TECHNOLOGY ASSISTANCE TO IMPROVE PRODUCTIVITY OF DAIRY CATTLE ON SMALLHOLDER FARMS IN SEVERAL DAIRY COOPERATIVES

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Presentation Outline

1. Introduction
2. Research objectives
3. Methodology
4. Key results and discussions
5. Conclusion and policy implications

INTRODUCTION

- Dairy Industry in Indonesia is concentrated in Java Island, consisting of non-cooperative dairy farmers (5.6%), cooperative dairy farmers (92.2%) and industries (2.2%), Most of as amount as 192,160 dairy farmers are smallholder farmers running an average business scale of three cows each farmer.
- Domestic milk production is around 947,690 tons, which can only meet domestic needs of less than 30%.

constraints to improve productivity

Feeding, breeding
Rearing management
Animal health
Yield marketing

It is necessary to have activities for implementing technology, mentoring and piloting it for farmers

Research Objectives

- Application of feed technology by farmer cooperators, implementation of training on feed management, milking and reproduction, housing and animal health.

Methodology

- Treatment feed concentrate was containing 16% CP while regular concentrate containing 12–14% CP was fed as a control.
- Ca-FA supplements were fed for one month before and one month after delivery (early lactation) as much as 100 g/day. Ca-FA (Kalem), were produced by IRIAP. The composition of Ca-FA contains 95% fat; 4.5% Ca; 0.54% NaCl; and GE 7021.5 kcal/kg or the equivalent of 17 MJ/Kg, respectively.
- In each location of 5 KUD, there were three groups of farmers:
  - Group-1 (G1). Six farmers were given training material assistance, feed containing 16% crude protein for 3 months and calcium fat (Ca-Fa for pregnant cows)
  - Group-2 (G2). Six farmers were given training, without material assistance.
  - Group-3 (G3). Six farmers without training nor material assistance.

- The technologies introduced were animal housing systems, measuring of production and quality

Construction for the feed that is easy to clean

Adlibitum drinking water trough construction

Carpet for cow base

Measuring Milk production and quality of milk

Technology introduced

- Provide training, guidance and monitoring.

Training activities for cooperative farmers

Results and Discussion

Average milk production, body weight and body condition score in farmer cows with feed treatment at 5 KUD

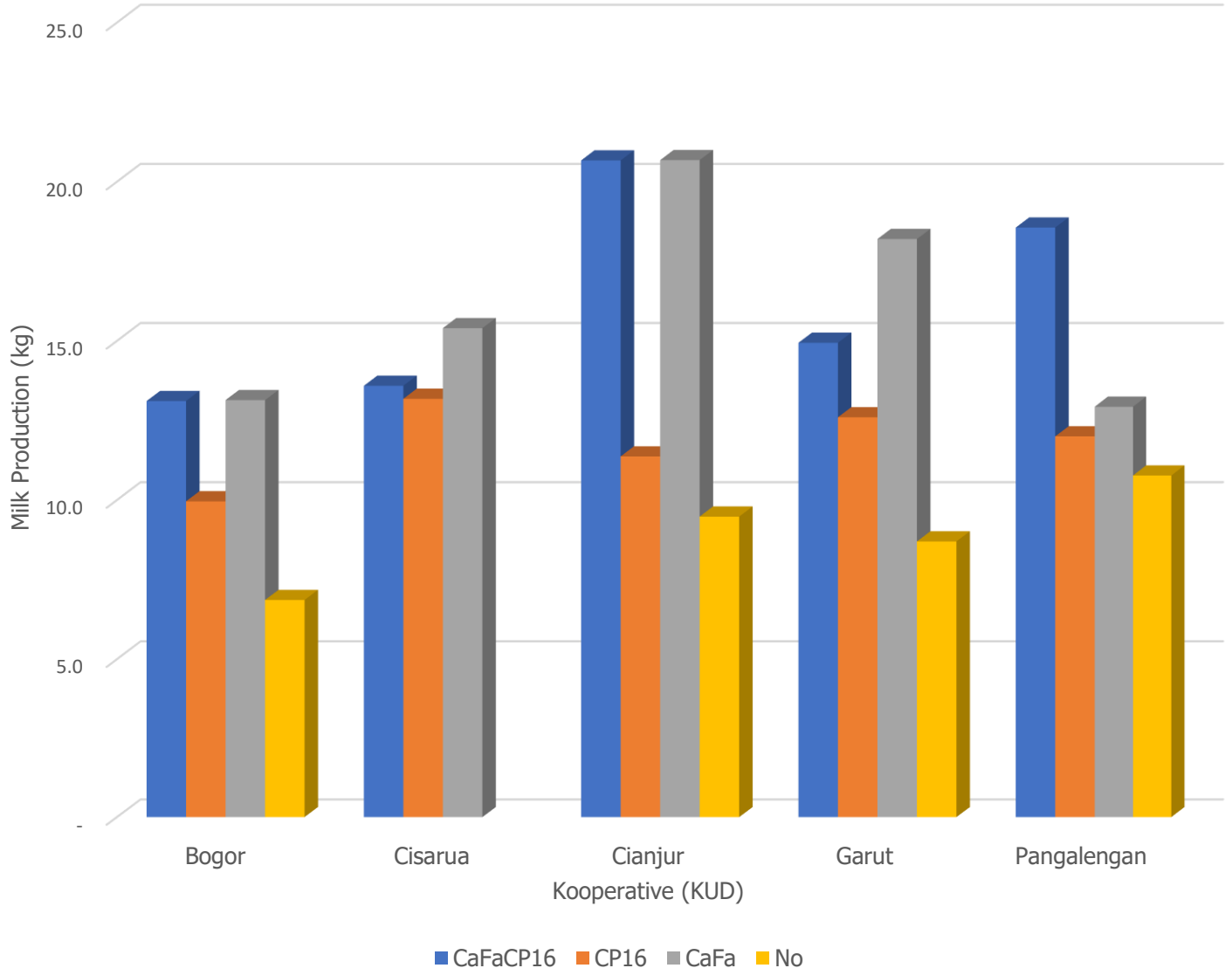
		Milk Prod (lt)			Body Weight (kg)				BCS			
Variable	N	Mean	SD		N	Mean	SD		N	Mean	SD	
KUD												
Bogor	172	8.98	3.59	a	81	465.70	62.06	a	81	2.91	0.46	a
Cianjur	227	12.61	5.00	bc	91	493.88	57.18	bc	91	2.72	0.15	bc
Cisarua	158	13.59	3.89	b	4	434.75	45.54	ab	4	2.40	0.12	bc
Garut	183	13.04	4.42	b	141	474.71	48.02	ab	141	2.64	0.17	b
Pangalengan	292	11.95	4.49	c	175	500.99	61.53	c	175	2.74	0.24	c
Group												
1	828	12.43	4.69	a	336	492.63	55.41	a	336	2.72	0.29	a
2	102	10.96	3.64	b	91	471.56	69.86	b	91	2.74	0.22	a
3	102	10.05	4.17	b	65	470.37	52.99	a	65	2.79	0.28	a
CP												
1	530	12.58	4.52	a	207	493.20	57.49	a	207	2.71	0.30	a
2	502	11.48	4.64	b	285	480.41	59.24	b	285	2.75	0.26	a
Kalem												
1	58	18.41	4.91	a	12	556.67	78.95	a	12	2.71	0.35	a
2	974	11.67	4.31	b	480	484.02	57.19	b	480	2.73	0.27	a

Note: Different superscripts in the same column for each variable, different ($P < 0.05$)

- Avg milk production kg/head/ day is significantly different among KUDs Average milk production in Cianjur, Cisarua and Garut was higher than Bogor and Pangalengan.
- (G1) showed higher milk production compared to those who did not get full technology introduction (G2 and G3).

- Milk production increased by 9.58% due to the use of CP 16% and increased by 57.75% due to the use of Ca-Fa, each compared to without giving both (control).
- Increased milk production was due to increased nutrient intake
- Feeding Ca-FA may provide additional energy to lactating cow
- The average live weight of lactating cows in each group was around 480 kg (around 417-608 kg) with an average BCS value of 2.78.

Milk production of cows based on group and feed treatments in 5 KUDs



Average milk quality of cattle in 5 KUD locations

Source	Protein (%)				Fat (%)				SNF (%)				Density				Mastitis			
	N	Mean	SD		N	Mean	SD		N	Mean	SD		N	Mean	SD		N	Mean	SD	
Bogor	143	3.06	0.99	a	143	4.43	1.37	a	143	8.12	0.43	a	143	26.93	8.63	a	143	0.13	0.32	a
Cisarua	89	3.19	0.36	a	89	4.17	0.63	b	89	8.41	0.24	c	89	28.37	1.28	b	89	1.61	0.64	b
Cianjur	167	3.12	0.25	a	167	4.47	0.61	a	167	8.69	0.41	b	167	28.09	1.99	b	167	1.76	0.75	b
Garut	189	2.54	0.14	b	189	4.16	0.51	b	189	7.60	0.40	d	189	23.43	1.35	c	189	1.17	0.47	c
Pangalengan	176	3.11	0.26	a	176	4.07	0.62	b	176	8.05	0.53	a	176	26.59	2.06	a	176	1.13	0.73	c

Note: Different superscripts in the same column, different ($P < 0.05$)

- In general, milk quality (protein, fat, SNF, density and mastitis) showed significant differences among KUDs
- The use of 16% CP and Kalem showed insignificant differences in SNF, density.

Reproductive performance of dairy cows raised by small farmers

KUD	Calving Interval/ CI (Month)				Sevice per Conceptoin (S/C)				Age of Calving (Month)			
	N	Mean	SD		N	Mean	SD		N	Mean	SD	
Bogor	145	13.92	2.11	a	36	1.19	0.62	a	253	24.94	2.24	a
Cianjur	209	13.55	1.62	a	90	1.80	0.88	b	272	26.14	1.53	b
Cisarua	137	12.81	2.02	b	41	1.15	0.53	a	207	29.24	4.44	c
Garut	208	12.04	0.36	c	130	1.11	0.31	a	265	26.39	3.39	b
Pangalengan	287	13.41	1.65	b	6	1.00	0.00	a	294	25.34	2.58	a

Note: Different superscripts in the same column, different (P <0.05)

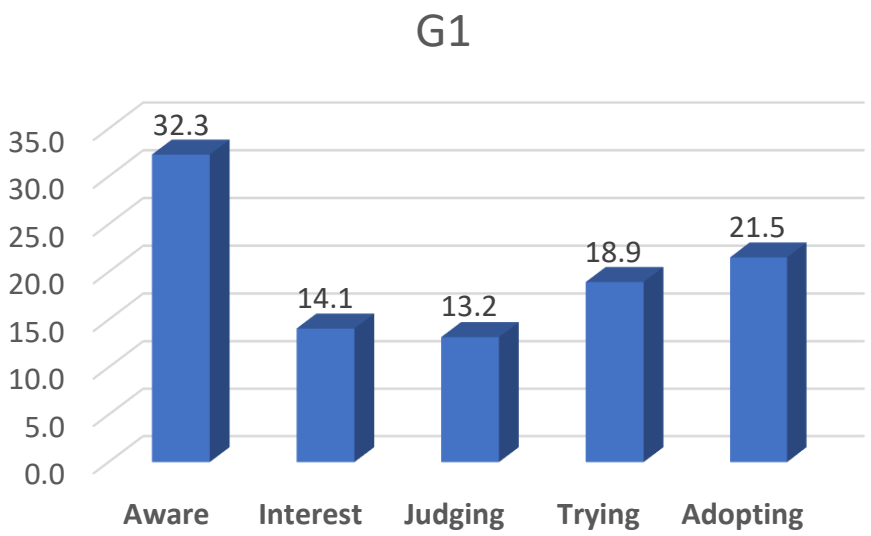
Reproductive performance in normal condition

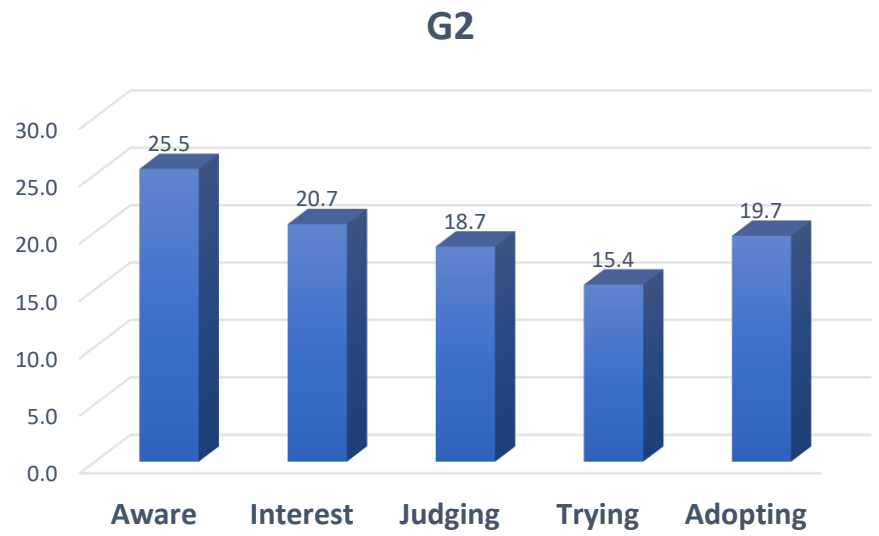
- C I : 13.15 months
- S/C: 1.25
- AFC: 26.41 months

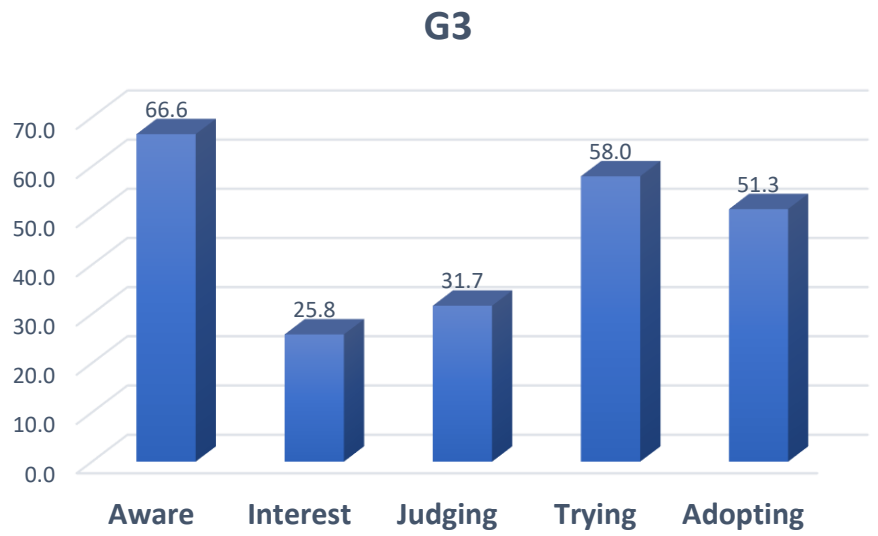
KUD	N	criteria	Temperature-humidity Index (THI)			
			Morning	Afternoon	Daily	Difference (afternoon-morning)
Bogor	395	Mean	64.11 [a]	70.28 [b]	67.20	6.16
		SD	4.24	3.36	3.66	
Cianjur	271	Avg	63.39 [a]	69.00 [b]	66.20	5.61
		SD	2.85	2.66	3.54	
Cisarua	162	Avg	66.71 [a]	72.07 [b]	69.39	5.36
		SD	2.01	2.00	1.45	
Cianjur	271	Avg	63.39 [a]	69.00 [b]	66.20	5.61
		Stdev	2.85	2.66	3.54	
Garut	260	Avg	60.47 [a]	67.05 [b]	63.76	6.58
		Stdev	2.07	1.18	1.48	
Panga-lengan	320	Avg	59.21 [a]	66.44 [b]	62.83	7.23
		Stdev	2.52	0.93	1.50	
Avg	1408	Avg	61.07	67.70	64.38	6.63
		Stdev	3.56	2.43	2.84	

- The average THI for all KUDs was 64.38 $\pm$ 2.84
- Significant difference in the THI level between morning and evening in each KUD

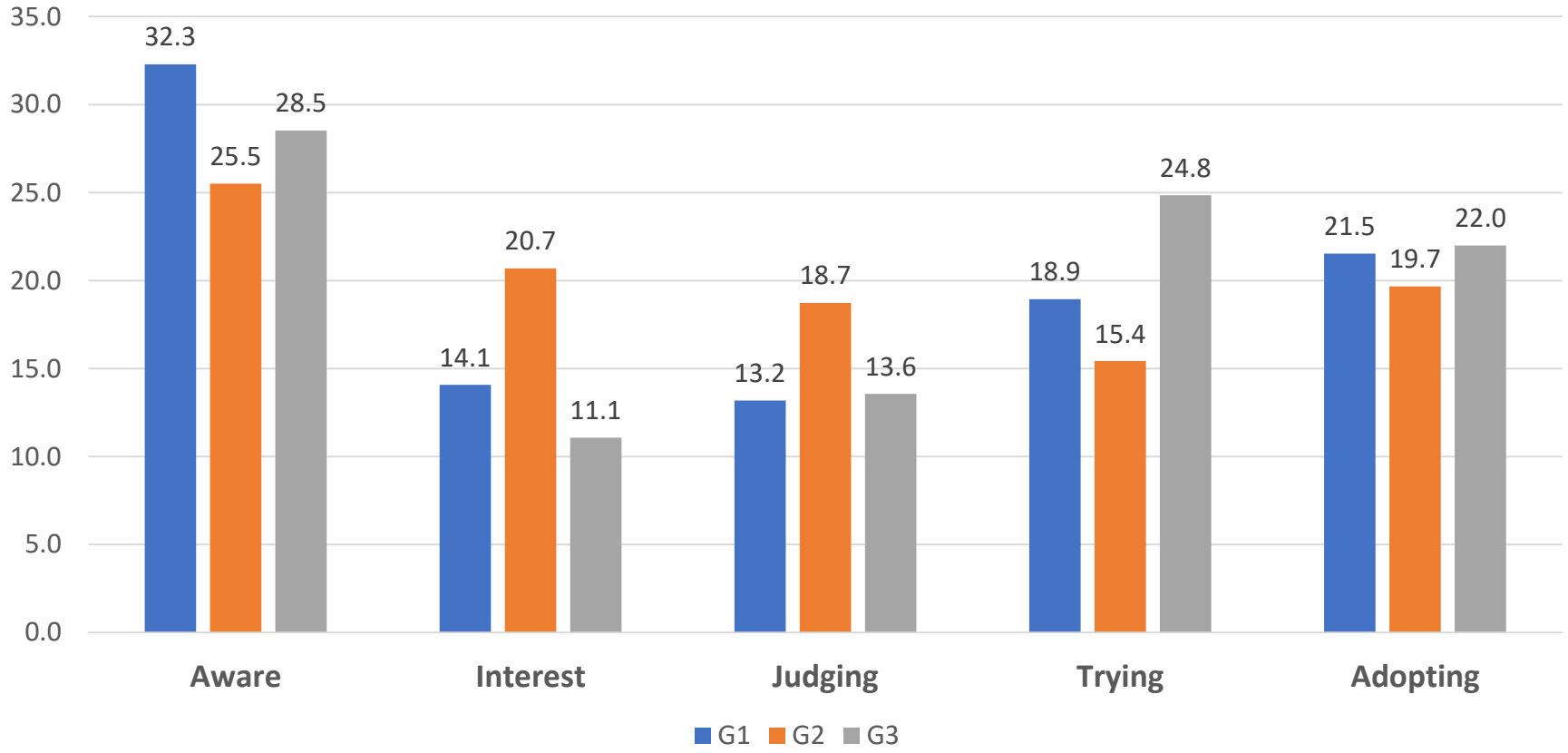
Adoption level of introduced technology by farmers for all KUD







Farmer groups by technology adoption level for all KUDs



Economic Analysis

Farm Income and Profit (Rp/Farm/ Year)

Variable	KUD				
	Bogor	Cisarua	Cianjur	Garut	Pangalengan
Number Of Cows	3	4	2	4	4
Milk Production/Year/ Farm (Litre)	9,288	16,488	8,014	16,474	17,424
Income : (Rp)					
Total Milk Income	44,408,250	82,440,000	36,462,045	75,778,100	75,794,400
Stock Sales	14,000,000	14,000,000	7,000,000	14,000,000	14,000,000
Total Farm Income	58,408,250	96,440,000	43,462,045	89,778,100	89,794,400
Total Farm Income/Liter	6,289	5,849	5,424	5,450	5,153
Variable Cost :					
Feed Cost	43,902,000	56,592,000	30,906,000	66,744,000	49,320,000
Cow Care Cost	980,000	1,130,000	705,000	950,000	650,000
Cage Cost	180,000	180,000	130,000	250,000	250,000
Fixed Cost (Cash)	400,000	400,000	475,000	525,000	505,000
Total Cost (Cash)	45,462,000	58,302,000	32,216,000	68,469,000	50,725,000
Farm Operating Profit (Rp)	12,946,250	38,138,000	11,246,045	21,309,100	39,069,400
Operating Profit/Litre (Rp/L)	1,394	2,313	1,403	1,294	2,242
Net Profit (Rp)	12,946,250	38,138,000	11,246,045	21,309,100	39,069,400
Net Profit (Rp/Litre)	1,394	2,313	1,403	1,294	2,242
R/C	1.28	1.65	1.35	1.31	1.77
B/C	0.28	0.65	0.35	0.31	0.77
BEP Milk Price (Rp/L)	4,895	3,536	4,020	4,156	2,911
BEP Production Volume (Litre)	8,914	11,660	7,080	13,694	10,145

- The biggest percentage of dairy cattle business is for feed costs in the range of 96% - 97%, and 66% to 74% was concentrate costs.
- The cost per liter of milk produced varies between KUDs. The R/C value in the five locations >1.
- The use of 16% CP concentrate even though the price is higher, it is still profitable.

Conclusion

- The increase of CP content in concentrate with a comprehensive technological has shown an increase in milk production in general by 9.58%. Likewise, feeding Kalem to after-calving cows has increased milk production by 57.75% compared to those do not get treatment. Increased milk production is due to increased nutrient intake in cows feeding concentrate with CP 16%.
- There are many factors that can determine the quality of milk, including sanitation and the handling of milk production which generally farmers have not been able to handle milk properly as recommended.
- Adoption technology is not yet at the expected stage, it needs time to be applied. It is required to facilitate the training and assistance based on technologies that have not yet been adopted or a low adopted level.

Policy Implications

- Technological assistance with appropriate extension methods to farmers must continue to be carried out
- Collaboration between government agencies, dairy cooperatives and private milk entrepreneurs needs to be continuously improved in supporting the increase in the quantity and quality of cow's milk at the farmer level.

Thank You

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