Learning media needs of beef cattle farmers in Kong Khaek Sub-district, Mae Chaem District, Chiang Mai Province

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Abstract The results found that the male farmers with an average age of 49.69 years old who graduated from primary school. The farmers had experienced in beef cattle rearing for an average of 7.75 years. In 2019, the average amount of beef cattle of 9.76 animals, and most of them reared native beef cattle. Most of the farmers were not members of the beef raising group in the community. The overview of farmers' needs learning media was high level ($\overline{X}$ = 2.29), especially knowledge of the prevention and treatment of beef cattle disease. Farmers want to learn through the department of livestock development's officers, watch videos, agricultural training, and handbooks. Most farmers needed to learn during 4.01-7.00 p.m. The hypothesis testing found that experiences in beef cattle rearing and receiving information about beef cattle correlated with learning media needs of beef cattle farmers. It is suggested that the relevant department should encourage and support beef cattle farmers to form a small group to increase their bargaining power,and advise and support farmers to manage the grass fields, produce silage, and stock roughage feed for the beef cattle during the drought. Moreover, It should provide practical training for farmers to strengthen the basic skills, such as dehorn and castration, and should provide the visual aids to farmers for self-study.

Keywords: Needs, Learning media, Beef cattle farmers, Mae Chaem

Introduction

The main goal of raising beef cattle for the farmer is to get income with high profits. It means that a low-cost production and a high price for sales. Therefore, the goal of beef cattle raising needed to seek for the knowledge of various aspects and paid attention to the principle of raising beef cattle (Department of Livestock Development, 2015). From the report of beef cattle farming in Thailand, in 2020 there were 897,588 beef cattle farmers and 6,137,928 beef cattle compared to 2019 there were 792,148 beef cattle farmers and 4,876,228 beef cattle (Department of Livestock Development, 2020). This indicated an increase in the number of beef cattle farmers and the number of beef cattle in Thailand for 13.31 percent and 25.87 percent.

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Chiang Mai province is the province with the highest cattle farming in the North. According to statistical data in 2018, it was found that there were 12,064 cattle farmers, mostly in Omkoi, Mae Chaem, and Chom Thong district, respectively (Chiang Mai Provincial Livestock Office, 2018). In Mae Chaem District, there is a large amount of maize cultivated in Chiang Mai province. Farmers used to be burning weeds to prepare agricultural areas, it is believed that burning the area will kill germs and pests in the soil. It has caused harzadous problem in Chiang Mai province. With the problems, it has done with policies and programs related to the reduction of forest burning and agricultural waste with the emphasis on promoting careers in livestock raising to increase income for farmers. Both government and private agencies are focused on solving the problem of burning forests and agricultural areas. (Intaruccomporn *et al.,* 2019).

Kong Khaek Sub-district, Mae Chaem District, Chiang Mai Province is a plateau area which locates in the Mae Chaem National Forest Reservation. The population in the area is indigenous Thais, hill tribes, and Hmong tribes which mainly engaged in agriculture.(Chiang Mai Provincial Livestock Office, 2018). With the physical characteristics of Kong Khaek Sub-district locates in a mountain complex and urban area, it makes transportation inconvenient and difficult to enter to the working areas for livestock officers.Livestock officers in Mae Chaem district are not enough to serve farmers. It made difficult to solve the problem of beef cattle raising among farmers in the area (Intaratat, 2010). Therefore, learning media are an important tool for livestock officers. It helps to transfer knowledge, processes, methods, including various information to farmers as well as an intermediary in the transmission between officials and beef cattle farmers.

For these reasons, it is interested to study the learning materials for beef cattle farmers in Kong Khaek Sub-district, Mae Chaem District, Chiang Mai Province. The objectives of this research were to study social and economic factors that affect beef cattle raising farmers, to analyze the learning materials for farmers, to suggest learning materials and farming practices to beef cattle farmers to apply the obtained information as a guideline in the production of appropriate promotional materials, and to match the needs of farmers in the areas. It was also to improve the level of knowledge required for farmers; therefore, they can continue to apply their appropriately knowledge.

Materials and methods

The research data collected from January to February 2020. The population of this study was beef cattle farmers in Kong Khaek Sub-district, Mae Chaem District, Chiang Mai Province, which was registered with the Mae Chaem District Livestock Office, a total of 227 cases (Chiang Mai Provincial Livestock Office, 2018). The researcher determined the sample size with Taro Yamane's formula. The confidence level is 95%, received a

sample of 145 people, and simple sampling. The research instrument is an interview form (α = 0.907) contained questions about farmers' basic in social, economic information and the need for learning media in beef cattle breed, beef cattle feed, management and rearing of beef cattle at different stages, prevention and treatment of beef cattle disease, and preparation of standards beef cattle farm. By adapting the numerical estimation method of the Likert Scale into 4 levels, the scores were 3, 2, 1, and 0, respectively. The interpretation used the range of the mean as the basis as follows: Mean 2.26 - 3.00 means high demand, 1.51 - 2.25 means medium demand, 0.76 - 1.50 means low demand, and 0.00 - 0.75 means very low demand. The collected data were analyzed using descriptive statistics including percentage, mean, and standard deviation to explain some basic social and economic information of farmers. And using stepwise multiple regression analysis to determine the relationship of independent variables with the learning material needs of beef cattle farmers in Kong Khaek Sub-district, Mae Chaem District, Chiang Mai Province.

Results

Basic social and economic information of beef cattle farmers in Kong Khaek Sub-district, Mae Chaem District, Chiang Mai Province

The study found that the most of the farmers were male with an average age of 49.69 years old, graduated from Grade 4, and average of 7.75 years in experience on raising beef cattle. In 2019, farmers gathered an average household income of 87,595.86 Baht, an average outstanding debt of 216,141.38 Baht which most of them borrowed money from Agricultural Cooperatives Bank. In the year 2019, it was found that most farmers raised indigenous breed of beef cattle with an average number of 14.52. Most farmers were used a model of free herd cattle raising. Besides, most of the farmers were not members of the beef cattle community. Farmers received information about beef cattle with the average of 1.9 and 0.84 in contact with livestock officers (Table 1).

The need for learning media of beef cattle farmers in Kong Khaek Subdistrict, Mae Chaem District, Chiang Mai Province

The content of learning media found that the need for learning media of beef cattle farmers was high ($\overline{X}$ = 2.29). When it considered as the knowledge subjects, and sorted by an average score from descending, it found that farmers received a high level of need for knowledge in three areas (Table 2), which were: 1) The knowledge of prevention and treatment of disease in beef cattle ($\overline{\overline{X}}$ = 2.51) found that farmers required knowledge at a high level. It was consisted of 5 topics, sorted by the average score from descending, which were observed in beef cattle behaviour for rearing management

($\overline{X}$ = 2.62), major epidemic disease of beef cattle ($\overline{X}$ = 2.59), basic knowledge about beef cattle disease ($\overline{X}$ = 2.52), endogenous and internal parasitic diseases of beef cattle ($\overline{X}$ = 2.51), and sanitation management in beef cattle farms ($\overline{X}$ = 2.30), respectively. 2) The knowledge of beef cattle feed ($\overline{X}$ = 2.33) found that farmers required knowledge at a high level which consisted of 5 topics, and sorted by the average score from descending, which were the concentrated feed formula for beef cattle in various ranges ($\overline{X}$ = 2.39), minerals for beef cattle ($\overline{X}$ = 2.34), preservation of forage to use during the dry season ($\overline{X}$ = 2.33), toxic substances in forage knowledge ($\overline{X}$ = 2.32) and forage (grass/peas) ($\overline{X}$ = 2.26), respectively. 3) The knowledge of beef cattle breeds ($\overline{X}$ = 2.32) found that the farmers required knowledge at a high level. There were related to 4 topics which were selected the breeders for beef cattle ($\overline{X}$ = 2.41), basic information of each breed, the breeding of beef cattle ($\overline{X}$ = 2.34), and the beef cattle method ($\overline{X}$ = 2.32), respectively. Farmers gained a moderate level of knowledge requirements for the estimation of cattle age and weight ($\overline{X}$ = 2.21). However, The armrest had a moderate level for knowledge into 2 subjects. 4) The knowledge of standardization of beef cattle farms ($\overline{X}$ = 2.20) found that the farmers required knowledge at a high level. It consisted of 2 topics which were animal welfare ($\overline{X}$ = 2.37), farm management and environment ($\overline{X}$ = 2.27), and farmers required knowledge at a medium level. It consisted of 3 topics which were beef cattle feed and water ($\overline{X}$ = 2.14), recorded data ($\overline{X}$ = 2.13), and farm composition ($\overline{X}$ = 2.07), respectively. 5) The knowledge of management and rearing of beef cattle in different stages ($\overline{X}$ = 2.11) found that the knowledge farmers required a moderate level. It consisted of 5 topics which was sorted by the average score from descending in beef cattle raising (feedlot cattle) ($\overline{X}$ = 2.18), management and raising beef cattle (Bulls) ($\overline{X}$ = 2.12), beef cattle raising (cows), raising cows during pregnancy ($\overline{X}$ = 2.10), management and raising cattle (calves) ($\overline{X}$ = 2.05), respectively.

Table 1. Mean and standard deviation of variables used in multiple regression analysis

variables	Mean	S.D.
1. Sex Gender (1 Male/ 0 Female)	0.79	0.406
2. Age (years)	49.69	10.869
3. Education level (years)	4.72	4.187
4. Beef rearing experience (years)	7.75	7.749
5. Total household income, in 2019 (Baht)	87,595.86	48,943.256
6. outstanding debt (Baht)	216,141.38	170,359.553
7. Number of beef cattle that farmers raised (number of beef cattle)	14.52	18.662
8. Group membership (1 member / 0 not member)	0.43	0.497
9. Contact the Department of Livestock Development officer, in 2019 (Times/ year)	0.84	1.540
10. Receiving information about beef cattle, in 2019 (number of channels)	1.90	1.123

Table 2. Learning media needs of beef cattle farmers in Kong Khaek Sub-district, Mae Chaem District, Chiang Mai Province (Content)

Subjects of knowledge about beef cattle raising	X̄	S.D.	Interpretation
1. Prevention and treatment of disease in beef cattle	**2.51**	**0.643**	**High**
1.1 Basic knowledge about beef cattle disease	2.52	0.746	High
1.2 Major epidemic of beef cattle	2.59	0.723	High
1.3 Diseases from external and internal parasites of beef cattle	2.51	0.718	High
1.4 Observation of beef cattle behaviour for rearing management	2.62	0.678	High
1.5 sanitation management in beef cattle farms	2.30	0.887	High
2. Feed of beef cattle	**2.33**	**0.712**	**High**
2.1 Forage (grass / peas)	2.26	0.890	High
2.2 Concentrated feed formulas for beef cattle in various ranges	2.39	0.810	High
2.3 Minerals for beef cattle	2.34	0.868	High
2.4 Toxic substances in forage that should known	2.32	0.807	High
2.5 Preservation of forage for use in dry season	2.33	0.882	High
3. Beef cattle breeds	**2.32**	**0.711**	**High**
3.1 Basic information of each breed	2.34	0.811	High
3.2 Selection of breeders of beef cattle	2.41	0.795	High
3.3 Breeding method	2.32	0.864	High
3.4 Breeding of beef cattle	2.34	0.827	High
3.5 Estimation of beef cattle age and weight	2.21	0.899	Medium
4. Standardization of beef cattle farms	**2.20**	**0.875**	**Medium**
4.1 Farm composition	2.07	1.011	Medium
4.2 Beef cattle feed and water	2.14	1.025	Medium
4.3 Farm management and environment	2.27	0.922	High
4.4 Animal welfare	2.37	0.905	High
4.5 Data recording	2.13	1.029	Medium
5. Management and raising of beef cattle at various stages	**2.11**	**0.882**	**Medium**
5.1 Management and raising cattle (calves)	2.05	0.945	Medium
5.2 Beef cattle raising (feedlot cattle)	2.18	0.948	Medium
5.3 Beef cattle raising (cows)	2.10	0.981	Medium
5.4 Raising cows during pregnancy	2.10	0.960	Medium
5.5 Management and raising beef cattle (Bulls)	2.12	0.957	Medium
Total	**2.29**	**0.604**	**High**

Note: Descending order, Mean 2.26 - 3.00 = High demand, 1.51 - 2.25 = Medium demand, 0.76-1.50 = Low demand, 0.00-0.75 = Very low demand.

The types of learning media found that the farmers wanted to learn in 5 subjects which was classified by the types of learning media as following written. 1) The knowledge of prevention and treatment of disease in beef cattle found that the majority of farmers wanted to learn through (1) personal media via livestock officers (57.93%), (2) technology by video viewing (80.69%), (3) activities through training (77.24%), (4) printing media by studying through the handbook (68.28%). The learning time that the majority of farmers wanted to learn is from 4.01-7.00 p.m. and they wanted to have printing media at the Administrative Organization District.2) The knowledge of beef cattle feed found that the most farmers wanted to learn through personal media via livestock officers (62.07%), technology by video viewing (78.62%), activities through training (75.68%), and printing media by studying through the handbooks (66.22%). The learning wanted time for the most farmers want was during 4.01-7.00 p.m. and they wanted to printing media at the Administrative Organization District. 3) The knowledge of beef cattle breeds found that the most farmers wanted to learn through personal media via livestock officers (66.89%), technology by video viewing (79.31%),activity through training (74.49%), printing media by studying through handbook (65.52%). The learning time through technology and personal media, most of the farmers wanted to learn at 4.01 - 7.00 p.m. (59.31%) and learning through activities during 9.01 - 12.00 a.m. (33.10%). They also wanted to printing media at the Administrative Organization District. 4) The knowledge of standardization of beef cattle farms found that the most farmers wanted to learn through personal media via livestock officers (61.38%), technology by video viewing (80.00%), activities through training (77.93%), and printing media by studying through handbook (67.58%). The learning wanted time of the most farmers were 4.01 - 7.00 p.m., and they wanted to printing media at the Administrative Organization District. 5) The knowledge of management and rearing of beef cattle in different stages found that the most farmers wanted to learn through personal media via livestock officers (59.31%), activity through training (80.00%), technology by video viewing (77.24%), printing media by studying through handbook (66.90%). The learning time through technology and personal media, most of the farmers wanted during 4.01 - 7.00 p.m. (63.45%), and learning through activities during 9.01 - 12.00 a.m. (31.72%). They also wanted for printing media at the Administrative Organization District (Table 3).

Table 3. Overview, the results of learning media needs of Beef Cattle Farmers

Subjects of learning media needs	X̄	S.D.	Interpretation	learning media, Time, and Service point			
				Personal media	**Technology media**	**Activity media**	**Printing media**
				Time	Time	Time	Service point
1. Prevention and treatment of beef cattle disease	2.51	0.643	High	Department of Livestock Development officer (57.93)	Videos (80.69)	Agricultural training (77.24)	Handbook (68.28)
				4.01 – 7.00 p.m. (33.10)	4.01 – 7.00 p.m. (62.07)	4.01 – 7.00 p.m. (28.97)	Sub-district Administration Organization (57.93)
2. Beef cattle feeds	2.33	0.712	High	Department of Livestock Development officer (62.07)	Videos (78.62)	Agricultural training (75.86)	Handbook (66.22)
				4.01 – 7.00 p.m. (32.41)	4.01 – 7.00 p.m. (62.76)	4.01 – 7.00 p.m. (31.03)	Sub-district Administration Organization (62.07)
3. Beef cattle breeds	2.32	0.711	High	Department of Livestock Development officer (66.89)	Videos (79.31)	Agricultural training (74.49)	Handbook (65.52)
				4.01 – 7.00 p.m. (34.49)	4.01 – 7.00 p.m. (59.31)	9.01 – 12.00 a.m. (33.10)	Sub-district Administration Organization (45.51)
4. Standardization of beef cattle farms	2.20	0.875	Medium	Department of Livestock Development officer (61.38)	Videos (80.00)	Agricultural training (77.93)	Handbook (67.58)
				4.01 – 7.00 p.m. (33.79)	4.01 – 7.00 p.m. (60.00)	4.01 – 7.00 p.m. (29.66)	Sub-district Administration Organization (62.76)
5. Management and rearing of beef cattle in different stages	2.11	0.882	Medium	Department of Livestock Development officer (59.31)	Videos (77.24)	Agricultural training (80.00)	Handbook (66.90)
				4.01 – 7.00 p.m. (35.18)	4.01 – 7.00 p.m. (63.45)	9.01 – 12.00 a.m. (31.72)	Sub-district Administration Organization (64.84)
Total	**2.29**	**0.604**	**High**				

Note : Descending order ,Mean 2.26 - 3.00 = High demand, 1.51 - 2.25 = Medium demand, 0.76-1.50 = Low demand, 0.00-0.75 = Very low demand.

Analysis of relationship between independent variables and demand for learning media of beef attle Farmers in Kong Khaek Sub-district, Mae Chaem District, Chiang Mai Province

Pears product-moment correlation coefficient found that there was no correlation between independent variables (Multicollinearity). The researcher analyzed using stepwise multiple regression analysis. From the analysis, it was found that multiple coefficients of determination: R^2 was 0.264. It was able to describe that all independent variables were mutually exclusive to describe dependent variables as 26.40%. There were 10 independent variables, but 2 independent variables correlated with the needs of farmers' learning media. The statistical significance level at 0.01 with the beef rearing experience and receiving information about beef cattle are shown in Table 4.

Y = 2.245 - 0.033 (beef rearing experience) + 0.162 (receiving information about beef cattle)

The analysis results revealed that

Beef rearing experience had a negative correlation with the needs of farmers' learning media. It means that the farmers with a high level of experience in rearing beef cattle had a low demand for learning media. Most of the farmers with a high level of experience were senior farmers who raised the cattle in a free herd on the mountain. It is a way of raising beef cattle according to hill tribe. Due to this way of raising beef cattle, it had a low-cost of farming.

Receiving information about beef cattle had a positive correlation with the needs of farmers' learning media. It means farmers who received information about the beef cattle in multi-channel increased the demand for learning media. Due to the farmers who received information through multi-channel would receive information about the new technology faster than farmers with less channel in receiving information. The farmers were able to apply the knowledge by testing with their farm.

Table 4. Regression coefficient of independent variables, factors related to learning media needs of beef cattle farmers in Kong Khaek Sub-district, Mae Chaem District, Chiang Mai province

Variables	Coefficient (b)	t	Sig
(Constant)	2.245		.000
Beef rearing experience (X_4)	-.033	-5.936	.000
Receiving information about beef cattle (X_{10})	.162	4.179	.000
R = 0.514 R^2 = 0.264 SEE = 0.522 F = 25.468 Sig of F = 0.000			

Discussion

The study found that most of beef cattle farmers in Kong Khaek Sub-district, Mae Chaem District, Chiang Mai Province cultivated maize which faced–water shortage. In addition, the geographical area is the hill area, the most farmers preferred to raise native beef cattle than hybrid beef cattle. The characteristics of the native beef cattle are easy to raise, tolerate climate, and resistant to diseases and pests.These characteristics revealed that farmers mainly used free herd in the hill area and raised beef cattle as a household income and saving.

The knowledge that farmers needed in 3 subjects found in accordance with Pojun *et al.* (2011) who explained that farmers had high demand in the knowledge of breeding, farm management, managing and rearing beef cattle in various stages, artificial insemination, cattle feed, drugs and treatment of disease, standardize beef cattle beef, and selling beef cattle, respectively. From the research finding, it reflected that farmers in the areas needed new knowledge and methods to solve the problems that raised in rearing their beef cattle through learning media for easy to learn and access. According to Rasamithet (2012) explained that the individual person had a role in learning and embracing the transition from information technology to improve the quality of life and solve the problem. It depended on the factor of learning in an individual.

The result of the factors related to the need for learning media for farmers was a negative correlation with experience in rearing beef cattle. Most elderly farmers with much experience have considerable expertised in raising beef cattle. Farmers were active in acquiring new knowledge to develop their skills for raising beef cattle.

They have good knowledge of the use of technology in Artificial Insemination, TMR,Synchronization,and AllFlex cattle tags who can access information quickly. There was a positive correlation to receive information in beef cattle. Farmers who received information from multi-channel would have the opportunity to receive new information about beef cattle rearing. It increased the level of seeking a new knowledge about the method of rearing beef cattle, and farm management in various styles to test on their farm through different channels. Enhancement of knowledge in the rearing of beef cattle for farmers was very important in developing the rearing of beef cattle. Therefore, the livestock office should have conducted the research and training to transfer the knowledge through learning media to develop and expanded knowledge from the workshop in the rearing of beef cattle. According to Angkuraseranee *et al.* (2019) who stated that it should enhance farmers' knowledge and competence of farmers through training programs or help in beef cattle rearing. This elevates the role of farmers in producing beef, increasing the source of income in beef cattle rearing, handling food, and preventing of beef cattle disease (Figure 1).
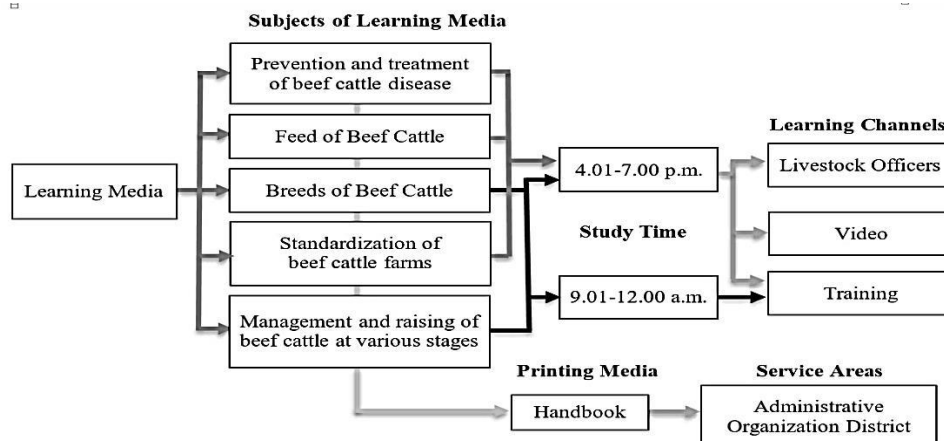
Figure 1. Guidelines for promoting the learning media to beef cattle farmers in Kong Khaek Sub-district, Mae Chaem District, Chiang Mai Province

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