Survey form (English Translation)

The original questionnaire was administered in Polish.
An English translation is provided below for transparency and replication purposes.

Participant Information and Informed Consent Statement

Purpose of the study

The purpose of this study is to collect anonymous survey data for scientific research purposes. The study aims to improve understanding of methane emission mitigation measures in dairy production.

Voluntary participation

Participation in this study is entirely voluntary. Participants may refuse to take part or withdraw from the study at any time before submitting the questionnaire, without providing a reason and without any negative consequences.

Anonymity and confidentiality

The survey is conducted anonymously. No personal data or information allowing the identification of participants is collected. All responses are analysed in aggregated form and used exclusively for scientific purposes.

Risks and benefits

Participation in the study involves no foreseeable risks beyond those encountered in everyday life. There are no direct benefits for participants, apart from contributing to scientific knowledge.

Informed consent

By proceeding with and completing the questionnaire, participants confirm that they have read and understood the information provided above and voluntarily agree to participate in the study. Completion of the questionnaire constitutes implied informed consent.

Contact information

For questions related to the study, participants could contact the researchers at: adam_was@sggw.edu.pl.

Three methods of reducing methane emissions in cattle production are considered:

Dietary supplementation (feed additive)
– administered daily, *approximate cost* – **180 PLN/cow/year**

Vaccination against Archaea
– administered once per year, *approximate cost* – **210 PLN/cow/year**

biofiltration
– investment in a ventilation system is required, *approximate cost* – **150 PLN/cow/year**

Payments are planned for undertaking these measures, differing in:

- **contract length** – 1 year, 5 years, 10 years
- **method of payment calculation**
  - **fixed rate** – for undertaking the measure regardless of the results
  - **variable rate** – increasing with methane emission reduction
- **proposed payment rate** (pln/cow/year)

Q1.In your opinion, are such climate mitigation measures needed?

Select one of the following answers:
◯ Yes
◯ No
◯ No opinion

Q2-10. Discrete choice experiment (9 choice cards)

Example of a Choice Card (Card 1)

Estimated costs of measures:

diet. supplement. – 180 PLN/cow/year.
Vaccination against Archaea– 210 PLN/cow/year.
biofiltration – 150 PLN/cow/year.

Please indicate your preferred option:

	Option A	Option B
Type of action	diet. supplement.	biofiltration
Type of contract	Result-based	Input Based (constant)
Contract duration	1 year	10 years
Amount of subsidies	70–200 PLN/cow/year*	860 PLN/cow/year

*The greater the methane reduction, the higher the payment.

Please select one of the following options:

☐ Option A
☐ Option B
☐ None of the above – I am not interested

Original polish version

Szacowane koszty działań:

Dodatki do pasz – 180 zł/krowę/rok.

Szczepionka "przeciwmetanowa" – 210 zł/krowę/rok.

Biofiltry – 150 zł/krowę/rok.

Proszę o wybranie preferowanego wariantu działania.

1	Wariant A	Wariant B
DZIAŁANIE	DODATKI PASZOWE 	BIOFILTRY 
DOPŁATA	Zależna od wyniku 	Stała 
KONTRAKT	1 ROK 1	10 LAT 10
STAWKA	70 do 200 zł /krowę/rok*	860 zł /krowę/rok

**im większa redukcja emisji metanu tym wyższa stawka*

*

Wybierz jedną z następujących odpowiedzi
Proszę wybrać jedną odpowiedź z poniższych:

◯ Wariant A
◯ Wariant B
◯ Żaden z powyższych wariantów - nie jestem zainteresowany/a.

*A total of 36 choice sets were generated using a D-efficient experimental design. Each respondent evaluated 9 randomly assigned choice sets. Attributes levels for all 36 choice sets are given in table S1

Q 11. Please indicate the location of the farm from the list. [16 Polish regions]
Please specify the key characteristics of the farm:

- Number of dairy cows
- Average milk yield (litres per cow per year)
- Number of other cattle
- Total utilised agricultural area (ha)
- Permanent grassland area (ha)
- Total number of persons working on the farm

Q12.Is there a potential successor in the farm?

A value between 1 and 100 indicates the percentage certainty that the successor will take over the farm. Enter 0 if no successor.

Q13.What is the financial situation of the farm?

Difficult, Rather good, Good, Excellent

Q 14. How harmful do you consider methane to be for the atmosphere and climate?

Scale from 1 (very low) to 5 (very high).

Thank you for completing the survey.

Table S1. Attribute-Level Matrix for All 36 Choice Cards

Card	Option A				Option B			
	Type of action	Type of contract	Contract duration	Amount of subsidies	Type of action	Type of contract	Contract duration	Amount of subsidies
1	diet. supplement.	RB	1	70–200	biofiltration	IB	10	860
2	diet. supplement	IB	10	120	vac. ag. Archaea	IB	5	350
3	vac. ag. Archaea	IB	5	140	diet. supplement.	RB	1	170–490
4	biofiltration	RB	5	170–620	diet. supplement.	IB	10	300
5	diet. supplement.	IB	10	120	biofiltration	RB	1	430–1530
6	biofiltration	RB	1	170–620	diet. supplement.	IB	5	300
7	diet. supplement.	RB	10	170–490	vac. ag. Archaea	IB	1	210
8	vac. ag. Archaea	RB	1	140–430	biofiltration	IB	10	350
9	diet. supplement.	IB	1	120	biofiltration	IB	10	860
10	diet. supplement.	RB	5	170–490	biofiltration	IB	1	350
11	diet. supplement.	IB	1	180	biofiltration	RB	10	170–620
12	diet. supplement.	RB	1	110–300	vac. ag. Archaea	IB	5	140
13	diet. supplement.	IB	1	120	biofiltration	IB	5	520
14	biofiltration	IB	1	860	diet. supplement.	RB	10	70–200
15	biofiltration	RB	5	430–1530	vac. ag. Archaea	IB	1	140
16	diet. supplement.	IB	1	300	biofiltration	RB	10	170–620
17	biofiltration	IB	1	350	diet. supplement.	RB	5	110–300
18	biofiltration	IB	5	520	diet. supplement.	RB	10	70–200
19	biofiltration	IB	1	520	vac. ag. Archaea	RB	5	240–710
20	biofiltration	RB	1	260–920	diet. supplement.	IB	5	120
21	diet. supplement.	IB	5	120	vac. ag. Archaea	RB	10	240–710
22	diet. supplement.	IB	10	300	vac. ag. Archaea	RB	5	100–290
23	diet. supplement.	RB	1	110–300	vac. ag. Archaea	IB	10	140
24	biofiltration	IB	5	350	vac. ag. Archaea	IB	1	210
25	diet. supplement.	RB	10	110–300	vac. ag. Archaea	IB	1	140
26	diet. supplement.	IB	10	180	vac. ag. Archaea	RB	1	100–290
27	biofiltration	RB	5	260–920	diet. supplement.	IB	1	300
28	diet. supplement.	RB	5	70–200	vac. ag. Archaea	IB	1	350
29	vac. ag. Archaea	RB	10	140–430	diet. supplement.	IB	1	120
30	diet. supplement.	IB	5	180	biofiltration	RB	1	170–620
31	vac. ag. Archaea	RB	10	140–430	diet. supplement.	IB	5	300
32	vac. ag. Archaea	RB	10	100–290	biofiltration	IB	1	520
33	vac. ag. Archaea	IB	5	210	biofiltration	RB	1	430–1530
34	vac. ag. Archaea	IB	10	210	diet. supplement.	RB	5	70–200
35	diet. supplement.	RB	1	110–300	vac. ag. Archaea	IB	10	350
36	vac. ag. Archaea	RB	1	240–710	biofiltration	IB	10	520

Table S2. Parameters for the objective function in the optimisation model

Type of action	Payment rate	Type of contract	Contract duration [years]	Methane emission reduction [kg CO_2e/cow/year]	Payment for farmer [PLN/cow/year] PPC_j	Cost of MMM with variable implementation costs [PLN/cow/year] PPC_j +CPC_j
diet. supplement.	A	RB	1	365.84	131.70	161.70
diet. supplement.	A	RB	5	365.84	131.70	157.70
diet. supplement.	A	RB	10	365.84	131.70	155.70
diet. supplement.	A	IB	1	324.36	116.77	126.77
diet. supplement.	A	IB	5	324.36	116.77	124.77
diet. supplement.	A	IB	10	324.36	116.77	123.77
diet. supplement.	B	RB	1	365.84	197.55	227.55
diet. supplement.	B	RB	5	365.84	197.55	223.55
diet. supplement.	B	RB	10	365.84	197.55	221.55
diet. supplement.	B	IB	1	324.36	175.15	185.15
diet. supplement.	B	IB	5	324.36	175.15	183.15
diet. supplement.	B	IB	10	324.36	175.15	182.15
diet. supplement.	C	RB	1	365.84	329.26	359.26
diet. supplement.	C	RB	5	365.84	329.26	355.26
diet. supplement.	C	RB	10	365.84	329.26	353.26
diet. supplement.	C	IB	1	324.36	291.92	301.92
diet. supplement.	C	IB	5	324.36	291.92	299.92
diet. supplement.	C	IB	10	324.36	291.92	298.92
vac. ag. Archaea	A	RB	1	520.03	187.21	217.21
vac. ag. Archaea	A	RB	5	520.03	187.21	213.21
vac. ag. Archaea	A	RB	10	520.03	187.21	211.21
vac. ag. Archaea	A	IB	1	378.42	136.23	146.23
vac. ag. Archaea	A	IB	5	378.42	136.23	144.23
vac. ag. Archaea	A	IB	10	378.42	136.23	143.23
vac. ag. Archaea	B	RB	1	520.03	280.82	310.82
vac. ag. Archaea	B	RB	5	520.03	280.82	306.82
vac. ag. Archaea	B	RB	10	520.03	280.82	304.82
vac. ag. Archaea	B	IB	1	378.42	204.35	214.35
vac. ag. Archaea	B	IB	5	378.42	204.35	212.35
vac. ag. Archaea	B	IB	10	378.42	204.35	211.35
vac. ag. Archaea	C	RB	1	520.03	468.03	498.03
vac. ag. Archaea	C	RB	5	520.03	468.03	494.03
vac. ag. Archaea	C	RB	10	520.03	468.03	492.03
vac. ag. Archaea	C	IB	1	378.42	340.58	350.58
vac. ag. Archaea	C	IB	5	378.42	340.58	348.58
vac. ag. Archaea	C	IB	10	378.42	340.58	347.58
biofiltration	A	RB	1	1084.60	390.46	420.46
biofiltration	A	RB	5	1084.60	390.46	416.46
biofiltration	A	RB	10	1084.60	390.46	414.46
biofiltration	A	IB	1	946.05	340.58	350.58
biofiltration	A	IB	5	946.05	340.58	348.58
biofiltration	A	IB	10	946.05	340.58	347.58
biofiltration	B	RB	1	1084.60	585.68	615.68
biofiltration	B	RB	5	1084.60	585.68	611.68
biofiltration	B	RB	10	1084.60	585.68	609.68
biofiltration	B	IB	1	946.05	510.87	520.87
biofiltration	B	IB	5	946.05	510.87	518.87
biofiltration	B	IB	10	946.05	510.87	517.87
biofiltration	C	RB	1	1084.60	976.14	1006.14
biofiltration	C	RB	5	1084.60	976.14	1002.14
biofiltration	C	RB	10	1084.60	976.14	1000.14
biofiltration	C	IB	1	946.05	851.45	861.45
biofiltration	C	IB	5	946.05	851.45	859.45
biofiltration	C	IB	10	946.05	851.45	858.45

Source: own calculations