



Factsheet 5: Dairy Farm Inputs

Background

In the previous factsheet, individual cow and farm management characteristics were analysed. In this factsheet, the characteristics of the IndoDairy Smallholder Household Survey (ISHS) will be further examined, focusing on the inputs used by dairy farmers.

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 districts are shown in Table A1 in the Appendix.

- **Farmers in Bandung (99%) and Garut (99%) received Animal Health Packages from their dairy co-operatives.**
- In regard to contents of the package, majority included artificial insemination services (100%), medicines (99%), vitamins (96%) and veterinary services (99%). Some

cooperatives (KUDs) provided family health insurance as part of the package.

Input use

Inputs used by farmers in the ISHS are summarised in Table A2 in the Appendix. These inputs are a separate purchase to those supplied through the dairy co-operative Animal Health Package.

Medicines, vitamins and minerals

Figure 1 shows the distribution of medicines, vitamins and minerals purchased by dairy farmers across the four districts.

- Medicines, vitamins and mineral mixes were covered in the Animal Health Packages received by farmers in Bandung and Garut districts and thus the share of purchases of these inputs externally was low for farmers from these districts.
- However, only 70% farmers from Bogor and 63% farmers from Cianjur purchased medicines.
- Only about half of the farmers from Bogor (55%) and Cianjur (45%) purchased vitamins.

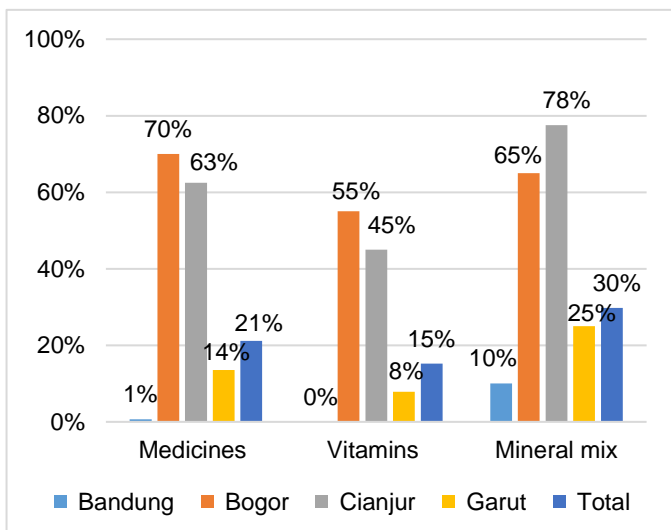


Figure 1. Medicine, vitamin and mineral inputs used by farmers. Note: These are inputs that were purchased independently to the co-operative Animal Health Package.

- Despite receiving mineral mix as part of the Animal Health Packages, 25% of the farmers in Garut and 10% of the farmers from Bandung still purchased these minerals externally.

Concentrates and waste feeds

Figure 2 shows the distribution of concentrates and waste feeds purchased by dairy farmers across the four districts.

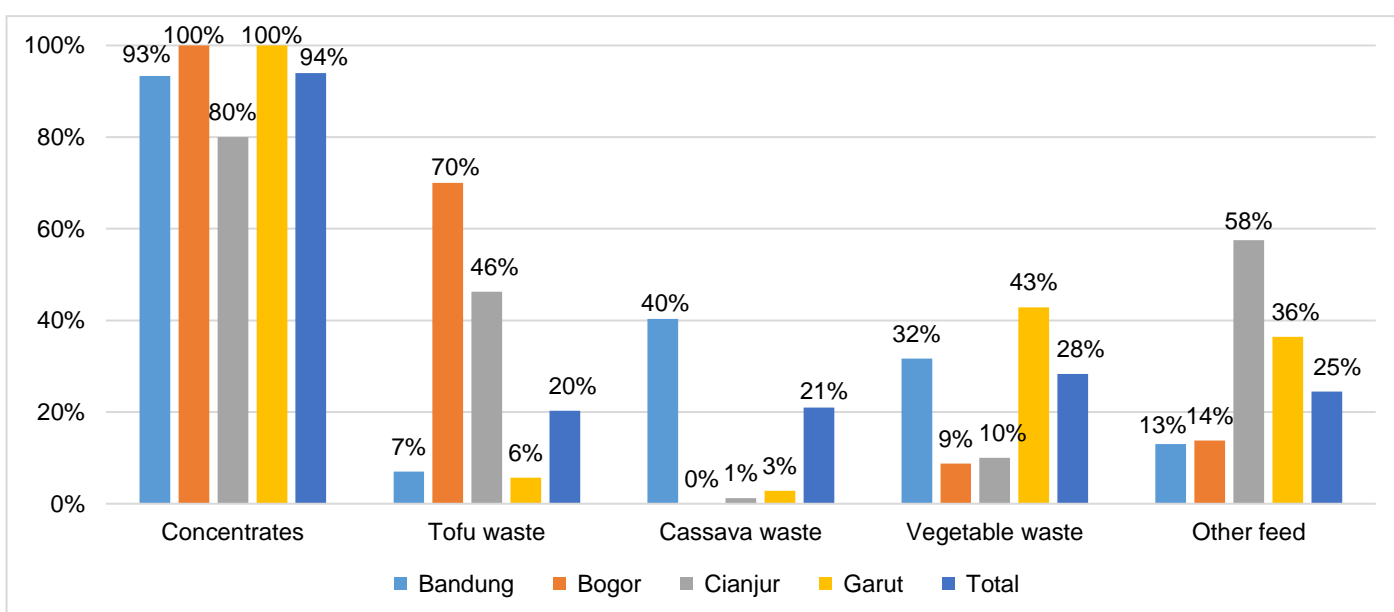


Figure 2. Concentrates and waste feeds used by dairy farmers.

- **94% dairy farmers purchased at least one type of concentrate** as a separate input to the Animal Health Packages.
- In particular, all Garut farmers and 93% of Bandung farmers reported purchasing at least one type of concentrate externally.
- 30% of farmers sourced two types of concentrates and 2% sourced three types (Table A2).

Dairy farmers utilised by-products from different food types as supplements for their herd, as they are generally cheap sources of energy and other nutrients.

- Common examples of by-products from different food types included tofu waste (20%), cassava waste (21%), and wastes from vegetables (28%).
- The share of farmers using cassava waste was highest in Bandung (40%).
- 70% farmers in Bogor district used tofu waste.
- Dairy farmers also utilised other feeds and waste mixes. Overall responses are shown in Table A3 in the Appendix.

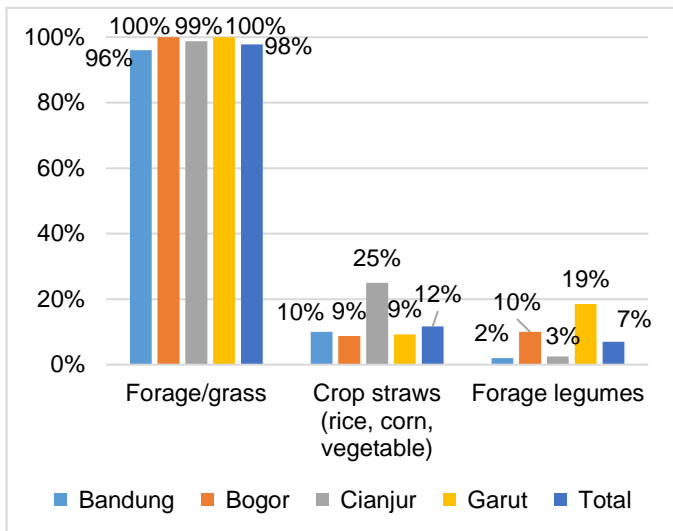


Figure 3. Forages and crop straws inputs used by dairy farms.

Forages and grasses

Figure 3 shows the distribution of forages and crop straws purchased by dairy farmers across the four districts.

- Majority of farmers (98%) purchased forages or grass. This was consistent throughout all districts.
- Overall, crop straws (rice, corn, vegetable) were not widely used by the farmers, with only 12% of the respondents utilising them. However, this number was substantially higher in Cianjur district (25%).
- Likewise, forage legumes were not broadly used either. Overall, only 7% reported purchasing them. However, this number was higher in Garut district (19%).

Table 1. Concentrate crude protein (CP) content knowledge, by district.

Districts	Knowledge of CP content (n = 575)	CP content of concentrates (%) (n = 65)
Bandung	14.5%	14.8
Bogor	17.5%	11.9
Cianjur	11.3%	15.2
Garut	1.4%	15.0
Total	11.3%	14.3

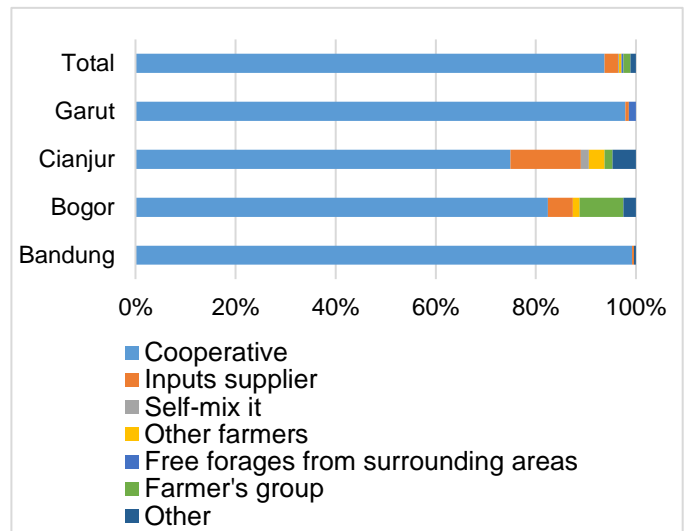


Figure 4. Sources of concentrates, by district.

Quality of concentrates

Concentrates are a nutrient-dense source of energy and proteins. 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 were aware of the CP for the concentrates they used.

Figure 4 shows the sources of concentrates, by district. Table 1 shows the summary of the respondents aware of the CP in their concentrates and the content itself. District wise results are shown in Table A4 in the Appendix.

Overall, the share of farmers aware of the CP of the concentrates was generally low (11%) (Table 1).

- **Highest share of farmers aware of the CP content was recorded in Bogor district (18%) and lowest was recorded in Garut (1%).**

Of the farmers who were aware of the CP levels, the **average CP level was 14.3%**, which was below the **recommended 16%** to optimise dairy cow performance. This was likely to be due to the higher costs to source or produce higher quality concentrates. Lowest average CP was recorded in Bogor district (12%).

- **94% of farmers who purchased concentrates sourced them from a co-operative (Figure 4).**

Summary

- **Animal Health Packages were critical inputs provided by co-operatives to farmers in Bandung and Garut districts.**
- **Forages or grasses and concentrates were the most commonly procured inputs by dairy farmers.**
- **Other key inputs included forage legumes, crop straws and waste feeds.**

The following factsheet, Factsheet 6, discusses aspects of dairy farm labour across the four districts.

Appendix to Factsheet 5

The tables included in this appendix provide summary statistics related to use of inputs at the dairy household level for the entire sample.

Statistical significance between districts 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 ($p < 0.1$). Districts 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	Bandung		Bogor		Cianjur		Garut		Total	
	Value ¹	Sig ²	Value ¹	Sig ²	Value ¹	Sig ²	Value ¹	Sig ²	Value ¹	Sig ²
Farmers who receive an Animal Health Package (n = 600)	99.3%	b	0%	a	0%	a	99.3%	b	72.8%	***
What is covered in the package? (n=437)										
<i>Artificial Insemination (AI)</i>	100.0%		0%		0%		100.0%		100.0%	
<i>Medicine</i>	100.0%		0%		0%		97.1%		99.1%	***
<i>Vitamin</i>	97.3%		0%		0%		94.2%		96.3%	
<i>Veterinary Fees</i>	99.0%		0%		0%		100.0%		99.3%	
<i>Reproduction Incentive</i>	17.8%		0%		0%		82.7%		38.4%	***

¹Value is percentage; ²Sig = Significance; * p < 0.1, ** 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 < 0.1). Districts with the same letter are not significantly different at the 5% level (p > 0.05).

Table A2. Usage of inputs on dairy farms accounting for inputs provided in the co-operative packages shown in Table 1 (n = 600).

Variable	Bandung		Bogor		Cianjur		Garut		Total	
	Value ¹	Sig ²	Value ¹	Sig ²	Value ¹	Sig ²	Value ¹	Sig ²	Value ¹	Sig ²
Artificial Insemination	0.7%		98.8%		92.5%		1.4%		26.2%	
Medicines:										
Type 1	0.7%		70.0%	a	62.5%	a	13.6%		21.2%	***
Type 2	0.0%	a	12.5%	b	11.3%	b	1.4%	a	3.5%	***
Type 3	0.0%	a	5.0%	b	2.5%	ab	0.0%	a	1.0%	***
Vitamins:										
Type 1	0.0%		55.0%	a	45.0%	a	7.9%		15.2%	***
Type 2	0.0%	a	5.0%	c	3.8%	bc	0.0%	ab	1.2%	***
Type 3	0.0%	a	1.3%	ab	2.5%	b	0.0%	ab	0.5%	**
Concentrates:										
Type 1	93.3%	a	100.0%	ab	80.0%		100.0%	b	94.0%	***
Type 2	35.3%	bc	43.8%	c	25.0%	ab	11.4%	a	29.5%	***
Type 3	3.0%		1.3%		2.5%		0.0%		2.0%	
Mineral mix	10.0%		65.0%	a	77.5%	a	25.0%		29.8%	***
Forage or grass	96.0%	a	100.0%	ab	98.8%	ab	100.0%	b	97.8%	**
Crop straws (rice, corn, vegetable)	10.0%	a	8.8%	a	25.0%		9.3%	a	11.7%	***
Forage legumes	2.0%	a	10.0%	bc	2.5%	ab	18.6%	c	7.0%	***
Feed wastes:										
Tofu waste	7.0%	a	70.0%		46.3%		5.7%	a	20.3%	***
Cassava waste	40.3%		0.0%	a	1.3%	a	2.9%	a	21.0%	***
Fermented soybean waste	0.0%	a	0.0%	a	1.3%	a	0.0%	a	0.2%	*
Soybean meal	0.0%	a	0.0%	a	1.3%	a	0.0%	a	0.2%	*
Palm kernel cake	0.0%		0.0%		0.0%		0.7%		0.2%	
Vegetable waste	31.7%	b	8.8%	a	10.0%	a	42.9%	b	28.3%	***
Other feeds	13.0%	a	13.8%	a	57.5%		36.4%		24.5%	***

¹Value is percentage; ²Sig = Significance; * p < 0.1, ** 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 < 0.1). Districts with the same letter are not significantly different at the 5% level (p > 0.05).

Table A3. Other feeds reported by dairy farmers (n = 147).

Other feeds	Number of farmers	Percentage of the total responses (n = 600)
Cassava	37	6.2%
Rice bran	28	4.7%
Peanut meal	13	2.2%
Pollard	12	2.0%
Bread waste	9	1.5%
Pellet	8	1.3%
Bread	7	1.2%
Banana leaves	6	1.0%
Cake	3	0.5%
Corn leaves	3	0.5%
Barley	2	0.3%
Silage	2	0.3%
Tempe/soybean waste	2	0.3%
Ransum concentrate	1	0.2%
African leaves	1	0.2%
Banana stem	1	0.2%
Banana stem and leaves	1	0.2%
Bread and rice bran	1	0.2%
Brown sugar and green coconut	1	0.2%
Cake and rice bran	1	0.2%
Cake powder	1	0.2%
Bread waste and peanut meal tempe	1	0.2%
Carrot	1	0.2%
Formula milk for calves	1	0.2%
Leaves	1	0.2%
Pollard and rice bran	1	0.2%
Rice waste	1	0.2%
Salt	1	0.2%

Table A4. Concentrate knowledge and sources.

Variable	Bandung			Bogor			Cianjur			Garut			Total		
	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)	14.5%		b	17.5%		b	11.3%		ab	1.4%		a	11.3%		***
Crude protein content of the concentrate (%) (n = 65)	14.81	3.53	b	11.94	2.73	a	15.22	2.28	ab	15.00	1.41	ab	14.26	3.36	**
Source of concentrates (n = 564):															
<i>Cut and carry from surrounding areas for free</i>	0.0%			0.0%			0.0%			1.4%			0.4%		***
<i>Cooperative</i>	99.3%			82.5%			75.0%			97.9%			93.8%		***
<i>Inputs supplier</i>	0.4%			5.0%			14.1%			0.7%			2.7%		***
<i>Self-mix it</i>	0.0%			0.0%			1.6%			0.0%			0.2%		***
<i>Other farmers</i>	0.0%			1.3%			3.1%			0.0%			0.5%		***
<i>Farmer's group</i>	0.0%			8.8%			1.6%			0.0%			1.4%		***
<i>Other</i>	0.4%			2.5%			4.7%			0.0%			1.1%		***

¹Value is either percentage or mean; ²SD = Standard Deviation; ³Sig = Significance. *p < 0.1, ** 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 < 0.1). Districts with the same letter are not significantly different at the 5% level (p > 0.05).