Factsheet 7: Milk Productivity, Price and Quality

Background

In the previous factsheet of the IndoDairy Smallholder Household Survey (ISHS) "*Farm-to-Fact*" series, dairy farm labour used by dairy farmers in West Java was evaluated. This factsheet sheds light on milk productivity, price and quality aspects including comparisons across the four districts: Bogor, Cianjur, Bandung and Garut.

Milk production

During the ISHS, farmers were asked about different measures of milk production for their farm, including average farm production, per individual cow, differences between wet and dry season. These figures were then used to estimate different measures of productivity and efficiency for farmers in the study. Detailed statistics are presented in Table A2 in the Appendix.

Total farm milk production

Total farm milk production per day is illustrated in Figure 1 by districts, including comparisons to milk produced per cow.

- **On average, total farm milk production was 39 litres per day.** Total farm milk production per day significantly differed across districts.

- **Farmers in Bogor were producing the highest amount of milk with 51 litres per day.**

- Farmers in Garut district produced the lowest amount of milk per day at around 26 litres, which was half of what farmers in Bogor were producing.

Milk production per cow per day

- **The average milk production per cow per day was 15 litres.** As with total farm production, milk production per cow per day was significantly different between districts.

- **Farmers in Bandung produced the highest amount of milk per cow per day with, on average, 15 litres.** Farmers in Cianjur produced significantly less milk per cow (14 litres).

When comparing milk production at the farm and cow level, as shown in Figure 2, there was no clear pattern across the districts. On the one hand, farmers in Garut were producing the least amount of milk per farm (26 litres) but were producing above average per cow (15 litres). Compared to this, farmers in Cianjur were producing above average at the farm-level (43 litres) but were the least productive per cow (14 litres) between the districts.

Total farm milk production is determined by milk production per cow and the size of the milking herd (presented in Factsheet 3) and would help explain these differences. A later factsheet will evaluate dairy profitability, including how milk productivity and herd size affect profit margins.

Milk produced per lactation

A key measure of a dairy cows' productivity is how much milk is produced in one lactation. Many aspects, including breed, age, parity (number of pregnancies) and nutrition, can affect this. Milk produced per lactation was estimated using a 300-day lactation period.

- With an average of 15 litre per cow per day, **it was estimated a cow will produce 4,426 litres per lactation.**

- When comparing districts, 15 litres per day in Bandung translated to around 4,535 per lactation, while, 14 litres in Cianjur translated to around 4,048. This means, **farmers in Bandung, on average, were producing approximately 500 litres more than Cianjur in one lactation.**

Milk produced per labour unit

Milk production per labour unit is an efficiency measure that is based on the amount of milk one person can support in a year. This is based on how much milk produced by a farm in one year and how much hired and family labour is currently utilised.

- **On average, milk produced per labour unit was 10,329 litres per year.**

- Farmers in Garut district were producing the least amount of milk per labour unit with, on average, 7,953 litres per labour unit per year.

- Farmers in Bogor district were producing significantly more milk 13,975 litres per labour unit per year; approximately 50% more milk than farmers in Garut district did.

- Farmers in Bandung and Cianjur district showed somewhat similar production levels with amount of milk per time spent on dairy farming, with farmers in Bandung producing

10,320 litres and farmers in Cianjur producing 10,872 litres in a year.

Milk produced per hectare per year

Milk produced per hectare evaluates the efficiency of production based on the land area used for dairy farming practices. Detailed land area statistics are presented in Factsheet 3.

On average, the area of land used per farm for dairy farming practices (i.e. for grazing cattle or growing fodder crops) was 0.22ha. When the total milk produced by a farm per year was considered by this land area, **it was estimated that a farm would produce 1,210,000 litres per hectare per year.**

- The average land area used for dairy farming practices was highest in Bogor district (0.33ha). However, the farmers in Bogor district were producing less milk as a proportion of their dairy land use compared to the other districts. This translated to approximately 759,000 litres per hectare per year.

- Farmers in Bandung (0.17ha), Garut (0.22ha), who managed less land, were able to produce more milk from land area utilised: 1,349,000 litre per hectare per year in Bandung and 1,363,000 in Garut district. This was almost double that of farmers in Bogor district.

Despite variations in dairy land area used and large differences in milk produced per hectare between districts, **there was no significant differences between districts in milk produced per hectare per year**. This is likely due to high variations between farms within in a district, which is seen by the large standard deviation (see Table A2 in the Appendix).

Seasonal difference in milk production

- **Overall, 76% of farmers reported a seasonal difference in daily milk production.**

- This varied between districts. A higher proportion of farmers reported a difference between seasons in Bandung (82%) and Garut (78%) compared to Bogor (54%).
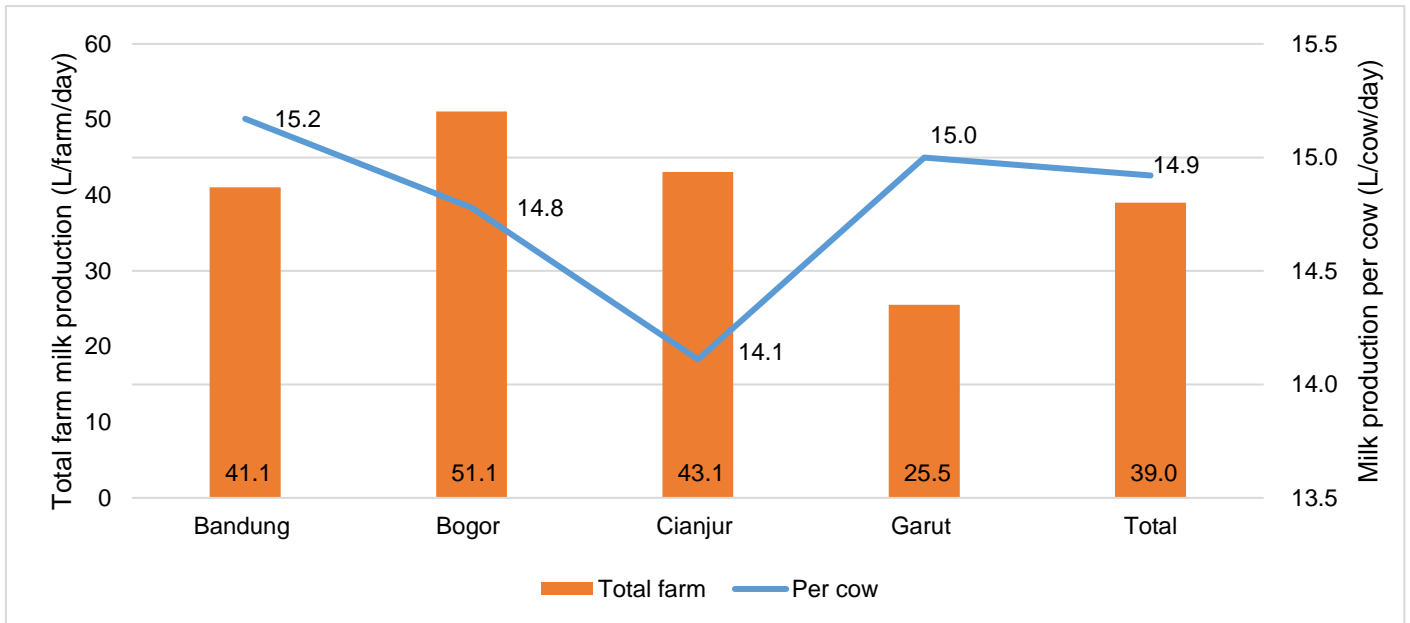
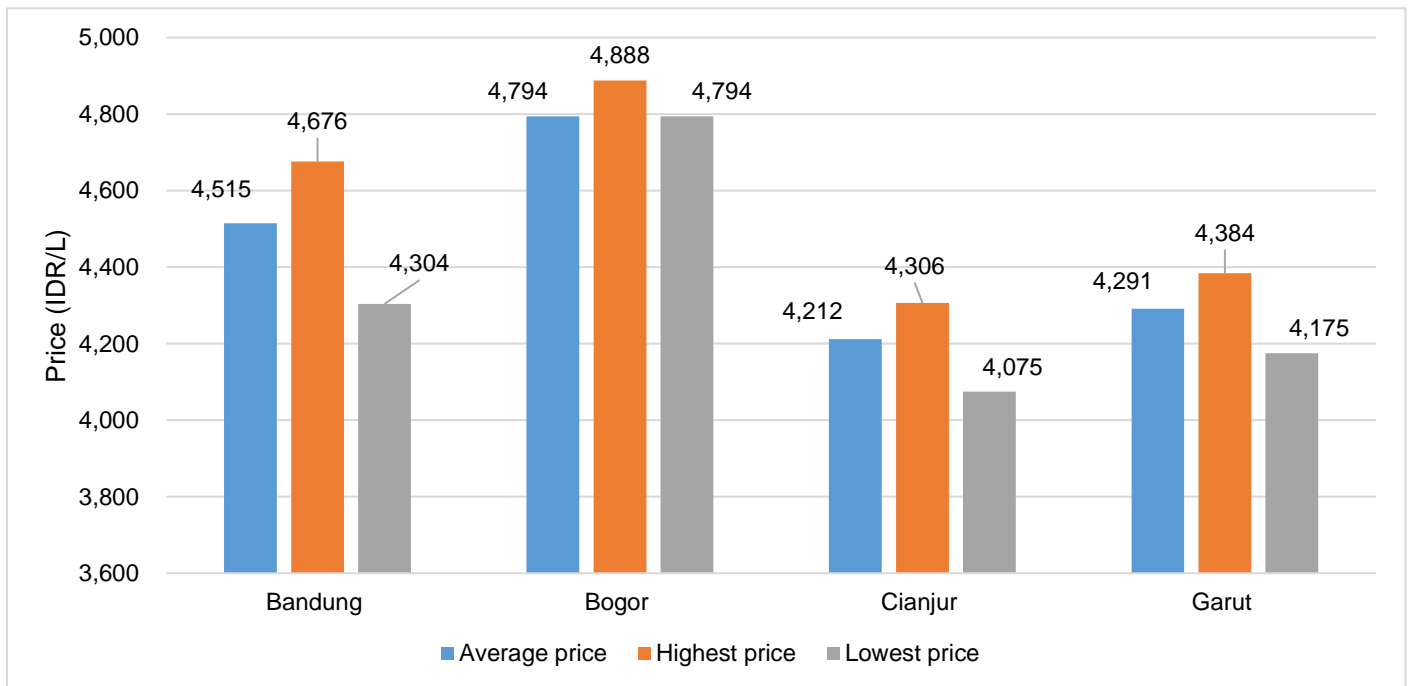**Figure 1.** Comparison of total farm and per cow milk production by district.

Figure 2. Farm-gate milk price across districts.

- This could be a result of differences in altitude and climatic characteristics of each district.

Farmers were then asked the average daily milk production between seasons.

- **On average farmers reported producing approximately four litres more per day in the wet season.**

- Farmers in Garut reported, on average, 26 litres in both seasons.

The differences in seasonal production could be explained by the availability of forages between seasons.

Milk price

Detailed milk price statistics and agreements with milk buyers are presented in Table A4 in the Appendix.

Milk price

Farmers were asked what the average, highest and lowest milk price they received per litre of milk.

- Overall, farmers reported **the average price received for fresh milk was IDR 4,458.7 (US 30.8 cents) per litre.**

- On average, the highest price received was IDR 4,586.1 (USD 31.7 cents) per litre, while the lowest price was IDR 4,308.0 (US 29.8 cents).

- Milk price was significantly different across the districts, with farmers from Bogor district receiving the highest amount (IDR 4,793.7 or US 33.2 cents per litre).

- There is a consistent trend for the highest, lowest and average price received across the districts (illustrated in Figure 2).

- Farmers from Cianjur district received the lowest milk price across the four districts at IDR 4,212 (US 39.1 cents) per litre.

Arrangement with buyers

Form of contract with buyers

Farmers were asked about the agreements they had with their main buyer, such as written or verbal contracts.

- **Majority (80%) of the farmers across the four districts reported that they did not have any form of contract**, either verbal or written, with the buyers of milk.

- The highest proportion of verbal contracts was observed in Cianjur district (18%), while the highest proportion of written contracts was observed in Bandung district (9%).

Milk delivery

Farmers were asked how their milk reached its next destination along the chain, such as dairy co-operatives, and milk processors or direct to consumers.

- Overall, 91% of farmers reported they delivered milk directly to their dairy co-operative or milk collection point (MCP).

- However, this was lower in Bogor (76%) and Cianjur (70%). In these districts, a higher proportion of farmers reported their milk was picked up by their co-operatives (15% and 29%, respectively).

Processing of milk on farm

Farmers were asked what milk processing occurred prior to it being delivered/picked up from their farm.

- **Overall, 98% of farmers filtered their milk on-farm** (to remove any physical contaminants) but did not cool the milk.

- Only 0.2% of farmers filtered and cooled the milk on farm.

- 2% of farmers reported they did not process the milk on farm.

- There was no significant difference between districts.

Farmers' awareness of milk quality determining price

Farmers were asked if the milk price they received was determined by milk quality parameters and, if so, which factors were the most important determinants.

- While **most farmers' reported milk price was determined by quality (85%),** the proportion was highest in Bandung and Garut districts (99%).

- The lowest proportion was reported in Bogor district (13%) where in fact, farmers received the highest average price for milk.

- Of the farmers who reported milk quality determined price, fat content (40%), total plate count (TPC, a measure of bacterial contamination) (39%) and absence of adulterants (32%) were reported as the most important quality factors.

- However, this was highly variable between districts and reflective of the pricing structures of the dairy co-operatives and milk processors. Table A1 in the Appendix summarises what farmers perceived as the three most important milk quality parameters by district.

It is interesting to note the overall percentage for any individual parameter was by no means high, with the exception to total solids (TS) in Cianjur (73%). This suggests that farmers were not fully aware of how milk quality parameters may affect the milk price they received. This is explored in the next section, where farmers' knowledge of milk quality parameters is reported.

Farmers' knowledge of milk quality parameters

Farmers were asked about their knowledge and awareness related to a number of factors related to milk quality, including their understanding of the concept; if they knew the measurement for their milk; and either, what the average was for their farm or why they could not find out the measurement. Table A5 in the Appendix summarises the responses.

- **Farmers' knowledge of their own milk quality measurements or the understanding of the concepts was generally low.**

- There were significant differences between farmers' knowledge of milk quality parameters across the four districts.

- Figure 3 summarises the proportion of farmers who knew what the milk quality parameters were (conceptually) and their knowledge of the measurement for their milk.

- **Less than 50% of farmers understood what total solids, milk density and somatic cell counts were conceptually** (represented by the blue bars in Figure 3). More farmers understood what fat content
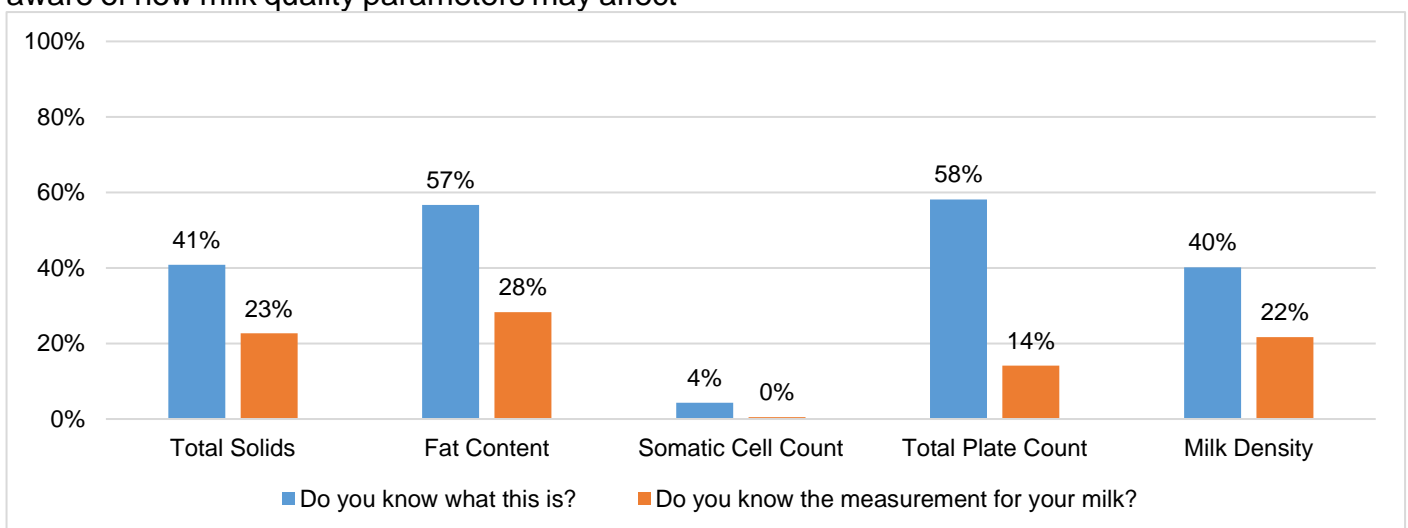

Figure 3. Farmers' knowledge of milk quality parameters.

and total plate counts (TPC) were (57% and 58%, respectively).

- **When asked about their knowledge of the measurement for their milk, less than 30% of all farmers knew the measurement for any milk quality parameter** (represented by the orange bars in Figure 3).

- For instance, of all the farmers who understood the concept of fat content (57%), only half of these (about 28%) knew the measurement of fat content for the milk they produced.

- Additionally, of all the farmers who understood the concept of TPC (58%), less than a quarter of these (24%) were aware of the TPC measurement of their milk.

Many dairy co-operatives have milk-testing equipment; however, this is used primarily to test groups of farmers and many farmers are not told what their individual results are. This is reflected across the results from ISHS. Figures 4 to 8 illustrate the understanding of each milk quality parameters by district.

- Understanding of total solids (TS) was highest in Cianjur (81%) and lowest in Garut (12%) (Figure 4).

- Understanding of fat content was fairly consistent across the districts, between 47% in Garut and 73% in Bogor. However, there was a considerable range of farmers who knew their own measurement; from 8% in Cianjur and 42% in Bandung (Figure 5).

- Understanding of somatic cell counts (SCC) (an indicator of mastitis) was very low across all districts, with less than 10% of farmers in any district aware of this quality factor (Figure 6).

- Total plate counts (TPC) was understood by a majority of farmers in Bogor (70%), Bandung (64%), and Cianjur (58%). However, very few farmers knew their own measurement, with highest in Bandung (22%). Despite the highest proportion of farmers understanding TPC being in Bogor, only 14% of farmers knew their measure;

meaning 56% of farmers knew about TPC but did not have access to their measurements (Figure 7).

- Milk density was understood by fewer farmers in Bandung (20%) compared to the other districts which ranged between 49% in Garut and 75% in Bogor. This was likely reflective of the determinants of milk prices (mentioned above), where milk density was not reported as a highly important factor of milk price (Figure 8).

Farmers were further asked about why, if they understood what the milk quality factor was, they did not know the measurement for their milk. These responses are summarised in Table A4 in the Appendix.

- Farmers either responded: they did not have the equipment to measure it themselves; it was measured by the co-operative but they were not told their measurement; or that it was not measured by the co-operative.

- **More than two-thirds of farmers reported the reason they did not know their measurement for any milk quality factors, was because they had not been told about their measurement, despite it being measured.**

To address these issues the following steps need to be taken:

1. Extension and training of farmers needs to occur to build up their understanding of what this quality factors are and why they are important

2. Investments in milk testing equipment that is able to test milk of individual farmers.

Summary

This factsheet summarises the major findings regarding the milk productivity, price, and quality from the IndoDairy Smallholder Household Survey (ISHS).

- **On average, total farm milk production was 39 litres per day.**

- **Farmers in Bogor were producing the highest amount of milk with 51 litres per day.**

- **The average milk production per cow per day was 15 litres.**

- **Farmers in Bandung produced the highest amount of milk per cow per day with, on average, 15 litres.**

- **On average, milk produced per labour unit was 10,329 litres per year.**

- **Overall, 76% of farmers reported a seasonal difference in daily milk production.**

- **Overall, farmers reported the average price received for fresh milk was IDR 4,458.7 (US 30.8 cents) per litre.**

- **Majority (80%) of the farmers across the four districts reported that they did not have any form of contract, either verbal or written, with the buyers of milk.**

- **Farmers' knowledge of their own milk quality measurements or the understanding of the concepts was generally low.**

- **When asked about their knowledge of the measurement for their milk, less than 30% of all farmers knew the measurement for any milk quality parameter.**

- **More than two-thirds of farmers reported the reason they did not know their measurement for any milk quality factors, was because they had not been told about their measurement, despite it being measured.**

In the next factsheet, Factsheet 8, costs, revenue and profit will be analysed across the four districts.
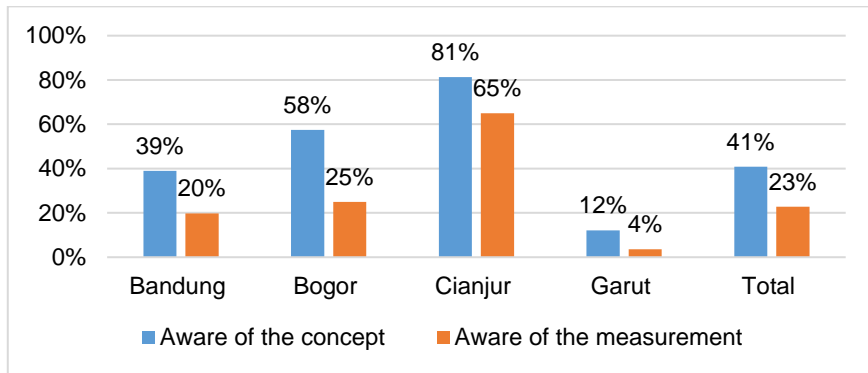
Figure 4. Farmer knowledge about _total solids (TS)_ by district.
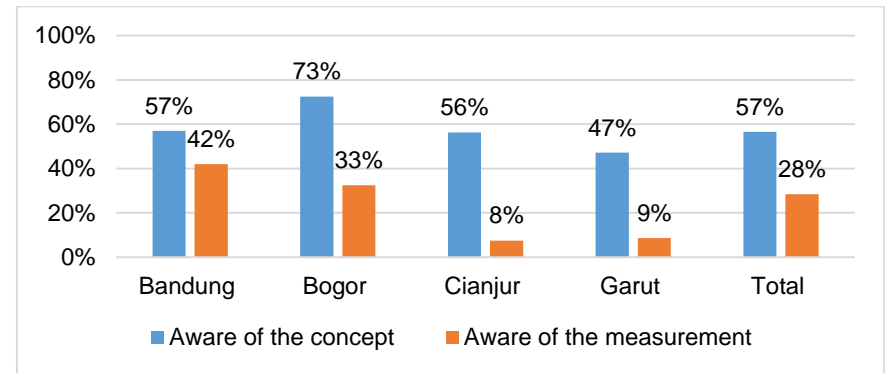
Figure 5. Farmer knowledge about _fat content_ by district.
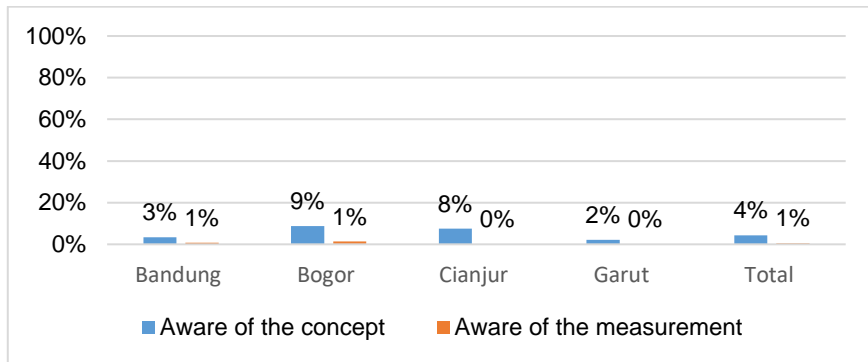
Figure 6. Farmer knowledge about _somatic cell count (SCC)_ by district.
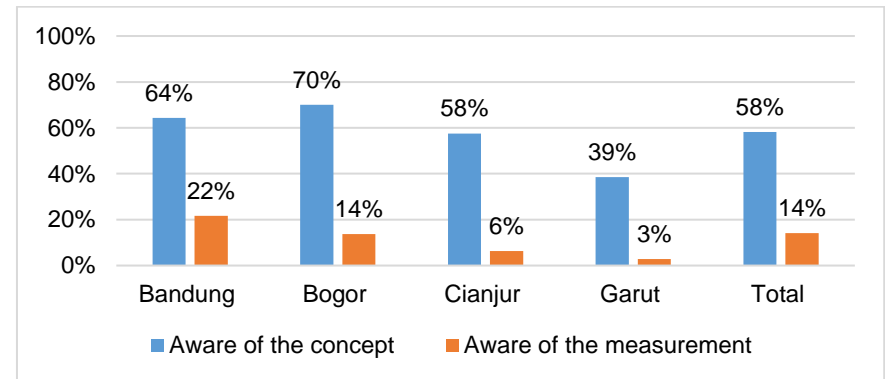
Figure 7. Farmer knowledge about _total plate count (TPC)_ by district.
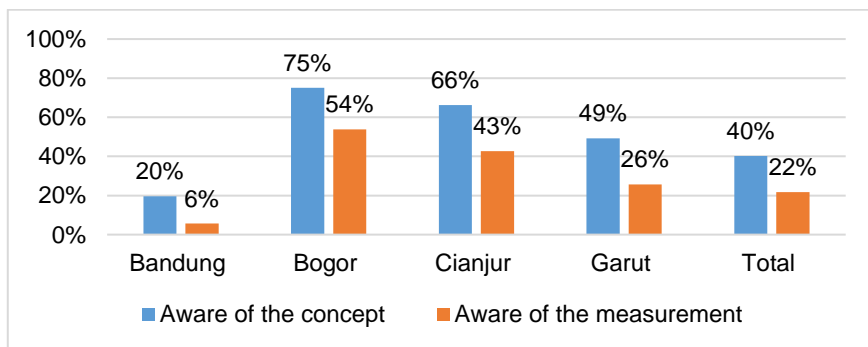
Figure 8. Farmer knowledge about _milk density_ by district.

Appendix to Factsheet 7

This appendix provides summary statistics for milk production, price and knowledge of milk quality for the entire sample grouped by districts. Standard deviations (SD) are included where relevant.

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 < 0.10). Districts with the same letter are not significantly different at the 5% level (p > 0.05).

Table A1. Summary of the three most reported milk quality factors by district.

	Bandung	Bogor	Cianjur	Garut	Total
Most important milk quality factors:					
Highest reported	TPC (51.5%)	TPC (50.0%)	TS (73.3%)	Milk density (47.4%)	Fat content (40.2%)
2nd highest reported	Fat content (44.1%)	Milk density (50.0%)	Milk density (53.3%)	Fat content (43.0%)	TPC (39.0%)
3rd highest reported	Adulterants (32.2%)	Adulterants (30.0%)	TPC (26.7%)	Adulterants (37.0%)	Adulterants (31.7%)

Percentage of farmers are displayed in brackets TPC = total plate count; TS = total solids; Adulterants refers to the absence of adulterants in milk (e.g. added water).

Table A2. Milk production statistics by districts (n = 600).

Variable	Bandung Value[1]	Bandung SD[2]	Bandung Sig[3]	Bogor Value[1]	Bogor SD[2]	Bogor Sig[3]	Cianjur Value[1]	Cianjur SD[2]	Cianjur Sig[3]	Garut Value[1]	Garut SD[2]	Garut Sig[3]	Total Value[1]	Total SD[2]	Total Sig[3]
Milk Production (n=600):															
Total farm (L/day)	41.05	31.03	a	51.05	56.48	a	43.09	40.00	a	25.50	16.50		39.02	35.24	***
Per cow (L/cow/day)	15.17	4.59	b	14.78	4.75	ab	14.11	4.95	a	15.00	3.89	ab	14.92	4.59	**
Per lactation (thousand L/cow/lactation)	4.53	1.13	b	4.28	1.19	ab	4.04	1.21	a	4.48	1.14	b	4.42	1.16	***
Per labour unit (thousand L/person/year)	10.32	5.54	a	13.97	12.59		10.87	8.20	a	7.95	4.82		10.32	7.32	***
Per land area (hundred thousand L/ha/year) (n=534)	13.49	25.37		7.58	15.30		9.61	12.42		13.62	25.69		12.12	22.87	
Is there any seasonal difference in milk production? (n=596)	81.9%		b	54.4%		a	69.6%		ab	77.7%		b	75.7%		***
Seasonal milk production (n=451)															
Dry season (L/day)	39.10	29.07	a	55.91	55.72	c	39.62	38.41	abc	26.19	16.57	a	37.67	32.48	***
Wet season (L/day)	43.70	31.22	a	59.40	54.55	b	43.81	42.98	abc	26.19	16.18		41.02	34.35	***

[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. Pairwise comparisons were performed for continuous and binary variables using Tukey tests when the ANOVA test was trending towards significant (p < 0.10). Districts with the same letter are not significantly different at the 5% level (p > 0.05).

Table A3. Milk prices by districts (n = 600).

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]
Milk Prices (IDR/L)															
Average	4,514.7	230.8		4,793.7	584.0		4,212.1	577.1	a	4,290.9	163.2	a	4,458.7	390.4	***
Highest	4,675.8	252.1		4,888.0	997.3		4,305.6	564.0	a	4,383.7	183.8	a	4,586.1	497.6	***
Lowest	4,304.4	300.3		4,793.7	584.0		4,075.3	407.7	a	4,174.7	228.8	a	4,308.0	407.8	***
Milk Prices (USD cents/L)[4]															
Average	31.22	1.59		33.15	4.03		29.13	3.99	a	29.68	1.12	a	30.84	2.70	***
Highest	32.34	1.74		33.80	6.89		29.78	3.90	a	30.32	1.27	a	31.72	3.44	***
Lowest	29.77	2.07		33.15	4.03		28.18	2.80	a	28.87	1.58	a	29.79	2.82	***

[1]Value is mean; [2]SD = Standard Deviation; [3]Sig = Significance; [4]Exchange rate 1 USD = 14,459.50 Indonesian Rupiah on 27 July 2018* $p < 0.10$, ** $p < 0.05$ 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 ($p < 0.10$). Districts with the same letter are not significantly different at the 5% level ($p > 0.05$).

Table A4. Arrangements between farmers and milk buyers by district (n = 600).

	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]
Form of contract with buyers (n = 599)										
None	75.0%		93.7%		75.0%		87.1%		80.3%	***
Written Contract	9.3%		0.0%		7.5%		0.7%		5.8%	***
Verbal Contract	15.7%		6.3%		17.5%		12.1%		13.9%	***
How is the milk delivered? (n = 600)										
Delivered to end-buyer location	2.0%		5.0%		0.0%		2.1%		2.2%	***
Delivered to co-operative/milk collection point	97.3%		76.3%		70.0%		96.4%		90.7%	***
Picked up by cooperative	0.7%		15.0%		28.8%		1.4%		6.5%	***
Picked up by the buyer	0.0%		3.8%		1.3%		0.0%		0.7%	***
Milk processing on-farm (n = 600)										
Filtering	97.7%		98.8%		100.0%		98.6%		98.3%	
Filtering <u>and</u> cool down	0.0%		1.3%		0.0%		0.0%		0.2%	
None	2.3%		0.0%		0.0%		1.4%		1.5%	
Milk priced determined milk quality (n=598)	99.0%	a	12.7%		96.2%	a	99.3%	a	87.1%	***
Most important quality factors for the buyer (n = 515)										
Total solids (TS)	30.8%	b	10.0%	ab	73.3%		9.6%	a	31.1%	***
Total plate count (TPC)	51.5%	b	50.0%	ab	26.7%	a	17.8%	a	39.0%	***
Fat content	44.1%	b	20.0%	ab	22.7%	a	43.0%	b	40.2%	***
Protein content	2.4%		0.0%		2.7%		2.2%		2.3%	
Milk density	3.1%		50.0%	a	53.3%	a	47.4%	a	22.9%	***
Absence of adulterants	32.2%	a	30.0%	a	20.0%	a	37.0%	a	31.7%	*
Body condition	11.9%	b	0.0%	ab	1.3%	a	11.9%	ab	10.1%	**
Genetic quality	0.3%		0.0%		0.0%		0.0%		0.2%	
Liquid content of milk / watery	15.6%	a	0.0%	a	9.3%	a	8.1%	a	12.4%	*
Other	13.2%	b	0.0%	ab	2.7%	a	8.9%	ab	10.3%	**

[1]Value is percentage. [2]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 ($p < 0.10$). Districts with the same letter are not significantly different at the 5% level ($p > 0.05$).

Table A5. Farmer knowledge about factors that influence milk quality (n = 600).

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]
Total solids (TS)															
Do you know what this is?	39.0%			57.5%			81.3%			12.1%			40.8%		***
Do you know the measurement for you milk? (n = 245)	50.4%		a	43.5%		a	80.0%			29.4%		a	56%		***
What is the measurement (%) (n = 136)	12.0	1.1	a	11.7	0.7	a	11.7	0.3	a	10.0	3.3		11.8	1.1	***
Why don't you know the measurement (n = 109)															
I cannot measure it	39.7%			19.2%			15.4%			25.0%			30.3%		
I have not been told what the measurement is	58.6%			76.9%			84.6%			75.0%			67.9%		
Not measured by cooperative	1.7%			3.9%			0.0%			0.0%			1.8%		
Fat content															
Do you know what this is?	57.0%		ab	72.5%		b	56.3%		ab	47.1%		a	56.7%		***
Do you know the measurement for you milk? (n = 340)	73.7%			44.8%			13.3%		a	18.2%		a	50.0%		***
What is the measurement (%) (n = 170)	4.3	2.0		4.4	2.5		5.0	3.0		4.8	3.8		4.4		
Why don't you know the measurement (n = 170)															
I cannot measure it	60.0%			28.1%			10.3%			14.8%			28.2%		***
I have not been told what the measurement is	40.0%			68.8%			87.2%			85.2%			70.6%		***
Not measured by cooperative	0.0%			3.1%			2.6%			0.0%			1.2%		***
Somatic Cell Count (SCC)															
Do you know what this is?	3.3%		a	8.8%		a	7.5%		a	2.1%		a	4.3%		**
Do you know the measurement for you milk? (n = 26)	20.0%			14.3%			0.0%			0%			11.5%		
What is the measurement (cells/mL) (n = 3)	261.5	365.6		12.0	.								178.3	295.9	
Why don't you know the measurement (n = 23)															
I cannot measure it	37.5%			0.0%			0.0%			0.0%			13.0%		*
I have not been told what the measurement is	62.5%			100.0%			100.0%			100.0%			87.0%		*

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]
Total plate count (TPC)															
Do you know what this is?	64.3%		a	70.0%		a	57.5%		a	38.6%			58.2%		***
Do you know the measurement for you milk? (n = 349)	33.7%		a	19.6%		ab	10.9%		a	7.4%		a	24.4%		***
What is the measurement (million cfu/mL) (n = 85)	0.48	0.49	a	3.18	2.47	b	1.14	0.48	a	4.5	3.1	b	1.06	1.63	***
Why don't you know the measurement (n = 264)															
I cannot measure it	39.8%			13.3%			12.2%			14.0%			26.1%		***
I have not been told what the measurement is	59.4%			77.8%			82.9%			86.0%			71.2%		***
Not measured by cooperative	0.8%			8.9%			4.9%			0.0%			2.7%		***
Milk density															
Do you know what this is?	19.7%			75.0%		a	66.3%		a	49.3%			40.2%		***
Do you know the measurement for you milk? (n = 241)	28.8%			71.7%		a	64.2%		a	52.2%		a	53.9%		***
What is the measurement (kg/L) (n = 130)	1.0	0.0	b	1.0	0.0	ab	1.0	0.0	a	1.0	0.0	ab	1.0	0.0	*
Why don't you know the measurement (n = 111)															
I cannot measure it	28.6%			11.8%			15.8%			15.2%			19.8%		
I have not been told what the measurement is	69.1%			82.4%			79.0%			84.9%			77.5%		
Not measured by cooperative	2.4%			5.9%			5.3%			0.0%			2.7%		

Note: Farmers were asked their knowledge and awareness related to a number of factors related to milk quality, including their understanding of the concept; if they know the measurement for their farm; and either, what the average is for their farm or why they cannot find out the measurement.
[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. Pairwise comparisons were performed for continuous and binary variables using Tukey tests when the ANOVA test was trending towards significant ($p < 0.10$). Districts with the same letter are not significantly different at the 5% level ($p > 0.05$).