Available online at JDR Website: http://Journal.unublitar.ac.id/jdr

Journal Of Development Research, 2 (2), November 2018, Page 43-48

DOI: https://doi.org/10.28926/jdr.v2i2.35

Reducing Losses of Milk Production at KPBS Pengalengan – West Java (Focused study on Social and Economical Analysis)

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Received: 3 February 2018; Revised: 21 July 2018; Accepted: 25 July 2018

Abstrack

Increased this research examines the profile of dairy farms and the strategic steps of KPBS Pengalengan as a milk cooperative that connecting between their members and milk industries to reduce losses in milk production, improve quality of fresh milk and influence welfare of the members. The objective research focused on animal health, milking hygiene, nutrition (feed and water), and socio-economic management. The result showed that KPBS Pengalengan policy to improve the quality of fresh milk with determine the price of milk based on the quality of fat, total solid and TPC, also built Milk Collecting Point (MCP) at the central of farm. This strategy are effective for changing the mindset of farmers, reducing losses of milk production and increasing the income members.

Key words: reducing losses, milk production, social and economical analysis

Introduction

The countries increasing population, urbanization trend and rising household income are correlatively with leading substantial increase in the demand of livestock product such as meat, milk and its products. The dependence developing countries on the developed countries in domestic milk demand is very high. According to Dinar Standard Synthesis and Analysis (2015), commercial imports of dairy and animal by products OIC member countries are $14,3 billion. It happen because of low milk production and high food losses in developing countries. If this condition persists, developing countries are potentially exposed to food traps from developed countries. Hence, in order to satisfy the growing demand the livestock product, production has to be improved and the losses occurring to milk should be minimized.

Food losses refer to the decrease in edible food mass throughout the part of the supply chain that specifically leads to edible food for human consumption. Food losses take place at production, postharvest and processing stages in the food supply chain. Food losses occurring at the end of the food chain (retail and final consumption) are rather called "food waste", which relates to retailers and consumers behavior (Parfitt et al., 2010).

Global quantitative milk losses and waste per year are roughly 20% (Gustavsson et al., 2011). In the case of Turkey the bulk of the milk losses occur at the production level (10%), followed by postharvest handling and storage (1%), processing and packaging (1.5%), distribution (6%), and consumption at household level (1.5%) (Tatlidil et al., 2013). While in MENA country at production level (3,5%) followed by postharvest handling and storage (6%), processing and packaging (2%), distribution (7%), and consumption at household level (2%) (FAO, 2011). Agricultural production losses related to dairy cow illnesses (mostly mastitis infections) are the cause of approximately 3-4% decrease in

milk yield worldwide (Gustavsson et al., 2011), while in Indonesia 10-20%.

KPBS Pengalengan-West Java is one of the dairy cooperatives in Indonesia with 4.690 members, 13.258 dairy cow population (7.515 lactation) and daily milk production reaching 80.000-82.000 liters/day (2016). Efforts are made by this cooperatives to reduce losses in milk production.

Material and Methods

This research is a result of field study at KPBS Pengalengan-West Java cooperatives and members. This research examines the profile of dairy farms and the strategic steps of KPBS Pengalengan as a milk cooperative that connecting between they members and milk industries to reduce losses in milk production, improve quality of fresh milk and influence welfare of the members. The objective research focused on animal health, milking hygiene, nutrition (feed and water), and socio-economic management. Respondents of this research are management of KPBS Pengalengan, employees and they members (dairy farmers). Observations were made by following the chain of milk production from farmers, milk collecting unit, cooling unit up to delivery to the milk industry. The data were collected through questionnaires, interviews and direct observation. The result of data were processed and analyzed by descriptively method. This study aims to examine the cause of losses on milk production and the effect of this to the income farmers.

Results and Discussion

Animal Health

Mastitis results in economic loss for producers by increasing the costs of production and by decreasing productivity. The premature culling of potentially profitable cows because of chronic mastitis is also a significant loss. Cases of clinical mastitis occur 2-3 times per lactation period in KPBS Pengalengan members showed at Table 1.

A dirty enclosure environment and improper handling of milking are the main trigger for this incident. Based on the reports, KPBS Pengalengan members have financial loss between Rp. 1.018.080,- up to Rp. 1.310.000,- /head/lactation period depend on the milk grade production. Some policy was made by KPBS Pengalengan to reduce adulteration and loss farmer income because of this case. The milk with sub-clinical mastitis and antibiotic still remain with separated containers and paid equivalent with fresh milk price, but the milk with clinical mastitis are responsibility of the members as punishment for infraction of SOP which has been determined by management to protect market an customer. Marhaeni et al (2015) concluded that customers are the main focus of the satisfaction of the perceived service quality. Consumer satisfaction is dominant and decisive factor in maintaining the company.

The decrease in milk production per cow due to the clinical and subclinical prevalence of mastitis is usually recognized as the main pathway in causing economic losses due to this disease. Other production effects that cause economic loss are mainly reduced longevity and short term lethality, the negative effects on body weight and feed intake, penalties or loss of premiums related to the somatic cell count of bulk tank milk and the milk withdrawn during and after antibiotic treatment, and also the money spent on its treatment. Mastitis has been recently reported to have a detrimental effect on reproductive performance in lactating dairy cows (Hertl et al., 2010).

The component economic losses can be due to loss of milk production, discarded milk from cows with clinical mastitis and treated cows, replacement cost of culled cows, extra labor required for treatment and monitoring, veterinary service for treatment and control, cost of first trimester abortions

Table 1. Cases of clinical mastitis and income farmers losses in KPBS Pengalengan

Cases of clinical mastitis and antibiotic	Grade I	Grade II	Grade III	Grade IV
	Rp. 5.200	Rp. 4.850	Rp. 4.450	Rp. 4.040
3 times/lactation, duration 7 days, average 12 liters/day	252 liters	225 liters	252 liters	252 liters
Income farmer losses	Rp. 1.310.000	Rp. 1.222.200	Rp. 1.121.400	Rp. 1.018.080

Table 2. Estimated loss due to Mastitis

Source of loss	Loss per cow ($)	Percent of total (%)
Reduced production	121.00	66.0
Discarded milk	10.45	5.7
Replacement cost	41.73	22.6
Extra labour	1.14	0.1
Treatment	7.36	4.1
Veterinary services	2.72	1.5
Total	184.40	100.0

due to clinical mastitis (Risco et al., 1999) and cost of control measures. However production losses contributed major part to the economic losses (Huijps et al., 2008 and Nielsen, 2009).

There are additional costs such as antimicrobial residues in milk from treated cows, milk quality control, dairy food manufacturing, and nutritional quality of milk, degrading of milk supplies due to high bacteria or SCC, and interference with the genetic potential of some cows from early involuntary culling because of chronic mastitis. The total annual cost of mastitis in the dairy cattle population is estimated to be 10% of the total value of farm milk sales, and about two-thirds of this loss is due to reduced milk production in subclinically affected cows. Losses due to mastitis may even be higher in developing countries because standard mastitis control and prevention practices recommended by national mastitis council of USA are not being carried out promptly (Sharif et al, 2009). Estimated loss due to mastitis showed at Table 2.

Milking Hygiene

Good dairy farming practices for milking hygiene are ensuring that (1) milking routines do not injure the animals or introduce contaminants into the milk; (2) milking is carried out under hygienic conditions; and (3) milk is handled properly after milking. Most of the KPBS Pengalengan members are small farmers with dairy cattle under 10 heads/farmers. Unstandard milking hygiene and not apply the Good Dairy Farming rules are common in this place as shown in Figure 1. Bad drainage, unstandard milking and improperly milking equipment causes cross contamination of milk and it is suspected to be a precursor of mastitis. Pakage et al (2014) explained that determinant variables causes technical inefficiency are business experience and number of family while age, gender and education level proved no negative effect. All members have received training on the application of SOP milking hygiene from KPBS management and routine counseling from veterinarian or human resources extension as a control function and evaluation, but the low level awareness of the members to apply this SOP resulted this case still continues.

Figure 1. Unstandard milking hygiene

Most small-scale dairy producers in developing countries milk their animals by hand, often in the presence of the calf to stimulate milk release. On medium to large dairy farms, where improved dairy breeds are used, it is more common and convenient to milk animals with milking machines. Irrespective of the milking method (hand or machine), it is crucial to avoid contamination of the milk during and after milking.

Milk should be transferred between containers by pouring and not scooping since this may introduce spoilage bacteria into the milk. Excessive shaking of milk should be avoided during transportation and this is achieved by mini-

Table 3. Effect of MCP installation to the TPC of milk

Information	Duration (minutes)					TPC (.000)
	Milk-ing	Transport (farm to col-lecting unit)	Collecting without cooling unit	Checking Point	Cooling Unit (up to 3 ºC)	
Milk without MCP	60-75	30-60	60-90	15	180-200	1000-1500
Milk with MCP	60-75	<15	0	15	180-200	300-700

**average 5 head cow lactation/farmer*

mizing the head space when filling the containers and these containers should not be kept under direct sunlight (Lore et al., 2006). Delivery of milk to collecting centers and processing plants shall be within two hours of milking to avoid deterioration.

Cooling after milking is important to minimize microbial activity in milk. Its mean that losses in dairy product causes by microbial activity can be reduce if the farmer can decrease the milk temperature to reach 4ºC in a short time. Especially in Indonesia, cooling unit placed in Milk Collecting Point (MCP) that closed with cooperative office, but in KPBS Pengalengan MCP was placed in every dairy farming center. This policy have benefit to cut the milk distribution time and decrease the TPC of fresh milk. Only members who produce fresh milk with TPC less than 1 x 106 cfu/ml are allowed to deposit milk in this installation. Fresh milk with TPC of more than 1,000,000 cfu/ml will be separated. Members who are unable to improve the quality of their milk will receive coaching and warning, if within 1 year is not able to make repairs the milk quality, they will be removed from the members. Effect of MCP installation to the TPC of milk has showed at Table 3.

Nutrition (Feed And Water)

A dairy animal's health and productivity, as well as the quality and safety of its milk, depend largely on providing the right feed and water. The requirements for feed and nutrients of dairy animals depend on factors such as physiological state, milk production level, age, sex, body condition, body weight, weight gain, health condition, level of activity and exercise, climate and season. The feeding of livestock is a major challenge in many developing countries. This challenge is even greater in the tropics because of seasonal fluctuations in the availability of feed – caused by summer periods – and the poor quality of feed. Dairy animals consume large amounts of water for milk production and pregnancy. Access to water therefore has a great influence on milk production.

Product quality has a positive and significant impact on customer satisfaction as well as consumer loyalty. That is, the higher the value of quality of products then it would affect the higher consumer satisfaction and consumer loyalty (Marhaeni et al, 2015). The fresh milk quality average of KPBS Pengalengan at 2016-2017 showed in Table 4. There was an increase of the fresh milk quality produced by KPBS farmers in 2017. Suroto et al (2013) research on decision purchase formula milk in Malang City concluded that culture, social, personal, psychological, product and price variables simultaneously influence the decision. The KPBS management policy in determining prices based on qualities of fresh milk proved to be effective in encouraging farmers to improve feed and hygiene practice.

One side, farmers will be competing to produce high quality milk for high prices which it will improving their income. In the other side, KPBS has succeeded to reduce milk losses of milk production and non accepted risk by dairy milk industry. Two mutually beneficial sides. Viewed from the process, this policy applies the principle of adaptive approach to counter uncertainty and unexpected for realizing the sustainable agriculture development (Fanani, 2017).

Table 4. The fresh milk quality average of KPBS Pengalengan

Fresh milk quality	2016	2017
Fat (%)	3.88	4.02
SNF (%)	7.86	7.93
Total Solid (%)	11.74	11.95
Total Plate Count (cfu/ml)	$1{,}65 \times 10^6$	$< 1 \times 10^6$

Table 5. KPBS Pengalengan strategy to improve the economic value of fresh milk

Milk Price (Rp.)	Grade I	Grade II	Grade III	Grade IV
Basic milk price	3.650	3.650	3.650	3.650
Fat and TS bonus	600	600-450	450-300	300-150
TPC bonus	1000	750-1.000	750-500	500-250
Total	5.200	4.850	4.450	4.040
Per head/lactation (270 days), 12 liters/day	16.848.000	15.714.000	14.418.000	13.089.600
Difference members income	0	-1.134.000	-2.430.000	-3.758.400

Table 6. Difference income of fresh milk with different quality of fresh milk at 2015-2016

Information	2015	2016
Milk Grade Average	IV	II - III
Price	Rp. 4.040	Rp. 4.450 – 4.850
Production 80.000 liters/days, 365 days/year	Rp. 117.968.000.000	Rp. 129.940.000.000 sd. Rp. 141.620.000.000
Difference Income of KPBS Pengalengan	0	Rp. 11.972.000.000 sd. Rp. 23.652.000.000

Socio-economic Management

Social responsibility and economic sustainability are integral to good dairy farming practice, as they address two key risks to the farming enterprise. Human resource and financial management ensure the sustainability of the enterprise. Good dairy farming practices for the socio-economic management of dairy farms are implementing effective and responsible management of human resources; ensuring that farm tasks are carried out safely and competently; and managing the enterprise to ensure its financial viability.

Research on beef cattle farming (Rohaeni et al, 2014), several things that should be improved and considered for sustainability and improve farmer welfare are maintain of resources, primarily environmental, economic, technological, physical, human, and institutional resources. Strategy of KPBS Pengalengan to improve the economic value of fresh milk are as follows showed in Table 5. Fresh milk with high fat, TS and low TPC get a bonus, this strategy effective to improve members maintenance they farm with good dairy farming practicess esspecially on feed management and hygiene application. In the end, the income of fresh milk with an increase in the quality of fresh milk at 2015-2016 showed in Table 6.

In other side, management of KPBS Pengalengan made any strategy to increasing price and added value of fresh milk such as : (1) Milk trade to the dairy milk industry based on the quality of the fresh milk (grading), (2) Processing fresh milk as butter, mozarella cheese, ice cream, cream cheese, yoghurt and pasteurized milk to increase the added value of fresh milk produced at once to reduce the dependence on milk industry (bergainning position), and (3) The growth of entrepeneur in the field of milk processing around the farm. This strategy effective to improve income of institution, employment and business opportunities for rural communities.

Conclusion

KPBS Pengalengan policy to improve the quality of fresh milk and reduce loss of milk production with determine the price of milk based on the quality of fat, total solid and TPC. Built MCP at the central farm is intended to reduce losses due to slow milk cooling and cutting off milk distribution times. This step is effective for changing the mindset of farmers, reducing losses of milk production and increasing the income members.

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