

IMPACT ASSESSMENT OF FARM ADVISORY PILOT BY ITCMAARS UNDER "PROJECT DRONAGIRI" IN VARANASI DISTRICT; UTTAR PRADESH

RABI CROP SEASON 2024-25

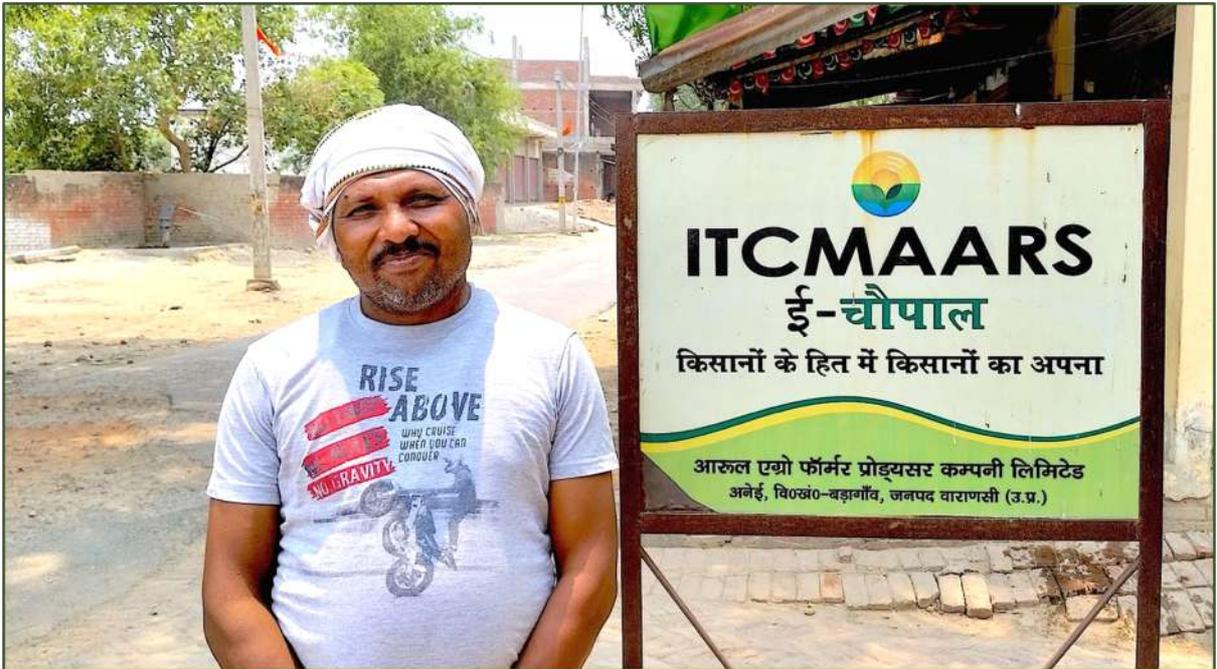
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ITCMAARS

Metamarket for Advanced Agri & Rural Services





Pragatisheel Arajiline Farmer Producer Company



Ma Nakteshvari Agro Farmer Producer Company



Admapur Agro Farmer Producer Company



ITCMAARS Demonstration farm



Arul Agro Farmer Producer Company



Sitakaha Daitra Farmer Producer Company

Acronyms and Abbreviations

ABD	Agri-Business Division
AV	Audio visual
BoD	Board of Directors
CoC	Cost of cultivation
DAP	Diammonium phosphate
FGD	Focus group discussion
FPC	Farmer producer company
FPO	Farmer producer organization
FYM	Farm yard manure
FYM	Farm yard manure
GAP	Good agricultural practices
GoI	Government of India
Govt.	Government
Ha.	Hectare
IAEP	Integrated Agricultural Extension Platform System
INR	Indian Rupees
ITCMAARS	Metamarket for Advanced Agricultural and Rural Services
Kg.	Kilo gram
KVK	Krishi Vigyan Kendra
mm	Millimetres
MoA &FW	Ministry of Agriculture and Farmers Welfare
MoP	Muriate of potash
MT	Metric Tons
OBC	Other backward classes
P.P.	Plant protection
PGR	Plant growth regulators
PoP	Package of practices
PPE	Personal protection equipment
Qt.	Quintals
RKVY	Rashtriya Krishi Vikas Yojana
ROI	Return on Investment
Rs.	Rupees
SC	Scheduled castes
SSP	Single Super Phosphate
ST	Scheduled tribes
SWOT	Strengths, Weaknesses, Opportunities and Threats

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EXECUTIVE SUMMARY

National Geospatial Policy (NGP) was notified by Department of Science and Technology (DST) on 28th December 2022, with an aim to position India as a global leader in the geospatial sector. As per the National Geospatial Policy 2022, the Government has established the Geospatial Data Promotion and Development Committee (GDPDC) headed by Mr. Srikant Sastri as the apex body responsible for formulating and implementing guidelines, strategies, and programs to promote activities in the geospatial sector in the country.

Operation Dronagiri is phase-1 implementation of NGP whose objective is to utilize modern geospatial data & technology in 3 priority sectors viz., 1) Agriculture 2) Transport & Infrastructure and 3) Livelihoods & Skilling. The expected outcome is to connect data providers and data users through a common/unified interface to demonstrate the socio-economic benefits of using geospatial technologies & data. The availability of geospatial data was facilitated through a common interface 'Geospatial Data Interface (GDI)'

ITCMAARS an initiative of ITC Agribusiness Division has taken up the lead to implement 'Farm Advisory Pilot for Agriculture sector under "Project Dronagiri" with an aim to improve crop productivity and net returns of the farmers through personalized and predictive farm advisory by using geospatial data during rabi season 2024-25. In this regard, Geospatial Data Promotion and Development Committee (GDPDC) supported ITCMAARS in partnering with Varanasi district administration for the farm advisory pilot.

The Impact Assessment of Farm Advisory Project by ITCMAARS reflects the qualitative and quantitative changes brought by phygital (a combination of digital and physical) interventions from ITCMAARS (Metamarket for Advanced Agricultural and Rural Services), which aimed at facilitating predictive and personalized agricultural advice basis geospatial data to farmers by incorporating hyperlocal weather forecasts, satellite-based remote sensing data, soil testing data, field-level crop monitoring and agronomic principles into an AI engine. In this pilot project, predictive, personalized and hyperlocal advisory on the entire crop production cycle from seed to market was given which included customized nutrition, weather related forecasts & alerts, disease-pest management, terminal heat stress management etc. for assessing the impact of ITCMAARS interventions 100 farmer fields were monitored impact where all the advisory interventions were ensured by field

supervisors throughout the rabi season 2024-25. Operation Dronagiri was implemented in geographies which are agrarian by occupation and the farmers in those villages were witnessing challenges to access full spectrum agricultural advisory services

In this pilot project, advisory on the best agricultural practices including customized nutrition, weather related alerts, disease pest mgt, terminal heat stress management practices etc. were shared on regular basis. ITC Ltd also organized 100 dedicated demonstration plots for wheat crop where all the advisory interventions were carried out during rabi season 2024-25.

Ingrain Technologies conducted the impact assessment of ITCMAARS Farm Advisory Pilot under Project Dronagiri during April -May 2025. The study, aim at quantifying and documenting the magnitude of benefits from the project-based interventions and provides indicative evidence on the changes.

- Among the member farmers of 15 FPCs covered under Operation Dronagiri, 79% are marginal farmers, 14% are small farmers and 7% are semi-medium farmers.
- Based community-wise segmentation, 26% of farmers belong to General category, 46% of farmers belong to OBC, 20% SC and 8% ST
- 88% of the farmers are men and 12% are women

ITC's crop advisory for wheat farmers through ITCMAARS brought improvements in knowledge and agricultural operations in rabi season 2024-25. ITCMAARS App successfully established 'digital connect' to approximately 26000+ farmers (93% small and marginal) from 15 FPCs to provide advisory on climate, improved agricultural practice and market intelligence. The contribution of Operation Dronagiri was observed from the perspective of learning and adoption of Good Agricultural Practices (GAP) and also crop performance related benefits for rabi wheat crop and improved farmer economics. The estimated area under coverage of crop advisory through ITCMAARS was approximately 39,000 acres, which was cultivated by approximately 26,000 beneficiary farmers in 346 villages.

- 88% of the respondent farmers (from beneficiary farmers group) informed that their knowledge regarding Good agricultural practice improved because of farm advisory under Project Dronagiri.
- 72% of the respondent farmers showed interest to follow the range of advisories from ITCMAARS for next crop season

- 78% respondent farmers informed that they could witness improvement in yield and improvement in income and 22% informed that their crop yields remained the same.
- It was observed that 84% of the farmers from beneficiary group (farmers from 346 villages) understood the positive influence of balance fertilizer application and are ready to implement the same to gain the reduction in cost of cultivation.

Advisory Facilitation:

These FPCs were strengthened through capacity building of the members in Rabi crops with specific focus on wheat cultivation aspects through ITCMAARS App which is the core soft infrastructure provider to the FPCs as it was instrumental in facilitating extension of predictive and personalized advisory for entire crop production cycle from seed to market. It played a catalytic and critical role in adding effectiveness to wheat farming operations and served as a digital bridge to promote effectiveness in farming. The member farmers of the FPCs were also provided with agronomy and crop management related trainings, demonstrations and important services like soil testing, availability of scientifically curated input kits, latest machinery etc.

- Member farmers and BoDs of FPCs appreciated the wheat crop specific and customized advisory to farmers along with the curated scientific inputs. Through the FPCs, a concerted effort for crop advisory facilitation through integration of geospatial data was done by ITCMAARS.
- ITCMAARS facilitated soil testing services at FPCs to the member farmers and customized crop nutrition related advisory was provided basis the soil test results. The soil test results obtained can be entered in the fertilizer calculator feature of ITCMAARS to get precise recommendations on the fertilizer combinations and usage. This initiative served the purpose of last mile connectivity of soil testing along with customized and balanced crop nutrition advisory which was highly appreciated by the beneficiaries.
- Mechanization for seed sowing through seed drill and happy seeder was popularized among the wheat farmers in 15 FPCs, whose benefits were acknowledged by farmers who adopted machine sowing of wheat crop.
- Adoption of seed treatment practice was also promoted by ITCMAARS for wheat seed and all the farmers who adopted seed treatment (100%) informed that it helped in preventing from seed/soil borne pests & diseases. They also expressed that the germination percentage and plant stand in the wheat farms was better than the farms with non-treated seeds.

Predictive & Personalized Crop advisory, Agricultural extension & other services through phygital platform ITCMAARS App

ITCMAARS, phygitally empowers the farming community by delivering customised solutions via synergistic integration of NextGen agri-technologies. ITC MAARS aims at bringing the power of digital revolution to farmers, by providing them a range of solutions through hyperlocal and personalized crop advisory using geospatial data, availability of genuine agri inputs, market linkage for farm produce and affordable credit services.

The offerings to the farmers were driven by “Phygital” system (combination of physical and digital systems), where field supervisors and Farmer Producer Company (FPC) acted as a Physical node, supported by dedicated features on digital platform. It is an integrated platform where farmers can get scientific advisory free of cost, avail credit, buy seeds, fertilizers, agro-chemicals, machinery and easy access to a market-place to sell their crops.

Weather advisory: ITCMAARS relayed weather advisory to farmers through ITCMAARS mobile app as a seamless service. Weather forecast and weather-based crop advisory formed one of the key elements in agricultural extension through ‘Farm Advisory Pilot’ under Project Dronagiri. Regular flow of current and forecasted weather data from Indian Meteorological Department (IMD) was also integrated into agrometeorological advisory through ITCMAARS.

Crop advisory for wheat crop: ITCMAARS App facilitated crop specific, predictive, personalized, timely and diagnostic advisory services and helped in enhancing the reach of farmers to advanced crop cultivation practices and bridged knowledge gaps to improve productivity. Phygital means of agri-extension was ensured through ITCMAARS App at various stages of crop growth. Other than the ITCMAARS App, messages through WhatsApp, telephonic advisory via Digital Engagement Centre and IVRS were also facilitated to reach out farmers of the 15 FPCs to provide comprehensive and hyperlocal crop advisory on regular basis.

Crop Doctor: An AI-ML based feature that allows farmer to click a picture of the disease or pest-ridden crop to get an instant diagnosis of the pest and disease and its integrated control measures. Farmer can raise a pest alert to inform neighbouring farmers and make them aware on the infestation to take up precautionary measures.

Krishi Mitra Chatbot is another AI based feature that interprets the farmer queries and prompts through various means like text/image/audio and provide instant resolutions in their localized languages.

Crop Calendar feature enables the farmers to know the schedule of crop operations once they enter the date of sowing. The personalized crop calendar has immense use in enhancing the preparedness and planning of farmers for crop operations. It is integrated with weather-based rule engine that sends continuous alerts on the precautionary and contingency measures to be taken based on the forecasted and current weather conditions.

Community Section served as a social media for farmers where they interacted with their peer farmers along with prompt resolution of their queries from agri-experts.

Learning Centre feature served as a knowledge repository to educate farmers on agriculture news, innovative technologies, animal husbandry etc. Success stories of progressive farmers were documented in video form and extended to motivate other farmers via ITCMAARS platform.

82% of the respondent farmers appreciated the holistic advisory organized through the combination of 'physical + digital' combination of ITCMAARS. They expressed their satisfaction regarding the regular monitoring at farm level and timely advisory. The specific and end to end advisory and support provided to them through ITCMAARS (digital) and deployment of field staff at FPC level was found to be highly useful to the farmers.

The respondent farmers attributed their improvement in knowledge in specific agronomic practices of wheat crop like varietal selection, right dosage of chemical fertilizers, crop nutrition, use of MoP spray, usage of seed drill for sowing of wheat etc. to 'Operation Dronagiri'.

No. of advisories issued in rabi 2024-25 (189 in total)

- Weather advisory – 31
- Weekly crop advisory -27
- FPC wise fertilizer recommendation -23
- Progressive farmers and testimonial videos -29
- Krishi Vigyan Kendra (KVK) expert videos - 10
- Government schemes, Animal Husbandry and other POPs, e.g. Irrigation management, pest and disease management -69

1. Total number of advisories facilitated through ITCMAARS App - 189
2. Farmers reached out through WhatsApp and IVRS Campaigns- 80000
3. Need based farmer outreach through telecalling for crop health advisory - 3000

Facilitation of Advisory linked agri-inputs to farmers:

ITCMAARS contributed to improvement of agri-input business of FPCs. ITC's digital platform enabled FPCs to streamline and scale up their agri-inputs business, ensuring efficiency and accessibility for member farmers.

44% of member farmers (respondents) expressed that they could purchase agri-inputs like seed, pesticides etc.) from their FPCs at lower prices compared to agri-input dealers' shops.

Advisory regarding availability of Government schemes for farmers:

ITCMAARS actively served the farming community in dissemination of information regarding various Government schemes and subsidies which were relevant to farming and farmers. Articles on complete information on schemes & subsidies and process to avail them were detailed in the ITCMAARS platform.

During the field survey, 20% of the respondent farmers acknowledged that they could get benefit from information given through ITCMAARS and they could avail some of the schemes like drip irrigation, solar pumps etc.

Market prices information:

ITCMAARS facilitated market price updates to farmers for wheat and other commodities from various markets as a dedicated service on regular basis. The farmers could understand the price fluctuations and market trends by tracking the market prices and take informed decisions regarding the sale of their crop which helps in preventing distress sale.

The respondent farmers expressed their satisfaction regarding the facilitation of market prices. 77% of the respondent farmers informed that they are regularly following the market prices of wheat in nearby market places.

Impact plots :

ITCMAARS under Farm Advisory Pilot has organized 100 impact plots for rabi season 2024-25 wheat crop which were spread across 52 villages among 15 FPCs in Varanasi district. Demonstration farms followed predictive and personalized crop advisory basis geospatial

data and suggested inputs. Field supervisors of ITCMAARS closely monitored the total range of agronomic practices from sowing to harvesting and ensured the recommendations were implemented. Scientists from Krishi Vigyan Kendra (KVK) visited the impact plots on regular basis and provided their advice to farmers.

Observations pertaining to demonstration farms:

- In Impact plots, farmers witnessed 7% decrease in seed rate, which was lower by 3.1 kg compared to control (resultant saving of approximately Rs.217 per acre).
- In Impact plots, farmers witnessed improvement of productive tillers by 29% compared to control which could potentially contribute to improvement in productivity.
- In Impact plots, farmers witnessed decrease in quantities of chemical fertilizers application of Diammonium Phosphate (DAP) and Urea because of following improved agronomic practices. The application of DAP and Urea decreased by 25% and 19% respectively. This measure resulted in saving of Rs.464 and Rs.193 respectively for DAP and Urea and contributed to mitigating leaching losses of the fertilizers and consequent possible environmental degradation.
- In Impact plots, farmers witnessed improvement of average yield by 2.5 quintal/acre (15.3%) compared to control farm.
- In Impact plots, farmers witnessed distinct improvement of 26.4% in net returns compared to control which is approximately Rs. 5,270/acre.
- 100% Impact plots farmers and 96% respondents from member farmers of FPC appreciated the adequacy, timeliness of the services and commitment of the field staff involved in the implementation of 'Farm Advisory Pilot'. Farmers acknowledged the regular plot visits and crop monitoring by field team during rabi 2024-25 season.

"Farm Advisory Pilot" customized hyperlocal advisory and successfully displayed the improved productivity and quality of grains by adoption of improved package of practices in wheat crop cultivation. The impact plots proved the dictum of "Seeing is believing" in the context of spreading recommended practices among the farmers of 15 FPCs.

- 100% of the impact farmers acknowledged their learning through attending and adoption of GAP.
- 96% of member farmers of FPCs who visited demonstrations acknowledged their learning regarding improved practices and 62% among them expressed their willingness to adopt the new crop practices in their farms from next crop season onwards.

Meetings & Trainings

ITCMAARS team conducted significant number of trainings which were scheduled at various stages of wheat crop to facilitate the learning and adoption of improved agricultural practices and agronomy knowledge among the FPC members in Farm Advisory pilot. Regular farmer meetings were also organized to learn and interact with Krishi Vigyan Kendra (KVK) scientists and Agri-experts.

Details of trainings and Farmers meetings:

- Farmers meetings in small groups - 300
- One to one farmer Interactions- 7000
- Farmer training by scientists from Krishi Vigyan Kendra; Varanasi and ITC's internal Agri -experts -10 (covering 4,000 farmers)
- Drone spray demonstrations on pilot basis - 3

Farmers' perception about the advisory services

S.no.	Outcomes and impact of Operation Dronagiri by ITC	Response from the farmer members (%)		
		Effective	Satisfactory	Not satisfactory
1	Customized crop advisory to farmers along with curated scientific inputs.	85%	15%	
2	Weather related alerts, terminal heat stress management practices etc.	88%	12%	
3	Advisory on disease & pest management (plant protection)	78%	22%	
4	Crop advisory - the best agricultural practices including customized nutrition	82%	18%	
5	Digital connectivity for farmers and FPCs	54%	46%	
6	Supporting services – like soil testing, provision of mechanization equipment like seed drills etc.	75%	25%	
7	Organizing demonstration plots for wheat	98%	2%	
8	Facilitation of agri-inputs through FPCs through ITCMAARS	76%	24%	
9	Market intelligence – commodity price information	86%	14%	

Satisfaction of farmers pertaining to Farmers trainings and Farmers meetings

Parameter	Highly satisfied	Satisfied	Not satisfied
Quality and , adequacy of the content of the training/orientation	38%	62%	
Delivery of the content/demonstration of applications	45%	55%	
Timeliness	66%	34%	
Clarification of doubts	33%	67%	

Wheat farmers' experience and benefits from Demonstration farms

S.No.	Benefit/Utility	Response from demonstration farms in %
1	Saving in quantity of seed	100%
2	Saving in sowing cost	100%
3	Timely sowing (in stipulated time) is possible	100
4	Savings in number of irrigations, quantum of water in irrigation	36%
5	Saving in chemical fertilizers	100%
6	Uniform crop stand	92%
7	Better productivity of wheat crop	100%

Purview of coverage - ITC's 'Farm Advisory Pilot' in Varanasi District; Uttar Pradesh (Rabi crop season 2024-25) effectively covered 15 FPOs across 3 blocks of Varanasi district, 346 villages, 26,000+ farmers and 39,040 acres.

Matrix of Relevance, Effectiveness, Efficiency and Scope for scale up in future:

The following table indicates the relevance of various interventions in "Farm Advisory Pilot" their relevance, effectiveness, efficiency in implementation and scope for scale up in future.

Matrix of Relevance, Effectiveness and Efficiency

S.no.	Interventions	Relevance	Effectiveness	Efficiency	Scope for scale up in future
1	Weather/ climate alerts/ advisory	Highly relevant	Very Effective	Efficient	Yes
2	Agricultural Extension & crop advisory (through ITCMAARS)	Highly relevant	Very Effective	Efficient	Yes
3	Soil testing services & customized crop nutrition recommendation	Relevant	Effective	Efficient	Yes
4	Agri-mechanization demonstration	Highly relevant	Effective	Efficient	Yes
5	Demonstration plots for wheat crop	Highly relevant	Very effective	Very efficient	Yes
6	Farmers trainings and Field days on Good Agricultural Practices (GAP)	Highly relevant	Effective	Efficient	Yes
7	Facilitation of agri-inputs(through ITCMAARS)	Relevant	Effective	Efficient	Yes
8	Facilitation of market intelligence and price updates on daily basis (through ITCMAARS)	Highly relevant	Very effective	Very efficient	Yes
9	Facilitation of information regarding Government schemes and subsidies (through ITCMAARS)	Relevant	Effective	Efficient	Yes
10	Reinforcement of Agricultural extension messages through WhatsApp & IVRS /Digital Communication Centre	Relevant	Effective	Efficient	Yes
11	Support by Field staff to farmers	Highly relevant	Very effective	Very efficient	Yes

Indirect benefits

- Trickle-down effect of learning regarding wheat crop agronomic practices to the non-FPC members because of demonstrations, trainings and farmer meetings

- Effective contribution to agri-extension in the geographies where FPCs are operating
- Large scale spread of market intelligence among the farmers

Qualitative improvements

- It was observed that Farm advisory plot instilled confidence in the farmers as they could access personalized and predictive crop advisory through various means and market linkages without hassle
- Satisfaction and sense of security because of hand holding through digital information and support by ITCMAARS Field team.
- Promise for improvement in productivity of wheat crop through the support of ITCMAARS
- Synergistic effect from combination of crop advisory, farmers' knowledge improvement and facilitation like soil testing services and agricultural mechanization contributed to positive outlook for the 26000+ farmers.

Conclusions

The important contribution of Farm Advisory Pilot was establishing the digital connectivity for farmers from 15 FPCs through ITCMAARS App and facilitating hyperlocal customized advisories on timely basis by integration of geospatial data which enhanced the access of farmers to predictive and personalized advisory which improved their farm productivity.

Farm Advisory Pilot successfully delivered the objectives in terms of effective dissemination of crop advisory using geospatial data, market intelligence, demonstrations, effective trainings for the farmers and also facilitated farm related services and customized agri-input kits. It was instrumental in establishing and operationalizing phygital (physical+ digital) ecosystem for agricultural extension and market intelligence for farmers of 15 FPCs in Varanasi district. It facilitated soft infrastructure and processes for enabling seamless access to customized advisory through various modes of dissemination.

Considering the above achievements and other inferences of the impact assessment study, it can be concluded that Farm Advisory Pilot was highly relevant, effective and efficiently implemented.

Recommendations

- Active involvement of stakeholders like Department of Agriculture may help in enhancing the effectiveness of agricultural extension through ITCMAARS
- Agricultural mechanization may be given further thrust in future by facilitating drones, seed drills, wheat harvesters etc.
- Incentives like “Best Farmer Award/ Best Learner Award/ Best Facilitator Award” etc. may be facilitated to accelerate the learning and adoption by the farmers
- Board of Director of FPCs may be trained and motivated to popularize ITCMAARS App and to scale up transactions through the same

1. INTRODUCTION, IMPACT ASSESSMENT FRAMEWORK AND PROCESS

Introduction:

National Geospatial Policy (NGP) was notified by Department of Science and Technology (DST) on 28th December 2022, with an aim to position India as a global leader in the geospatial sector. As per the National Geospatial Policy 2022, the Government has established the Geospatial Data Promotion and Development Committee (GDPDC) headed by Mr. Srikant Sastri as the apex body responsible for formulating and implementing guidelines, strategies, and programs to promote activities in the geospatial sector in the country.

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Predictive, personalized and hyperlocal advisory on the entire crop production cycle from seed to market was given in this pilot project which included customized nutrition, weather related forecasts & alerts, disease-pest management, terminal heat stress management etc. For assessing the impact of ITCMAARS interventions, 100 farmer fields were monitored where all the advisory interventions were ensured by field supervisors throughout the rabi season 2024-25.

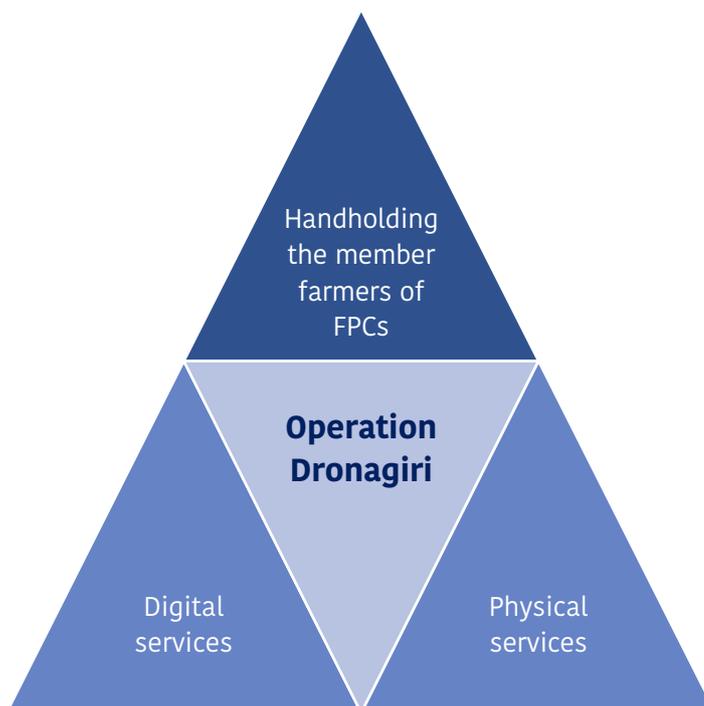


Launching of Operation Dronagiri on Nov 13th 2024

Scope of work in impact assessment:

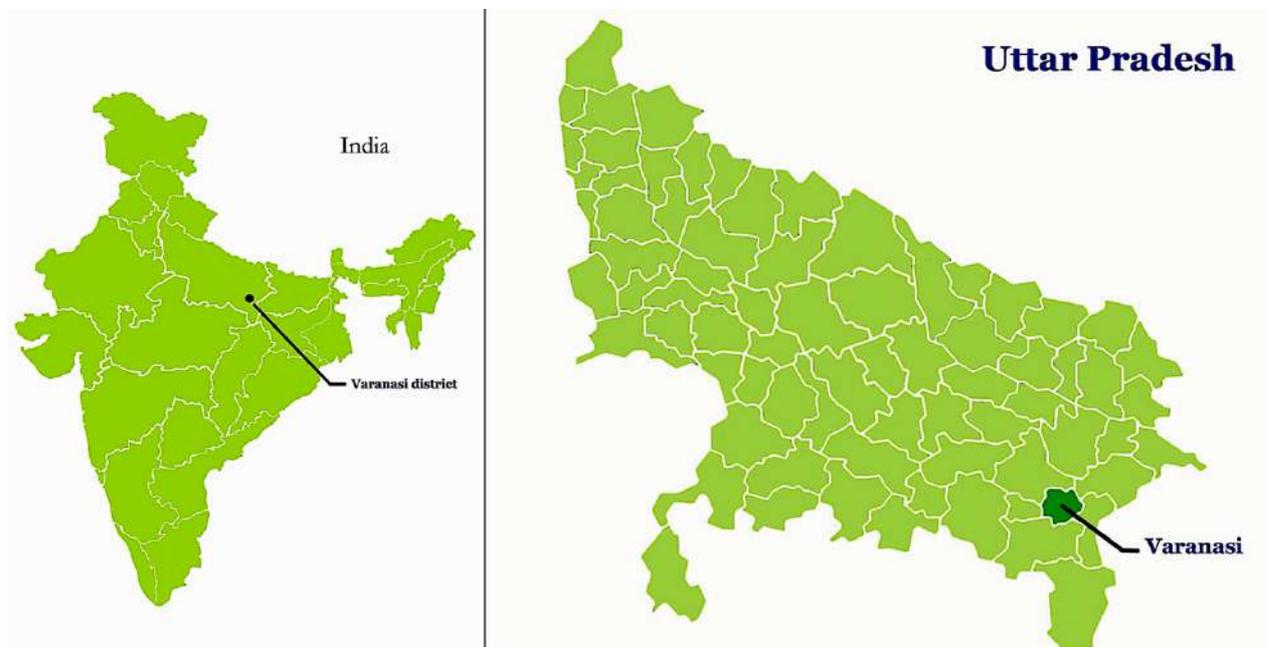
Ingrain Technologies conducted an impact assessment study for various interventions of ITCMAARS through “Farm Advisory Pilot” under ‘Operation Dronagiri’ covering 15 FPOs and 26,000+ farmers. Quantitative and qualitative impact of the initiatives of diagnostic, predictive and personalized farm advisory through ITCMAARS was assessed through on-ground surveys, interviews with stakeholders and analysis of existing data pertaining to 15 FPOs. The scope of the study would cover the following: The scope of the study would cover the following

- Impact assessment is done for interventions done by ITC’s Agri Business Division through ITCMAARS to improve farmer’s net returns, increase yield and quality of the agricultural commodities while the time period of the impact assessment study was rabi season 2024-25.
- Impact assessment covers predictive and personalized advisory facilitated to 15 FPOs of Varanasi district by ITCMAARS using geospatial data (right agricultural practices including crop cultivation advisory, customized nutrition, weather advisory, disease-pest management, terminal heat stress management etc.



Geographic coverage:

State	District	No. of FPCs
Uttar Pradesh	Varanasi	15



Map depicting the geographies of 'Operation Dronagiri'

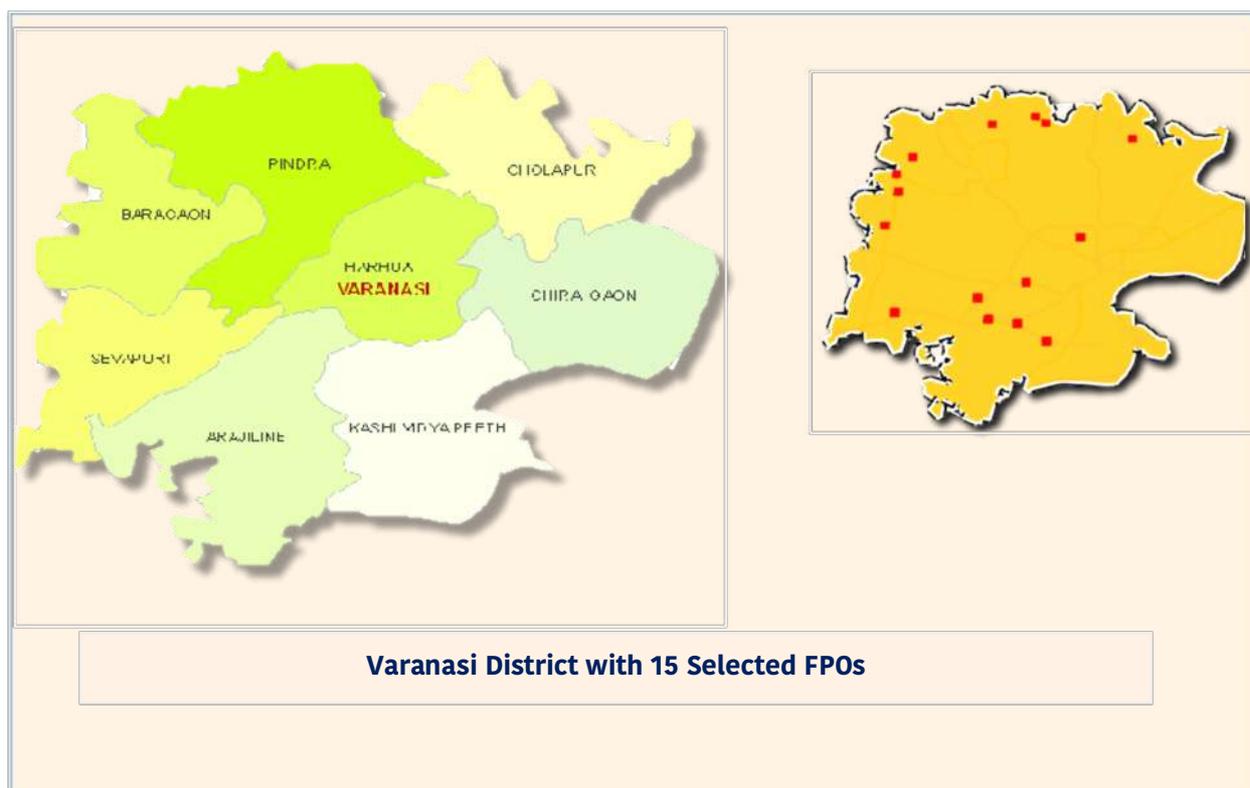


Table no.1 – Details of 15 FPCs covered under Operation Dronagiri in Varanasi district

Block in Varanasi district; U.P.	Name of FPO	Village Name	No. of farmers on ITCMAARS
Pindra	Agrobasantpur Navkrishak Farmers Producer Company	Basantpura	1,102
	Aharak Agro Farmer Producer Company	Aharak	883
	Akorha Farmer Producer Company	Akorha	2,184
	Arul Agro Farmer Producer Company	Aneai	4,440
	Marueepindra Farmer Producer Company	Maruee	2,541
	North-Agro Farmer Producer Company	Barwan	1,499
Sewapuri	Admapur Agro Farmer Producer Company	Admapur	2,867
Varanasi	Cholapur Kalyan Farmers Producer Company	Panditpur	1,000
	Cultiville Farmers Producer Company	Madhukar Shahpur	661
	Krishi Jananee Jai Farmer Producer Company	Alauddinpur	2,741
	Ma Nakteshvari Agro Farmer Producer Company	Aswari	1,313
	Namami Gange Farmer Producer Company	Lohara Dih	842
	Pragatisheel Arajiline Farmer Producer Company	KarniDadi	992
	Sitakaha Daitra Farmer Producer Company	Jalalpur	3,108
	Varanasi Vegetable and Fruit Producer Company	Bachhawn	800
	15 FPOs		26,973

Assessment parameters:

1. Outcomes, impact and learnings regarding the predictive and personalized advisory using geospatial data (best agricultural practices including package of practices, customized nutrition, weather related alerts, disease pest management, terminal heat stress management practices etc).
2. To measure the improvement in FPC member farmers' net returns, increased yields/productivity and quality of the agricultural commodities basis integrated customised crop advisory.
3. Satisfaction of beneficiary farmers regarding improved livelihood of member farmers
4. Perception of enhanced market linkages and avenues of income among farmers through output procurement, agri-input linkage, credit service facilitation, creating micro/village level entrepreneurs etc.
5. No. of farmers connected digitally through the FPOs
6. Productivity improvement infrastructure created/facilitated for the 15 FPOs
7. Training and development – Satisfaction of beneficiary FPOs on the quality of training either directly as member farmers/through collectivization or as network farmers through better access to quality input and agri-advisory availability, output market linkages and credit access. (if applicable)
8. The other aspects like productivity improvement with reference to member farmers' farming operations, ease in operations, enhanced reach to markets and market intelligence, economic benefits witnessed etc.



Approach and methodology:

- Use of survey format / questionnaire to capture primary data from Boards/BoDs of the 15 FPOs and farmer members
- Focus group discussions (FGD) – with farmers of FPOs
- Interviews with key stakeholders (collaborating institutions / Government officials)
- Case studies

For impact assessment, “with & without” method was followed. The parameters under consideration were compared between impact plots and control (non- demonstration) plots. ‘Before and After’ method was used for comparison of parameters related to FPC member

farmers (learning about best agricultural practices, access to market information etc.). The impact assessment covered both *quantitative and qualitative aspects* and also the *direct and indirect impacts*.

Sampling design for the impact assessment study:

The following table indicates the sample design for the impact assessment study at field level

A. Survey sample:

FPCs			Sample for field study				
State	District	Number of FPOs	Interaction with Board of Directors at each FPC	Member farmers of the FPOs @20 per FPC	Stakeholders	FGDs	Case studies
Uttar Pradesh	Varanasi	15	15 (for 15 FPOs)	300	3	3	3

B. Data analysis:

- **Data analysis of 100 impact plots** which were monitored during the implementation of integrated predictive and personalized advisory and other services from ITCMAARS

2. FINDINGS OF THE IMPACT ASSESSMENT STUDY

2.1 Profile of beneficiaries

The following charts depict the profiles of FPC farmer members of 15 FPCs in Varanasi district under 'Farm Advisory Pilot'.

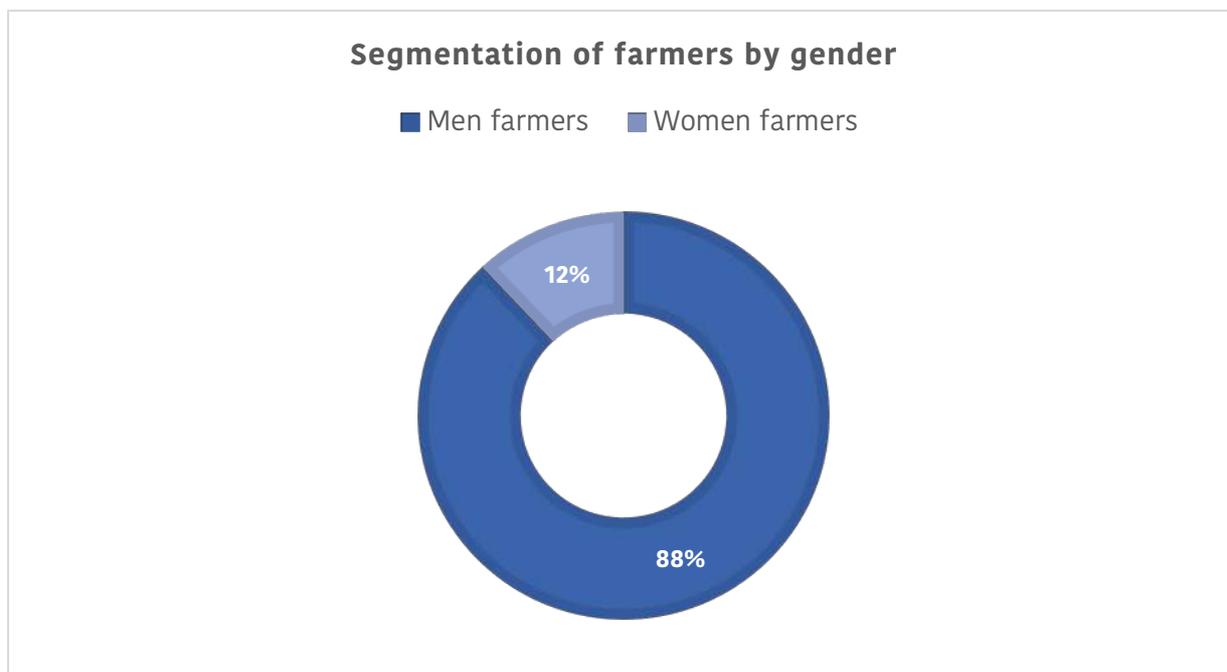


Chart no.1 – Segmentation of member farmers by gender

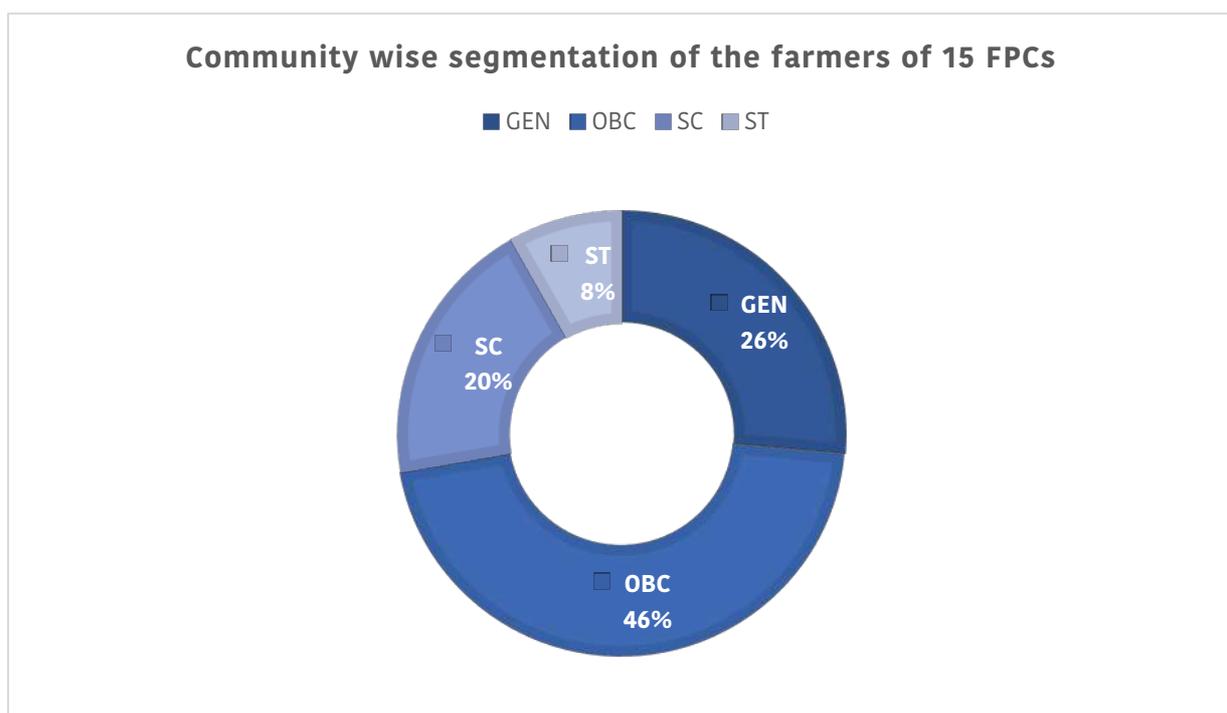


Chart no.2 – Community wise segmentation of the FPC member farmers

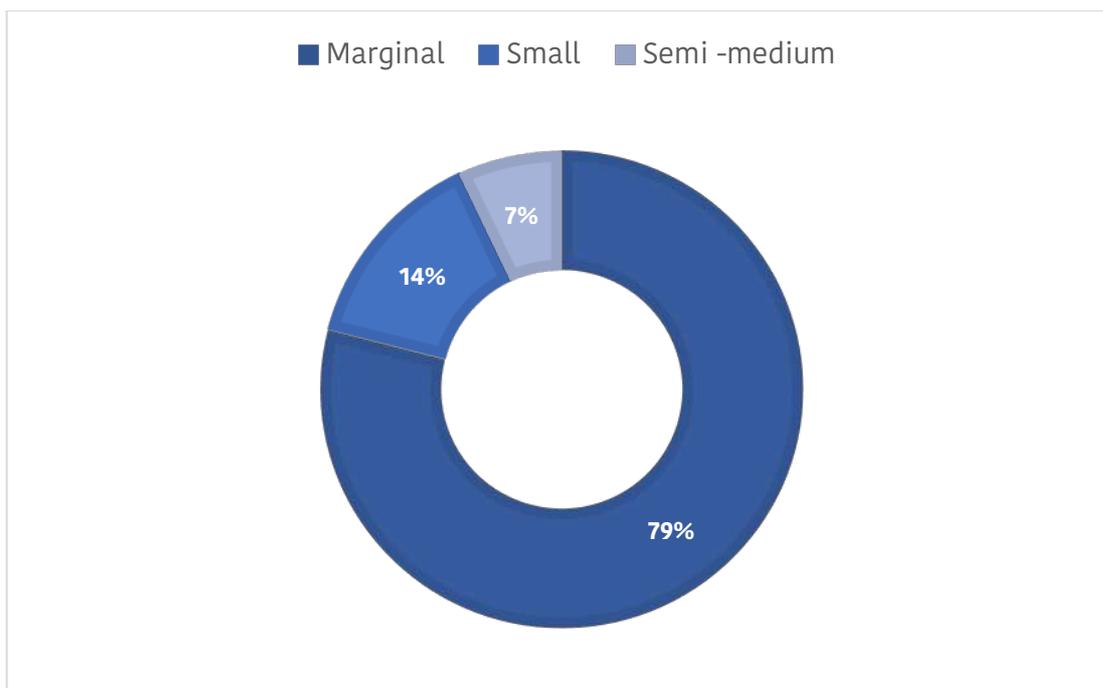


Chart no.3 – Segmentation of FPC member farmers by ownership of land holding

- Marginal farmers- land holding less than or up to 1 Ha.
- Small farmers - land holding above 1 Ha. and up to 2 Ha.
- Semi -medium farmers - land holding above 2 Ha. and up to 4 Ha.

2.2 Facilitation of crop advisory and services

A) Soil testing services

ITCMAARS established 3 mini soil testing labs to FPCs and conducted 622 soil tests during rabi season 2024-25 at a quick pace. The soil-testing was facilitated and the soil reports/soil health cards were distributed to the respective farmers. The soil health cards contained the customized recommendations regarding the applications of chemical fertilizers, manures/other nutrition details for the respective fields from which the soil samples were drawn. By Integrating geo-spatial data as well as ITCMAARS soil test data, customized nutrient recommendations were given to farmers at FPC level via ITCMAARS platform. This initiative served the purpose of **‘last mile connectivity of soil testing and crop nutrition advisory’** and it was highly appreciated by the beneficiaries.

All the beneficiary farmers (100%) who availed soil testing expressed their appreciation and satisfaction over the customized soil testing reports. They also expressed that the soil testing contributed to reduction in application of Urea and Diammonium phosphate (DAP) in their rabi crop. They informed that they were unknowingly applying excess Urea and DAP to their crop and they could reduce the excess quantities and opted for recommended

dosage of Urea and DAP based on the customized fertilizer recommendations. On an average the farmers could reduce DAP and Urea application / acre by 17 kg (25% reduction) and 30 kg (19% reduction), respectively.

ITC Limited		Soil Health Card	
<p>परीक्षण केंद्र नाम - UP/BAB/001 पता - VARANASI, Uttar Pradesh # itc00019-20240621-00001</p>	<p>लाभार्थी का विवरण नाम - SUSHIL SINGH पता - Sadar, Varanasi District, Uttar Pradesh, India मोबाइल - +9*****3693</p>	<p>नमूना जानकारी चयनित फसल - धान प्लॉट का आकार - 1.000 एकड़ स्थान - 82.83,25.33 Survey No. - नमूना एकत्रीकरण दिनांक - 21 जून 2024 परीक्षण दिनांक - 21 जून 2024 को 4:10 pm बजे</p>	
<p> पीएच 7.20 श्रेणी: 6.5 - 7.5</p>	<p> उपलब्ध आपरन 4.69 mg/kg श्रेणी: > 2.50</p>	<p>Scale</p> <p>उच्च, अम्ल, Saline, जलवहिक क्षारीय मीचा (OC,OM) </p> <p>नीचा, अपूर्ण </p> <p>मध्यम (OC,OM) </p> <p>मध्यम, तटस्थ, पर्याप्त, क्षारीय, धोड़ा अम्लीय उच्च </p> <p>चयन नहीं किया गया </p>	
<p> हलोकृतिकल कंडक्टिविटी 0.30 dS/m श्रेणी: < 1</p>	<p> उपलब्ध जिंक 0.82 mg/kg श्रेणी: > 0.60</p>		
<p> कार्बनिक कार्बन 0.88 w% श्रेणी: 0.50 - 0.75</p>	<p> उपलब्ध बोरॉन 0.57 mg/kg श्रेणी: > 0.50</p>	<p>मिट्टी की गहराई 15.00 cm </p>	
<p> Organic Matter 1.52 w% श्रेणी: 0.86 - 1.29</p>	<p> कार्बन भंडार 106.9 T/Ha</p>		
<p> उपलब्ध नाइट्रोजन 202 kg/ha श्रेणी: 280 - 560 Ammonical-N (ppm): 23.17 Nitrate-N (ppm): 38.0</p>	<p> मिट्टी स्वास्थ्य सूचकांक (Sql) -0.55 (औसत)</p>		
<p> उपलब्ध फास्फोरस 10.29 kg/ha श्रेणी: 10 - 25</p>	<p> घनत्व .81 g/cc</p>		
<p> उपलब्ध पोटेशियम 26.00 kg/ha श्रेणी: 110 - 280</p>			
<p> उपलब्ध सल्फर 3.24 mg/kg श्रेणी: 10 - 30</p>	<p>संस्तुति मृदा अनुकूलक/ संशोधन एफवाईएम/कम्पोस्ट/खाद (टन) - 10.1 माइक्रोन्यूट्रिएंट उर्वरक (in किलो/बैग) डीएपी - 35 kg एमओपी - 36 kg यूरिया (45) - 2 bags and 23.85 kgs सूक्ष्म पोषक तत्व उर्वरक बैटोनाइट सल्फर - 0 kg</p>		
<p> उपलब्ध कॉपर 0.66 mg/kg श्रेणी: > 0.20</p>			

अवधि: उपरोक्त रिपोर्ट को पूरी तरह से या अंशिक रूप से पुनः प्रयोग नहीं किया जाना है और लागू की अवधि में बहुत से अन्य में इसका उपयोग नहीं किया जा सकता है और हमारे पूर्व लिखित अनुबंध के लिए किसी भी प्रकार का दायित्व नहीं है।

Powered By Krishitantra

BHU-VISION
Krishi-RASTAA Soil Testing Device

Customized soil test report



Soil testing equipment at the FPC

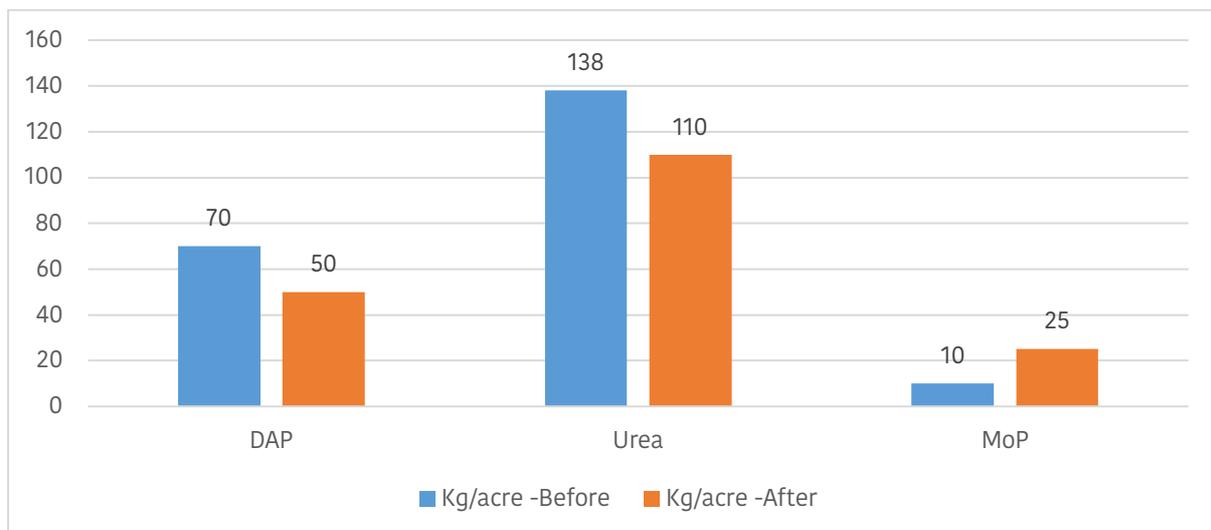


Chart no.4 – Change in chemical fertilizer application after soil testing by wheat farmers

The chart no.4 depicts the average dosages of various chemical fertilizers followed by beneficiary farmers before and after soil testing. About 82% of the farmers informed that the practice of application of Muriate of Potash (MoP - Potassic fertilizer) to wheat crop was not followed by them before Farm Advisory Pilot, but after receiving the customized recommendations and advisory on plant nutrition, they have applied MoP in rabi 2024-25.

After application of MoP, the farmers could observe visible difference in quality of wheat grains as the grains in MoP applied fields were bold, shiny with improvement in grain weight. The wheat grains from demonstration farms showed an improvement in hectoliter weight of wheat by approximately 3%, indicating better milling quality of wheat grains from farms in which MoP was applied in right quantities.



Wheat grains from control (non-demonstration) farms (left) and demonstration farms (right)

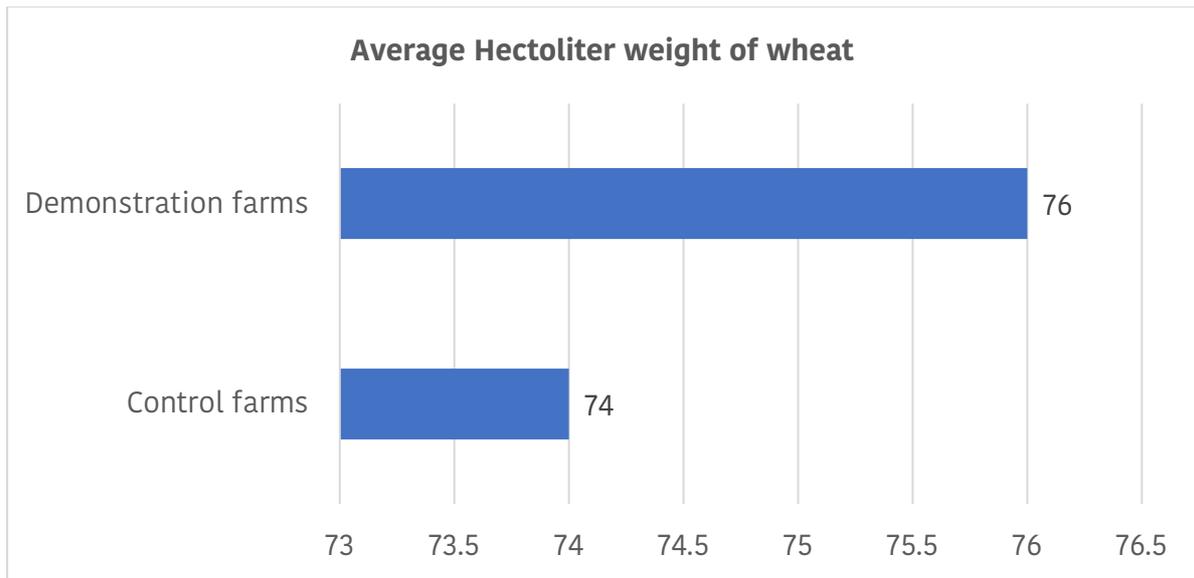


Chart no.5 - Hectoliter weight of wheat grains from demonstration farms and control farms



Wheat hectoliter weight measuring apparatus

1. Soil testing and customized chemical nutrient recommendation helped the farmers to understand the importance of right dose of fertilizer usage (100% of beneficiaries) and reducing the excess and unwarranted doses of chemical fertilizer application in wheat crop
2. Farmers understood the role of Potash in nutrition and appreciated the learning regarding usage of Potassic fertilizers for quality improvement of wheat (100%)
3. Soil testing could successfully introduce the concept of ‘application balanced fertilizers’ based on the customized recommendation. The fertilizer application based on customized recommendation helped to prevent the environmental issue because of leaching of unutilized doses of chemical fertilizers.
4. Soil testing and customized fertilizer recommendation introduced the usage of Potassic fertilizers in wheat and also helped in reduction of excess application of Urea and DAP by farmers. The reduction of Urea and DAP reduced the cost of chemical fertilizer application per acre but the application of MoP (Potassic fertilizer) added to the cost of chemical fertilizers. Overall, the difference in cost of chemical fertilizers did not change significantly in terms of before and after soil testing but the farms received balanced fertilizers and there was saving in DAP and urea quantity while simultaneously reducing the environmental damage by avoiding excess fertilizer application and consequent leaching losses.
5. In some cases, before the soil testing, the application of Urea and DAP in excess quantities used to result in luxuriant vegetative growth and consequently high incidence of pests was witnessed. By opting for balanced fertilization, the consequences of unscientific and indiscriminate application chemical fertilization were successfully avoided. This has been a direct addition to the learning curve for the farmers’ agronomic knowledge.

B) Popularization of mechanization for seed sowing



Sowing of wheat seeds with seed drill

ITC facilitated 4 seed drills to FPCs to promote mechanized seed sowing in wheat crop during rabi 2024-25. The member farmers of the FPCs utilized the seed drills to sow the seeds. All the FPC members who utilized seed drills for sowing purpose expressed that they witnessed saving of seeds to the tune of 20 kg (on average basis per acre compared to broadcasting method). The benefits like proper placement of seeds and uniform and healthy growth of crop were also attributed to mechanized seed sowing. Because of the reduction in seed rate (quantity of seed used /acre), the farmers who utilized seed drill could witness an average saving of Rs. 500 to 1400 / acre (based on type of seed). Seed drills were

organized for custom hiring by FPCs for its farmer members at a nominal custom hiring cost of Rs.100/day.

Table no. 2 – Benefits of mechanized sowing in wheat crop

Benefits of sowing with seed drill.	% of farmers acknowledged
Better fertilizer placement	100%
Ease of intercultural operations (because of inter-row space)	100%
Uniform crop stand	94%
Timely and proper maturity of wheat grains	96%

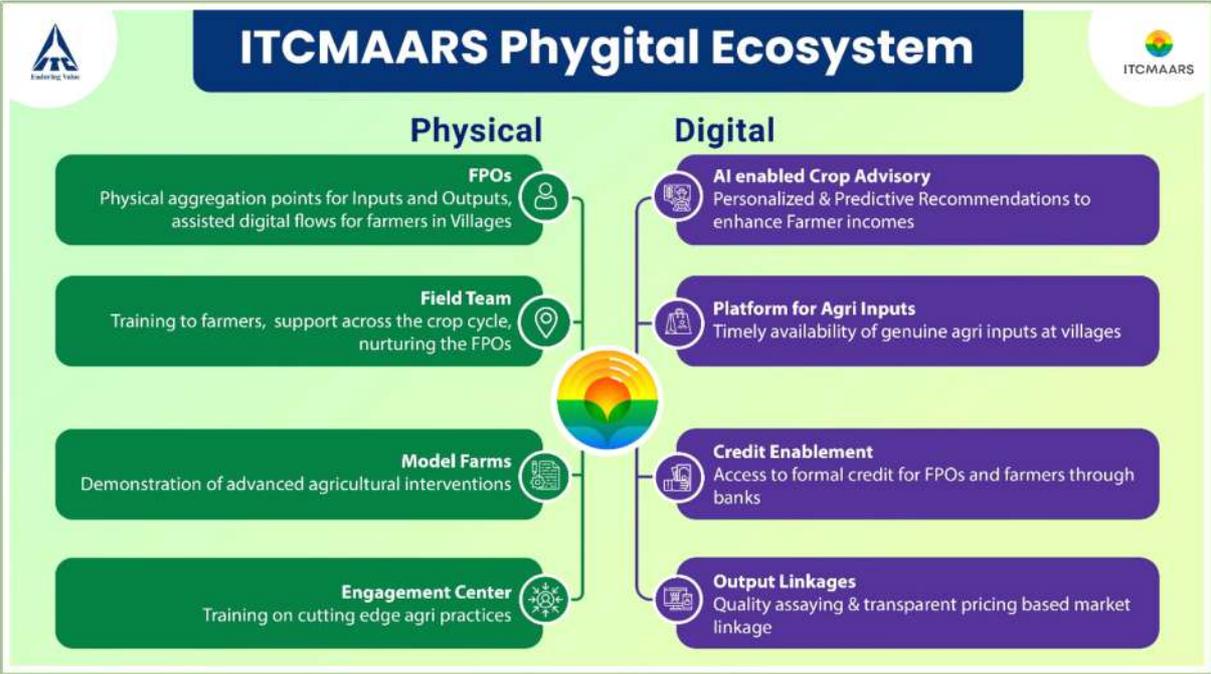
Seed treatment was also promoted by ITCMAARS throughout the sowing window among the farmers. All the farmers who adopted seed treatment (100%) informed it helped in preventing seed/soil borne pests & diseases. They also witnessed that germination percentage and plant stand for wheat was better in farms where seed treatment was done compared to farms where nontreated seeds were used.

The respondent farmers (62%) informed that they could learn the practice of seed treatment through impact plots and they would like to opt for seed treatment in the next crop season onwards.

C) Crop advisory, agricultural extension and other services through ITCMAARS App

ITCMAARS (Metamarket for Advanced Agricultural and Rural Services), phygitally empowers the farming community by delivering customized solutions via synergistic integration of NextGen agri-technologies. ITC MAARS aims at bringing the power of digital revolution to farmers, by providing them a range of solutions through hyperlocal and personalized crop advisory using geospatial data, availability of genuine agri inputs, market linkage for farm produce and affordable credit services.

The offerings to the farmers were driven by “Phygital” system (combination of physical and digital systems), where field supervisors and Farmer Producer Company (FPC) acted as a Physical node, supported by dedicated features on digital platform. It is an integrated platform where farmers can get scientific advisory free of cost, avail credit, buy seeds, fertilizers, agro-chemicals, machinery and easy access to a market-place to sell their crops.



C.1) Weather advisory: ITCMAARS relayed weather advisory to farmers through ITCMAARS App as a seamless service. Weather forecast and weather-based crop advisory formed one of the key elements in agricultural extension through ‘Farm Advisory Pilot’ under Project Dronagiri. Regular flow of current and forecasted weather data from Indian Meteorological Department (IMD) was also integrated into agrometeorological advisory through ITCMAARS. Weather forecast/alerts and weather-based crop advisory was highly appreciated by farmers.

WEATHER ADVISORY AND WEEKLY CROP ADVISORY:

<p>ITCMAARS Agri Expert 4 days ago</p> <p>उत्तर प्रदेश में बारिश की चेतावनी, जून में मौसम का ह्रास 1. महत्वपूर्ण मौसम विशेषताएँ और संचित स्थितियाँ:-</p> <p>पश्चिमी विक्षोभ एक ट्रोपिकल के रूप में बंगाली द्वीपों में अपनी तूफानी शक्ति के साथ औसत समुद्र तल से 5.9 किमी ऊपर जब मोंटे नीर पर देशांतर 61° पूर्व और अक्षांश 23° उत्तर के उत्तर में चल रहा है।</p> <p>एक उत्तरी हवा का चक्रवाती परिवहन और समुद्र तल से 1.5 किमी ऊपर पश्चिमी राजस्थान और आंध्रप्रदेश के इलाकों में स्थित है।</p> <p>दोषिका अब पश्चिमी राजस्थान से मध्य प्रदेश होते हुए उत्तर पश्चिम दिशा में चल रही है और औसत समुद्र तल से 0.9 किमी ऊपर तक फैली हुई है।</p> <p>2. मुख्य मौसम अवलोकन:-</p> <p>पिछले 24 घंटों के दौरान उत्तर प्रदेश के दोनों मौसम मण्डलों में मौसम शुष्क रहा।</p>	<p>ITCMAARS Agri Expert 8 months ago</p> <p>उत्तर प्रदेश के लिए मौसम चेतावनी 1. महत्वपूर्ण मौसम विशेषताएँ और संचित स्थितियाँ:-</p> <p>पश्चिमी विक्षोभ उत्तरी पाकिस्तान और उसके आसपास के इलाकों में चक्रवाती परिवहन के रूप में अब उत्तरी पाकिस्तान और उससे सटे जम्मू क्षेत्र में समुद्र तल से 3.1 और 9.6 किमी ऊपर स्थित है।</p> <p>उत्तर-पूर्व राजस्थान और उससे सटे दक्षिण हरियाणा पर चक्रवाती परिवहन समुद्र तल से 1.5 किमी ऊपर तक बना हुआ है।</p>	<p>ITCMAARS Agri Expert a month ago</p> <p>एरोमेट फसल समाह: धारावाही प्रभाग- मार्च भाग-2 नोडल अधिकारी धारावाही (बीएचएम): जिले: धारवाही, अजमेर, गान्धीपुर, बंदोली, सोनभद्र, मिर्जापुर, सत रविदास नगर, जोगपुर और मंड</p> <p>मैंगू: आम के समय शान्त हवाओं में आसफकानुसार खाड़ी फसल की सिंचाई करें। रोप 24 किलोग्राम पुरिया/एकड़ को पुष्टकर बनने की अवस्था में उत्तर से डालें।</p> <p>जवार/बड़ा बाजरा: आसफकानुसार खाड़ी फसल की सिंचाई करें और आसफकानुसार पौध संरक्षण उपाय करें।</p> <p>सर्सों (कटाई): समय पर बोई गई परिपक्व फसल की कटाई करें। डेर से बोई गई फसल में, एचिड टिखने पर निम्नलिखित कीटनाशकों में से किसी एक का चिड़काव करें: इमिडाक्लोप्रिड 17.8% (0.025 मि/ली/ली), धायनेथोक्सम 25 डबल्जुली (0.02 ग्राम/ली), डाइमिथोएट 30ईटी 1 मि/ली/ली) पानी आम के समय।</p> <p>मका: पुआई बसंत चतु की फसल की रोपाई करें।</p>	<p>ITCMAARS Agri Expert a month ago</p> <p>एरोमेट फसल समाह: धारावाही प्रभाग- मार्च भाग-1 नोडल अधिकारी धारावाही (बीएचएम): जिले: धारवाही, अजमेर, गान्धीपुर, बंदोली, सोनभद्र, मिर्जापुर, सत रविदास नगर, जोगपुर और मंड</p> <p>मैंगू: आम को शान्त हवाओं में आसफकानुसार खाड़ी फसल की सिंचाई करें। पौआई बरफ पर रोप 60 किलोग्राम पुरिया/हेक्टेयर की दर से उत्तर से डालें।</p> <p>जवार/बड़ा बाजरा: आसफकानुसार खाड़ी फसल की सिंचाई करें और आसफकानुसार पौध संरक्षण उपाय करें।</p> <p>सर्सों (कटाई): परिपक्व समय पर बोई गई फसल की कटाई करें। डेर से बोई गई फसल में, एचिड टिखने पर फसल पर निम्नलिखित कीटनाशकों में से किसी एक का चिड़काव करें: इमिडाक्लोप्रिड 17.8% (0.025 मि/ली/ली), धायनेथोक्सम 25 डबल्जुली (0.02 ग्राम/ली), डाइमिथोएट 30 ईटी 1 मि/ली/ली) पानी आम के समय में।</p>
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Farmers who followed weather forecasts expressed that by following alerts, they could plan their farm operations like sowing, spraying, irrigation and harvesting. Also weather alerts were very effective in guiding them to take up agronomic operations. They (76%) also informed that by knowing the weather forecast before-hand they could minimize the loss and maximize the returns from the respective agronomic operations. Farmers could avoid irrigation when they received an alert regarding rainfall and plan for harvesting based on rainfall alerts etc. 88% of the respondent farmers informed that they follow the weather advisory of ITCMAARAS on regular basis. the loss and maximize the benefit from the respective agronomic operations (76%). They could avoid irrigation when they received an alert regarding rainfall and plan for harvesting based on rainfall alerts etc. 88% of the respondent farmers informed that they follow the weather advisory of ITCMAARAS on regular basis.

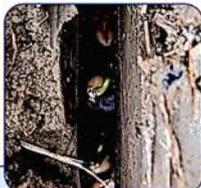
C.2) Crop advisory for wheat crop: ITCMAARS App facilitated crop specific, predictive, personalized, timely and diagnostic advisory services and helped in enhancing the reach of farmers to advanced crop cultivation practices and bridged knowledge gaps to improve productivity. Phygital means of agri-extension was ensured through ITCMAARS App at various stages of crop growth. Other than the ITCMAARS App, messages through WhatsApp, telephonic advisory via Digital Engagement Centre and IVRS were also facilitated to reach out farmers of the 15 FPCs to provide comprehensive and hyperlocal crop advisory on regular basis during Rabi 2024- 25.



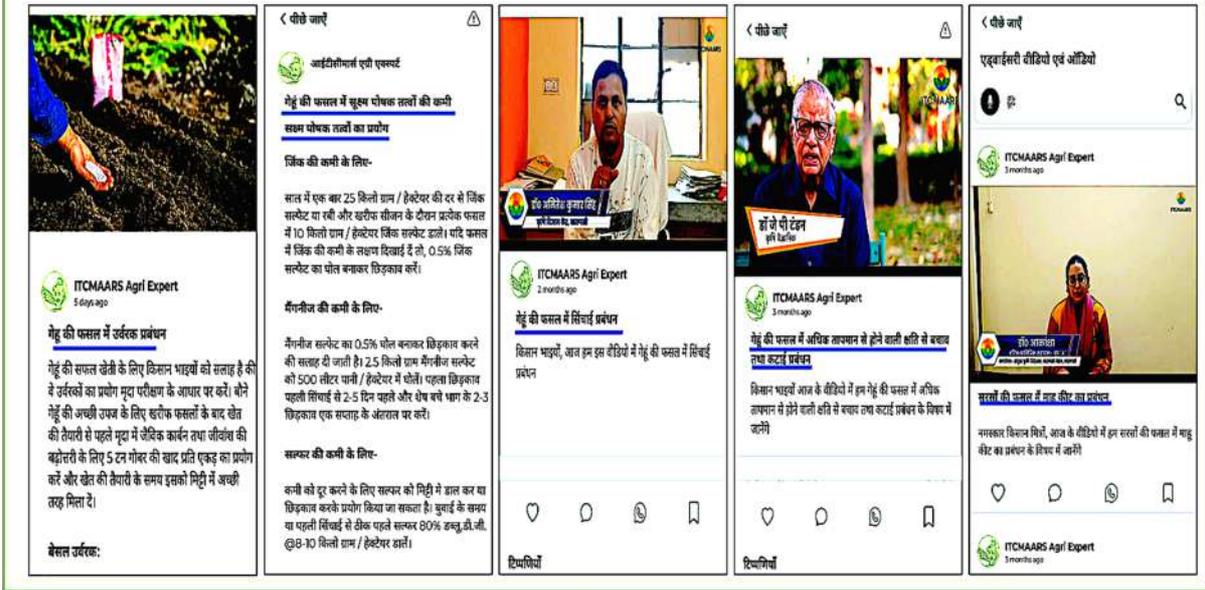
Table no. 3 – Advisories issued by ITCMAARS in rabi 2024-25

Category	No. of advisory issued
Weather advisory	31
Weekly crop advisory	27
FPC wise fertilizer recommendation	23
Progressive farmers and testimonial videos	29
Krishi Vigyan Kendra (KVK) expert videos	10
Govt. schemes, Animal Husbandry and other POPs, e.g. Irrigation management, pest and disease management	69
Total	189

WHEAT CROP & ADVISORIES ISSUED:

Sowing & Germination	Tillering	Booting & Flowering	Grain Filling and Dough	Maturity & Harvesting
				
<ul style="list-style-type: none"> • Nutrient recommendation on basis of Soil tests • Articles published through ITCMAARS App • Timely applications ensured through physical farmer meet • Weather Advisory 	<ul style="list-style-type: none"> • Top Dressing recommendation of nutrients • Irrigation management • Weed management • Weather Advisory • Crop Advisory basis Remote sensing data of crop health 	<ul style="list-style-type: none"> • Irrigation Management • 2nd Top Dressing recommendation of nutrients • Heat Stress Advisory and Advisory on MOP Spray • Disease and Pest management 	<ul style="list-style-type: none"> • WhatsApp campaign & IVRS on Heat stress management • Irrigation advisory • High wind speed advisory to prevent crop lodging • Weather advisory and Rainfall alert 	<ul style="list-style-type: none"> • High wind speed advisory & Rainfall Alert • Harvesting indices • Storage management

EXPERT ADVISE ON CROP MANAGEMENT PRACTICES:



Total number of advisories facilitated through ITCMAARS App - 189

Farmers reached out through WhatsApp and IVRS Campaigns - 80000

Need based farmer outreach through telecalling for crop health advisory - 3000

WHATSAPP CAMPAIGN & IVRS:



गेरूं में दाना बनते समय अधिक तापमान से होने वाली हानि से बचाव के उपाय

मौसम पूर्वानुमान के अनुसार आगामी सप्ताह में तापमान 3-4°C डिग्री बढ़ने का अनुमान है।

तापमान बढ़ने पर प्रभाव:

- ✓ दाना छोटा तथा हैक्टोलीटर माप कम होता है
- ✓ उपज में कमी तथा मंडी में कीमत कम मिलती है।
- ✓ दिन व रात का तापमान मिलाकर 15-18°C से अधिक होने पर ये प्रक्रिया बाधित होती है।

तापमान सामान्य से अधिक होने पर क्या करें?

- ✓ खेत में जमी की कमी न होने दें, नियमित अंतराल पर हल्की सिंचाई करते रहें।
- ✓ फसल की लाइनों के बीच सूखी घास/फसल अवशेषों को फैला कर मसूच बना दें।
- ✓ पोटाशियम क्लोराइड (म्यूटेड आफ पोटाश/एमओपी) के छिड़काव से औसत उपज लाभ 5-7% और दानों के भार तथा हैक्टोलीटर माप में 2% तक की बढ़त पायी गयी है।

एमओपी (पोटेसियम क्लोराइड) प्रयोग विधि:

- ✓ छिड़काव परागण अवस्था (फ्लो-1) के बाद तथा दाना बनने की प्रारम्भिक अवस्था (फ्लो-2) पर करने से पूर्ण लाभ मिलता है।
- ✓ 2 ग्राम/लीटर या 500 ग्राम/एकर मात्रा को 200 लीटर पानी में मिलाकर छिड़काव करें।

परागण अवस्था दाना बनने की अवस्था

1800 103 0545 पर कॉल करें।

आइसीसी मार्ग एप्लिकेशन डाउनलोड करें
के लिए कृपया इस QR को स्कैन करें



गेहूं की फसल के लिए मौसम चेतावनी

किसान भाइयों, उत्तर प्रदेश तथा बिहार में पूरे सप्ताह तेज सतही हवाएँ चलने का पूर्वानुमान है।

जिससे गेहूं की फसल गिरने की सम्भावना है।

चूंकि, फसल गिरने से उपज व अनाज की गुणवत्ता पर विपरीत प्रभाव पड़ता है, अतः किसान भाइयों को सुझाव है कि इन दिनों में फसल में सिंचाई न करें।

1800 103 0545 पर कॉल करें।

आइसीसी मार्ग एप्लिकेशन डाउनलोड करें
के लिए कृपया इस QR को स्कैन करें

C.3) Crop Doctor: This feature of ITCMAARS, based on AI-Machine learning model allows farmers to click a picture of the disease or pest-ridden crop and get an instant diagnosis of the pest and disease. Farmer has to click a picture of the disease/pest-ridden crop, submit and get instant recommendations of integrated management practices. ITCMAARS will scan the picture and identify the disease. Farmer can raise a pest alert to inform neighbouring farmers and make them aware on the infestation to take up precautionary measures. Farmer will be shown details such as symptoms of disease/pest, a detailed description, steps to prevent the spread.

Expert advice by crop doctor

This feature allows farmers to click a picture of the disease or pest-ridden crop and get an instant identification of the pest and disease

- 1 Farmer clicks on Crop Doctor button in his Home page
- 2 Farmer has to click a picture of the disease/pest-ridden crop and submit. ITC MAARS will scan the picture and identify the disease
- 3 Farmer can raise a pest alert to inform neighboring farmer
- 4 Farmer will be shown details such as symptoms of disease/pest, a detailed description, steps to prevent the spread
- 5 Farmer will be given advanced steps to fix the disease through application of products (quantity to be used, how to use the product)
- 6 Farmer also has the option to get support on call with DEC agent

ITCMAARS 5

Farmer will be given holistic recommendations including cultural, biological and chemical to control the disease/pest/nutrient deficiencies. They are also advised on protocols of product usage like quantity to be used, how & when to use the product etc. Farmer also has the option to get support on call with Digital Engagement Center (DEC) agent in case more clarity on the recommendation is required. Farmer can get his/her questions resolved through other farmers, ITC's agri-experts and field agents by uploading photo/audio/video in the community section of ITCMAARS app.



Creating awareness about toll-free number for crop advisory during farmer trainings

Crop Doctor facility was appreciated by 76% of the beneficiaries as they could get solutions for their crop protection related queries. More awareness on Crop Doctor feature would support farmers in better management of crop health.

Along with Crop Doctor, geo spatial remote sensing data was utilized to provide advisory regarding pest and disease incidence to the farmers through ITCMAARS App. Calls were organized to farmers via Digital engagement center for giving advisory where crop health was poor.

C.4) Personalized crop calendar: This feature enables the farmers to know the schedule of crop operations once they enter the date of sowing. The personalized crop calendar has immense use in enhancing the preparedness and planning of farmers for crop operations. This feature is integrated with weather-based rule engine that sends continuous alerts on the precautionary and contingency measures to be taken based on the forecasted and current weather conditions.

Personalized Crop Calendar to track daily tasks

Farmer can easily track his agricultural activities- previous, current, and upcoming, for maximum yield and productivity

1 ITC MAARS provides all information related to crops- farmers can add crops and view complete package of practices and crop operations for all stages of his crop

1a Farmer can also update his date of sowing if wrong date has been uploaded. An accurate date will give precise steps/tasks farmer has to take to manage his farm

2 Farmer can view previous tasks advised and check if he has completed those tasks

3 A detailed step-by-step task will be allocated to the farmer along with videos, pictures, details on quantity and process of fulfilling a task (for e.g. quantity of urea per kg to be applied, video for application, when to apply)

4 Farmers can also pre-plan (buying inputs, equipment, etc.) by checking his upcoming tasks

Farmer always have the option of calling a DEC for any doubt

ITCMAARS 6

Member farmers and Board of Directors of FPCs appreciated the crop specific and customized advisory along with curated scientific inputs. A concerted effort for crop advisory facilitation was done by Farm Advisory Pilot of ITCMAARS under "Project Dronagiri" 82% of the respondent farmers appreciated the holistic advisory organized through the combination of 'phygical+digital' combination of ITCMAARS. They expressed their satisfaction regarding the regular monitoring at farm level and timely advisory by field staff. The specific, end to end advisory and support provided to them through ITCMAARS and deployment of field staff at FPC level was found to be highly useful in enhancing agronomic expertise of farmers for their crops like varietal selection, sowing practices, right dosage of chemical fertilizers, crop nutrition, use of MoP spray, usage of seed drill for sowing of wheat, pest & disease management, harvesting and post-harvest management etc.

Farmers acknowledged the benefit of customized nutrient recommendations that were delivered through fertilizer calculator feature where the nutrient recommendations are given for their crops. This feature delivers precise recommendations taking into consideration the soil fertility mapping data and soil test results.

Community section is an interesting feature reported by respondent farmers which serves as a social media for farmers where they interacted with their peer farmers along with prompt resolution of their queries from agri-experts.

Farmers also appreciated learning center feature that served as a knowledge repository to educate on agriculture news, innovative technologies, animal husbandry etc. Success stories of progressive farmers were documented in video form and extended to motivate

other farmers via ITCMAARS platform. Farmers seemed excited while using another AI-based feature 'Krishi Mitra Chatbot' that interprets the farmer queries and prompts through various means like text/image/audio and provide instant resolutions in their localized languages.

C.5) Facilitation of advisory linked agri-inputs to farmers:

ITCMAARS addresses ground level issues pertaining to agri-inputs (seeds, pesticides, other agrochemicals etc.) like unavailability of genuine agri-inputs on time to farmers and prevailing influence of Retailer (agriinput dealer) regarding selection of agriinputs by farmers.

ITCMAARS proactively facilitated agri-inputs availability which were linked to advisory to enhance income and to ensure this, tie-up with leading agri-input companies were organized in order to facilitate authentic agri-inputs to farmers. This ensured high-quality products and reduced the risk of spurious or substandard materials. Bulk purchases enabled FPCs to negotiate better prices, passing the cost savings to their members. Farmers received inputs on time, which helped to improve crop productivity and reduced dependency on private retailers or intermediaries. ITCMAARS provided guidance on the appropriate use of inputs, helping farmers maximize their use efficiency while reducing wastage or overuse.

ITCMAARS contributed to improvement of agri-input business of FPCs. ITC's digital platform enabled FPCs to streamline and scale up their agri-inputs business, ensuring efficiency and accessibility for member farmers.

- Through ITCMAARS App, FPCs could place bulk orders for seeds, and pesticides and other agro-chemicals
- ITCMAARS App helped FPCs to manage their stock levels effectively, providing real-time updates on available inventory.
- ITC's digital platform provided a curated list of trusted suppliers, ensuring quality and authenticity of inputs.
- ITC's digital platform enabled FPCs to communicate offers, availability, and advisories to farmers, improving engagement and timely access to inputs.



Arul FPC's agri-input shop

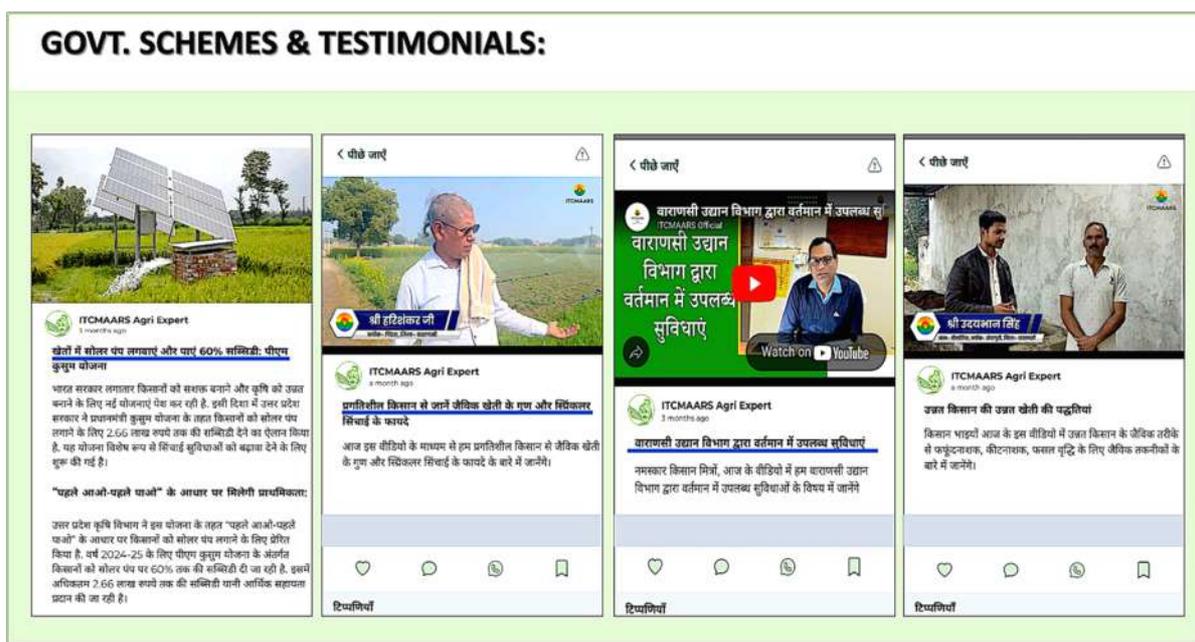
Benefits from buying agri-inputs through FPCs

- **Cost saving** - FPC representatives informed that they could make cost savings due to bulk procurement and direct sourcing from certified suppliers by leveraging collective buying power and eliminating intermediaries.
- 44% of member farmers (respondents) expressed that they could purchase agri-inputs like seed, pesticides etc.) from their FPCs at lower prices compared to agri-input dealers' shops.
- FPCs procured seeds, fertilizers, pesticides, and other inputs in bulk and ensured availability at critical stages of the crop cycle.
- ITCMAARS delivered tailor made advisory services regarding agri-inputs, pest and disease management, nutrient application, and good agricultural practices (GAP). This measure could contribute to increased trust levels and loyalty of farmers, and participation in the FPCs' activities.

C.6) Dissemination of information about Government schemes to farmers:

ITCMAARS actively served the farming community in dissemination of information regarding various Government schemes and subsidies which were relevant to farming and farmers.

Articles on complete information of schemes and subsidies and process to avail them were detailed in the ITCMAARS application.



Regular updates regarding the schemes and their details were shared through ITCMAARS which provided timely information and supported in availing the respective applicable schemes.

The following table indicates the purview of the Government schemes that were covered through ITCMAARS.

Table no. 4 – Advisory facilitation of Government Schemes

Government schemes
PM Kisan Scheme
PM Fasal Bima Yojana
Agri Mechanisation Schemes
Solar Pump Scheme
Paramparagat Krishi Vikas Yojana
Kisan Credit Card
Horticulture Schemes
Any other applicable schemes

During the field survey, 20% of the respondent farmers acknowledged that they could get benefit from information given through ITCMAARS and they could avail some of the schemes like drip irrigation, solar pumps, mechanization etc. About 27% of the farmers informed that because of the information from ITCMAARS, they applied for schemes pertaining to Horticulture Department, Agricultural mechanization and their applications are in process.

C.7) Market prices information:

ITCMAARS facilitated market price updates to farmers for wheat and other commodities from various markets as a dedicated service on regular basis. The farmers could understand the price fluctuations and market trends by tracking the market prices and take informed decisions regarding the sale of their crop which helps in preventing distress sales. Other than ITCMAARS, the market prices were also disseminated through WhatsApp messages to the farmers for regular back up

The respondent farmers expressed their satisfaction regarding the facilitation of market prices. 77% of the respondent farmers informed that they are regularly following the market prices of wheat in nearby market places through ITCMAARS. They expressed that they found that the price tracking is convenient and highly user- friendly for wheat crop.

C.8) Impact plots:

ITCMAARS under Farm Advisory Pilot has organized 100 impact plots for rabi season 2024-25 wheat crop which were spread across 52 villages among 15 FPCs in Varanasi district. Demonstration farms followed predictive and personalized crop advisory basis geospatial data and suggested inputs.

Field supervisors of ITCMAARS closely monitored the total range of agronomic practices from sowing to harvesting and ensured the recommendations were implemented. Scientists from Krishi Vigyan Kendra (KVK) visited the impact plots on regular basis and provided their advice to farmers.



ITCMAARS Demonstration farm

Inputs of LCB fertilizers were also used in few impact plots which contained organic sources of carbon, nitrogen and other nutrients that helped in improving crop growth while simultaneously enhancing the soil structure. The results of these plots have been monitored through remote sensing before and after the application which showed an improvement of vegetation cover by 26%, chlorophyll content by 12% and moisture retention capacity of soil by 12%. It was also found that usage of this fertilizer helped in saving the dosage of urea in 2nd top dressing



Demonstration farmer with Krishi Samadhan kit from ITCMAARS



Comparison of plants from demonstration and control farms

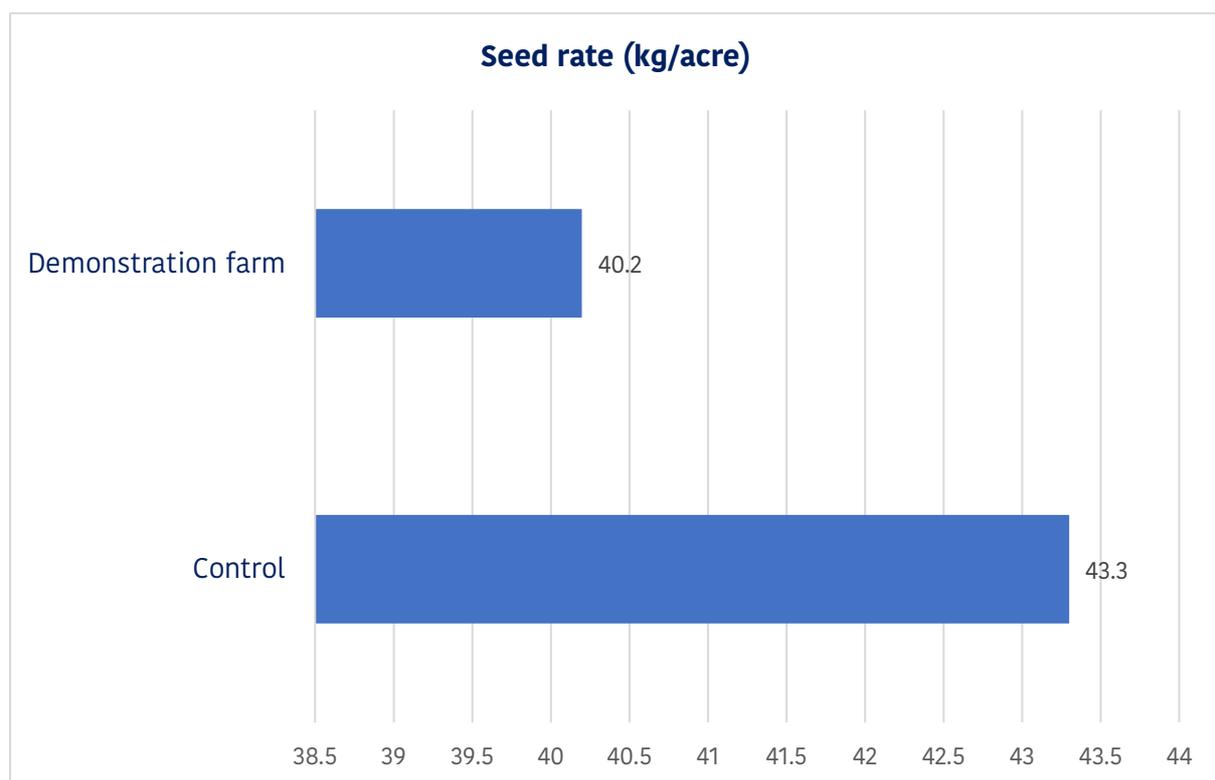
Scientifically curated “Krishi Samadhan Kit” consisting of customized inputs for sowing and growing phase was used in impact plots of farmers. The kit contained the following inputs, which supported plant growth and development throughout the crop cycle.

- Seed treatment
- Herbicide to control grassy, narrow and broad-leaved weeds
- Muriate of potash (MoP)
- Biological based plant growth promoter (Seaweed extract)
- Zinc and sulphur-based nutrition
- Bulk manure with organic source of nutrients & biofertilizers

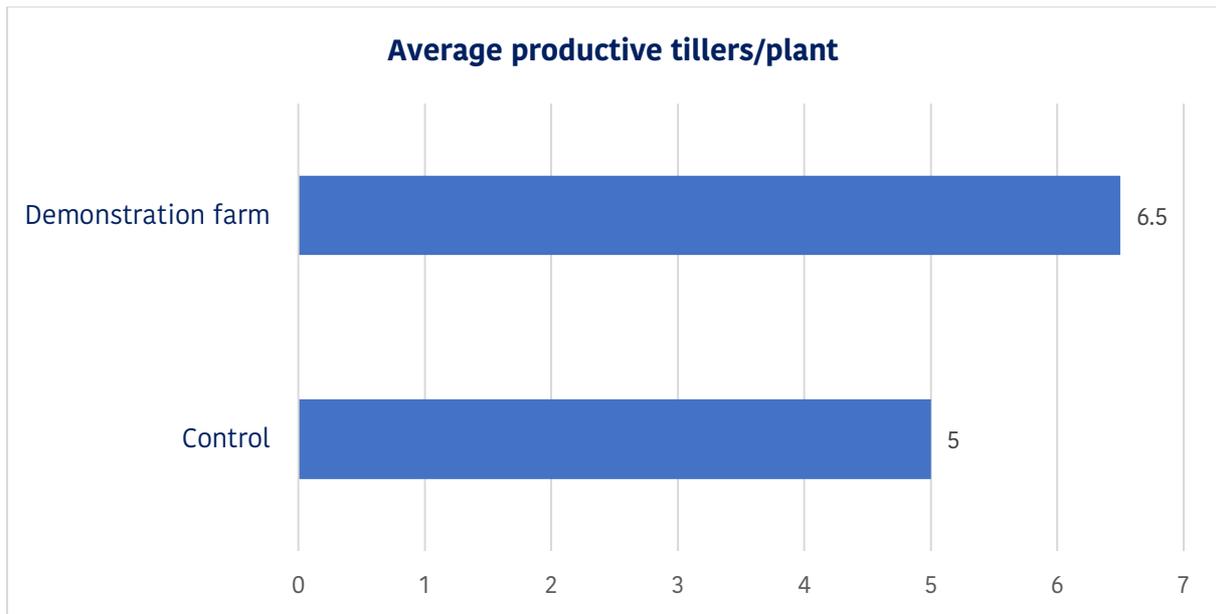
In addition to digital advisory, ITCMAARS meticulously ensured farm level advisory through regular visits of field supervisors, managers and scientists. The impact plots could serve the purpose of dissemination of “customized and personalized crop advisory” to wheat farmers in the FPO catchment villages. The following charts and tables depict the comparison of selected parameters in impact plots with control plots (by average values).

Table no. 5 – Perception regarding benefits from MoP spray

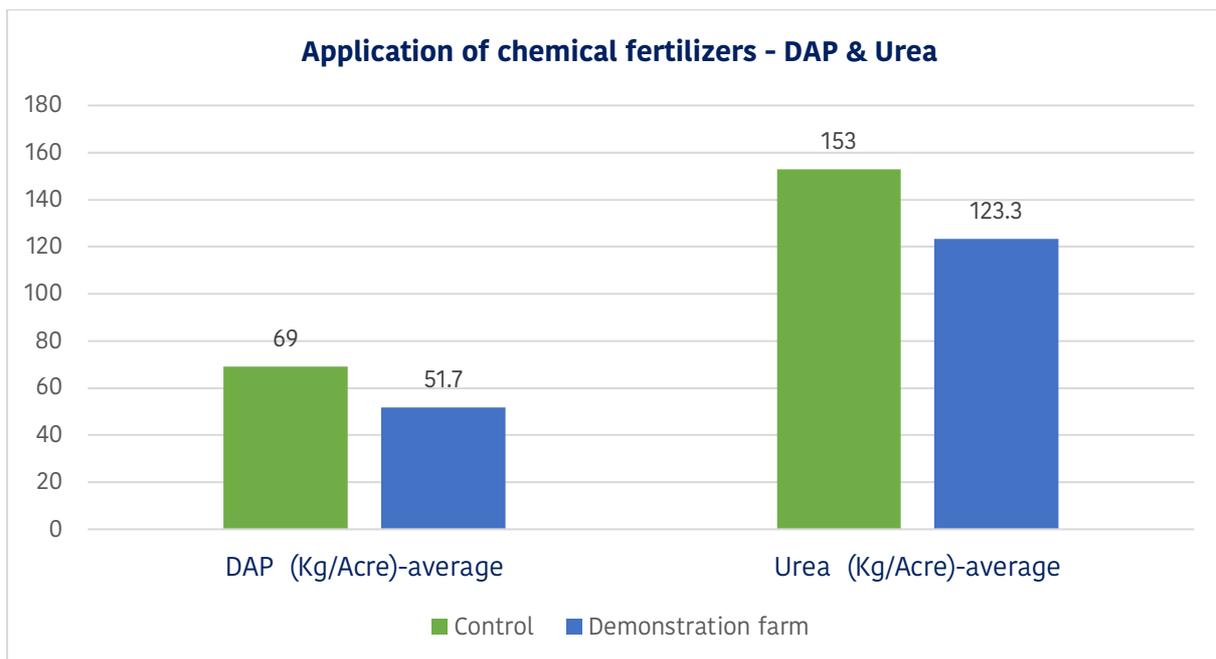
S.no.	Benefits from Muriate of Potash (MoP) spray	% respondents in agreement
1	Grain lustre was better compared to control	100%
2	Grain shrivelling was comparatively lower	100%
3	Grain size was comparatively bolder/heavier	88%



In demonstration farms, farmers witnessed 7% decrease in seed rate, which was lower by 3.1 kg compared to control (resultant saving of approximately Rs.217 per acre in terms of research seed).



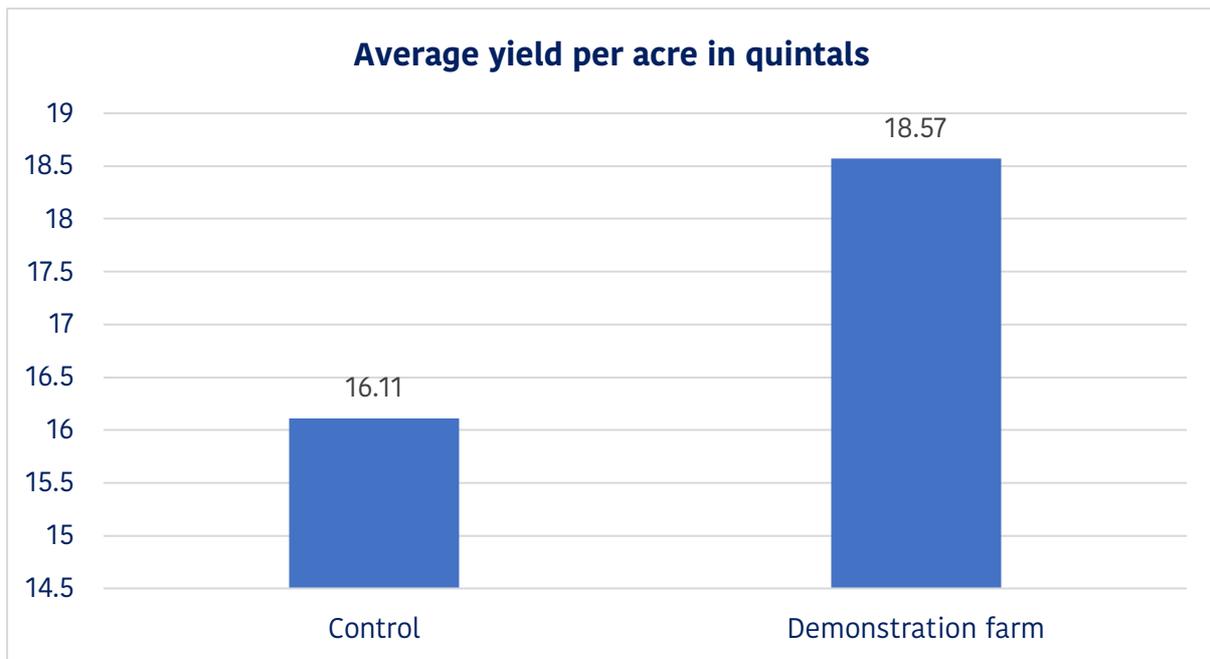
In impact plots, farmers witnessed improvement of productive tillers by 29% compared to control (which could potentially contribute to improvement in productivity)



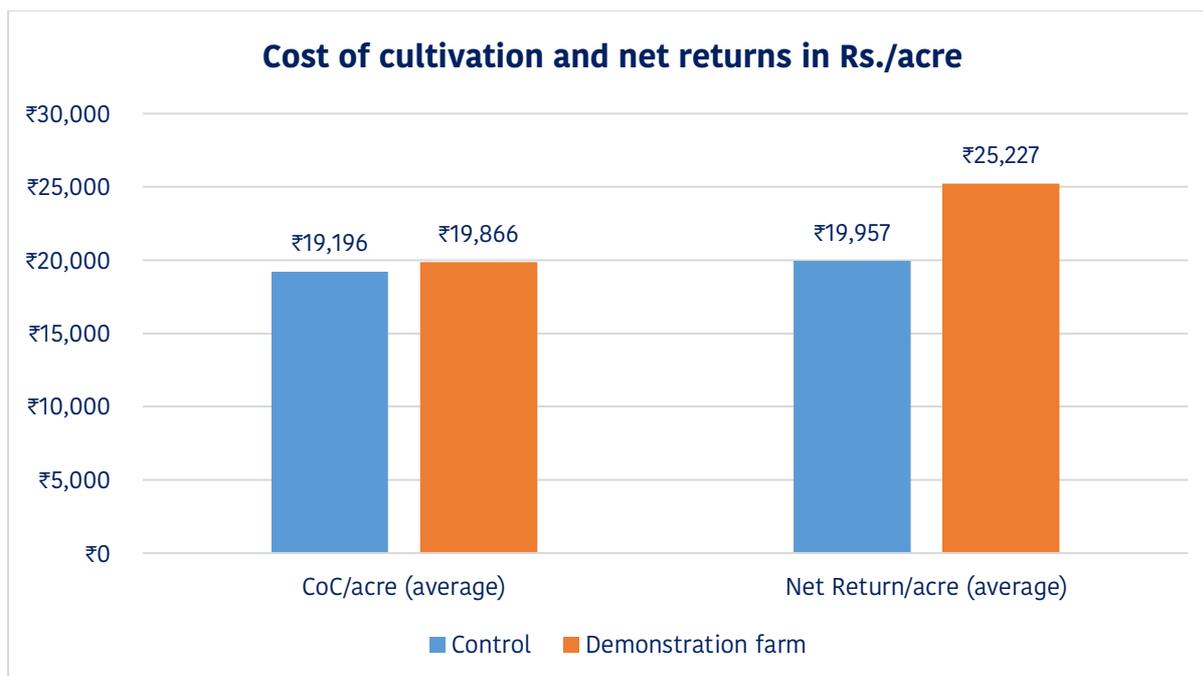
In Impact plots, farmers witnessed decrease in quantities of chemical fertilizers application of Diammonium Phosphate (DAP) and Urea by following improved agronomic practices. The application of DAP and Urea decreased by 25% and 19% respectively. This measure resulted in saving of Rs.464 and Rs.193 respectively for DAP and Urea and contributed to mitigating leaching losses of the fertilizers and consequent possible environmental degradation.



Estimation of crop yield in ITCMAARS demonstration farm



In demonstration farms, farmers witnessed improvement of average yield by 2.5 quintal/acre (15.3%) compared to control farm.



In demonstration farms, farmers witnessed distinct improvement of 26.4% in net returns compared to control which is approximately Rs. 5,270/acre.

“ITCMAARS” facilitated agricultural extension and successfully displayed the improved productivity and quality of grains by way of adoption of improved package of practices in wheat crop cultivation. The demonstration farms proved the dictum of “Seeing is believing” in the context of spreading recommended practices among the farmer members of 15 FPCs. 100% of the Impact plot farmers acknowledged their learning through attending and adoption of GAP. 96% of respondent farmers who visited demonstrations acknowledged their learning regarding improved practices and 62% among them expressed their willingness to adopt the new crop practices in their farms from next crop season onwards.



ITC's Field Supervisors Team

100% of the Impact plot farmers acknowledged their learning through adoption of advisory recommendations. 96% respondents from member farmers of FPC appreciated the accuracy, adequacy, timeliness of the services and commitment of the field staff involved in the implementation of 'Farm Advisory Pilot'. Farmers acknowledged the regular plot visits and crop monitoring by field team during Rabi 2024-25 season.

C.7) Meetings & Trainings for the farmers:

ITCMAARS Team conducted significant number of trainings which were scheduled at various stages of wheat crop to facilitate the learning and adoption of improved agricultural practices and agronomy knowledge among the FPC members in Farm Advisory Pilot. Regular farmer meetings were also organized to learn and interact with Krishi Vigyan Kendra (KVK) scientists and Agri-experts.



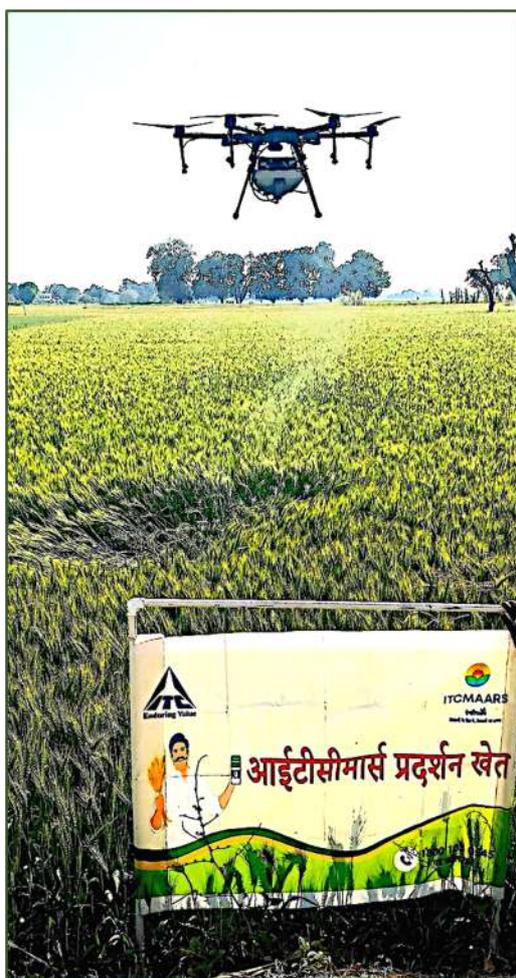
Farmers meeting with scientists and agri-experts

Details of trainings and Farmers meetings:

Farmers meetings in small groups - 300

Farmer training by scientists from Krishi Vigyan Kendra; Varanasi and ITC's internal Agri -experts - 10 (covering 4000 farmers)

Drone spray demonstrations on pilot basis - 3



Drone spray demonstration

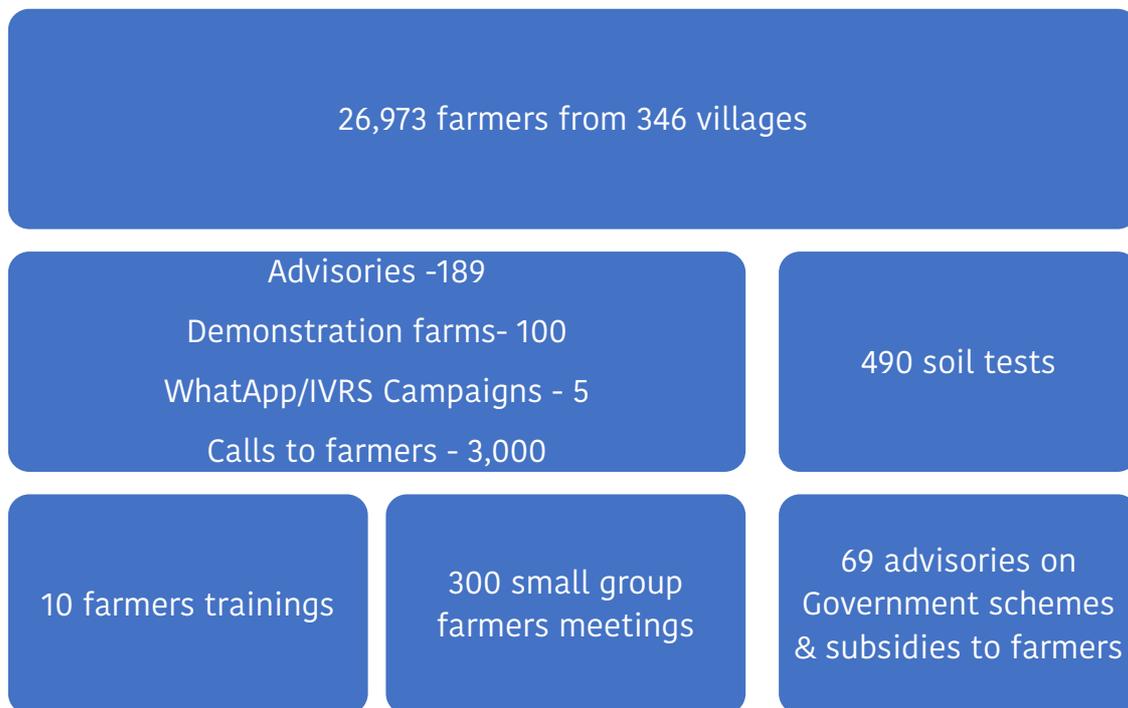
Table no.6 - Satisfaction of farmers pertaining to Farmers trainings and Farmers meetings

Parameter	Highly satisfied	Satisfied	Not satisfied
Quality and adequacy of the content of the training/orientation	38%	62%	
Delivery of the content/demonstration of applications	45%	55%	
Timeliness	66%	34%	
Clarification of doubts	33%	67%	

Table no. 7 – Farmers’ perception about the advisory services

S.no.	Outcomes and impact of crop advisory through Operation Dronagiri by ITC	Response from the farmer members (%)		
		Effective	Satisfactory	Not satisfactory
1	Customized crop advisory to farmers along with curated scientific inputs.	85%	15%	
2	Weather related alerts, terminal heat stress management practices etc.	88%	12%	
3	Advisory on disease & pest management (plant protection)	78%	22%	
4	Crop advisory - the best agricultural practices including customized nutrition	82%	18%	
5	Digital connectivity for farmers and FPCs	54%	46%	
6	Supporting services – like soil testing, provision of mechanization equipment like seed drills etc.	75%	25%	
7	Facilitation of agri-inputs through FPCs through ITCMAARS	76%	24%	
8	Market intelligence – commodity price information	86%	14%	

Farm advisory under ‘Operation Dronagiri’ in 346 villages of Varanasi district (rabi 2024-25):



ITC’s crop advisory for wheat farmers through ITCMAARS brought improvements in knowledge and agricultural operations in rabi season 2024-25. ITCMAARS App successfully established ‘digital connect’ to approximately 26,000+ farmers (93% small and marginal) from 15 FPCs to provide advisory on climate, improved agricultural practice and market intelligence. The contribution of Operation Dronagiri was observed from the perspective of learning and adoption of Good Agricultural Practices (GAP) and also crop performance related benefits for rabi wheat crop and improved farmer economics. The estimated area under coverage of crop advisory through ITCMAARS was approximately 39,000 acres, which was cultivated by approximately 26,000+ beneficiary farmers in 346 villages.

- 88% of the respondent farmers (from beneficiary farmers group) informed that their knowledge regarding Good agricultural practice improved because of Project Dronagiri.
- 72% of the respondent farmers showed interest to follow the range of advisories from ITCMAARS for next crop season
- 78% respondent farmers informed that they could witness improvement in yield and improvement in income and 22% informed that their crop yields remained the same after crop advisory from ITC.

- It was observed that 84% of the farmers from beneficiary group (farmers from 346 villages) understood the positive influence of balance fertilizer application and are ready to implement the same to gain the reduction in cost of cultivation.

During the impact assessment survey, it was witnessed that significant percentage of beneficiary farmers acknowledged the usefulness of weather alerts and they appreciated the outcomes like saving in irrigation cost etc. It was understood that “weather alerts” from ITCMAARAS was highly acknowledged and appreciated by 88% of the beneficiaries from 346 villages.

2.3 Indirect benefits

- Trickle-down effect of learning regarding wheat crop agronomic practices to the non-FPC members because of impact plots, trainings and farmer meetings
- Effective contribution to agri-extension in the geographies where FPCs are operating
- Large scale spread of market intelligence among the farmers

2.4 Qualitative improvements

- It was observed that Farm Advisory Pilot instilled confidence in the farmers as they could access personalized and predictive crop advisory through various means and market linkages without hassle
- Satisfaction and sense of security because of hand holding through digital information and support by ITCMAARS Field team.
- Promise for improvement in productivity of wheat crop through the support of ITCMAARS
- Synergistic effect from combination of crop advisory, farmers’ knowledge improvement and facilitation like soil testing services and agricultural mechanization provided positive outlook for the 15 FPCs

Table no.8 – Wheat farmers’ experience and benefits from Demonstration farms

S.No.	Benefit/Utility	Response from demonstration farms in %
1	Saving in quantity of seed	100%
2	Saving in sowing cost	100%
3	Timely sowing (in stipulated time) is possible	100
4	Savings in number of irrigations, quantum of water in irrigation	36%
6	Saving in chemical fertilizers	100%
7	Uniform crop stand	92%
8	Reduction in cost of cultivation	100%
9	Better productivity of wheat crop	100%

3. CONCLUSIONS AND RECOMMENDATIONS

3.1 SWOT Analysis

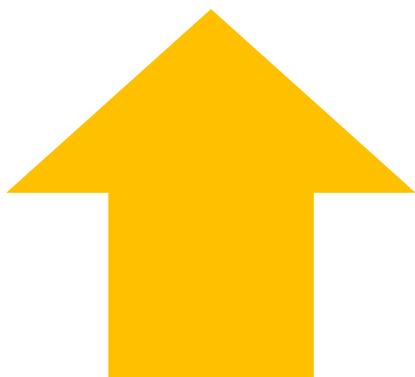
The following table depicts the SWOT analysis of ‘ITC’s Operation Dronagiri in Varanasi District; U.P.’

Table no.9 – SWOT Analysis

Strengths	Weaknesses
<ul style="list-style-type: none"> • ITCMAARS App has highly useful set of features to provide the important and most sought-after solutions for the farmers in agronomic and agri-commodity marketing perspectives • Coverage of multiple crops and information from multiple agri-commodity markets by ITCMAARS App • Networking with ICAR Institutions, State Agricultural Universities, Krishi Vigyan Kendra (KVK), Departments of Agriculture & Horticulture etc. for implementation and regular update of information for the farmer • Presence of qualified and well-trained field staff to facilitate handholding support for the FPC member farmers • Facilitation of supporting services like soil testing and facilitation for agri-mechanization (drones/seed drills etc.) to FPC farmers • Timely, comprehensive solutions to farmers pertaining to agronomy, crop protection, market prices etc. Holistic and multi-pronged support system for the farmers through ITCMAARS App, facilitation of Field Staff, conducting impact plots of wheat in their villages and regular and continuous agricultural extension flow • Farmer centric solutions through App to maximize crop yield, to minimize cost of cultivation, timely and detailed market intelligence to farmers • Continuous focus on crop advisory, farmer economics and facilitation of services and agri-inputs to farmers through ITCMAARS • Timely facilitation of information through ITCMAARS App to FPC farmer members regarding various Government schemes related to crops and farmers’ welfare 	<ul style="list-style-type: none"> • Challenges in adoption and 100% utilization of ITCMAARS App by farmers because of multiple (a range of) reasons like predominance of small and marginal farmers, limited penetration of smart phones, limited tech-savviness of farmers because of socio-economic conditions, limited formal education etc.

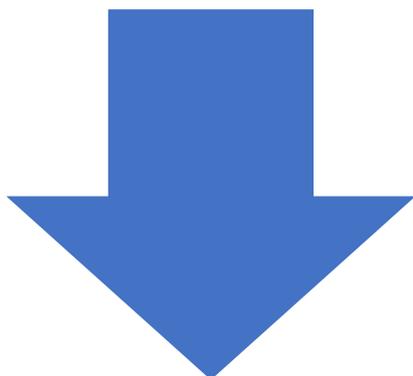
Opportunities	Threats
<ul style="list-style-type: none"> • Constant effort to refine and improve the accuracy and authenticity of customized crop advisory for the farming communities. • Further enhancing the scale and scope of agri-inputs to FPC member farmers through ITCMAARS over a period of 2 years • The role for key stakeholders like KVKs Agriculture Departments, Agri Institutes etc. may be enhanced to bring higher levels of effectiveness, coordination and farmer adoption • Scope for further enhancing the adoption of mechanization for agricultural operations 	<ul style="list-style-type: none"> • Low adoption rate (of ITCMAARS) by farmers may affect the efficiency and effectiveness of support because of economies of scale

3.2 Contributions of ITCMAARS Farm Advisory Pilot under Operation Dronagiri to farmers and agri-ecosystem



Improvement

Knowledge and skills pertaining to crop cultivation, soil fertility, weather advisory, access to quality agri-inputs, crop productivity, net returns to farmer, market intelligence, access to market for FPCs, availability of information regarding various Government schemes for farming and farmers' welfare



Reduction

Quantity of chemical fertilizers, agricultural extension gap to farmers, possible crop loss because of inadequate information regarding climate, dependence on local middlemen for market intelligence, gap in access to genuine agri-inputs

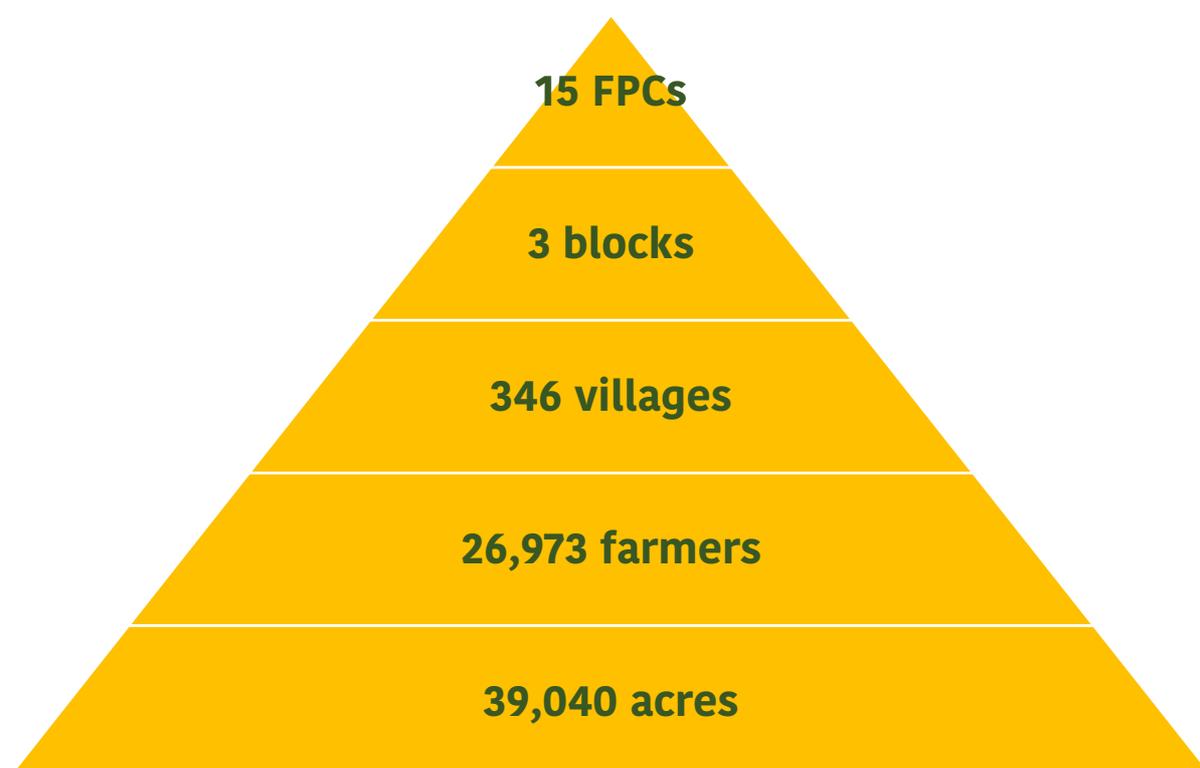
3.3 Process related perspectives

3.3.1 Unintended side effects:

No unintended side effects were observed because of ‘ITCMAARS Farm Advisory Pilot’ under Operation Dronagiri in Varanasi District; U.P. which covered 15 Farmer Producer Companies and 26000+ farmers (Rabi 2024- 25).

3.3.2 Purview of coverage

ITCMAARS ‘Farm Advisory Pilot’ in Varanasi District; Uttar Pradesh effectively covered 15 FPCs across 3 blocks of Varanasi district and it’s coverage is illustrated in the following diagram.



The effectiveness of ‘Farm Advisory Pilot’ was found both in its reach out to significant number of farmers from Farmer Producer Companies (FPC) and non-FPC farmers in the villages where it was implemented. During the Impact assessment study, it was observed that the trickle-down effect of ITCMAARS crop advisory also benefitted the non-FPC member farmers in the 346 villages. The strength of the project was found in its geographic spread and importantly the reach-out to small and marginal farmers.

3.3.4 Matrix of Relevance, Effectiveness, Efficiency and Scope for scale up in future:

The following table indicates the relevance of various interventions in ‘Farm Advisory Pilot’ and their effectiveness, efficiency in implementation and scope for scale up in future.

Table no. 10 - Matrix of Relevance, Effectiveness and Efficiency

S.no.	Interventions	Relevance	Effectiveness	Efficiency	Scope for scale up in future
1	Weather/ climate alerts/ advisory	Highly relevant	Very Effective	Efficient	Yes
2	Agricultural Extension & crop advisory (through ITCMAARS)	Highly relevant	Very Effective	Efficient	Yes
3	Soil testing services & customized crop nutrition recommendation	Relevant	Effective	Efficient	Yes
4	Agri-mechanization support	Highly relevant	Effective	Efficient	Yes
5	Demonstration plots for wheat crop	Highly relevant	Very effective	Very efficient	Yes
6	Farmers trainings and Field days on Good Agricultural Practices (GAP)	Highly relevant	Effective	Efficient	Yes
7	Facilitation of agri-inputs(through ITCMAARS)	Relevant	Effective	Efficient	Yes
8	Facilitation of market intelligence and price updates on daily basis (through ITCMAARS)	Highly relevant	Very effective	Very efficient	Yes
9	Facilitation of information regarding Government schemes and subsidies (through ITCMAARS)	Relevant	Effective	Efficient	Yes
10	Reinforcement of Agricultural extension messages through WhatsApp & IVRS /Digital Communication Centre	Relevant	Effective	Efficient	Yes
11	Support by Field staff to farmers	Highly relevant	Very effective	Very efficient	Yes

3.3.5 What farmers liked ? - Activities which were sought after by farmers

The following table depicts the interventions which were liked and sought after by farmers in 'Farm Advisory Pilot'.

Table no.11 : Interventions liked by the farmers

S.no.	Interventions	High	Medium	Low
1	Weather/ climate alerts/ advisory			
2	Agricultural Extension & crop advisory (through ITCMAARS)			
3	Soil testing services & customized crop nutrition recommendation			
4	Agri-mechanization demonstration			
5	Demonstration plots for wheat crop			
6	Farmers trainings and Field days on Good Agricultural Practices (GAP)			
7	Facilitation of agri-inputs (through ITCMAARS)			
8	Facilitation of market intelligence and price updates on daily basis (through ITCMAARS)			
9	Facilitation of information regarding Government schemes and subsidies (through ITCMAARS)			
10	Reinforcement of Agricultural extension messages through WhatsApp & IVRS / Digital Communication Centre			
11	Support by Field staff to farmers			

3.4 Conclusions

ITCMAARS crop advisory for wheat farmers through ITCMAARS brought improvements in knowledge, agricultural operations, yield, quality and net returns in rabi season 2024-25. ITCMAARS App successfully established digital connect to 26,000+ farmers (93% small and

marginal) from 15 FPCs to obtain advisory on climate, improved agricultural practice and market intelligence.

The contribution of Farm Advisory Pilot was observed from perspective of learning and adoption of best agronomic practices and also crop performance related benefits for rabi wheat crop and improved farmer economics. The estimated area under coverage of crop advisory through ITCMAARS was approximately 39,000 acres, which was cultivated by approximately 26,000 beneficiary farmers in 346 villages. 88% of the respondent farmers (from beneficiary farmers group) informed that their knowledge regarding package of practices improved because of project. 72% of the respondent farmers showed interest to follow the range of advisories from ITCMAARS for next crop season. It was observed that 84% of the farmers from beneficiary group (farmers from 346 villages) understood the positive influence of balance fertilizer application and are ready to implement the same to gain the reduction cost of cultivation.

During the impact assessment survey it was witnessed that significant percentage of beneficiary farmers acknowledged the usefulness of weather alerts and they appreciated the outcomes like saving in irrigation cost etc. It was understood that “weather alerts” from ITCMAARS was a highly acknowledged and appreciated by 88% of the beneficiaries from 346 villages. The important contribution of ‘Farm Advisory Pilot’ was to establish the phygital connect for farmers through ITCMAARS to facilitate timely customized and predictive crop advisories by integrating geospatial data to enhance crop yields and net returns of farmers. It enhanced the access of farmers to personalized advisory and market intelligence and the same was confirmed by farmers.

The endeavours of Farm Advisory Pilot could inspire and direct significant number of small and marginal farmers of wheat crop towards adoption of improved agricultural practices. It catalyzed inculcating the measures and methods to improve productivity of crop and profitability of the farmers.

Through impact plots, the effect of customized crop advisory is evident in improving crop productivity under multiple facets such as reduction in seed rate by 7%, reduction in fertilizer quantity by 15%, increase in yield by 15%, increase in HL by 3% and net returns by 26%. These results have an immense potential for implementation and scale up in other areas in improving farm productivity.

Considering the above achievements and other inferences of the impact assessment study, it can be concluded that ‘Farm Advisory Pilot’ under ‘Operation Dronagiri’ was highly relevant, effective and efficiently implemented. With phygital and integrated approach of ITCMAARS, the 15 FPCs hold differentiating capabilities for their operations. and exude optimism for future growth.

Operation Dronagiri has the potential to transform agriculture through integration of geospatial data with the combination of digital and physical competencies for crop advisory support and it may be scaled up in future.

3.5 Recommendations

1. Active involvement of stakeholders like Department of Agriculture may help in enhancing the effectiveness of agricultural extension through ITCMAARS
2. Agricultural mechanization may be given further thrust in future by facilitating drones, seed drills, wheat harvesters etc. along with joint action from Department of Agriculture/Horticulture etc.
3. Incentives like “Best Farmer Award/ Best Learner Award/ Best Facilitator Award” etc. may be facilitated to accelerate the learning and adoption by the farmers
4. Board of Director of FPCs may be trained and motivated to popularize ITCMAARS App and to scale up transactions through the same

4. CASE STUDIES

STOP LOSS THROUGH WEATHER ALERTS

Mr. Dhananjay Singh is a progressive farmer from Madhukar Shahpur village, Rajatalab block of Varanasi and he is a member of Cultiville Farmers producer Company. He became a beneficiary of ITCMAARS as Cultiville FPC was included in Farm Advisory Pilot. He actively followed the total range of advisories from ITCMAARS App and also attended farmers trainings and meetings conducted by ITCMAARS Field team.



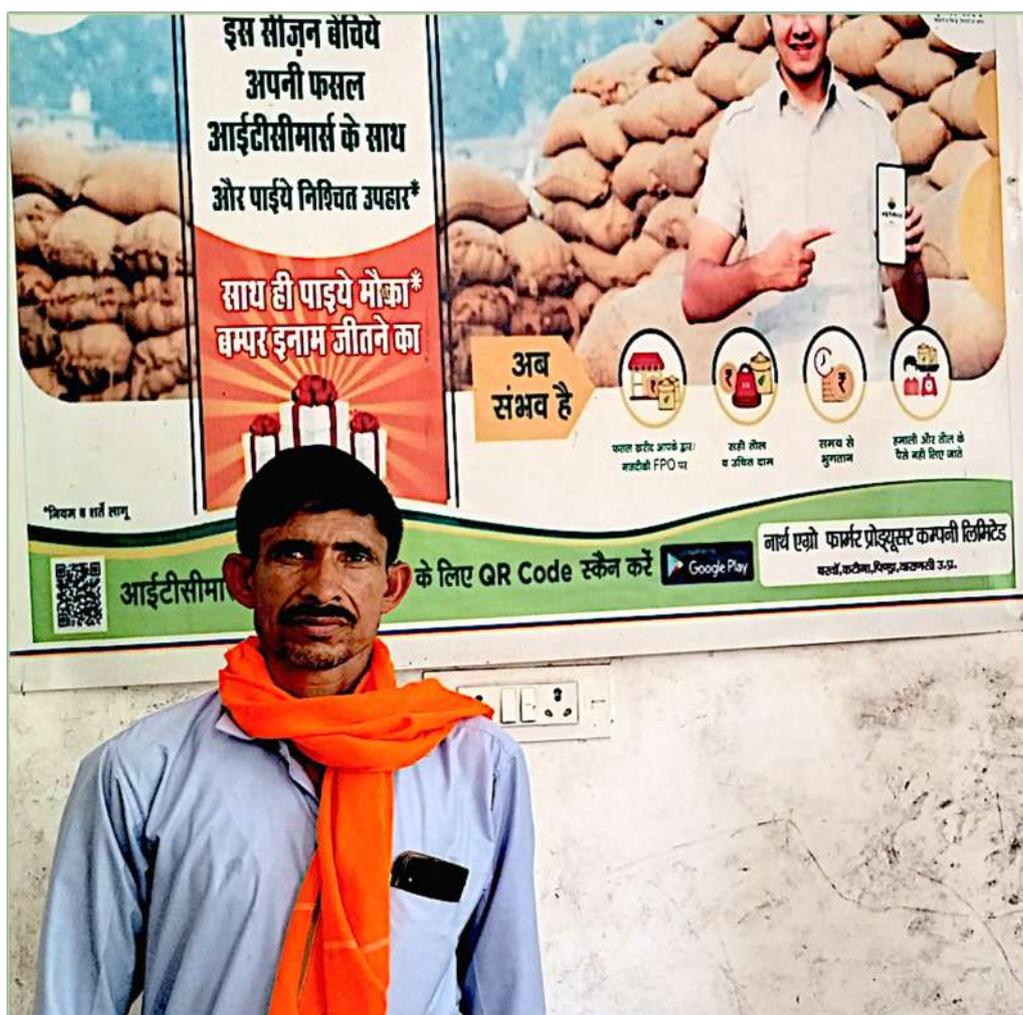
He opted for soil testing from the facility at the FPC and received the customized report for chemical fertilizer application for his rabi wheat crop in 2024-25. "After soil testing only, we could understand that we should not use excess chemical fertilizers. We reduced DAP application by 31% and urea by 21%". "We have applied 'MoP + Urea spray' based on

ITCMAARS recommendation and it worked well. Grains are bold, shiny and their weight has also improved” Mr. Dhananjay Singh said. “I have attended Farmer training programs, conducted by ITCMAARS with Agri-experts from ITC and KVK who gave information on dos and don’ts in wheat crop very clearly. The field staff visited our farms on regular basis without fail” he added. Mr. Dhananjay Singh witnessed an improvement in crop yield by 20%. The net returns/acre increased by 27% resulting in a gain of Rs.7,900/acre approximately.

“We received reliable weather alerts regularly from ITCMAARS in rabi 2024-25. I found this feature exciting. Because of the rainfall alert, I could reschedule irrigation operation in wheat farm. This alert was a great saver in disguise because every irrigation costs approximately Rs. 950/acre. If I don’t have the reliable information on rainfall, I would have gone ahead and irrigated the farm. There was a cost attached to irrigation, which we saved by following weather alerts. Many farmers in my village follow weather alerts of ITCMAARS to stay informed regarding climatic conditions. Weather alerts played important role in planning the harvesting of wheat also ” Mr. Dhananjay expressed.

ADVISORY ON BALANCE FERTILIZER APPLICATION FOR FARMERS' ADVANTAGE

Mr. Ajay Kumar Singh is a small farmer from Charo village, Pindra block of Varanasi district and he is a member of North Farmer Producer Company. He has been cultivating wheat from past 18 years. Before joining as ITCMAARS farmer, he was facing challenges in accessing the recommendations for pests and diseases control during crop cultivation. He was also looking for reliable sources of information regarding market prices of wheat after harvesting the crop. When ITCMAARS Field team approached him to join as advisory beneficiary member he showed interest and installed ITCMAARS App in his smart phone.



He meticulously implemented all the improved agricultural practices by following ITCMAARS advisories like seed treatment, mechanized seed sowing by seed drill, balanced fertilizer application and plant nutrition, MoP spray etc. He could reduce dosage of DAP in his wheat farm by 10 kg/ acre (65 kg to 55kg) and Urea by 60 kg/acre (130kg to 70kg) and

increased Muriate of Potash application by 12 kg/acre (from 15kg to 27 kg). This activity saved approximately Rs.366/ acre.

“The concept of balanced fertiliser application and MoP usage was not known to us till the time we followed ITCMAARS advisory. Now we understood that we have been using excess fertilizer in our farms and because that our crops got infested by pests. When I followed the recommended dosage of DAP, Urea and MoP, I could see the healthy growth of wheat crop with minimal level of pest infestation. MoP application proved to be very useful. The grains are shiny, bold and weight of the grain improved. It made difference in the yield as well” Mr. Ajay said. “After following the advisory, I could see an improvement of yield by 2.2 quintals/acre in my farm” he added.

In Mr. Ajay’s farm, after following crop advisory, the estimated net returns showed an increase by Rs.3,821/acre and the yield/acre increased from 14.8 quintals per acre to 17 quintal/acre. “I started following mandi prices of wheat through ITCMAARS App and I can sell wheat at right and remunerative price. This is a strength passed on to farmers through ITCMAARS” he asserted

EFFECTIVE AND END TO END ADVISORY FOR FPC MEMBERS

Mr. Anil Prakash Pandey is a progressive farmer from Karemua village, Pindra block of Varanasi district. He is one of the Board of Directors for AgroBasantpur Navkrishak Farmer Producer Company. When ITCMAARS team approached him regarding 'Farm Advisory Pilot', he showed keenness in opting for the advisory and encouraged the FPC members to opt for the same.



“When our farmer members are empowered with ITCMAARS, our FPC is empowered. ITC reached out to us to empower us at farmers level and also at FPC level. We have utilized the end-to-end advisories by ITCMAARS and we are happy about the same. In addition to weather alerts, agricultural advisory and market prices, we could get an update regarding Government’s schemes and subsidies on the app. 2 farmers in our FPC availed Government schemes (irrigation) because of ITCMAARS. It is not only for improving farmers’ profit but also for welfare of the farmers”. Mr. Anil said. “Through ITCMAARS, we understood the importance of varietal usage, seed treatment, importance of soil testing, balanced fertilizer application for wheat. I could reduce application of DAP by 20 kg/acre. The improvement in yield was 2.1 quintals/acre and the estimated improvement in net returns is 3,600/acre” he added.

“ITCMAARS played bigger role than just providing agro-advisory. FPC members could access to the mandi prices on regular basis. The overall positive effect of combination of crop advisory, farmers’ knowledge improvement, agri-input business facilitation, large scale

spread of market intelligence among the farmers and even to non-FPC members is very useful for our FPC.

Availability of inputs in the form of Krishi Samadhan Kit also helped in improving the crop yield and we also does not have to run to retailer for understanding which inputs to use. The farmer trainings and visits by field staff helped farmers to upgrade their knowledge on wheat crop cultivation. We are following the weather alerts to take up any agricultural operation because it is required for the farmer to adjust crop operations based on climate. Now a days we see a change in climate and having a reliable climate tracking App is beneficial for our farmers. Overall, ITCMAARS infused enthusiasm and optimism among our FPC members” Mr.Anil expressed.





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