



## Factsheet 10: Farmers' Attitudes, Perceptions of Change and Future Aspirations

### Background

This factsheet provides an overview of the perceptions of change, risk and expectations for the future by dairy farmers in West Java. This information builds upon Factsheet 3 and 4, which summarises household, farm and individual animal characteristics of the IndoDairy Smallholder Household Survey (ISHS).

This information provides a base to understand farmers' attitudes towards dairy farming, how they perceived risks towards changing their practices and their intentions with respect to expanding their dairy business or exiting dairy altogether.

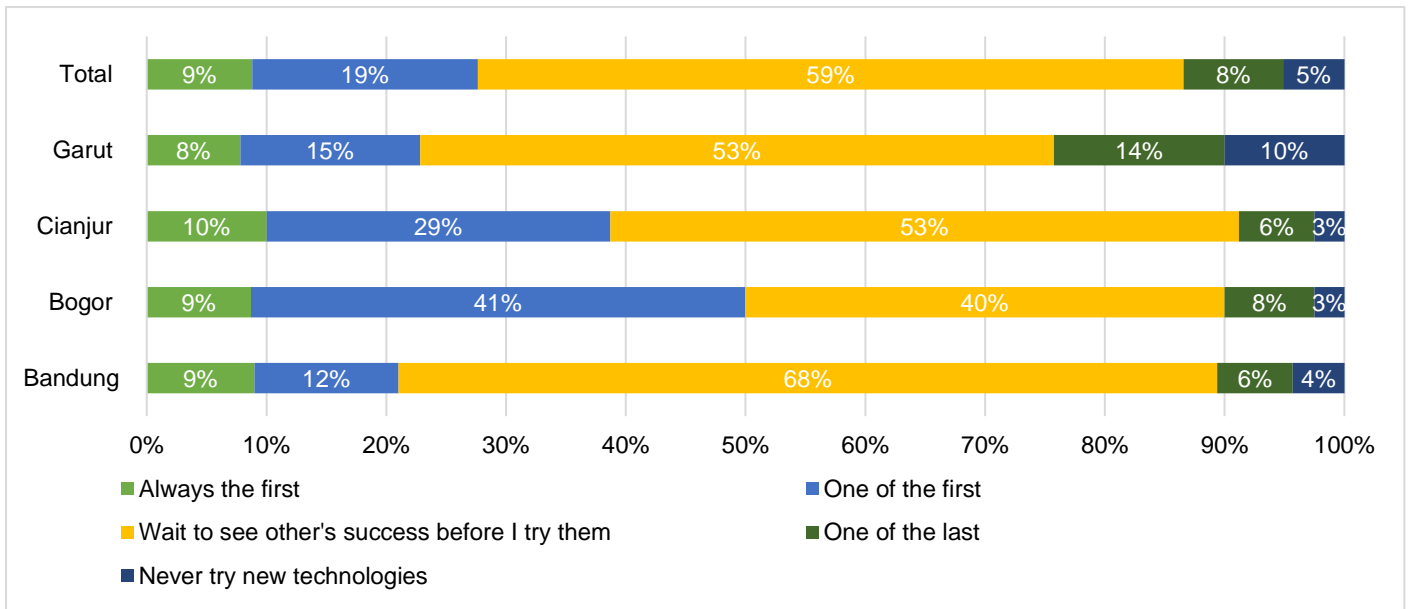
Dairy farmers' perceptions of changes provide insight into what factors were leading to changes in availability, quality, and prices of inputs and services. This provides us with a better understanding of potential areas where interventions such as extension programs could have a significant positive impact.

### Attitudes towards adopting new technology and practices

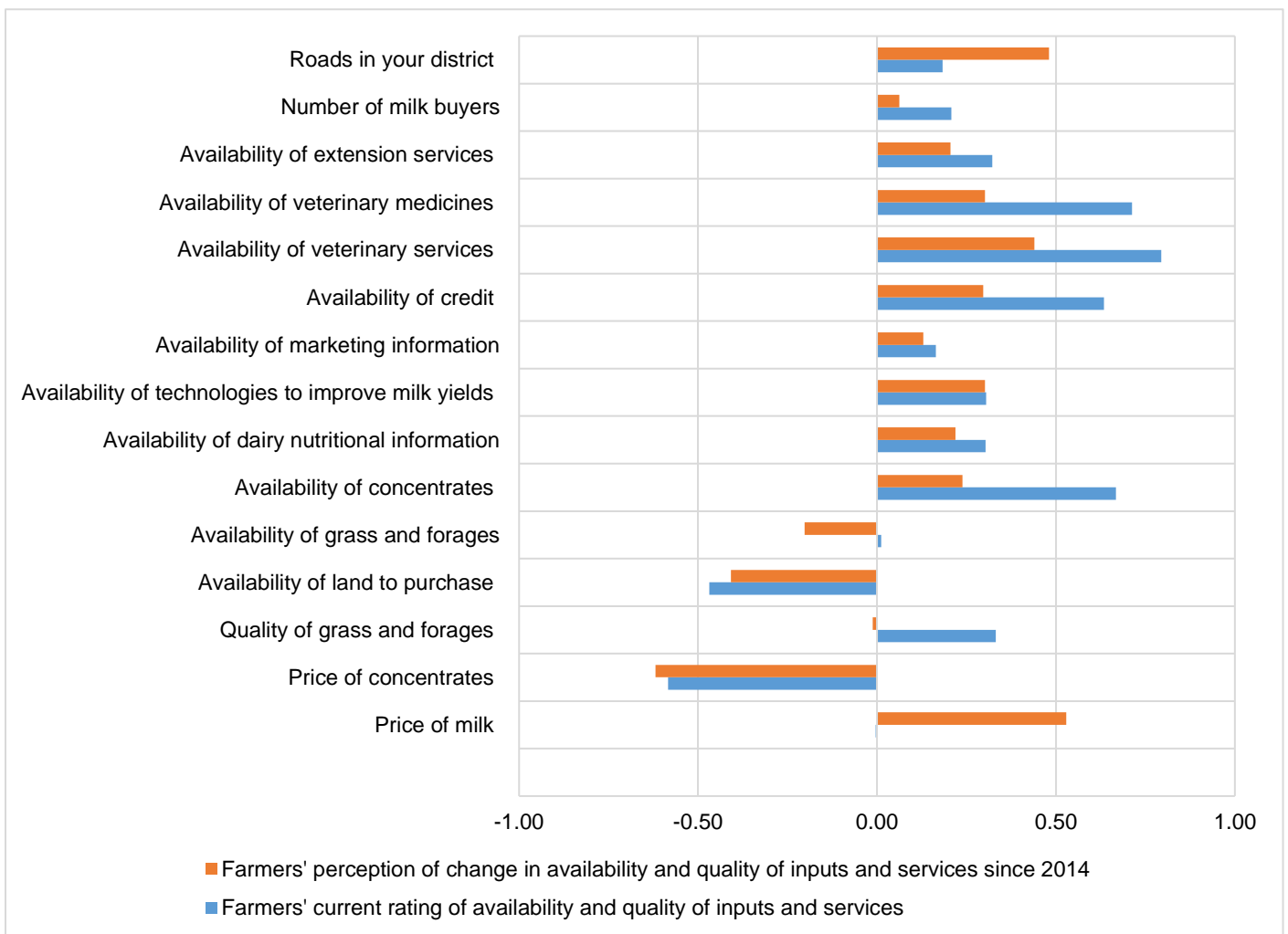
In the ISHS, the dairy farmers were asked what their attitudes were towards trying new technologies, management practices and production methods. A summary of their

responses is displayed in Figure 1 and Table A1 in the Appendix.

- **The majority of the farmers (59%) indicated that they normally waited to see others' success before trying new technologies, management practices and production methods.**
- Roughly 28% of farmers indicated that they were 'early adopters' (always or one of the first to adopt) of new technologies and practices. In Bogor district, a much higher share of farmers, nearly 50% considered themselves to be early adopters.
- Farmers in Garut and Bandung had the lowest proportion of farmers identifying as 'early adopters' (21% and 23%, respectively). Additionally, Garut had the highest number of late (14%) and non-adopters (10%) compared to the total sample population (8% and 5%, respectively).



**Figure 1.** Farmers' attitudes towards adoption of new technologies, management practices and production methods grouped by district.



**Figure 2.** Farmers' current rating and perception of change (since 2014) in prices and the availability and quality of inputs and services.

Dairy farmer households in Bogor are in close proximity to the developed urban centres of Bogor City and Jakarta. Thus for these farmers, better access to inputs and services, and access to different types of markets could be one reason for the higher propensity for 'early adoption'. It may also be that farmers in these districts were exposed to new technologies, management practices and production methods earlier than farmers in other districts.

### **Rating of prices, availability and quality of inputs and services**

An aim of the ISHS was to identify how farmers perceived and rated the availability, quality and prices of essential inputs and services required for dairy farming. They also indicated how things had changed since 2014, that is, three years prior to when the survey was conducted.

Farmers were asked how they would currently rate various aspects related to dairy farming, where: 1 = good, 0 = fair and -1 = poor.

Next farmers indicated how these aspects had changed since 2014, where: 1 = improved, 0 = no change and -1 = became worse (detailed summary statistics are provided in Table A2 and A3 in the Appendix).

Figure 2 illustrates how farmers rated various aspects related to their dairy business at the time of the survey, and their perception how each aspect had changed since 2014.

#### ***What was perceived to be 'good'?***

On average, dairy farmers rated the following aspects to be 'good' (i.e. the mean value in Table A2 is  $\geq 0.50$ ):

- Availability of concentrates (note: farmers in Cianjur, Bogor and Garut rated concentrates significantly lower than in Bandung);
- Availability of credit (note: farmers in Garut rated credit availability significantly higher than Bogor and Cianjur);
- Availability of veterinary services; and
- Availability of veterinary medicines.

#### ***What was perceived to be 'poor'?***

Considering the average rating, farmers reported only two of the 15 aspects to be 'poor' (i.e. mean value in Table A2 is  $< 0.00$ ):

- Price of concentrates (note: on average, farmers in the Bandung district rated the price of concentrates more positively than in other districts); and
- Availability of land to purchase (note: farmers in the Bogor district rated land availability relatively more negative than other farmers).

#### ***What was perceived to be 'fair'?***

On average, farmers gave a 'fair' rating (i.e. the mean value in Table A2 is  $\geq 0.00$  and  $< 0.50$ ) to the following:

- Price of milk (with the exception of farmers in Bogor and Cianjur who rated the price of milk as 'poor' on average; Bogor farmers' average rating was significantly lower than farmers in Bandung and Garut, and Cianjur farmers' rating was significantly lower than Bandung);
- Number of milk buyers;
- Quality and availability of grass and forages;
- Availability of dairy nutritional information (note: farmers in the Bogor district rated availability of nutritional information relatively lower);
- Availability of technologies to improve milk yield (note: on average, farmers in the Bandung district rated this more positively than farmers in Bogor and Garut);
- Availability of marketing information;
- Availability of extension services (note: on average, farmers in the Bandung district rated this more positively than farmers in other districts, and farmers in Bogor rated extension services more negatively);
- Quality of roads (note: on average farmers in Bogor rated road quality significantly higher than farmers in Bandung).

## Perceptions of changes (from 2014) in prices, availability and quality of inputs and services

Dairy farmers were also asked to indicate whether each of the fifteen factors discussed in the previous paragraphs had changed compared to 2014 (three years prior).

The summary statistics of their responses are shown in Table A3 in the Appendix.

### What had 'improved'?

- A large share of farmers in Bogor, Cianjur and Garut indicated they perceived that **milk prices had improved** since 2014 (i.e. the mean value in Table A3 is  $\geq 0.50$ ).
- Other factors like concentrate availability, dairy nutritional information, access to credit, and availability of veterinary medicines and services showed general signs of improvements in all districts.
- Availability of extension services was also perceived to have improved in Bandung, Cianjur and Garut; however, Bogor dairy farming households viewed availability of extension services as declining.
- Farmers in Bogor had a significantly more positive perception of change in the number of milk buyers as compared to Bandung, Cianjur and Garut.
- Farmers in Bogor, Cianjur and Garut perceived that roads in their district had improved as compared to 2014.

### What had 'worsened'?

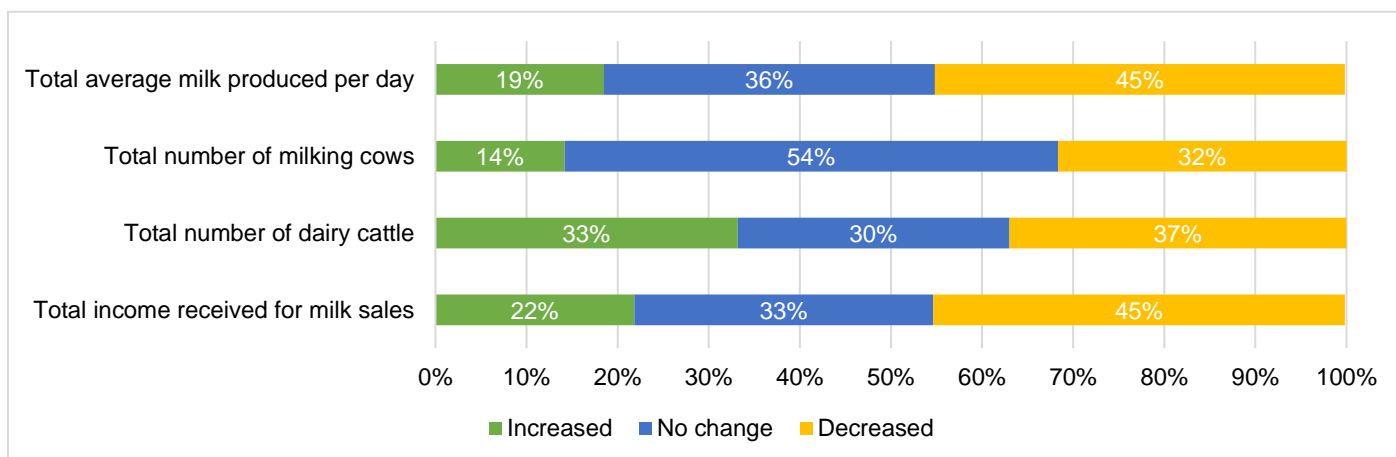
- On average, farmers indicated that price of concentrates had gotten worse (more expensive) (i.e. the mean value in Table A3 is  $< 0.00$ ).
- Farmers also indicated that the availability of land to purchase, and the availability and quality of grass and forages had declined.
- Bogor farmers indicated that the availability of extension services had declined since 2014. This is noteworthy because all other districts perceived that availability had improved.

Farmers' perception of availability of technologies had not registered much change since 2014.

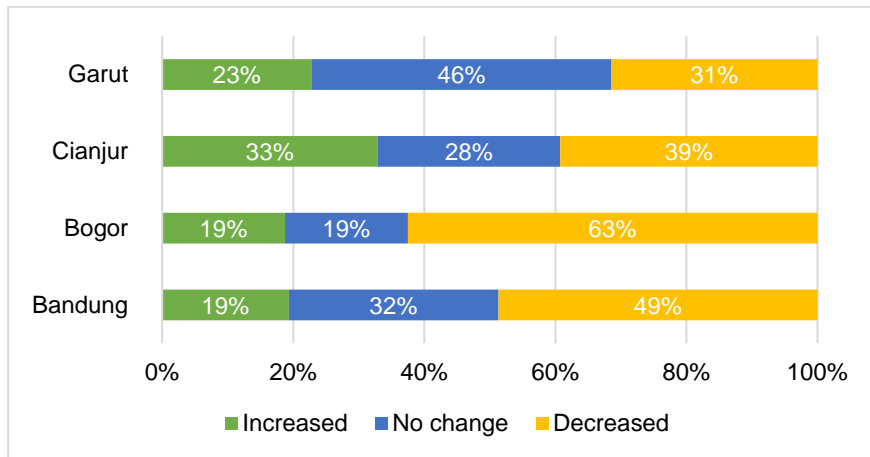
## Perceptions of changes of farming characteristics in the past 12 months

Farmers were asked to indicate their perceptions of change in farming characteristics in the past 12 months. The results of the overall sample are shown in Figure 3 and Table A4 in the Appendix. District wise results are shown in Figures 4 to 7 and in Table A5 in the Appendix.

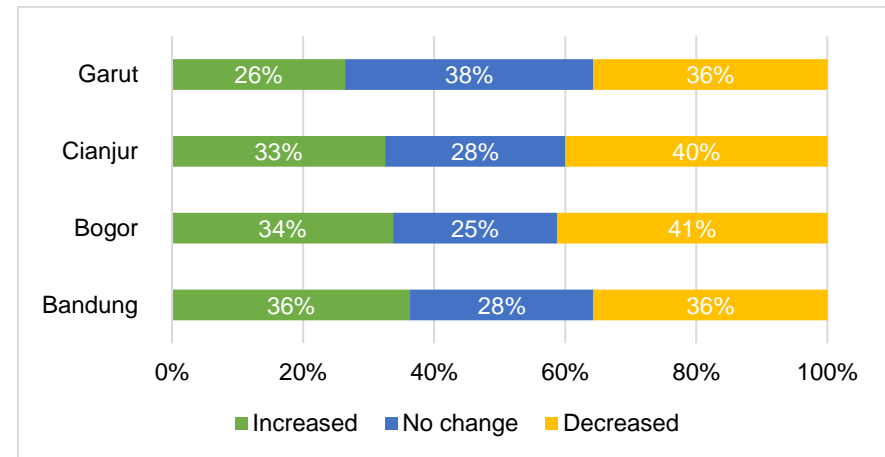
- **Overall, 45% of households indicated that total income received for milk sales decreased in the past 12 months**, while 22% indicated that milk sales increased.
- One-third of households said they had increased the number of dairy cattle, however, a large share (**37%**) indicated



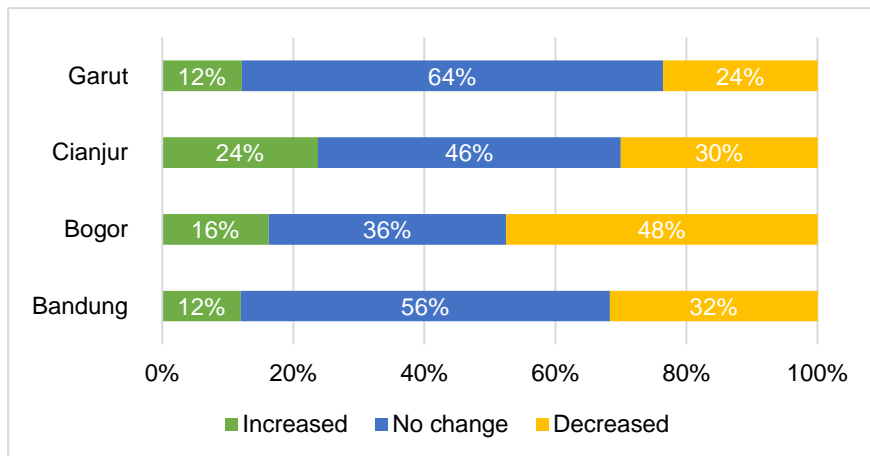
**Figure 3.** Changes in farming characteristics in the past 12 months.



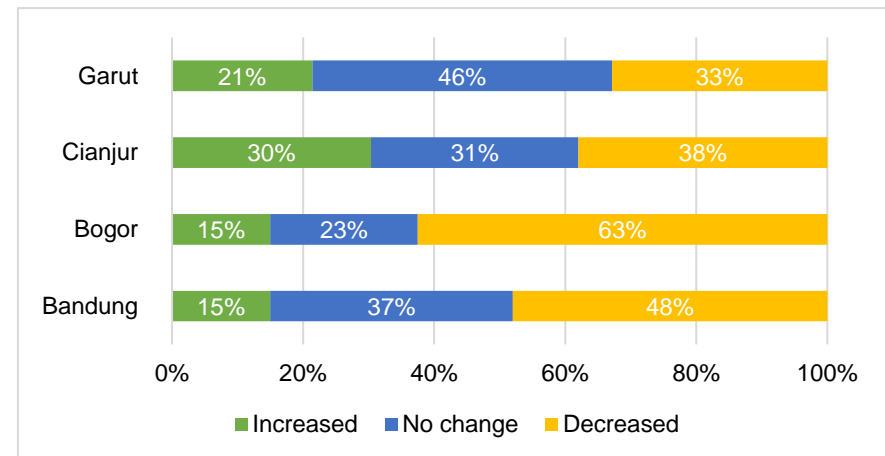
**Figure 4.** Change in total income received from milk sales in past 12 months.



**Figure 5.** Change in total number of dairy cattle in the past 12 months.



**Figure 6.** Change in total number of milking cows in the past 12 months.



**Figure 7.** Change in total average milk produced per day in the past 12 months.

**that they decreased the number of dairy cattle.**

- More than half (54%) farmers reported no change in the number of milking cows.
- Overall, **total average milk produced per day decreased for 45% households** and increased for only 19% of households.

### **Comparisons between districts**

#### Total income received from milk sales

- The share of farmers whose total income from milk sales decreased was higher in the districts of Bandung and Bogor (Figure 4).
- Farmers in Cianjur district reported the highest (33%) share of increase in total income received from milk sales (Figure 4).

#### Total number of dairy cattle

- The share of farmers who had increased the size of their dairy cattle was slightly higher in Bandung district (Figure 5).
- The highest reduction in total number of dairy cattle was in Bogor district (41%) (Figure 5).

#### Total number of milking cows

- Farmers in Bogor district reported the highest share (48%) of reduction in milking cows, followed by farmers in Bandung district (32%) (Figure 6).

- Farmers in Cianjur had the highest share (24%) of increased number of lactating cows in the past 12 months (Figure 6).

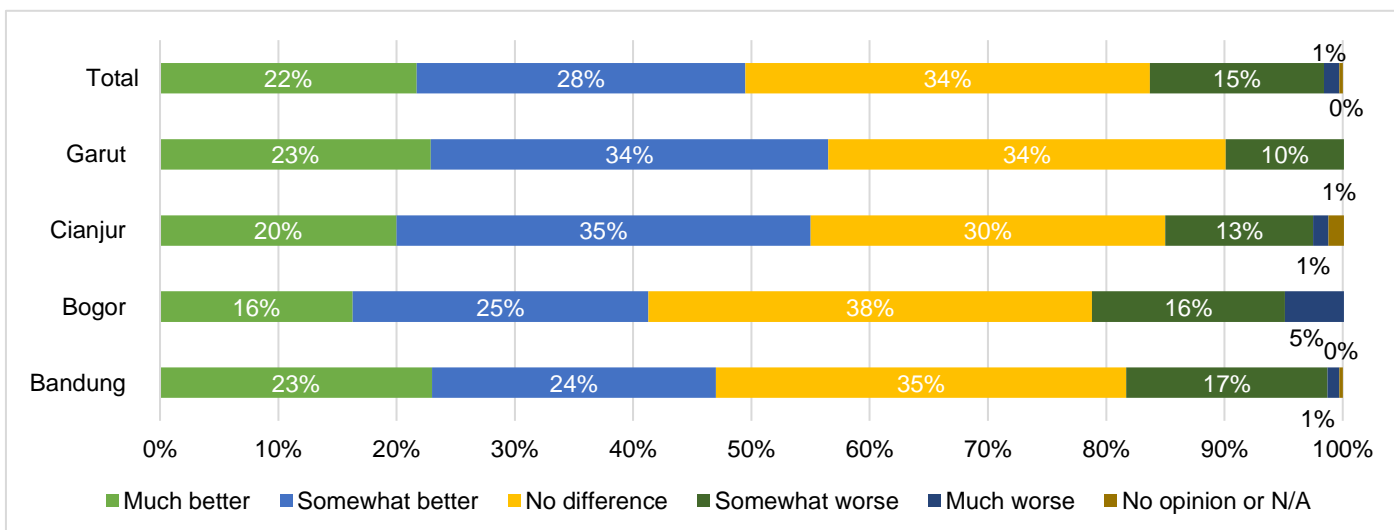
#### Total average milk produced per day

- There was noteworthy reduction in total average milk production per day in Bogor district (63%) and Bandung district (48%). (Figure 7). This is likely because there had been a reduction of lactating cows in both Bogor and Bandung districts in the past 12 months.
- In regard to labour in the dairy business, the majority of farmers indicated no change to labour (male: 97%; female: 93%, and total family labour: 76%) in the past 12 months (Figure 7).

### **Perception of change in household financial situation (compared to 2014)**

The change in household financial situation is shown in Figure 8. This provides a broad overview of changes experienced by households that have had an impact on their financial situation and perceived reasons for these changes.

- **Overall, about 50% of farmers felt their financial situation had become somewhat or much better, while 16% indicated that it had become somewhat or much worse.**



**Figure 8.** Perception of change in household financial situation (compared to 2014).



- The primary reasons indicated for changes in the household financial situation were changes in non-dairy livestock income (25%), non-farm income (21%) and changes in milk yields (20%).
- Compared to other districts, a large share of farmers (42%) in Cianjur and Bogor district indicated they experienced a change in non-dairy livestock income. In Garut, a relatively larger share of farmers (roughly 37%) indicated a change in non-farm income.

### Farmers' aspirations

The respondents were asked about their future aspirations for their dairy farming operations. The results are presented in Table A7 in the Appendix.

- **90% of farmers intend to expand their dairy farm operations.**
- In the future, farmers in Bogor district expected to have the largest herd size with about 18 head of cattle while farmers in Garut district expected their herd size to grow to about 6 head of cattle.

Despite current farm size being significantly smaller in Garut (3.1 cows) compared to Bogor (7.7) as shown in Factsheet 3, the proportional increase that farmers expect was approximately twice as much in Bogor compared to Garut.

### Training needs

In order to support the farmers with training that would help them achieve their ambitions for dairy farming, the farmers were asked to identify the areas they would like to receive training to improve dairy production practices. These results are shown in Table A8 in the Appendix.

- **Dairy farmers indicated a strong desire for training to increase their capacity in animal husbandry (33%), cattle nutrition and feed management (21%) and farm business management (18%).**
- Field practice and field training was identified as the most preferred method of training.

### Significant constraints faced by farmers

The training areas identified by farmers were further reflected in their answers when asked about significant constraints to the dairy industry from the dairy farmer's perspectives (results shown in Table A9 in the Appendix).

- **The top constraint identified by dairy farmers were adequate feed resources (27%).**
- Access to high quality animals (14%), personal knowledge limitations regarding dairy farming (9%).
- Farmers also identified a range of other constraints that include access to capital, animal health, low milk prices and issues with quality of feed (a detailed list is provided in Table A10 in the Appendix).

### Summary

- **Overall, price of concentrates and availability of land to purchase were perceived to be poor by dairy farmers.**
- **Farmers indicated that since 2014, the price of concentrates, availability of land to purchase, and the availability and quality of grass and forages had all worsened.**
- **Farmers in the Bogor district indicated a decline in availability of extension services. Farmers in Bogor district also had the highest share in reduction of lactating cows in the past 12 months, which had also led to reduction in total average milk produced.**

In addition to understanding farmers' attitudes and perceptions, it is important to understand how decisions are made among household members in order to identify strategies that would positively impact production (quality and quantity). The following factsheet, Factsheet 11, provides information on gender inclusiveness in decision making.

## **Appendix to Factsheet 10**

The tables included in this Appendix provide summary statistics related to farmers' expectations, perceptions of risk and perception of changes 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 ( $p < 0.10$ ). Districts with the same letter are not significantly different at the 5% level ( $p > 0.05$ ).



**Table A1.** Farmers' attitudes towards trying new technologies, management practices and/or production methods grouped by districts (n=600).

Variable	Bandung	Bogor	Cianjur	Garut	Total	Sig <sup>1</sup>
Attitudes towards trying new technologies new management practices and new production methods:						
<i>Always the first</i>	9.0%	8.7%	10.0%	7.8%	8.8%	***
<i>One of the first</i>	12.0%	41.2%	28.7%	15.0%	18.8%	***
<i>Wait to see other's success before I try them</i>	68.3%	40.0%	52.5%	52.8%	58.8%	***
<i>One of the last</i>	6.3%	7.5%	6.3%	14.2%	8.3%	***
<i>Never try new technologies</i>	4.3%	2.5%	2.5%	10.0%	5.1%	***

<sup>1</sup>Sig = Significance; \* p < 0.10, \*\* p < 0.05 and \*\*\* p < 0.01 indicate significance at the 10%, 5% and 1% levels, respectively.

**Table A2.** Farmers' perceptions of current situation with respect to prices and quality or availability of inputs and services (1= good, 0 = fair, -1 = poor).

Variable	Bandung			Bogor			Cianjur			Garut			Total		
	Value <sup>1</sup>	SD <sup>2</sup>	Sig <sup>3</sup>	Value <sup>1</sup>	SD <sup>2</sup>	Sig <sup>3</sup>	Value <sup>1</sup>	SD <sup>2</sup>	Sig <sup>3</sup>	Value <sup>1</sup>	SD <sup>2</sup>	Sig <sup>3</sup>	Value <sup>1</sup>	SD <sup>2</sup>	Sig <sup>3</sup>
Prices paid by buyer for milk (n=600)	0.15	0.69	c	-0.40	0.72	a	-0.21	0.67	ab	0.01	0.72	bc	0.00	0.73	***
Number of milk buyers(n=519)	0.19	0.57		0.36	0.61		0.23	0.66		0.16	0.65		0.21	0.61	NS
Price of concentrates (n=598)	-0.49	0.60		-0.68	0.50	a	-0.72	0.50	a	-0.66	0.56	a	-0.58	0.57	***
Quality of grass and forages (n=599)	0.29	0.63		0.44	0.67		0.29	0.64		0.38	0.62		0.33	0.64	NS
Availability of land to purchase (n=587)	-0.44	0.69	a	-0.71	0.58		-0.38	0.80	a	-0.44	0.76	a	-0.47	0.72	***
Availability of grass and forages(n=599)	-0.01	0.80		-0.01	0.77		0.04	0.77		0.05	0.79		0.01	0.79	NS
Availability of concentrates (n=599)	0.70	0.48		0.65	0.55		0.71	0.48		0.58	0.59		0.67	0.52	NS
Availability of dairy nutritional information (n=557)	0.40	0.57	a	0.01	0.72	b	0.22	0.65	ab	0.31	0.62	a	0.30	0.63	***
Availability of technologies to improve milk yields (n=573)	0.41	0.63	a	0.11	0.71	b	0.26	0.69	ab	0.23	0.61	b	0.31	0.66	***
Availability of marketing information (n=546)	0.21	0.63	a	0.28	0.66	a	0.09	0.74	a	0.05	0.71	a	0.16	0.67	**
Availability of credit (n=588)	0.67	0.53	bc	0.49	0.70	ab	0.43	0.71	a	0.77	0.46	c	0.63	0.58	***
Availability of veterinary services (n=599)	0.81	0.41		0.85	0.45		0.74	0.50		0.76	0.50		0.79	0.45	NS
Availability of veterinary medicines (n=584)	0.68	0.50	a	0.73	0.55	a	0.84	0.43	a	0.70	0.48	a	0.71	0.49	*
Availability of extension services (n=596)	0.53	0.65		-0.18	0.79		0.19	0.76	a	0.24	0.79	a	0.32	0.76	***
Roads in your district (n=600)	0.08	0.82	a	0.48	0.71	b	0.23	0.83	AB	0.22	0.87	ab	0.18	0.83	***

<sup>1</sup>Value is a mean; <sup>2</sup>SD = Standard Deviation; <sup>3</sup>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.** Dairy farmers' perceptions of changes (compared to 2014) in prices and quality or availability of inputs and services (1 = good, 0 = fair, -1 = poor). Perceptions of change in inputs and services (1= increased, 0= no change and -1= decrease).

Variable	Bandung			Bogor			Cianjur			Garut			Total		
	Value <sup>1</sup>	SD <sup>2</sup>	Sig <sup>3</sup>	Value <sup>1</sup>	SD <sup>2</sup>	Sig <sup>3</sup>	Value <sup>1</sup>	SD <sup>2</sup>	Sig <sup>3</sup>	Value <sup>1</sup>	SD <sup>2</sup>	Sig <sup>3</sup>	Value <sup>1</sup>	SD <sup>2</sup>	Sig <sup>3</sup>
Price paid by buyer for milk (n=594)	0.58	0.65	a	0.20	0.77		0.62	0.61	a	0.56	0.64	a	0.53	0.67	***
Number of milk buyers(n=591)	0.02	0.15	ab	0.28	0.45		0.09	0.29	b	0.01	0.08	a	0.06	0.24	***
Price of concentrates (n=593)	-0.54	0.59	b	-0.63	0.56	ab	-0.73	0.45	a	-0.73	0.48	a	-0.62	0.55	***
Quality of grass and forages (n=594)	0.04	0.47	b	-0.01	0.52	ab	-0.17	0.50	a	-0.04	0.44	ab	-0.01	0.48	***
Availability of land to purchase (n=586)	-0.37	0.52	a	-0.60	0.52		-0.38	0.59	a	-0.39	0.52	a	-0.41	0.54	***
Availability of grass and forages (n=598)	-0.14	0.64	a	-0.26	0.59	a	-0.32	0.67	a	-0.24	0.60	a	-0.20	0.63	*
Availability of concentrates (n=595)	0.32	0.50	b	0.20	0.51	ab	0.19	0.49	ab	0.12	0.42	a	0.24	0.49	***
Availability of dairy nutritional information(n=552)	0.29	0.48	b	0.07	0.38	a	0.13	0.38	a	0.20	0.40	ab	0.22	0.44	***
Availability of technologies to improve milk yields (n=566)	0.39	0.52	b	0.19	0.53	a	0.27	0.47	ab	0.21	0.43	a	0.30	0.50	***
Availability of marketing information (n=557)	0.15	0.36		0.14	0.45		0.06	0.37		0.11	0.31		0.13	0.37	NS
Availability of credit (n=583)	0.32	0.50	bc	0.11	0.58	a	0.21	0.66	ab	0.41	0.49	c	0.30	0.54	***
Availability of veterinary services (n=596)	0.47	0.52		0.36	0.51		0.42	0.57		0.42	0.52		0.44	0.53	NS
Availability of veterinary medicines (n=583)	0.31	0.48		0.25	0.46		0.33	0.53		0.30	0.46		0.30	0.48	NS
Availability of extension services (n=593)	0.41	0.60		-0.26	0.63		0.18	0.60	a	0.06	0.62	a	0.21	0.65	***
Roads in your district (n=599)	0.39	0.73	a	0.63	0.60	b	0.58	0.67	ab	0.53	0.70	ab	0.48	0.70	**

<sup>1</sup>Value is a mean; <sup>2</sup>SD = Standard Deviation; <sup>3</sup>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 A4.** Changes at the dairy household level in the past 12 months (n=600).

Variable	Increased	No change	Decreased	N/A <sup>1</sup>
Total income received for milk sales	21.8%	32.8%	45.2%	0.2%
Total number of dairy cattle	33.2%	29.8%	37.0%	0.0%
Total number of milking cows	14.2%	54.2%	31.7%	0.0%
Total averaged milk produced per day	18.5%	36.3%	45.0%	0.2%
Total household family labour in dairy business (male)	0.5%	96.5%	1.5%	1.5%
Total household family labour in dairy business (female)	0.0%	92.8%	0.7%	6.5%
Total household family labour in dairy business	0.3%	76.3%	0.5%	22.8%

<sup>1</sup>N/A = Not Applicable.

**Table A5.** Changes at the dairy household level in the past 12 months, grouped by districts (n=600).

<b>Variable</b>	<b>Bandung</b>	<b>Bogor</b>	<b>Cianjur</b>	<b>Garut</b>	<b>Total</b>	<b>Sig<sup>1</sup></b>
Total income received for milk sales						
<i>Increased</i>	19.3%	18.8%	32.5%	22.9%	21.8%	***
<i>No change</i>	32.0%	18.8%	27.5%	45.7%	32.8%	***
<i>Decreased</i>	48.7%	62.5%	38.8%	31.4%	45.2%	***
<i>N/A</i>	0.0%	0.0%	1.3%	0.0%	0.2%	***
Total number of dairy cattle						
<i>Increased</i>	36.3%	33.8%	32.5%	26.4%	33.2%	
<i>No change</i>	28.0%	25.0%	27.5%	37.9%	29.8%	
<i>Decreased</i>	35.7%	41.3%	40.0%	35.7%	37.0%	
<i>N/A</i>	0.0%	0.0%	0.0%	0.0%	0.0%	
Total number of milking cows						
<i>Increased</i>	12.0%	16.3%	23.8%	12.1%	14.2%	***
<i>No change</i>	56.3%	36.3%	46.3%	64.3%	54.2%	***
<i>Decreased</i>	31.7%	47.5%	30.0%	23.6%	31.7%	***
<i>N/A</i>	0.0%	0.0%	0.0%	0.0%	0.0%	
Total averaged milk produced per day						
<i>Increased</i>	15.0%	15.0%	30.0%	21.4%	18.5%	***
<i>No change</i>	37.0%	22.5%	31.3%	45.7%	36.3%	***
<i>Decreased</i>	48.0%	62.5%	37.5%	32.9%	45.0%	***
<i>N/A</i>	0.0%	0.0%	1.3%	0.0%	0.2%	***
Total household family labour in dairy business (male)						
<i>Increased</i>	0.7%	1.3%	0.0%	0.0%	0.5%	
<i>No change</i>	96.0%	96.3%	97.5%	97.1%	96.5%	
<i>Decreased</i>	1.3%	2.5%	1.3%	1.4%	1.5%	
<i>N/A</i>	2.0%	0.0%	1.3%	1.4%	1.5%	
Total household family labour in dairy business (female)						
<i>Increased</i>	0.0%	0.0%	0.0%	0.0%	0.0%	
<i>No change</i>	93.3%	88.8%	90.0%	95.7%	92.8%	
<i>Decreased</i>	1.0%	0.0%	0.0%	0.7%	0.7%	
<i>N/A</i>	5.7%	11.3%	10.0%	3.6%	6.5%	
Total household family labour in dairy business						
<i>Increased</i>	0.7%	0.0%	0.0%	0.0%	0.3%	
<i>No change</i>	76.3%	72.5%	71.3%	81.4%	76.3%	
<i>Decreased</i>	0.3%	1.3%	0.0%	0.7%	0.5%	
<i>N/A</i>	22.7%	26.3%	28.8%	17.9%	22.8%	

<sup>1</sup>Sig = Significance; \* p < 0.10, \*\* p < 0.05 and \*\*\* p < 0.01 indicate significance at the 10%, 5% and 1% levels, respectively

**Table A6.** Change in household financial situation since 2014, grouped by districts.

Variable	Bandung	Bogor	Cianjur	Garut	Total	Sig <sup>1</sup>
Change in household financial situation since 2014 (n=600)						
<i>Much better</i>	23.0%	16.3%	20.0%	22.9%	21.7%	*
<i>Somewhat better</i>	24.0%	25.0%	35.0%	33.6%	27.8%	*
<i>No difference</i>	34.7%	37.5%	30.0%	33.6%	34.2%	*
<i>Somewhat worse</i>	17.0%	16.3%	12.5%	10.0%	14.7%	*
<i>Much worse</i>	1.0%	5.0%	1.3%	0.0%	1.3%	*
<i>No opinion or N/A</i>	0.3%	0.0%	1.3%	0.0%	0.3%	*
Reasons for change in household financial situation (n=393)						
<i>Change in milk prices</i>	14.9%	2.0%	5.5%	6.5%	9.9%	***
<i>Change in milk yield</i>	25.6%	10.0%	20.0%	12.9%	19.9%	***
<i>Change in dairy cattle price</i>	1.0%	2.0%	1.8%	0.0%	1.0%	***
<i>Change in livestock (non-dairy) income<sup>2</sup></i>	17.4%	36.0%	41.8%	23.7%	24.7%	***
<i>Change in non-farm income<sup>3</sup></i>	20.0%	14.0%	7.3%	36.6%	21.4%	***
<i>Change in family size</i>	4.1%	2.0%	1.8%	2.2%	3.1%	***
<i>Household member found a new job</i>	1.0%	4.0%	1.8%	3.2%	2.0%	***
<i>Household member lost a job</i>	0.5%	0.0%	0.0%	0.0%	0.3%	***
<i>Expenses associated with illness</i>	0.5%	0.0%	0.0%	1.1%	0.5%	***
<i>Expenses associated with education</i>	1.5%	12.0%	1.8%	0.0%	2.5%	***
<i>Member of household passed away</i>	1.0%	0.0%	0.0%	0.0%	0.5%	***
<i>Other</i>	12.3%	18.0%	18.2%	14.0%	14.3%	***

<sup>1</sup>Sig = Significance; \* p < 0.10, \*\* p < 0.05 and \*\*\* p < 0.01 indicate significance at the 10%, 5% and 1% levels, respectively. <sup>2</sup>Non-dairy livestock income includes income derived from sale of cattle. <sup>3</sup>Non-farm income includes income derived from off-farm activities like wage employment, self-employment, pensions, remittances, and trading businesses.

**Table A7.** Future aspiration of farmers with respect to dairy farm operations, grouped by district.

Variable	Bandung	Bogor	Cianjur	Garut	Total	Sig <sup>1</sup>
Future aspiration of farmers with respect to dairy farm operations (n=600)						
<i>Remain the same</i>	7.7%	3.8%	8.8%	10.7%	8.0%	
<i>Expand</i>	90.3%	95.0%	90.0%	84.3%	89.5%	
<i>Undecided</i>	0.0%	1.3%	0.0%	2.1%	0.7%	
<i>Quit</i>	0.7%	0.0%	0.0%	1.4%	0.7%	
<i>Other</i>	1.3%	0.0%	1.3%	1.4%	1.2%	
Expected future herd size (no. of cows) (n=540)	11.39	17.46	13.22	6.38	11.39	***

<sup>1</sup>Sig = Significance; \* p < 0.10, \*\* p < 0.05 and \*\*\* p < 0.01 indicate significance at the 10%, 5% and 1% levels, respectively.

**Table A8.** Training requirements and expectations of dairy farmers, grouped by district. For areas of training, farmers were asked to identify up to 3 options.

Variable	Bandung	Bogor	Cianjur	Garut	Total	Sig <sup>1</sup>
Willingness to participate in a farmer training day/workshop in village (n=600)	94.0%	92.5%	90.0%	89.3%	92.2%	
Willingness of female members of household to attend farmer training day/workshop (n=600)	72.3%	73.8%	63.8%	81.4%	73.5%	**
Preferred method of training (n=575)						
<i>Seminar</i>	18.1%	18.4%	13.0%	20.2%	17.9%	
<i>Theory / written material</i>	6.9%	1.3%	3.9%	6.7%	5.7%	
<i>Field practice</i>	56.3%	57.9%	64.9%	62.7%	59.1%	
<i>Farm visit</i>	18.8%	22.4%	18.2%	10.5%	17.2%	
Preferred areas of training (n=1437)						
<i>Nutrition / feeding management</i>	19.8%	26.3%	19.0%	23.4%	21.4%	**
<i>Animal husbandry</i>	31.2%	29.9%	34.4%	35.8%	32.6%	**
<i>Reproduction</i>	12.1%	10.8%	9.2%	9.3%	10.9%	**
<i>Milking practice / management</i>	15.1%	6.7%	16.4%	14.7%	14.1%	**
<i>Farm business management</i>	19.0%	21.1%	18.5%	13.9%	18.0%	**
<i>Other</i>	2.9%	5.2%	2.6%	2.9%	3.1%	**

<sup>1</sup>Sig = Significance; \* p < 0.10, \*\* p < 0.05 and \*\*\* p < 0.01 indicate significance at the 10%, 5% and 1% levels, respectively.

**Table A9.** Dairy farmers' perceptions of significant constraints facing the dairy industry. (Note: Farmers were asked to identify up to three constraints). The figures in this table represent a proportion of all constraints identified by farmers (n=1067).

Variable	Bandung	Bogor	Cianjur	Garut	Total	Sig <sup>1</sup>
Significant constraints to dairy industry from the dairy farmer's perspective (n=1067)						
<i>Knowledge</i>	11.3%	4.8%	6.1%	8.9%	9.1%	*
<i>Training</i>	6.2%	2.1%	4.7%	6.2%	5.4%	*
<i>Quality animals</i>	12.5%	15.1%	11.5%	18.5%	14.2%	*
<i>Feed resources</i>	25.3%	28.1%	27.0%	27.7%	26.5%	*
<i>Availability of vet services</i>	0.4%	0.7%	1.4%	2.3%	1.0%	*
<i>Marketing</i>	3.9%	6.2%	2.7%	1.5%	3.5%	*
<i>Nutrition</i>	3.9%	3.4%	5.4%	1.9%	3.6%	*
<i>Labour</i>	4.9%	4.8%	4.7%	3.1%	4.4%	*
<i>Reproduction</i>	4.7%	4.1%	4.1%	6.2%	4.9%	*
<i>Calf rearing</i>	0.8%	0.0%	0.0%	0.4%	0.5%	*
<i>Other</i>	26.1%	30.8%	32.4%	23.5%	27.0%	*

<sup>1</sup>Sig = Significance; \* p < 0.10, \*\* p < 0.05 and \*\*\* p < 0.01 indicate significance at the 10%, 5% and 1% levels, respectively.

**Table A10.** Summary of 'other' significant constraints facing the dairy industry.

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**'Other' significant constraints to dairy industry**

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Access to capital

Access to credit

Low milk prices

High prices of inputs like concentrates and feeds

Availability of land

Animal health issues

Quality of inputs like concentrates and feeds

Limited availability of water

Lack of communication between dairy cooperatives and farmers

Lack of good infrastructure

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