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Adoption of Improved Small Ruminant Husbandry Practices among Ranchers in Selangor, Malaysia

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Abstract

This study determined the extent to which improved husbandry practices in the study area were adopted by ranchers of small ruminants. A total of 100 respondents of small ruminant ranchers were selected for this study, using simple random sampling. Data were analyzed using descriptive percentage and cross tabulation to determine the adoption of improved small ruminant husbandry practices among ranchers. The study revealed that reproduction, healthcare and feeding had a higher adoption rate among the key management practices of small ruminant husbandry compared to general management. The findings revealed the majority of the respondents (65%) were classified as medium level adopters of improved animal husbandry practices, with an average adoption index of 65. The adoption rates of animal husbandry among small ruminant ranchers should be enhanced by promoting guidance, education and their evaluation on the practices.

Keywords: Technology adoption; husbandry practices; small ruminant.

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Introduction

Malaysia is a country that has an equatorial climate with daily temperatures ranging from 21 to 32 °C and is a mega biodiversity hotspot in terms of flora and fauna. Its multi-ethnic, racial and linguistic diversity makes Malaysia a unique country. Currently, Malaysia's population stands at approximately 32,776,194, with a population growth rate of 1.27% **(**Malaysia Population Commission, 2021). Increased growth in population has a substantial impact on the rate of food sufficiency. Malaysia imports over 51.46 million Malaysian ringgit worth of food annually, but its exports are far less. This is a major problem that needs to be addressed as the country moves forward with its vision to become a developed nation. Accordingly, food supplies must be sourced from the agricultural sector, and Malaysia is now categorized as an emerging country in the sector. A country can be affected by the state of its economic growth and lack of food security. According to the Global Food Security Index (2021), Malaysia is ahead of other Asian countries in terms of food security, ranked 39th out of 113 countries worldwide.

In Malaysia, the small ruminant industry is considered tiny in comparison with other livestock commodities. Nevertheless, the Malaysian livestock industry has made steady progress in recent years. The non-ruminant (poultry and swine) industry has grown remarkably, whereas the ruminant industry has lagged. The total value of ex-farm output estimated from beef and milk is worth RM1543.10 million and RM101.47 million, respectively, while mutton is estimated to be about RM164.42 million in 2019. In terms of self-sufficiency comparison, the chicken/duck egg industry leads by 117.95%, followed by poultry meat 103.95%, pork 90.35%, beef 21.59%, and mutton 10.02% (Kumawat et al. 2016; Munish, 2017).

As with other challenges in agricultural production, ranchers often lacked the knowledge and skills needed in livestock husbandry practice. Traditionally, small ruminant is farmed as a sideline activity for smallholder ranchers. A total of 21,600 people are small ruminant ranchers in Malaysia (Adam et al. 2019). Half (12,566) of the ranchers used traditional farming to rear their small ruminant, and only 47 ranchers are doing commercial farming. Meanwhile, another 127 used semi traditional farming to rear their small ruminant. Therefore, adopting the improved husbandry practices and the efficient use of available resources have emerged as the ranchers' best bet for improving their livestock output (Kumawat et el. 2016).

Animal husbandry contributes substantially to the national economy through socio-economic growth, job creation and employment opportunities in rural areas, particularly small and marginal farmers, as well as year-round stable income from animal produce. Therefore, this study aims to determine Adoption of Improved small ruminant husbandry practices among Ranchers.

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Methodology

Selangor is one of the 13 states of Malaysia, the state lies on latitude 3° 30' 33.2892" N and longitude 101° 31' 29.2908" E. The population of Selangor is 6.56 million (Malaysia Population Commission, 2021). Selangor is Malaysia's most populous state, as well as the state with the largest economy in terms of gross domestic product (Nazli, 2021). Data were collected from 100 respondents in Selangor. The list of respondents in all districts in Selangor was obtained from the Department of Veterinary Services (DVS). The respondents were categorized according to the number of small ruminant they owned: small scale (below 50), medium scale (51-100) and large scale (150 and above). The study was conducted in the districts with the highest number of ranchers in Selangor. From each district, ranchers were randomly selected from a sampling frame obtained from the DVS offices.

This was done to ensure equal coverage of the survey of small ruminant farming in Selangor. This is mainly to collect all types of ranchers that are available and operating in Selangor. A total of 20 farms were selected from each district. The study involved a total of 20 villages, with five farms chosen at random from each village, for a total of 100 ranchers.

Personal interviews were conducted to collect data on adoption of improved small ruminant husbandry practices among ranchers. Five Improved Small Ruminant Husbandry Practices were considered. 1) Feeding management; 2) reproductive management 3) health management; 4) goat management, and 5) general management. The scale comprised 24 practices, five (5) each from the management of feeding, reproductive management and goat management, six (6) from health management and three (3) from general management.

The adoption index measures the extent to which a respondent actually adopts the practices. Each practice was given a value of 1 for scientifically “adopted” practices and 0 for scientifically “not adopted” practices. The minimum and maximum possible scores were 0 and 24. All data were analyzed using the IBM SPSS version 21.0.

Result and Discussions

Feeding Management Practices

The majority of the respondents (Table 1) used a high yielding variety of fodder like dried hay and straw (86%), feeding of a mineral mixture (85%), feeding of balanced concentrate mixture for milk production (75%), pregnancy allowances to advance pregnant animals (74%) and feeding chopped fodder to the animals (65%). Comparable adoption rates of such practices are also reported by (Yusoff et al. 2016). Overall, the adoption rate for feeding methods was 77%. The availability of dry fodder has made it possible for farmers to feed their livestock in adequate quantities. There is also the use of mineral mixtures or common salt to increase the palatability and consumption of feed by animals. Chopped fodder, in particular, has become more palatable for animal feeding. Pregnant animals would require extra doses of feed. The

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findings corroborate with the findings of Yusoff et al. (2016) on exploring critical success factors for stakeholder management in small ruminant farming in malaysia.

Table 1: Adoption rate of feeding management practices

Practices	Adoption Rate (%)	Rank
Use of a high yielding variety of fodder	86	1
Feeding of mineral mixture	85	2
Feeding of balanced concentrate mixture for milk production	75	3
Pregnancy allowances	74	4
Feeding of chopped fodders to animals	65	5

Reproduction Management Practices

Table 2 shows that the majority (98%) of the respondents has adopted the proper disposal of placenta and was ranked 1st, artificial insemination was ranked 2nd with 95% of the respondents adopted. Treatment of reproductive disease by a veterinarian was adopted by 90% of the respondents and was ranked 3rd, Pregnancy diagnosis between 60-90 days after services was ranked 4th with 75% adoption by the respondents and finally, having a goat served within 90 days after calving has less adoption of 49%and was ranked 5th. A similar adoption rate was also reported by Faizal and Kwasi (2019) on determinants of factors that influenced small ruminant livestock production decisions in Northern Ghana.

Table 2: Adoption rate of reproduction management practices

Practices	Adoption Rate (%)	Rank
Proper disposal of the placenta	98	1
Artificial insemination	95	2
Treatment of reproductive disease by a veterinarian	90	3
Pregnancy diagnosis between 60-90 days after services	75	4
Having a goat served within 90 days after calving	49	5

Healthcare Management Practices

The majority of dairy producers (Table 3) involved in this study implemented the practice of controlling ectoparasites (81%), isolating sick animals from the healthy ones in a different house/shed/location (74%), and deworming adult animals (69%). Also, nearly all of the respondents (96%) appeared to rely on veterinary professionals to treat their sick animals, which can be ascribed to a decent network between the veterinary health services of Anand Milk Union Limited (AMUL) dairy) and the veterinary dispensary of DVS in the state. Adherence to a set of proper health management procedures is arguably the most critical aspect of raising a goat. Therefore, a higher adoption rate is to be expected in this study. Notably, all the ranchers had vaccinated their livestock to avoid infectious diseases such as HS, FMD

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and Brucellosis. A number of previous studies have similarly found a greater rate of adoption of vaccination (Ministry of Agriculture and Food Industries, 2021).

Table 3: Adoption rate of healthcare management ractices

Practices	Adoption Rate (%)	Rank
Vaccination against infectious diseases (Hemorrhagic Septicemia/Foot and Mouth Disease/Brucellosis)	100	1
Treatment of sick animals by the veterinary doctor only	96	2
Control measures of ectoparasites	81	3
Deworming of adult animals	69	4
Prompt notification of an outbreak of a contagious disease to the local veterinarian	68	5
Isolation of sick animals from the healthy ones in a separate house/shed/location	74	6

Goat Management Practices

The majority of respondents (Table 4) practiced cleaning their goats after delivery (77%), dewormed them (80%) and fed colostrum to newborn goats within one hour of birth (56%). The adoption rates for such practices are comparable to the report by the Department of Veterinary Service. A rather low adoption rate was observed for the practice of using sterilized scissors or knives to cut the naval cord and the administration of tincture iodine. Overall, the adoption rate for goat management practices was 62%. Similar findings were reported by melissa et al., (2016) that nearly 85% of the goat and sheep ranchers had a medium to a high level of adoption.

Table 4: Adoption rate of goat management practices

Practices	Adoption Rate (%)	Rank
Deworming of goats	80	1
Cleaning of goats after birth	77	2
Feeding of colostrum to new-born goats within one hour of birth	56	3
Disbudding of goats	52	4
Use of sterilized scissors/knife for cutting the naval cord and application of tincture iodine on the naval cord	45	5

General Management Practices

Table 5 has shown that management practices can have a tremendous effect on animal welfare. Nearly 40% of respondents maintained their farm records. The farmers acquired their animals from reputable sources (73%), none visited a

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veterinarian before the purchase. According to Fita and Trivedi (2020), only 42.86% of the farmers in Bikaner kept records of milk production.

Table 5: Adoption rate of general management practices

Practices	Adoption Rate (%)	Rank
Purchasing animals from a reliable source based on scoring/weightage on milk production	73	1
Maintaining farm records	39	2
Purchasing animals after consulting with veterinary officers	00	3

Adoption of Improved Animal Husbandry Practices

Table 6 shows that the majority of the small ruminant producers (65%) were classified as medium level adopters of improved animal husbandry practices, with an average adoption index of 65.10 ± 1.89. This finding is consistent with the findings of Rizwan et al. (2019) who discovered medium level of adoption of improved animal husbandry practices in Gujjars of Jammu and Kashmir area in India.

Table 6: Adoption of improved animal husbandry practices

Adoption Index of Improved AH Practices	Percentage
Low (< 48.53)	17
Medium (48.54 to 81.67)	65
High (> 81.67)	18

Mean= 65.10, S.D. = 18.88

Conclusion and Recommendations

Animal care, housing, feed regiments, financial control and record keeping. According to research, almost 80% of the variation in milk output is attributed to variables in management and environment, whereas genetic only accounts for 20.0%. The study concludes that reproduction, healthcare and feeding had a higher adoption rate among the key management practices of animal husbandry compared to milking and general management. The findings further concludes that majority of the respondents (65%) were classified as medium level adopters of improved animal husbandry practice. The adoption rates of animal husbandry among small ruminant ranchers should be enhanced by promoting guidance, education and their evaluation on the practices.

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Conflict of interest

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Authors contribution
NAMA: Conceived, designed, coordinated data collection, data analysis and writing the draft manuscript.
NM: Contributed in designing of the instrument and supervise the research process.
AAAH: Contributed in supervision and editorial work of the manuscript.
SM: Contributed in validating the instruments, research framework and results interpretation.

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