

GOAT PRODUCTION IN THAILAND

S. Saithanoo¹, B. Cheva-Isarakul²
and K. Pichaironarongsongkram³

¹Department of Animal Science, Faculty of Natural Resources,
Prince of Songkla University,
Hat Yai 90110, Thailand

²Department of Animal Husbandry, Chiangmai University,
Chiang Mai 50002, Thailand

³Department of Livestock Development, Phythai Road,
Bangkok 10400, Thailand

ABSTRACT

This paper presents an overview of goat production and development in Thailand. Some results of the current studies on goats are reviewed. Recommendations for future research and development on goats are proposed.

INTRODUCTION

Thailand is an agricultural-based country located in south-east Asia between the latitudes of 5° and 21° north. Its development has largely been based on agricultural production. Approximately 76% of the total population resides in rural areas (Anonymous 1983) and produces agricultural products which provide 60% of the nation's export earnings and accounts for 25% of the gross domestic product (GDP; Anonymous 1985). Most of its agriculture involves intensive crop production and predominantly comprises small farms of up to a few hectares based on nuclear families. Livestock are generally secondary and support crop production. Although, livestock and their products contribute only 3-5% to the GDP (Chantalakhana and Bunyavejchewin 1986), it is possible that their contribution to available cash income may be more important at the farm level. Most livestock (>90%) are traditionally integrated with agricultural systems by small farmers (Saithanoo 1987). Buffaloes, cattle, swine and poultry are among the most important species found throughout the country whereas goats and sheep are important only in the southern region where there are large numbers of Thai Muslims.

This paper present overview of goat production and development in Thailand with special attention to goats in the southern region. Most of the region is in equatorial monsoon zone with a humid-tropic climate characterised by an annual rainfall of about 2,000 mm, temperatures of 20-35°C, relative humidity of 60-90% and less than 60 minutes difference in daylength between solstices. There is a 3 to 4 month dry period commencing early January with bimodal peaks in rainfall occurring in June and November. The lowland soils are either acidic gravely colluvium or spodosols. Mountainous limestone

outcrops are a common feature of the landscape.

CURRENT POPULATION AND TRENDS

Among ruminants, buffaloes and cattle are numerically the most significant in Thailand. In 1989, cattle and buffalo populations accounted for 5.07 and 5.71 million respectively whereas goat and sheep populations were 79,000 and 95,000 respectively (Centre for Agricultural Statistics (CAS) 1989). This may largely be due to the high demand for draught power and low-price beef. Nevertheless, goats are considered an important species to small farmers in the southern region, particularly in the Thai Muslim communities where goat numbers are not greatly different from those of large ruminants (Saithanoo 1985). The 1978 Agricultural Census Report (National Statistical Office (NSO), 1980) showed that approximately 88% of Thailand's goat population were in the South and, of the goats in the South, about 71% were in the Thai-Malaysian border zone.

The CAS statistics indicated that the annual growth rate of the goat population between 1980 and 1989 was about 2.4%. Importation of goat and sheep meat to supply local demand in this period was about 27 tons per year with an increase of 12% annually (FAO 1981, 1989). About 2,000 goats/month were reportedly being imported from Burma during the dry season (Cheva-Isarakul 1987). Prices of goat meat are high being 90, 26, 30 and 43% more expensive (per kg) than those of buffaloes, cattle, swine and chicken, respectively (Saithanoo et al 1985b). These statistics indicate that the in-country production is not sufficient to meet increasing demand for goat meat.

The report of Saithanoo et al (1991) suggest that village goats are highly prolific and consequently, under existing husbandry, they have a high biological capacity to increase in numbers (approximately 37.7% per year). This contrasts markedly with the earlier reports of the National Statistical office (NSO 1980) and Saithanoo et al (1985a) implying that the goat population in the southern region declined at the rate of 2.4% per year. The high extraction rate (as per the total number of goats of 17.8%; Saithanoo et al 1991) alone is not great enough to cause the population decline when it has this growth capacity. Other important factors could be: (1) slaughter of breeding stock, (2) some farmers discontinuing goat raising activities and (3) a large number of goats being sold to traders from other regions since the demands and prices there were high. Sarobol (1985) reported that about 1,000 goats per month were bought from the South to supply the Bangkok market. Statistics for the year 1978 to 1985 also indicated that the demand for goats in Malaysia was high (Hutagalung 1985; Vidyadaran et al 1988). These high demands would have considerable effects on the population changes, but again it is still unclear why farmers do not increase production in response to such demands.

SOCIO-ECONOMIC ASPECTS

A village survey on goat production in the southern region (Saithanoo et al 1991) showed that goats were raised mainly as a secondary enterprise. Goats in the survey areas were raised in association with agricultural systems

such as fishing, rice growing and rubber, oil palm and fruit tree plantations. Most owners were smallfarmers who owned 1.4 ha/family and raised goats either for home consumption or sale for occasional cash income. Only 12% of owners raised goats solely for sale and 21% solely for home consumption. The majority of owners (67%) raised goats for both purposes. Traditionally, goat production enterprises have been passed-on from one generation to another. Most people (95%) raised goats because they were easily managed, sold for a high price and needed few inputs. Despite the small size of flocks (5 head/family), the contribution of goats to farm cash income was relatively high, especially in a rice-growing system (approximately 56% per year).

Women played an important role in goat rearing and in making decisions concerning goat production, particularly in fishing villages where males were largely responsible for fishing. The woman's role in goat production is similar to that observed by Okali and Sumberg (1985) in south-west Nigeria, Gatenby (1988) in West Timor and Petheram and Basuno (1986) in Java, Indonesia.

MANAGEMENT SYSTEMS

The management systems used can be classified into four types: (1) tethering, (2) controlled grazing (animals graze under owner supervision), (3) free-to-roam and (4) cut-and-carry (zero grazing) systems. Saithanoo *et al* (1991) reported that tethering was widely used in all seasons and more than 65% of owners employed this system. Controlled grazing and free-to-roam systems were mainly used where there was ample uncultivated grazing land (e.g. fishing villages). A cut-and-carry system was only employed in the wet season, mainly where areas were easily flooded. Goats commonly grazed natural grasses and weeds available in the areas. Supplements, mostly in the form of tree leaves, were given only in the wet season and at low level. Few treatments for health problems were used. Only 21% of owners provided special shelter for their goats, others allowed their goats stay underneath their high-set houses. Nevertheless, the majority of owners (74%) provided at least a simple raised floor for their goats to sleep on at night.

Saithanoo *et al* (1991) also reported that bucks were generally run with does all year round but less than half of owners had breeding bucks. At least 78% of owners slaughtered or sold their bucks before 3 years of age, whereas more than 79% of owners retained does to 5 years of age.

PRODUCTION LEVEL

Goat production in Thailand is primarily for meat (Chantalakhana 1985; Falvey 1977; Saithanoo 1985) and there is no large-scale commercial or intensive goat farming. The breeds of goats in different locations and their main characteristics are shown in Table 1. The main breeds are of the indigenous strains. Milk is a secondary product and mainly used for home consumption. Because of the small scale of production, other products such as skin, hair and by-products are not economically important. Dairy goats, mainly crosses between imported dairy types and indigenous goats, are estimated to be less than 1% of the total population (Saithanoo 1985).

Table 1 Goat breeds of Thailand

Breed ¹	Location	Function priority
Indigenous	All regions	Meat
Burmese-Bangladesh	North, west	Meat
Exotic and crossbred	Central plain	Milk, meat
Crossbred	All regions	Meat, milk

¹'Exotic' refers to purebred Alpine, Anglo Nubian, Saanen and Toggenburg; and 'crossbred' refers to the crosses between the exotic and others.

Source: Saithanoo and Pichaironarongsongkram (1990)

Most goats found in the southern region were an indigenous meat-type similar to the Kambing Katjang of Malaysia (Saithanoo *et al* 1991). Some results of studies on indigenous and F1 crossbred (Indigenous x Anglo Nubian) goats carried out in a Goat Research and Development Programme at Prince of Songkla University (PSU), Hat Yai, are presented in Table 2. The indigenous were small with an average mature body weight of 23.1 and 21.5 kg for males and females, respectively. From 6 to 12 months of age, male goats were 22 to 30% heavier than females. However, the difference dropped to less than 10% as they grew older. This could be due to the fact that most of the male goats with larger size (or heavier liveweight) were sold at younger age for high price.

The data in Table 2 indicate potential productivity under improved forage and management systems established at the PSU farm. In this situation, one-year-old indigenous goats are about 56% heavier than those in the villages reported earlier by Saithanoo *et al* (1985c). On the other hand, the crossbred are 16 to 34% heavier than the indigenous animals despite the low milk supply from the indigenous does. On a percentage basis, there were only very small differences in carcass composition between the two types so there was a greater meat production per animal from the crossbred.

As a consequence of these uncontrolled matings, about 60% of females conceived before 7 months of age with some (7%) conceiving as young as 3-4 months of age. The average age at first kidding was 12.4 months. The annual kidding rate of village goats was high as does had several opportunities to mate each year. These were higher than those obtained under a controlled annual mating system at the PSU farm (190 vs 161%), but the weaning rate is lower (135 vs 155%).

The high mortality rate of 29% for young kids in villages was caused by both disease (such as scabby mouth or pneumonia) and accidents (such as dog bites or vehicle collisions). Milton *et al* (1987) indicated that endo- and ecto-parasites may debilitate village goats if burdens are high, but their incidence could not be quantified.

Table 2 Performance of female indigenous and crossbred (indigenous X Anglo-Nubian) goats raised under village and improved farm conditions. The values presented are means (with SE in parentheses)

Trait	Village ^a		Improved farm ^b	
	Indigenous		Indigenous	Crossbred
Production				
Birth weight, kg	*		1.73 (.03)	2.00 (.07)
Weight at 3 months old, kg	6.80 (.42)		9.16 (.19) ^c	11.15 (.34) ^c
at 6 months old, kg	9.96 (.52)		12.43 (.26)	16.07 (.45)
at 12 months old, kg	13.04 (.57)		20.00 (.34)	26.73 (.47)
at 18 months old, kg	17.30 (.67)		24.13 (.39)	32.40 (.95)
at 24+ months old, kg	21.51 (.60)		29.49 (.44)	38.02 (1.4)
Reproduction				
Kidding rate, %	189.63		160.59 ^d	170.83 ^d
Pre-weaning kid mortality, %	29.10		4.95	6.32
Annual mortality of adult, %	7.20		4.72	1.72
Body and carcass composition^{b, e}				
- No. of goats	10		23	12
- Dressing %	45.10 (1.0)		45.70 (.80)	45.15 (.70)
- Saleable %	70.90 (1.1)		71.40 (.80)	71.85 (.95)
- Muscle, %	70.65 (.72)		68.38 (.59)	66.55 (.70)
- Bone, %	17.97 (.48)		18.20 (.40)	17.55 (.50)
- Total fat, %	5.07 (.75)		8.38 (.61)	8.70 (.70)
- Muscle:bone ratio	4.00 (.11)		3.84 (.09)	3.80 (.13)

* Unavailable data

^aSource: Saithanoo *et al* (1991)

^bSource: Saithanoo and Pichaironarongsongkram (1990)

^cWeaning weight, but village goats are weaned about 3-6 months of age

^dA controlled single-annual-mating system

^eOf male goats. Means (+ SE) of fasted liveweight (kg) and age (days) of village indigenous, farm indigenous and farm crossbred goats used in the studies are 15.3 (1.2) and 331 (19), 15.1 (0.8) and 212 (12), 25.5 (1.4) and 290 (2), respectively.

MARKETING SYSTEMS

The major consumers of goats in Thailand are Muslims. Apart from seasonal demands (between May and August) for religious rites, there is an increasing demand for goat meat in Muslim and Chinese restaurants. There was no marketing or selling place for live goats or goat carcasses as there was for other livestock. Hence, traders and consumers had to make direct contact with individual goat owners and often the owners only sold their goats when cash was needed. Consequently, goat prices varied markedly and it was often difficult for buyers to obtain the animals they needed unless they paid a high price.

RESEARCH AND DEVELOPMENT

Goat research and development in Thailand is far behind some other countries in the region. Baseline quantitative information on the farmers as well as productivity of their animals in village situations is very limited. Four institutions known to be involved in goat research and development in Thailand at present are: (1) The Department of Animal Science at PSU (in collaboration with the Thai-Australian PSU Project), (2) the Department of Livestock Development, Ministry of Agriculture and Cooperatives, Bangkok, (3) the Department of Animal Science, Kasetsart University, Bangkok, and (4) the Department of Animal Husbandry, Chiangmai University, Chiang Mai.

The main research areas for goats in Thailand are identified in Table 3. These include baseline data, nutrition and management, reproductive management and breeding, and animal health. Apart from baseline data collection considered as the first priority, this table does not imply that one area is more important than the others. Another area being considered as an important part of the PSU goat programme is carcass studies. These studies provide information factors affecting growth and carcass composition (e.g. environments, genotypes, age, sex, growth pattern, nutrition).

CONCLUSIONS

When compared to other livestock, the current and potential role of goats in the country are not well recognized and long-term research and development programmes on goats have only commenced in recent years (Saithanoo and Phichaironarongsongkram 1990). Baseline quantitative information on farmers as well as the productivity of their goats in village situations is very limited. In the past, research programmes have failed because the problems considered by research workers were not relevant to the problems perceived by farmers, particularly where only the biological restraints to production were considered. For example, it is not useful to demonstrate that improved production comes from better nutrition if the farmers have no spare cash, labour or knowledge for implementing necessary changes. It is, therefore, imperative that information is acquired on the present biological and sociological determinants of, and limitations to, goat production in the villages. This information can be used to formulate research programmes which will have maximum impact at the village level for improving production.

Table 3 Research areas for goat development in Thailand

Research area	Research program
<u>Baseline data collection:</u>	- Conduct village survey to identify present productivity and restraints (management and socio-economics) operating at the village level.
<u>Nutrition and management:</u>	<ul style="list-style-type: none"> <li data-bbox="399 462 1110 562">- Examine the nutritive value and application of readily available feed and cheap agricultural by-products for supplementation of goats, e.g. rice straw, oil palm residues, tree legumes. <li data-bbox="399 593 1052 668">- Investigate the role of protein and mineral supplements for goats in the areas where goat production appears to be poor. <li data-bbox="399 698 1122 808">- Evaluate important productive parameters of indigenous and crossbred goats under optimum and village conditions, and identify the major factors limiting productivity. <li data-bbox="399 838 1118 921">- Develop feeding and management strategies (mating, housing, grazing, supplements) to reduce kid mortality.
<u>Reproductive management and breeding:</u>	<ul style="list-style-type: none"> <li data-bbox="399 956 1122 1059">- Study the reproductive physiology, reproduction patterns and environmental factors influencing them (e.g. nutrition, temperature, interaction between males and females). <li data-bbox="399 1089 1153 1189">- Develop techniques and breeding management to avoid the infertility problems usually associated with the introduction of 'exotic' bucks into this environment. <li data-bbox="399 1220 1110 1279">- Determine the effects of heterosis upon important productive parameters. <li data-bbox="399 1309 1122 1387">- Develop systems for improvement of productivity by selection and distribution of genetically superior animals.
<u>Animal health:</u>	<ul style="list-style-type: none"> <li data-bbox="399 1422 980 1446">- Conduct survey on health in local goats. <li data-bbox="399 1476 1122 1551">- Develop practical and cheap strategies to control endoparasites for village and intensive management systems. <li data-bbox="399 1582 1153 1632">- Develop management methods (e.g. housing, drenching, vaccination) for reduction of disease incidence.

REFERENCES

- Anonymous (1983). 1980 Population and Housing Census. Office of the Prime Minister, Bangkok.
- Anonymous (1985). Economics Monthly Reports, Vol.25, Bank of Thailand, Bangkok.
- CAS (Center for Agricultural Statistics) (1989). Agricultural Statistics of Thailand, Crop Year 1988/89. Office of Agricultural Economics, Ministry of Agriculture and Co-operatives, Bangkok. Agricultural Statistics No.409.
- Chantalakhana, C. (1985). Goat production and development in Thailand. In: Goat Production in Asia (Eds: E.C. Villa and N.V. Llemit), Proceedings of the international seminar held at Philippine Council for Agriculture and Resources Research and Development, Los Banos, Laguna, the Philippines, 8-11 May 1984. PCARRD Book Series No. 20, pp. 67-79.
- Chantalakhana, C. and Bunyavejchevin, P. (1986). Livestock development in Thailand during the nineties. Asian Livestock, 11: 135-139.
- Cheva-Isarakul, B. (1987). Integration of small ruminants and mixed deciduous forest in northern Thailand. In: Small Ruminant Production Systems in South and Southeast Asia (C. Devendra, ed.), Proceedings of a workshop held in Bogor, Indonesia, 6-10 October 1986. International Development Research Centre, Ottawa. IDRC-265e, pp. 223-234.
- Falvey, L. (1977). Goat production in the north Thailand highlands. Thai Journal of Agricultural Science, 10: 121-130.
- FAO (Food and Agriculture Organization of the United Nations) (1981). 1980 FAO Production Yearbook, Vol.34. FAO, Rome, Italy.
- FAO (Food and Agriculture Organization of the United Nations) (1989). 1988 FAO Production Yearbook, Vol.42. FAO, Rome, Italy.
- Gatenby, R.M. (1988). Goat husbandry in West Timor, Indonesia. Small Ruminant Research, 1: 113-121.
- Hutagalung, R.I. (1985). The national goat programme for chevon and dairy production in Malaysia. In: Goat Production in Asia (Eds: E.C. Villar and N.V. Llemit), Proceedings of an international seminar held at the Philippine Council for Agriculture and Resources Research and Development (PCARRD), Los Banos, Laguna, Philippines, 8-11 May 1984. PCARRD Book Series No.20, pp. 89-105.
- Milton, J.T.B., Kochapakdee, S., Saithanoo, S., Pralomkarn, W., Rakswong, W. and Suttiyotin, P. (1987). Features of the goat research facility at Prince of Songkla University. Proceedings of the 25th Annual Conference on Animal Science, Kasetsart University, Bangkok, Thailand, 3-5 February 1987, pp. 14-21.
- NSO (National Statistical Office) (1980). 1978 Agricultural Census Report.

Office of the Prime Minister, Bangkok, 126 pp.

- Okali, C. and Sumberg, J.E. (1985). Sheep and goats, men and women: Household relations and small ruminant development in southwest Nigeria. *Agricultural Systems*, 18: 39-59.
- Petheram, R.J. and Basuno, E. (1986). Livestock component farming systems research in Java - the case for work with women. *Agricultural Administration*, 21: 119-127.
- Saithanoo, S. (1985). Goat Production in Thailand. *Songklanakarin Journal of Science and Technology*, 7: 335-342.
- Saithanoo, S. (1987). Livestock production in Thailand in relation to education, research and extension. In: *Training for the Tropics* (Ed: P.W. Ladd), *Proceedings of the Symposium on Post-graduate Training Programmes in Tropical Animal Health and Production*, James Cook University, Townsville, Australia, 31 August-2 September 1987, pp 180-187.
- Saithanoo, S. and Pichaironarongsongkram, K. (1990). Priorities for research and development on small ruminants in Thailand. In: *Small Ruminant Production Systems Network for Asia* (Ed: C. Devendra), *Proceedings of a the Inaugural Meeting and Launching of the Asian Small Ruminant Information Centre held in Kuala Lumpur, Malaysia*, 21-23 August 1989. IDRC-MR258e, pp. 91-97.
- Saithanoo, S., Kuprasert, S., Di Donato, R., Suttiyotin, P., Choldumrongkul, S. and Pralomkarn, W. (1985a). Village goat production in southern Thailand: 1. Number and distribution of goats. *Songklanakarin Journal of Science and Technology*, 7: 267-270.
- Saithanoo, S., Suttiyotin, P., Kochapakdee, S. and Rakswong, W. (1985b). Goat marketing in the border region of southern Thailand. *Animal Husbandry Bulletin*, 1: 75-79.
- Saithanoo, S., Suttiyotin, P. and Kuprasert, S. 1985c. Distribution and some characteristics of goats in southern Thailand. *Proceedings of the 23rd Annual conference on Animal Science*, Kasetsart University, Bangkok, Thailand, 4-7 February 1985, 10 pp.
- Saithanoo, S., Norton, B.W., Pattie, W.A., and Milton, J.T.B. (1991). Production systems and productivity of village goats in southern Thailand. (*Small Ruminant Research* : in press).
- Sarobol, S. (1985). Goat research and development in Thailand. In: *Goat Production and Research in the Tropics* (J.W. Copland, ed.), *Proceedings of a workshop held at the University of Queensland, Brisbane, Australia*, 6-8 February 1984. Australian Centre for International Agricultural Research, Canberra. ACIAR Proceedings Series No.7, pp. 22-23.
- Vidyadaran, M.A., Rajion, M.A. and Tuen, A.A. (1988). Goat meat production in Malaysia. In: *Goat Meat Production in Asia* (C. Devendra, ed.),

Proceedings of a workshop held in Tando Jam, Pakistan, 13-18 March 1988. International Development Research Centre, Ottawa. IDRC-268e, pp. 140-151.