

Livestock production in East Nusa Tenggara: potential of small animals in integrated rural development programs

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Abstract

This paper reviews the potential, opportunities and constraints in rearing small animals for integrated rural development based on experiences and review of studies. This review may prove useful for developing the potential of small animal husbandry particularly for farmers, partnerships and activities models.

Small animals such as goats, sheep, local chickens, pigs and ducks are potentially a major component of integrated rural development. Farmers generally have low education levels so need continuing advice and guidance to develop agribusiness acumen. Programs for rearing small animals in rural areas should be managed within a cooperative system with diversification activities, and sustained with wise management based on agribusiness principles. There is a need for cooperation from supporting and skilled partners in order to ameliorate problems and realise opportunities. These outcomes are important for integrated rural development programs, with small animals as the basic unit of rural animal industries.

Produksi ternak di Nusa Tenggara Timur: potensi ternak kecil pada program pembangunan desa terpadu

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Abstrak

Makalah ini bertujuan untuk menemukan potensi-potensi, kesempatan-kesempatan, dan keterbatasan dalam memelihara ternak kecil untuk pembangunan pedesaan terpadu berdasarkan pengalaman-pengalaman dan studi-studi peninjauan lapangan. Dari studi-studi peninjauan itu diperoleh informasi yang berguna untuk menentukan strategi bagi pengembangan potensi-potensi ternak kecil khususnya strategi-strategi untuk sumber daya manusia atau petani, model kegiatan-kegiatan dan kemitraan.

Ternak kecil termasuk kambing, domba, ayam lokal, babi, dan bebek dipandang potensial untuk mendukung pembangunan pedesaan terpadu. Oleh karena itu petani sebagai sumber daya dengan tingkat pendidikannya yang rendah perlu secara terus menerus diberikan nasihat dan pendampingan dalam jangka

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waktub tertentu agar berjijwa wirausaha. Demikian pula program pemeliharaan ternak kecil di daerah pedesaan harus dikelola dengan system koperasi dengan keragaman aktivitas, dan dipertahankan dengan pengelolaan yang baik berdasarkan pendekatan agribisnis. Dalam pendekatan ini kerjasama membutuhkan dukungan dan mitra agar mampu menyelesaikan masalah-masalah yang dihadapi dan mengenali kesempatan-kesempatan yang tersedia. Kemampuan ini bermanfaat untuk program-program pembangunan pedesaan terpadu dengan ternak kecil sebagai unit dasar untuk mencapai industri ternak pedesaan.

Introduction

As stated in *Undang-Undang Dasar 1945* and *Garis Besar Haluan Negara*, development in Indonesia is mainly focused on creating employment opportunities and increasing the prosperity of the people. The majority (60–80%) of Indonesian people live in rural areas and most of the rural population are classified as 'poor' (Yasin and Echiwati 2004), so it is reasonable that development programs be initiated in rural areas. These programs must involve the participation of several relevant sectors in integrated roles in order to achieve their aims.

It is important that development programs in rural areas of East Nusa Tenggara (NTT) are sustainable in the long term. Development programs in rural areas should consider three factors: natural resources or *Sumber Daya Alam*; human resources or *Sumber Daya Manusia* and regional government policies. Small animals are significant resources in rural areas. Unfortunately, 30% of the people are poor (Pangestu 2006) and 80% of these people are concentrated in rural areas (Anon. 1994). Most of those people are poorly educated. In addition, 468 of 1,734 registered villages are classified as poor (Lamijan 1994) with over 110,000 people jobless (Mukhlisin 2006). Also, regional government policies may be inappropriate; therefore, investment in animal production is necessary.

Poverty in rural areas is caused by many factors, the major factor being poor education and the consequent poor natural resources management. With poor economic returns in rural areas there is a trend to urbanisation in NTT as people seek employment in the cities, or possibly as labourers *Tenaga Kerja Indonesia*—employment overseas.

This article describes a system involving poorly educated rural people in optimising small animal production to develop a rural small animal industry. The industry may offer jobs and sufficient earnings for labourers and so reduce loss of rural populations to

cities, and finally achieve the aims of the development program.

General review of Nusa Tenggara Timur region

NTT is composed of four large islands and a hundred small islands, at 8–12°S and 112–125°E, with over 47,350 km² of land and a 200,000 km² maritime zone. Most (75%) of the land is hilly with 50° slope and a high erosion potential. NTT's climate is wet–dry tropical, with long dry seasons (8–9 months) and relatively short rainy seasons (3–4 months) each year. Commonly annual rainfall in this region ranges from 254 to 508 mm with 100 rainy days per year, but some areas are wetter, with 800–3,000 mm annual rainfall. About a third (36%) of the land cover is savanna that is suitable for pastoral activities. However, with the expansion of housing, shifting populations, reforestation and plantations, there will be encroachment on pastoral land in the future. Current rural development is more suited to holding small animals than big animals. In NTT, holding animals has been a part-time activity, but it can be the main source of a family's income. Most (86%) farmers holding small animals in rural areas are poorly educated and consequently the adoption of development programs using small animals has been poor.

Small animal population, distribution and potential

Small animals including goats, sheep, pigs, local chickens and ducks are a significant source of meat in rural areas during seasons when crops fail and during other times of food shortage or when there are sudden unexpected food requirements for ceremonies such as marriages and funerals. Commonly, traditional animal husbandry systems in rural areas are extensive, but there is potential to increase profitability in the future (see substantial population sizes in Table

1). Until now the purpose of holding small animals in rural areas was only for meat and egg production. This enterprise could be improved by developing more intensive systems for greater economic returns.

Table 1 shows that, except for Kupang city and West Sumba, all kabupaten (regions/municipalities) in NTT have potential for goat production. Kabupaten Kupang and Rote-Ndao have potential for sheep production; all kabupaten except Kupang city are suitable for pig production. Local chicken production is appropriate for Kabupaten Kupang, South Central Timor (TTS), Belu, Alor, East Flores, Sikka, Ende and Ngada conditions. Ducks are well adapted in Kabupaten Kupang, Belu, Lembata, Sikka and Ende. The economic value of holding small animals depends on farmers developing animals according to their potential economic return. Current small animal populations could be used to select kecamatan (sub-districts) for small animal development in each kabupaten.

The potential of small animals as meat and fertiliser sources is not optimised, and economic value is low because traditional husbandry systems are extensive. This article suggests small animal holdings have potential for development at the home industry scale or at rural industry scale. If these enterprises are not developed resources are wasted and environmental pollution may result. Industries that can be developed at the home industry scale include waste processing (producing fertiliser); meat processing, making

krupuk, egg production, rope weaving, producing mosquito drugs and producing polish (Figure 1).

Opportunities and constraints in small animal enterprises

Before developing small animal enterprises, it is necessary to identify the opportunities and constraints pertaining to the program. The following factors *enhance* opportunities for developing small animal businesses in NTT:

Climate

NTT's climate is mostly semi-arid, with long dry seasons (8–9 months) and short (3–4 months) rainy seasons and is suitable for developing small animal enterprises.

Populations of small animals

Existing populations of small animals (Table 1) are high in all kabupaten so they are a potential asset for developing small animal businesses in NTT.

Lands

Hazibuan and Mangunsong (1993) found that class IV–VI soils that have potential for growing animals dominate lands in NTT. CIDA (1976) reported that of the 4.7 million ha of available land in NTT, 830,000 ha are pasture and 155,000 ha are bush areas that are suit-

Table 1. Population of small animals in each kabupaten in NTT, 2004

Kabupaten/kotamadya	Small animals				
	Goats	Sheep	Pigs	Local chickens	Ducks
Kotamadya Kupang	3,942	34	20,200	20,200	2,557
Kabupaten Kupang	76,283	29,984	94,429	1,932,615	17,698
Timor Tengah Selatan	33,668	–	243,235	781,731	9,679
Timor Tengah Utara	15,621	35	57,523	139,621	8,915
Belu	11,664	23	90,656	773,479	20,018
Alor	24,379	6	60,311	371,724	11,444
Lembata	29,586	459	43,663	189,812	17,773
Flores Timur	52,795	2,105	114,446	500,631	10,761
Sikka	34,742	201	88,843	495,559	44,347
Ende	19,694	48	61,592	1,699,494	56,622
Ngada	41,776	3,064	131,393	609,767	17,132
Manggarai	41,088	93	126,689	615,209	8,051
Sumba Timur	37,125	891	32,788	516,275	2,432
Sumba Barat	10,057	–	53,124	629,101	2,537
Rote Ndao	29,682	19,560	57,072	110,617	550
NTT	462,102	56,502	1,276,166	9,389,208	230,515

Source: Dinas Peternakan Nusa Tenggara Timur 2005

able for animal breeding businesses. However, there is an expansion of housing, agricultural plantations and forestry, so that land available for animal production is diminishing. Fortunately small animal husbandry is suited to small land areas.

Government policies

Regional income from the animal sector is second only to the food sector. From the 1960s to the 1980s,

government policies were mainly focused on the development of large animals (especially cattle); now, 20 years later, the focus is more concentrated on small animals. Programs that are examples of focus on small animal production include *Intensifikasi Ayam Buras*—intensification of local chicken breeding systems; and *Bantuan Pembiayaan Langsung Masyarakat*—direct loans to farmers conducted by animal, social, labour and related departments.

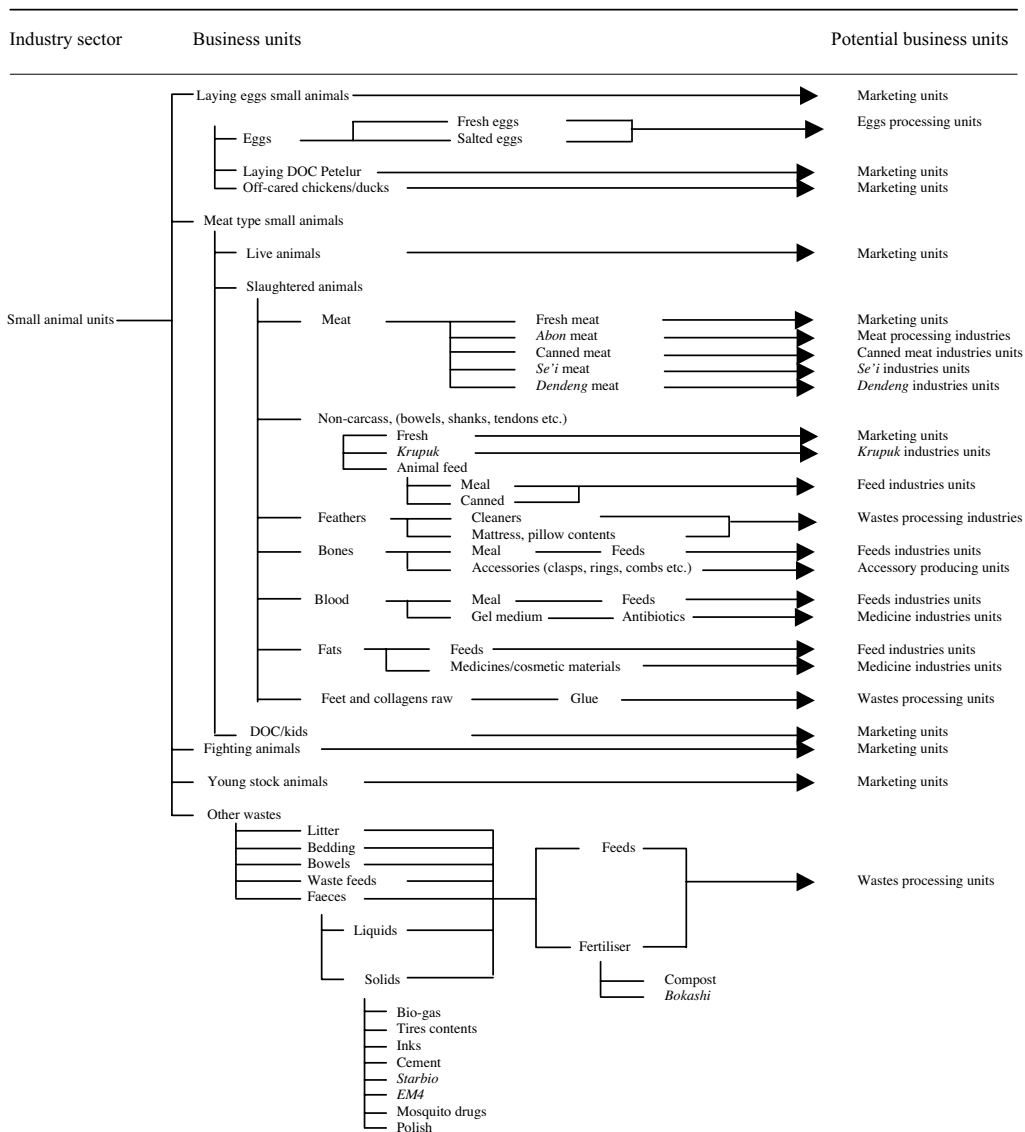


Figure 1. The tree of small animal industry units

Market demand

Market demand is one of the determining factors in animal systems and their product flow. Demand will increase as the population of residents increases, particularly with increased education and knowledge of nutrition needs. Protein requirement of NTT's residents has increased from 4.24 to 8.6 kg/year and 60% of these requirements are supplied from small animals, mainly pigs and chickens. Increasing domestic demand may stimulate increased productivity of small animals and increase the value of their products. It could provide opportunities in economic returns for the development small animal industries.

Human resources

The potential for small animal production is evident in the high populations of small animals in rural NTT. These potentials could be enhanced through greater involvement of institutions such as the Department of Animals, the Faculty of Animal Husbandry, and other non-degree agricultural schools.

Institutions

Institutions that could be involved in the development of small animal programs include non-government organisations (NGOs/LSM), sellers of animal supplies, farmers' cooperatives and banks. NGOs in NTT provide and conduct training; cooperatives and banks provide capital for people to invest in animal development programs; animal supplies shops may provide materials needed to accelerate the programs. These contributing institutions are present in most kecamatan in NTT.

The following factors may *constrain* development of small animal programs in NTT:

Climate

NTT's seasonally dry climate limits development of small animal enterprises due to seasonal lack of water and feedstuff. Also, some animals have low resistance to this climate.

Human resources

Low education levels and existing cultural practices of farmers in rural areas of NTT could influence their capability to adopt innovations. Traditionally, farmers care for their small animals using local extensive methods. As a result, small animals are not valuable, business in this commodity does not attract

interest, and consequently small animal production grows slowly. Therefore, educational institutions must be involved and integrated into planning and development programs for small animal industries.

Marketing

Until now, marketing small animals and their products has been local and traditional. Production under the extensive traditional holding system being insufficient to supply either regional or international market needs.

Ineffective counselling

Low education of farmers has been a barrier in adopting innovations. Learning has been limited due to inappropriate counselling methods for improving animal production in rural NTT, and this situation has been worsened by inexperienced or inept field counsellors or *Pekarja Praktek Lapangan* (PPL). It is helpful for extension officers to be aware of traditional practices and be accompanied by experienced and competent PPL.

Low income

Farm income from holding small animals is generally low due to high buying prices, high holding costs and low selling prices. Time and energy spent on small animal production are rarely justified by the price received. Consequently, farmers consider care of small animals to be part-time work.

Government policies

Government policies focus on large animals rather than small animals. This has been one of the constraints in developing small animal programs in rural NTT. Regional government has not seriously considered policies tailored to investment and growth of sectors that support small animal industries. This has resulted in the aid offered to farmers not achieving the program goals.

Potential of small animals for integrated rural development programs

The most crucial factors influencing small animal development programs are lack of feedstuff and water. New programs must first overcome these limitations.

Conversion of surplus rainy season forages to hay or silage products can overcome the lack of feedstuff during the dry season. In addition, introducing adaptable forage on farmers' lands or into low capacity pastures will help ensure the quality and continuity of feed. These strategies are not only useful for feedstuff sustainability but also for improving farmers' knowledge and their commitment to animal production, and in enhancing the quality and capacity of land and pasture for grazing. These revegetation programs can also be applied to areas surrounding dams to optimise the use of these areas for human and small animal needs, or for creating barriers to garden and farm areas. Feed for animals can be sustained by processing dried grass or straw and other plant by-products using fermentation methods and bioconversion techniques, as well as reusing treated animal wastes. A strategy for achieving the nutrient requirement of animals is to provide supplements such as palm oil extracts, rice bran and tofu extract. In addition, local sources of concentrates, such as tamarind seeds, *putak* and tubers, may be used.

Scarce water can be addressed in several ways. Adding fat to animal diets is one way to increase the amount of metabolic water in an animal's body, thus reducing water intake. Anggorodi (1979) stated that lipid metabolism produces metabolic water, each unit of metabolic lipid producing one unit of metabolic water in the animal's body. Adding fat is also useful for inhibiting methane formation but increasing propionate production (Demeyer et al. 1967). Methane and propionate are ruminal fermentation products important in sheep and goat fattening techniques.

Developing market- and agribusiness-oriented small animal industries can be realised through partnership programs between private firms, NGOs or government firms *Badan Usaha Milik Negara* (BUMN) and farmer groups or farmers' cooperatives. Partnerships can be by an adoption or by capital loan. In such a partnership program, farmers are responsible for animal husbandry including diversification activities. Firms are responsible for providing and supplying facilities, capital, marketing and training programs. The program is not only for profit generation but also beneficial by improving the farmers' knowledge of farm and capital management, animal husbandry, and in adopting innovations and selecting the most effective and appropriate technologies for their small animal industries. In these programs it is important that PPL are present to advise and accompany the farmers in all activities.

Government policies such as tax concessions and price standardisation are also important to stimulate and motivate farmers to maintain their small animal enterprises. These policies are also positive for investors interested in animal industries, particularly investors creating and developing other sector and commodity industries linked to the animal sector. When small animal industries are well developed in an area, the NTT government must identify regional or international markets for those industries. In this way the government's role is facilitation of an integrated sector partnership among farmers, money sectors, marketing agencies, NGOs and BUMNs in order to create a profitable system for small animal industries.

Strategies for developing small animal enterprises within integrated rural development programs

Based on identified opportunities, constraints and solutions in developing small animal industries in NTT rural areas, strategies need to focus on developing capacity within farmer activities and the partnership models.

Farmers

The success of small animal industries in rural areas depends on farmers being educated, trained and prepared. Farmers are the main determining factor in animal enterprises (Suhadji 1991). At present, farmers in rural areas are poorly educated and therefore continuing guidance, advice and mentoring by PPL are important to achievement of the development goal. Indeed, to achieve this, the PPL should be adequately rewarded in their salary and supported with necessary operating materials and equipment. For example, in South Korea, the salary of PPLs is nine times that of city officers, and as a result development in rural areas is growing rapidly.

Business model

In establishing a business model for small animal enterprises, the following factors are to be taken into account: system; type of business; partnership; and supporting factors such as capital availability and sustainability of production facilities, human resources and marketing condition. Considering these factors, development of small animal enter-

prises should be managed as cooperative systems with diversification activities between various animal sectors and between animal and agricultural sectors. The model of Kaira District Cooperative Milk Producers Union in Anand, India, is an example of well-managed cooperation that could be adopted in Indonesia. In 1978, this cooperative involved 250,000 dairy farmers spread over 700 villages with diversification activities and US\$40 billion yearly income. A cooperative system must provide adequate services for customers and the public, and should apply agribusiness approaches (Turk 1978). In this approach, farmers in each desa (village) are gathered into a desa cooperation unit and those units are assembled to perform host cooperation in their kabupaten. Village cooperatives collect products from all members (farmers) and bring those to the host cooperative to be marketed or processed according the customer's wishes. Product marketing can be carried out directly by the host cooperative or by partner services.

Partnership model

The cooperative model for small animal industries needs partners similar to those of large-scale animal industries for marketing their products and banks for providing and supporting sufficient capital. Financial input is needed because funds from members of the cooperative are not sufficient for meaningful investment. Other partners are industrial and animal husbandry departments or NGOs providing assistance with quality control, guidance, advice and participation in field programs.

Conclusions

Sustainable small animal industries in rural areas can be developed in cooperative systems with diversification activities. The system requires supportive services, agribusiness-based approaches and partnerships in marketing, providing capital, and processing products and by-products. PPLs, as partners in guidance, advice and participatory field activities, should be rewarded sufficiently for the serious and intensive services they provide. Successful programs will enhance the cooperative's income and farmers' incomes, thus helping to reduce poverty. These

advantages can be realised with support from appropriate government policies. Success of programs will promote prosperity in rural areas of NTT.

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