

Farmers Use in %
(Area of Operations)

Farmers Use in % — Sowing: 34, Irrgation: 80, Harvesting: 42, Application of Organic Fertilizers: 76, Application of Bio Pesticides: 69
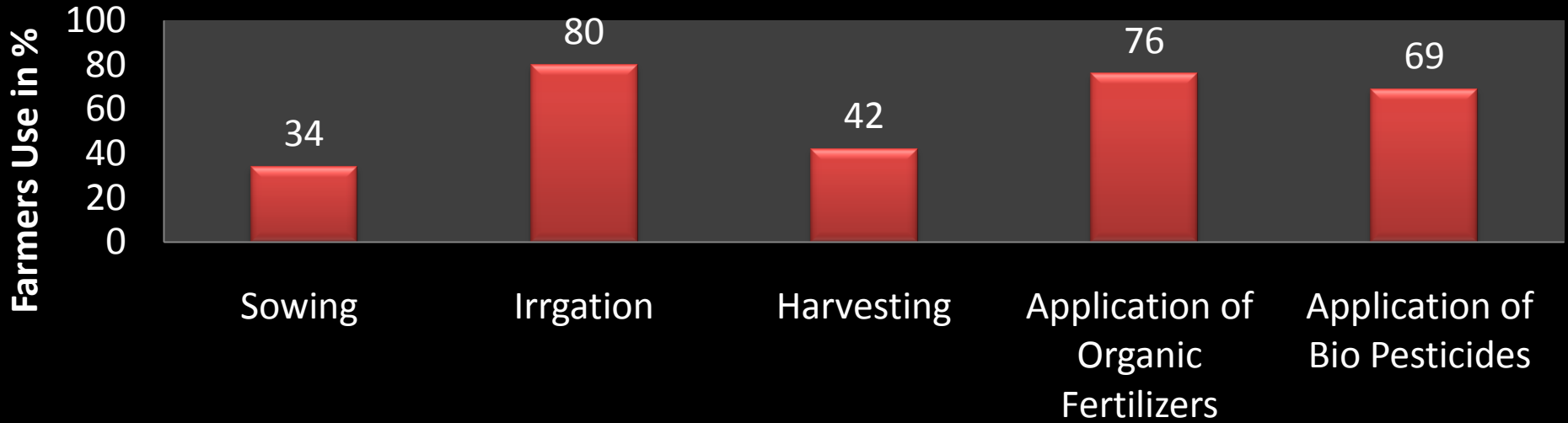
Summary and Level of Impacts Described by Farmers in %

Impacts described by farmers in % — Impotance: 76, Usefullness: 60, Value of weather Services: 80, Accuracy of Forecast: 82.5

Level of Description
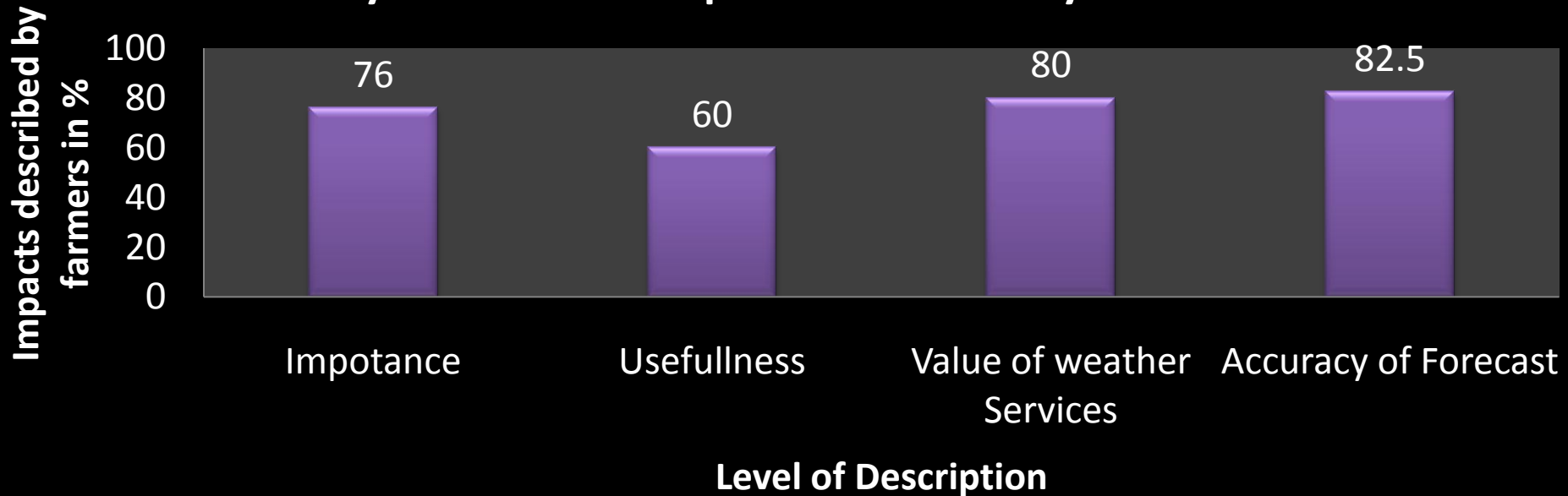
Input Cost Reduced by Farmers in %
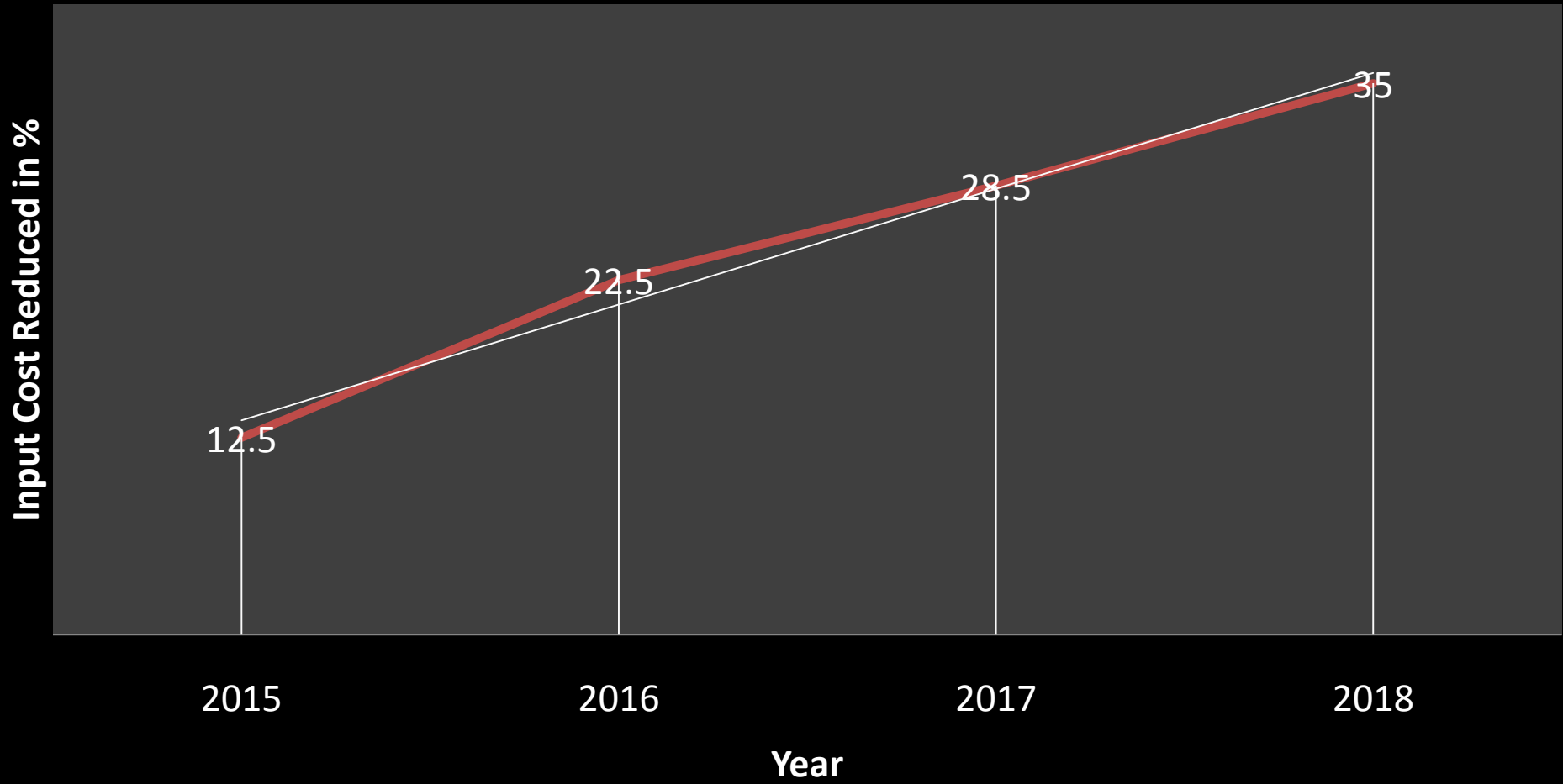
Conclusions

- Demand for weather services at once end users have developed confidence in application through direct training.

- 5-day forecast developed by DRCSC, contributing to resilience through both saving costs and adding productivity to their agricultural livelihoods.

- Farmers are saving 12.5-35% input cost by applying these advisories into their agricultural practices.

- Forecasts are also used for household security decisions, with women emphasising the importance of this value as well as the more direction application to agriculture.

- SMS use has facilitated rapid spread, with registered users forwarding forecasts on to relatives and friends so that indirect users now outnumber direct users by 5 to 1.

Cont'd

- The current communication methods are the most popular (SMS, what;s app messages, hard copies and notice boards)

- Climate volunteers in each village are also playing a crucial role in disseminating the information and also in empowering people in application of weather and agro advisories.

- Regular review every month through farmer field schools was considered a valuable way of interacting

- Considerable enthusiasm for use of weather services

Name: Mahadev Tudu

- Address: Chittra . Battanrd, PS: kashipur
- Plot Area: 0.11 acre of land
- Major decision: Based on forecast he did vegetable cultivation instead of paddy in medium up land (Baid) during last rainy season and got monetary benefit as mentioned below.

SL No	Name of Produce	Quantity Produced (Kg)	Rate (Rs.)	Total Expenses (Rs.)	Total Income (Rs.)	Net Income (Rs.)
1	Ridge Gourd	60 Kg	30	50	1800	1750
2	Pumpkin (own Seed)	120 Kg	14	0	1680	1680
3	Amaranths	50 Kg	10	20	500	480
4	Ploughing (Own)	3 days	200	600		
	Total			670	3980	3310

Mahadev has earned Rs 3310/- but his other two paddy fields were dried due to lack of rain.

Case study on Weather Services

- **Name of the Group: Chachanpur Marang Buru Dol**
- **Address:** Chhachanpur, Chhatna, Bankura

- **Methodology**: postponed the seed sowing of 10 acre land and not irrigate to 5 acre land of standing crop to follow the weather forecast on and from 6 Feb – 10 Feb 2020
- **Result:**
- **Save seed about 1 quintal green gram & 30 kg sesame seed which approximate market value Rs. 15000**
- **Not ploughing of 10 acre land due to rain forecast so farmers save about Rs. 6000 of ploughing cost**
- **Not irrigate to 5 acre of standing crop and saved about 15 hrs pump set cost about Rs. 1500**
- **Benefits:**
- **Fuel consumption**
- **Able to take decision making**
- **Risk factor become decrease**
- **Agriculture cost become reduce**

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Thanks