A Model of Sustainable Ruminant Feed Industry in Jepara, Central Java

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Abstract

Feed availability and quality are among the main problem in animal production in Indonesia, whereas agricultural and agroindustrial by products are very potential feedstuffs. On the other hand, there are lack of accurate data and information of local feedstuffs quantity and availability. The aims of this research are to identify local feedstuff availability, to evaluate its carrying capacity, and to develop model of feed industry in Jepara . It is expected that the present research may provide a basic data and information for feed industry development in Indonesia. Survey method was used in this study, primary and secondary data were descriptively analyzed. Location of this research was determined with purposive sampling method and number of respondents with randomized sampling. The results showed that the production of available local feedstuffs were: soybean straw was 98% of total production, cassava leaf was 98%, rice bran was 100%, and fermented soybean (tempe) by product was 100%. The optimal carrying capacity of Jepara based on the real production was 27480.79 AU. Model of sustainable ruminant feed industry was designed based on integrated farming that consist of feedmill, agroindustrial industry, feed raw material industry, organic fertilizer and bioenergy industry. Recomended feedmill capacity in Jepara is 577.20 tons/month to produce concentrate for 9620 beef cattle. Based on this study, Pakis aji, Mlonggo, and Bangsri are recommended for feedmill establishment.

Keywords: Jepara, model of feed industry, ruminant

Introduction

Feed availibility and quality are among of the main problem in animal production in Indonesia. Whereas agricultural and agroindustrial by products are very potential feedstuffs. On the other hand, there are lack of accurate data and information of local feedstuffs quantity and availability. The competitive market very supported feedmill development (Sukria dan Krisnan, 2009). Based on characteristic of animal farming, ruminant depends on biological prosess and natural resources so goverment have to concern with local potential feedstuff. The aims of this research was to identify local feedstuff availability, to evaluate its carrying capacity, and to develop model of feed industry in Jepara. It is expected that the present research may provide a basic data and information for feed industry development in Indonesia.

Materials and Methods

Survey method was used in this study, primary and secondary data were descriptively analyzed. Location of this research was determined with purposive sampling method and number of respondents were decided with randomized sampling. Potential, effective, and real production of agricultural by product was calculated based on Dry Matter (DM), Crude Protein (CP), Total Digestible Nutrient (TDN). The potential production (ton DM) was calculated with formula: wide of crop area (ha) x DM productivity (ton/ ha) and production of agroindustrial by product was calculated with formula: total of by product (ton) x DM (%) (Tabrany, 2006). The effective production was calculated with formula: the potential production x proper use factor. The proper use factor of rice straw was 70%, corn straw was 75%, peanut straw was 60%, soybean straw was 60%, sweet potato leaf was 80%, cassava leaf was 30%, and sugar cane sprout leaf was 80% (Reksohadiprojo, 1984). The real production was calculated with formula: the effective production x feedstuff used factor of Jepara. Carrying capacity was calculated by dividing production (ton/year) based on DM, CP, and TDN with nutrient consumption for 1 animal unit (AU) (ton/ year) (Syamsu, 2006) with assumption that 1 AU consumes 9,59 kg/day DM, 1,151 kg/day CP, and 5,71 kg/day TDN (NRC, 1988). Analysis of model of sustainable ruminant feed industry consist of population and nutrient consumption analysis, feedstuff availibility evaluation, and feedstuff carrying capacity analysis.

Results and Discussion

Production of agricultural by product in Jepara consisted of available and unavailable product. The available production became feed use factor of agricultural by product, feed use factor of rice straw was 70%, corn straw was 91%, peanut straw was 95%, soybean straw was 98%, sweet potato leaf was 90%, cassava leaf

was 98%, and sugar cane sprout leaf was 95%. Because of the production based on CP (%DM) was the lowest production, so it became a limiting factor in production of agricultural by product in Jepara. Production of agricultural by product in Jepara was showed in Table 1.

The result showed that production of agricultural by products in Jepara were available among January with March and May with October. Lack of feedstuff happened at April, November, and December. The real production was available and exploited agricultural by product. Real production in Jepara was 37,23% of effective production, while 62,77% of production was exploited for another industries. Production of agroindustrial by product in Jepara (ton CP/year) was 3.440,08 consist of rice bran was 3.401,54, soybean cake (tahu) by product was 14,48 and fermented soybean (tempe) by product was 24,05.

Carrying capacity Jepara was capability of Jepara to provide ruminant feedstuff in form of agricultural and agroindustrial by product that accomodate for a number of ruminant in Jepara. The result of carrying capacity showed that based on potential production, Jepara could accommodate 40.156,46 AU, based on effective production 36.207,88 AU, and based on real production 27.480,79 AU. Carrying capacity based on real production was optimum population that could be accomoded by Jepara based on available and exploited feedstuff. Based on real production, Jepara excessed about 8.781,21 AU.

Nalumsari, Batealit, and Mayong Sub-district were potential agricultural by product center in Jepara. Developing Feedstuff industry could support this potency, it managed agricultural by product as crude fiber (CF) source, while, alternative feedmill location were Pakis Aji, Mlonggo, and Bangsri Sub-district.

Tabel 1. Production Potential of Agricultural by Product Based on CP (%DM) Jepara (tons/year)

Feedstuffs	Production CP (%DM)		
	Potential Production	Effective Production	Real Production
Rice Straw	7,540.44	5,278.31	3,694.81
Corn Straw	1,683.70	1,262.78	1,149.13
Soybean Straw	6.23	3.74	3.66
Peanut Straw	3,377.82	2,026.69	1,925.36
Sweet Potato Leaf	68.43	54.75	49.27
Cassava Leaf	2,374.11	712.23	697.99
Sugar Cane Sprout	731.16	584.93	584.79
Total	15,781.89	9,923.42	3,694.81

In general, Jepara has potential for developing beef cattle and buffalo (Tabrany, 2006) so model of feedmill industry was recommended to produce concentrates feed for beef cattle. Jepara had 9.620 beef cattles, they were dominated Ongole hybrid with weight 200 kg, a beef cattle consumed 3% of weight DM and 1% of weight concentrate (Tillman *et al*, 1991) so concentrate consumption was needed by beef cattles in Jepara was 19,24 ton/day or 577,2 tons/month.

The sustainable feed industry was developing of sustainable feed industry; it was an effort to manage resources conservation trough technology development and based on institution in order to provide available feed in Jepara. Developing of sustainable feed industry based on efficiency and zero waste principle. Model of sustainable feed industry based on integrated farming in Jepara was showed in Figure 1.

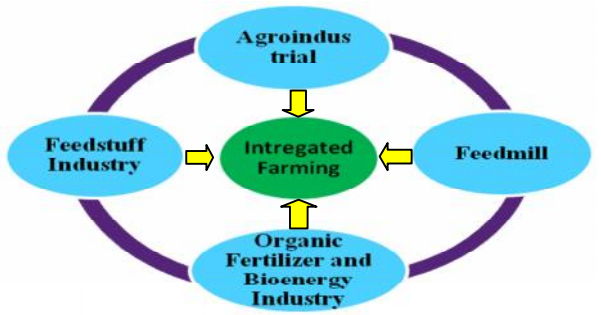

Figure 1. Model of Sutainable Ruminant Feed Industry Based on Intregated Farming in Jepara

Figure 1 showed that intregated farming consisted of:

1. Feedstuff industry that managed and processed agricultural by product. Jepara had real production of agricultural by product 8.105,01 tons/year and carrying capacity 19.292,36 AU so it provided feed for 5.772 AU beef cattles.
2. Agricultural industry that managed and processed agricultural product from local farmer, whereas its main product and by product became feedstuff for feedmill.
3. Feedmill that produced concentrates 577,2 tons/month for 9.620 beef cattles.. Alternative feedmill location were Kecamatan Pakis Aji, Mlonggo, and Bangsri Sub District.
4. Organic fertilizer and bioenergy industry that managed feces became organic fertilizer and bioenergy. 9.620 beef cattles produced 192.400 kg/day solid feces and 86.580 wet feces with assumption that a beef catle produced 20 kg/day solid feces and 9 kg/day wet feces. If 3 beef cattles provided energy for a family, so Jepara could provide energy for 3.206 families.

Conclusions

The most available agricultural by product in Jepara were soybean straw was 98%, cassava leaf was 98%, rice bran was 100%, and fermented soybean (tempe) by produc was 100%. Carrying capacity of Jepara based on potential production was 40.156,46 AU, effective production was 36.207,88 AU, and real production was 27.480,79 AU. Model of sustainable feed industry based on integrated farming consisted of feedstuff industry, agricultural industry, feedmill, organic fertilizer and bioenergy industry. Feedmill was recommended to produce concentrates for 9.620 beef cattles that need 577, 20 ton/month. Recommended alternative feedmill location were Pakis Aji, Mlonggo, and Bangsri Sub-district.

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