HEALTH MANAGEMENT PRACTICES OF GOAT FARMS IN SANDAKAN

MUHAMMAD FAKHRUR BIN KHAMIS

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88999 Kota Kinabalu, Sabah
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DR. ABDUL RAHIM AWANG
Pensyarah Kanan/Penyelia Projek Tahun Akhir
Fakulti Pertanian Lestari
Universiti Malaysia Sabah
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1. DR. ABDUL RAHIM BIN AWANG
   SUPERVISOR

Signature and stamp
DR. ABDUL RAHIM AWANG
PENSYARAH KANAN
FAKULTI PERTANIAN LESTARI
UMS KAMPUS SANDAKAN

2. DR. BONAVENTURE BONIFACE
   CO-SUPERVISOR

Signature and stamp

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ABSTRACT

Goat rearing activities are one of the main agricultural activities in Malaysia including Sandakan which aimed to meet the needs of the local population especially in terms of food supply. Goat farming is done intensively and extensively for high quality meat, dairy products and fibre production. Objectives of this study are to identify the demographic and socio-economic background of goat farmers, to identify the levels of understanding in terms of the proper practice of health management by the goat farmers, to compare the health management practices among the respondents and to compare the farm productivity per year among the goat farms in Sandakan. The processes of data collection for this study have been done after several visits to the farms and interview sessions with the goat farmers in this district were conducted. Descriptive analysis, factor analysis and analysis of variance or ANOVA were used to achieve all the objectives of the study by using SPSS software version 21.0. The findings of this study show that there are differences in terms of demographic and socio-economic background of goat farmers and their understanding levels regarding the proper practice of health management. For health management components, there are several differences in terms of health management practices especially in terms of feeding management, types of medicines used and more. There are also differences in terms of goat farm productivity per year such as in aspects of goat age for marketing, average sale per year and more. Hence, the communication and the coordination of long-term goals between Department of Veterinary Services and Animal Industry and the farmers should be emphasized continuously to provide a balance in development of goat farming especially implementation of proper health management in the goat farms and to ensure the supply of goat meat at the optimum level consistently.

ABSTRAK

Aktiviti penternakan kambing adalah salah satu aktiviti pertanian utama di Malaysia termasuk Sandakan yang bertujuan untuk memenuhi keperluan penduduk tempatan terutama dari segi bekalan makanan. Penternakan kambing dilakukan secara intensif dan ektensif untuk penghasilan daging berkualiti tinggi, produk tenusu dan pengeluaran serat. Objektif kajian ini adalah untuk mengenal pasti latar belakang demografi dan sosio-ekonomi penternak kambing, untuk mengenal pasti tahap pemahaman dari segi amalan pengurusan kesihatan yang betul oleh penternak kambing, untuk membandingkan amalan pengurusan kesihatan di kalangan responden dan untuk membandingkan produktiviti ladang setiap tahun di ladang-ladang kambing di Sandakan. Proses pengumpulan data untuk kajian ini telah dilakukan selepas melakukan beberapa lawatan ke ladang-ladang dan sesi temu bual dengan penternak kambing di daerah ini. Analisis deskriptif, analisis faktor dan analisis varians atau ANOVA digunakan untuk mencapai semua objektif kajian dengan menggunakan perisian SPSS versi 21.0. Hasil kajian ini menunjukkan bahawa terdapat perbezaan dari segi latar belakang demografi dan sosioekonomi penternak kambing dan tahap pemahaman mereka mengenai amalan yang betul mengenai pengurusan kesihatan. Untuk komponen pengurusan kesihatan, terdapat beberapa perbezaan dari segi amalan pengurusan kesihatan terutamanya dari segi pengurusan makanan, jenis ubat yang digunakan dan banyak lagi. Terdapat juga perbezaan dari segi produktiviti ladang setiap tahun seperti dalam aspek umur kambing untuk pemasaran, jualan purata setiap tahun dan banyak lagi. Oleh itu, komunikasi dan penyelarasan matlamat jangka panjang antara Jabatan Perkhidmatan Haiwan dan Perusahaan Ternak dan petani perlu ditekankan secara berterusan untuk menyediakan keseimbangan dalam pembangunan penternakan kambing terutama pelaksanaan pengurusan kesihatan yang baik di ladang-ladang kambing seterusnya untuk memastikan bekalan daging kambing pada tahap optimum secara konsisten.

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%	Percent
°F	Fahrenheit
ANOVA	Analysis of variance
CLA	Caseous Lymphadenitis
CAE	Caprine Arthritis and Encephalitis
DVS	Department of Veterinary Services
etc	et Cetera
FAO	Food and Agriculture Organization of the United Nations
g	Gram
Kg	Kilogram
JPHPT	Jabatan Perkhidmatan Haiwan dan Perusahaan Ternak
PKC	Palm Kernel Cake
RM	Ringgit Malaysia
SPSS	Statistical Package for Social Science
UMS	Universiti Malaysia Sabah

CHAPTER 1

INTRODUCTION

1.1 Overview

Goat or *Capra hircus* domesticated for at least 9,000 years and it is reared to supply meat, milk and fibre, and also have been an essential source of economy for communities through the ages (Devendra, 2010). Even today more people worldwide consume goat-based products rather than any other species of animals according to Firuza and Siti (2011). More than 80% of the world's goats live in Asia and Africa as domesticated or feral animals (Solaiman, 2007). Goats originate from warm, dry Mediterranean and western Asian countries. They are ruminants (animals with a rumen, where microbes digest eaten plant material, instead of a simple stomach), have a voracious appetite, and will eat a wide range of plants. There are over 100 main breeds of goat worldwide, bred for milk, fiber or meat. Although easily domesticated, goats can quickly revert to a feral state if released from captivity (Chetroiu and Collin, 2014).

Sandakan is one of the districts in Sabah with an area of 875 square miles consisting of urban area (56 square miles) and rural and islands (773 square miles). Sandakan has lots of attractions from various aspects which is including the aspect of history, culture, nature, economy and many others. Sandakan District also includes three constituencies namely P184 Libaran, Batu Sapid P185 and P186 Sandakan. Distribution of the population in this area consists of Malays, Chinese, Kadazans and other tribes such as the Bajau, Murut, Sungai, Bugis, Suluk, and others. According to the 2010 population census, population in this area is about 453 500 people (Majlis Perbandaran Sandakan, 2013).

Prospects of goat farming in Malaysia is expected to grow rapidly with growth of about 6.7% per annum since 2006 until 2010. Interest of the entrepreneur in the goat rearing industry is also growing due to government policies that promoting the growth of the goat farming. Industry of National Goat Production Policy aimed at the production of 4.96 million pieces, with 1.99 million for the rearing of goats by 2015. There are three types of goats that are currently bred in Malaysia which are meat-type, dairy-type and wool-type breeds. Some breeders intend to bred certain types of breed such as Katjang breed (local breed), Jamnapari and Boer (Devendra, 2010). All these three breeds become the favorites among of local livestock farmers due to their good performance in terms of production and adaptability with the local climate.

Moreover, through the Ministry of Rural Development and the Federal Development Department, the establishment of the People's Welfare Development Unit (SPKR) has provided various types of development programs which are related to agriculture sectors such as livestock rearing and long-term crops and able to create opportunities for locals to upgrade and enhance their lifestyle especially in terms of socio-economic. With the given opportunities, the local residents started to involve themselves in agricultural activities such as goat farming, cattle farming, poultry farming and more (Majlis Perbandaran Sandakan, 2013).

1.2 Justification

The Third National Agricultural Policy (NAP3) stressed on food production from local sources, and this included the production of goat meat. In line with the NAP3, the Department of Veterinary Services (DVS) had studied and re-evaluated the role it can play in this effort. Through its field observations and study on a number of projects, the goat production operations can be mobilized and given renewed focus as it offers great potential for further development. Although goats have long been reared by farmers in Malaysia, it is usually carried out on a small scale as a side activity, weed controller, a hobby or as a source of animal protein to fulfill their own requirement. According to the findings of Ministry of Agriculture and Agro-Business Industry Malaysia (2013), the demand for goat meat in 2010 was projected at 21.30 metric tonnes but production reached only 2.18 metric tonnes and the self-sufficiency level for goat meat in 2010 stood at only 10.23%. This would offer many opportunities for farmers to venture into this field.

However, many farmers just maintain their farm at the existing level with little efforts to expand the farm productivity into a larger scale, either as a semi-commercial or even a commercial goat farm. In addition, Firuza and Siti (2011) pointed out problem of little knowledge faced by many farmers about goat farming. Since many farmers start rearing goat in a small scale farm, they do not have proper knowledge to handle and improve their farm productivity, as well as upgrade their farm's scale. Most local farmers do not know the proper components of health management that should be practiced in their farms in order to expand their small-scale farms into semi-commercial or commercial farms effectively. Moreover, some of the goat farmers in Malaysia including in Sandakan still practice the health management practices in their farms based on their experiences and farm situation rather than following the recommended guidelines by the local authorities. In order to ensure the management practices could bring positive impact on the productivity and reduction in mortality, the farmers need to identify crucial and effective practices which can enhance the health aspects of the goats in their farms. In a large-scale goat farm, poor health management could affect high number of mortality rate and would cause total loss to the farm itself.

Although various initiatives have been undertaken by various parties, facilities, capability and knowledge seem the most crucial components in managing goat rearing activity especially in terms of hygienic and health managements that can influence farm productivity. According to Ershaduzzaman *et al.* (2007), health management and disease control programs are essential to reduce the spread of diseases in a farm. This coincided with a statement by Beat and Stephen (2007), in which he indicated that livestock manure management, nutrition and hygiene are very important in maintaining animal welfare. In addition, interest in the health management of livestock including goats are very important in order to increase the yield, as well as generate downstream production of basic livestock products for export markets (Rosly, 2008).

This research would be conducted with the cooperation of the Sandakan office of the Sabah Department of Veterinary Services, UMS's Faculty of Sustainable Agriculture and several farmers around Sandakan. All the information from this research hopefully can be published and shared with the DVS in Sandakan to be used as a source of reference by the local goat farmer in order to help them in managing their farms properly and hence increase their farm productivity. Hopefully, the findings from this study are able to provide useful information and though in small way can contribute to the quality

of goat industry in Sandakan, Sabah which can help to enhance their socio-economy and fulfill the demand from the local customers.

1.3 Objectives

There are several objectives of this study such as:

I. To identify the demographic and socio-economic background of goat farmers selected in the study.

II. To identify the levels of understanding in terms of the proper practice of health management by the goat farmers in Sandakan.

III. To compare the health management practices among the respondents.

IV. To compare the farm productivity per year among the goat farms in Sandakan.

1.4 Questions

With the objectives of study, the following are the research questions which the study would try to find the answers based on the data those will be gathered:

I. What is the demographic information and level of understanding of the proper practice of health management by the goat farmers surveyed in Sandakan?

II. What is the level of understanding in terms of the proper practice of health management by the goat farmers in Sandakan?

III. Is there any difference in term of health management practices among the respondents?

IV. Is there any difference in term of farm productivity per year among the goat farms in Sandakan?

CHAPTER 2

LITERATURE REVIEW

2.1 Overview

This section presents a literature review that has been used to help develop the case based on previous studies , shows a journal or all issues that have been produced to substantiate the analysis obtained from this study , and provides a rationale for highlighting the fact that the results of the study (Boote and Beile, 2005). In the study by Siti and Fizura (2011) are some aspects that need to be understood and applied in goat farming background, breed livestock farm management , goat management , animal health care.

2.2 World Goat Population

Generally, goat is one of the earliest animals that have been bred by humans about 9000 years ago and most of the population around the world raise goat for meat and milk, as well as apparel and home building materials taken from hair, feathers, leathers and goat bones. In addition, the utilization of the goat products is also important for all aspects which are related to community festivals such as religious ceremonies and celebrations (Boyazoglu *et al.*, 2005).

Sandra (2010) said that among the biggest producer of goat in the world is Asia, followed by Africa. Furthermore, Sandra (2010) also stated that the countries that spent a lot of goats are China, India, and Pakistan even Australia and New Zealand are the two main exporters of goats but they are not the primary producers of goat industry.

2.3 Status of Goat Husbandry Industry in Malaysia

Goat is the first animal domesticated and plays an important role in history. Goat farming is one of the main agricultural activities in Malaysia (Siti and Firuza, 2011). According to Mohmad (2012), goat farming industry in Malaysia is still being outnumbered by small farmers. Recently, the Ministry of Agriculture and Agro-based Industry (MOA) has taken various initiatives to improve production of livestock in Malaysia, especially goats. In general, goat farming industry in Malaysia is small compared to other livestock commodities. Therefore, compared with chicken (121.39%), eggs (113.79%) and cows (24.88%), self-sufficiency and goat meat goat production in 2007 reached only 8.75% (Department of Veterinary Services, 2013). In terms of demand for goat meat, it is still insufficient for the population in this country. According to statistics from the Department of Veterinary Services (2013), there are only 2,000 metric tons of mutton can be supplied to accommodate the needs of nearly 21000 metric tons by per capita consumption of 0.75 kg.

With such a high demand, Malaysia is able to supply the demand for goat meat only for less than 10%. Partly imported from Australia and other neighboring countries such as Indonesia, Vietnam which have larger number of livestock animal and more consistent production rate every year compared to Malaysia (Lembaga Pertubuhan Peladang, 2011). This situation has encouraged farmers to begin the farming of goats and today the number of goats has increased by 56.2% to 545.7 thousands heads in 2010 compared to 349.4 thousands heads in 2006 (Jabatan Perangkaan Malaysia, 2013).

According to Rosly (2008), goat farming industry in Malaysia aims to produce milk and meat. Then breeds of goats which can produce good milk quality are usually imported from abroad such as Jamnapari, Saanen, Anglo Nubian and for breed of Toggenburg goats are used for breeding with local breed. Through the breeding program between the, it will produce a fast-growing kid with high resistant to extreme weather and can produce a lot of milk. Goat industry can bring many advantages, especially for small farmers. They are not necessarily focused on meat production only because of other products from goat such milk and leather have a high both in market value and demand. Goats also can help the small farmers to use the potential of their land for use as livestock farms and can provide income rather than leave the land empty without any uses. (Devendra, 1994).

In terms of large-scale, goat industry in Malaysia needs focus on meat production because meat of goat has a high value in the market and farmers are advised to set their main objective in goat farming for the slaughter purpose rather than breeding purpose which require a high cost and longer period to perfectly establish. In addition, goat meat also has its own advantages compared to the other livestock in terms of lower cholesterol, small size, easily managed, high protein content and has good taste compared to other livestock meat (Azhar, 2012).

2.4 Status of Goat Industry in Sabah

Goat industry in Sabah is increasing due to rapid growth and short period of time needed to harvest the goat and the animal also has a high nutritive value. Referring to Yahya (2009), goat farming was introduced in the state in the 1980s and has greatly contributed to the economic development of the country. However, the current supply for goat meat is still low especially during festival seasons such as Raya Haji and the situation is the main reason for the government to import live goats about 18 451 heads and around 1.98 million kg of meat (goat / sheep) with a cost of RM 40.3 million and this was happened in 2007.

In addition, there are several approaches which have been implemented to improve the production of goats in Sabah such as the establishment of Rural Development Corporation and this agency has established a crossbred Boer goat farm located in Kabang, Papar known as Boer Goat Breed Breeding Center. Until now, there are two new farms of Boer goat farm and the first farm is located at Bukau, Beaufort and next one located at Kelatuan, Papar which serves as the main breeding farm for Boer goats. The establishment of the facilities is to solve the shortage of the meat supply and then fulfill the market demand especially in Sabah (Koperasi Pembangunan Desa, 2012).

2.5 Background of Farmers

Goat farming had positively affected the farmers' economy, particularly for increasing the income of households (Mamabolo and Webb, 2005). According to Lindsay (2010), some researchers have encouraged and helped many goat farmers especially in Asia through a number of programs and policies. Regarding the policies, there are two main methods used which are to solve the problems of farmers in terms of managing and presenting new information to the government to act as a support in the establishment of financial institutions for the farmers, as well as providing the farm facilities to produce the farmers to venture into this field.

In addition, there are several characteristics in terms of entrepreneurship that are required as the compulsory conditions to become a successful commercial goat producers and the characteristics are ability to identify business opportunities, brave enough to take risks, have a strong commitment to the business and ability to create systematic plans. The farmers shall able to identify the need to implement proper feeding system and stocking the feedstuff at optimum level consistently. In addition, elements of honesty and trust, fair decisions, uniform structure and ability to solve the problems successfully are the main components to build a farm with efficient management in all stages (Sikosana and Senda, 2010).

2.6 Factors Influence Infection in Goat Farming

Disease and death are the cause of losses in meat goat farming business and required a higher cost for to provide facilities and medicines in case to treat the sick goat. Thus, the principle of "prevention is better than cure" should be practiced in farm management. Farm biosecurity must be strictly controlled to avoid the causes of disease transmission to the farm can be avoided. Stocks of new animals should be free of disease and use of serological screening to identify infectious diseases such as Caseous lymphadenitis (CLA), Brucellosis and Meliodosis is important. Quarantine new animals for 30 days is also necessary to identify signs of disease before it is incorporated with existing animals on the farm (Devendra, 1994). For newborn goat kids, besides providing immunity colostrum feeding, separating them from adults other than her mother goat and treatment of the wounds on the umbilical cord with iodine solution also needs to be

done. Vaccine is also very important to avoid getting the newborns from get infected by the other adult goat. The vaccine should also be carried out by the experts only.

2.6.1 Disease and Parasites

There are several guidelines for the prevention and treatment of diseases of goat meat. The symptom need to be identified based on the Table 2.1 before giving the required treatments.

Table 2.1: Guidelines for the Prevention and Treatment of Diseases of Goats

Disease	Symptoms	Preventions	Treatment
Endoparasites (worms)	- Skinny Body - Potbelly - Pale - Diarrhoea -The fur looks wrinkled and rough - Lack of appetite.	-Grazing by rotation within 4-6 weeks to one area. -Always clean the cage and make sure the cage dry.	-Provision of drenching every 6 months at a rate of 10ml per 100kg weight.
Ectoparasites	- Pests that irritates -Fleas in the eyes and ears of her legs.	-Ensure the cleanliness of the cage. -Always take care of the wound with iodine and do not let the wound is exposed. -Spray poison ticks to new animals before brought to the farm.	-Spray or sponge with poison ticks (Asuntol or Bovinox)
Food poisoning	-Diarrhoea	-The feeding of concentrates according to the needs of livestock	-Injection of antibiotics and electrolytes
Ulcer	- Pimple, scabs and scaly skin in the mouth, lips, nose, eyelids, ears or breast.	- Vaccination and animal quarantine diseased	- Sweeping iodine on the boil
Pink eye	- Watery and red eyes due to pathogen infection and can cause the goat-blind without treatment.	- Quarantine infected flocks than others.	-Wipe or spray Teramycin

Foot rot	-Goat limp, redness between the foot and leg swelling.	-Avoid muddy ground and do the trimming nails.	- Clean the infected nails, trim and soak the nail in a solution of copper sulfate or 10% formalin.
Caseous lymphadenitis (CLA)	- Boils in the lymph nodes under the ears and legs.	-Vaccination, periodic blood tests and culling infected flocks.	-There is no effective treatment, culling is necessary.
Bloating	-Stomach bulge and tense on the left. Livestock lying and breathing difficulties.	-Avoid giving nuts, food concentrates and grass in excessive quantities.	-Anti-bloating or cooking oil (100-200 milliliter).
Meliodosis	-Fever, weakness, runny nose, runny eyes, internal organs abscess.	-Perform regular blood serological screening to detect infected flocks and culled	-There is no effective treatment, need culls.
Inflammatory breast	-Breast swelling, heat and redness.	-Maintain cleanliness goat breast before and after breastfeeding, avoid excessive feeding of concentrates.	- Milking goats milk for mothers whose milk is sucked out and antibiotic injection.
Pneumonia	-Runny, fever, shortness of breath, cough and lack of appetite.	-Vaccination	-Injection of antibiotics

Source: (Musaddin, 2007).

2.6.2 Diet

Daily diet with proper nutritional formula should be provided to ensure the goat gained enough energy for growth, reproduction and develop the level of immunization against disease. Energy requirements also vary according to the physiological functions. Sandra (2010) said goats' basic diet which consist of carbohydrate and protein are essential for the purpose of maintenance of body structure and namely the dry weight of the feedstuff need to be by 3% of the weight of the goat. Male goats require crude protein between 12%-14% of that amount. The feeding of the male goats should be controlled so that the male obtained ideal weight and prevent the goat from suffering fewer problems affect their libido to mate or other fertility problems. Nutrition for female goat depends

bundled breeding cycle, either at the time of pregnancy, childbirth, or the mating season. For mothers with young goat more than four months, 12-14% crude protein should be given. Less energy during the period of pregnancy will cause death due to ketosis. Every day, new goat maternity and nursing needs to be given grass and legume foliage dry weight was 1-1.5Kg and supplemented with concentrate food 100-200g for single mothers give birth while 300-500g for the mother of twins (Sandra, 2010).

Newborn goat kids need to consume colostrum as soon as they were born. As a kid born without any immunity, colostrum must be given in sufficient quantities and at the time required. Colostrum should be given within 12 hours after birth at a rate of 12-15% of body weight of a kid according to Suzanne (2014). Naturally, the mother goat will be breast-feeding with colostrum in the first 24 hours after birth. However, there will still exist problems such as maternal mortality or difficulty suckling at the mother and the kids should be given colostrum with a bottle of milk. Colostrum can be given using the bottle at least 200ml per kg body weight of the goats, 2 to 3 times in the first 24 hours for a kid who did not receive colostrum from the mother. Then, continue with giving powdered milk or milk replacer of 500 to 750ml in feeding 3-4 times a day for the first 3 days and 2 times a day for the next period of breastfeeding until the child is weaned. Before the milking is fully stopped, goat kids should be started to feed with a certain amount grass and foliage with high quality in their daily diet after 2-3 weeks old kid. Forages and concentrates need to be given during this period to accelerate the development of the rumen. After weaning, kid must be supplied with a diet rich in fiber and starch to accelerate the growth rate. 15 - 20g of dry matter per day per metabolic body weight should be given to the kids after weaning. Excessive protein grant will also cause lack of energy to get rid of goat excess protein in the body and reduce weight gain (Schoenan, 2014). In addition, excessive protein in the diet will also lead to the spread of worms in the stomach of a goat and the cause of death due to bloating from gas nitrate. Thus, feeding concentrates should not exceed 150g / goats for a day (Musaddin *et al.,* 2007).

Minerals play an important role to increase appetite and also complete the goat metabolism. Mineral needs can be provided with a block of appropriate mineral or salt. Besides, the water supply is also very important to ensure health. Young goats and nursing mothers need more water than the old goat and sheep that are not breastfed.

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