UNIVERSITI PUTRA MALAYSIA

INVESTIGATION INTO THE CONTRIBUTING FACTORS TO IMPROVE THE DAIRY AND MEAT GOAT PRODUCTIVITY

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INVESTIGATION INTO THE CONTRIBUTING FACTORS TO IMPROVE THE DAIRY AND MEAT GOAT PRODUCTIVITY

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DEDICATIONS

In the name of Allah, The Most Benevolent, The Most Merciful

Mostly dedicated to:

Abah, Ma, Angah, Anih, Ayak, Ajik, Una

My late Tokki. And my big family

Love you guys so much.

To the teachers and lectures

And for myself for completing this project

It is hereby certified that we have read this project paper entitled "Investigation into the Contributing Factors to Improve the Dairy and Meat Goat Productivity", by Hafizah binti Mohamad Zawawi and in our opinion is satisfactory in terms of scope, quality, and presentation as partial fulfillment of the requirement for the course VPD 4901 – Project.

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Hafizah binti Mohamad Zawawi

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CONTENTS

LIST OF TABLE

ABSTRAK

Abstrak kertas projek yang dikemukan kepada Fakilti Perubatan Veterinar untuk mememnuhi sebahagian daripada keperluan kursus VPD4999 – Projek Ilmiah Tahun Akhir.

MENGKAJI FAKTOR – FAKTOR YANG MENYUMBANG KEPADA PENINGKATAN PRODUKSI KAMBING TENUSU DAN KAMBING PEDAGING.

Oleh,

Hafizah binti Mohamad Zawawi

2017

Penyelia **:** Prof Abdul Aziz Saharee

Penyelia Bersama **:** Dr Siti Zubaidah Ramanoon

Industri ruminan di Malaysia masih lagi bergantung kepada import tidak seperti industry bukan ruminan untuk memenuhi permintaan terhadap penggunaan daging dan susu. Pelbagai usaha telah dilaksanakan oleh Jabatan Perkhidmatan Veterinar (JPV) untuk membantu penternak kecil untuk meningkatkan produksi haiwan. Walaupun dengan bermacam usaha yang telah dijalankan, hasil produksi haiwan masih lagi rendah. Kajian ini bertujuan untuk mengkaji cara pententeranakan yang diamalkan oleh pernternak sekarang dan untuk mencadangkan beberapa cadangan untuk meningkatkan pengurusan ladang selari dengan sistem Amalan Baik Penternakan Haiwan (GAHP) untuk

menghasilkan produksi daging dan susu yang lebih baik. Kaji selidik telah dijalankan di 10 ladang, di mana 5 daripadanya ialah ladang kambing pedaging dan 5 lagi adalah ladang kambing tenusu berkenaan cara pengurusan dan hasil penternakan mereka sekarang. Selain itu, kami juga menggunakan rekod kesihatan Ladang Angkat, UPM dari Hospital Veterinar Universiti untuk menilai tahap kesihatan ternakan. Berdasarkan kaji selidik yang telah dijalankan, kebanyakan penternak masih lagi kekurangan dalam beberapa kriteria terutamanya dalam pengurusan rekod dan makanan ternakan. Kebanyakan ladang ternakan tidak mempunyai penyimpanan rekod pengurusan dan produksi ternakan yang baik. Pemakaanan khusus mengikut fasa dan umur ternakan tidak diamalkan di ladamg ternakan. Kriteria lain seperti pengurusan, kandang, dan program pembiakan masih lagi kekurangan di beberapa ladang. Kesimpulannya, kesemua ladang ternakan ada mengamalkan sistem amalan baik penternakan haiwan tetapi dalam beberapa kriteria-kriteria tertentu sahaja.

Keyword: Kambing, Kambing tenusu dan pedaging, Kaji selidik, GAHP

ABSTRACT

An abstract of the project paper presented to the Faculty of Veterinary Medicine in partial fulfilment of the course VPD4999.

INVESTIGATION INTO THE CONTRIBUTING FACTORS TO IMPROVE THE DAIRY AND MEAT GOAT PRODUCTIVITY.

By,

Hafizah binti Mohamad Zawawi

2017

Supervisor **:** Prof Abdul Aziz Saharee

Co-Supervisor **:** Dr Siti Zubaidah Ramanoon

Ruminant industry in Malaysia still depends on importation unlike non ruminant industry to meet the demand for meat and dairy consumption. Various strategies from the Department of Veterinary Services (DVS) were done to support the smallholder farmers in order to increase the production of the animals. In despite of all the effort done, the animal's productivity is still low. This study was conducted in order to investigate the current practice of smallholder goat farmers and to suggest some recommendation in order to improve the management parallel with good animal husbandry practice (GAHP) for better meat and milk production in goat. A survey was done on 10 selected farms, 5 of which were meat goat farms and other 5 were dairy goat farms on their management practices and the production of the animals. Other than that, we also used 'Ladang

Angkat' farms' records from University Veterinary Hospital to evaluate the health condition of the animals. Based on the survey that was done, most of the farmers still lacked in some criteria, especially in the management of record and feeding the animals. Most of the farms did not have proper record keeping on their management and production. Specific nutrition and feeding management according to physiological of the animal was not practiced in any farms. Other criteria, which are management, housing and breeding program were still lacking in certain farms. In conclusion, some farms did practice good animal husbandry practice only in certain criteria.

Keywords: Goat, Dairy and meat goat, Survey, GAHP

1.0 INTRODUCTION

In comparing ruminant and non-ruminant sectors in Malaysia, the non-ruminant sector has made great progress over the last three decades while the ruminant sectors mainly depend on importation (Wong & Chen , 2006). According to the data from Department of Veterinary Service (DVS) (2015), more than 85% of mutton was imported for human consumption. Development of the ruminant industry depends among other things, on the availability and price of feed (Alimon, 2005). In trying to reduce the cost of importation of livestock products, the Malaysian government decided to enhance its livestock industry in 2005 by importing goats from Australia for breeding program. During the period 2005 to 2010, a total of 64,658 head of commercial grade Boer goats were brought in for the breeding program. Besides goat for breeding purpose, dairy goats have been imported by the Agriculture Department in 2009, consisting of Saanen, Anglo Nubian, British Alpine, Toggenberg and the Australian Brown to meet the request of the local dairy goat producers (Malaysian Livestock Breeding Policy, 2013).

Goats can be an alternative source of animal protein and can provide meat and milk to complement cattle and buffalo production. Besides that, goats are smaller compared to cattle and buffalo which make it easier to handle and manage (Salleh, et al., 2010). Goat farms in Malaysia are mainly in the hands of smallholder farmers with approximately 200,000 goats are kept in small scale and supplying only 8% of the local demands for chevon (Salisi & Saad, 2012). Currently, there are a total of 372,090 heads of goats in Malaysia (DVS, 2015). Goat farming is becoming more popular

nowadays in Malaysia, however, there are some farmers who are not practicing good farming system, especially in term of managing the records or data of the animals and farm activities. This might be due to lack of experience and knowledge on herd health management system (Jesse et al., 2015).

In University Veterinary Hospital (UVH), UPM, *Ladang Angkat* program was implemented in order to help the farmers and also give more opportunities to students of Faculty of Veterinary Medicine to get more exposure and hands-on experience in ruminant clinical practice. There is an increase in term of productivity of the animals in *Ladang Angkat* farm compared to the previous study that was done 3 years after the program was implemented. However, further improvements could be done to increase the productivity of the farms.

In order to help the farmers to improve the production of the animals, the current practice of the farms should be known. The purpose of this project is to investigate the factors that can contribute to improve goat farming in Malaysia and *Ladang Angkat* will be used as our respondent. Several factors will be included in the project, such as housing, management, nutrition, reproductive management, health status of the animals, environmental protection and quality issue of the farms. Based on the survey, some suggestion and recommendation will be suggested in order to improve the current management practice thus can help to increase the production of meat and dairy goat farms.

2.0 LITERATURE REVIEW

2.1 Current ruminant industry

According to Wong & Chen (2006), non-ruminant sector in Malaysia has made great progress over the last three decades while ruminant sectors mainly depend on importation to meet local requirement. Malaysia still imports more than 80% of beef, mutton and milk products as our own production cannot meet the increasing demand (Alimon, 2005). In total, Malaysia imports food more than 45 billion ringgits in 2016 (DVS,2016). In Malaysia, goat industry is not really broad and the farms are mainly in the hands of smallholder farmers with approximately 200,000 goats kept in small scale and supplying only 8% of the local demands for chevon (Salisi & Saad, 2012). Currently, there are a total of 372,090 heads of goats in Malaysia (DVS, 2015). Development of the ruminant industry depends, among other things, on the availability and price of feed (Alimon, 2005).

2.2 Ladang Angkat program UPM

Ladang Angkat program is a program to help the farmers as well as giving more opportunities to the students in order to get more exposure and hands-on experience in ruminant practice.

2.3 Factor effect the production

2.3.1 Management

In order to determine how to manage the goat, the purpose of the animal being reared should be clear which could be for the meat, milk or wool. This is to ensure that the management of the animals is to be more effective. The systems of production practiced by the farmers vary, from extensive, semi intensive to fully intensive (Alimon, 2005). Large farms practicing fully intensive system exists, their numbers are small but are slowly increasing in numbers. Smallholder farmers usually constitute a large proportion of the small ruminant farmers who mostly practice the intensive or semi intensive farming systems.

2.3.2 Housing

House is important in provide the shelter to the animals. According to Nor Faridah (2008), building a good house for goats must be according to the requirement. The house must be located in a suitable area that is comfortable for both the animals and the farmers. Besides that, equipment to build the house should be cheap and easy to get. Malaysia is the country of high rainfall, thus it is not suitable to kept goats on the ground without high losses from parasites and disease (Meat & Livestock Australia, 2008). An elevated shed with wide roof and slatted floor is recommended to protect goats from heavy rainfall and to allow the waste to be cleared out easily from the house. Thus ammonia level of the farm is controlled.

In one house, there should be pens for males, females with young, females without young, weaned young, young males and females for breading and also isolated pen for sick animals. This will be easier to manage because these different phase or physiological status of the animals require different space and feed. This also will be easier in managing their mating schedule. Separating young animals at breeding age can help to control inbreeding. The optimum pen for buck is 1 X 1.5 m, while for pregnant and female with young require 1 X 1.5 m space and for female without young is 0.8 X 1.5 m (Faridah & Mikail, 2008).

2.3.3 Nutrition

Goat is a ruminant animal which has fore stomach, thus the main diet for the animal should be grass and green plant which is high in fibre. Feed given to the animal should comprise of energy, protein, minerals and vitamins. This can help the microbes to promote fermentation in order to break down the feed (Meat & Livestock Australia, 2008). Balanced nutrition must be provided to the animals to promote the growth thus can utilize more meat and milk for human consumption (Nor Faridah,2008). Common source of energy given to the goat is roughage and concentrate (Amin, 2012). In addition, supplementation such as vitamins and minerals also important to ensure the animal get balance nutrient. Protein, carbohydrate and fat ratio need to be monitored when feeding the animal.

The amount and function of the plant can depend on several factors which are the age of the plant, land condition, and type of plants.

In smallholder practice, main feed resource of animals comprises of native pasture available on waste lands and are either grazed or fed cut and carry. These animals are often supplemented with some form of protein and energy sources such as cut grass, palm kernel cake, soya waste, brewers spent grain and bakery wastes. The main problem associated with feed in Malaysia is the availability of reasonably cheap feed and Malaysia does not produce much raw ingredients for animal feed, thus Malaysia still depends on the importation of feedstuffs from other countries to feed the animal (Alimon, 2005). Agro industrial by product and crop pasture are also good to be fed to the animals to replace the pasture such as soy bean, brew, palm kernel, oil palm fond as pasture is no longer readily available and they are easy to get and cheap (Alimon, 2005).

Besides that, purpose of the animals also influence the type of feeding should be given to the animals. Goat that rear with breeding purpose require more forage, while fattening goats for slaughter requiring good quality feed and more concentrates (Meat & Livestock Australia, 2008). Other than that, different feed should be fed to different phase of animal such as adult dry goats and does in early pregnancy can have 40-70% roughage in their diet while goat during late pregnancy and lactation least 30% roughage should be in their diet to help with the production of

high levels of good quality milk. Colostrum is important to new-born kid to ensure that it obtains adequate amount of antibody. Colostrum can be fed to the kid by allowing them to suckle directly from the dam or milk the colostrum from the dam and bottle feed them if the kid does not suck by themselves (Amin, 2012).

Pregnancy toxaemia is common metabolic condition that is related closely to the method of feeding the animals. This usually occurs to the does during their late pregnancy of first or two weeks after kidding. It usually occurs in the thin or obese does that carry twin or triplet (Maggie, 2007).

2.3.4 Reproductive management

Reproduction is an important aspect in order to ensure perpetuation of the species, the production of meat, milk, skin and fibre did not stop and also to ensure availability of replacement for breeding stock. Reproduction management is important to produce healthy and productive kid and to sustain high individual animal productivity through selection of specific trait. This is also important in marketing of business planning because without proper reproduction management, it will be only waste of energy and money to rear livestock animals. In order to manage the reproduction on the animal, the age of the animal is important because from there we can know when to start to mix the male and female for them to mate.

The most suitable age for the goat to be mixed is more than 1 year and usually kept for 5 to 6 years to breed the animal. Breeding soundness evaluation (BSE) should be done in order to select good breeder. BSE is done to evaluate libido, reaction time, scrotal circumference, semen quality and quantity before using the buck as a breeder (Amin, 2012).

2.3.5 Herd Health Program

According to Jesse et al (2015), herd health management programs is an attempt to organize all information applicable to goat herd health into a simple, usable, and easily remembered format. Herd health program is an essential part of a successful meat and dairy goat management program (Steven and Jeremy, 2015). Good herd health management program can reduce health problem thus will minimize the cost of treating the animals. According to Nor Azlina et al (2010), endoparasitism in small ruminants mainly due to haemonchosis is acknowledged to be the second most important cause of mortalities in small ruminants in Malaysia. This might be due to the resistance of the antihelmentic as the drug is easily accessible and affordable by the farmer. Besides the nematodes, other parasite such as coccidiosis and theileriosis are other common parasites that can be found in small ruminant in Malaysia. Controlling the parasitism infection in the small animal is important as it can increase the production of the animals and reducing the treatment cost thus can increase the production of the goats in Malaysia (Zainalabidin et al, 2015).

2.3.6 Environmental protection

Environmental protection is important in controlling pests besides managing the waste and sanitation thus reducing environmental pollution and damage. Dead animals should be disposed correctly either by incinerator or burying the carcass at specific area. According to Steve and Jeremy, good sanitation is necessary to prevent diseases from spreading or occurring in the farms. This can help the farmer to reduce the cost of treatment and it is more economical to prevent the disease from occurring compared to the treatment. The animal area should also be clean and dry to minimize the source of the disease in the farms. Other than that, management of the fecal material or waste product should be done as frequently as possible to reduce the amount of ammonia in the farms. High level of ammonia can also be one of the source of disease to occur in the animal especially if the house is not on a raised floor.

2.4 Record keeping

The most important thing in the industry is to have proper records in order to evaluate the animal's performance. The previous study revealed that most of the farmers were not keeping any record on reproduction and only have the records of the animal's production (Jesse et al, 2015). According to Doye (2004), records keeping can help the farmer to identify when is the suitable time for mating besides can do selective breeding in order to choose only good animals that can be used as replacer animals. In addition, in order to apply for MyGAP certification, the

farm should have proper farm records and documents that is well kept and up to date (DVS, 2014). Farm records should consist of the animal identification, herd health and individual health of the animals, animal's performance in term of milk yield in a day or average daily gain of the animals besides financial records which include both expenses and gains from the farm in order to able to calculate if the farm is making profit or loss.

3.0 METHODOLOGY

3.1 Sample size

A total of 10 farms were selected based on the farms available from *'Ladang Angkat'* UPM and data from the Department of Veterinary Services (DVS) as the respondent which consisted of 5 meat goat farms and 5 dairy goat farms. The survey was done at '*Ladang Angkat'* UPM with a total of 6 farms, 5 meat goat farms and 1 dairy goat farms. These farms are located in Selangor and Negeri Sembilan. In addition, another 4 dairy goat farms located in Terengganu were selected based on data from Department of Veterinary Services.

3.2 Sampling method

There were 2 methods of sampling, which were the farms visits and records from UVH on the farms health performance, especially for the *'Ladang Angkat'* farms. During the farm visits the questionnaires were given to the farmers to answer. Besides that, interview about the current practice of their management system was

also done during the farm visits. The interview was done with the owner of the farm or the worker who knew the most about the management of the farms.

3.2.1 Farm visit

Farm visit was done to all the respondent farms. During the farm visit the current management of the farm such as the storage of the feed, the drugs and the condition of the house could be observed clearly.

3.2.2 Questionnaire

This study was done through survey. The questionnaire was design based on Department of Veterinary Service (DVS) and Good Animal Husbandry Practice (GAHP) guideline. The questionnaire consisted of 104 questions and divided into three sections described as Section 1, Section 2, Section 3. Section 1 was the question about the farm profile which had 14 question in total. This section consisted of three parts which was information about the farm, type of management and details about human resources. Section 2 was the question about the management that they currently practiced which consisted of several factors and had 80 questions in total. Section 2 was divided into 10 parts which were farm location, infrastructure and farm facilities, farm resources, biosecurity management, herd health program, farm sanitation, waste management, pest control and breeding program of the farm. Section 3 was the question about the production of the farm in the meantime, this question was specific based on the purpose of them rearing animals such as for the meat or milk. This section consisted of three part with

a total of 10 questions. The first part was the question about the dairy animal production while the second question was for meat animal production. The third part of this section was the question about the recording of the farm about the sales of the animals and goods.

3.3 Data analysis

The data collected then was tabulated into the Microsoft Excel® Spreadsheet and then analysed using descriptive analysis on the factors studied.

4.0 RESULT AND DISCUSSION

Based on the survey, we managed to get all the information according to the factors that we studied which were housing, management, nutrition, reproductive management, health status of the animals, environmental protection and quality issue of the farms.

All 10 farms were owned by the farmers themselves and not bounded with any company or cooperation, which meant that they had full authorities on the farm and could make changes by themselves. All these farms were practicing intensive farming system and using different breed of goats which were good breed of animals according to their purpose. According to Faridah (2008), intensive farming system is a good management practice in small animals especially in a country such as Malaysia. This is because Malaysia is a humid country and through this management system, farmers can monitor and control the animals especially in terms of animal's health. Seven out of the ten farms had at least one worker who monitored the animals all the time, most of them were foreign worker while the other three were monitored and managed by the farmer. Most of the

workers in all the farms were using boots but only one of them had their own uniform in the farm. Eight of the farm land was owned by the owner of farm itself while other two was rented. All five farms were near to housing areas, with the nearest only around 100 m from the housing area while the furthest was around 300 meter. This can increase the chance of disease transmission especially zoonotic disease. Besides that, these farms were also located near to other farms which were cattle and goat farms which can be risky if there is any outbreak of disease from nearby farms. All of these farms had paved road to the farms which was easier for the visitor to access to the farms. All these farms were practicing ear tagging as animal identification. This is good practice as from the tagging, we can trace and track back the animals if there is any outbreak of the disease. This practice will be easier for the farmer in managing the records of the animals and farm. However, none of the farms recorded the animal's identification in their individual records. The individual records could be the animal's identification, health record of the animals and also the breeding record of the particular animal.

As for the housing management, all the farms were using slatted floor which would be easier for the feces and urine to be dropped down and can ensure the cleanliness of the house thus can reduce the level of ammonia in the house. However, the feces still need to be cleaned at certain period of time which most of the respondent cleaned once a week. All the farms did practicing good animals practice by separating animals according to their phase especially the pregnant and lactating animals. Separating the animals according to their phase will be easier for the farmer to manage the animal as these different phase or physiological status of the animals require different space and feed.

This also will be easier in managing their mating schedule. Separating young animals at breeding age can help to control inbreeding. Mixed pen is usually the pen which consist of adult male and female mixed for breeding purpose. Single pen is usually pen for the pregnant animal and the female with one to two kids. The stocking density for the meat goat farms had an average of 1.5m² per animal for the mixed pen while 1.6m² for single pen. On the other hand, the stocking density for the dairy goats has the average of 1.7m² for the mixed pen while 1.2m² for the single pen. As recommended by Faridah and Mikail (2008), the optimum pen for buck is 1 X 1.5 m, while for pregnant and female with young require 1 X 1.5 m space and for female without young is 0.8 X 1.5 m which is being practiced by the farmers. Most of the farms practicing to wean the kid at the age of 3 months and separate it into a different pen from the dam.

In nutrition management, all the farmer practiced cut and carry system. All the farms were practicing on giving the feed twice a day with different types of feed. Nine out of ten farms used Napier grass as the main feed while the other one farm gave oil palm frond as the source of energy to the animal with range of 3 – 5 kg per animal. Besides the Napier grass and oil palm frond, all the farm supplemented concentrate to the animals which nine out of ten farms gave the mixture of commercial pellet and soy bean, while another one farm used their own formulation by mixing soybean, brew and palm kernel and gave to the animals with an average of 500g to 800g per animals. Other than that, all the farms gave salt as supplement where seven farms were using commercial mineral blocks while other three farms used rock salt as mineral supplement. None out of the ten farms practiced different phase of feeding according to the different physiological phase

of the animals. Different feeding phase is important especially in pregnant and lactating animals which need for high energy diet compared to other phase of the animals as they need high energy compared to others. This is also to avoid cases of pregnancy toxaemia in pregnant animals and ketosis in lactating animals. Pregnancy toxaemia commonly occurs to the does during their late pregnancy at first or two weeks after kidding. It usually occurs in the thin or obese does that carry twin or triplet (Maggie, 2007). Besides the phase feeding, the nutritive value of the animals feed should also be known as these can help with the amount of feed to be given to the animals according to the correct ratio between the roughage and concentrate.

The next factor is the herd health management practice. Most of the farms had good herd health management practices as all the farms had their own advisor which could be the University Veterinary Hospital (UVH), UPM and Department of Veterinary Services (DVS). Both UVH and DVS are giving the advice to the farmers on the animal health. Seven out of ten farms have disease surveillance done by the DVS. Disease surveillance was done by taken the blood sample once to twice a year. Disease surveillance is usually done for Q-fever, Brucellosis and Foot and Mouth Disease (FMD). Other than blood, milk sample is also taken by the DVS in all 5 dairy goat farms. The milk is usually used to check the quality control of the milk and also for disease surveillance which is for Brucellosis. Vaccination program is another important criterion in herd health management program. Based on 10 of our respondent, only 3 farms had practicing vaccination, which are the vaccination for Pasturellosis and Foot and Mouth Disease (FMD). Both farms only vaccinated adult animals once a year for Pasturellosis

and twice a year for FMD. All ten farms were practicing deworming program but with different regime. Six out of ten farms were using Albendazole as dewormer, three out of ten using Ivermectin while other one farm was using both Albendazole and Ivermectin to deworm the animals. 6 out of 10 farms did the deworming when necessary, while most of them did when the animals show clinical sign. This is a good practice to reduce the usage of anthelmintic in the animals. Intensive farming system actually is good management to control the worm burden of the animals. This is because, most of the parasitic gastroenteritis infection is caused by the grass which can be managed through intensive system as the grass is cut and carried to the animals. Deworming program should be designed after fecal egg count (FEC) of the animals was done to determine whether the deworming should be given or not to the herd. According to Jesse at al (2015), from the previous study all farmers were willing to invest money for herd health program that guarantee long term profitability in the future which could be good opportunities to improve the health of the animals thus can lead to increasing productivity of the animals.

For the biosecurity, all 10 farms have proper fencing and locked which can prevent outside people or animals to enter without permission and also can control the movement of the visitors such as veterinarian, feed miller, and their customer in and out of the farms. 2 out of 10 farm established and used foot dip at every house. For the animal status, 9 out of the 10 farm had health certificate from the Department of Veterinary Services, which showed that the animals were healthy and did not have any disease. Besides that, animal movement from one farm to another farm is also important as the new animals into the

farm could be the carrier of the disease into the farms. That is why, the records of the animals are important as we can track and trace back the sources of the disease.

In dairy animals, management and procedure during the milking is very important as this will reflex the quality of the milk. None of the 5 dairy goat milk farms had milking parlor for milking procedure. All the farms milking inside the pen as all the farms separated the lactating female in single pen. According to Nor Faridah (2008), to ensure that milk is clean and good, the milking place should be clean, no dust and the milking place should have a flat area such as cemented floor or woody floor. During the milking procedure, all 5 dairy goat farms did practicing washing the udder before starting milking. However, only 2 out of 5 farms washed the udder using water and antiseptic, while the other 3 farms used only water. Besides that, only 2 out of 5 farms did teat dipping after the milking procedure. According to Belanger and Bredesen (2010), whether milking process is done in separate parlour or in the pen, cleanliness is the most important thing. The goat should be clean, free from hair and dust, and the udder must be washed and disinfected using water and disinfectant. Then, the udder must be dried before starting the milking procedure. In addition, the hand of the milker should also be clean and dry and need to be washed before starting milking other does. All 5 farms did not have any mastitis control programs in the farm. However, when there are cases of mastitis in the farms, they did treat the animals using various ways either using medication or traditional methods.

Environmental control is another important issue in practicing good animal health husbandry practice because the management of the waste, sanitation and pest control is

important in order to protect the environment too. Based on the survey, only 3 out of 10 farms has pest control which is to control flies and rats. For the rats, all the 3 farms are using oral poison in order to reduce the rats from the farms. In order to control the flies, flies trap was placed in the animal's house. As for the management of dead animals, all 10 farms buried the carcass in the hole surrounding the farms and there was no lime used to cover the area. For manure management, all 8 out 10 farms removed the manure at least once a week and collected it before selling or removed outside from the farm once a month. The other 2 farms removed the manure every 3 months to outside of the farms. Manure should be collected as frequent as possible to reduce the ammonia level to the animals which later can affect the animal health. Manure management was being practiced in a good way by the respondents as they did collect the manure frequently and selling it or remove it from the farms. Only 2 out of the 10 farms had proper drainage system, where then the waste would be drained into the designated pond. All the farms did practicing cleaning of the farms where 7 out of the 10 farms did wash the farms at least once a month while the other 3 after the production period has finished and before new animals enter the pen or house. There were only 3 out of 10 farms using water and disinfectant to clean the pen while the other 7 farms were using only water. According to Steve and Jeremy, good sanitation is necessary to prevent diseases from spreading or occurring in the farms. This can help the farmers to reduce the cost of treatment and it is more economical to prevent the disease from occurring compared to the treatment.

All 10 farms did practiced natural mating system with the ratio of male to female ranging from 1:9 to 1:20. Various literature recommends that the suitable male to female

ratio for natural mating is 1:20 to 1:25. Only few of the farmers did exactly follow the recommended ratio which meant that the animals were mostly under used. The range of breeding age for meat goat practiced by the farmer were as early as 4 months-old to 24 months-old. On other hand, for dairy goat, farmer started to bred the animal at the range of 6 months-old to 12 months-old. The most suitable breeding age is around 8 months old for male and around 6 months old for the female. Some of the farm practiced breeding at an early age. This can increase the cases of reproductive problem such as dystocia or uterine rupture. For the performance of the animals, it was more or less the same for both meat and dairy goat animals which the kidding interval was ranging from 6 to 12 months and for the kidding to conception was around 3 to 7 months. None of the farms had proper written records on the breeding and reproductive performance of the animals. However, there was 1 farm who had the records for the kidding and pregnant animals but only for the current records but not for all of the animals.

Production of the farms is another criterion that can be considered to measure the performance of the farms as the production of the animals did reflect the management of the farms. On average for meat goat farms, the average market weight for the animals are 30kg which can be gained in 10 months. In comparing to the current market, the market weight of the goats ranges from 30kg to 50kg according to the breed of the animals and mostly are sold at the age of less than 12 months old for slaughter and more than 18 months old for Aqiqah and Qurban (DVS, 2016). All 5 of meat goat farm sell the animals as live animals for events such as Aqiqah and Qurban. On the other hand, the amount of milk that can be collected from the dairy goats also vary according to the breed of the

animal which range from 1.5 to 3 litre per animal per day. The performance of the respondents is range from 0.8 to 3 litre per animal per day which is quite good. 2 out of 5 farms sold the milk to the retailer while the other 3 farms were selling the milk directly to the customer. Both dairy and meat goat farms have their own side income such as manure or fertilizer, animals feed, milk for meat goat farms and goat for slaughter for dairy goat farms.

5.0 RECOMMENDATION

5.1 Management

Animal identification is important in farms as from the animal identification such as animals tag, records of the animals will be more systematic. Computerized data recording system and data management can be computerized for efficient genetic selection in lean growth rate, feed efficiency, fertility and tropical adaptability traits for future plan which could be done by the government to help the small holding farmer (Livestock Breeding Policy, 2013).

5.2 Housing

Animal house is the place where animals shelter from the weather changes and other risk such as predator. The house should be comfortable enough for the animals especially in intensive farming system as the animals are in the house all the time. The area and stocking density of animal's pen should be suitable with the physiological status of the animals. In addition, if the animals are mixed such as the breeding animals, the area of the pen should be enough thus the stocking

density of the animals are good and not too many animals in a pen. The recommended stocking density of the animals is as shown in the table 1.

Table 1: Stocking density of animals

Physiological phase of animal	**Area(m^2)/ animal**
Male	1.25 x 1.5
Female	1.0 x 1.25
Pregnant/ female + kid	1.25 x 1.5
Weaned kid	1 x 1.25

5.3 Nutrition

Nutrition is another criterion that is important in good animal husbandry practice as from good feed, in order to promote growth and utilize more meat and milk production (Nor Faridah, 2008). Following the separation the animals according to their physiological phase, the feeding of the animals can be more systematic as different stage of animals requires different level of nutrition. For example, in the late pregnant doe, they require more energy as lack of nutrient in the late trimester of the doe can lead to pregnancy toxaemia. According to Olfati et al (2013), pregnancy toxaemia is a metabolic disorder characterized by hypoglycaemia and hyperketonaemia resulting from incapacity of the animal to maintain adequate energy balance. This condition commonly occurs in animals that carry twins or triplet usually during the last trimester. Besides that, the nutrient content of the

feed should also be known in order to get higher average daily gain but at the same time to reduce the cost of animal's feed (Amin, 2012). Table 2 shows the recommended feeding phase of the animals.

Table 2:Feeding of the animals according to the phases

Physiological phase of animal	**Feeding method**
Young kid (before weaning)	Milk replacer
Weaned kid (3-4 month)	Grass, high protein diet
Adult goat (male, female)	Grass, legumes, concentrate
Pregnant doe	Grass, concentrate , more pellet (last 6 week of gestation, molasses (supplement)
Lactating doe	Grass, concentrate, more pellet (during lactating phase), high protein diet

5.4 Herd health program

Herd health program is another important criterion in every farm in order to ensure that all animals are in good condition and safe to be served to the customer. Schedule vaccination and deworming program is important for herd as management as through vaccination, some disease that is important in some country can be controlled and prevented from entering the farms. The current vaccination that are practiced in Malaysia are Foot and Mouth Disease (FMD) and pneumonia (Jesse at al, 2015). Deworming program should also be designing

accordingly based on the status of the farm. Fecal egg count must be performed first before designing the deworming program especially in farms that practice intensive farming system. Other than that, disease surveillance should also be done at least once a year to know the status of the animals in the farms whether is it free from any disease or not. Disease surveillance can be done on the disease that is common that in a particular area or county such as Brucellosis, Meliodosis and Food and Mouth Disease (FMD) are the most common diseases in small ruminant. Biosecurity is also important to prevent disease from spreading thus causing outbreak. Quarantine new animals before entering the farms can reduce the chances of the disease from entering the farm. Besides that, disease screening can also be done to ensure that the new animals are clean from any disease and can eliminate the carrier animal from entering the farms.

5.5 Reproductive management

Reproduction is a factors that can be used to evaluate the performance of the farms. Thus the records of reproductive performance of the animals are important. The records that should be noted by the farmers include the body condition score of the breeder, the age of the first kidding, the kidding interval and the reproductive problems of the animals. According to Doye (2004), record keeping can help the farmers to identify the suitable time for mating and selecting animals for traits that will benefit the farmer financially such as twinning, and removing animals with traits that cause financial loss, such as low milk production. Breeding soundness examination (BSE) is important in choosing the buck as according to

Amin, 2012 good buck should be chosen to ensure that the animal has good libido, reaction time, scrotal circumference also semen quality and quantity. While for female animals, pregnancy diagnosis is important to ensure that the farms can achieve the target of the animal's production. As suggested by many literature, the most suitable male to female ratio is from 1:20 to 1:25.

5.6 Production

The most important thing in the production is the records keeping. Without proper record keeping on the expenses and income of the farms, the farmer cannot really calculate the profit or losses of the farms. Other than that, the records animal performance such as daily milk yield for dairy goats and average daily gain for meat goats should also be recorded in order to ensure the performance of the animals are good.

6.0 CONCLUSION

Based on the study that had been done, some of the farmer did practice Good Animal Husbandry Practice guideline but only in certain criteria, such as herd health program (HHP), housing and nutrition. Small holder farmers can help in increasing the productivity of the small animals if they follow the guideline given accordingly and not only in certain criteria. The enforcement and guideline from the advisors or veterinarian of the farms also important in order to ensure the farmer did follow the guideline from GAHP in term of the management not only focusing on HHP as

through good animal husbandry practice, disease and animal health can be controlled thus can lead to increase productivity of the animals.

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APPENDIX

FAKULTI PERUBATAN VETERINAR,
UNIVERSITI PUTRA MALAYSIA,
43400 UPM SERDANG,
SELANGOR, MALAYSIA.

BORANG KAJI SELIDIK PROJEK TAHUN AKHIR

TAJUK : Mengkaji faktor-faktor yang menyumbang kepada peningkatan produksi ternakan ruminan

Kajian ini adalah bertujuan untuk mengkaji faktor-faktor yang menyumbang kepada peningkatan produksi ternakan tenusu dan pedaging oleh ladang-ladang yang diusahakan secara kecil-kecilan. Semua maklumat adalah SULIT dan akan digunakan untuk tujuan kajian ini sahaja.
Sila bulatkan pilihan jawapan anda pada tempat yang bertanda (*)

1. PROFIL LADANG

1.1 BUTIRAN LADANG

Nama Ladang : _____

Alamat Ladang : _____

_____

_____

Tahun penubuhan ladang :_____

Pegawai yang boleh dihubungi : _____

Nombor Telefon : _____

Laman Web/ e-mail : _____

Ladang ini adalah sebuah ladang yang dipunyai oleh *usahawan persendirian / milik syarikat swasta / koperasi / badan berkanun (_____)

Jumlah ternakan :_____

Baka ternakan :_____

Tujuan anda membuka ladang *(hobi/ ladang keluarga/ sumber pendapatan keluarga/ lain-lain:_____)

1.2 JENIS PENGURUSAN. *Sila tanda yang berkenaan (√)*

Lembu Pedaging (Fidlot)		Kambing Pedaging *(Intensif/Semi-intensif)	
Lembu Pedaging (Integrasi)		Kambing Tenusu *(Intensif/Semi-intensif)	
Lembu Tenusu *(Intensif/Semi-intensif)		Kambing Baka *(Pedaging/ Tenusu)	
Lembu Baka *(Pedaging/ Tenusu)			

1.3 BUTIRAN SUMBER MANUSIA (LADANG)

Jumlah keseluruhan pekerja : _____ orang

Pekerja ladang terdiri daripada *(Penduduk tempatan / negara asing _____).

Kesemua pekerja dilengkapi dengan *(uniform / kasut but / _____).

2. GAHP

2.1 LOKASI LADANG

Status tanah* : (persendirian / swasta / tanah negeri / badan berkanun)

Pemilikan tanah* : (pemilik / sewa / pajak / tanah rizab)

Keluasan tapak : _____ ekar / hektar / kaki

Perumahan terdekat : _____ kilometer

Ladang terdekat : _____kilometer, *(ayam/ kambing /lembu/babi/lain-lain:_____)

Tanaman sekeliling ladang: *(kelapa sawit / pokok getah / lain-lain: _____)

Jalan masuk ke ladang melalui *(lebuhraya / jalan berturap / lorong tanah merah)

2.2 INFRASTRUKTUR & KEMUDAHAN LADANG

2.2.1 BANGUNAN KANDANG TERNAKAN

Kod kandang	Tahun Dibina	Tinggi (m)	Keluasan Lantai (m2)	Jumlah ternakan

2.2.2 KANDANG TERNAKAN *(sekiranya ternakan anda diasingkan)*

Jenis Kandang	Jumlah ternakan
Ternakan Induk	Jantan: Betina:
Ternakan Jantan	

Ternakan Dara	
Sembelihan (Trading)	
Ternakan Bunting	
Ternakan Beranak	
Anak Cerai Susu	
Ternakan sakit	
Tempat Pemerahan Susu *(untuk ternakan tenusu sahaja)*	

2.2.3 BEKALAN ELEKTRIK DAN AIR

a. Ladang ini menggunakan bekalan elektrik dari *Tenaga Nasional Berhad (TNB) / generator.

b. Bagi sumber air ternakan, ladang menggunakan bekalan air dari *Bekalan Air Negeri (_____) / air bawah tanah yang dirawat menggunakan _____ / air bawah tanah yang tidak dirawat.

2.3 SUMBER LADANG

2.3.1 SUMBER TERNAKAN

a. Pihak ladang mendapatkan sumber bekalan *(kambing/lembu) dari pembekal dari *(dalam / luar negara). Butiran pembekal adalah seperti berikut :

Nama Pembekal : _____

Alamat Pembekal : _____

_____

_____

b. Ternakan yang di dapati *(telah memperolehi / belum) memperolehi Sijil Kesihatan dari Jabatan Perkhidmatan Veterinar (JPV).

c. Ladang mempunyai kapasiti bagi _____ ekor ternakan.

2.3.2 PEMAKANAN DAN MINUMAN TERNAKAN

a. Sistem pemberian makanan *(meragut/ cut and carry / lain-lain:_____)

b. Jenis makanan yang diberikan *(rumput/ daun/ konsentrat/ silaj/ sisa tanaman)

c. Bagi sumber bekalan makanan konsentrat, ladang membeli dari pembekal yang telah *(mengamalkan GMP / tiada amalan GMP) iaitu dari pembekal yang berikut ;

Nama Pembekal : _____

Alamat Pembekal : _____

_____

_____

d. Bagi pemberian pastura, ladang mendapatkan pastura (sila nyatakan jenis rumput :_____) dari *(tanam sendiri / pembelian dari sumber luar)

e. Kekerapan pemberian makanan (sila nyatakan _____)

f. Pemberian supplemen mineral seperti _____ juga diamalkan.

g. Adakah makanan diberi pada ternakan mengikut peringkat umur dan fasa? * (Ya/Tidak)
(jika ya, jawab soalan berikutnya)

Fasa	Jenis makanan/ supplemen
Anak (cerai susu	
Bunting	
Menyusu (lactating	

h. Peralatan:

Palung makanan : konkrit / tong drum / kayu / _____

Saiz palung makanan : _____ inci X _____ inci

Palung air : konkrit / kolam / tong drum / _____

Saiz palung air : _____ m3

2.4 PENGURUSAN BIOSEKURITI

2.4.1 Sistem Pemagaran

Sekeliling kawasan ladang *(dipagari / tidak dipagari). Pagar adalah diperbuat dari bahan *(*cyclone* / *chain-link* / pagar berkawat / lain-lain, sila nyatakan_____). Kawasan bagi produksi juga *(dipagari / tidak dipagari). Pagar adalah diperbuat dari bahan *(*cyclone* / *chain-link* / pagar berkawat /lain-lain ,sila nyatakan _____). Pintu utama memasuki kawasan ladang adalah *(berkunci / tidak berkunci).

2.4.2 Disinfektan

a. Bagi kenderaan : Pencelup tayar kenderaan *(Ada / Tiada)

b. Bagi pekerja / pelawat: tempat persalinan pakaian *(Ada / Tiada)

c. Bagi pencelup kasut *(pada setiap pintu kandang / pada pintu masuk utama kawasan produksi / tiada)

2.4.3 Sanitasi Dan Cucian Pemerahan Susu*(Untuk ternakan tenusu sahaja)*

Detergen dan sanitizer 'food grade' yang digunakan untuk mencuci peralatan pemerahan, penyimpanan dan penghantaran susu seperti _____

Prosedur sanitasi dan cucian mesin perahan susu:

1.

2.

3.

2.5 PROGRAM KESIHATAN TERNAKAN (Sila tandakan (√))

a. Doktor veterinar Ladang

Ya		Berkhidmat secara	
Tidak		Ad- hoc	

b. Servis dan penasihat lain adalah daripada

i. Jabatan Perkhidmatan Veterinar

ii. UPM

ii. Sektor Swasta:

Syarikat Feedmill	
Syarikat Vaksin	
Syarikat Ubat	
Lain-lain	

b. Ladang *(mempunyai/ tidak mempunyai) program vaksinasi untuk ternakan. Vaksin diperolehi daripada JPV negeri/lain-lain:_____

c. Vaksin dan ubat cacing:

i. Jenis vaksinasi:_____

ii. Umur divaksinkan:_____

iii. Kekerapan vaksinasi:_____

iv. Jenis ubat cacing:_____

v. Umur diberikan ubat cacing:_____

vi. Kekerapan ubat cacing diberikan:_____

d. Pengambilan sampel untuk pemantauan penyakit dilakukan oleh pihak *(ladang/JPV/pihak swasta/tidak dilakukan).

e. Pengambilan sampel susu untuk pengujian susu dilakukan oleh pihak *(ladang/JPV/pihak swasta/tidak dilakukan).

f. Ladang *(mempunyai/tidak mempunyai) program kawalan penyakit mastitis. Ubatan diperoleh daripada JPV negeri/ Syarikat swasta iaitu _____.

g. Ubat kutu

i. Jenis ubat kutu:_____

ii. Kekerapan:_____

iii. Cara aplikasi:_____

j. Rekod pengenalan haiwan *(Ada/ Tiada)

i. Jenis pengenalan haiwan:_____

k. Pemotongan kuku *(Ada/ Tiada)

i. Kekerapan:_____

l. Pernahkah haiwan ternakan anda mengalami masalah kesihatan seperti yang berikut, dan

apakah tindakan anda bagi mengatasi masalah tersebut?

☐	Kurus:	_____
☐	Tiada selera makan:	_____
☐	Cirit-birit:	_____
☐	Masalah pernafasan:	_____
☐	Puru:	_____
☐	Masalah bulu:	_____

m. Pernahkah ladang anda diserang wabak? *(Ya/Tidak)
(jika ya, sila jawab soalan berikutnya)

i. Jenis wabak:_____

ii. Tarikh kejadian:_____

iii. Tempoh:_____

iv. Jumlah haiwan dijangkiti:_____

v. Jumlah haiwan mati:_____

vi. Tindakan yang diambil:_____

n. Kadar kematian setahun (disebabkan oleh penyakit):_____

2.7 PENGURUSAN SANITASI LADANG

a. Kandang dicuci *(2 kali sehari / sekali sehari/ seminggu sekali/ lain-lain:_____) dengan menggunakan *(air sahaja/ air dan disinfectant/ lain-lain:_____)

b. Tinja yang dicuci dari kandang akan disalurkan *(ke dalam kolam efluen bertingkat / terus ke kawasan luar ladang) menggunakan *(sistem perparitan / tiada sistem perparitan).

2.8 PENGURUSAN SISA LADANG

a. Bagi ternakan yang didapati mati, ladang mengamalkan sistem *(penanaman bangkai / pembakaran bangkai / lain-lain, sila nyatakan:_____).

b. Sekiranya berlaku kematian, tindakan laporkan kepada DVS *(Ya/ Tidak)

c. Bagi pengurusan tinja, tinja akan dikumpulkan *(seminggu sekali / sebulan sekali / selepas ternakan dijual habis /lain-lain nyatakan: _____). Tinja dijual *(tanpa sebarang pengubahsuaian/ selepas dikeringkan/ selepas dirawat, sila nyatakan bahan kimia yang digunakan_____).

d. Penggunaan EM di dalam pengurusan tinja * (Ya/ Tidak). Jika ya, sila nyatakan: _____

2.9 PROGRAM MAKHLUK PEROSAK

Adakah terdapat haiwan perosak di ladang anda? *(Ya/ Tidak)

Program kawalan makhluk perosak dilakukan oleh *(Pihak ladang sendiri/syarikat swasta).

Kawalan makhluk perosak meliputi kawalan bagi *(tikus/ lalat/ biawak/lain-lain seperti:_____). Bahan dan kaedah kawalan makhluk perosak adalah:

Makhluk Perosak	**Bahan/ alat yang digunakan**	**Cara penggunaan**
Tikus		
Lalat		
Bau		
Lain-lain		

2.10 PEMBIAKAN TERNAKAN

a. Adakah anda mempunyai rekod bertulis tentang pembiakan ternakan anda? *(Ya / tidak)

b. Kadar jantan dan betina dalam satu kandang: _____ jantan_____betina

c. Umur mula dibiakkan:_____

d. Cara pembiakan:
   i. Pembiakan semulajadi: ☐
   ii. Pemanian berhadas: ☐
      a) Sumber semen:_____
      b) Baka semen:_____
      c) Cara mengesan biang:_____

e. Bilangan anak dalam setahun (satu ibu):_____

f. Bilangan anak mengikut ibu (setiap kelahiran):_____

g. Berapa lamakah masa yang diambil untuk ternakan dibiakkan semula selepas beranak?: _____

h. Pernahkah haiwan ternakan anda mengalami kes keguguran? *(Ya / Tidak)
   (jika ya, sila jawab soalan berikutnya)

i. Kekerapan:_____
ii. Fasa kebuntingan:_____
iii. Apakah tindakan anda:_____

3. PRODUKSI

3.1 TERNAKAN SUSU

a. Pemerahan susu dilakukan secara *(manual/mesin perah susu) sebanyak _____ kali sehari pada _____(masa).

b. Jumlah pengeluaran susu (seekor/sehari):_____

c. Produk susu dijual pada _____ dengan harga RM_____/liter.

3.2 TERNAKAN PEDAGING

a. Pemasaran ternakan adalah bagi tujuan jualan ternakan hidup kepada *(Peraih / akikah / korban / daging segar secara runcit / lain-lain, sila nyatakan_____) dengan harga RM_____/kg.

b. Sembelihan haiwan *(Sendiri/rumah sembelih / lain-lain, sila nyatakan _____)

c. Berat yang dicapai untuk dipasarkan (seekor):_____

d. Tempoh yang diambil untuk mencapai berat jualan:_____

3.3 REKOD JUAL-BELI

a. Adakah anda mempunyai rekod bertulis mengenai jual-beli ternakan/susu? *(Ya/ Tidak)

b. Purata jumlah ternakan /susu dijual dalam masa setahun :_____

c. Adakah ladang anda mempunyai hasil selain jual-beli ternakan atau susu? *(Ya /Tidak), jika ya, sila nyatakan:_____