

## Impact Assessment of e-Velanmai model of Extension in Tamil Nadu

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**ABSTRACT:** An impact study of e-Velanmai model of extension, implemented by Tamil Nadu Agricultural University, was undertaken in three districts viz., Coimbatore, Tirupur and Villupuram of Tamil Nadu with 90 beneficiary respondents and 90 non-beneficiary respondents. It was found that hardly any of the non-beneficiary respondents were aware about the functioning of e-Velanmai project in their locations. The beneficiary respondents were significantly higher in their extent of adoption of recommended technologies than that of the non-beneficiary respondents. With respect to economic impact, the annual net gain received by the beneficiary respondents due to e-Velanmai project was Rs. 28,481/- per acre. Service Quality analysis revealed that the beneficiary respondents were satisfied with the functioning of e-Velanmai model of extension, since it had fulfilled their expectations.

### INTRODUCTION

e-Velanmai (Electronic Agriculture) project, funded by World Bank, was operated by the Tamil Nadu Agricultural University (TNAU) from July 2007 to March 2013 under TN-IAMWARM (Tamil Nadu Irrigated Agriculture Modernization and Water-Bodies Restoration and Management) project. According to Karthikeyan (2011), the Principal Investigator of the project, e-Velanmai project, a new model of extension, was a combination of personal and ICT (Information and Communication Technology) based, demand driven and participatory technology transfer model meant for providing timely agro advisory services by TNAU Scientists to farmers using ICT tools (Digital Camera, Computer, Internet, Mobile Phone) with the help of a Field Coordinator.

As e-Velanmai was a paid model of extension service and a new venture, it was expected that it would evoke different kinds of responses from among the beneficiaries. Totally, 10,507 farmers, of which 1,076 were farm women, were enrolled as members in the project by paying a nominal fee of Rs. 50/- per

farmer with upto five acres of land, Rs. 100/- for those with 5.1 to 10 acres, and Rs. 150/- for those with land holding of above 10 acres. During the project period, based on demand advices were given to the members to solve their farm problems and to take informed decisions. In the light of the above it was decided to assess the impact of e-Velanmai project among the beneficiaries.

The objectives of the study were as follows:

- To assess the impact of e-Velanmai model of extension among the beneficiaries.
- To elicit suggestions from the beneficiaries for further improving the e-Velanmai model of extension.

### MATERIALS AND METHODS

The e-Velanmai project was implemented in three districts of Tamil Nadu viz., Coimbatore (Aliyar sub-basin), Tirupur (Palar sub-basin) and Villupuram (Varahanadhi sub-basin), and therefore the study was carried out in all these three districts. The respondents of the study were registered members (beneficiaries)

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of e-Velanmai project and those farmers who did not register in the e-Velanmai project (non-beneficiaries). Based on probability proportionate sampling method, 30 beneficiary respondents were selected from two Water User Associations (WUAs) in Aliyar sub-basin; 30 respondents from three WUAs in Palar sub-basin; and 30 respondents from three WUAs in Varahanadhi sun-basin, and thus the total sample size of the beneficiaries was 90. Non-beneficiary respondents were selected from the same WUAs of the three sub-basins viz., Palar, Aliyar and Varahanadhi, as it was considered in line with sound sampling procedure. The criterion that was followed to select a non-beneficiary respondent from each village of a WUA was 'closest physical proximity' to the selected e-Velanmai beneficiary respondent's farm. This was uniformly followed for selecting all the 90 non-beneficiary respondents that were included in the study.

The impact of e-Velanmai project was assessed in terms of Extent of Adoption, Economic Impact, and Service Quality parameters.

'Extent of Adoption' was operationalized as the level of adoption of recommended agricultural technologies by the beneficiary (under e-Velanmai) and non-beneficiary respondents. The extent of adoption was measured by means of an Adoption Index followed by Theodore (1988), which is given as follows:

$$\text{Extent of Adoption} = \frac{\text{Actual}}{\text{Recommended}} \times 100$$

For this purpose, with respect to beneficiaries, the problems encountered by the respondents that were recorded in the membership card were taken into account. The extent of adoption was worked out for each of the technologies recommended by the TNAU Scientists for the problems reported by the respondents. The Technology-wise Adoption values were summed up and then finally divided by the number of technologies recommended. The resulting value was multiplied by 100 to indicate the Technology-wise Adoption value in terms of percentage. Lower percentage indicated 'less adoption' and higher percentage meant 'high adoption'. Based on the percentages, the respondents were classified into low, medium and high categories using frequency distribution method. In the case of non-beneficiaries, the major package of practices followed for the crops grown by them were considered for assessing their adoption. The rest of the procedure as followed in the case of beneficiaries was followed for non-beneficiaries also.

'Economic Impact' referred to the economic gain or loss faced by the beneficiaries of e-Velanmai model of extension as a result of adoption of technologies recommended by TNAU Scientists, as well as making certain modifications in selected farm operations. Economic impact was assessed in terms of partial budgeting. Partial budgeting is a statement of anticipated changes in costs, returns and profitability for minor modifications (Reddy *et al.*, 2010). When a farmer contemplates few modifications or minor changes in the existing organization of his farm business, partial budgeting technique is employed. It is similar to that of marginal analysis, wherein changes in costs and returns resulting from proposed modifications are alone considered. It consists of four important elements viz., added costs, added returns, reduced returns and reduced costs. Partial budgeting technique is generally used to evaluate the profitability of input substitution, enterprise substitution and scale of operation.

1. **Added Costs:** Additional costs are incurred, if the proposed modification is the introduction of a new enterprise or increase in the size of the existing enterprise.
2. **Added Returns:** Additional returns could be received when the proposed modification is the addition of a new enterprise, or increase in the size of the existing enterprise or adoption of technology that results in higher productivity.
3. **Reduced Returns:** Decrease in the returns is observed when the proposed modification involves the elimination of an existing enterprise or reduction in the size of the existing enterprise.
4. **Reduced Costs:** Decrease in the costs is found when the proposed modification involves the elimination of existing enterprise or reduction in the size of the enterprise or adoption of a technology that uses fewer amounts of resources.

The results of the partial budgeting may either be net loss or net gain. The formula used is as follows:

Partial Budget = (Added Returns + Reduced Costs) - (Reduced Returns + Added Costs).

'Service Quality' referred to the perceived excellence of the facilities / assistance / benefits that were provided to the beneficiaries of e-Velanmai model of extension. Service Quality was measured by means of the RATER model of gap analysis developed by Zeithaml *et al.*, (1990). The gap analysis

aimed to study the difference between: Standards and the delivery of those standards, or Beneficiary perception and expectation.

The **RATER** model is explained as:

- **Reliability** refers to the ability to perform the service accurately and dependably.
- **Assurance** relates to knowledge and accuracy of employees and their ability to convey trust and confidence to the customers.
- **Tangibles** refer to the appearance of physical facilities, equipment, personnel and communication materials.
- **Empathy** refers to dealing with customers in a caring and individualized manner.
- **Responsiveness** is the willingness to help customers and provide prompt service.

Based on the above five attributes a schedule was developed with 15 statements, at the rate of three statements per indicator. Each statement was assessed in terms of its 'service satisfaction' and 'service expectation' by assigning scores of 1 to 5 for each.

The interpretation of the scores is given as under.

Scores	Service Satisfaction	Service Expectation
1.	Highly dissatisfied	Highly unexpected
2.	Dissatisfaction	Somewhat unexpected
3.	Neutral	Neutral
4.	Satisfied	Somewhat expected
5.	Highly satisfied	As expected

The mean score obtained by the respondents on each of the attribute was calculated. The gap was identified between satisfaction and expectation levels. Paired 't' test was carried out to test the significance of difference between the satisfaction and expectation mean values.

## RESULTS AND DISCUSSION

The results and discussion are presented as follows:

### Awareness on e-Velanmai among Non-beneficiaries

The awareness of non-beneficiaries on e-Velanmai project is presented in Table 1.

**Table 1**  
**Awareness of Non-beneficiaries about e-Velanmai**

S.No.	Awareness Categories	Non-beneficiaries (n=90)	
		Number	Per cent
1.	Aware of e-Velanmai project	4	4.40
2.	Not Aware of e-Velanmai project	86	95.60
	Total	90	100.00

Table 1 shows that most (95.60%) of the non-beneficiary respondents were not aware of the functioning of e-Velanmai project, and the rest (4.40%) were aware of the e-Velanmai project in their area.

Most of the non-beneficiary respondents were not aware of the functioning of the e-Velanmai project in their area. It was because not enough publicity was given about e-Velanmai model of extension in the project area. Moreover, it also indicates that the technical seminars organized periodically in selected places did not generate enough publicity in the respective areas about the e-Velanmai project.

As awareness is a prerequisite for any kind of subsequent action, the State Department of Agriculture which at present has taken up the responsibility to implement the e-Velanmai project in 100 blocks, need to take this into account, and take efforts to create as much publicity as possible about the project. This would enable more number of farmers to register in the project and to access the project benefits.

### Extent of Adoption

The results with respect to extent of adoption of recommended technologies by beneficiary and non-beneficiary respondents are presented in Table 2.

**Table 2**  
**Distribution of Respondents According to Extent of Adoption**

Extent of Adoption Categories	Beneficiaries (n = 90)		Non-Beneficiaries (n = 90)	
	Number	Per cent	Number	Per cent
Low (1-33 %)	0	—	11	12.22
Medium (34-66 %)	0	—	0	-
High (67-100 %)	90	100.00	79	87.78
Total	90	100.00	90	100.00
Mean		100.00		92.41
Difference between means			7.59	
't' value			3.335**	
CV %		9.26		34.24

\*\*Significant at 0.01 level of probability

It is seen from Table 2 that all the beneficiary respondents were found with high level of extent of adoption. Among non-beneficiary respondents, it was found that more than three-fourths (87.78%) had high level of extent of adoption and the rest (12.22%) had low level of extent of adoption. This finding is in conformity with that of Shanthinichandra (2012) who had observed in her study on formative evaluation of e-Velanmai model of agricultural extension that almost all the beneficiary respondents of e-Velanmai (97.50%) had adopted the recommendations given by TNAU scientists for the problem-based queries.

The 't' value was significant at 0.01 level, indicating that there existed a highly significant difference between beneficiary and non-beneficiary respondents with respect to extent of adoption. The Coefficient of Variation (CV) was 9.26 per cent for beneficiary respondents, while it was 34.24 per cent for non-beneficiary respondents, indicating that the internal variation among non-beneficiary respondents was higher than that of the beneficiary respondents with respect to extent of adoption.

The influence of e-Velanmai model of extension, the persuasion of Field Coordinators, the conviction created by TNAU Scientists and the commitment of the beneficiaries to the e-Velanmai project, would

have caused cent per cent adoption of technologies by the beneficiary respondents.

### Economic Impact

The economic impact was assessed by means of Partial Budgeting, and the results of the analysis are presented in Tables 3 and 4.

**Table 3**  
Expenditure on Major practices / Activities for Beneficiary and Non-beneficiary Respondents

S.No.	Parameters / Practices	Non-beneficiaries (Rs. / ac)	e-Velanmai beneficiaries (Rs. / ac)
1.	Information Cost	25.00	3.00
2.	Fertilization	7,290.00	6,802.00
3.	Irrigation	1,375.00	1,120.00
4.	Weeding	13,100.00	11,250.00
5.	Pest Management	860.00	645.00
6.	Disease Management	975.00	940.00
7.	Inter-Cultural Activities	4,800.00	4,500.00
8.	Yield	3,30,107.00	3,55,423.00

It is seen from Table 3 that the non-beneficiary respondents had incurred more expenditure than the beneficiary respondents in all the eight parameters / practices.

**Table 4**  
Results of Partial Budgeting Analysis

S.No.	Debit (A)	Value (Rs. / ac)	Credit (B)	Value (Rs. / ac)
1.	Added Costs		Reduced Costs	
	-	Nil.	Information Cost	22.00
			Fertilization	448.00
			Irrigation	255.00
			Weeding	1,850.00
			Pest Management	215.00
			Disease Management	35.00
			Inter-cultural Activities	300.00
			Total	3,165.00
2.	Reduced Returns		Added Returns	
	-	Nil.	Yield	25,316.00
	Total	-	Total	28,481.00
			Net Gain = (B - A)	28,481.00

It is inferred from Table 4 that there was reduced cost (information cost, fertilization, irrigation, weeding, pest management, disease management, inter-cultural activities) to the tune of Rs. 3,165 / -. An added return of Rs. 25,316 / - was obtained from yield and the reduced return was nil. The net gain was found to be Rs. 28,481 / - per acre. It can therefore be concluded that e-Velanmai had led to increase in the farm income for the beneficiaries.

It is seen that the expenditure incurred by the non-beneficiary respondents with respect to the parameters / practices viz., information cost, fertilization, irrigation, weeding, pest management, disease management, and inter-cultural activities, was higher than that of the e-Velanmai beneficiaries. In addition, with respect to yield it is noticed that the yield value of beneficiary respondents was higher than that of the non-beneficiaries. As a result the net-

gain for the beneficiaries was Rs. 28,481/- per acre. Most of the technologies recommended by TNAU to the farmers are scale-neutral and also less expensive. However, farmers who are not aware of the recommendations are likely to incur higher expenditure due to indiscriminate usage. This would have resulted in higher expenditure on the different practices / parameters for non-beneficiary respondents whereas, in the case of beneficiaries, they would have adopted the exact recommendations given by the TNAU scientists, which would have resulted in less expenditure. This may be the primary reason for higher net gain for the beneficiaries. The reason why the yield value was higher for the beneficiary respondents is may be due to their participation in e-Velanmai and the meticulous adoption of the recommendations.

**Service Quality**

The distribution of beneficiary respondents according to service quality is given in Table 5.

**Table 5**  
**Distribution of Beneficiary Respondents According to Service Quality**

S. No	Statements	Satisfaction	Expectation	Gap
<i>Reliability</i>				
1.	The Field Coordinator was dependable in providing extension advices.	3.33	2.45	0.88
2.	Services were provided at the right time.	4.15	3.34	0.81
3.	Advices provided were appropriate to my problem/situation.	3.96	3.17	0.79
<b>Assurance</b>				
4.	Field Coordinator was knowledgeable enough to solve my field problems.	3.48	2.70	0.78
5.	Advices offered were quite precise to the situation.	4.18	3.44	0.74
6.	Field Coordinators were trustworthy in delivery of extension services.	3.93	2.94	0.99
<b>Tangibles</b>				
7.	The Field Coordinator made personal visits to the farm to offer services.	3.75	3.02	0.73
8.	Advices offered by Field Coordinator were clear, understandable and complete.	4.05	3.17	0.88
9.	The solutions offered by the Field Coordinator were cost effective.	4.15	3.25	0.90

contd. table 5

S. No	Statements	Satisfaction	Expectation	Gap
<i>Reliability</i>				
<b>Empathy</b>				
10.	Custom tailored advices were offered.	3.44	2.82	0.62
11.	Field Coordinator was quite concerned to solve my problems.	3.95	3.31	0.64
12.	Convincing approach was adopted by the Field Coordinator.	3.90	2.96	0.94
<b>Responsiveness</b>				
13.	The Field Coordinator was prompt in attending to my calls.	3.21	2.54	0.67
14.	There was hardly any delay while offering solutions.	4.11	3.43	0.68
15.	Field Coordinator was quite willing to extend his services any time.	4.07	3.12	0.95
<b>'t' Value</b>		<b>25.96<sup>NS</sup></b>		

NS: Non-significant

From Table 5 it is observed that the 't' value was non-significant indicating that there exists no significant gap between the satisfaction scores and expectation scores of the beneficiary respondents with respect to Service Quality.

The results imply that the beneficiary respondents were satisfied with the quality of the services offered under e-Velanmai model of extension. This means that the Field Coordinators and TNAU scientists were able to match the requirements of the beneficiary respondents, which was supported by effective use of the ICT tools.

**Suggestions for Improving the Services under e-Velanmai**

The suggestions offered by the beneficiary respondents for improving the e-Velanmai model of extension is given in Table 6.

It is observed from Table 6 that the foremost suggestion offered by the beneficiary respondents for improvement of the e-Velanmai model of extension was "Number of Field Coordinators may be increased" (86.60 %), followed by "Day-to-day market information may be provided" (72.20 %), "Post Harvest Technology / Value Addition information for coconut and other crops may be provided" (50.00 %), "A separate office for e-Velanmai project may be opened in every sub-basin" (47.70 %), "Schemes with Subsidy details may be provided" (21.10 %), "Farm Machinery details for various crops may be provided" (20.00 %) and "TNAU Scientists need to visit farmers fields once a month as part of the e-Velanmai project (7.70%)".

**Table 6**  
**Suggestions for Improving the Services under e-Velanmai**

S.No.	Suggestions	Beneficiaries	
		Number	Per cent*
1.	Number of Field Coordinators may be increased	78	86.60
2.	Day-to-day Market Information may be provided	65	72.20
3.	Post Harvest Technology/ Value Addition information for coconut and other crops may be provided	45	50.00
4.	A separate office for e-Velanmai project may be opened in every sub-basin	43	47.70
5.	Schemes with Subsidy details may be provided	19	21.10
6.	Farm Machinery details for various crops may be provided	18	20.00
7.	TNAU Scientists need to visit farmers fields once a month, as part of the e-Velanmai project	7	7.70

\* Multiple Reponses.

The first and foremost suggestion offered by the beneficiary respondents was “number of Field Coordinators may be increased”. When the e-Velanmai project was operated by TNAU, one Field Coordinator was made in-charge for an entire sub-basin. The Field Coordinator was in the cadre of SRF (Senior Research Fellow) drawing Rs. 16,000 /- per month, with a six-day work schedule. The daily schedule would start by 9.00 AM and end by 5.00 PM. Vehicles for mobility were not provided to the Field Coordinators. Each sub-basin covered a vast area; for instance Palar sub-basin covered an area of 1,53,965 hectares. Therefore, if additionally one more Field Coordinator is posted to look after a sub-basin, the work turnover will be more and any delay in meeting the registered members can be avoided.

## CONCLUSION

The findings of the study not only empirically prove the effectiveness of e-Velanmai beyond doubt, but also indicate the potential of e-Velanmai model of extension to supplement and complement the existing extension activities of the State Department of Agriculture. In general, the main reason for any farmer who participates in any of the extension programmes is whether his participation will lead to increase in farm income levels or not. On this account, since e-Velanmai model of extension has resulted in income gain, it not only indicates the far reaching consequences of this project, but also makes us realize the importance of this ICT model capable of creating a greater impact in Tamil Nadu agriculture in the years to come.

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