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## The Role Dairy Farming In Generating Rural Household Income At East Java Indonesia

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### ABSTRACT

Milk consumption was growing faster by the year and it was mostly supplied by smallholder dairy farming that has more prevalent in rural areas. Small scale dairy farmers who raised less than five cows have relied on this farming as the main source of income because dairy farming can enhance job opportunity, generate income, alleviate poverty, and it leads to improving farmer's welfare. It was interesting to insight the potential role of dairy farming for sustaining the livelihood among rural communities. Thus, the research objectives were to: (a) determine the earning pursued in dairy farmer; and (b) investigate Revenue Cost ratio of (R/C ratio) smallholder dairy farmers based on stratum. The research was held in Banjarejo Village, Ngantang Sub-District, and East Java, Indonesia. 30 respondents were selected using total sampling method and categorised into three strata, stratum 1 (raised: < 4 AU, n=19), stratum 2 (owned: 4 – 8 AU, n = 7), and stratum 3 (controlled : > 8 AU, n = 4). Survey method using a structured questionnaire was employed to gather data which carried out from 1st September to 1st October 2014. Descriptive method with economic equation was performed to analyse the data. Results discovered that farmers who raised dairy cattle less than four Animal Units showed more profitable in terms of obtaining more income (Rp.18,248,-/AU/day or US\$1.52/AU/day ) and achieving somewhat higher (1.66) of R/C ratio.

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## INTRODUCTION

Dairy farming represented as important sources for providing milk requirement in Indonesia. Milk consumption increased from 9.5 Kg/capita/year milk consumption in 2004 to 11 Kg/capita/year in 2008 (Industry Department, 2009). East Java accounts for 98% of the total dairy cow numbers in Indonesia. As the centre of dairy cattle development, East Java has about 221,773 dairy cow with 1,034 ton/day of milk production by the year of 2010 (Animal Husbandry Department, 2011).

Dairying is implemented a tradition practise in milk production for a longer time period and mostly operated by smallholders who controlled about 2 to 5 cows. Dairy farming as a part of a farming system has become increasingly important as an aspect of labour and income generating activities of farm households. Utami and Seruni (2013) discovered that household labour was allocated more to dairy farming compared to the farm and non-farm work which female participation was most evident in feed preparation and feeding, whereas the predominant male activity was forage collection for the dairy cattle.

Studies on livestock farming indicated that livestock can provide additional income and employment to households, especially in developing countries (Sansoucy, 1995; 1995; Piraux, *et al.*, 1996). Farming of dairy animals not only increases the level of expected income but also reduces the magnitude of income risk (Bhende and Venkataram, 1994). For instance, the dairy cattle in Bangladesh are proposed as a supplementary income source for smallholders (Wimaladharma, 1995). Similarly, dairy farming is found beneficial in terms of increasing income (Bhople, *et al.*, 1992; Mullins, *et al.*, 1996) and generating employment (Ravindra and Veerabhadraiah, 1991). Therefore, dairy farming can increase villager's life standards and growth income in the area where land holding is inadequate and unbalanced (Kocturk, 2009). Mumba, *et al.*, 2011 found that smallholder dairy farming in Zambia has an important role in rural development and poverty alleviation. Dairy farming expenses was USD 0.18 / litre, or 42.1% of the milk price, with USD 0.43/ litre the revenue and it can obtain profit approximately USD 0.25) or 57.9% of the a milk price. Hence, dairy farming has an important role

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in generating income and improving prosperity among rural community. Thus, these research objectives are to: (a) determine the earning pursued in dairy farming by strata; and (b) investigate Revenue Cost ratio of smallholder dairy farming based on strata.

#### *Methodology:*

The research was held in Banjarejo Village, Ngantang Sub-District, and East Java, Indonesia. The objective of this study was to study financial performance of smallholder dairy farming in terms of cost production, revenue, income, and R/C ratio. Total sampling technique was used to determine 30 respondents. The respondents were then categorised into three strata, stratum 1 (raised : < 4 AU, n=19), stratum 2 (owned : 4 – 8 AU, n = 7), and stratum 3 (controlled : > 8 AU, n = 4). Survey method using a structured questionnaire was employed to gather data which carried out from 1<sup>st</sup> September to 1<sup>st</sup> October 2014. Descriptive method with economic equation, including Total Production Cost, Revenue, Profit, and R/C ratio were conducted to analyse the data as performed in the following paragraph.

#### 1. Total Production Costs

Total Production Costs represented all of the expenses to produce product either good or services. It is composed by Fixe Cost and Variable Cost (Ibrahim, 2009). It can be formulated as :

$$TC = FC + VC$$

where:

TC = Total Production Costs for yielding the fresh dairy milk (Rp./year).

FC = Fixed Cost used for dairy cattle (Rp./year).

VC = Variable Cost used for dairy cattle (Rp./year).

#### 2.. Revenue of dairy cattle:

Revenue referred to compute the value of output. The revenue is defined as output multiplied by the price of output (Ibrahim, 2009). The equation of revenue is presented as :

$$TR = Pq \times Q$$

where:

TR = Total Revenue received from selling fresh dairy milk (Rp./year).

Q = quantity of fresh dairy milk (litre./year).

Pq = The price of fresh dairy milk (Rp./year).

#### 3. Profit or Income:

Profit is defined by the subtraction between Total Total revenue with Total Production Costs (Ibrahim, 2009). It can be stated as :

$$\pi = TR - TC$$

where:

$\pi$  = Profit obtained from selling fresh dairy milk (Rp./year).

TR = Total Revenue received from selling fresh dairy milk (Rp./year).

TC = Total Production Costs used to yield fresh dairy milk (Rp./year).

#### 4. R/C ratio:

Revenue Profit ratio (R/C ratio) is the comparison between Total revenue and Total Cost. R/C ratio can be used to determine enterprise efficiency ( R/C ratio > 1 means efficient; R/C ratio =1 means zero profit; R/C ratio < 1 means inefficient (Soekartawi, 2002). The equation can be presented as :

$$R/C \text{ ratio} = TR : TC$$

where:

R/C ratio = The ratio between Total Revenue and the Total Cost for raising dairy Cattle.

TR = Total Revenue received from selling fresh dairy milk (Rp./year).

TC = Total Production Costs used to yield fresh dairy milk (Rp./year).

## RESULTS AND DISCUSSIONS

#### *The Profile of Smallholder Dairy Farming:*

Farmers aged 35 – 49 years old has dominated more in stratum 1(63.15% ) than those of stratum 3 (50%) and stratum 2 (42.80%). Mostly farmers has a primary education for stratum 1 (42.10%) and stratum 2 (42.85%), while half of farmers in stratum 3 has a higher level education. The experienced in raising dairy cattle (> 20 years) was mostly come from stratum 4 (50%) compared to stratum 2 (42.85%) and stratum 1 (42.10%).

Majority of stratum 1 (52.63%) and stratum 2 (85.71%) have about 3-4 family members, whereas about three fourth of farmers in stratum 3 represented by 5-6 household members.

#### *The Capital Structure of Smallscale Dairy Farming:*

Capital has a potential role in representing the financial structure controlled by the smallholder dairy farming. It is divided into two types of asset, namely fixed asset and working capital as seen in the following Table 1.

**Table 1:** Capital structure for Smallholder dairy farming by stratum.

Items	Stratum 1 (n=19)		Stratum 2 (n = 7)		Stratum 3 (n = 4)	
	(Rp./AU)	%	(Rp./AU)	%	(Rp./AU)	%
<b>I. Fixed Capital</b>						
1. Dairy Cattle	10142105	29.31	31678571	48.23	41875000	47.65
2. Housing	13926346	40.24	21182857	32.25	29620000	33.70
3. Barn's Equipment	2064053	5.96	4570571	6.96	8338500	9.49
<b>Total Fixed Capital</b>	<b>26132504</b>	<b>75.51</b>	<b>57431999</b>	<b>87.45</b>	<b>79833500</b>	<b>90.84</b>
<b>II. Working Capital</b>						
1. Total Fixed Cost	889337	2.57	882360	1.34	969102	1.10
2. Total Variable Cost	7585104	21.92	7362056	11.21	7085567	8.06
<b>Total Working Capital</b>	<b>8474441</b>	<b>24.49</b>	<b>8244416</b>	<b>12.55</b>	<b>8054669</b>	<b>9.16</b>
<b>III. Total Capital (= I + II)</b>	<b>34606945</b>	<b>100</b>	<b>65676415</b>	<b>100</b>	<b>87888169</b>	<b>100</b>

Note:

1. Stratum 1 : Dairy Farmers who owned <4 AU; Stratum 2 : Dairy Farmers who raised 4 - 8 AU; and Stratum 3 : Dairy Farmers who owned > 8 AU.
2. US\$ 1 = Rp.12,000,-

Table 1 explained that investment requirement rose along with the increase of strata. Dairy farming in stratum 1 was only needed a few asset about Rp. 34,606,945,- and its capital then has a rise up to Rp.65,676,415,- and 87,888,169,- for stratum 2 and stratum 3, respectively. The stratum increased in accordance with the incline of fixed capital from 75.51% (stratum 1) to 90.84% (stratum 3), whereas it decreased from 24.49% in stratum 1 to 9.16% in stratum 3 on working capital (Table 1). In regard to fixed asset, the value of dairy cattle has a higher (48.23%) proportion for stratum 2 than those of stratum 3 (47.65%) and stratum 1 (29.31%). Total fixed cost in working capital, however, represented a lower (1.10%) proportion particularly come from stratum 3 in comparison with stratum 2 (1.34%) and stratum 1 (2.57%).

#### *The Role Dairy Farming on Household's Income:*

Table 2 represented income statement or profit loss statement from dairy farming on the basis of stratum. In general, production costs, revenue and profit tend to incline as the increase of stratum. Revenue from dairy farming has fluctuated in respect to stratum, with the majority arising from stratum 1 (Rp. 45,862,-/AU/day). Revenue from dairy farming was primarily derived from milk which stratum 3 was marginally higher (89.25 %) than those from stratum 2 (88.28 %) and stratum 1(83.33%). Meanwhile, selling culled dairy cattle tended to decline as the stratum increase. It was slightly higher for stratum 1 (6.23% compared to stratum 2 (5.44 %) and stratum 3 (4.54%).

Interestingly, production costs slightly dropped from Rp. 24,870,- /AU/day (stratum 1) to Rp. 24,138,-/AU/day (stratum 2) and Rp. 23,231,-/AU/day (stratum 3). A high cost was provided for feed consumption with dominated by dairy farming in stratum 1. On the contrary the expenses in medicine have a lower proportion of total production costs, and it fluctuated with ranged between 0,08% - 0.10 %.

Even though, stratum 3 indicated a lower expenses in operating dairy farming than other strata, however the higher profit (Rp.18,248,-/AU/day) was achieved by stratum-1 which required a higher production costs in raising the livestock. This finding implied that dairy farming in stratum 1 can obtain more earning (Rp.18,248,-/AU/day or US\$1.52/AU/day ) compared to those of stratum 2 (Rp. 17,541,-/AU/day or US\$1.46/AU/day) and

stratum 3 (Rp. 17,021,-/AU/day or US\$1.42/AU/day). The profitable farm in stratum 1 is due to the household involvement that can reduce the expenses in operating dairy farming. This finding was similar to Utami and Seruni (2013) that household labour including women have a higher participation in dairy farming sector, especially in developing countries. Likewise the previous study (Bhople, *et al.*, 1992; Sansoucy, 1995; 1995; Mullins, *et al.*, 1996; and Piraux, *et al.*, 1996) claimed that livestock farming can enhance earning for rural people who have a limited access to land to have a good living standard (Kocturk, 2009). Therefore, the rural labour empowerment in dairy farming will lift up their income and it can be used as a mean to alleviate poverty among villagers (Mumba, *et al.*, 2011).

**Table 2:** Profit/Loss statement for smallholder dairy farming by stratum.

Items	Stratum 1 (n = 19)		Stratum 2 (n = 7)		Stratum 3 (n = 4)	
	(Rp./AU/Day)	%	(Rp./AU/Day)	%	(Rp./AU/Day)	%
<b>I. Revenue</b>						
1. Selling Milk	38219	83.33	39233	88.28	38636	89.25
2. Selling Calf	3540	7.72	978	2.20	1621	3.74
3. Selling Heifer	1247	2.72	1813	4.08	1069	2.47
4. Selling Culled Dairy Cattle	2856	6.23	2416	5.44	1966	4.54
<b>Total Revenue</b>	<b>45862</b>	<b>100</b>	<b>44440</b>	<b>100</b>	<b>43292</b>	<b>100</b>
<b>II. Production Costs</b>						
<b>II.1. Fixed Cost</b>						
a. Dairy Cattle Depreciation	786	2.85	1149	4.27	1598	6.08
b. Housing Depreciation	947	3.43	778	2.89	537	2.04
c. Equipment Depreciation	137	0.50	166	0.62	207	0.79
d. Land's rent	874	3.17	668	2.48	698	2.66
<b>Total Fixed Cost</b>	<b>2744</b>	<b>9.94</b>	<b>2761</b>	<b>10.26</b>	<b>3040</b>	<b>11.57</b>
<b>II.2. Variable Cost</b>						
a. Concentrate Feed	16512	59.80	14351	53.35	13627	51.87
b. Forage	7039	25.49	6880	25.58	6888	26.22
c. Medicine	25	0.09	26	0.10	21	0.08
d. Artificial Insemination	64	0.23	69	0.26	72	0.27
e. Water and Electricity	926	3.35	628	2.33	484	1.84
f. Transportation	304	1.10	228	0.85	186	0.71
g. Labour	0	0	1956	7.27	1953	7.43
<b>Total Variable Cost</b>	<b>24870</b>	<b>90.06</b>	<b>24138</b>	<b>89.74</b>	<b>23231</b>	<b>88.43</b>
<b>Total Production Costs</b>	<b>27614</b>	<b>100</b>	<b>26899</b>	<b>100</b>	<b>26271</b>	<b>100</b>
<b>IV. Profit (= I - II)</b>	<b>18248</b>		<b>17541</b>		<b>17021</b>	

Note:

1. Stratum 1 : Dairy Farmers who owned <4 AU; Stratum 2 : Dairy Farmers who raised 4 - 8 AU; and Stratum 3 : Dairy Farmers who owned > 8 AU.
2. US\$ 1 = Rp.12,000,-

*Revenue Cost Ratio (R/C ratio):*

Efficiency in raising dairy farming was measured through R/C ratio and figured in Table 3. Smallholder dairy farming indicated efficient (R/C ratio >1) in rearing dairy cattle irrespective of stratum, with the slightly higher of efficiency arising from stratum 1 (1.66). It implied that Rp. 1,000,000,- expenses in stratum 1 can yield Rp. 1,660,000,- of revenue and obtain Rp. 660,000,- of profit. Hence, smallholder farmers in stratum 1 and stratum 2 has inefficient in operating dairy farming than those of stratum 1.

**Table 3:** R/C ratio for smallholder dairy farming by stratum.

Items	Stratum 1	Stratum 2	Stratum 3
	(Rp./AU/Day)	(Rp./AU/Day)	(Rp./AU/Day)
I. Total Revenue	45862	44440	43292
II. Total Production Costs	27614	26899	26271
III. R/C ratio	1.66	1.65	1.65

*Conclusions:*

An investigation on small scale dairy farming has found that stratum 1 (owned : < 4 AU) was more profitable than stratum 2 (raised : 4-8 AU and stratum 3 (controlled : > 8 AU) on the basis of the following criteria.

1. Dairy farming in stratum 1 required a higher (Rp. 27,614,-/AU/day) production cost than those of stratum 2 (Rp. 26,889,-/AU/day), and stratum 3 (Rp. 26,271,-/AU/day).
2. Revenue of dairy farming was higher (Rp. 45,862,-/AU/day ) for stratum 1 in comparison with stratum 2 (Rp.44,440,-/AU/day) and Stratum 3 (Rp.43,292,-/AU/day ).
3. Dairy farming in stratum 1 can obtain more earning (Rp.18,248,-/AU/day or US\$1.52/AU/day ) compared to those of stratum 2 (Rp. 17,541,-/AU/day or US\$1.46/AU/day) and stratum 3 (Rp. 17,021,-/AU/day or US\$1.42/AU/day).
4. R/C ratio for small-scale dairy farming stratum 1 appeared somewhat higher about 1.66 compared to those approximately 1.65 of either stratum 2 or stratum 3.

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