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## **Impact Assessment of Mobile Based Agro-advisory: A Case Study of Tribal Farmers of Ri-Bhoi District of Meghalaya**

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### **Abstract**

To enhance livelihood and income of tribal farmers in Meghalaya, an agro-advisory service has been launched under the programme “Development and Deployment of Mobile Based Agro-advisory System in North-East India” at Central Agricultural University, Barapani. This study has accessed the impact of this project in 11 villages of Ri-Bhoi district of Meghalaya by randomly selecting 218 farmers. The study has revealed that the information gathered through agro-advisory service has been very useful and helpful to the farmers. The programme has gained high popularity among the farmers of Meghalaya and a sufficient number of farmers has been found to be benefitted through the agro-advisory service in the crop as well as livestock sectors. Among the crops, the ginger being a cash crop of the state, needs more care right from its planting to harvesting. The agro-advisory on the complete package and practices especially in selection of rhizome, its treatment, maintaining spacing during planting and also tips about proper care during harvesting provided by the experts of agro-advisory has been highly beneficial in production of ginger in the state. Facilitating artificial insemination and vaccination in pig and piglets have encouraged the farmers to have more access to agro-advisory services. Hence, to provide agro-advisory in a sustainable manner, convergence of such types of programmes with state department extension machinery is recommended as it will help uplift the livelihoods of rural tribals in the state.

**Key words:** Impact assessment, agro-advisory, tribal farmers, mobile phone, ICTs, Meghalaya

**JEL Classification:** O33

### **Introduction**

In Meghalaya, the application of information and communication technologies (ICTs) could benefit agriculture, especially in bringing changes in the socio-economic conditions of the poor in the difficult areas. Therefore, different initiatives in IT sector were launched in the state to provide agro-advisory services to the farmers. Among these initiatives was launching of an agro-advisory system under the project “Development and Deployment of Mobile Based Agro-advisory System in North-East India (hereafter called

m4agriNEI)” by the Central Agricultural University (CAU) at Barapani in the state. The system was started with the collaboration of Media Lab Asia, New Delhi and was funded by the DeITY (Department of Information and Technology), Government of India, New Delhi.

The m4agriNEI is an integrated system with a combination of Web, Interactive Voice Response System (IVRS) and mobile phone technologies for dissemination of farm- and farmer-specific advices/information at the user desired mode and time. It has a Toll Free Number (1800-345-3700). It is a mobile-based pull and push system from which agriculture-

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related information can be pulled/pushed by the farmers using their mobile phones. There is a mobile interface at the front end for the farmers and web interface at the back end for the agri-experts. The system allows transmission of the data through voice, texts, images and videos from both ends (farmers to expert and vice versa). Also, a farmer can call the system to get any information or agro-advisory. The farmer receives information (SMS/Voice Call/ Data on Smart Phone) for only those services for which he has subscribed and has the option to select some more services or unsubscribe some of the existing services at a later date. The system is connected to a centralized database, which has all the information about farm, farmer and previous transactions. The experts at back end (data centre and virtual expert) can access the database of the farmers while responding to the farmer's queries and only the registered users can have access to the m4agriNEI system. There is a mobile interface at front end for the farmers and web interface at the back end for the agricultural experts (Level-I and Level-II). Further, the designated 'Farmer Co-ordinators' and rural youth facilitate the registered farmers in getting information and knowledge about farms and they can also provide feedback to the m4agriNEI system.

### Components of Agro-Advisory

The different components of agro-advisory are describe below.

#### Mobile Application for Smart Phones (Android and Windows)

- Standalone application
- Offline query aggregation capabilities
- Data synchronization at hot spots / areas of data connectivity (store and forward)
- Offline capability of display of last synchronized data
- Coordinator information system (profile page, visit scheduling, list of registered farmers)
- Farmer registration and profile

#### Web-based Application

- Colour coded iconic based logins for various type of users
- Expert support system linked with authentic content /information service providers

- Information dissemination and aggregation system (multimodal)
- Centralized common database for web, mobile and IVRS applications
- Currently available in English, Khasi and Garo languages
- Reports and analytics

#### Interactive Voice Response System (IVRS) Based Applications

- Call incoming facility on expert's computer
- Call forwarding and recording facility in case the experts are not available
- Intelligent enough to route the call to the relevant experts
- 24 × 7 query registration facility for farmers

### Data and Methodology

The agro-advisory service is being provided to 2813 farmers of 47 villages of the Ri-Bhoi district in Meghalaya. The information recorded during registration of a farmer is uploaded on the mobile-based agro-advisory service system. The system displays complete history of the registered farmers, such as name, village name, photograph and crops grown by the farmers as and when call landing to system. An impact assessment of the project was conducted in 11 villages of Ri-Bhoi district of Meghalaya by selecting a sample of 218 farmers randomly. Data were collected through personal interview method by using pre-tested well-structured interview schedule. The tabular analysis was carried out to study the impact of programme in the state.

### Results and Discussion

#### Analysis of Farmers' Queries

The farmers raised different types of queries and the number of each type of query is recorded in Table 1. The highest number of queries was about the seed and its source and it accounted for 32.91 per cent of the total queries. Improved seeds of ginger, tomato, paddy, french bean, maize, chilli, flower and other vegetables were demanded by the farmers. In livestock, information about piggery piglets, poultry chicks

**Table 1. Aspect-wise query analysis in Meghalaya**

Aspect of query	Query	
	No.	Percentage (%)
Source of seeds	1073	32.91
Crop disease and pest management	557	17.08
Enquired about the project	486	14.9
Livestock management	403	12.36
Crop cultivation and improvement	227	6.96
Information about scheme	224	6.87
Trainings	170	5.21
Other miscellaneous aspects	60	1.84
Marketing	34	1.04
Fishery management	12	0.36
Nutrient management	14	0.42
Total	3260	100

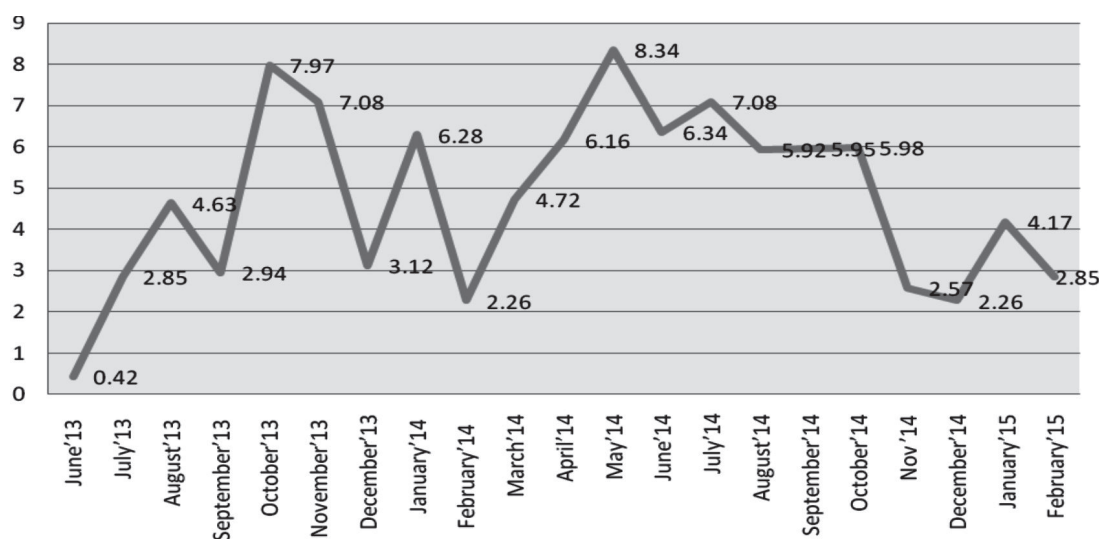
(Kuroiler, layers) and fish fingerlings was sought by the farmers. The second highest number of queries raised by the farmers was on crop disease and pest management and it accounted for 17.08 per cent of the total queries. The farmers enquired about modern scientific preventive measures of various diseases and pests. Crop disease and pest management of ginger (soft rot disease, shoot borer), preventive measures of paddy diseases (*blast disease, brown spot, bacterial blight, Udbatta disease*) and pests (*Gundhi bug, cutworm, white grub, rice leaf folder, rice case worm, and rodents*) and for french bean (*leafminers and aphids*). About 14.9 per cent queries were to know about the

agro-advisory system and the toll free number. Similarly, 12.36 per cent of the queries were raised about livestock management, in which maximum were on piggery, seeking information related to skin infection, de-worming of pigs, artificial insemination, vitamins, coughing, diarrhoea, swine fever, castration. It was followed by information about preventive measures of rani khet coughing, diarrhoea disease of poultry.

The queries on crop cultivation and crop improvement were observed to be 6.96 per cent of the total queries and information were sought on scientific management and improvement of cultivation of different crops like ginger, onion, paddy, tomato, cauliflower, orange, mustard and other crops. About 6.87 per cent of the queries were raised about the welfare schemes launched by the state government. Some farmers were found interested in trainings and 5.21 per cent of the queries were on trainings related to piggery, poultry, ginger cultivation, fish farming, mushroom cultivation, paddy cultivation, beekeeping, flower cultivation, vegetable cultivation, etc. A few queries were also raised on nutrient management, fishery management, marketing, etc.

### Month-wise Analysis of Queries

The month-wise dynamics in raising queries is depicted in Figure 1 for the period June 2013 to February 2015. It was found that in the beginning (June 2013) the queries accounted for only 0.42 per cent of

**Figure 1. Month-wise raising of queries, June 2013 to February 2015**

the total queries during the study period. This could be due to unawareness about toll free number for enquiry and initial inhibition of the farmers to make calls to the agro-advisory. But, as information about the service spread, the farmers started raising queries through the toll free number and the highest number of the queries were raised due to the fact that the month of May is the active growing period for rice, ginger and turmeric crops in the state.

### Use of Different Channels for Query

The different channels used by the farmers to seek information are depicted in Table 2. Despite provision of a toll free number, most of the farmers were reluctant to raise queries by themselves. To manage this problem, assistance of a Farmer Coordinator was provided to the farmers to raise query to the agro-advisory lab. After making much efforts by the project team through awareness generation, training programmes, and field visits by level-1 and level-2 experts, the farmers started raising queries on their own. Farmers raised queries through different channels of which 77.20 per cent were raised with the help of the Farmer Coordinator, followed by Level-I expert assistance (16.80%) and farmers themselves without any assistance through toll free number (5.18%).

**Table 2. Different channels used by farmers for raising queries**

Channel	No. of queries	Percentage (%)
Farmer coordinator (FC)	2517	77.20
Village level entrepreneur (VLE)	26	0.79
Level-I expert	548	16.80
Own call from farmers	169	5.18
Total	3260	100

### Perception of Farmers about Mobile Based Agro-advisory

As a whole, the project design was flexible enough to accommodate the changing situations of farming system of the farmers. All the respondents were fully aware about the project through different sources: 114 (52.29%) through repeated on-site awareness generation training programmes, 82 (37.61%) through farmer coordinators (FCs) and 22 (10.09%) through

interaction with the project team members during their field visit programmes.

The information provided through the m4agriNEI team was clear and understandable according to most farmers; and was timely according to three-fourth farmers. It was rated complete and practicable/adaptable in field conditions by about 40 per cent farmers (Table 3).

**Table 3. Perception about the quality of information and advisory support by m4agri.NEI**

Perception	Response (%)
Clear information	92.2
Easily understandable	91.28
Timely information	76.14
Complete	41.73
Practicable / adaptable in the field conditions	37.61

Most of the respondent-farmers (82.1%) were satisfied with the information provided by the m4agriNEI team on pest and disease management on ginger. About 69.66 per cent of participants reported that training provided on ginger cultivation was beneficial to them. Around 19.26 per cent of the farmers were satisfied with the training conducted on improved variety of ginger. The ginger being a high-value crop, contributes a lion's share to the livelihood and income of the farmers and therefore, training and information provided by the agro-advisory team to the farmers on ginger was appreciated by the majority of farmers. About 66.05 per cent of the farmers reported that advisory provided on piggery was beneficial. On the advisory given on rice crop, only 7.33 per cent of the rice growers reported it as beneficial since rice is being grown since long in the area and most of farmers are highly adamant to cultivate rice using the traditional method and also, rice is grown only for home consumption and not for marketing (Table 4).

In piggery, the information provided through m4agriNEI service was utilized fully by 17.88 per cent of the respondents and partially by 26.60 per cent respondents. The information related to ginger crop was utilized fully by 2.75 per cent of the respondents and partially by 33.94 per cent respondents. In the case of rice, only 2.75 per cent of the respondents partially utilized the information (Table 5).

**Table 4. Knowledge gained through mobile based agro-advisory**

Sectors	Response (%)
<b>Ginger</b>	
Pest and disease management	82.11
Training	69.66
Improved variety	19.26
<b>Piggery</b>	66.05
<b>Rice</b>	7.33

**Table 5. Extent of information utilization by the farmers provided through mobile based agro-advisory (Per cent)**

Sector	Extent of utilization	
	Full	Partial
Ginger	2.75	33.94
Piggery	17.88	26.6
Rice	-	2.75

About 19.72 per cent of the respondents expressed that they were benefitted due to m4agriNEI service with regard to ginger cultivation technology and sources of availability of healthy rhizomes.

## Conclusions

The study has revealed that the information gathered through agro-advisory service has been very useful and helpful to the farmers. The farmers have started taking interest in accessing information on the management of crops and animal husbandry. The seed for crops and pig management have been the major aspects on which farmers have been found interested

to get information. Since the initial stage of the programme, sufficient numbers of farmer have been found to be benefitted through the agro-advisory service. Hence, to provide the agro-advisory in a sustainable manner, convergence of such types of programmes with state department technical help from Central Agricultural University along with KVKs personnel is recommended as it will help uplift livelihoods of the rural tribals in a rapid way.

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