

AGRISNET

Farm Crop Management System



***Department of Agriculture
Government of Tamil Nadu***

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Executive Summary

The AGRISNET project was conceptualized with the vision of creating interconnected technology enabled network which can deliver ‘informational services’ effectively to the farming community. The project aimed to integrate cross-functional processes of the Department of Agriculture, so as to effectively and efficiently communicate informational services to the farming community through ‘one-stop’.

Although a number of technological innovations in the field of communications such as mobile telephony, mobile apps, tablets (for on-field monitoring), text & voice advisory (for last mile connectivity) were available, yet they could not be used at the time of the initial launch of the project, as the technologies were still emerging and were pre-mature to be used for wide-spread dissemination or broadcasting information. Therefore the traditional means of Kisan Call Centre and physically contacting the local offices of the government were used extensively.

This posed ‘scale & sustainability’ challenges as the penetration of mobile phones grew in the rural and semi-urban India, along with the development of information platforms for providing services to the masses in the private sector. This led to a substantial increase in the demand of informational services from the government as well.

The Department of Agriculture, Government of Tamil Nadu understood clearly that it needs to innovate to fill this ‘information service delivery gap’, building on the intensification networking capabilities and wide spread availability of communication infrastructure right up to village level.

Building on the data collection, aggregation and analysis platform under AGRISNET initially, the Department of Agriculture, Government of Tamil Nadu, further enhanced it to include ‘***Personalized-Information***’ to a farm throughout the crop-lifecycle. Some of the distinct features include: farm based crop advisory, inputs & resources availability mapping locally, insurance and finance requirements based on cropping patterns, digital market linkages etc. All these informational services are now provided through the use of mobile, text, voice and online platforms.

Introduction

AGRISNET won the 'Gold Award' in the category '**Incremental Innovation in Existing Initiatives**' in the 18th National e-Governance Awards. The project reaches out to about 385 block level offices, 31 district headquarters, 1 state level office, soil testing laboratories, seed certification offices in the state. These offices are connected through TNSWAN and BSNL broadband.

Incremental innovation under AGRISNET is the evolution of – '**Farm Crop Management System**', which has shifted the paradigm from an area based approach to farm based approach.

Incrementally individual farm asset mapping is being done along with soil health mapping. The villages have been classified into micro agro climatic zones and zonation has been done with groups of homogeneous micro agro climatic zones based on rainfall data along with other factors of production such as land, irrigation, individual farmers' resource base, yield gap of the particular farm etc. A detailed crop matrix has been defined for each zone and the farmers are provided with a bouquet of cropping options that can be taken up for cultivation, both productively and profitably. Crop Plans can now be developed online, individual to farms in consultation with their farmers.

Upon suitable analysis of the potential yield of a particular crop in that area and the actual yield obtained from a farm, the yield gap are ascertained. Farm level production constraints are examined and discussed between the extension worker and the farmer, farm wise in a personalized manner.

While developing the crop plan within an area, inputs and pre-cultivation requirements such as seed variety, fertilizer, bio-fertilizer, and weedicides are aggregated at the back-end so that the dealers and dealing agencies can be intimated in advance about such requirements, so as to stock suitably. In this way glut and dearth of the stock during peak and off-seasons are averted.

Through AGRISNET, the benefits of personalized / individual farm level advice are analysed to be the most viable alternative to reduce yield gap, increase production and income of the farmer.

Project Owner

Dr. Sandeep Saxena, IAS

Agricultural Production Commissioner and Principal Secretary, Department of Agriculture, Government of Tamil Nadu

Dr. Saxena observed that Tamil Nadu had seven Agro Climatic Zones and two thirds of the population depended directly or indirectly on agriculture for their source of livelihood. He further observed that state faced challenges in agricultural extension service delivery and production of crops on account of the prevailing ecosystem in Tamil Nadu. He initiated the launch of the initial AGRISNET project in 2010, to act as a Decision Support tool for agricultural extension workers and farmers. The initial project was conferred the 'Best Portal' in the 15th National e-Governance Awards, 2011-12.

Built on the initial AGRISNET platform the incremental innovation of Farm Crop Management System (FCMS) was conceived, designed and implemented.

He envisioned that the project should oversee an all-round development in cultivation, production and marketing of crops in Tamil Nadu through dissemination of agricultural information and the use of modern communication technologies to reach the farmer at their door-step. With the incremental innovation of 'Farm Crop Management System', the project has moved from being '*Localized*' to being '*Personalized*' in adding value to the farming systems across Tamil Nadu.

Project Overview

Key Challenges / Constraints Faced

- Increase in the demand of personalized agricultural information
- Diverse cropping patterns within agro climatic zones
- Linking pre-cultivation, cultivation and post-harvest phases with farm-level crop plans

Scope of Services

- Online Registration of individual farm assets
- Online Soil Test results
- Online crop plans for individual farms
- Crop Health Monitoring reports of individual farms
- Online Input availability – for government points-of-sale
- Advisories - both Text & Voice on pest & disease management, weather forecast, market information, welfare scheme etc.
- Services available through CSCs
- Electronic work flow processing
- Most services available online with mobile enablement of certain services

Incremental Innovation

- Individual asset mapping at farm level
- Linking farmers mobile number with the survey number (mandatory)
- Soil health monitoring made mandatory (soil nutritional status)
- Micro agro climatic zonation conceptualized and developed
- Personalized Crop Matrix developed by extension workers in consultation with farmers
- Personalized Crop Plans developed by extension worker in consultation with farmers
- Crop Plan based on soil nutrient status & actual nutrient requirement fertilizer requirement calculated and given in the crop plan
- Details on input supply agencies viz., seed, fertilizer both private and co-operative agencies, given to farmers
- Zonal input requirements estimated and communicated to agencies at block level
- Scheduled visits to farm fields by extension workers for continuous crop health monitoring
- Village wise yield projections calculated and communicated to Agricultural Market Intelligence and Business Promotion Cell (AMI&BPC)
- Farmers sent market related advisories based on market analysis & prevalent prices
- Development of ‘grower-clusters’ at village and block levels, further to be federated at district level as FPOs.
- Farmers linked to agricultural produce traders through Post Harvest Management System (PHMS).
- All information, at every stage available as text advisory from the field level practitioners

- Input Supply Management System launched catering to 880 Agricultural Extension Centres
- Touch Screen Kiosks & PICO mini projectors deployed at block level offices to disseminate extension services.

Modalities of the new system

Baseline Study

- Extensive farm level asset mapping and soil health mapping conducted
- Detailed farm level crop matrix based on micro agro climatic zones, including parameters on soil health, irrigation type and rainfall pattern.

Implementation Model

- Services available online, through portal and also through mobile (limited services)
- Coverage includes all villages in Tamil Nadu
- Master trainers trained in teaching 'how to use' AGRISNET
- Increased frequency of interactions between district level officers on field issues
- Dedicated software support resource available for support

Technology

- Web based application developed using open source (PHP & MySQL)
- ELCOT (Electronic Corporation of Tamil Nadu) appointed as nodal agency
- Centralized procurement, installation and maintenance of hardware & software
- 'User Involved Software Development' life-cycle model adopted

Adaptability & Scalability

- Project originally developed and pilot tested in six districts
- User feedback incorporated to improve and scale at the state level
- Software developed on open source and hence it can be easily customized

Efficiency Enhancement

- Capacity of processing more than 1,000 transactions per second
- Volume growth estimated around 14,157 MB & around 12 crores records per year
- Per day 30,000 to 40,000 records updated
- 206 database tables & about 45 masters maintained
- On average 0.02 seconds taken to process transactions
- Accuracy of assured output ~95%
- No service delays encountered in service delivery as yet

Accessibility

- **User Accessibility**
 - Department officials involved in addition / modification of records provided with unique credentials
 - Role based access provided to all users, ensuring that only those eligible to view a specific data set can access it.
 - Public information provided on the portal, without the need to register or login.
- **Transparency**
 - Transaction logs maintained for all additions, modifications done on the portal.
- **Single Window Resolution**
 - Decision makers provided with dynamic dashboards for information and monitoring.
 - Common Service Centre linked for providing information to end user i.e. farmers through the Tamil Nadu Government official portal.
- **Visits required before & after automation**
 - Before: At least two / three times per crop cycle
 - After: Only on need basis
- **Communication channels**
 - Online Portal
 - Short Messaging Service (SMS)
 - Input availability displayed on the web portal
 - Input sale can be conducted online and managed dynamically
 - Government of India, SMS gateway integrated to the portal
 - Information disseminated in regional language

User Convenience

- **Service Delivery Channels**
 - Web portal
 - Text and Voice advisories
 - Touch screen Kiosks installed at critical crop production points
 - Action plan during the cropping period
 - Continuous crop health monitoring by the field level functionaries
- **Completeness of the information provided to the users.**
 - Information collection(soil, water, climate) using the web enabled platform
 - Individual Crop plan
 - Continuous/closer monitoring
- **Accessibility (Time Window)**
 - Web portal-24x7 availability
 - Touch screen kiosk-10 AM to 5.45 PM
- **Distance required to travel to Access Points**
 - Maximum 10 km from the point of his living
 - 3-4 KM in case of common service centres
- **Facility for online/offline download and online submission of forms**

- Information can be downloaded
- Submission done to field staff only
- In future, information will be readily available online
- **Status Tracking**
 - Each transaction is tracked by the software.

Ease of transaction

- Village level Campaigns “Uzhavar Peruvizha” used for training farmers how to access and interpret information on web.
- Training to access the Touch Screen Kiosks
- End to end solution is given to the farmers
- In future more secure finance transactions will be made available

Appropriateness of context and degree of localization

- Static information is available in Tamil
- Dynamic information is collected in English from the user
- Database is supporting the local language interface

Cost effectiveness

- Software Development Life Cycle (SDLC) is used making it very cost effective.
- Software support (Enhancement and improvement) is done in house.

Number of users and services

Users

- 1500 Nos. of Departmental users
- About 17000 stake holders viz., seed, fertilizer, pesticides, credit institutions
- About 72 Lakhs registered farm holdings

Services

- Farm resources productivity enhancement
- Soil Health improvement
- Individual farm level intervention
- Crop Productivity improvement
- Crop Health Monitoring
- Comprehensive Input Supply Management System
- Online Machinery Hiring
- Technology dissemination
- Input assessment and Stake holder’s synergy
- Farm related advisory both text and voice
- Dissemination of technical information through Touch Screen Kiosks and technical short films.
- A special tool called “*Crop Doctor*” is used for knowledge dissemination and imparting skill using “Know it yourself” concept.
- Market information

- Post-Harvest Management

Impact on the stakeholders

Impact assessment

- 6 pilot districts were used for assessment Outcome was implemented across the entire state
- AGRISNET-FCMS platform used for technologically backing up farm activities
- Active farmer participation
- Services of Extension functionaries systematized
- Quick effective solution due to online database
- Input use efficiency(Demand and supply synchronisation)

Results achieved/value delivered

To organization

- Robust Decision Support System
- Quick delivery of services
- Making Administration vibrant and agile

To Citizen

- Easy availability of information and definite profit oriented outcome
- Approach to administration made simple and precise

To Other Stakeholders

- Comprehensive decision making
- On time delivery of goods and services
- Streamlining of demand assessment

Sustainability

- Open Source Technology
- Right technology (php , MySQL)
- Unique credentials to each user to maintain privacy
- Since payment gateway is not being used, so digital encryption is kept on hold
- Software support and server side supports all the 24x7.
- Periodic training of application users
- E-team at state level
- 4-5 Master trainers at district level

Annexure

Comparative Analysis of earlier Vs new system:

The Original Project AGRISNET provided information on the soil status, availability of inputs (seeds, fertilizers, pesticides, technologies etc. The present incremental aspects of the AGRISNET - FCMS addresses the 'Individual farm level requirements' for effective capitalization of resources, Asset Mapping, Soil Health Mapping, Micro Agro Climatic delineation, Crop Matrix to provide bouquet of options, development of individual crop plans to each farm in consultation with farmers on participatory approach, providing advisories both text and voice, Synergy with stake holders, linking with the market, etc.

Following are the features that differentiate new AGRISNET from old AGRISNET

1. Dynamic online capturing of all transactions
2. Dynamic flow of information
3. Stake holders Networking and on time supply of quality inputs
4. Individual farm level intervention
5. Continuous crop health monitoring to provide timely and effective farm advisories
6. Integration of services (Agriculture, Horticulture, Agricultural, Engineering, Input Supply Chain, Individual based advisories, market)
7. Providing demand based service delivery rather than supply based
8. Focusing on elimination of production constraints and providing suitable intervention on participatory approach.
9. Last Mile connectivity achieved through mobile communication both – text and voice based advisories.