

# Characteristics of Feed Mills at Farmers Group Scale in Supporting the Development of Beef Cattle

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**Abstract**—One of the strategies to increase the availability of beef cattle feed in small holder livestock farms is to build feed industry of raw material agricultural waste-based. Development of small scale feed mills at the farmers group level is a necessity in supporting their farm. The important thing to consider in feed production not only on the quality aspect, but also the economical aspects need to be considered, which can be affordable by the farmers. The farmer group of Padang Tawang is one of a farmers group that having small-scale feed mill that processing the raw material feed into the feed concentrates and complete feed. Based on identification of the availability of feed raw materials in the region of farmer groups generally available raw material feed is a source of fiber with a crude protein content below 20 % (14 of feed ingredients), and it was only two feed ingredients that are categorized as a protein source with crude protein content above 20 % was coconut meal and shrimp head.

**Index Terms**—feed mills, farmers group, beef cattle

## I. INTRODUCTION

The main problems encountered in industrial feed business for scale farmer groups is a limitation of availability of raw materials, quality feed products are not standardized, market limitation, fluctuation of feed prices, and it is difficult to compete with similar products from large feed mill. Therefore, the development of feed industry in the scale of farmer groups should be based on local resources. Development of feed industry in the scale of farmer groups will be able to support the development of livestock, especially for beef cattle. Development of feed mill in the farmer group scale has the potential to utilize existing local feed resources in rural areas. With intensively the growing of food crops patterns have implications for higher production of agricultural waste that can be used as feed.

On the other hand, the farmers have a limitation in the supply of beef cattle feed. The strategy to increase the availability of beef cattle feed in small holder livestock farms is to build a feed industry of raw material agricultural waste-based (agricultural waste). This strategy take advantage of opportunities due to high population of beef cattle, and this ruminant livestock

along with agricultural crops are generally increasingly intensive maintained by the farmers [1]. Therefore, a strength factor that can be utilized as feed for the beef cattle is the utilization of waste crops resource that having a high production especially after harvesting the crops, as well as the use of crop wastes as ruminant feed is not optimal yet, and so far, the crop wastes are not used for other purpose.

Effort in resulting a maximum benefit in order to support the successfully of beef cattle breeding is to maintain a cheap feed that originated from local materials that continuously available around the place where the beef cattle are raised and in turn to meet nutritive requirements for the beef cattle. Development of feed industry in the scale of farmer groups is a essential due to its importance in supporting the development of livestock, especially for beef cattle. Moreover, the important thing and more attention needed in feed production, not only in the aspect of feed quality but also economic aspect, means that feed produced should economically benefit to the farmers [2]. Therefore, the aim of this study was to identify the potential of feed industry in the scale of farmer groups in supporting the development beef cattle in small holder farms.

## II. MATERIALS AND METHODS

This study was conducted on February – April 2014 in a farmers group of Padang Tawang, in Sub-district of Patampanua, Pinrang Regency, South Sulawesi Province, Indonesia. This farmers group is being managed a small feed industry that used to produce feed for beef cattle. The characteristic of identify small feed industry was performed with the farmers by means of focus group discussion (FGD). The discussion was focused on the availability of feed component and the facilities of the industry. The quality of feed components was analyzed including dry matter, crude protein, and crude fat [3]. The data obtained was analyzed descriptively.

## III. RESULTS AND DISCUSSION

### A. Study Area and Farmers Description

Pinrang Regency is one of regencies in South Sulawesi Province in Indonesia. Geographically, this region located between 43 10'30" – 30 19'30" and 119 26'30" – 119 47'20" eastlongitude. The total area of Pinrang

Regency is 1 961.77 Km or 3.15% of the area of South Sulawesi, consist of 12 sub-districts, 39 villages and 65 rural areas. The topography in this area varies from flat to steep conditions, which include three-dimensional regional, lowland, highland, and around the coast. The climate is tropical and has two seasons: the rainy season which occurs in November to June and the dry season occurs in August until September. In general, rainfall occurs quite high and strongly influenced by the seasonal winds. Based on BPS data in 2010, the population was 350 928, with the population density reaches 172/km<sup>2</sup>.

One of the sub-districts that having the potential for the development of beef cattle is Patampanua, with a density of 256 animal unit (AU)/1000 people and 0.26 AU/km<sup>2</sup>. Potential crop waste as a source of cattle feed is 67 015 tons dry matter (DM) of rice straw, 23 580 tons DM of corn straw, and 295 tons DM of soybean straw. Based on this production of the crop wastes, it can be used as cattle feed as many as 39 842 AU. This indicated that this region has the resources of local feed ingredients that can be used as cattle feed [4].

Based on the results of interviewing the farmers, most of the farmers were the age ranging from 31 to 50 years old (69.6%), while 8.7% were between 21 and 30 years old. Less than 5% of the farmers were above 50 years old. Their experience in farming, about 52.2% of the farmers had farming experience less than 20 years, while 39.1% between 10 and 20 years, and 8.7% greater than 20 years. On the other hand, the educational level of the respondents showed that 91.3% of the farmers had formal education and the remaining 8.7% had no formal education (Table 1). The role of education level supposed to increase the knowledge and skills of the farmers and in turn would increase the productivity of their farming and subsequently determine the success of the cattle business [5]. This suggests that higher education levels of the farmers, resulting in higher the quality of human resources, which in turn affected to the productivity of their farming. Therefore, farmers with higher education are expected to have better the performance of farm businesses [6].

### B. Feed Mills Facilities and Feed Resources

Basically, development of beef cattle needs to be supported by the availability of sustainable feed. Therefore, it required a feed industry to produce feed to meet the requirement of beef cattle. In Sub-District of Patampanua have feed mill of farmers group scale that conducted by the farmers group of Padang Tawang has been operating since 2012. Padang Tawang farmers group is a group of farmers who undertake farming as many as 60 heads of beef cattle with a membership of 23 people. Managed feed mills are expected to produce feed to meet the needs of beef cattle maintained by members of the group.

TABLE I. FARMER DESCRIPTION

Description	Total	
	No. of Farmer	%
<b>Education Level</b>		
Not Pass Elementary School /No Formal Education	2	8.7
Elementary School	4	17.4
Junior High School	5	21.7
Senior High School	11	47.8
University Graduate	1	4.3
<b>Ages Level (years)</b>		
<20	0	0.0
21-30	2	8.7
31-40	6	26.1
41-50	10	43.5
>50	5	21.7
<b>Farming Experience (years)</b>		
<10	12	52.2
10-20	6	26.1
21-30	3	13.0
>30	2	8.7



Figure 1. Feed mills facilities in padang tawang farmers group

The results of the identification of the feed mills facilities in Padang Tawang farmers group especially machinery as shown in Table II and Fig. 1. Based on the machinery tools shows in Table II, it can be classified that this farmers group's feed mill is a small-scale. With those equipments, the farmers group performed the processing of raw materials into feed for beef cattle rations that is feed concentrates and complete feed. The processing of feed that has been done is the raw material for feed milling and mixing processes feed into the feed mash form.

TABLE II. FEED MILLS FACILITIES IN PADANG TAWANG FARMERS GROUP

Machinery	No. of unit	Capacity
Hummer mill	1	200 kg/h
Disc mill	2	200 kg/h
Pellet Machine	1	100 kg/h
Mixer	1	150 kg/h
Scale	1	100 kg
Drying Machine	1	200 kg

The improvement of livestock production is related to the availability of adequate feed in terms of quality demonstrated by their nutritive value or nutrient in terms of quantity, where the amount of feed to be provided must be available in sufficient quantity and continuously. However, to meet the need for feed encountered many obstacles, either from feed or feed ingredients in finished

form which is sold in the market. This availability of feed greatly affects the market conditions and in turn the prices often fluctuate and even expensive [7].

Based on identification of the availability of feed raw materials in the region of the farmers group, it could be identified as many as 16 feed ingredients that are generally come from agricultural waste. Based on Table 3, it is showed that generally feed raw material that is a source of fiber with a crude protein content below 20% (14 of feed ingredients), and only two feed ingredients that are categorized as a protein source with crude protein levels above 20% is coconut meal and shrimp head.

### C. Feed Mills Development

The development of feed industry of farmer groups-based cannot be separated from the institutional development of the farmer groups. According to Abdullah [8] that the development of the livestock farmer groups conducted by growing awareness of the farmers, where the presence of the farmer groups made of, by, and for the farmers.

Development of farmer groups should be carried out with the feel of a participatory so that the principle of equality, transparency, responsibility, accountability and cooperation into new charges in the empowerment of farmers. A farmer groups formed on the basis of similarity of interests among the farmers make the farmer groups can exist and have the ability to access to all the resources such as natural resources, human, capital, information, and facilities and infrastructure in developing farming [8].

TABLE III. NUTRITIONAL QUALITY OF FEED INGREDIENTS

Raw feed material	Nutritional content (%)			
	Dry matter	Crude protein	Crude fat	Crude fiber
Peanut hay	89.25	8.33	2.70	31.44
Green bean hay	87.24	5.93	4.78	35.38
Rice straw	87.70	3.84	2.06	46.34
Corn straw	83.22	5.16	1.08	27.47
Sweet potato hay	79.55	13.11	2.99	24.88
Soybean hay	85.46	9.71	4.77	46.41
Coffee skin	81.71	11.89	2.52	21.84
Rice bran	89.62	12.32	2.43	18.82
Coconut mill	84.67	26.23	10.65	14.17
Cocoa shell mill	89.64	14.35	6.28	23.54
Corn cob	79.09	5.75	1.87	25.34
Corn flour	88.78	9.21	3.87	2.12
Peanut shell	87.35	5.67	2.15	73.44
Green bean shell	86.93	15.23	3.49	26.87
Soybeans shell	88.50	18.23	1.32	22.78
Shrimp head	77.80	30.43	1.45	13.15

The development of small-scale feed mill, are generally hampered by the difficulty of finding competent

human resources required. Such as feed mill management, having knowledge of how to formulate a good feed and

are able to formulate a feed based on local feed ingredients available. On the other hand, many farmers have not adopted the technology and the use of high quality feed forage (grass and legume) [9].

Feed mills have been at the spearhead of temperate technology transfer with all the associated problems arising from the lack of appreciation of the needs of small farms. The concept of balanced cattle feed took no recognition of the major constraints to productivity of cattle in the hands of small farmers in developing countries, which is the imbalance in nutrients in the basal diet. In developing countries the basal diet is almost always a crop residue or a dry mature pasture, as compared with maize silage, high protein hay or grass/legume pastures in the industrialized countries. In other words feed mills that target their products at the rural producer should concentrate their attention on the manufacture of appropriate supplements based on agro industrial byproducts that are locally available [10].

Forecasting the development of the feed industry in a given country should take into account not only the production target but the present production in the country. Even if the demand for animal products is strong, compound feed production is only possible when several conditions are met: easy access to ingredients and existence of a market for the products, ability to build and maintain adapted (and sometimes sophisticated) equipment and experience in least-cost feed formulation for efficient animal production [11].

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