Asian Journal of Agriculture and Rural Development

journal homepage: http://aessweb.com/journal-detail.php?id=5005

The Policy Strategy of Rice Straw Utilization of as Feed for Ruminants

Jasmal A. Syamsu
Department of Animal Nutrition and Feed Science, Faculty of Animal Science, University of Hasanuddin, Makassar, Indonesia

Hasmida Karim
ACIAR Field Support Office in Makassar, Indonesia

Abstract

As it is known that the success of the livestock business associated with feeding management support. Bantaeng District is one district that prioritizes the development of animal husbandry for the welfare of society, also this district has a great potential of agricultural waste. The tools used in the analysis is SWOT-Analysis (Strengths-Weakness-Opportunities-Threats). This matrix combines opportunities and threats which can be match to the strengths and weaknesses to produce an alternative strategy, that is SO strategy, strategy WO, WT strategy, and ST strategy. The final step is making the decision to determine which strategies are feasible alternatives and the best, with Quantitative Strategies Planning Matrix (QSPM) analysis which had previously been given an Attractiveness Score questionnaire. The result of research were the strategies require the provision of rice straw storage in groups on large livestock production centers, increased use of rice straw as a staple feed of cattle, provision of quality rice straw in the dry or drought season, supply and use of straw as animal feed with various methods of delivery and utilization.

Keywords: Rice straw, feed, ruminant, strategy, SWOT analysis

Introduction

The livestock development, especially ruminants like cattle, still depends on the adequate availability of forage feed, both in quality and continuity throughout the year. Often times, there is shortage of forage availability especially in the dry season. One of the feed source that can be used for ruminants food is agricultural waste.

Indonesia's tropical climate has agricultural waste potential which is very abundant according to season. Agricultural waste is a local food waste originating from food crops and its production is very dependent on the type and amount of planting area or planting pattern of food crop sector in the region. Agricultural wastes that are usually used as animal feed is rice straw, maize straw, peanut straw, soybean straw, rice straw green beans, sweet potato hay and cassava shoots.

Rice straw is one of the agricultural wastes that often used as animal feed, because rice production in Indonesia is very abundant in accordance with the season, but some farmers do not use it optimally. According to Komar (1984), 36 to 62% of rice straw in our country is burned or returned to the soil as compost, there is 31 to 39% used to feed livestock ranges, while the rest ranged from 7 to 16% is used for industrial purposes. This is understandable because rice straw has very low nutritional value or benefits as livestock food.

Corresponding author's details:
Name: Jasmal A. Syamsu
Email address: jasmals@yahoo.com

South Sulawesi with a total area of 6,248,254 ha, about 44.5% of the area or 2.78131 million ha is agricultural land and of approximately

598,216 ha agricultural land is paddy fields (Ella, 2001). Based on BPS (2005), the percentage of crop harvested area in South Sulawesi showed 70.5% of rice, corn 17.8%, 3.39% of cassava, sweet potato, 0.47%, 3.61% peanuts, soybeans 1.41% and 2.76% green beans. The potential of the harvest area had serve as indication that the agricultural waste generated will also largely used as a source of ruminant feed.

Some efforts to improve the nutritional value of agricultural waste using feed technology has been applied in communities such as physical, chemical and biological treatment. At the farmer level, there are various obstacles to apply technology to improving the quality of agricultural waste, such as the relatively small amount of waste that can be collected by farmers due to lack of facilities for storage and the additional expense and labor costs for the farmers to apply making these technologies (Djajanegara, 1999), therefore a simple, inexpensive and easy to adopt feed technology is required by farmers.

As it is known that the success of the livestock business associated with feeding management support. Bantaeng District is one district that prioritizes the development of animal husbandry for the welfare of society, also this district has a great potential of agricultural waste. The vision of animal husbandry development sector in this area is to establish a prosperous and productive society through the development of animal husbandry, whose mission is to utilize and conserve the natural resources supporting livestock. Therefore, we need a strategy in determining the direction of the development of livestock policy tailored to the physical and socioeconomic conditions of local communities, particularly the utilization of rice straw as ruminant feed source.

Materials and methods

The research was conducted in the Bantaeng District, South Sulawesi Province, Indonesia. Interview technique was used to collect data by distributing questionnaires to experts. Experts involved in the research are those who know about the potential and utilization of rice straw as ruminant feed, consisting of: the government namely Bantaeng Head of Animal Husbandry (one person), universities namely Animal Husbandry Faculty in University of Hasanuddin (two people), institutions research namely the Agricultural Technology Assessment Institute in South Sulawesi (one person), a businessman in the District Bantaeng (one person), as well as farmers namely those who are raising themselves (one person), and that included in the farmers' groups (one person) of Bantaeng District.

This research conducted in several steps based on formulation techniques strategy according to David (2001) to formulate a utilization strategy of rice straw as ruminant feed resources in the District Bantaeng.

Identification of external and internal factors
The first step is to capture information and identify internal and external factors relating to the utilization of rice straw as ruminant feed, by conducting discussions and interviews using questionnaire to experts. Internal factors include the strengths and weaknesses. External factors include the opportunities and threats.

Determinant of weight and rating
The results of identification and analysis of those two factors become an external determinant using external factor evaluation matrix (EFE) and internal determinant using an internal factor evaluation matrix (IFE), which in turn will be given a rating that is weighted and ranked by using a weights and ratings determining questionnaire by the experts.

Alternative strategy formulation
The next step is matching which focuses on generate viable alternative strategy to integrate the result of external and internal factors in the initial steps. The tool used in the analysis is SWOT Matrix (Strengths-Weakness-Opportunities-Threats). This matrix combines opportunities and threats which can be match to the strengths and weaknesses to produce an alternative strategy, that is SO strategy, strategy WO, WT strategy, and ST strategy. SWOT

matrix scheme consists of nine cells, there are four main factors cells (external and internal), four-cell and single-cell strategy that shows the external and internal factors.

Strategy decision

The final step is making the decision to determine which strategies are feasible alternatives and the best, with Quantitative Strategies Planning Matrix (QSPM) analysis which had previously been given an Attractiveness Score questionnaire. QSPM matrix is using the results of the initial step and matching phase analysis. The main components are QSPM key factors, alternative strategies, the value of attractiveness (attractiveness score - USA), the total value of attractiveness (attractiveness Total Score - TAS), as well as the sum total value of attractiveness (attractiveness Sum Total Score). After the experts filled in a questionnaire determining the value of attractiveness (attractiveness Score) then the data is entered into the QSPM matrix.

Result and discussion

Identification of external and internal factors

Based on the interviews conducted, the obtained results of the identification of external factors, including opportunities and threats, as well as internal factors which include the strengths and weaknesses are useful as preliminary information from the utilization of rice straw. Meanwhile the result of identification interview and external and internal factor assessment (of weights and ratings) with the experts is shown in Table 1 and 2.

Table 1: External factors evaluation matrix (EFE)

No	External Factors	Integrity (B)	Rating (R)	Score (BxR)
	Opportunity			
1	Livestock population in Bantaeng is quite large.	0,15	4	0,60
2	Paddy-field is quite large.	0,20	3	0,60
3	Lacking of pasture field so that farmers will use other feeding source	0,10	3	0,30
4	The availability of feed in dry season is hard to obtain	0,05	4	0,20
5	Rice harvest season is twice a year	0,05	3	0,15
	Amount			1,85
	Threats			
1	There is competition with other type of feed	0,10	3	0,30
2	It is used as raw materials by pulp industry	0,05	1	0,05
3	Declining of livestock population especially the productive female due to the meat-market need.	0,05	2	0,10
4	Farmers' habit to burn straw.	0,10	1	0,10
5	Land conversion for industrial plants and residential.	0,15	1	0,15
	Amount			0,70

Having obtained the identification of these factors, we perform weighting and ranking according to their importance which was repeated by experts through a questionnaire, and data is entered on the matrix of the external evaluation and internal evaluation matrix. Having obtained the weights and ratings of each external and internal factors, then the weighting values multiplied by the rankings in order to obtain a score for each factor.

Based on the results of external evaluation matrix, we can see that the total score for the opportunity factor is 1.85 and the threat is 0.70. This shows that the utilization of the rice straw utility as animal feed has a significant opportunity in the Bantaeng district. This is supported by many animal population in Bantaeng which tends to increase, according to Halim (2004) in 2003 the total population of ruminants in Bantaeng District were 24,365.15

AU (animal unit), with an increase of 328.064 AU/year for cattle and 81.769 AU/year for goats. Also there is quite a lot of wetland in the district to enable the increasing of rice straw production every year.

Halim (2004) stated that there is 277.92 DM (dry matter) tons increase of rice straw production each year.

However there is competition with other better feed nutrients and easy to obtain by the farmers. Sarwono and Arianto (2001) said that in addition to the low nutritional content, rice straw feed also part of forage that difficult to digest due to high crude fiber content.

Table 2: Internal evaluation factor matrix (IFE)

No.	Internal Factors	Integrity (B)	Rating (R)	Skor (BxR)
	Strength			
1.	Nutritional quality can be improved through fermentation, physical treatment, chemical and biological.	0,10	3	0,30
2.	Abundant straw production	0,20	4	0,80
3.	All year long continuity	0,06	4	0,24
4.	Could be an alternative cattle feed.	0,15	4	0,60
	Amount			1.94
	Weakness			
1.	Low nutritient quality	0,15	1	0,15
2.	Its production is determined by the harvested area	0,05	2	0,10
3.	There is competition with other better feed nutrients.	0,10	2	0,20
4.	Easily damaged	0,04	4	0,16
5.	Les palatability	0,15	1	0,15
	Amount			0.76

Based on the results of internal evaluation matrix, the total score for the strength is 1.94 and weakness is 0.76. This means that in the internal terms, rice straw quality has a better strength, although it is known that the nutritional quality of rice straw is very low because of high crude fiber content. However the hay nutritional quality can be improved with the use of feed technology. The often used feed technology to improve the quality of rice straw is fermentation, it is very easy and do not cost much so that farmers and ranchers can use it. This is in accordance with the opinion Soetanto (2000) that the utilization of agricultural wastes like rice straw, cereal straw or sugar cane shoots need to be intensified by using simple, low-cost, and easily adopted technology by farmers and environmentally friendly.

The obtained score difference is 1.15 on an external factor between the opportunities and threats and 1.18 on internal factors between the strengths and weaknesses. These results define focus strategy to be prioritized that is the SO strategy or quadrant I, which means that the strategy should be applied in these conditions is a strategy that supports the activities of a development and utilization of rice straw as ruminant feed in the District Bantaeng.

Alternative strategy

Based on the space matrix analysis result, the main priority of the strategy to be implemented is on the strategy of SO (Strengths-Opportunities). Other strategies such as strategies ST (Strengths-Threats), WO (Weakness-Opportunities) and WT (Weakness-Threats) is an alternative strategy that will be applied.

SO strategy is a strategy that uses the internal strength to take advantage of external opportunities. SO strategy is 1). Provision of rice straw storage facilities based in groups in

large livestock production centers, 2). The increase of existing use of rice straw as a staple food of cattle, 3). Provision of good quality rice straw in dry/drought season, and 4). Provision and use of straw as animal feed with various methods of delivery and utilization.

ST Strategies (Strengths-Threats) is a strategy which uses the internal strength to avoid or reduce the impact of external threats.

ST strategy is 1). Optimize the utilization of rice straw rotation in paddy fields. 2). Preparation of feed formulation using rice straw and other feed sources to improve quality. 3). Increasing the economic value of straw as good quality and continuous animal feed. 4). Increased farmers awareness to use rice straw as cattle feed.

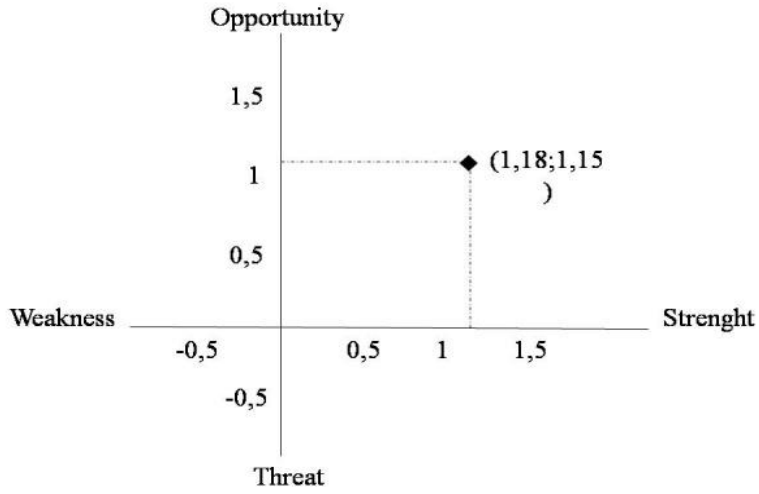
WO Strategies (Weaknesses-Opportunities) is a strategy that seeks to minimize the internal weaknesses so as seize better external opportunities. Activities that can be done in this strategy is 1). Optimize the overall production of rice straw for animal feed. 2). Improve the quality of straw as livestock feed. 3). Improved the more durable storage methods, and 4). Conduct of feeding rice straw throughout the year.

ST Strategies (Weaknesses-Threats) is a strategy aim to reduce internal weakness and avoid threat. WT strategy is 1. Improving nutritional quality and palatability of rice straw through the feed technology. 2. Provision of rice straw in accordance with the needs and livestock population. 3. Increased awareness of farmers to store rice straw after harvest period. 4. Coordinate with relevant agencies to use rice straw as animal feed.

Strategy selection

The selection of strategy is conducted by distributing QSPM questionnaire (Quantitative Strategies, Planning Matrix) to determine the attractiveness of each SO strategies that already exist, because the analysis result on the matrix space (Figure 1) shows that the difference of external and internal factors are at quadrant I, i.e., in areas of strength and opportunity. The result of attractiveness assessment of each SO strategy can be seen in Table 3.

It is known from the results in Table 3 that the strategy that has the highest attraction is at the third strategy which is the provision of good rice straw quality in dry season / drought, while strategy II, IV and I respectively ranked second, third and fourth namely to increase the use of rice straw as a staple food for cattle, supply and utilization of straw as cattle feed with various methods, as well as providing a means of rice straw storage in groups on large livestock production centers.



Picture 1: Space analysis matrix

Tabel 3: Quantitative strategies planning matrix (QSPM)

No.	External and internal factors	Integrity	STRATEGY - SO							
			Strategy 1		Strategy 2		Strategy 3		Strategy 4	
			AS	TAS	AS	TAS	AS	TAS	AS	TAS
Opportunity										
1.	Bantaeng livestock population is quite large and tend to increase.	0,15	3	0,45	3	0,45	4	0,60	4	0,60
2.	Total paddy-field area is quite large.	0,20	4	0,80	4	0,80	4	0,80	4	0,80
3.	Lack of grazing land so that farmers will utilize other food sources.	0,10	2	0,20	3	0,30	3	0,30	3	0,30
4.	The provision of feed during drought season	0,05	4	0,20	3	0,15	4	0,20	3	0,15
5.	Harvest season is twice a year	0,05	4	0,20	3	0,15	3	0,15	3	0,15
Threat										
1.	There is competition with other feed resouces.	0,10	3	0,30	2	0,20	2	0,20	2	0,20
2.	It is used by pulp/paper industry as raw material.	0,05	2	0,10	1	0,05	1	0,05	1	0,05
3.	The decline of livestock population push farmers to slaughter productive female cattle due to the need for meat.	0,05	1	0,05	2	0,10	2	0,10	2	0,10
4.	Farmers habit to burn straw.	0,10	3	0,30	4	0,40	2	0,20	2	0,20
5.	Land conversion for industrial plants and residential.	0,15	2	0,30	2	0,30	2	0,30	2	0,30
Strength										
1.	Nutritional quality cab ne improved through fermentation.	0,10	3	0,30	4	0,40	4	0,40	4	0,40
2.	Abundant production	0,20	4	0,80	4	0,80	4	0,80	3	0,60
3.	All year continuity	0,06	3	0,18	4	0,24	3	0,18	3	0,18
4.	Alternative cattle feed.	0,15	3	0,45	4	0,60	4	0,60	4	0,60
Weakness										
1.	Less nutrient quality	0,15	3	0,45	3	0,45	4	0,60	3	0,45
2.	Its production is determined by the harvest area	0,05	3	0,15	3	0,15	3	0,15	3	0,15
3.	There is competition with other better nutrient feed.	0,10	2	0,20	2	0,20	3	0,30	2	0,20
4.	Easily damaged	0,04	1	0,04	2	0,08	2	0,08	3	0,12
5.	Less palatability	0,15	1	0,15	4	0,60	3	0,45	4	0,60
Total of attractiveness score		**1,00**		**5,62**		**6,24**		**6,46**		**6,15**

Total attractiveness value

The implementation of strategy III is supported by strategy I, II and IV, because in order to streamline the provision of good quality rice straw in dry/drought and rainy seasons more is need such as warehouse storage, storage methods and the provision of appropriate feed technology so that there is increased use of rice straw as a staple food for cattle. In addition to the implementation of this strategy, it is expected to reduce the competition with other better feed nutrients. To support the successful implementation of these strategies will require planning programs, both in long and short term. The long-term planning programs which can support the implementation of this strategy is : 1). The increased demand for animal feed derived from local agricultural waste particularly rice straw. 2). Development and application of feed technology in the processing of agricultural wastes, especially rice straw. 3). The quality development of human resources in livestock field, particularly in knowledge and skills. In addition, there is a short-term planning program for one year period consist of :

1. Community Organization and Development :
    - The establishment of farmer groups.
    - Guidance on the use of agricultural waste as animal feed.
    - Training in the use of feed technologies for rice straw.
    - Consultation on the rice straw provision and utilization method as animal feed.
2. Development and maintenance of farm infrastructure :
    - Manufacture of livestock feed warehouse in location near the paddy fields.
    - Compose stables groups near the feed barn
    - Provision means of transportation.
    - Procurement of facilities inside stables

Conclusion and recommendation

There is a conclusion based on the results and discussion to create rice straw utilization strategy as ruminant feed, it is that the strategies require the provision of rice straw storage in groups on large livestock production centers, increased use of rice straw as a staple food of cattle, provision of quality rice straw in the dry or drought season, supply and use of straw as animal feed with various methods of delivery and utilization.

Related to the implementation of rice straw utilization strategy as ruminant feed, there are other strategic alternatives that could be developed to support the success of key strategies including awareness raising of farmers to use rice straw as cattle feed and store the rice straw after harvest also increasing rice straw nutritional quality and palatability through the feed technology. The results of this study can be considered to enhance regional development programs especially in the livestock development in the Bantaeng district.

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