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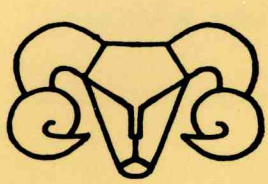
Small Ruminant Production Systems in South and Southeast Asia

Proceedings of a workshop held in Bogor, Indonesia, 6–10 October 1986



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Editor: C. Devendra

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Abstract This publication presents the results of a meeting held in Bogor, Indonesia, 6-10 October 1986, that focused specifically on the assessment of small ruminant production systems in South and Southeast Asia. It considered the prevailing circumstances, the innovations, and the strategies that are pertinent for stimulating increased productivity from goats and sheep. The present patterns of production were examined in detail with reference to characteristics of the small farms, existing management methods, and nature and components of the production systems. These systems include extensive systems, systems combining arable cropping, and systems integrated with tree cropping. The discussion of the systems were further highlighted by country case studies, issues and policies that considered the available production resources, especially the genetic and feed resources available, constraints to production, and potential means to achieve desirable improvements. An important session was devoted to examining research methodology, strategies for development appropriate to individual systems, and a conceptual framework for on-farm economic analysis. Together, these discussions enabled a definition of research protocols and the priorities for future direction that are likely to have a major impact on productivity from small ruminants.

Résumé L'ouvrage présente les conclusions d'une réunion tenue à Bogor, en Indonésie, du 6 au 10 octobre 1986, portant sur l'évaluation des systèmes de production touchant les petits ruminants en Asie du Sud et du Sud-Est. On y a brossé un tableau de la situation actuelle, des innovations et des stratégies susceptibles d'accroître la productivité dans l'élevage de la chèvre et du mouton. On a examiné en détail les méthodes actuelles de production dans la perspective propre aux petits exploitants, les éthodes actuelles de gestion, le type de systèmes de production et leurs éléments. Il s'agit ici des systèmes extensifs, des systèmes associant la culture des terres, et des systèmes intégrant la sylviculture. Les discussions ont été étayées d'études de cas, de problèmes et de politiques émanant des divers pays et portant sur les ressources disponibles pour la production, spécialement les ressources génétiques et fourragères, les contraintes à la production, et les possibilités d'amélioration qui existent. Une importante session fut consacrée à l'examen de la méthodologie de la recherche, des stratégies de développement convenant à chaque système, et d'un cadre conceptuel pour l'analyse économique des activités sur le terrain. Toutes ces réflexions ont permis de définir des plans de recherche et d'établir les priorités qui, dans l'avenir, auront vraisemblablement un impact majeur sur la productivité liée à l'élevage des petits ruminants.

Resumen Esta publicación presenta los resultados de la reunión celebrada en Bogor, Indonesia del 6 al 10 de octubre de 1986, cuyo temp principal fue la evaluación de los pequeños sistemas de producción de rumiantes en el

Sur y Sureste asiático. En la misma se analizaron las circunstancias imperantes, las innovaciones y las estrategias pertinentes para estimular la mayor productividad del ganado caprino y ovino. Se examinaron detenidamente los patrones actuales de producción con respecto a las características de las pequeñas granjas, a los métodos de manejo existentes y a la naturaleza y componentes de los sistemas de producción. Estos sistemas incluyen sistemas extensivos, sistemas que combinan el cultivo de tierras arables y sistemas integrados con plantaciones de árboles. La discusión de estos sistemas estuvo acompanada del análysis de etudios de casos en diferentes países, así como de problemas y políticas relacionados con los recursos de producción disponibles, especialmente los recursos genéticos y alimenticios disponibles, las limitantes de la producción y los posibles medios para obtener las majoras deseadas. Una importante sesión estuvo dedicada a examinar la metodología de las investigaciones, las estrategias para el desarrollo apropiadas para cada sistema individual, y un marco conceptual para la realización de análisis económicos en las granjas. En su conjunto, estas discusiones permitieron definir los protocolos de investigación y las prioridades para el futuro, que probablemente habrán de tener importantes repercusiones sobre la productividad de los pequeños rumiantes.

CONTENTS

DISEASE PROBLEMS OF SMALL RUMINANTS IN INDONESIA

Purnomo Ronohardjo and A.J. Wilson

Research Institute for Animal Disease, P.O. Box 52,
Bogor, Indonesia

Abstract *Diseases of small ruminants are divided into three types: first, those of known economic significance; second, those of unknown economic significance; and, third, those of other livestock species in which small ruminants may play an important epidemiological role. Parasitic diseases are the most important in the first group, especially gastrointestinal nematodiasis and fascioliasis. These diseases can be controlled by chemotherapy and sound management, and extension services to farmers need to be improved to maximize economic return. The second group includes a number of diseases and more research work is required to ascertain their importance. In the third disease group, small ruminants play an important epidemiological role in foot-and-mouth disease of large ruminants and malignant catarrhal fever (sheep only) of Bali cattle and buffalo. The control of some of these diseases and future research requirements are discussed.*

There are about 8×10^6 goats and 4×10^6 sheep in Indonesia. Of this population, about 85% is on the island of Java, which is only 9% of the total land mass of the country (Biro Pusat Statistik 1984). Both species are kept with minimal land requirements by smallholders or landless farmers in villages. There is a strong correlation between the population densities of humans and small ruminants (Tillman 1981); around 20% of all farms in Indonesia have small ruminants (Knipscheer et al. 1983). Small ruminants are kept for a variety of purposes including meat, milk, wool, cultural and religious functions, manure, and as a source of "liquid" money (Fletcher 1984). There are two main breeds of goat (Kacang and grade Ettawah) and three main breeds of sheep (Javanese thin tailed, Priangan, and fat tailed). Goats are important components of some transmigration schemes.

There are few detailed studies on the epidemiology and economics of diseases of small ruminants. Rangkuti et al. (1984) listed 18 diseases of goats and Thedford et al. (1984) produced a goat health handbook for Indonesian farmers that contains notes on a large number of diseases that may occur in Indonesia. Ronohardjo et al. (1985) attempted to divide diseases of small ruminants into those thought to have some significance and those known to occur but whose significance is unknown. Of the former group, parasitic diseases are the most important.

This paper describes and reviews the main diseases of small ruminants in Indonesia and concentrates on diseases of some significance. Diseases of other livestock in which sheep or goats play an important epidemiological role are also mentioned.

DISEASES

Diseases of small ruminants in Indonesia are divided into three groups (Table 1). Group A includes important diseases, which are listed here and in Table 1 in order of suggested economic importance; group B consists of other diseases known to occur; and group C includes diseases that are important in other livestock species and involve small ruminants as possible carriers.

Group A

Gastrointestinal nematodiasis

This disease complex is caused by a number of nematode parasites including Haemonchus, Trichostrongylus, Strongyloides, and Oesophagostomum. Of these, Haemonchus and Trichostrongylus are the most important. Much information on the effects that these parasites have on small ruminants has been obtained at the Research Institute for Animal Disease in Bogor. This research has been recently reviewed by Beriajaya and Stevenson (1986a). These studies showed that worm infestation was very common, but that the level of infestation could be influenced by rainfall and altitude, the feeding system, and pen construction. Higher helminth levels were found in small ruminants in low, wet areas, in animals using a fully grazed as opposed to a zero-grazed system, and in animals in pens with poorly designed floors that retain feces. Weight-gain improvement can be achieved by the administration of anthelmintics, but the choice of anthelmintic is very important. A study

Table 1. A summary of diseases of small ruminants in Indonesia.

Group A. Diseases of significance in suggested order of economic importance

- Gastrointestinal nematodiasis: parasitic, endemic, widespread, Haemonchus most important
- Fascioliasis: parasitic, endemic, widespread, Fasciola gigantica most important
- Mange (goats only): parasitic, endemic, widespread, Sarcoptes scabei most important
- Pneumonia: bacterial (precise aetiologies often uncertain), endemic, widespread, Pasteurella most important
- Plant intoxication: toxic or fungal etiology, sporadic

Group B. Diseases known to occur

- Virological: bluetongue (other Orbiviruses), contagious ecthyma (Orf), rabies
- Parasitic: primary myiasis (screw worm), secondary myiasis, coccidiosis
- Bacterial: anthrax, salmonellosis, tetanus, clostridia, foot rot

Group C. Diseases of other livestock involving small ruminants as carriers

- Foot-and-mouth disease: large ruminants, pigs
- Malignant catarrhal fever (sheep only): large ruminants
- Bluetongue

using different anthelmintics and different regimes on 636 small ruminants showed that significant weight gain occurred after the repeated use of broad-spectrum anthelmintics. Single doses of narrow- or broad-spectrum drugs were of limited value because of rapid reinfestation with larvae (Beriajaya and Stevenson 1986b); this study also showed that anthelmintic treatment could be cost effective. The annual cost of haemonchosis to the small ruminant industry in Indonesia has been estimated at around USD 16 million (Parsons and Vere 1984).

Fascioliasis

Two species of liver fluke, Fasciola gigantica and Gigantocotyle explanatum, can be found in the livers of small ruminants in Indonesia, with the former being much more important. Mixed infections can occur. Fasciola gigantica is more common in large ruminants than in small ruminants. The point-prevalence rates of flukes in the livers of cattle passing through the Bogor abattoir was 60.6% compared with 21.9% in sheep and 20.6% in goats (Suhardono 1984). This lower prevalence rate in small ruminants is probably due to management practices, because zero-grazed animals would not come into contact with the snail intermediate host. However, Fascioliasis in small ruminants is associated with acute disease and high mortality. Thus, this disease is economically important. Anthelmintics are rarely used to combat this disease because of expense, availability, and ignorance of possible economic benefit. Management practices should concentrate on systems that eliminate contact with the snail intermediate host.

Mange

Mange, which is due to Sarcoptes scabei, is common in goats but not sheep (Sangvaranond 1979) and can cause severe mortality in kids (Kertayadna et al. 1982). The disease can be treated with acaracides, but these are not always available and repeated treatment is necessary (Manurung 1986). The annual cost of mange to goat production in Indonesia has been estimated at USD 5 million (Parsons and Vere 1984).

Pneumonia

Pneumonias of different types are another common cause of death in both sheep and goats (Rangkuti et al. 1984). The etiologies are often uncertain; however, Pasteurella and Mycoplasma pathogens have been implicated. The prevalence of pneumonia is associated with climate and management. The disease is more common in the rainy season and in systems where crowded housing and poor nutrition are characteristics.

Plant intoxication

Diseases thought to be due to toxic plants occur sporadically and are relatively uncommon. The etiology of such diseases is often obscure. Ronohardjo (1981) reported a case of photosensitization in sheep that may have been associated with Lantana camara. Facial eczema of sheep has been reported (Murdiati et al. 1983) to be associated with feeding on Brachiaria. However, the fungus responsible for facial eczema, Pithomyces chartarum, has not been identified on Brachiaria grasses in Indonesia.

Group B

There is little accurate information on the epidemiology of most of the group B diseases. Antibodies to five types of bluetongue virus (1, 12, 17, 20, and 21) have been reported in sheep and goat sera collected from different parts of Indonesia (Indrawati et al. 1986); however, clinical bluetongue in sheep and goats has only been reported once (Sudana and Malole 1982.) Contagious ecthyma (Orf), which is caused by a pox virus, can be common in goats and uncommon in sheep. Feeding is difficult during the disease and young animals may die of starvation. Coccidiosis and foot rot have been reported in kids in wet areas, where they are heavily stocked (de Boer 1986).

Group C

Foot-and-mouth disease

In Indonesia, foot-and-mouth disease (FMD) caused by type O virus is thought to be mainly a disease of large ruminants and only these animals are vaccinated. However, in the last major outbreak in 1983, the clinical disease was observed in sheep, from which FMD virus was isolated (Young et al. 1985). Thus, small ruminants may play an important role in the epidemiology of this important disease.

Malignant catarrhal fever

A fatal type of malignant catarrhal fever (MCF) in large ruminants associated with sheep is widespread in some areas of Indonesia. Sheep-associated MCF has similar pathology and clinical signs to an African form associated with wildebeest, whose causal agent is a herpes virus (Snowdon and St George 1982). The etiology of sheep-associated MCF has not yet been established. However, there is a clear association with sheep, especially after lambing (Ramachandran et al. 1982). Sheep-associated MCF particularly affects Bali cattle and buffalo,

with Bali cattle being the most sensitive species (Ginting 1979; Hoffman et al. 1984).

Bluetongue

The involvement of sheep and goats in bluetongue has already been mentioned. However, small ruminants may act as a reservoir for bluetongue in large ruminants: antibodies to the disease have been found in small ruminants (Sudana et al. 1982).

DISCUSSION

There is little doubt that diseases are major constraints to the sheep and goat industry developing to their full potential in Indonesia. Although there are good control measures available for all the important diseases, disease control by itself is of limited value and should be associated with management packages tailored to individual situations. The majority of farmers in Indonesia are smallholders or landless farmers and the numbers are increasing (Biro Pusat Statistik 1984). Most of these farmers have little knowledge of disease control and, thus, great efforts are required to mobilize extension services so that management packages have some chance of sound and beneficial application.

There is great potential for the further development of the small ruminant industry in Indonesia. The development of the sheep industry, however, is severely constrained because of the role of sheep in MCF in large ruminants. Thus, Bali cattle and sheep cannot be reared in the same areas; e.g., in West Java, a prominent sheep-rearing area, no Bali cattle are found. Emphasis is being placed on the Bali cattle industry in many areas of the country, especially Sulawesi and Timor; in these areas, sheep cannot be reared. There should be much greater potential for increased goat production and, in fact, this is occurring in some transmigration schemes.

Small ruminant research should be collaborative and concentrate on the development of improved production methods. Emphasis should be placed on disease control and nutritional systems, breed performance, and possible breed improvements.

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