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SHORT COMMUNICATION

Prioritization of extension interventions for empowering resource poor dairy farm households in Haryana state

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Abstract: Dairy farming is practised mainly by resource poor farmers whose limited access to knowledge, skill, training and credit hamper their socio-economic and technological empowerment. Extension interventions would help these farmers to enhance their access to knowledge and technologies leading to better standard of living. Therefore, the present study was undertaken in three districts of Haryana state namely Karnal, Jind and Jhajjar representing three different Agro climatic zones in Haryana in 2022 to understand their existing level of knowledge, adoption and needs in dairy farming. The study constituted a sample size of 120 respondents by selecting 40 respondents in a cluster of villages with the predominance of resource poor dairy households in each of selected districts. The findings revealed that most of the respondents were middle aged (44.17%), male (81.67%), acquired secondary level of education (26.67%), land holding upto 1 acre (35.83%), belonged to medium level of income group and had joint family (58.33%). Extension interventions were prioritised as per the expert opinion by using Analytical Hierarchy Process methodology which indicated that training has acquired the highest rank with a value of 0.35 followed by demonstration with value of 0.34. Among policy interventions, subsidy has acquired the highest rank with a value of 0.37 and then incentive acquired 2nd rank with value of 0.25. The study suggests the importance of intensive training, demonstration and exposure visit to research institution and progressive farmers for gradual empowerment of the resources poor farmers.

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India is primarily an agrarian country with vast biological and ecological diversity. About 56.6 per cent of the population is engaged in agriculture and allied sectors. The average size of operational holdings has decreased from 2.28 hectares in 1970-71 to 1.84 hectares in 1980-81, to 1.41 hectares in 1995-96 and to 1.08 hectares in 2015-16. About 82 per cent of farmers are small and marginal engaged in agriculture and allied sectors (FAO, 2021). The share of Agriculture and Allied Sectors in Gross Value Added (GVA) of the country in the year 2020-21 is 20.2 per cent and share of livestock in the GVA of the country is 4.11 per cent (NSO, 2021). India has about 535.78 million livestock population as per the 20th livestock census. India maintains first rank in milk production at global level since 1998 and the Indian dairy farming is dominated by resource poor farm households. A family whose resources like water, land, labour and capital don't allow a secure livelihood of family is known as resource poor farm family. Even farmers with more than 2 ha of land holding but whose land is not fertile are prone to flood or erosion and having low and unreliable rainfall (Chamber and Ghidyal, 1984) who are also in the bracket of resource poor. Resources poor farmers are not able to harness the technologies because there is lacuna of sources and resources (Ponnusamy et al. 2021).

Empowering resource poor farmers is very vital because it will augment their income and harness the resources so that milk yield will increase and then it will increase the economy of the country (Ponnusamy and Padaria, 2021). Ponnusamy and Ambasankar (2006) observed that productivity of milch animals and profitablity of farmers could considerably be increased through introduction of various technological interventions like compound feed, salt lick, ectoparasiticide, minerals and vitamins to the cows and buffalos. Patel and Ponnusamy (2019) developed and validated extension strategies for managing reproductive problems of dairy animals with 60 respondents from three villages *viz.,* Dilawara, Chundipur and Dhakwada of Karnal district. Among 14 selected extension strategies, development and demonstration of video on specific reproductive issues with Rank Based Quotient (RBQ) value of 81.19 and preparation of extension

literature with RBQ value of 72.38 were found to be the two best strategies for faster dissemination of information on management of reproductive problems. This explains the effectiveness of extension strategies in improving the socio-economic conditions of resource poor dairy farm households. Therefore, a study was undertaken to determine the appropriate extension strategies for the empowerment of poor dairy farm households.

The present study was conducted in the Haryana state in three districts namely, Karnal, Jind, and Jhajjar which were randomly selected representing three different Agro climatic zones of the state as classified by Haryana Kisan Aayog. From the selected districts, cluster of villages with the predominance of resource poor dairy households were selected in consultation with the Krishi Vigyan Kendra of respective districts. From each selected district, 40 respondents were selected randomly. Thus, the study was conducted with 120 respondents. The dairy farmers having less than or equal to one ha of land and possession of herd size up to five dairy animals were selected wherein it was ensured that more than 50 per cent income should come from dairy farming at the time of investigation as respondents for the study.

The data were collected personally through well-structured and pre tested interview schedule. Suitable statistical tools and technique like Analytical Hierarchy Process (AHP), Frequency and Percentage and Cumulative Square Root Frequency were used in data analysis in order to draw meaningful conclusions.

Tabular analysis was used to understand the socio-economic conditions of resource poor dairy farm households. Procedure for Analytical Hierarchy Process: When application of AHP is done for any decision-making, the first requirement is the breaking up of the decision problem into decision element in a hierarchical fashion. The predecessor of AHP is pair-wise comparison in psychological measurement. AHP is based on pair-wise comparison, but associated with hierarchical formulation of multi-criteria. Thus, this has obvious advantage of providing 'objective decision', based on subjective and personal preference of an individual. The advantage of AHP includes its ability to make both qualitative and quantitative decision attributes commensurable, and its flexibility with regard to the setting of objectives (Kangas, 1992). Subjective preference, expert knowledge and objective information can all be included in the one and the same decision analysis (Kurttila *et al*, 2000).

In order to better understand the prioritisation of extension interventions, it is important to know the socio-economic background of the resource poor dairy farm households as both are closed related.

The socio-economic variables which were identified for assessing the status of respondents are listed in Table 1. Most of the respondents belonged to middle aged group (44.17%), middle to secondary educated and medium family size with joint family type. Majority of them (65%) did not have any social participation which deprives them in accessing useful information.

Almost one fourth of them (22.50%) had no land and 35. 83 per cent of respondents possessed upto one acre of land. Only 7.50 per cent had land with more than 2 acres. About 43.33 per cent of them owned two lactating animals followed by 19.17 per cent with single lactating animal. About 58.34 per cent of respondents produce less than 8 litres of milk per day and 61 per cent of them sold milk between 4 and 7 litres per day. Three-fifth (60%) of them could generate the annual income ranging between Rs. 57,600-98,000. This clearly explains the poor socio-economic conditions and the need arises to design appropriate interventions for improving their socio-economic conditions.

The prioritisation of extension interventions is depicted in Table 2. Analytical Hierarchy process (AHP) was used to prioritise the extension interventions. AHP utilised pair-wise comparison method to understand the overall priority of each intervention which can help to empower the resource poor households.

The relevant factors were identified under Extension, Policy, Technological and Input service interventions in relation to resource poor dairy farm households. The quantitative importance of each factor in the overall importance in specified intervention was determined as could be seen in the Table 2.

Factors *viz*. Training, Field trip, Demonstration and Dairy mela among Extension interventions were prioritized with lambda value 4.18 and consistency ratio of 0.06138 by using AHP methodology. Among the factors prioritized, training has acquired the highest rank with a value of 0.35 and then demonstration acquired 2nd rank with value 0.34. Field trip and dairy mela acquired 3rd and 4th rank which accounts to the value of 0.17 and 0.14 respectively. As per the expert opinion, among the four factors of extension interventions, training and demonstration with the highest values emerged as most useful strategies for empowering resource poor dairy farm households as compared to field trip and dairy mela.

Similarly, for policy intervention factors viz. Subsidy, Incentives, Credit facility and Insurance with lambda value 4.10 and consistency ratio of 0.037549 were prioritised. Among the prioritized factors, subsidy has acquired the highest rank with a value of 0.37 and then Incentive acquired 2nd rank with value 0.25. Insurance and credit facility acquired 3rd and 4th rank which accounts to the value of 0.20 and 0.17 respectively. Subsidy and incentive would always serve as motivational factors as both factors can be financially supporting the resource poor dairy farmer households for adoption of advance scientific technologies. Utilization of credit and insurance policy can play significant role once the farmers acquire substantial socio-economic status. There is a greater need to create awareness about schemes having subsidy component among resource poor dairy farm households.

Further for technological interventions factors viz. Artificial Insemination (A.I), mineral mixture, silage preparation and vaccination and deworming with lambda value 4.19 and consistency ratio of 0.071474 were determined. Among the factors prioritized, A.I. has acquired the highest rank with a value of 0.41 and then mineral mixture acquired 2nd rank with value 0.26. Vaccination and deworming and Silage preparation acquired 3rd and 4th rank which accounts for the value of 0.17 and 0.14 respectively. A.I and mineral mixture with the highest values come out as most potential strategies for empowering the income level of poor dairy farm households as compared to vaccination and deworming as well as silage preparation. It has been observed that the calves born through A.I technique is more towards true to type breed characters than the calves born through natural service.

Table 1: Socio-economic profile of resource poor dairy farm households

Variables	Categories	Frequency	Percentage
	Young (upto 35 years)	24	20.00
Age	Middle (36-50 years)	53	44.17
	Elder (>50 years)	43	35.83
Sex	Male	98	81.67
	Female	22	18.33
Education	Illiterate	12	10.00
	Primary	22	18.33
	Middle	29	24.17
	Secondary	32	26.67
	Intermediate	24	20.00
	Graduate and above	1	0.83
Family Size	Small (<5)	18	15.00
	Medium (5-7)	77	64.17
	High (>7)	25	20.83
Family type	Nuclear	50	41.67
	Joint	70	58.33
Experience in Dairy Farming	Upto 10 years	27	22.50
	11-20 years	53	44.17
	>20 years	40	33.33
Social Participation	No	78	65
	Yes	42	35
Land Holding	Landless	27	22.50
	Up to 1 acre	43	35.83
	1.1 to 2 acres	41	34.17
	>2 acres	9	7.50
Herd size (Lactating)	Single	23	19.17
	Two	52	43.33
	>2	45	37.50
Milk production (in litres/day)	Low (<8)	70	58.34
	Medium (8-10)	34	28.33
	High (>10)	16	13.33
Milk Consumption	Low (<3)	67	55.80
(litres/day)	Medium (3-4)	36	30.04
	High (>4)	17	14.16
Milk sale (litres/day)	Low (<4)	24	20.00
	Medium (4-7)	73	61.00
	High (>7)	19	19.00
Milk sale rate (Rupees)	Low (<40)	69	57.50
	Medium (40-59)	49	40.83
	High (>59)	2	1.67
Annual Income from Dairy Farming (in Rs)	Low (<57,600)	27	22.50
	Medium (57,600-98,000)	72	60.00
	High (>98,000)	21	17.50

For input service intervention factors *viz*. milking equipment, chaff cutter, medicine and veterinary drug and fodder seed/sapling with lambda value 4.06 and consistency ratio of 0.025412 were prioritised. Among the factors prioritized, milking equipment has acquired the highest rank with a value of 0.45 and then medicine and veterinarian drug acquired 2nd rank with value 0.25. Chaff cutter and Fodder seed/sapling got 3rd and 4th rank which accounts to the value of 0.18 and 0.11 respectively. Milking equipment and medicine and veterinarian drug with the highest values were found to be most useful and affordable strategies for empowering resource poor dairy farm households as compared to chaff cutter and fodder seed/sapling. However, incentive structures are to be worked out for motivating the resource poor farmers in order to enhance the adoption of improved dairy farming practices.

Conclusions

Resource poor dairy farm households have relatively lesser access to technologies, resources and finance. The study suggests that there is a dire need to realign the extension interventions such as training, demonstration, subsidy, incentives, A.I., mineral mixture, milking equipment and veterinary drugs for popularising improved dairy farming practices with the active involvement of resource poor farmers. As per the opinion of experts by using AHP methodology, training would empower the resource poor farmers followed by demonstration, field trip and dairy mela while, subsidy has acquired the highest rank followed by incentives among policy interventions. A.I. has acquired the highest rank followed by mineral mixture among technological interventions. The findings of this study would be helpful for formulating policies and interventions by policy makers, scientists, extension workers, private agencies and NGOs engaged in the development project related to resource poor dairy farmers. The realigned extension interventions have the potential to augment the milk productivity and thereby improving the livelihood of resource poor dairy farm households through increased revenue generation.

Table 2: Priority weights of categorized extension intervention factors in relation to empowering resource poor dairy respondents

Interventions	Factors	λ_{max} = Lamda	Consistency ratio (CR)	Priority of the factors within interventions
Extension Interventions	Training	4.18	0.06138	0.347451
	Field trip			0.177471
	Demonstration			0.334205
	Dairy mela			0.140874
Policy Interventions	Subsidy	4.10	0.03754	0.365262
	Incentives			0.255696
	Credit facility			0.172653
	Insurance			0.20639
Technological Interventions	A.I.	4.19	0.07147	0.415321
	Mineral mixture			0.268744
	Silage preparation			0.142544
	Vaccination and deworming			0.17339
Input Service Interventions	Milking equipment	4.06	0.02541	0.453645
	Chaff cutter			0.180744
	Medicine and veterinary drug			0.251025
	Fodder seed/sapling			0.114586

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