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EXPLORING INFORMATION MEDIA PREFERENCES AMONG GOAT AND SHEEP FARMERS: A CASE STUDY IN DAERAH ISTIMEWA YOGYAKARTA PROVINCE

Eksplorasi Preferensi Media Informasi Peternak Kambing dan Domba: Studi Kasus di Provinsi Daerah Istimewa Yogyakarta

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ABSTRACT

Goats and sheep are small ruminants with positive growth values in Daerah Istimewa Yogyakarta Province (DIY). Goats and sheep development in DIY is necessary since these two livestock might be profitable to farmers. Information media have a significant role in disseminating knowledge and innovation to farmers quickly and effectively. However, information access fulfillment for the farmers is the weakness of livestock development. The aims of this research are to analyze farmers' information media preferences and the factors influencing them. The information media in this study are dummy, namely person media with code zero (0) and ICT media with code one (1). The data was collected through a survey method that involved face-to-face structured questionnaire interviews to goat and sheep farmers in DIY who have at least one year of experience raising goat and or sheep. Farmers in DIY used personal media as their primary information source (86.42%), with fellow farmers being the most popular choice among farmers. Only 13.58% of farmers choose ICTs, with mobile phones being the preferred ICT over computers, radio, and television. The preference for using ICT is influenced by farmer characteristics: age ($p < 0.01$), livestock experience (p

< 0.05), costs (p < 0.1), and ICT number (p < 0.05). Information dissemination using ICT media will be more appropriate for young farmers who are just starting their business.

Keyword: ICT media, livestock farmers, preference

ABSTRAK

Kambing dan domba merupakan ternak ruminansia kecil yang memiliki nilai pertumbuhan positif di Daerah Istimewa Yogyakarta (DIY). Secara ekonomi kedua ternak ini dapat memberikan keuntungan bagi peternak, oleh sebab itu pengembangan kambing dan domba di DIY perlu dilakukan. Media informasi memiliki peran penting dalam upaya tersebut untuk menyampaikan pengetahuan maupun inovasi kepada peternak secara cepat dan tepat. Namun demikian justru pemenuhan kebutuhan akses informasi peternak masih merupakan salah satu kelemahan dalam upaya pengembangan peternakan. Penelitian ini bertujuan untuk menganalisis preferensi media yang digunakan oleh peternak untuk mengakses informasi dan faktor yang mempengaruhinya. Media informasi pada penelitian ini merupakan dummy person media dengan kode 0 dan ICT media dengan kode 1. Pengumpulan data dilakukan dengan metode survey menggunakan wawancara kuesioner face to face kepada peternak kambing dan atau domba di DIY yang memiliki pengalaman beternak minimal selama 1 tahun dan memelihara kambing dan atau domba saat penelitian ini dilakukan. Hasil yang diperoleh menunjukkan peternak kambing domba di DIY masih menjadi person media sebagai media informasi utama (86.42%), dengan teman sesama peternak sebagai preferensi yang paling banyak digunakan oleh peternak. Preferensi ICT media hanya dilakukan oleh 13.58% peternak, dengan pilihan paling banyak adalah handphone dibandingkan televisi, radio dan computer. Dari analisis logistic regression, preferensi penggunaan ICT media dipengaruhi oleh karakteristik peternak yaitu usia (P<0.01), pengalaman beternak (P<0.05), biaya pemeliharaan (P<0.1) dan ICT number (P<0.05). Maka dengan demikian diseminasi informasi dengan menggunakan ICT media akan lebih tepat dilakukan pada peternak muda yang baru memulai usahanya.

Kata Kunci: media teknologi informasi, peternak, preferensi

INTRODUCTION

Farmers in rural Indonesia usually raise small ruminants like goats and sheep as a saving because they can be sold easily (Hidayat et al., 2021). Farmers can earn income, fulfill dietary needs, and ensure food safety for their households by raising these two livestock (A'yun et al., 2019; Utami & Dian, 2019). Economic benefits for farmers can be live livestock, meat, milk, and skins as well as manure (Kusumastuti et al., 2019; Tiesnamurti et al., 2020). In addition, goats and sheep are very easy to maintain in various regions of Indonesia (Ibrahim et al., 2021).

The Indonesian Central Statistics Agency data show 421,400 goats and 150,500 sheep living in Daerah Istimewa Yogyakarta (DIY) as of 2022. Small ruminants dominate large ruminants, following these findings, goats and sheep have a stronger potential for development than other ruminants. In terms of economic value, goats and sheep have a R/C value close to one, implying that if developed, they will benefit farmers (Tenrisanna & Kasim, 2021).

Adequate information can assist farmers in increasing their knowledge about managing their farms. Information is a valuable resource for business operations and helps farmers make effective decisions (Hariyanto & Anwar, 2019). The availability and use of technical information are important in the adoption of best management practices. Farmers' access to information is a critical aspect of their business (Liu et al., 2018).

In practice, farmers have barriers to information access in general due to a lack of suitable infrastructure and facilities, poor internet connections, a lack of facilitator knowledge, and farmer characteristics such as education and awareness (Misaki et al., 2018). The barriers to accessing agricultural information are commonly associated with the lack of means and facilities (Panda et al., 2022). Thus, important information should be made available through appropriate media in order to improve farmers' knowledge and skills (Misaki et al., 2018). Farmers' information media use is analyzed to determine the importance of these media and their preferences (Moyo & Salawu, 2019). The barrier to developing small ruminants in Indonesia is farmers' poor access to necessary information (Tiesnamurti et al., 2020).

The existence of information and communication technology (ICT), which is a medium or tool for processing, manipulation, management, and transfer of information, also helps accelerate the delivery of information in agriculture. The ICT used is an important pillar of agricultural extension and has recognized as mechanism for delivering modern information (Purnomo & Kusnandar, 2019). ICT facilitates knowledge sharing within and among agriculture networks, including researchers, exporters, extension services, traders, and farmers (Kabirigi et al., 2023). ICT has been widely used abroad for the study and improve various aspects of livestock production, animal health, research, and education (Panda et al., 2022; Trendov & Vasa, 2020). The ICT used in livestock information dissemination are mobile phones, radio, television, and computers (García-Villegas et al., 2020).

Certain countries have researched on the use of information media in their agricultural sectors. Radio, extension agents, and fellow farmers are the most commonly used information media by farmers in Nigeria (Fidelugwuowo, 2021; Oluwatayo & Ojo, 2019). In Pakistan, where extension agents is last option, farmers prefer to get agricultural information through print or electronic media (Aldosari et al., 2019). Farmer information media can be divided into two categories: person and ICT media. Meanwhile, no research

has done on the preferences of goat and sheep farmers for the information media used in DIY. This study is critical for analyzing small ruminant farmers' preferences for using person and ICT media. The findings of this study are intended for the design of farmer's information media to transfer information appropriately and efficiently.

RESEARCH METHOD

Sampling and Data Collection

The stratified random sampling method was used to determine the survey location. Three regencies were first chosen at random, and then three districts were chosen randomly from each regency. Additionally, farmers selected through the purposive sample method were interviewed in each district. The purposive sampling, with the requirements of being a goat and sheep farmers in the DIY Province with at least one year of and owning goats and sheep. The distribution of regencies and the number of farmers in each district are show in the Table 1.

Table 1. Sampling Area

Regency	District	Number of Farmer Respondent
Sleman	Prambanan	33
	Berbah	33
	Kalasan	33
Bantul	Dlingo	35
	Imogiri	35
	Piyungan	35
Gunung Kidul	Wonosari	35
	Playen	35
	Patuk	35

Source: Secondary Data Processed, 2023

A total 309 small ruminant (goats and sheep) farmers participated in the study from June through September 2022. Data about farmer characteristics, farmer business characteristics, and information media preferences were obtained through face to face interviews with a structured questionnaire.

Data Analysis

The preference is the farmer's information media primary choice to access information related to the business or maintenance of goats and sheep. According to the literature studies, there are two general categories for farmers'

information media preferences: person and ICT media. Person media includes extension agents, veterinarians, livestock group leaders, fellow farmers, intermediary traders, family members, or researchers which are then categorized as zero (0). ICT media includes mobile phones, television, radio or computers which are then categorized as one (1).

Binary logistic regression was used to examine the factors influencing these preferences. Table 1. shows the variables used in the factor analysis.

Table 2. Variables Definition

Code	Variable	Definition	Measurement Type	Expected Sign
Dependent variable				
Y	Preference	Farmer information media preferences	Categorical 0 = person 1 = ICT media)	
Independent variable				
X1	Age	Farmers' age in units of years	Continuous	-
X2	Education	Farmers' formal education in units of years	Continuous	+
X3	Livestock experience	Experience raising goats and or sheep in units of years	Continuous	+
X4	Livestock number	The total number of livestock owned by the farmer in Tropical Animal Unit (TLU[a])	Continuous	+
X5	Costs	Total monthly costs incurred by farmers for livestock maintenance in rupiah	Continuous	+
X6	ICT number	Farmers' total number of information and communication technologies	Continuous	+

[a]TLU is a Tropical Livestock Unit which a young goat and sheep equal to 0.06 TLU and a mature goat and sheep equal to 0.13 TLU
Source: Literature Review Processed, 2023

Logistic regression was used to predict the categorical dependent variable. Logistic regression analysis is a method for developing prediction models such as linear regression, often known as Ordinary Least Squares (OLS) regression. The distinction is that logistic regression predicts dependent variables that scale on a dichotomous scale. The dichotomous scale is a nominal data scale with two categories (Harris, 2021). The dependent variables are dichotomized, with farmers' preferences for ICT media coded 1 and person media coded 0. SPSS version 22 was utilized as a statistical analysis tool with significance values of $p \leq 0.01$, $p \leq 0.05$ and $p \leq 0.10$. The logistic regression equation utilized in this study is as follows:

$$Log\left[\frac{P}{(1-P)}\right] = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + e$$

Noted:

P = the probability farmers choose ICT media
$1 - P$ = the probability farmers choose Person media
$\beta 0$ = Constanta
$\beta 1$ = coefficient regression of age
$\beta 2$ = coefficient regression of education
$\beta 3$ = coefficient regression of livestock experience
$\beta 4$ = coefficient regression of livestock number
$\beta 5$ = coefficient regression of costs
$\beta 6$ = coefficient regression of ICT number

Table 3. Descriptive Statistics of The Variables

Variables	Unit
Age	Year
Education	Year
Livestock experience	Year
Livestock number	TLU
Costs	IDR
ICT number	Number

Source: Literature Review Processed, 2023

RESULT AND DISCUSSION

Demographic Characteristics Of Farmers

The demographic characteristics included in this study are age, education, livestock experience, livestock number, cost, and ICT number. Goat and sheep farmers in Yogyakarta Special Region Province are between 26 and 60 years old (75.38%), indicating that most farmers are of productive age. Farmers over the age of 60 represent 23.62% of all farmers, while those under the age of 25 account for only 1%. Even though 5.5% of farmers are illiterate, more than half have a secondary and high school education, 36.58% have a primary school education, and 3.55% have a doctoral degree or higher. The average livestock experience is 10.48 years, with most farmers having 5 to 10 years of experience (35%). In addition, 33% of farmers have fewer than five years of expertise, while 32% have more than ten years of experience.

Table 3. Demographic Characteristics Of Farmers

Demographic Characteristics	Frequency	Percentage (%)	Mean
Age (years)			51.52
Less than 25	3	1	
26-60	233	75.38	
More than 60	73	23.62	
Education			8.40
Illiterate	17	5.5	
Primary schooling	113	36.58	
Secondary and high level schooling	168	54.37	
Graduate and above	11	3.55	
Livestock experience (years)			10.48
Less than 5	102	33	
5 – 10	108	35	
More than 10	99	32	
Livestock number			1.23
Less than 0.26	15	4.85	
0.26 – 0.65	138	44.66	
More than 0.65	156	50.49	
Costs(IDR)			562,226
Less than 1.500.000	289	93.5	
1.500.000 – 3.000.000	12	4.2	
More than 3.000.000	7	2.3	
ICTs number (unit)			2
0	15	4.85	
1 – 3	288	93.21	
More than 3	6	1.94	

Source: Primary Data Processed, 2023

Livestock number shows the large number of goats and sheep owned by farmers with total livestock units (TLU). The conversion of the total livestock unit (TLU) value for an adult sheep and goat is 0.13 TLU, whereas it is 0.06 TLU for a young sheep and goat. The average livestock number is 1.23 TLU or equal to 9 adult sheep and goats plus a young sheep and goats. With the number of goats and sheep, the average monthly maintenance cost is IDR. 562,226.00. According to the findings, almost all of the farmers (93.21%) already have ICT tools.

Farmers' Information Media Preferences

Information media preferences are a priority for farmers' choice of various media to obtain animal husbandry information. The purpose of using information media, particularly in the development of the livestock industry, is to disseminate knowledge to farmers so that they could solve problems and

make business decisions in their livestock business. Overall, farmers remain to choose information media in the form of person (86.42%) above ICT media (13.58%) (Table 4).

Table 4. Farmers' Information Media Preferences

No.	Information media	Number	Percentage (%)	Total Percentage (%)
1	Person			86.42
	a. Extension agent	11	3.56	
	b. veterinarians	27	8.73	
	c. livestock group leaders	38	12.29	
	d. fellow farmers	141	45.63	
	e. intermediary traders	7	2.27	
	f. family members	43	13.91	
	g. researchers	-	-	
2	ICT media			13.58
	a. Mobile phones	41	13.26	
	b. Television	1	0.32	
	c. Radio	-	-	
	d. Computer	-	-	
	Total	309	100.00	100.00

Source: Primary Data Processed, 2023

Among the available media, both in person and through ICTs, more farmers (45.63%) prefer fellow farmers to gather information. The reason is because they consider it is more frequent and convenient for them to meet with fellow farmers. Several farmers have made the following statements about this matter:

Farmer 73 "I meet my fellow farmers more often, and it's easier to find them when I want to meet". Farmer 48 "We can exchange information by sharing our experiences with fellow farmers".

The main source of information for farmers is fellow farmers (Skaalsveen et al., 2020). Farmers rely on informal sources of information for their agricultural information needs, and they typically obtain their daily agricultural knowledge through discussions with fellow farmers (Diemer et al., 2020). In addition, all information acquired from fellow farmers is based on experience, so it is accurate. Recommendations from fellow farmers are more valued because of real-life experience (similar socioeconomic circumstances);

hence, adopting farmers is practically certain to get the same results as referring farmers (Rust et al., 2022). The farmer-to-farmer model refers to the exchange of information between farmers. In this model, farmers actively seek information from other farmers to expand their expertise (Azumah et al., 2018). This knowledge-gathering method, also known as social learning, is distinguished by the pooling of information or by observing and imitating the behavior of others (Cronkleton et al., 2021).

Extension agents that are educated animal husbandry professionals receive a very low percentage in the person media (3.56%). These findings indicate that extension agent interaction with farmers and extension agent duty implementation are relatively low. As is well known, extension agent role are to disseminate new knowledge and technology to farmers in order to boost farmers' livestock production (Baloch & Thapa, 2018). Extension agents provide assistance with the goal of helping farmers to develop their knowledge and abilities for improved business results. Extension agents disseminate information to farmers and families, because livestock activities are generally carried out within the family scope (Tamsan & Yusriadi, 2022). Extension agents must visit farmers more frequently, with the goal of encouraging and assisting farmers in resolving problems related to their livestock business (Baba et al., 2019).

The usage of information and communication technology (ICT) media as a priority for getting livestock information is quite low, falling short of 15%. In general, farmers are still unaware of how to use ICT media to boost livestock productivity. Farmers that have implemented ICT media report a good influence on their business (Aldosari et al., 2019). The majority of farmers utilize ICT in the form of mobile phones; some of the farmers' statements regarding the use of ICT media include:

Farmer 118 "Usually I use a mobile phone to open Youtube, by looking at Youtube videos, I understand better and can be played back".

Farmer 206 "I access information using a mobile phone because it is easier and faster to get information".

Farmer 240 "I prefer to obtain information via mobile phone because there are groups with other farmers on Whatsapp and Facebook where I can get a lot of information".

According to the opinions of some farmers, the usage of ICT media can benefit farmers by allowing them to gain information more quickly and easily. Farmers can acquire information from numerous sources such as YouTube, Whatsapp, and Facebook. In this study, all farmers with media preferences are mobile phones, accessing YouTube, which is generally used to find information related to feed management. The ICT used in the dissemination of livestock information primarily aids in disease prevention, livestock rearing management, livestock production, and livestock product marketing (Rajoria et

al., 2019). ICT provides its users with a multimedia experience that includes sound as well as moving visuals in the form of videos (Purnomo & Kusnandar, 2019). It is also useful for reaching a large audience rapidly and at a minimal cost (Panda et al., 2022).

Agriculture information resources should be significantly organized and processed to disseminate right information to the right user at the right time. ICT tools could be a feasible option for the extension service providers. Information and communication technology (ICT) is the output of all forms of transmission such as electronic devices, networks, mobile phones, services, and apps that aid in the immediate and effective dissemination of information. However, in this study, only 13.58% of farmers used ICT to access information. These results indicate that the use of ICT in goat and sheep farmers in DIY is still low. This result is in line with research conducted by Khalak et al., (2018), where the majority of the farmers had low access to ICT while only 3.8% had medium access and 15.0% of them having no access to ICT based media. The major challenges inhibiting the use of ICT in disseminating agricultural knowledge and information are the low level of access to ICT infrastructure and services which need to be addressed (Debelo, 2020).

Factors Analysis

The results of the logistic regression analysis show that farmers' choices for using ICT media are influenced by age ($p < 0.01$), livestock experience ($p < 0.05$), costs ($p < 0.1$), and ICT numbers ($p < 0.05$). Table 5 summarizes the empirical result of logit regression. The model explained 207.679 (-2 log likelihood) of all the variables significant at $p < 0.01$. The model with the independent variable fits the data.

The results indicate that farmers' age has a negative coefficient and is significant at 1%. The negative coefficient indicates that the older the farmer, the less probable the farmer is to use ICTs. The trend ICT is more towards young farmers. In addition, younger farmers are more open to new ideas and innovations than older ones (Mdoda & Mdiya, 2022). It has also been confirmed that age has a negative effect on technology adoption and usage, particularly ICTs. It is imperative to influence adoption and use of ICT in agriculture to the young entrepreneurs, because they are faster than their older counterparts (Jolex & Tufa, 2022).

The livestock experience has a negative value, implying that the longer farmers have been raising goats and sheep, the less likely they are to use ICTs to get information. Farmers with more experience will have a strong network of fellow farmers, extension agents, veterinarians, and other people related to their business. On the other hand, farmers will be more certain that the information they acquire is correct if they obtain it directly from people they know who have experienced the object or situation in question.

Table 5. Logistic Regression Analysis

Characteristic	Coefficient	Standard Error	*Sig.*
Age	-0.043	0.016	0.009***
Education	0.058	0.058	0.313
Livestock experience	-0.076	0.033	0.021**
Livestock number	-0.115	0.091	0.206
Costs	0.000	0.000	0.095*
ICT number	0.486	0.216	0.024**
Number of observation	309		
Constanta	-1.614		
Chi-square	34.244***		
-2 Log Likelihood	207.679***		
Total correctly predicted (%)	88.0		
% correctly predicted (ICT media)	12.2		
% correctly predicted (Media person)	99.6		

* $p < 0.1$; ** $p < 0.05$; *** $p < 0.01$
Source: Primary Data Processed, 2023

The average livestock experience of farmers is more than ten years. Farmers with more than ten years of experience typically have access to information through radio, newspaper, or word of mouth (William et al., 2021). Farmers with relatively long experience will have a learning process affected, including their needs and readiness to receive new information (Anwarudin & Dayat, 2019). Experience is a source of information for farmers, and farmers can make decisions to control the problems (Moya et al., 2020).

Farmers with high maintenance costs will prefer ICT media for information access. The high maintenance cost is countered in part by the large number of livestock owners. Farmers with more livestock will focus on agribusiness, not just for savings or as a side income. Farmers' information needs must be met quickly, easily, and completely. ICT media is the ideal tool for meeting these information needs.

When farmers receive adequate information on market trends, investment, and other issues, it can help lower the agribusiness activities costs. Access to information via ICT media can be accomplished at low cost, reducing the cost burden borne by farmers (Owuor, 2021). The ICT used can also gradually lower the cost of information management, allowing farmers to conduct information-related jobs considerably more efficiently (Zhang et al., 2022).

The ICT number factor demonstrates that the more ICT media farmers have, the more probability farmers are to choose ICT media. The large percentage of ICT media ownership and accessibility raises the possibility of using ICT media to develop knowledge and provide information about agriculture (Subejo et al., 2019).

CONCLUSION AND SUGGESTION

Conclusion

Although 93.21% of farmers already have ICT tools, the majority of goat and sheep farmers in DIY Province continue to rely on personal media, i.e., fellow farmers, to receive information on the implementation of their livestock businesses. The farmer preferences to extension agents in accessing information remains low. Based on the farmer's statement, this is because by face to face communication, they can exchange experiences and get solutions to problems directly. Factors affecting farmers' preferences using ICT media over personal media are age, livestock experience, costs, and ICT number.

Suggestion

Farmers now have ICT tools in more than 90% of cases, but they still prefer personal media to get livestock information. This shows that the ICT used has not been optimal, further research is needed related to the constraints, the frequency, the type of information accessed, and the attitude of farmers towards the use of ICTs.

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