THE UNIVERSITY of ADELAIDE
The Centre for Global Food and Resources

The IndoDairy Smallholder Household Survey
From Farm-to-Fact

Factsheet 13.3: Profitability Comparison - Dairy Farm Inputs

Background

In the previous factsheet, information on individual cow characteristics and farm management practices was considered. In this factsheet, the characteristics of the IndoDairy Smallholder Household Survey (ISHS) based on profit quartiles will be studied further, focusing on farming inputs.

Dairy co-operative Animal Health Packages

Dairy co-operatives in West Java play a critical role as input suppliers for farmers, in many cases sourcing raw materials and mixing concentrates. Some dairy co-operatives provide this in the form of "package", where a portion of the milk sales from farmers goes towards covering the costs of supplying feeds, supplements and subsidising animal health services (including vets and artificial insemination). Summary statistics of Animal Health Packages across the profit quartiles are shown in Table A1 in the Appendix.

- As presented in a previous factsheet, most farmers across the profit quartile received a package from their co-operative, representing 73% of farmers.
- Although not significantly different, the percentage of farmers receiving this support was highest in Quartile 2 (Q2) (76%) while lowest in Quartile 1 (Q1) (67%).
- Based on these results, it is difficult to determine if the provision of this service would likely have a standalone impact on profitability. It would likely be determined by the quality of the inputs provided in the package and the pricing in place.

Inputs used

Inputs used by farmers in the ISHS are summarised in Table A2 in the Appendix. These inputs are a separate purchase to those supplied on the dairy co-operative Animal Health Package. The section below summarises how the proportions of inputs used differed between the profit quartiles.

Significant difference

The following characteristics were significantly different between profit quartiles ($p < 0.05$):

Concentrates

- As shown in Figure 1 below, number of farmers sourcing concentrates was the lowest among Q4 farmers (88%) compared to Q1 farmers (97%).

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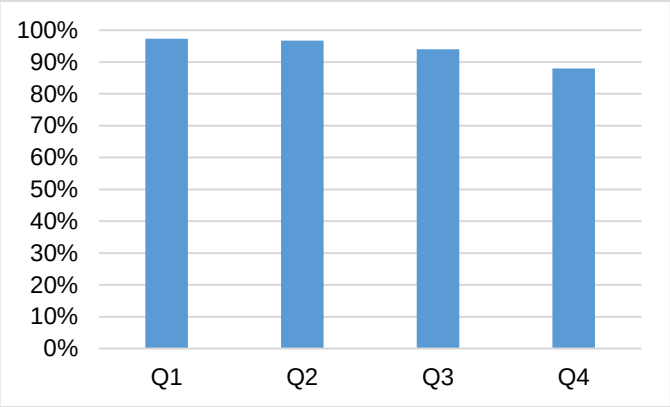

Figure 1. Use of concentrates across profit quartiles.

Medicines

- Out of the 21% total farmers that sourced medicines, 3% farmers in Q1 sourced 3 types of medicines compared to less than 1% for Q2, Q3 and Q4.

Slight difference

The following characteristics were significantly different between profit quartiles ($p < 0.10$):

Forages and grasses

- Similar to concentrates, slightly fewer farmers in Q4 (most profitable) reported the use of forage or grasses (95%) compared to the other quartiles which were over 98%.

No difference

The following characteristics were not significantly different between profit quartiles ($p > 0.10$):

- Artificial Insemination (AI)
- Vitamins
- Mineral mix
- Crop straws
- Forage legumes
- Feed wastes (e.g. tofu, cassava or vegetable wastes)

Quality of concentrates

Concentrates are a nutrient-dense source of energy and proteins which enables dairy cows to maximise their biological capacity to produce milk and maintain their body condition. For dairy production, sourcing high quality concentrates is essential. A key measure of concentrate quality is the crude protein (CP) content. In the ISHS, farmers were asked if they knew the CP for the concentrates they used. These results, comparing profit quartiles are presented in Table A3 in the Appendix.

- **There was no significant variation between the profit quartiles about knowledge or sourcing of concentrates, however, knowledge was generally low.**
- **Overall, only 11% of farmers who used concentrates knew the CP of the concentrates.**
- Of those farmers, the average CP was 14%, which was below the recommended 16% to optimise dairy cow performance. This would likely be due to the higher costs to source or produce higher quality concentrates.
- As previously mentioned, co-operatives are a major source of inputs, which is the case for concentrates. In the ISHS, **94% of farmers who purchase concentrates sourced them from a co-operative.**

Summary

This factsheet looked at comparison of dairy farm inputs between the profit quartiles.

- **Despite there being few input characteristics that were significantly different between profit quartiles, over the past few factsheets, there has been common theme emerging regarding the use and cost of concentrates.**
- **The use of concentrates was significantly higher among the farmers in the first quartile (97%) than the farmers in the fourth quartile (88%). This indicates that about 10% of the farmers in the fourth quartile were not using as much concentrates as the farmers in the first quartile and this was leading to cost control. This could be a result of the ability of farmers in the fourth quartile to source different feeds at lower prices, such as tofu waste, cassava waste,**

fermented soybean waste, vegetable waste, and still maximise the production per cow.

- **There was no significant variation between the profit quartiles about knowledge or sourcing of concentrates, however, knowledge was generally low.**
- **Overall, only 11% of farmers who used concentrates knew the Crude Protein (CP) content of the concentrates.**
- **94% of farmers who purchased concentrates sourced them from a co-operative.**

In an earlier factsheet on profitability (Factsheet 13), it was noted that costs associated with concentrates were one of the most significant point of outlays for dairy farmers. The potential resourceful procurement of the inputs by the farmers in the fourth quartile was resulting in an impact on the costs that these farmers were incurring which were significantly lower than those incurred by the farmers in the first quartile. Additionally, it was potentially a combination of resourcefulness and multiple feed types the most profitable farmers were using on to maximise production and reduce costs. However, this needs to be further investigated in detail.

The following factsheet, Factsheet 13.4, discusses aspects of dairy farm labour across the profit quartiles.

Appendix to Factsheet 13.3

This appendix provides a summary for farming inputs by profit quartiles. Standard deviations (SD) are included where relevant.

Statistical significance between quartiles were determined using ANOVA (for binary and continuous variables) and Pearson's Chi-squared test (for categorical variables). For categorical variables with small observations ($n < 5$), Fisher's exact test was used to confirm the Chi-squared test. ANOVA and Chi-squared tests results are shown in the right-hand column, under the Total. Pairwise comparisons were performed for continuous and binary variables using Tukey tests when the ANOVA test was trending towards significant ($p < 0.10$). Quartiles with the same letter are not significantly different at the 5% level ($p > 0.05$).

Table A1. Animal Health Packages from dairy co-operatives by profit quartiles.

Variable	Quartile 1 Value[1]	Quartile 2 Value[1]	Quartile 3 Value[1]	Quartile 4 Value[1]	Total Value[1]	Sig[1]
Farmers who receive an Animal Health Package (n = 600)	66.7%	77.3%	76.0%	71.3%	72.8%	
What is covered in the package? (n=437)						
Artificial Insemination (AI)	66.7%	77.3%	76.0%	71.3%	72.8%	
Medicine	66.7%	76.7%	75.3%	70.0%	72.2%	
Vitamin	64.0%	74.0%	74.7%	68.0%	70.2%	
Veterinary Fees	66.7%	77.3%	75.3%	70.0%	72.3%	
Reproduction Incentive	22.7%	33.3%	28.7%	27.3%	28.0%	

[1]Sig = Significance; * p < 0.10, ** p < 0.05 and *** p < 0.01 indicate significance at the 10%, 5% and 1% levels, respectively.

Table A2. Percent of farmers using various dairy farm inputs, accounting for those provided in the co-operative packages as shown in Table 1, by profit quartiles (n = 600).

	Quartile 1		Quartile 2		Quartile 3		Quartile 4		Total	
Variable	**Value[1]**	**Sig[2]**	**Value[1]**	**Sig[2]**	**Value[1]**	**Sig[2]**	**Value[1]**	**Sig[2]**	**Value[1]**	**Sig[2]**
Artificial Insemination	32.0%		22.0%		22.0%		28.7%		26.2%	
Medicines:										
Type 1	26.7%		20.7%		15.3%		22.0%		21.2%	
Type 2	4.7%		3.3%		2.7%		3.3%		3.5%	
Type 3	3.3%	b	0.0%	a	0.0%	a	0.7%	ab	1.0%	***
Vitamins:										
Type 1	18.0%		13.3%		14.7%		14.7%		15.2%	
Type 2	2.7%		0.7%		1.3%		0.0%		1.2%	
Type 3	1.3%		0.0%		0.7%		0.0%		0.5%	
Concentrates:										
Type 1	97.3%	a	96.7%	a	94.0%	ab	88.0%	b	94.0%	***
Type 2	34.7%		28.0%		28.7%		26.7%		29.5%	
Type 3	4.7%	b	2.0%	ab	0.0%	a	1.3%	ab	2.0%	**
Mineral mix	33.3%		28.7%		28.7%		28.7%		29.8%	
Forage or grass	98.0%	a	99.3%	a	98.7%	a	95.3%	a	97.8%	*
Crop straws (rice, corn, vegetable)	14.0%		10.0%		13.3%		9.3%		11.7%	
Forage legumes	6.7%		8.7%		6.0%		6.7%		7.0%	
Feed wastes:										
Tofu waste	24.7%		18.7%		19.3%		18.7%		20.3%	
Cassava waste	23.3%		22.0%		21.3%		17.3%		21.0%	
Fermented soybean waste	0.7%		0.0%		0.0%		0.0%		0.2%	
Soybean meal	0.0%		0.7%		0.0%		0.0%		0.2%	
Palm kernel cake	0.0%		0.7%		0.0%		0.0%		0.2%	
Vegetable waste	27.3%		34.0%		28.0%		24.0%		28.3%	
Other feeds	28.0%		25.3%		20.7%		24.0%		24.5%	

[1]Sig = Significance; * $p < 0.10$, ** $p < 0.05$ and *** $p < 0.01$ indicate significance at the 10%, 5% and 1% levels, respectively. Pairwise comparisons were performed for continuous and binary variables using Tukey tests when the ANOVA test was trending towards significant ($p < 0.10$). Quartiles with the same letter are not significantly different at the 5% level ($p > 0.05$).

Table A3. Concentrate knowledge and source by profit quartile.

	Quartile 1			Quartile 2			Quartile 3			Quartile 4			Total		
Variable	**Value[1]**	**SD[2]**	**Sig[3]**	**Value[1]**	**SD[2]**	**Sig[3]**	**Value[1]**	**SD[2]**	**Sig[3]**	**Value[1]**	**SD[2]**	**Sig[3]**	**Value[1]**	**SD[2]**	**Sig[3]**
Know concentrate crude protein content (n = 575)	12.9%			10.4%			11.4%			10.4%			11.3%		
Crude protein content of the concentrate (%) (n = 65)	14.12	2.20		15.60	3.36		13.66	4.21		13.73	3.53		14.26	3.36	
Source of concentrates (n = 564):															
Manufacture from free materials	0.7%			0.0%			0.7%			0.0%			0.4%		
Co-operative	93.8%			93.1%			95.7%			92.4%			93.8%		
Inputs supplier	2.7%			3.5%			0.7%			3.8%			2.7%		
Self-mix	0.7%			0.0%			0.0%			0.0%			0.2%		
Other farmers	0.0%			0.7%			0.7%			0.8%			0.5%		
Farmer's group	0.7%			0.7%			2.1%			2.3%			1.4%		
Other	1.4%			2.1%			0.0%			0.8%			1.1%		

[1]Value is either percentage or mean; [2]SD = Standard Deviation; [3]Sig = Significance; * p < 0.10, ** p < 0.05 and *** p < 0.01 indicate significance at the 10%, 5% and 1% levels, respectively.