Factsheet 5: Dairy Farm Inputs

Background

In the previous factsheet, we looked at farmer' attitudes, perceptions of change and future aspirations. In this factsheet, we will continue to study the characteristics of the IndoDairy Smallholder Household Survey (ISHS), 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 an input supplier 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 1.

- **Farmers in Bandung (99%) and Garut (99%) receive Animal Health Packages from their dairy co-operatives.**

- With regards to inclusions in the package, majority include artificial insemination services (100%), medicines (99%), vitamins (96%) and veterinary services (99%). Some cooperatives (KUDs) provide family health insurance as part of the package.

Input Use

Inputs used by farmers in the ISHS are summarised in Table 2 (Appendix). These inputs are a separate purchase to those supplied on the dairy co-operative Animal Health Package.

Figure 1 shows the distribution of inputs purchased by dairy farmers across the four districts.

Medicines, vitamins and minerals

- Medicines, vitamins and mineral mixes are covered in the Animal Health Packages received by farmers in Bandung and Garut districts and thus the share of purchases of these inputs externally is low for farmers from these districts.

- However, only 70% farmers from Bogor, 62% farmers from Cianjur purchase medicines.

- Only about half of the farmers (55% from Bogor, and 45% farmers from Cianjur) purchase vitamins (Figure 1).

Concentrates

- **94% dairy farmers purchase at least one type of concentrate** as a separate input to the Animal Health Packages.

- 29% of farmer sourced two types of concentrates, and 2% sourced three types.

Forages and grasses

- Majority of farmers (97%) purchased forage or grass.

- Forage legumes and crop straws, such as rice and maize straw, are not widely used by farmers with only 12% and 7%, respectively. However, this is slightly higher in Garut (19%) and more farmers use crop straws in Cianjur (25%).

Waste feeds

Dairy farmers utilise 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 include tofu waste (20%), cassava waste (21%), and wastes from vegetables (28%).

- The share of farmers using cassava waste is highest in Bandung (40%).

- 70% farmers in Bogor district use tofu waste.

Artificial insemination (AI)

- While farmers in Bandung and Garut districts receive AI as part of the Animal Health Package, as a farm input, 99% farmers in Bogor and 93% farmers in Cianjur purchase AI.

Quality of Concentrates

Concentrates are a nutrient-dense source of energy and proteins, which enable 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 were aware of the CP for the concentrates they used. The results are presented in Table 3 in the Appendix.

- **The share of farmers aware of the CP of the concentrates is highest in the Bogor district (18%) and the lowest in Garut district (1%). However, overall the level of awareness is generally low (11%).**

Of the farmers who are aware of the CP levels, the **average CP level was 14.3%,** which is below the recommended 16% to optimise dairy cow performance. This is likely to be due to the higher costs to source or produce higher quality concentrates. Lowest average CP was in Bogor district (11.9%).

- **94% of farmers who purchase concentrates source them from a co-operative.**

Summary

- **Animal Health Packages are critical inputs provided by co-operatives to farmers in Bandung and Garut districts.**

- **Artificial Insemination (AI), forages or grasses and concentrates, are the most commonly procured inputs by dairy farmers.**

- **Other key inputs include forage legumes, crop straws and waste feeds**

In the next factsheet, we will look into the aspects of milk productivity, quality and price across the districts.
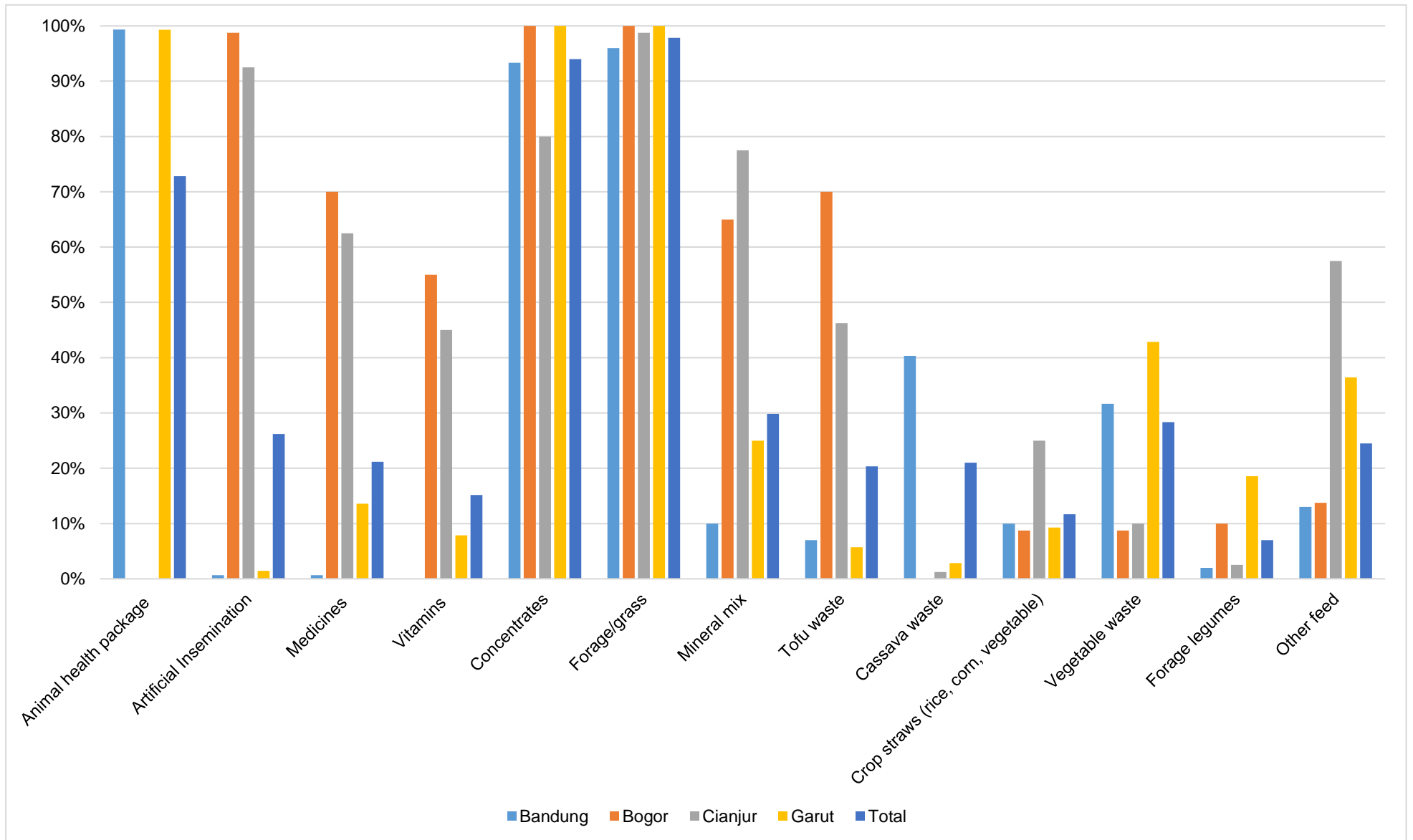
Figure 1. Distribution of input purchases across dairy farms. Note: the Animal Health Package covers dairy farming inputs such as artificial insemination, medicines, vitamins etc

Appendix to Factsheet

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

	Bandung		Bogor		Cianjur		Garut		Total	
Variable	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)										
Artificial Insemination (AI)	100.0%		0%		0%		100.0%		100.0%	
Medicine	100.0%		0%		0%		97.1%		99.1%	***
Vitamin	97.3%		0%		0%		94.2%		96.3%	
Veterinary Fees	99.0%		0%		0%		100.0%		99.3%	
Reproduction Incentive	17.8%		0%		0%		82.7%		38.4%	***

[1]Value is percentage; [2]Sig = 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 2. Usage of inputs on dairy farms accounting for inputs provided in the co-operative packages shown in Table 1 (n = 600).

Variable	Bandung Value[1]	Sig[2]	Bogor Value[1]	Sig[2]	Cianjur Value[1]	Sig[2]	Garut Value[1]	Sig[2]	Total 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%	***

[1]Value is percentage; [2]Sig = 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 3. Concentrate knowledge and sources.

Variable	Bandung Value[1]	SD[2]	Sig[3]	Bogor Value[1]	SD[2]	Sig[3]	Cianjur Value[1]	SD[2]	Sig[3]	Garut Value[1]	SD[2]	Sig[3]	Total 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):															
Cut and carry from surrounding areas for free	0.0%			0.0%			0.0%			1.4%			0.4%		***
Cooperative	99.3%			82.5%			75.0%			97.9%			93.8%		***
Inputs supplier	0.4%			5.0%			14.1%			0.7%			2.7%		***
Self-mix it	0.0%			0.0%			1.6%			0.0%			0.2%		***
Other farmers	0.0%			1.3%			3.1%			0.0%			0.5%		***
Farmer's group	0.0%			8.8%			1.6%			0.0%			1.4%		***
Other	0.4%			2.5%			4.7%			0.0%			1.1%		***

[1]Value is either percentage or mean; [2]SD = Standard Deviation; [3]Sig = 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).