



Original Article

Extension Strategy Development and Training Needs for Small Scale Commercial Poultry Farmers in Nigeria

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ABSTRACT

The study ascertained Small Scale Commercial poultry farmers' needs on improved production techniques in Osogbo Local Government Area of Osun State. A purposive sampling technique was used to select sixty (60) poultry farmers. Findings revealed that the percentages of poultry farmers that need training on various poultry production techniques are as follows: housing system (83.3%), feeds and feeding strategies (87%), disease/parasites prevention and control (80%); handling skills (80%) and marketing strategies (88.3%). Findings also showed that (13.3%) of the poultry farmers hired labour for the business, (53.3%) are making use of family/relatives for the business while (28.3%) of the respondents employed both labour and family together. Marital status, level of education and awareness of improved poultry production techniques were significant ($X^2 = 6.136$, $P < 0.05$) and $X^2 = 19.679$, $P < 0.05$). Also there was no significant relationship between farmers' awareness of poultry production techniques and training needs ($X^2 = 1.016$, $P < 0.05$). It is recommended that seminar/workshops should be regularly organized for the poultry farmers' on the best practices that will save the cost of feeds and reduce mortality in their poultry production techniques.

Keywords: Commercial, Poultry, Small Scale and Training.

INTRODUCTION

The main purpose of rural development in Nigeria endeavour is to improve the quality of life of rural people by enhancing their employment and income opportunities. In this over all contest one has to examine how the poultry (domesticated birds including Chickens, turkey, ducks, pigeon, and geese among others) sector contribute to this objective, its role, its importance and the opportunities offered by the sector within given constraints. Poultry in Nigeria prior early seventies was in the hands of most deprived and destitute groups in rural areas. Though, no exact estimate of its actual share of contribution in terms of percentage of household income is available, it is anybody's guess as to how a regular assured small cash flow play very crucial role in the household economy of the people in the lowest strata of the economic ladder. Poultry for the poorest people had added advantage by way of regular day-to-day cash returns by sale of eggs and also periodic cash income from sale of birds for

meeting the occasional family exigencies. It requires minimum capital and ensures quick return. In terms of nutrition, poultry production contributes to national food security. Poultry meat is a good source of high quality protein and contains iron, zinc and B-complex vitamins except folic acid (Speedy, 2003). It contains a well balanced supply of minerals including calcium and phosphorous especially if the bones are eaten. Chicken egg contains most of the constituents of nutritional importance to man and egg is a rich source of vitamin D, retinol, riboflavin, iodine and protein. Apart from providing man with all these, Odunsi et al. (2005) indicated that consumption of poultry products is lower in developing countries than advanced countries. Yet, poultry keeping was never considered as a full time primary economic activity of rural people in the country. It best suit to the landless households as it does not require more farmland and is accommodated in the homestead area.

Poultry utilizes substantial quantities of non-edible agriculture and industrial by-products. It supplements the family income and improves nutritional status as a subsidiary activity.

Unfortunately, traditionally managed stock is over 86% for all species while commercially managed stock is only significant for poultry at 13.8% and to a lesser extent for pigs (3.24%) as shown in Table 1 (Rim 1992, Poultry International, 2004). The most commonly raised poultry by small scale farmers is chickens. Chickens have its scientific name to be *Gallus domesticus*. Chickens can be grouped as layers (egg producers), broilers (meat producers), local breeds, dual-purpose breeds. Numerous people engage in poultry production at small scale level due to general poverty among the citizens of Nigeria, fear of the risks involved in the business, high cost of feeds and management problems among others. To buttress this, Adeyemo et al. (1996) asserted that the structure of livestock production is such that 80-90% of the nation livestock lies in the hands of small-scale producers. Paying adequate attention to small-scale commercial poultry farmers will elevate them to large scale level of production and the business will serve as tool for poverty alleviation. Table 2 showed that of all indicated livestock reared in Nigeria, chickens are the most populated, common and widespread.

Table 1: Livestock Population in Nigeria

Species	Total	Traditionally managed (%)	Commercially managed (%)
Cattle	13,885,813	99.50	0.50
Goats	34,453,724	99.97	0.03
Sheep	22,092,602	99.84	0.16
Pigs	3,406,381	96.76	3.24
Chicken	72,400,856	86.17	13.83

Source: RIM (1992)

Poultry outnumbers all other forms of livestock in Nigeria, and, not surprisingly, is found throughout the country wherever there is human settlement. Although pigeons, ducks, guinea fowl and some turkeys are also widely kept, chickens are by far the most common. Typically they are maintained under traditional, low-input, free-range management systems, but substantial numbers are also reared intensively on commercial basis, particularly in the southern states of Nigeria. Commercial holdings account for some 10 million chickens, or 11 percent of the total estimated population of 82.4 million.

Table 2: Livestock population in Nigeria, 2010

Species	Number	Species	Number
Chickens	82,400,000	Other poultry*	31,900,000
Goats	34,500,000	Pigs	3,500,000
Sheep	22,100,000	Dogs	4,500,000
Cattle	13,900,000	Cats	3,300,000
Donkeys	900,000	Rabbits	1,700,000
Horses	200,000	Guinea pigs	500,000
Camels	90,000	Giant rats	60,000

*Includes pigeons, ducks, guinea fowl and turkeys. Source: FAO Corporate Document Repository, 2010

There was a boom in intensive chicken production in the early 1980s, when the government subsidized the prices of day-old chicks and feed ingredients. The subsidies have since been withdrawn. Indeed, almost every household own chickens, which provide a valuable source of supplementary protein and income.

The poultry sector is characterized by relatively faster growth in consumption and trade volume than any other agricultural sector. About 35% of the GDP (of which the livestock farming sub-sector accounted for about 10%) and over 38% of non-oil foreign exchange earnings of the country are contributed by the agricultural sector. In terms of the provision of employment, about 75% of the populace depends on agriculture and agro-based businesses for their livelihood (CBN, 2007). Over the last 4 decades of technological breakthrough and efficient management interventions in poultry, the scenario has totally changed in Nigeria. Organized poultry farming is one of the most commercial activities in competitive terms, among not only animal husbandry but within the total agriculture sector. Poultry, which was considered as a backyard venture in the early 70's has now been transformed into a strong farming activity. However, the modern system of commercial eggs and broilers production involves considerable control over climatic environment which requires high standards of management if optimum levels of performance are to be achieved. Furthermore, the ability to modify the feeding, the physical and social conditions of the stock imposes an added obligation on all concerned poultry farmers. Edun (1998) opined that establishing a poultry projects is a capital-intensive venture and such financial requirement is out of reach of the average farmer, therefore, before going into the venture, good and reputable day-old chicks should be purchased coupled with consultation of veterinary professional.

No matter how conservative the individual farmer or how out of contact he is with the stream of social change, it is impossible for him to escape completely from the stimulating and challenging influence of modern technology that forces him to improve his standard of living. Therefore, the farmers' level of skill and knowledge need to be sought in order to know what to teach them for maximum production (Laogun 1985). To this end, in order to plan good extension training programmes for farmers, programmes of extension must be strategic and based on farmers' individual needs. This will serve the role of transmitting new ideals and improved practices to the farmers, which will increase their production (Laogun 1985).

Strategic development entails channeling development to meet specific needs in order to improve and enhance performance. Development involves three elements which are economic, social and human development. The human development component serve as the driver directing the other components, thus needs proper attention in order to perform creditably. To achieve this need, the performance at present must be reviewed vis-a-vis the expected performance considering the potentials of the resources available and

those needed to achieve the expected goals. Training on the order hand deals with the acquisition of knowledge, skill and attitude by an individual to bridge the gap between actual situation and the desired situation (Laogun, 1991). Thus training aims at filling the gap between what the trainee knows and what he/she should know. It improves the knowledge and skill of the farmers, helps farmers gain self-confidence in their ability to manage their own problem and provides a better understanding of new technologies being transferred to them (Alan, 2003).

Extension is an informal educational process directed toward the rural population. This process offers advice and information to help them solve their problems. It also aims to increase the efficiency of the family farm, increase production and generally increase the standard of living of the farm family. Extension is concerned not just with physical and economic achievements but also with the development of the rural people themselves. Extension agents, therefore, discuss matters with the rural people; help them to gain a clearer insight into their problems and also source for information/technology that will help them to decide how to overcome these problems (Kristin 2008). This involves helping farmers to improve the productivity of their agriculture and also developing their abilities to direct their own future development. To achieve all these, extension employs strategic development tools which training is one of the key components.

For training to be effective, efficient and have high impact there is need to conduct a Training Need Assessment. A systematic exploration of the way things are and the way they should be. These “things” are usually associated with organizational/individual performance (Adewole, 2008). Training needs assessment is a process whereby the gap between the required levels of competence which forms the need is bridged by prioritizing and selecting such needs for specific action as part of training development. To conduct training needs assessment is to pinpoint if training will make a difference in productivity, to decide what specific training each individual needs and what will improve their performance.

The need analysis process can be grouped into four phases. These include Job analysis, Task analysis, Trainee skill estimation and Gap analysis. The Job analysis involves dissecting the job into its components. This allows the trainer to have a better understanding of the activities the farmer actually do and generate a list of tasks the farmer completes in the course of his work. Task analysis involves breaking down the job tasks into its components to determine its relative importance and how critical it is in accomplishing the job task. Trainee skill estimation involves an analysis of the potential learners in relation to the tasks outlined in the tasks analysis. Gap analysis involves the analysis of what the learner needs in order to accomplish/get to the desired result (Adewole 2008).

The importance extension in the socio-economic development of a nation (especially Nigeria) cannot be over-emphasized as it is the driver to the development of the rural farmers. The rural farmers produce most of the agricultural produce consumed in Nigeria and their

low performance leads to the poor production of protein foods. For instance, due to inadequate intake of protein in the diets of most Nigerians, there is high infant mortality, low resistance to diseases, poor growth and development, mental retardation among others. This is supported by Awosanmi (1999) and Binuomote et al. (2008). Anthony et al. (1991) therefore observed that poultry production seems to hold the answer to the national protein deficiency problem, as its products such as eggs and meat provide an acceptable form of animal protein to most people throughout the world.

However, Nigeria in spite of all efforts to boost agriculture, still import frozen chicken, breeding stock from foreign countries though federal government placed ban on it recently, it has resulted into hike in prices of pullets, eggs, chicken etc. due to poor production, incompetence/neglect of small scale poultry farmers and low supply of the poultry products. Disease, parasites, mortality, high cost of feeds, high cost of fixed inputs, as said by Aromolaran (1999) are giving poultry keepers serious problems to manage and thus, hindering poultry business. Their problems can be attributed to several factors ranging from resources available, technical proficiency to job experience. These usually culminate to low productivity/production and subsequently reduced income which not only frustrates the venture but can even lead to financial bankruptcy. Technical proficiency usually account for most crisis experienced in poultry production. These calls for a diagnosis in all areas of operation on the part of poultry farmers and thus, identify deficiencies and solutions to them if the business is to be maintained. However, this work examines small scale commercial poultry farmers training needs on improved production techniques in Osun state. Hence, this study will provide accurate answers to the following questions: What are the ways of finding solution to extension strategy development among poultry farmers? What are the training needs among the poultry farmers? How will training needs improve poultry production practices? There is need to educate and empower the poultry farmers with adequate knowledge and skills towards the best practices for effective and efficient production.

MATERIALS AND METHODS

This study was carried out in Osogbo Local Government Area of Osun State, which has its secretariat at Oke-bale in Osogbo town. It is the trade centre for a farming region of Yam, Cassava, Maize, Corn and Cash crop like Cocoa. Agriculture is the traditional occupation of the people in Osogbo. It is located on a raised land, which is well over 500m above the sea level. The sample size is sixty (60), purposive sampling method was used to select wards that have poultry farms. The data were collected by means of well structured questionnaires of open and close ended type. Interview schedule was used to collect the information on personal and socio-economic characteristics which are age, marital status, education level, farm size, year of experience, source of water, source of labour and so on from the semi-literate and illiterate respondents (information on personal and

socio-economic characteristics which are age, marital status, education level, farm size, year of experience, source of water, source of labour and so on). The reluctance of the poultry farmers and farm workers involved was one of the hindrances encountered during the course of study this project. This could be due to business insecurity, fear of exposing business secrets. Both descriptive and inferential statistics was used for data analyses. The descriptive statistics used includes, frequency counts and percentages while inferential statistic used to test for significant relationship.

RESULTS AND DISCUSSION

Demographic characteristics of the respondents:

Table 3 reveals that 55% of the respondents are within the age range of 21-40 years who are considered to the young agile and active poultry farmers therefore capable of the tasks involved in poultry production. More so, they are likely to be a set of youths that are unemployed but eventually settled for poultry business. On the average the respondent were 30.6 years old. This implies that youths are mostly engaged in poultry farming in the study area and this conformed to the finding of Agbamu (1993), which reported, that there was a predominance of medium aged people between farming population. It also shows that most of the respondents were male (88.39%) while others were female (11.7%). The table further revealed that all the respondents had education at various levels, 8.4% had primary education, 41.6% had secondary education while 50% had tertiary education, and it shows that education helps farmers to respond to challenges, innovation and other poultry technology, which results to high productivity. It also showed that 51.6% of the respondent had 1-5 dependents, about 28.3% of them had 6-10 dependents and 15% respondents have 10-15 dependents while 1.6% respondent had 21-25 dependents. It is obscured that larger percentages of them have reasonable family size.

The table further revealed that the farm size of the respondents was based on the following categories: small, medium and large scale. It was seen that 56.6% of the respondents have small farms, 16.6% have medium sized farms while 26.6% have large farms. It could be observed that a greater percentage of poultry farmers were still on small scale production.

Table 4 also shows that 70.0% of the respondents have 10 years' experience and less while 15.0% have between 11 and 15 years of experience, 13.3% had 16-20 years of experience, while 1.7% have 21-25 years of poultry experience.

This implies that the handling of the birds is clearly known to them through experience to some extent and the farm will thus be stable. Also, the table shows that 78.3% use well water for their birds while 3.3% each use tap and borehole water for their birds. This finding is an indication that well water is the convenient and cheapest source of water in the study area. Tap water is not reliable while borehole is expensive to acquire.

Table 4 reveals that (13.3%) hire labour for their enterprise, (53.3%) are making use of family/relatives for their enterprise while (28.3%) of the respondents employed both labour and family together. The finding shows that majority of the respondents are using family/relative. This is due to its cheapness coupled with low production cost that characterizes it uses.

Table 3: Distribution of respondents by their personal characteristics

Personal characteristics	Frequency	Percentage
Age group (Years)		
<20	17	28.3
21-40	33	55.0
41-60	10	16.6
Mean age	30.6	
Sex		
Male	53	88.3
Female	07	11.7
Marital Status		
Single	12	20.0
Married	45	75.0
Divorced	03	05.0
Education level		
Primary	05	8.4
Secondary	25	46.1
Tertiary	30	50.0
Family size		
1-5	31	51.6
6-10	17	28.3
11-15	09	15.0
16-20	02	3.3
21-25	01	1.6
Farm size		
Small	34	56.6
Medium	10	16.6
Large	16	26.6
Total	60	100.0

Source: Field Survey, 2012

Table 4: Distribution of Poultry Farmers in respect of source of labour, water and years of experience

Distribution	Frequency	Percentages
Years of Experience		
1-5	25	41.7
6-10	17	28.3
11-15	09	15.0
16-20	08	13.3
21-25	01	01.7
Source of water uses		
Tap	02	03.3
Well	47	78.3
Bore hole	02	03.3
No response	09	15.0
Source of labour		
Poultry attendant / hired labour	08	13.3
Family / relatives	32	53.3
Both	17	28.3
No response	03	05.0

Source: Field Survey, 2012

Training needs on Poultry Housing: Table 5 shows that 83.3% of the respondents are highly in need of training on housing knowledge of the birds which includes spacing, ventilation, light and protection (from weather and predators) while 16.7% are of low need.

The finding indicates that some poultry farmers have not been housing their birds properly.

Training needs on Feeds and Feeding Knowledge / Technique: Table 5 indicates that 87% of the respondents are highly in need of training on feeds preparation and feeding methods of the birds while 13.3% are low of the need. The finding shows that poultry farmers have been feeding their birds with feeds that lack some essential nutrients that are meant for growth, maintenance, good laying of eggs among others.

Training needs on poultry diseases/parasites prevention or control and handling skills: Table 5, indicates that 80% of the respondents are highly in need of training on ways to prevents, and control diseases/parasites and handling on their farm while 20% of them are of low need. The finding is an indication that most of the respondents have been deviating from various rules, precautions involved in diseases/parasites prevention and controls. Many of them may rely on veterinary doctors alone.

Training needs on poultry daily and special routine operations: Table 5 reveals that 76.7% of the respondents are highly need of training on daily and special routine operations while 23.3% of them are of low need. The finding indicates that most of the respondents do not adequately take to guidelines and principles that are required of the poultry business either daily or on special occasions.

Training needs on record keeping: Table 5, indicates that 23.3% of the respondents are highly in need of training on types and ways of record keeping while 76.7% of them are of low need. The finding shows that most of the farmers keep records appropriately and as expected though fewer numbers of them that are highly in need of training on record keeping might be those with no/low educational background.

Training needs on marketing strategies: Table 5 reveals that 88.3% of the respondents are highly in need of training on marketing strategies while 11.7% of them are lowly in need of it. The finding reveals that most of the respondents need to be trained properly so as to raise their level of sale and marketing.

Sources of Inputs, information and knowledge used in production: Table 6 indicates that 73.3% of the respondents receive information and training from veterinary doctor while 11.7% receive from poultry association of Nigeria (PAN). Also, 3.3% represent those that receive information and training from livestock workshop, printed materials and mass media each. The extension agents were less patronized for information and training only 1.7% visited them. This means that respondents are aware of importance of veterinary doctors and it is likely that veterinary doctors are up and doing and are functioning as expected. Also, poultry association is also playing good roles in

disseminating new ideas to their members. Extension agents are not all that recognized by the farmers which is an indication that they pay little attention to poultry production.

Table 5: Poultry Farmers' training needs in production (n = 60)

Training Needs	Frequency	Percentage
Housing Knowledge		
High need	50	83.3
Low need	10	16.7
Feeds and Feeding Knowledge / Technique		
High need	52	87.0
Low need	08	13.3
Disease / Parasite Prevention and control		
High need	48	80.0
Low need	12	20.0
Poultry Handling skills		
High need	48	80.0
Low need	12	20.0
Daily and Special Routine Operations		
High need	46	76.7
Low need	14	23.3
Records and Recording knowledge		
High need	14	23.3
Low need	46	76.7
Marketing Skills		
High need	53	88.3
Low need	07	11.7

Source: Field Survey, 2012

Table 6 reveals that 85% of the respondents secure feed from the feed millers while only 1.7% of the respondents compound and formulate their feeds themselves while others did not respond. This shows that majority of the respondents need training on self-compounding of feeds, which in turn will reduce their cost of production.

Table 6 also shows that, 85% of the respondents procure drugs and vaccines from veterinary medicine stores while others did not respond to the item. This reveals that the respondents patronize veterinary doctors as expected. If they therefore manage their farm very well, it will be disease free. It will also ensure that right drugs will be used always. It also indicates that 81.7% of the respondents obtained their poultry knowledge from formal education centres, 10% obtained knowledge from organized extension training and poultry association of Nigeria (PAN) while the rest are not respond. The table further, reveals that 41.7% of the respondents patronize reputable breeders / hatcheries for pullets, day-old-chicks and broilers. They were able to state conveniently the reputable breeders' farms they are patronizing. Meanwhile, 57.8% that failed to respond are likely to be obtaining chicks from just anybody (middle men) and therefore do not know the original sources.

The Chi-square (X^2) analysis at ($P > 0.05$) shows that there is no significant relationship between farmers' awareness of poultry production practices

(housing, feeds and feeding, diseases /parasites prevention and control, daily and special routine operations, record keeping, marketing strategies) and their training needs. This shows that in the study area, awareness of poultry production practices has no influence on training needs of the farmers.

Table 7 reveals that major constraints of the respondents include mortality (85%), due to low knowledge of diseases/parasites managements on the farm; poor weather condition (83.3%) due to poor housing structures that the farmers make use of; inadequate capital (81.7%), fluctuation of inputs' cost price (80%), due to poor supply of the compounding ingredients, marketing problems (76.7%); lack of credit facilities (76.7%). The minor constraints include labour (25%) and inaccessibility to good water source (6.7%).

Table 6: Distribution of poultry farmers in respect of sources of inputs, information and knowledge used in production

Distribution Sources	Frequency	Percentages
Poultry management information and training		
Livestock workshop	02	03.3
Poultry Association (PAN)	07	11.7
Extension agent	01	01.7
Veterinary doctor	44	73.3
Printed materials	02	03.3
Mass media	02	03.3
No response	02	03.3
Feeds used in production		
Self compounding / formulation	01	01.7
Feed millers	51	85.0
No response	08	13.3
Knowledge / Skill on improved poultry production techniques.		
Secondary education level	27	45.0
Tertiary education level	22	36.7
Organized extension training programme	03	05.0
Association (PAN) / other farmers	03	05.0
No response	05	08.3
Sources of drug and vaccines		
Veterinary medicine store	51	85.0
No response	09	15.0
Sources of pullets, day old chicks and broilers used in production		
Reputable breeders / Hatchery farms	25	41.7
No response	35	58.3

Source: Field Survey, 2012

Hypotheses testing

The Chi-square (X^2) analysis on table 8, reveals that there was no significant relationship in sex, ($X^2=0.145$, $P>0.05$), and training needs on improved poultry production practices.

However, there was significant relationship in marital status ($X^2=6.136$, $P<0.05$) and level of education ($X^2=19.679$, $P<0.05$) of farmers' and training needs on improved poultry production practices. This is an indication that the duo (marital status and level of education) had influence on farmers' training needs on improved poultry production practices.

The Chi-square (X^2) analysis on table 9 shows at ($P>0.05$) that there is no significant relationship between farmers' awareness of poultry production practices (housing, feeds and feeding,

diseases,/parasites prevention and control, daily and special routine operations, record keeping, marketing strategies) and their training needs. This shows that in the study area, awareness of poultry production practices has no influence on training needs of the farmers.

Table 7: Frequency distribution of the respondents in respect of their constraints (n=60)

Constraints	Frequency	Percentage	Rank
Inadequate capital	49	81.7	3
Lack of credit facilities	46	76.7	6
Fluctuation of inputs' cost price	48	80.0	4
Inaccessibility to good water source	04	06.7	11
Lack of veterinary knowledge	25	41.7	9
Mortality	51	85.0	1
Diseases and parasites	41	68.3	7
Labour	15	25.0	10
Marketing problems	46	76.7	5
Pilfering	33	55.0	8
Poor weather condition	50	83.3	2

Source: Field Survey, 2012.

Table 8: Chi-square results of relationship between personal characteristics of the respondents (sex, marital status, level of education) and training needs of poultry production practices

Variables	X^2	df	P	Decision	Remark
Sex	0.145	1	0.703	NS	Accept
Marital status	6.135	1	0.013	S	Reject
Level of education	19.679	5	0.001	S	Reject

Source: Field Survey, 2012

Table 9: Chi-square results of relationship between farmers' awareness of poultry production practices and training need

Variables	X^2	df	P	Decision	Remark
HTN	0.016	1	0.900	NS	Accept
FFT	0.122	1	0.727	NS	Accept
DPPC	1.567	1	0.211	NS	Accept
DSRO	0.119	1	0.730	NS	Accept
RTN	1.097	1	0.295	NS	Accept
MTN	0.279	1	0.597	NS	Accept

Source: Field Survey, 2012. HTTP: Housing training need; FFT: Feeds and feeding training needs; DPPC: Diseases/parasites prevention and control; DSRO: Daily and special routine operations; RTN: Record training need; MTN: Marketing training need.

CONCLUSIONS

The study investigated the training needs of small scale commercial poultry farmers on various improved poultry production practices. Findings showed that, they are highly aware of improved/automatic housing system, feeds and feeding, diseases/parasites prevention and control, daily and special routine operations and low awareness of vital records to be kept and marketing strategies. However, they have low knowledge on poultry housing, feeds and feeding, diseases/parasites, prevention and control, daily and special routine operations that high knowledge on record keeping and marketing strategies of poultry products. Therefore, small scale commercial poultry farmers need highly training on housing, feeds

and feeding, diseases/parasites prevention and control, daily and special routine operation as concluded by Adedeji et al. (2011) that good programme of work on poultry farm safety practices should be developed annually by the extension agents. Also, the single most critical needs for development of poultry production is the right type of organization (social homogenous group in a manner of self help groups of 10 to 20 poultry farmers), that will be able to address – provision of timely and regular quality inputs; collection and marketing off eggs and chicken on definite regular interval, daily, bi-weekly or weekly as is practiced in dairy sector; value additions as aid to marketing strategies for the products; they need credit facilities for the best management of diseases and parasites, among others.

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