

A Study on Mobile Based Agro-advisory in Meghalaya

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ABSTRACT

The ICT is a partial tool to enhance the productivity and profitability of the farmer. Various initiatives in IT (Information Technology) were launched in the state to boost up the yield of crops in order to enhance the livelihood and income of the farmers. Among the initiatives one agro-advisory laboratory has been established under the programme of “Development and Deployment of Mobile based Agro- advisory system in North-East India (hereafter m4agriNEI)” in College of Post Graduate Studies, Central Agricultural University, Barapani. The present study was conducted in 11 villages of Ri-Bhoi district of Meghalaya. Over 218 farmers were randomly selected from the eleven villages. Data were collected by using pre-tested structured interview schedule through personal interview method. The tabular analysis was done to study the perception and accrual of benefits of the programme for the farmers located in remote villages. The farmers expressed that the information gathered through agro-advisory were very useful and helpful for them. The programme has gained lot popularity among the farmers of Meghalaya and the sufficient numbers of beneficiaries were found to be benefitted by using the agro-advisory in the crop as well as in livestock sector. Among the crops, the ginger crop being a cash crop of the state need more care right from its planting to harvesting. The agro-advisory on complete package and practices especially in selection of rhizome, its treatment, maintaining spacing during the planting and also the tips of proper care during harvesting provided by experts of agro-advisory really became the boon in production of ginger in the state. Providing the artificial insemination and vaccination in pig and piglets encouraged the farmers to come forward to access more and more information from Agro-advisory services. Keeping the success in view the funding agency has extended the finance support two times. Hence, to provide the agro-advisory in sustainable manner, the Government of Meghalaya taken over the Laboratory which has added one more component viz, mobile marketing vans for agri-produce from farmers to market in the state

Keywords: Agro-advisory, Lesson, Meghalaya, Mobile, Tribal

INTRODUCTION

Meghalaya state is the homeland of tribes namely *Khasi*, *Jaintia* and *Garo*. The schedule tribes comprise more than 86 per cent of the total population in the state. The tribal people of Meghalaya are the world’s largest surviving matrilineal culture. They follow the traditional matrilineal norm. The state is basically rural based with agriculture as the predominant role in the state’s economy around 80 per cent of its population depending entirely

on agriculture for their livelihood (GOM, 2015). The cropping intensity of the state is estimated as 119 per cent. It is low compared to national level. The state’s agricultural system is predominantly traditional. The state being agrarian, economy also depends on animal husbandry. The various big animals such as cattle (767 thousand), Buffaloes (18 thousands), pigs (420 thousand) small animals (2821 thousand). Fish production annually accounted as 3.9 thousand ton in the state (Anonymous, 2008). According to basic statistics of NER, 2006, the

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overall geographical land-to-man ratio for the NE region (0.67 ha/Person) is much higher than the national average (0.32 ha/Person). The soil and climatic condition of the state is suitable for growing different types of agricultural crops from cereals to fruits in both tropical and temperate climatic environment occurring on different altitudes. Though, 81 per cent of the population depends on agriculture, the net cropped area is only about 9.87 per cent of the total geographical area of the state (GOM, 2015).

Food grains are the most important crops in the state and cover an area of over 60 per cent of the total crop area. The state is still deficit in food grains by 1.22 lakh tonnes annually to feed a population of 2.3 million. This is due to a lot of constraints, such as the undulating topography, transport and communication problem, population dispersal pattern, inadequate credit support, poor marketing system, etc. State's climate is very much favourable to produce all types of crops such as cereals (rice and maize), fruits (mandarin and pineapple), spices (ginger and turmeric), medicinal crops, flowers and cash crops (cashew nut and tea leaves) etc. Mostly, the farmers in rural areas have to deal with frequent crop failure and animal illness due to limited accessibility of agro-advisory particularly farmers of remotely located villages in difficult terrain. They have to walk for long distance to get solutions of their problems and it incurs time and money a lot. As everything else wait, but agriculture never (Nehru, 1947) becoming more relevant for such type of area where getting information/advisory and same time providing the advisory to the farmers located in remote village is really a challengeable task.

About the Agro-advisory System

Agriculture in the state could benefit tremendously with the application of ICTs (Information and Communication Technologies) especially in bringing changes to socio-economic conditions of the poor in the backward areas. Therefore, different initiatives in IT sector were launched in the state to provide the agro-advisory to farmers. Among the initiatives an agro-advisory system launched under the project of "Development and Deployment of Mobile based Agro-advisory system in North-East India (hereafter

m4agriNEI)" by the Central Agricultural University (hereafter CAU) at Barapani in the state. The system is started with collaboration of Media Lab Asia, New Delhi funded by IT department, government of India, New Delhi. The m4agriNEI is an integrated system with a combination of Web, Interactive Voice Response System (IVRS) and mobile technologies for dissemination of farm and farmer specific advices/information at user desired mode and time it has Toll Free Number (1800-345-3700). It is a mobile based pull and push system where agriculture related information can be pulled/pushed by the farmers using their mobile phones. There is a mobile interface at front end for the farmers and web interface at the back end for the agri-experts. The system allows transmitting the data through voice, texts, images and videos from both end (farmers to expert and vice versa). Also, the farmer can call the system to get any information as well as to get agro advisory. Farmer receive information (SMS/Voice Call/ Data on Smart Phone) for only those services for which he has subscribed and has an option at a later date to either select some more services or unsubscribe to some of the existing services. The system is connected to a centralized database, which has all information of farm, farmer and previous transactions. The experts at back end (data centre and virtual expert) can access to the database of the farmers while responding the farmer's queries and only registered user can access 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, designated Farmer Co-ordinators and rural youth facilitate the registered farmers in getting farm information and knowledge and also they provide feedback to the m4agriNEI system. The system is connected to a centralized database, which have informations on farmer, farm history, and previous interactions (Figure 1).

Components of Agro Advisory

Agro-advisory (m4agriNEI) is an integrated system with a combination of Web, IVRS and Mobile applications for dissemination of farm and farmer specific advices/information at user desired mode and time (Figure 2). Each component is described as under:

Figure 1: System architecture of Agro-advisory & Activity frame work

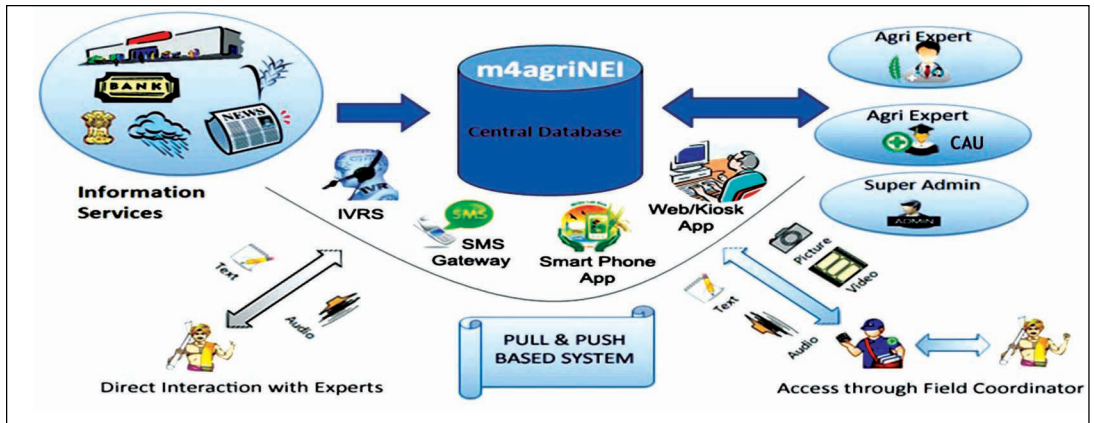


Figure 2: Component of Agro Advisory



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 & IVRS applications.
- Currently available in English, Khasi and Garo.
- Reports and analytics.

Interactive Voice Response System (IVRS) based application

- Call incoming facility on expert’s computer.
- Call forwarding and recording facility in case if the experts are not available.
- Intelligent enough to route the call to the relevant experts.
- 24x7 query registration facility for farmers.

METHODOLOGY

The agro-advisory service is being provided to 2813 numbers of farmers of 47 villages of Ri-bhoi district. The registered farmers on a specific form are being served by the mobile based agro-advisory service system. The

system displaying the all history of the farmers which include the information of name, village name, photo of the farmer 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. A sample of 218 farmers has been drawn randomly from the eleven selected villages. Data were collected by using pre-tested well structured interview schedule through personal interview method. The simple tabular analysis was done to study the impact of the programme in the state.

RESULTS AND DISCUSSION

Analysis of Queries

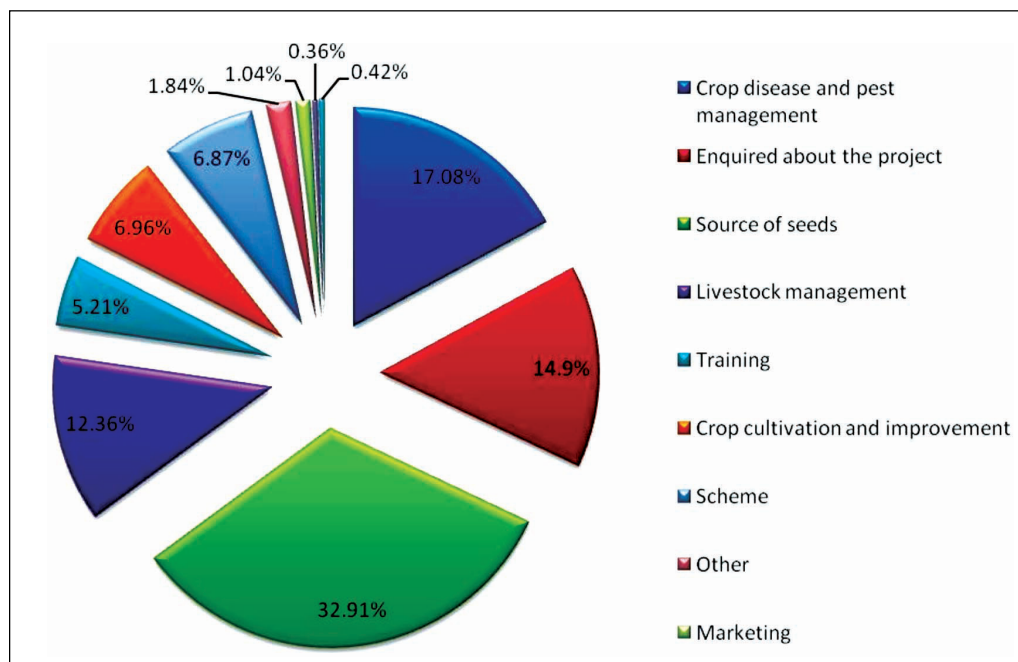
The query analysis is presented in Table 1 and Figure 3. The farmers raised query about the seed and its source which was accounted of 32.91 per cent of the total queries. Improved seeds of ginger, tomato, paddy, French bean, maize, chilli, flower and other vegetables were the seeds wanted by farmers. Piggery piglets, poultry chicks (Kuroiler, layers) and fish fingerlings were queries among livestock which enquired by the farmers. The second highest number of queries raised by the farmers was on crop disease and pest management and accounted to be 17.08 per cent of the total queries. Farmers enquired on modern scientific preventive measures of various diseases

Table 1: Query analysis

Type of Query	Total	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
Scheme	224	6.87
Training	170	5.21
Other	60	1.84
Marketing	34	1.04
Fishery management	12	0.36
Nutrient management	14	0.42
Total	3260	100

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 (*leaf miners and aphids*). The 14.90 per cent of query rose to know about the agro-advisory system and toll free number. Similarly, 12.36 per cent of the queries were raised about livestock management, in which maximum on piggery which related to skin infection, de-worming of pig, artificial insemination, vitamins, *coughing, diarrhoea, swine fever, castration*

Figure 3: Analysis of Queries



which was followed by preventive measures of *rani khet coughing*, *diarrhoea* disease of poultry. Further, the query on crop cultivation and improvement of crops was observed to be 6.96 per cent of total queries in which information enquired on scientific management and improvement of cultivation of different crops like ginger, onion, paddy, tomato, cauliflower, orange, mustard and other crops. An about 6.87 per cent of the queries were raised about the welfare schemes launched by state government. Some of the farmers were found to be very much interested on trainings of which 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 raised on nutrient management, fishery management, marketing etc.

Monthly Analysis of queries

It can be observed from the Figure 4 that the queries raised by the farmers in the beginning (June' 13) accounted to be only 0.42 per cent of the total queries. This may be due to unawareness of farmers about toll free number and due to lack of initial inhibition of the farmers to make calls to the agro-advisory. But as the service moved forward, the farmers have started to raise queries through the toll free number of which the highest percentage of the queries was observed in the month of May 2014 and

it was estimated to be 8.34 per cent and it may be due to the fact that the May month is an active growing period for rice, ginger and turmeric crop in the state.

Queries from different channel

The different channel used to raise the by the farmers is presented in Table 2 and Figure 5. Most of the farmers are reluctant to raise queries by themselves through the toll free number so overcome to this problem assistance of Farmer Coordinator were asked to assist the farmers to raise query to the agro-advisory lab. But after much effort made by the project team through awareness, training programmes conducted, field visits by level-1 and level-2 experts the farmers started to raise queries on their own. Farmers raised their queries through different channel of which 77.20 per cent of the queries were raised with the help of the Farmer Coordinator and followed by Level-I expert assistance which was accounted to be 16.80 per cent. An around 5.18 per cent of the queries were raised by farmer themselves without any assistance through toll free number.

Perception about the mobile based agro-advisory

As a whole, the project design was flexible enough to accommodate changing situations of farming system of the farmers. All of the respondents were fully aware

Figure 4: Monthly Analysis of Queries

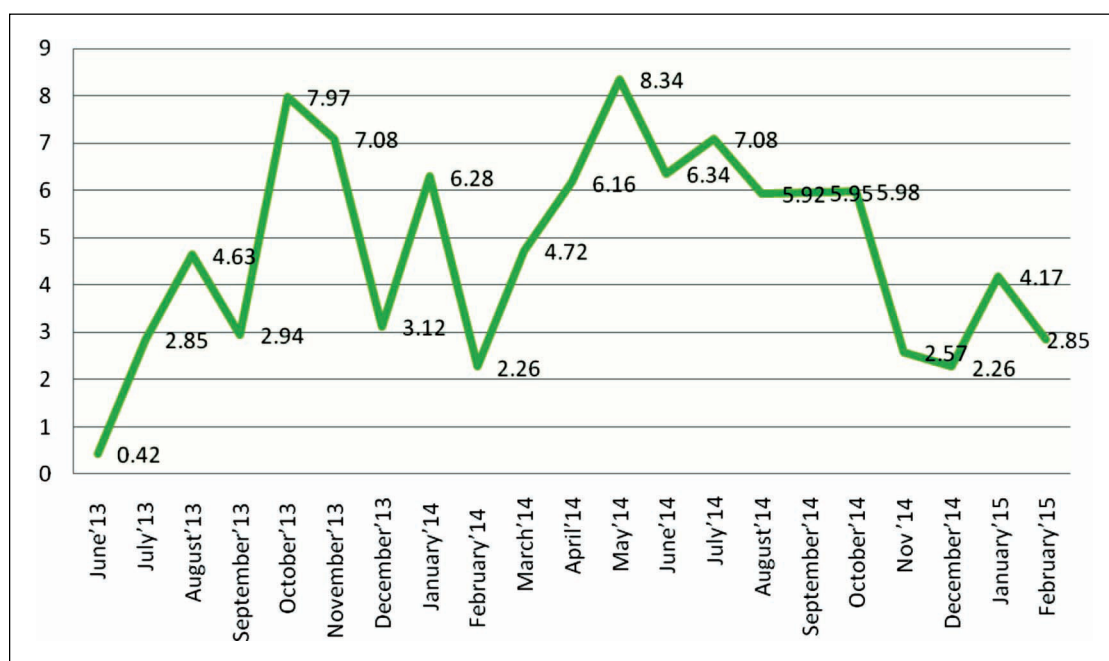
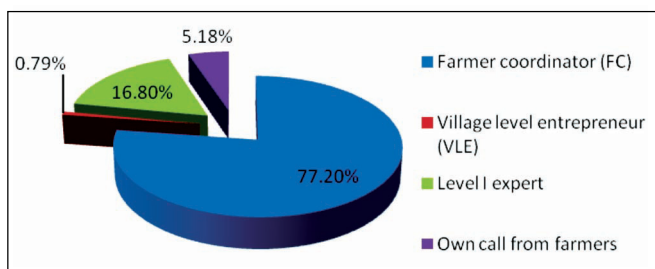


Table 2: Queries raised by the farmers through different Channel

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

**Figure 5: Queries from different channel**

of the project through different sources: 52.29 per cent through repeated on-site awareness/training programmes, 37.61 per cent through farmer coordinators and 10.09 per cent through interaction with the project team members during their field visit programmes (Table 3).

Table 3: Awareness about the mobile based agro-advisory (n=218)

Source	Response
Awareness/Training programmes	114 (52.29)*
Farmer Coordinator	82 (37.61)
Through project team home/field visit	22 (10.09)

*Figures in parenthesis indicate percentage to total

The information provided through the m4agriNEI team was clear to 92.20 per cent, easily understandable to 91.28 per cent, timely to 76.14 per cent, complete to 41.73 per cent and practicable/adaptable in field conditions to 37.61 per cent (Table 4).

Majority of the respondents were satisfied with the information provided by the m4agriNEI team on pest and disease management on ginger and 82.11 per cent of respondents responded in this favour. About 69.66 per cent of participants reported that training provided on ginger cultivation was beneficial for them. Around 19.26

Table 4: Perception about the quality of information and advisory support

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

of farmers were satisfied with the training conducted on improved variety of ginger. Hence, training and information provided by the agro-advisory to the farmers on ginger was appreciated by majority of the farmers since, the ginger being a high value crop is contributing lion share in the livelihood and income of the farmer. Other hand 66.05 per cent of farmers reported that advisory provided on piggery was beneficial. The advisory given on rice crop only 7.33 per cent of rice growers reported it as beneficial since rice is grown long back and mostly of farmers are very adamant to cultivate rice in traditional method and another reason the rice is grown only for home consumption not for commercial purpose (Table 5).

Table 5: Knowledge gained through mobile based agro-advisory

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

The information provided through m4agriNEI service was fully utilized by 17.88 per cent of the respondents in terms of piggery while 26.60 per cent have partially utilized that information. In terms of information related to ginger crop, 2.75 per cent of the respondents have fully utilized the information while 33.94 per cent have partially utilized that information. In case of rice, 2.75 per cent of the respondents have partially utilized the information (Table 6).

Table 6: Extent of information utilization by the farmers provided through mobile based agro-advisory

Sectors	Extent of utilization (%)	
	Full	Partial
Ginger	2.75	33.94
Piggery	17.88	26.60
Rice	00	2.75

Table 7: Perceived accrual of benefits by the farmers from agro-advisory services

Sectors	Response (%)
Animal husbandry	19.72
Progress in crops	18.80

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 (Table 7).

CONCLUSION

The farmers expressed that the information gathered through agro-advisory were very useful and helpful for them for collaborative learning with peers and experts. The farmers found to be taking interest to access the information in management of crops and animal husbandry. The seed for crops and pig management were the major aspects on which farmers were interested to get information. At initial stage of the programme, the sufficient numbers of beneficiaries were found to be benefitted by using the agro-advisory. Moreover, its success has provided and extended financial support twice and it has attracted the state Government of Meghalaya for taken over under the administration and

finance control of local government. It led the sustainability forever the intervention. Hence, to provide the agro-advisory in sustainable manner, the convergence of such type of programmes with state department in other states of the region considering the technical help from Central Agricultural University along with KVKs personnel is highly recommended so that it will help to uplift the livelihood of rural tribal in rapid way.

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