

# Information and Communication Technology Utilization at Tamil Nadu Agricultural University

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## Prelude

The world is in the midst of a knowledge revolution, complemented by opening up entirely new vistas in communication technologies. Recent developments in the field of Information and Communication Technologies are indeed revolutionary in nature. By definition, Information and Communication Technologies (ICT) are a diverse set of technological tools and resources to create, disseminate, store, bring value-addition and manage information with feedback. ICT, when used as a broad tool for educating the communities especially entrepreneurs, business graduates and managers, heralds the formation of a new class of society—the Knowledge Society. Knowledge thereby becomes the fundamental resource for all economic and societal developmental activities in the highly competitive and pluralistic world.

The five unique features of ICT interventions in the social transformations are

- Increasingly 'ubiquitous' connectivity along value chains
- Increasingly 'precise' applications
- Increasingly 'accessible' data and information
- Increasingly 'diverse' set of digital applications
- Increasingly 'inter-connected' tools and knowledge bases

The agriculture sector, with more than 60% population dependence, contributes only about 18 per cent of the total Gross Domestic Product (GDP), resulting in low per capita income in the farm sector. Consequently, there is a large disparity between the per capita income in the farm sector and the non-farm sector. The income levels are determined by the overall production, supported by reasonable levels of yield and prices realized by the farmers. Several constraints such as

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preponderance of small and marginal holdings accounting for about 82 per cent of total holdings, imperfect market conditions and lack of backward and forward linkages affect the income levels of farmers adversely. Information and Communication Technology (ICT) is making huge waves in all fields. Agriculture is no exception. Its potentials are huge in the wake of far spread farmlands in India. Achieving 4 percent growth in agriculture as formulated in the National Agricultural Development Project (NADP), quick and extensive methods needs to be utilized. Information and Communication technology can be utilized for quick and easy technology transfer. It can bring the best expertise to all rather than a particular locality. Tamil Nadu Agricultural University has taken up Information and Communication Technology for its transfer of technology and it is attempting to develop a new mode of link between the extension officials and the farmers. The following are the initiatives that are functioning at the Directorate of Extension Education in the university.

## **1. e-Agriculture Service for Accelerating Agricultural Development and Living Standards of Farmers through TNAUAGRITech Portal**

### **1.1. Present Technology Delivery System**

In Tamil Nadu, farm technologies are transmitted to farmers through State Department of Agriculture, (Public), Private Dealers and NGO's. Still, these agencies are following the conventional extension approaches such as Mass, Group and Individual approach. Due to the fast growing economy, these approaches are not able to deliver the technologies as expected by the farming community. The existing staff in the agriculture department, Government of Tamil Nadu is not matching the growing rural population in the villages, which resulted in slow transfer of technologies and delivering of untimely information. To reach the unreached and last milestone of the farmers, a new comprehensive approach was to be evolved. There is a need to develop a dynamic website for farm entrepreneur which could help them in day-to-day decision making.

### **Fig. 1. Home Page of TNAU AGRI TECH PORTAL integrating Research, Extension and User System**

### **1.2. Need of Alternate System**

Knowledge Management and Knowledge Portal are the talk of day in ICT. Analyzing the Global scenario on web delivery or portal, integrated information is not available. Agriculture means not alone the crop and its dynamics. Farming holds the integration subsidiary activities and networking

of allied enterprises. In this connotation under NADP (National Agricultural Development Project) it is planned construct and design integrated knowledge portal involving all the stakeholders in the farming profession. Apart from the standard search engine feature, web portals offer other services such as e-mail, news, stock prices, information and entertainment. Portals provide a way for enterprises to provide a consistent look and feel with access control and procedures for multiple applications, which otherwise would have been different entities altogether.

The screenshot displays the TNAU Agritech Portal website. At the top, the header includes the TNAU logo and the text "TNAU AGRITECH PORTAL" and "TamilNadu Agricultural University, Coimbatore". Below the header is a navigation bar with links: Home | About Us | Success Stories | Farmers Association | Gallery | Message Board | TNAU Publications | FAQ's | Downloads | Contact. The main content area is divided into several sections:

- Technologies:** Crop Production, Crop Protection, Crop Improvement, Sustainable Agriculture, Organic Farming, Indigenous Farming.
- Special Technologies:** SRI-System of Rice Intensification, Precision Farming, GAP | GLP | GMP.
- Schemes & Services:** Govt. Schemes & Services, IANM/WARM, Development Blocks, Banking & Credit, Crop Insurance, KVK, ATMA, NGOs & SHGs, Kisan Call Centre (1551), MDG-2015.
- Ask Your Expert:** A section for user queries.
- Visitors No.:** A counter for website visitors.
- Core Activities:** A central image of a farmer in a field, surrounded by circular icons representing various agricultural activities: Animal Husbandry, Agriculture, Horticulture, Fishery, Forestry, Sericulture, Seed Certification, and Agricultural Engineering.
- Major Areas:** Weather, Soil, Water, Seed, Farm Enterprises, Nutrition, Post Harvest Technology, Bio Technology, Bio-Fuels.
- Daily Events:** Dynamic Market Info, TNAU-DEMIC, HRD, Television Programs, Farm Radio Programs, News Paper Information, Farm Magazines, Water Level (Dams), TNAU Community e-Radio.
- Agri Infos:** Minimum Support Price, Input Source, Export & Import, Patents.
- Related Infos:** Environment & Pollution, Disaster Management, ICT Initiatives, Important Links.

At the bottom of the page, there is a footer with the text: "Dynamic Market Information - for more details logon to www.tnau.ac.in/www.indg.in". Below this are navigation links: Home | About Us | Success Stories | Farmers Association | Gallery | Message Board | TNAU Publications | FAQ's | Queries | Downloads | Site Map | Disclaimer | Contact. The footer also includes the copyright information: "© All Rights Reserved. TNAU-2008".

### 1.3. Content in TNAU AGRITECH Portal

The TNAU AGRITECH Portal is being developed by scouting information from various trusted sources like the State Agricultural University, State Department of Agriculture, Horticulture, Engineering, Animal Husbandry and other line departments. Information is also obtained on private input dealers, marketing, export and import, KrishiVigyanKendras, indigenous technologies, schemes, food science and technology, Self Help Groups, Non Government Organizations,

entrepreneurs, agro industries and the like. The collected materials are validated with the help of subject matter specialists and the content is converted into knowledge pages. The special feature of the portal is that it has been designed to be in bilingual language i.e., English and Tamil - the local language, the targeted audience being field extension officials and farmers.

The software used for this purpose include Adobe Photoshop CS as Template Designing Tool, Macromedia Dream Weaver 8 for Web Developing Tool, HTML, XHTML, ASP.net, Flash Scripts as Coding Tool and Open Software – Moodle as platform. The core areas in the portal are Agriculture, Horticulture, Agricultural Engineering, Sericulture, Forestry, Fisheries, Animal Husbandry and Marketing. The other issues covered are Crop Production, Protection, Improvement, Organic Farming, Sustainable Farming, Indigenous Farming, Soil and water management, Government Schemes, Banking, Insurance, Self Help Group and Non Government Organizations, Post Harvest Technologies, Daily events (Market Information, News Paper Clippings, Radio and TV programmes, water level in dams and streamed Audio on TNAU Community Radio), Patents, Environment and Pollution, Inputs Source, etc.

The major areas such as Weather, Soil, Water, Nutrition, Enterprises, Post Harvest Information, Biotechnology and Bio fuels are covered. Few of the specialized technologies including System of Rice Intensification (SRI), Precision Farming Systems, Good Agricultural Practices, Good Laboratory Practices and Good Manufacturing Practices. Other related information such as Availability of Input Sources, Minimal Support Prices, District wise Agricultural Action Plan and Agro linkage with other agencies.

#### **1.4. Unique Feature of PORTAL**

It also intends to set up e-connectivity in all the 60 centres of TamilNadu Agricultural University (14 KVKs (Krishi Vigyan Kendra) + 2 PCCs (Plant Clinic Centres), 34 Research Centres and 10 Colleges). It is also trying to create interface mechanism between Agriculture Department, NGOs (Non Government Organization) and Farmers Association. This project aims to achieve Transfer of technology to the last milestone of the farming community, timely delivering of need based information to the farming community, Field problem diagnosis through Video Conferencing mode and giving farm advisory services.

The unique feature of PORTAL is Message Board and Ask your Expert with multimedia based dynamic network including audio and video streaming. Message board links with users to add any message they would like to share through this platform reaching to the intended audience. At the same time the user may also forward suggestions to improve portal services and corrective measures as a Feed Back. In the case of Ask Your Expert which links with Experts in the field of farming and allied sector and ensures to provide corrective measures and implementable action plans within a stipulated time of 24 hours. Both Message Board and Ask Your Expert also will be shared through Live Video Conferencing from HUB centre or from the clientele or users node.

Further, the portal information would like to focus on “more visuals / images with dynamics than less text and routine kind of nature”. As the research team involved in design and development perceived that generation old aspects like ploughing, weeding (manual), irrigation, application of inputs, harvesting and so on are not included in the content construction. More focus have been emphasized on science behind the facts, distinctive and pragmatic information to educate the field extension officials, farmers and stakeholders. In feature, the portal platform have strong convergence of including private partnership in the agreed aspects to reach more number of beneficiaries.

## **2. Dynamic Market Information Support for Agri-Horti Produces through [www.tnau.ac.in](http://www.tnau.ac.in) / [www.indg.in](http://www.indg.in) portal: Linking the Farmers with Market**

### **2.1. Need of Market Interface Mechanism (Perishables)**

India produces 150 million tonnes of fruits and vegetables. It is estimated that about 50% of the agricultural produce is available as marketable surplus. Post-harvest losses are estimated to be of the order of 5-7 per cent in food grains and 25-30 per cent in the case of fruits and vegetables. More than 72 per cent of the vegetables and fruits are wasted in the absence of proper retailing.<sup>4</sup>In order to reduce this wastage and also develop a direct link between the farmers and the market the State Agricultural Management & Extension Training Institute (SAMETI) & Directorate of Extension Education, Tamil Nadu Agricultural University in collaboration with C-DAC (Centre for Development of Advanced Computing), Hyderabad is operating this project.

### **2.2. Market Coverage and Information Reach**

In Dynamic Market Information, the market rates of perishable commodities (both whole sale and retail are collected and uploaded in the website ([www.tnau.ac.in](http://www.tnau.ac.in) and [www.indg.in](http://www.indg.in)) on daily basis. The project covered five markets in the first phase. They were Cochin, Coimbatore, Oddanchatram, Chennai, Bangalore and Trichy. Presently in the second phase 13 markets are covered. The markets included are Madurai, Hosur, Mettupalayam, Ottanchatram, Panruti, Thalaivasal and Tirunelveli. Project Analysts are placed in the different potential marketing zones. They collect the market data and upload in the portal. As on date, 152 commodities have been added to the DMI list. The rates are ready to be viewed by 1.00 pm daily. The information is given in Tamil and English.

The additional features in the website include market profiles with photographs, traders profile and addresses in each markets to promotes the traders business in the market, farmers association details, best practices adopted by other successful farmers, Minimum Support Price of major commodities, regulated Markets in Tamil Nadu and KrishiVigyanKendras (Farm Science Centres) in TamilNadu. The site also provides space to access previous data for comparison.



**Fig. 2. Linking the Farmers with Market**

As a value added service the price details of selected commodities are sent to the farmers on trial basis to 1000 farmers through mobile on select commodities. The number of commodities and markets is limited to two to each subscriber. This is done on a pilot basis and given in free of cost.

### 2.3. Future plans

- Linkage with the farmers federations to promote and use of available information
- Expanding to major markets in North India like PuneKolkataan New Delhi.
- Exploring the possibility to link with GIS & GPS to provide spatial assessment for market forecast
- Popularization with partnership and reaching the un reached
- On-line trading

- The holistic marketing related information namely trends, quality preference, daily market prices, demand and supply analysis for the different produces, composition of suppliers, packaging and transport mode for different produces will be analyzed and informed to the producers, buyers and consumers through online portal [www.indg.in](http://www.indg.in)
- Periodical publishing of market support information with regional specific inferences for different produces for the benefit of the all the stakeholders

Often farmers are exploited by the middlemen and unable to get actual benefit for their end produces. This joint initiative will facilitate the farmers and field extension officials to understand the daily prices of important markets in south India. Ultimately this would like to help the growers to mobilize the bulk commodities to get the real market prices. If the **farmers are not able to mobilize their produce individually they can organize into groups and take their commodities to the market that gives them better economic returns.**

### 3. Development of Expert System for Crop and Animal Husbandry Enterprises

#### 3.1. Exploration of Expertise Advise

Agricultural production has evolved into a complex business requiring the accumulation and integration of knowledge and information from many diverse sources. In order to remain competitive, the farmers often depend on agricultural specialties and advisors for information on decision-making. Unfortunately, agricultural specialists' assistance is not always available when the farmer needs it. In addition, all the extension systems and transfer of technology institutions have been equipped with the connectivity and networking system without location specific technology contents for decision making and adoption. Besides, the big diversity in languages and characters in the Indian languages prevent us from sharing information. In order to solve these issues, expert system is identified as one of the powerful tool with extensive potential in agriculture.

#### 3.2. Expert System

The expert system could be developed for decision-making and location specific technology dissemination process. An expert system is software that attempts to reproduce the performance of one or more human experts, most commonly in a specific problem domain, and is a traditional application and/or subfield of artificial intelligence. Expert systems helps in selection of crop or variety, diagnosis or identification of pests, diseases and disorders and taking valuable decisions on its management.

The project aims at development of expert systems for crop and animal enterprises facilitating instant decision-making process of the farmers through ICT enabled mechanism. The expert system will also be synergized with the existing KVK e-linkage system for its implementation. Five important crops identified, they are Paddy, Ragi, Sugarcane, Coconut and Precision Farming Technology for Banana. The animal enterprises include management of important diseases and nutritional disorder of Dairy cow, Sheep, Goat and Poultry birds.

### 3.3. Consortia Partnership

In order to develop location specific knowledge needs of the farming community in Tamil Nadu, Puducherry, Karnataka and Kerala the following institutes have been identified as network centres.

- National Research Centre for Women, Bhubaneswar
- Zonal Coordinating Unit, Zone VIII, Bangalore, Karnataka
- Directorate of Extension Education, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu
- Directorate of Extension Education, TANVASU, Chennai, Tamil Nadu

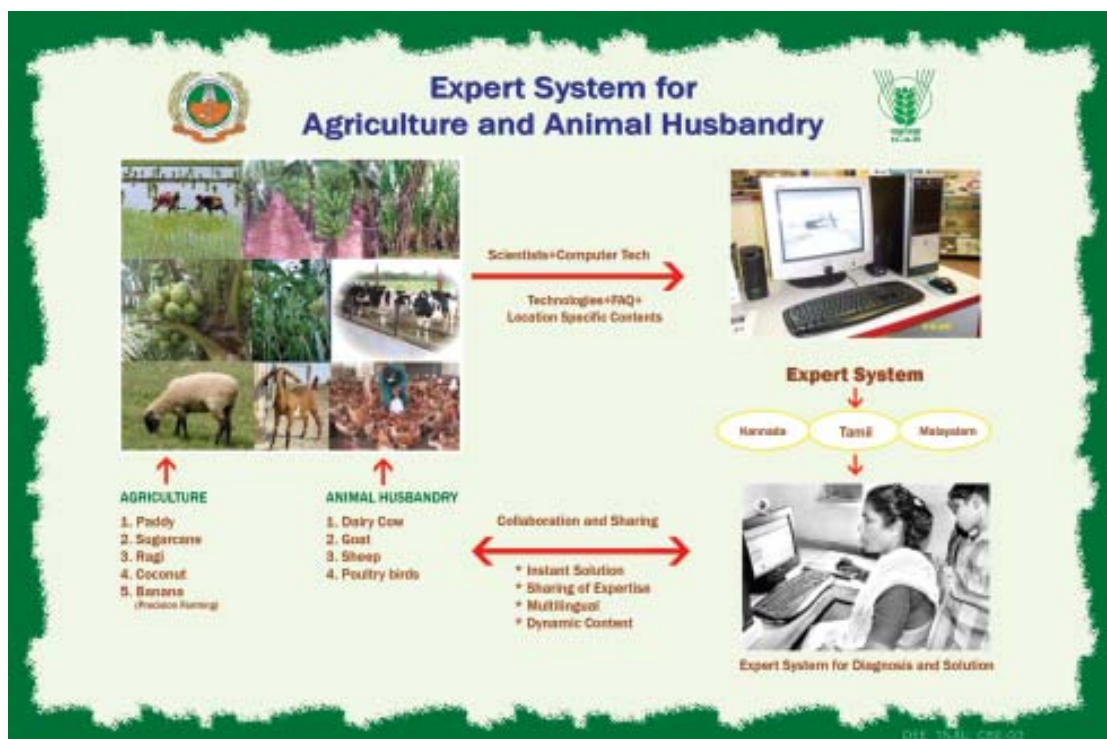


Fig. 3. Conceptual Frame Work of Expert System



### 3.4. Expected Outcome

For content development in multilingual the assistance of the following resource centres will be utilized.

Language	Resource Centre
Kannada	Indian Institute of Science, Bangalore
Malayalam	C- DAC, Thiruvananthapuram
Tamil	Anna University, Chennai

The major activities will include identifying location specific knowledge needs of the farming community for content generation and digitization, development of expert system in respective languages on the crops and animal enterprises, testing of validity and reliability of the expert systems at different locations both on men and women farmers before finalizing on multilingual customized mode. Presently the content for the various crops have been collected and experts are validating it.

## 4. Mass Awareness and outreach Module for Agricultural Research and Development

The project on '**Mobilizing Mass Media Support for Sharing Agro-Information**' is in the initiation phase and has been designed and developed with the objective to enhance the agricultural communication and awareness in the country at grass-root level by using effective communication and information tools. The capacity building will be undertaken to make the communication platform developed under the project sustainable beyond the project period enhancing visibility and adoption of agricultural technologies by farming community and entrepreneur. Latest ICT tools will be used to develop a quick and responsive interface with farmers, media and general public.

The project will be implemented in the participatory mode with active contribution from consortia partners like Indian Institute of Horticulture Research (IIHR), Central Institute for Subtropical Horticulture (CISH), Indian Institute of Vegetable Research, Varanasi (IIVR), Indian Institute Spices Research (IISR), Central Institute of Fisheries Technology (CIFT), Central Institute of Post Harvest Engineering Technology (CIPHET), TamilNaduAgricultureUniversity (TNAU)&GovindBallabh Pant University of Agriculture & Technology (GBPUA & T) and link organizations such as IGNOU, IIMC, PrasarBharati (AIR and Doordarshan) and Media groups located across the country. Directorate of Information and Publications of Agriculture, New Delhi will act as Nodal and Coordinating Agency for the implementation and monitoring of the project.

The project is focusing on documentation and dissemination of agricultural success stories in print, audio and video format for motivation of the farming community and general public at large. With the launching of online digital images library, the very effective, but hitherto neglected, pictorial communication will get an impetus. The project aims to use media as message multiplier and provides opportunity of media interaction with the scientists and farmers mutually benefiting both the stakeholders. Showcasing of agricultural technologies at regional level is another important activity to popularize the technologies ready for adoption or commercialization.

The project will establish a communication network within National Agricultural Research System by creation of small but well equipped communication units with sensitized and trained scientists/technical personnel to handle the communication efficiently and effectively. Impact assessment study will be undertaken to further refine and sharpen the communication tools for enhanced agricultural communication and awareness.

The agricultural communication platform developed under the project will be an interactive, multi-layered, quick and participatory communication system crossing economic, gender, languages and social barriers. It will ultimately lead to agrarian prosperity and inclusive agricultural growth in the country. The project plans to enhance visibility of the agricultural technologies developed by ICAR in regional and national media, regularly cover agricultural issues in print media, create sustainable information flow system, disseminate and demonstrate ICAR technologies to the farmers and masses. Success stories in the form of audio and video films will motivate the farmers to adopt ICAR Technologies.

## **5. m-Velanmai Agro Advisory Services for Improving the Livelihood status of the Farming Community of Tamil Nadu**

m-velanmai is an innovative mobile based advisory service to be initiated on public Private partnership by Tamil Nadu Agricultural University. Farmers can receive relevant information and advice on various topics in farming on his mobile phone. It also enables farmers to send queries specific to their land and crop to receive personalized replies from agricultural experts, on their phones. Using sensor networks, m-Velanmai Mobile Agro advisory system transfers the farmers' environment to the expert. Farmers can also send pictures of their crops and pests captured with mobile phone cameras; Sensors provide farm specific soil and crop data; Weather stations provide microclimate details. Using this data, about the farmer's environment experts guide them directly, on water, pesticide and fertilizer usage, helping them save money, effort and the environment.

The project will be integrated with existing the TNAU Agritech Portal, Dynamic Market Information, Automatic Weather Station, Agri Clinics to connect the last mile connectivity through Mobile. Cluster level associations (20 member/cluster) will be formed at Automatic Weather Station block. Five Automatic Weather Stations based clusters will be formed per district of Tamil Nadu. 28 Districts will be targeted as pilot basis. Totally 140 weather stations (Clusters) ie., 2800 farmers (Precision Farmers Associations) will be involved for this project to test the efficiency of Mobile based agro service facilitated by mobile connectivity system.

Individual Farmers farm database, which includes soil types, water quality, pH level etc., will be developed using this mobile based system. Mobile based advisory system, which includes agro advisory, pest and diseases diagnosis and recommendations, market price, information on bank loans, insurances and Government schemes will be given. One dynamic farmer / Agri Clinic owner will be trained as facilitator for each cluster who will act as local expert and promoter of the scheme. Each five cluster will get one project associate for content development that suits to mobile, giving expert advice using mobile, individual farm data base creation and training the farmers on mobile system who will be attached to TNAU centres either at KVKs or Research Stations. ELCOT, Government of Tamil Nadu, TNAU and Tata Consultancy Services will implement the project jointly. The Mobile based Agro Advisory service will be promoted to all the villages through Business model after seeing the impact this initiative. This will also help in creating a database of the farmers.

*m-Velanamai* mobile based advisory solution will work on a profit model so that the solution delivery becomes self sustainable with minimum government funding. Agri Clinic entrepreneurs will be empowered as service providers of the programme and will be handed over to them from second year onwards. It will be sustained by collecting nominal fees from the farming community by the agri clinic owners.

## 6. e-Velanmai

It is an ICT based demand driven participatory extension system to provide timely agro advisory services by TNAU scientists to the registered farmers using ICT tools (Internet, Computer, Digital Camera, Mobile phone etc.) on need and/or regular basis. It involves, farmers enrolled for the service, Expert team of Scientists formed at TNAU, Field Coordinators/SRFs to develop the capacity of farmers (Extension services), ICT tools to link farmers and Experts, Information about the agricultural problems (data) collected from farmers for advice. The other components include the technical message delivered by the experts to solve agricultural problems faced by the farmers and follow-up actions on the advices adopted by the farmers. Farmers pay a membership fee based on the farm size owned by them to avail the extension services under e-Velanmai as a mark of their participation

in the system of technology transfer. Scientists attend the farmers queries based on their call (demand) or need and hence it is demand driven for technical advice or scientific farming.

## **Conclusion**

Information and Communication Technologies when used adequately can speed up the process of transfer of technology. The utilization of mass media, internet and the mobile can bring about considerable changes in the lives of the farmers as it transfers the current and precise technologies. Crop production and management, schemes, market rates and farmers experience provide adequate information to fulfill the farmers information needs. When this is reached at the exact time of requirement then it bears fruit. The above said efforts are towards this goal and it hopes to change the livelihood of the farmers.

