



## Development of an Index to Measure the Farmers' Perception towards Input Dealers as Para Extension Workers

**Madhu Latha C<sup>1</sup>, K.S. Kadian<sup>2</sup>, B.S. Meena<sup>3</sup>,  
Manjunath K.V<sup>4</sup> and Deepak Chand Meena<sup>5</sup>**

1,4 &5. Ph.D. Scholar, 2&3. Principal Scientist, Division of Dairy Extension,  
ICAR- National Dairy Research Institute, Karnal, Haryana (India)

Corresponding author e-mail : [madhusharathmadhu@gmail.com](mailto:madhusharathmadhu@gmail.com)

Paper Received on June 01, 2021, Accepted on August 20, 2021 and Published Online on October 01, 2021

### ABSTRACT

*This study measured the perception of farmers towards Input dealers who has undergone the diploma course as para extension workers by developing an index adopting a systematic procedure; four indicators under this index were selected namely Information, Quality of services, DAESI as para extension model and Transfer of technology. The Normalised Rank Order Method was used for determining the scale values. These dimensions were ranked according to judges perceived significance and proportions were calculated accordingly while determining the values for each, by Guilford table. To measure the perception, 65 statements under four indicators were selected, due care was taken to include all relevant items. Out of 65 statements under selected indicators, 40 were retained for item analysis. Based on the rating of 30 judges, mean relevancy and overall mean relevancy scores were calculated. The statements having relevancy weightage (RW) > 0.85 and Mean Relevancy Score (MRS) greater than the Grand Mean Relevancy Score i.e., 2.25 were considered for inclusion in Perception Index and finally 20 indicators were included.*

**Key words:** Perception Index; DAESI; Farmers; Input dealers; Para extension workers.

**T**he public extension system alone is not sufficient to make our agriculture sector keep pace with the world agriculture system. Public research and extension had played a major role in bringing about the Green Revolution. In the post-green revolution era, however, extension faces important challenges in the areas of relevance, accountability and sustainability. According to *Planning Commission (2008)* in India extension has a mixed record. The literature recognized its role in promoting productivity, sustainable resource use and agricultural development. But public provision has fallen short of expectations, links between research extension

and farmers are seen to be inadequate and uncoordinated effort a bowed. Agricultural extension has grown over last six decades in India. It is supported and funded by the central government through its ministry of agriculture (MoA) and other allied ministries. By giving its heavy reliance on the work of its pluralistic extension system Indian agriculture sector had a long-term record of transforming the country out of serious food shortages despite rapid population increase. (*Suman, 2014*). The institutional change in input and service delivery is vital for the development of smallholder agriculture. The Private extension service can be successful even in

resource poor areas provided appropriate technologies along with integrated extension service including marketing facilities are available (*Mukherjee, 2015*).

Several shifts of technology studies have indicated that input dealers are more likely to contact farmers than from other sources. It has an extensive network of about 2.82 lakh agricultural input dealers in rural areas across the country and is the second most important source of agricultural information for the farming community after progressive farmers. Therefore agricultural development has a leading position in the field among input dealers (*Chandra Shekara 2007*). Input dealers serves as an important link between the manufactures and the farmers. So, he/she has the responsibility to disseminate latest farm technology upto the field level especially in the era of the free economy and the world trade organization (*Khose, 2004*). Technical qualifications in agriculture are mandatory to overcome potential adverse effects, to sell farm inputs as well as to issue dealership licenses to provide farm-advisory services. But, most of these input dealers do not have formal agricultural education. If these input dealers are made para-extension professionals by providing the necessary knowledge, they can commercialize extension services and contribute to the paradigm shift in Indian agriculture and thereby help the farming community. Farmers tried and adopted the information that they received from progressive farmers and input dealers more than from other sources (*Babu et al., 2012*).

The Directorate of Extension is working hard to transform the technical capabilities of input dealers into para extension workers and to provide efficient and effective extension services to farmers. Input dealers are basically entrepreneurs and know about different market forces. If they transform into para extension professionals by imparting systematic knowledge in remote education, they can expand into market leadership and bring about change in Indian agriculture. With this in mind, the National Institute of Agricultural Extension Management (MANAGE) developed the Diploma in Agricultural Extension Services for input dealers (DAESI), a one-year diploma course offering formal education to input dealers. To combine with business Services other than regulatory responsibilities. Farm-input dealers in the country provide important sources of agricultural information, inputs and credits to the farming community. For Improving their technical

efficiency in agriculture and for providing better services to farmers and to act as para-extension professionals. "One Year Diploma in Agricultural Extension Services for Input Dealers (DAESI) Program started in the year 2003" with a course fee of Rs.20, 000/- to the input dealers by National Institute of Agricultural Extension Management (*MANAGE, 2012*). MANAGE-One year diploma in Agricultural Extension Services for Input Dealers (DAESI) is one of the government initiatives for production driven to market driven extension approach (*Kumar, et al, 2012*). The mission of DAESI programme is to transform practicing input dealers into para-extension professionals thereby strengthening the agricultural extension system so as to enable these input dealers to serve the farmers better. Keeping all this in mind, an Index was developed to measure the extent to which the diploma course had attained its mission in transforming the practicing input dealers into para-extension professionals and how the farmers are perceiving these trained dealers as para-extension workers.

## METHODOLOGY

This section usually deals with procedural steps required to accomplish the objectives laid down for the investigation. An attempt was made to explain the various methods and procedures followed to devise the Perception Index under the following sub-heads:

*Formulation of construct* : It is imperative to operationalize the different concept for ease of measurement. In other words construct to be formulated in light of the scientific study. A construct is a concept. It has the added meaning, however, of having been deliberately and consciously invented or adopted for a special scientific purpose (*Kerlinger, 2012*). Different constructs devised/adopted for present purpose are as under:

*Perception* : Perception in this study is defined as the ways by which farmers conceive agrochemicals to be of good quality and good amount of information provided by input dealers. Perception of farmers towards input dealers was operationalized as the farmers awareness, and understanding the role of input dealers agro-advisory services while discharging business activities as the main aim of agriculture input dealers was to provide expert services, advice to farmers and supply of inputs to agriculture according to local needs i.e., quality seeds, fertilizers, pesticides, engineering material and required services. Training of input dealers will minimize the

problems faced by them and ensure the quality of service, advices rendered and contribute to evolving the input dealers into para-professionals (Singh, et al, 2016).

*Perception Index* : Perception Index is an aggregation of sets of variables for the purpose of meaningfully condensing large amounts of information related to input dealers as para-extension professional. It was developed to evaluate the role of input dealers as para-extension workers.

*Development of Perception Index* : Kerlinger (1983) defined an Index as “number that is composite of two or more other numbers”. A composite index can be defined as an aggregation of sets of variables for the purpose of meaningfully condensing large amounts of information.

*Perception index is developed as under:*

*Selection of indicators:* A meticulous review of literature and discussion with the experts in relevant field played an important role in the identification of indicators. Indicators like Information, Quality of services, and DAESI as para extension model and Transfer of technology were selected to measure the farmers’ perception towards input dealers as para extension workers. The identified indicators were operationalized as follows:

*Information* : Farmers are increasingly looking for frequent interactions with various information sources not only to carry out their farming and marketing tasks efficiently but also to ensure delivery of safe and quality agricultural products to consumers. ‘Input dealers’, has emerged as the second biggest source of information dissemination. Input dealers gather information from different sources, by providing information, input dealers try to earn goodwill of the farmers and to some extents are able to promote their business relationships with them.

*Quality of services* : Quality is a characteristic property that defines the apparent individual nature of any particular service provided by input dealers. The quality of any service provided by input dealers is determined by its efficiency to control, repel, or destroy pests of any sort: weed, insects and fungi. Consumers’ perception of quality is influenced by the products intrinsic attributes as well as by extrinsic indicators and cues provided by the input dealers.

*Transfer of technology* : Most of the agriculture input dealers are related to transfer of agriculture technology.

Inputs dealers may this way perform the function of the “change agent”. Agriculture input dealers are also playing an important role in increasing agricultural production in the country. Agriculture input dealers played a vital role in transfer of farm production technology.

*DAESI as para extension model* : Para professional is a job title given to persons in various occupational fields, such as education, healthcare, engineering, and law, who are trained to assist professionals but do not themselves have professional licensure. The Greek prefix “para” indicates beside or side by side hence, a paraprofessional is one who works alongside a professional. Hence para extension professional is one who assists extension workers and the one who is always available near to the people and performs the job of extension workers.

*Determination of scale value* : It has decided to give specific weights (scale values) to each dimension of the Perception Index based on their perceived significance.

The Normalized Rank Order Method suggested by Guilford (1954) was used for determining the scale values. The method has got a unique advantage that it can be used with any number of variables and does not require a large number of judges.

*Judges’ rating* : As per the method, four different indicator of perception Index were ranked by the group of judges according to their perceived significance in determining DAESI dealers as a para extension worker and DAESI as a para extension model. Ranking was obtained from judges who involved experts in the field of Social Science, Dairy Extension Division, NDRI, KVK experts, Facilitators of diploma programme and ANGRAU, Guntur. The Performa containing indicator of perception Index was sent through e-mail and also handed over personally to the total 50 judges for ranking (1 to 4) indicator according to their perception of input dealers as para extension worker. Out of 50 judges 30 judges had returned the same set of indicators after duly recording their judgments in a stipulated span of one month. These 30 responses were considered for the item analysis. The rankings given by all 30 judges were summarized and presented in Table 1.

*Calculation of proportions* : The proportions were worked out for the ranks assigned by all the judges. The formula is as follows -

$$p = \frac{Ri - 0.5}{n} \times 100$$

Where,

Ri stands for the rank value of the dimension i in the reverse order as 4 to 1.

n indicates the number of indicators ranked by the judges. Here we needed the middle area of the indicator ranked.

The p is the centile value which indicated the area of the indicator in the normal distribution.

The p values were worked out for all the ranks shown in table 1. Thus, p values for the ranks ranged from the lowest 12.5 to 87.5.

*Determining the C values* : The next step is to find out the C values for all the ranks. The correct rank order (1 to 4) is given in the Column under ri in Table 1. The second column Ri in Table 1 is the reverse rank order (4 to 1). The C values were determined for each rank from the Table (*Guilford, 1954, p. 577*). These values can be traced by putting the finger on the column extreme left of the Table-M, on the number which indicates the number of Indicator used in the experiment. In the case of this experiment the numbers of Indicator were 4, and also the number of Indicator to be ranked. While moving the finger from this number 4 towards right, stop at the number which indicates the rank number (ri, 4). Above the rank number you can find the respective C value 6 for the rank 4 and this can be entered in the Table 3.3 under the letter C. The C values are ranging from 1 to 9 only. The same procedure may be adapted in finding out the C values for all the ranks (ri) from the table.

*Calculation of  $\Sigma(f_{ji}C)$  value for all the indicator* : The next step is to find out the  $\Sigma(f_{ji}C)$  value for all the dimensions. This value for every dimension was obtained by multiplying the frequencies found in the columns of the respective dimension by the C values of the rank (ri), and summing up the products for each dimension and entering the same in the row against  $\Sigma(f_{ji}C)$ . The mean of the total frequencies, that is for the whole data of the matrix was 6.75 (810/120) and the mean of the C values was 6.75 (27/4).

*Calculation of scale values of dimensions* : The  $\Sigma(f_{ji}C)$  values for each dimension was divided by the total number of judges 30, which resulted in obtaining the  $Mc = R_j$ . The treatment of data can be stopped at this stage and the Mc values can be accepted and treated as the scale values. The total value was 27 which was also the total sum of the C values, and the mean of the Mc or Rj or Rc values was 6.75. The standard deviation

and standard error of the Mc values was 0.41 and 0.075, respectively. The obtained scale values (Rc) were shown in table 1 against row Mc or Rj or Rc.

*Selection of indicators* : Selection of effective indicators is the key to the overall success of any measuring instruments. To measure the farmers' perception towards input dealers as para extension workers, indicators were selected after preliminary survey of the study area, literature scan, consultation of the experts such as scientists, officials of the related departments and personnel from KVKs working in the area. Due care was taken to include all relevant items. The procedure involved could ensure the efficiency of the instrument to measure the by ascertaining content validity. The following steps were followed for selecting relevant indicators of perception index.

*Collection and editing of statements* : By referring the available literature on relevant subject, a total 65 statements were collected covering the almost entire universe of content. The researchers, farmers and extension experts were also consulted for selecting indicators. The statements were edited as per 14 informal criteria suggested by *Edwards (1957)* as outcome 25 statements were eliminated. Finally, 40 statements were retained after editing and considered for judge's rating.

*Response to statements* : The Performa containing 45 statements on three-point continuum i.e. Most Relevant, Relevant and Least Relevant was sent by post, through email and also handed over personally to the total 50 judges. These judges were experts in the Division of Dairy Extension of NDRI, KVK experts, Facilitators of diploma programme and ANGRAU, Guntur. The judges were requested to indicate their response by tick mark in suitable continuum in front of each indicator. Also, the judges were requested to make necessary modifications and additions or deletions, if they desired so. Out of 50 judges 30 judges had returned the same set of indicators after duly recording their judgments in a stipulated span of one month. Those 30 responses were considered for the item analysis.

*Relevancy test* : Item analysis is an important step while constructing valid and reliable index. It is possible that all the indicators collected may not be relevant equally in measuring the perception of farmers towards input dealers as para extension workers. Hence, these indicators were subjected to scrutiny and their subsequent screening for inclusion in the final index.

The judges were asked to indicate degree of relevancy on each indicator with three-point continuums ‘Most Relevant, Relevant and Least Relevant’ with scoring 3, 2, and 1, respectively. The Relevancy Weightage (RW) and Mean Relevancy Score (MRS) were worked out for all the selected indicators individually by using the following formula

$$RW = \frac{f_{xi} \times 3 + f_{xii} \times 2 + f_{xiii} \times 1}{f_x \times 3}$$

$$MRS = \frac{f_{xi} \times 3 + f_{xii} \times 2 + f_{xiii} \times 1}{f_x}$$

By using these two criteria the statements having Relevancy Weightage (RW) >0.85 and Mean Relevancy Score (MRS) >2.25 were considered for inclusion in the perception Index and finally 20 statements were included. The finally selected indicators of Perception Index and statements under these respective indicators with respective relevancy weightage and mean relevancy score were shown in Table 2.

*Computation of the composite index:* Each indicator of perception Index consists of number of statement and hence, their range of total scores was different. Therefore, the total score of each dimension was converted into unit score by using simple range and variance as given below,

$$U_{ij} = \frac{Y_{ij} - \text{Max } Y_j}{\text{Max } Y_j - \text{Min } Y_j}$$

Where,

$U_{ij}$  = Unit score of the  $i^{\text{th}}$  respondents on  $j^{\text{th}}$  dimension

$Y_{ij}$  = Value of the  $i^{\text{th}}$  respondent on the  $j^{\text{th}}$  dimension

$\text{Max } Y_j$  = Maximum score on the  $j^{\text{th}}$  dimension

$\text{Min } Y_j$  = Minimum score on the  $j^{\text{th}}$  dimension

Thus, the score of each indicator range from 0 to 1 i.e. when  $Y_{ij}$  is minimum, the score is 0 and when  $Y_{ij}$  is

maximum the score is 1. Then, the unit scores of each respondent were multiplied by respective scale value of each dimension and summed up. Thus, the score obtained was divided by the sum of scale values in order to get the perception Index for each respondent.

$$P_{li} = \frac{\sum U_{ij} \times S_j}{\sum \text{Scale values}}$$

Where,

$P_{li}$  = Perception Index of  $i^{\text{th}}$  respondent

$U_{ij}$  = Unit score of the  $i^{\text{th}}$  respondent on  $j^{\text{th}}$  component

$S_j$  = Scale value of the  $j^{\text{th}}$  component

$\Sigma$  = Sum

The status of respondent’s perception was calculated based on the total index score of all the indicators. The classification of respondents into the categories of low, medium and high was based on the cumulative square root frequency method.

*Standardization of an index:* The validity was ascertained for standardization of the index. It is the property that ensures the obtained test scores as valid, if and only if it measure what it is supposed to measure. An index is said to be valid if it stands for one’s reasoning. The validity was measured by content validity. Experts’ judgment technique was used to test the content validity of the index. The content validity is the representative or sampling adequacy of the content, the substance, the matter and the topics of a measuring instrument. This method was used in the present index to determine the content validity of the index. The content of the index was thoroughly covered through literature scan and expert opinions. The indicators had at least 80 per cent judges’ agreement were retained. This indicated validity of the index content. As the scale values, relevancy weightages and mean relevancy

**Table 1. Weightage to the indicators of Perception Index**

ri	Ri	Four dimensions of Perception Index				$\Sigma$	p	C
		Information	Quality	Technology	DAESI			
1	4	3	15	5	7	30	87.5	8
2	3	5	8	4	13	30	62.5	7
3	2	12	6	10	2	30	37.5	6
4	1	10	1	11	8	30	12.5	6
$\Sigma f$		30	30	30	30	120	200	27
$\Sigma fC$		191	218	194	207	810		
Mc orRj orRc		6.37	7.27	6.47	6.90	27	Mc= 6.75, $\sigma$ =0.4149, SE for Mc=0.07576	

ri = Correct rank order, Ri = Reverse rank order,  $\Sigma$  = Sum, p= Proportion, C = C values of respective ranks, Mc = Mean value, Rj = Response value, Rc = Scale value,  $\sigma$  = Standard Deviation, Standard Error=  $\sigma / \sqrt{N} = 0.4149 / \sqrt{30} = 0.07576$

scores of all the indicator and indicators had discriminating values, it seemed reasonable to accept the index as valid measure of the desired dimension.

## RESULTS AND DISCUSSION

Final index containing 20 statements in the form of interview schedule was used to collect data on perception of farmers by using Information, Quality of services, DAESI as para extension model and transfer of technology as indicators to measure the extent of farmers' perception towards input dealers as para extension workers.

The frequencies of ranks as given by judges for four indicators by using *normalised rank order method* suggested by *Guilford (1954)*.

Ranking for four different dimensions of perception index were ranked by judges (experts involved in the field of Social Science, Dairy Extension Division, NDRI, KVK experts, Facilitators of diploma programme and ANGRAU, Kurnool.) according to their perceived significance in determining the perception of farmers. From the Table 3, it could be revealed that according to experts the first and foremost important indicator for measuring perception of farmers towards trained input dealers as para extension workers is quality of services which paves the way for other different dimensions like information and transfer of technology where they ranked DAESI as a para extension model as second, Transfer of technology as third and fourth respectively. It could be enunciated that according to experts, quality

**Table 2. The selected statements of respective indicators of index with their relevancy weightage and mean relevancy score**

Indicators	RW	MRS
<i>Information</i>		
Frequent information provided by input dealers are useful in solving farmers' problems.	0.90	2.70
I feel that information by input dealers help farmers to get firsthand info. on pest and soil health management.	0.91	2.73
I agree that information given through agro-advisory services by input dealers is practicable.	0.99	2.97
Business experience will help the input dealers for giving good information to the farmers.	0.92	2.77
Agro-advisory services by input dealers may lead to increase in cultivable area in dry land as they provide advice on technologies like drip irrigation, sprinkler irrigation and watershed management.	0.94	2.83
<i>Quality of services</i>		
Agro-advisory services by input dealers along with inputs are more appropriate in getting more yield.	0.92	2.77
Agro-advisory services delivered by input dealers with the objective of profit rather than serving farming community.	0.89	2.67
The Quality of the implements and inputs offered by input dealers are good.	0.86	2.57
The DAESI input dealers helps the farmers in making rational decisions.	0.91	2.73
Recommendations of Agro-advisory services based on the company/Department of Agricultural guidance.	0.87	2.60
<i>Transfer of technology</i>		
I feel that technologies given through agro-advisory services by input dealers should be cost effective while practicing at the field.	0.89	2.67
Agro-advisory services by input dealers on recent technologies are essential to ensure better adoption of farming practices.	0.87	2.57
Input dealers are attracting the farmers by giving free samples of agro chemicals.	0.86	2.57
The extension services provided by input dealers are not appropriate to influence the farmers to adopt the new technology.	0.90	2.70
More field demonstrations are needed to be conducted by input dealers for popularizing new technology.	0.89	2.67
<i>DAESI as a para extension model</i>		
The Programme is enhancing the confidence of input dealers in dealing with the farmers and officers.	0.90	2.70
The programme molded the input dealers as an effective source of information to the farmers.	0.86	2.57
DAESI model established a strong linkage between the dealers, Agriculture and allied sectors.	0.86	2.57
DAESI as a Para extension model is more accessible to all the farmers compared to formal extension system	0.86	2.57
I hope the DAESI as a Para extension model is strengthening the private extension.	0.91	2.73

**Table 3. The frequencies of ranks as given by judges for four dimensions of perception index by using normalised rank order method suggested by Guilford (1954)**

Perception index	Calculated Mc or Rj	Rank
Information	6.37	IV
Quality of services	7.27	I
Transfer of technology	6.47	III
DAESI as a para extension model	6.90	II

of services is more important as it defines the apparent individual nature of any particular service provided by input dealers and more the quality of services provided by input dealers, more will be the perception of farmers towards input dealers as para extension workers. Input dealers through transfer of technology perform the function of the “change agent”. ‘Input dealers’, has emerged as the second biggest source of information dissemination. Information provided, quality of services and transfer of technology to the farmers influence the perception of farmers towards input dealers as para extension workers. Input dealers gather information from different sources, by providing information, input dealers try to earn goodwill of the farmers and to some extents are able to promote their business relationships

with them. Input dealers are basically businessmen and know about different market forces. If they are transformed as para extension professionals by providing regular knowledge in a distance mode of education, they can form market led extension, and there by bringing a paradigm shift in Indian agriculture.

## CONCLUSION

The reliability and validity of index indicate the precision and consistency of results. Farmer’s perception about input dealers as para extension workers helps policy makers for designing policies for further growth and development. The developed index will reveal the farmers perception towards input dealer’s role as Para extension workers through information & quality of services provided by input dealers and role in transfer of technology and how DAESI as a para extension model is enacted in three districts of Andhra Pradesh. This index can be used to assess the extent the DEASI programme of MANAGE fulfilled its mission in transforming input dealers as Para extension workers beyond the study area with suitable modification and evaluation of validity of index.

## REFERENCES

- Mukherjee; Anirban and Mity, Anirudha (2015). Public-private partnership for convergence of extension services in India Agriculture. Pp-1557(General Article).
- Babu, S.C.; Glendenning, C.J.; Asenso-Okyere, K. and Govindarajan, S.K. (2012). Farmers’ information needs and search behaviours — A case study in Tamil Nadu, India, IFPRI Discussion Paper 01165, International Food Policy Research Institute, Washington, DC, USA.
- Chandra Shekara, P. (2007). Private extension: Indian experiences. National Institute of Agriculture Extension Management. Andhra Pradesh. Pp.1-3.
- Guilford, J. P. (1954). Psychological methods. Tata McGraw Hill Publishing Co. Ltd
- Khose, (2004). Exploratory assessment of the Macao casino dealers job perceptions. Zonal conference, RABI-2004-05. *Fertilizer Marketing News*, **35** (1) : 7-8.
- Kerlinger, F.N. (2012). Foundations of behavioral research (Second Ed.). Fourteenth reprint, 2012. Surjeet Pub., Delhi, India, pp1-741.
- Kumar, R., Singh, B. P. and Kaswan, S. (2012). Production driven to market driven extension approach. *Indian Res. J. Ext. Edu.*, Special Issue, **II** : 125-129 (2012)
- MANAGE, (2012). Progress under diploma in agricultural extension services for input dealers as on 01-04-2011, [www.manage.gov.in/daesi/daesi-distyearwiselist.pdf](http://www.manage.gov.in/daesi/daesi-distyearwiselist.pdf)
- Singh, A. K., De, H. K. and Pal, P. P. (2016). Training needs of agro-input dealers in South 24 Parganas District of West Bengal. *Indian Res. J. Ext. Edu.*, **15** (2) : 7-10.
- Suman, RS. (2014). Attitude of farmers towards sustainability of vegetable cultivation. *J. of Agri Search*, **1** (1): 1-3.

