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Identification of Indicators for Assessing Research-Extension-Farmers Linkage in Fisheries Sectors of Tripura

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ABSTRACT

The study was conducted in Tripura from 2019 to 2022 to identify different indicators for linkage between research-extension-farmers in fisheries sectors. For selecting relevant indicators that are responsible for establishing linkage among the researchers, extension personnel, and farmers, different published documents, reports, and secondary sources were reviewed for the study. The indicators identified for establishing linkage were pooled and a comprehensive list of indicators was prepared. There were 53 indicators that were kept under different categories in the pooled list using the three-point continuum; Most Relevant (MR), Relevant (R), and Not Relevant (NR). After obtaining the judges' opinions, the relevancy score for each indicator was worked out using the relevancy percentage. The 24 indicators having an average relevancy percentage of more than 75 were finally selected for the study. Conducting need-based training (92.78%, I), Regular contact with farmers (92.12%, II), and Assessing the outcome and impact of training attended (91.35%, III) were few of the important indicators identified in the study.

INTRODUCTION

Being an integral part of the Indian economy, agriculture provides access to entrepreneurial opportunities to many people and acts as a stable means of income to many farmers. Most Indian farmers, today struggle with issues including increased debt, decreased financial inclusion (Arunkumar et al., 2023), weak barging power, and a lack of insurance options (Nain et al., 2016; Kumar et al., 2021). Indian farming community is dominated by 86.21 per cent of the country's total land holdings which are owned by small and marginal farmers (Gorai et al., 2022). Agricultural advisory services are also proved to be important tools, which provide critical and scientific farming information in a timely manner, which in turn help in livelihood development and farmers' welfare especially, in rural places (Lahiri et al., 2020). It is quite usual to have knowledge and information about the elements that affect the acceptance of new practises in agriculture. However, there haven't been many attempts to create quantitative models that can anticipate adoption for those organising relevant research, extension, development, and policy intervention in agricultural sectors (Kuehne et al., 2017). Typically, extension planning, implementation, and evaluation activities do not include the marginalised and impoverished farmers (Adugna, 2013). This can be one of the reasons for the information and communication gap between the farmers and extension personnel. The three primary pillars of the agricultural system (research, extension, and farmers) depend heavily on one another for their efficiency (Sewnet et al., 2016). Effective extension programmes can be created by taking into account the information that farmers need, how they find that information, and the sources they rely on (Joshi, 2021). It may

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be possible to combine many sectoral plans and create cogent cross-sectoral policy by understanding the connections between various aims in order to seek synergies (Mainali et al., 2018). Agricultural production and productivity will suffer if the connections between the players in the agricultural knowledge system are inadequate since this would impede information flow from researchers to extension personnel or from extension personnel to farmers (Adesoji & Tunde, 2012). Strong coordination and linkage between research and farmers can't be made without highly trained and competent extension personnel (Adugna, 2013).

The main means of communicating the pertinent information to the farmers and other stakeholders is through indicators. The identification of the most efficient indicators is, therefore, extremely important in the context of the existing linkages among research-extension-farmers and information gap. When linkages are successful, stakeholders can benefit from having appropriate understanding about the socioeconomic environment for effective use of technology and innovation (Urhibo, 2021). Indicators are the instruments used to evaluate the condition, status, or trend of a certain system. Indicators are variables that help to measure changes in a given situation. It gives qualitative and quantitative details to objectives (Chandana et al., 2022). For the present study, indicator has been operationally defined as a function, programme, event, condition that describes or measures changes in the respondents' perceptions of changes over time in the connections between researchers, extension personnel and farmers.

METHODOLOGY

The study was conducted during the year 2019-2022 to identify different indicators for assessing research-extension-farmers linkage in fisheries sector. Tripura state was selected for the study since the state has the highest per capita fish consumption and significantly high demand for fish. The ex post facto was deployed in several districts of Tripura to identify the indicators that are responsible for the extent of linkage among the researchers, extension personnel and fish farmers. For selecting the indicators, a list of indicators that may be responsible for establishing linkage among researchers, extension personnel and farmers was essential. Relevant indicators from different published documents, reports and secondary sources were also reviewed for the study. The following procedure was followed to prepare the list of indicators. To enumerate the possible indicators, the relevant stakeholders were contacted with the help of an open-ended questionnaire/ schedule and were requested to indicate the factors, functions, events, conditions, etc., which contributed for establishing linkage among them. The indicators identified for establishing linkage were pooled and a comprehensive list of indicators responsible for establishing linkage among researchers, extension personnel and farmers was obtained. There were 53 indicators which were kept under different categories in the pooled list using the three-point continuum: Most Relevant (MR), Relevant (R) and Not Relevant (NR). In order to select relevant indicators, judges' opinions were obtained. The selected 53 indicators were first edited with the help of experts. The list of indicators was sent to 62 experts out of which 38 responded. The judges considered for this purpose were researchers from ICAR (Tripura Centre), faculty from CAU, extension experts from Krishi Vigyan Kendras (KVK) and Department of Fisheries.

After obtaining judges opinion, the relevancy score for each indicator was worked out using the relevancy percentage. Relevancy percentage was calculated by summing up the scores of Most Relevant (MR), Relevant (R) and Not Relevant (NR) categories, which was then converted into percentage as was followed by Saravanan (2009).

The indicators having average relevancy percentage of more than 75 per cent were selected and 24 indicators were finally selected for the study.

RESULTS AND DISCUSSIONS

Identifying indicators for assessing research-extension-farmers linkage

Out of 53 indicators which were kept under different categories in the pooled list using the three-point continuum; Most Relevant (MR), Relevant (R) and Not Relevant (NR) were converted into percentage as was followed by Saravanan (2009). Table1 shows the major indicators which were responsible for establishing linkage among researchers, extension personnel and fish farmers; 24 indicators having relevancy percentage of 75 or more were selected and listed in the table. Indicators for assessing research-extension-farmers linkage were grouped under seven different domains namely, organizational related indicators, extension related indicators, IT related indicators, training related indicators, input related indicators, programme related indicators and finance related indicators. Relevancy percentages were calculated and were ranked as per their scores obtained.

Figure 1 indicates the top indicators which were perceived to play significant roles in assessing Research-Extension-Farmers Linkage. It was found that '*Conducting need-based training*' (92.78%, I) was the main indicator for assessing the existing linkage among researchers, extension personnel and farmers. Depending on geographical locations, availability of natural resources and prevalence of certain farming systems, the needs of the farmers may differ. Moreover, farmers basically feel the need to acquire knowledge, skills on proper fish culture techniques and various means to increase their productions through integrated farming, composite farming, etc. Training for farmers should be need based and region specific and relevant training programmes should be organised to boost the fish production and enhance their income thereby improving the livelihood of the farmers. For instance, formulation of Strategic Research and Extension Plan (SREP) of ATMA is significantly essential with the help of research

$$\text{Relevancy percentage} = \frac{\text{Number of most relevant responses} \times 2 + \text{Number of relevant responses} \times 1}{\text{Maximum possible score } (n \times 2)} \times 100$$

Where, n = number of respondents (38)

Table 1. Relevancy percentage of the selected indicators for assessing research-extension-farmers linkage

S.No.	Indicators for assessing research-extension-farmers linkage	Relevancy (%)	Rank
	Organizational related indicators		
1	Regular contact with extension organizations	89.20	VI
2	Regular contact with farmers	92.12	II
3	Having a committee for planning and monitoring	79.32	XVII
4	Regular review of extension activities	76.55	XXI
	Extension related indicators		
5	Interface meeting with researchers, extension personnel and farmers	77.98	XIX
6	Participatory technology development	87.67	VIII
7	Location specific programmes	90.31	IV
8	Conducting regular village meetings	78.18	XVIII
9	Conducting regular demonstration	77.67	XX
10	Publication of extension literature success stories of farmers	76.33	XXII
	IT related indicators		
11	Use of Smartphones	89.65	V
12	Use of Social media platforms	85.86	XI
13	Use of internet/e-mail	76.24	XXIII
	Training related indicators		
14	Conducting need-based training	92.78	I
15	Assessment of Training needs	88.37	VII
16	Assessing outcome and impact of training attended	91.35	III
17	Conducting collaborative training	81.06	XIV
	Input related indicators		
18	Adopting single window system	79.54	XVI
19	Supply of quality inputs	87.15	IX
	Programme related indicators		
20	Involvement of rural youth	83.65	XII
21	Programme for development of weaker section	86.78	X
22	Promoting indigenous knowledge/practice/technologies of farmers	81.65	XIII
	Finance related indicators		
23	Providing subsidies	75.90	XXIV
24	Awareness on availing financial benefits from different organizations	80.04	XV

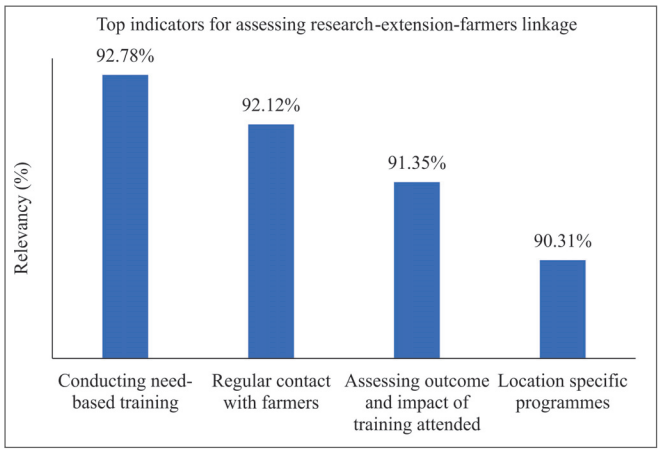

Figure 1. Indicators with greater than 90% relevancy percentage for assessing Research-Extension-Farmers Linkage

institutes and other relevant stakeholders to assess the training needs of the farmers. Accordingly, the experts are to be identified from the College, ICAR, KVKs, Department of Fisheries, NGO, etc. to redesign the training.

Therefore, assessment of training needs is very crucial for identifying farmers' interest and needs. Similar findings were also reported in studies conducted by Sajeev et al., (2012) & Rahman et al., (2018). 'Regular contact with farmers' (92.12%, II) was also found to be a significant indicator for assessing the linkage mechanisms since regular communication with farmers by researchers and extension personnel is essential to build good rapport, to monitor and supervise farm related issues and to share and receive information and feedback for effectively and timely dissemination of farm information. Effective transfer of knowledge from extension personnel to farmer is found to be a very essential form of extension activity (Lukuyu et al., 2012; Niu & Ragasa, 2018; Sekiya et al., 2015). Identification of potential adopters among the farming community is very important for which regular visits must be made in collaboration with other stakeholders. Therefore, development of extension and support services like Matsya Seva Kendras is very essential to increase the frequency of contacts with the farmers. Apart from the above indicators, 'Assessing the outcome and impact of training attended' (91.35%, III) was also perceived as one of the most significant indicators to identify the status of linkage among researchers, extension personnel and farmers. Different training and demonstration programmes are generally kept untracked after the completion of the event thereby widening the information gap among the stockholders involved. To identify the adoption rate, constraints

and issues faced by farmers, drawbacks of the technologies, limitations of the training conducted and strategies to improve the efficacy of the training programmes, study on the outcomes and impacts of the training programmes is very essential. This finding is in line with the other findings reported by Gautam et al., (2017); Ragasa et al., (2022). A team of experienced and knowledgeable scientists, faculties and extension personnel should be formed to study and access the training programmes. 'Location specific programmes' (90.31%, IV) is another important indicator which implies the selection of appropriate and relevant extension activities and programmes suited for a particular region or place. Since social and institutional contexts of a country or region may vary, extension services providers should also create institutions and organizations which are more favourable for innovation adoption within a particular social system (Suvedi et al., 2017). Public organisations like KVKs should be encouraged to focus on conducting more On-Farm Trials (OFT) to work on location-specific programmes. Among the IT related indicators, 'Use of Smartphones' (89.65%, V) is a crucial indicator at present time which acts as an important tool for information sharing and communication between different stakeholders. Extension provides information and services that may be incompatible with certain farming systems and which may involve complex interactions and communication flows between different stakeholders. This information gap can be minimised by the use of different recent ICT and other communication tools (Nord, 2022; Meijer et al., 2015). 'Regular contact with extension organizations' (89.20%, VI); 'Assessment of Training needs' (88.37%, VII), etc. are some of the significant indicators which signify the extent of linkage among different stakeholders. Findings by Girma & Kuma (2022) indicate the importance of market/ input/ finance oriented extension service to improve the welfare of the farmers. Borah et al., 2019 stated the importance of conducting regular demonstrations, conducting regular village meetings and publication of different leaflets/magazines in different regional languages which are intended for the use by the farming community in a way easily understandable by them.

CONCLUSION

Poor monitoring and evaluation, improper top-down management structure, political interference, less coordination among stakeholders, weak accountability and inadequate funding are few factors which can hinder the linkage mechanism as a whole. Linkage needs to be improved so that farmers could connect freely with researchers and extension personnel, thereby improving the bottom-top approach system of communication. Conducting need-based training, regular contact with farmers and assessing outcome and impact of training programmes are few of the major aspects for assessing the linkage. Therefore, there is a need to develop strong coordination and cooperation among different stakeholders to provide farmers with efficient extension services. Apart from producing more farm publications in local languages, efforts should also be given on the usage of ICT tools and different social media platforms for information sharing and exchange. This would enhance the feedback mechanisms from the farmers and provide timely and more effective communication with different stakeholders.

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