

## Level of technology acceptance on Assisted Reproductive Technology (ART) among ruminant farmers in Kelantan, Malaysia

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### Abstract

This study was conducted as a response to the slow pace movement of the uptake and utilization of assisted reproductive technologies towards ruminant animals. This study has been conducted among ruminant farmers in Kelantan, specifically in Bachok and Jeli district. Simple random sampling technique was employed and a total of 87 ruminant farmers were involved. From the analyzed data, the acceptance of assisted reproductive technologies is depicted at a moderate level. Hence, based on the result obtained, educational institutions together with government agencies is recommended to play their roles together as a body to educate local ruminant farmers to ensure the increment of beef and milk productions as well as reaching the self-sufficiency level.

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## 1. INTRODUCTION

Meat is a crucial component in many parts of the world as it is incorporated into a typical diet as it contains essential proteins needed by the body. Thus, the livestock industry in Malaysia plays a crucial role for the Malaysian population. Despite production of poultry and swine has reached self-sufficiency levels, production of the ruminant subsector is still inadequate and a clear gap between demand and production can be observed (DVS, 2015). In a study conducted by Fadhilah (2015) states that livestock production is still inadequate to meet demand following the increase in population as well as rising consumption of meat. Besides, recent data show that ruminant farmers only produce 51,000 tons of beef metric ton (MT), while demand is more than 201,000 MT in 2013 (DVS, 2015). Consumption of livestock products will continue to increase, as well as the demand for ruminant products. The key to reduce this problem comes from smallholder farmers. As mentioned by Ariff, Sharifah and Hafidz (2015), these farmers have vast potential for further improvement of beef production efficiency. However, there are many obstacles and challenges in order to achieve the adequacy of ruminant supply.

The first reason for the inadequacy is the local ruminant breeds are petite, generating low quantity of meat and milk. And secondly, the practice of rearing animals is done as a side income for farmers. Hence, majority of them are small-holder farmers, rearing at most 5 heads of cattle on farms less than two hectare in size (Ariff et al., 2015).

Not only that, almost 70% farmers maintains the usage of natural mating (Noraida, Normala and Hassan et al., 2014). A measure to counter this problem, the Malaysian government comes out with different policies such as the Third National Agriculture Policy and National Agro-Food Policy with the aim to increase the efficiency of the ruminant industry through effective breeding services (Nor Amna A'liah & Mohamad Hifzan, 2015). Through this method, the genetic attributes of the local ruminant breeds can be modified, producing higher amount of meat and milk, narrowing the difference between supply and demand of ruminant products. However, even with the intervention of government bodies, the uptake and utilization of breeding policy is moving at a slow pace. Therefore, the level of acceptance towards assisted reproductive technologies (ART) is to be investigated as it is the solution to increase the productivity of the ruminant subsector in Malaysia as stated in the Malaysian Livestock Breeding Policy 2013.

## 2. MATERIALS AND METHODS

This study was conducted using quantitative research design with 87 ruminant farmers from Jeli and Bachok. The selection of Bachok and Jeli as the location of this study is due to location of Universiti Malaysia Kelantan campuses, to check whether there is any effort can be done for the local farmers there. The questionnaire was developed based on past studies together with literature reviews. Meanwhile, the reliability of the items

in the questionnaire was measured by using reliability test. Thus, the findings of this study indicate that the Cronbach alpha value for technology acceptance is 0.474. However, in order to increase the value of Cronbach alpha to 0.645, one item has been omitted. Furthermore, simple random sampling was employed in this study in order for each ruminant farmer to have equal chances to be selected as respondents. The name list of ruminant framers was given by the Department of Veterinary Services (DVS) and the researcher has randomly selected the respondents based on the name list. All items in the questionnaire were measured using Likert scale range 1-5, representing from strongly disagree to strongly agree and IBM SPSS Statistics was employed to run the appropriate analysis of this study.

### 3. RESULTS AND DISCUSSION

Table 1 shows the demographic profile of the respondents which has explained based on descriptive analysis such as frequency, percentage, mean and standard deviation. The age of ruminant farmers in this study ranged from 16 to 75 with mean score 41.3. In addition, this study also shows that majority of ruminant farmers are male with age ranged from 31 to 40. According to a study conducted by Tambi et al. (1999), age is one of the factors that influence the use of ART with the age group below 50 has a positive and significant relationship with the demand of ART. Besides that, education is also a factor that influences the acceptance of ART among farmers. The positive relationship between level of education and use ART is supported by Murage, Murage and Ilatsia (2014), farmers are likely to use ART as they are better informed with the advantages of ART such as increase in performance of their animal. Based on the result obtained, majority of the ruminant farmers completed their SPM (*Sijil Pelajaran Malaysia*) and 25.3% of them are degree holder. Meanwhile, 73.6% of the respondents have experience in business between one to 10 years. Thus, it shows that a good education background accompanied with the experience in business can lead to a success in ruminant farming.

Other than that, majority of the respondents had an annual income between RM 1,001 to RM10,000. Based on research done by Tambi et al. (1999), other factors which can influence a farmer to use ART is the income of that particular company. The demand of ART increases as there is an increase amount of annual income of the

producer. Thus, as the income is getting higher, these farmers are more financially able to use ART (Gros, 1994). On the other hand, years of business experiences also affects the acceptance of new technologies as the longer the business experience, the more likely farmers would accept ART as part of their farming activities (Sapkota et al., 2016). This is due to the realization of importance of ART and the benefits that it brings for a farm.

Meanwhile, based on Table 2, there is 25.3% of respondents' response that they do not know about ART. In addition, majority of the respondents (46.0%) believed that performing ART onto their animals is a difficult task and they are unable to perform it on their own without the help of a skillful person such as a veterinarian. However, at 36.8%, respondents have taken their time to take notice of new ART besides artificial insemination (AI), such as somatic cell nuclear transfer (SCNT) and many other procedures. Moreover, 34.5% of the ruminant farmers in Kelantan strongly agree that there is no importance of ART onto their own company and 46.0% of the respondents think that there is no importance to use ART onto their farm animals. The respondent moderately agrees at 28.7%, that the cost to use ART is expensive and 35.6% of respondents agreed that they have been exposed on the importance of ART.

**Table 1:** Frequency distribution of demographic profile among respondents.

Variables	Frequency	Percentage	Mean	SD
<b>Age</b>			41.3	14.1
≤20	5	5.7		
21-30	16	18.4		
31-40	24	27.6		
41-50	19	21.8		
51-60	14	16.1		
≥60	9	10.3		
<b>Gender</b>				
Male	81	93.1		
Female	6	6.9		
<b>Education</b>				
<b>Level</b>	9	10.3		
UPSR	14	16.1		
SRP/PMR	27	31.0		
SPM	10	11.5		
STPM/Diploma	22	25.3		
Degree	5	5.7		
Others			8.6	9.4
<b>Years of Business</b>	64	73.6		
1-10	16	18.4		
11-20	4	4.6		
21-30	2	2.3		
31-40	1	1		
41-50				

**Table 2:** Percentage distribution of respondents by items for acceptance on ART (n=87).

Items	1	2	3	4	5
I do not know about ART	16.1(14)	23.0(20)	21.8(19)	25.3(22)	13.8(12)
I believe ART is difficult	2.3(2)	10.3(9)	20.7(18)	46.0(40)	20.7(18)
I do not have time to take notice of new ART	11.5(10)	36.8(32)	12.6(11)	18.4(16)	20.7(18)
I think ART has no importance to my company	5.7(5)	17.2(15)	10.3(9)	32.2(28)	34.5(30)
I think there is no importance to use ART	5.7(5)	11.5(10)	6.9(6)	29.9(26)	46.0(40)
I think the cost to use ART is expensive	24.1(21)	21.8(19)	28.7(25)	18.4(16)	6.9(6)
I was not exposed to the importance of ART	12.6(11)	35.6(31)	13.8(12)	29.9(26)	8.0(7)

The result from Table 3 shows that the mean score for the acceptance of ART. The mean score has been categorized into three groups which are low (1-2.33), moderate (2.34-3.66) and high (3.67-5). Acceptance on ART indicates at the moderate level which is 2.73. There is 14.9% and 51.7% of the respondents were highly and moderately accepting the introduction of ART onto their farms and their companies. The acceptance of technology involves multiple different factors such as attitude, perceptions and so on and is a multi-dimensional event (Rezaei & Bagheri, 2011). In addition, professionals are claiming that the importance of different ART, especially artificial insemination is emerging (Rathod et. al, 2016).

**Table 3:** Level of acceptance towards ART.

Level	Frequency	Percent	Mean	SD
			2.73	0.75
Low (1-2.33)	13	33.3		
Moderate (2.34-3.66)	45	51.7		
High (3.67-5)	29	14.9		

#### 4. CONCLUSION

Based on the results, Kelantan ruminant farmers showed positive acceptance on ART. However, different approaches could be taken in order to increase the acceptance of ART. Government bodies such as the Department of Veterinary Services (DVS) and Malaysian Agricultural Research and Development Institute (MARDI) should come up with attractive extension programs in order to expose these farmers on the advantages of using ART as a part of their farms. These extension programs could be done in the form of workshops and seminars, teaching the proper method of performing ART such as AI. Moreover, government bodies should be working together with potential research institutes or universities to create a proper teaching module as these kinds of seminars and workshops are highly requested by the ruminant farmers in Kelantan.

Other than that, it is crucial to increase the source of semen supply of ruminants and artificial inseminator in Malaysia. At this moment, there is a shortage of semen supply and artificial inseminator in Malaysia and the only way of acquiring these services is from the DVS. The government could either increase the supply or to create

opportunities in the form of incentives and funds in order to create more external producer for such services.

This study should be continued in the future in order to see changes in the acceptance of ART among ruminant farmers of not only in Kelantan but throughout the whole of Malaysia as well. The Malaysian government has comes up with policies such as the National Agri Food Policy 2011-2020 (NAP) and Transformasi Nasional 50 (TN50) to create more ruminant farmers in Malaysia thus this will increase the acceptance of ART.

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