variable	lower	median	upper	distribution	description	unit	source
n_years	x	NA	x	const	Length of the simulation	a	
var_cv	5	NA	10	posnorm	Coefficient of variation	%	
discount_rate	1.86	2.99	5	posnorm	Used to calculate the present value of future cash flows	%	(Thiesmeier and Zander 2023; Deutsche Bundesbank 2024)
arable_area_treeless	10.14	NA	10.14	const	Size of the arable field	ha	(Grosse-Kleimann, personal communication, January 2024)
tree_row_area	0.57	NA	0.57	const	Total area of tree rows (wooded area) in AF system	ha	(Grosse-Kleimann, personal communication, January 2024)
num_trees	473	NA	473	const	Number of apple trees planted in AF system		(Grosse-Kleimann, personal communication, January 2024)
water_price	0.000005	0.00003	0.00031	posnorm	Cost of irrigation water	€/l	(Römer 2019)
farmer_planning_time	150	NA	300	posnorm	Time spent discussing goals with consultants, planning AF system and other planning work done by farmer	h	(Grosse-Kleimann, personal communication, January 2024)
planning_consulting	800	NA	6000	posnorm	Total payment of hired agroforestry consultant	€	(Grosse-Kleimann, personal communication, January 2024; Expert interview, personal communication, February 2024)
labour_cost	12.41	17.3	19.85	posnorm	Cost of labour	€/h	(Grosse-Kleimann, personal communication, January 2024)
pruning_course	2180	NA	2680	posnorm	Paying pruning course for employee	€	(Obstbaumschnittschule 2025)
gps_field_measuring	1.15	NA	7	posnorm	Labour hours for measuring field with GPS, identifying placement of trees	h/ha	(MLUK 2020; Grosse-Kleimann, personal communication, January 2024)
dig_planting_holes	0.09	NA	0.13	posnorm	Labour hours for preparing planting holes	h/hole	(Expert interview, personal communication, February 2024; KTBL 2005 in Frenzel 2024)
planting_trees	0.5	NA	1.5	posnorm	Labour hours of planting tree	h/tree	(Rösler 2007; Grosse-Kleimann, personal communication, January 2024)
appletree_price	10	NA	20	posnorm	Price per apple tree (tree only)	€/tree	(Grosse-Kleimann, personal communication, January 2024)
vole_protection	9	NA	11.75	posnorm	Cost of mesh for protection against vole damage	€/tree	(Gartenpfiff n.d.)
deer_protection	1.18	NA	4	posnorm	Cost of mesh for protection against deer browsing	€/tree	(Biobaumversand n.d.; TerraGala n.d.)
weed_protection	1.15	NA	1.6	posnorm	Cost of adding fleece to tree base for weed suppression	€/tree	(Grube KG Forstgerätestelle n.d.)
irrigation_sys_install	3500	NA	5000	const	Cost of buying and installing irrigation system	€	(Grosse-Kleimann, personal communication, January 2024; Expert interview, personal communication, February 2024)
irrigation_after_planting	5	NA	50	posnorm	Water use right after planting tree	l/tree	(Grosse-Kleimann, personal communication, January 2024 ; Dalival n.d.)
irrigation_123	230	NA	345	posnorm	Water use in frist three years of tree establishment	l/tree	(Äpfel & Konsorten e.V. 2022)
irrigation_annual	1	NA	413	posnorm	Water use in annual irrigation	l/tree	(Äpfel & Konsorten e.V. 2022)
chance_irrigation_repair	0.05		0.15	posnorm	Risk that irrigation system needs repair		
irrigation_repair_cost	0.05		0.3	posnorm	Assumption: repair costs between 5 and 30 % of the price of new irrigation system		
compost_after_planting	10	NA	20	posnorm	Compost used at time of planting	l/tree	(Grosse-Kleimann, personal communication, January 2024)
compost_price	0.19	NA	0.19	const	Price of compost	€/l	(Grosse-Kleimann, personal communication, January 2024)
pruning_juv1	0.15	NA	0.2	posnorm	Labour hours for pruning juvenile apple trees (year 1-5)	h/tree	(Grosse-Kleimann, personal communication, January 2024; Grolm and Bannier n.d. (adapted))
pruning_juv2	0.35	NA	0.45	posnorm	Labour hours for pruning juvenile apple trees (6-10)	h/tree	(Grosse-Kleimann, personal communication, January 2024; Grolm and Bannier n.d. (adapted))
pruning_adult1	0.5	NA	0.7	posnorm	Labour hours for pruning mature apple trees (year 11-15)	h/tree	(Grosse-Kleimann, personal communication, January 2024; Grolm and Bannier n.d. (adapted))
pruning_adult2	0.4	NA	0.65	posnorm	Labour hours for pruning mature apple trees (year 16 onwards)	h/tree	(Grosse-Kleimann, personal communication, January 2024; Grolm and Bannier n.d. (adapted))
root_pruning	1	NA	2	posnorm	Labour hours for root pruning trees	h	(Grosse-Kleimann, personal communication, January 2024)
mowing_treerow	56	NA	87	posnorm	Labour hours for mowing the tree strips manually	h/ha	(Grosse-Kleimann, personal communication, January 2024)
codling_moth_protect	200	NA	300	posnorm	Cost of installing pheromone dispensers	€/ha	(Expert interview, personal communication, February 2024)
maize_yield	5.42	10.37	13.69	posnorm	Maize yield	t/ha	(IT.NRW 2024a, b)
wheat_yield	5.99	8.155	9.7	posnorm	Winter wheat yield	t/ha	(IT.NRW 2024a, b)
barley_yield	4.48	6.825	9	posnorm	Winter barley yield	t/ha	(IT.NRW 2024a, b)
rapeseed_yield	2.9	3.76	5	posnorm	Winter rape seed yield	t/ha	(IT.NRW 2024a, b)
maize_seed_price	176.76	NA	293.12	posnorm	Cost of Maize seed	€/ha	(Bayerische Futtersaatbau GmbH n.d.)
maize_value	131	175.4	305.6	posnorm	Value of maize	€/t	(Statista 2024)
maize_fert_price	153.5	203.7	240.01	posnorm	Cost of fertilizer (NPK + Lime)	€/ha	(LLG 2016; KTBL n.d.)
maize_cides_price	63.2	70	102	posnorm	Cost of pesticides used in conventional maize field	€/ha	(LLG 2016; KTBL n.d.)
maize_mach_price	285.75	506.19	607.02	posnorm	Machine cost for Maize management, includes fixed and variable machine cost	€/ha	(LLG 2016; KTBL n.d.)
maize_labour	7.43	9.29	12.67	posnorm	Labour hours for Maize management	h/ha	(LLG 2016; KTBL n.d.)
maize_insurance	6	6.55	9.13	posnorm	Cost of insurance	€/ha	(LLG 2016; KTBL n.d.)
wheat_seed_price	39.2	100.66	229.32	posnorm	Cost of wheat seed	€/ha	(LLG 2016; KTBL n.d.)
wheat_value	126	175.65	310	posnorm	Value of winter wheat	€/t	(Statista 2023)
barley_value	114	157.3	279.1	posnorm	Value of barley	€/t	(Statista 2024b)
rapeseed_price	192.4	362.1	712.1	posnorm	Value of rape seed	€/t	(Statista 2024c)
wheat_fert_price	221.6	271.84	284	posnorm	Cost of fertilizer (NPK + Lime)	€/ha	(LLG 2016; KTBL n.d.)
wheat_cides_price	98.53	133.34	214.78	posnorm	Cost of pesticides used in conventional wheat field	€/ha	(LLG 2016; KTBL n.d.)
wheat_mach_price	261.3	350.03	369.69	posnorm	Machine cost for Wheat, includes fixed and variable machine cost	€/ha	(LLG 2016; KTBL n.d.)
wheat_labour	3.45	4.6	6.75	posnorm	Labour cost for wheat management	h/ha	(LLG 2016; KTBL n.d.)
wheat_insurance	7.7	8.1	11.78	posnorm	Cost of insurance	€/ha	(LLG 2016; KTBL n.d.)
rapeseed_seed_price	69	102	150	posnorm	Cost of rapeseed seed	€/ha	(BayWa AG n.d.)
rapeseed_fert_price	228.5	266.365	272.46	posnorm	Cost of fertilizer (NPK + Lime)	€/ha	(LLG 2016; KTBL n.d.)
rapeseed_cides_price	178.38	197.045	259.87	posnorm	Cost of pesticides used in conventional rape seed field	€/ha	(LLG 2016; KTBL n.d.)
rapeseed_mach_price	266	331.17	438	posnorm	Machine cost for rapeseed, includes fixed and variable machine cost	€/ha	(LLG 2016; KTBL n.d.)
rapeseed_labour	4.8	6.055	8.25	posnorm	Labour cost for rapeseed management	h/ha	(LLG 2016; KTBL n.d.)
rapeseed_insurance	16.38	17.55	34.36	posnorm	Cost of insurance	€/ha	(LLG 2016; KTBL n.d.)
barley_seed_price	56.1	81.515	210.49	posnorm	Cost of barley seed	€/ha	(BayWa AG n.d.)
barley_fert_price	172.65	201.31	219.9	posnorm	Cost of fertilizer (NPK + Lime)	€/ha	(LLG 2016; KTBL n.d.)
barley_cides_price	94.61	122.68	163.92	posnorm	Cost of pesticieds used in conventional barley field	€/ha	(LLG 2016; KTBL n.d.)
barley_mach_price	257.35	345.89	362.07	posnorm	Machine cost for barley, includes fixed and variable machine cost	€/ha	(LLG 2016; KTBL n.d.)
barley_labour	3.1	4.36	6.13	posnorm	Labour cost for barley management	h/ha	(LLG 2016; KTBL n.d.)
barley_insurance	7.07	7.765	9.33	posnorm	Cost of insurance	€/ha	(LLG 2016; KTBL n.d.)
table_apple_price	2	NA	5	posnorm	Price of table apples	€/kg	(Grosse-Kleimann, personal communication, January 2024)
bqual_apple_price	1	NA	2	posnorm	Price of intermediate quality apples	€/kg	
juice_apple_price	0.09	NA	0.16	posnorm	Price of juice apples	€/kg	(Hochstamm Deutschland e.V. 2023)
apple_yield_first	5	NA	10	posnorm	First apple yield, % of max. apple yield	%	(Expert interview, personal communication, February 2024)
apple_yield_second	20	NA	30	posnorm	Second stage apple yield, % of max. apple yield	%	(Expert interview, personal communication, February 2024)
apple_yield_max	10	NA	70	posnorm	Maximum apple yield	kg/tree	(Crawford 2015; Grosse-Kleimann, personal communication, January 2024; Expert interview, personal communication, February 2024; Gartencenter Meier n.d.)
time_to_first_apple1	4	NA	4	const	Estimate 1 when apple trees produce first harvest		
time_to_first_apple2	5	NA	5	const	Estimate 2 when apple trees produce first harvest		
time_to_second_apple1	7	NA	7	const	Estimate 1 when apple trees reach second yield stage (for gompertz curve)		
time_to_second_apple2	8	NA	8	const	Estimate 2 when apple trees reach second yield stage (for gompertz curve)		
apple_harvest	0.2	NA	1.2	posnorm	Labour cost for harvesting a kg of apples	€/kg	(Expert interview, personal communication, February 2024; Fischer 2008)
perc_table_apple	50	NA	80	posnorm	Percentage of total apple yield with table apple quality	%	(Grosse-Kleimann, personal communication, January 2024 ; Expert interview, personal communication, February 2024)
perc_bqual_apple	20	NA	50	posnorm	Percentage of intermediate quality apples	%	(Expert interview, personal communication, February 2024)
es3_subsidy	200	NA	200	const	Annual AF maintenance funding through the Eco Scheme programme	€/ha	(LEL 2023)
es3_application	5	NA	12	posnorm	Time spent on application for financial support	h	(Grosse-Kleimann, personal communication, January 2024; Expert interview, personal communication, February 2024)
gaec8	1	NA	1	const	Boolean variable, testing for compliance with GAEC 8		
alley_crop	1	NA	1	const	Boolean variable, testing if AF system is alley cropping system		
arable	1	NA	1	const	Boolean variable, testing if AF system is silvoarable		
treerow_SRC	0	NA	0	const	Boolean variable, testing if AF is SRC based		
treerow_shrubs	0	NA	0	const	Boolean variable, testing if AF is shrub based		

treerow_timber_food	1	NA	1	const	Boolean variable, testing if AF is fruit or timber based		
ni_invest_sub_max	20000	NA	20000	const	Maximum investment support for AF in Lower Saxony	€	(ML Nds. 2023)
ni_sub_application	2	NA	5	posnorm	Labour hours for applying for investment support	h	(Expert interview, personal communication, February 2024)
by_invest_src	1566	NA	1566	const	Investment support per ha of SRC tree row	€/ha	(StMELF and StMUV 2022)
by_invest_shrubs	4138	NA	4138	const	Investment support per ha of shrub tree row	€/ha	(StMELF and StMUV 2022)
by_invest_timb_food	5271	NA	5271	const	Investment support per ha of food/timber tree row	€/ha	(StMELF and StMUV 2022)
by_invest_max	50000	NA	50000	const	Maximum investment support for AF in Bavaria	€	(StMELF and StMUV 2022)
by_invest_maxpc	65	NA	65	const	Maximum investment support for AF in Bavaria	%	(StMELF and StMUV 2022)
by_sub_application	2	NA	5	posnorm	Labour hours for applying for investment support	h	
mv_invest_src	1566	NA	1566	const	Investment support per ha of SRC tree row	€/ha	(MKLUM MV 2023)
mv_invest_shrubs	4138	NA	4138	const	Investment support per ha of shrub tree row	€/ha	(MKLUM MV 2023)
mv_invest_timb_food	5271	NA	5271	const	Investment support per ha of food/timber tree row	€/ha	(MKLUM MV 2023)
mv_invest_max	300000	NA	300000	const	Maximum investment support for AF in Mecklenburg-Western pomerania	€	(MKLUM MV 2023)
mv_invest_maxpc	65	NA	65	const	Maximum investment support for AF in Mecklenburg-Western pomerania	%	(MKLUM MV 2023)
mv_sub_application	2	NA	5	posnorm	Labour hours for applying for investment support	h	
bw_invest_max	1500	NA	1500	const	Maximum investment support for AF in Baden Württemberg	€	(LEL 2023)
bw_invest_maxpc	80	NA	80	const	Maximum investment support for AF in Baden Württemberg	%	(LEL 2023)
bw_sub_application	2	NA	5	posnorm	Labour hours for applying for investment support in Baden Württemberg	h	(LEL 2023)
bb_sub_application	2	NA	5	posnorm	Labour hours for applying for investment support in Brandenburg	h	(LEL 2023)
bb_invest_max	1530	NA	1530	const	Maximum investment support for AF in Brandenburg	€	(MLUK 2024)
th_invest_max	2000	NA	2000	const	Maximum investment support for AF in Thuringia	€	(TLVwA 2023)
th_invest_maxpc	100	NA	100	const	Maximum investment support for AF in Thuringia	%	(TLVwA 2023)
th_sub_application	2	NA	5	posnorm	Labour hours for applying for investment support	h	
sn_sub_application	2	NA	5	posnorm	Labour hours for applying for investment support	h	
sn_invest_max	5000000	NA	5000000	posnorm	Max. investment support for AF in Saxony	€	(SMUL 2023)
sn_invest_min	20000	NA	20000	posnorm	A min. of 20.000€ of eligible investment cost must be proven to apply for funding	€	(SMUL 2023)
extra_arable_time	5	NA	30	posnorm	Additional expected labour for managing arable crops in AF system	%	(Grosse-Kleimann, personal communication, January 2024)
cv_wheat_yield	9.6	NA	9.6	const	Coefficient of variation of wheat yields	%	(IT.NRW 2024a, b)
cv_wheat_value	24.6	NA	24.6	const	Coefficient of variation of wheat value	%	(Statista 2023)
cv_wheat_seed_price	44.72	NA	44.72	const	Coefficient of variation of wheat seed prices	%	(LLG 2016; KTBL n.d.)
cv_wheat_fert_price	7.23	NA	7.23	const	Coefficient of variation of fertilizer cost (NPK +Lime)	%	(LLG 2016; KTBL n.d.)
cv_wheat_cides_price	23.15	NA	23.15	const	Coefficient of variation of total pesticide cost	%	(LLG 2016; KTBL n.d.)
cv_wheat_mach_price	11	NA	11	const	Coefficient of variation of machine cost for wheat	%	(LLG 2016; KTBL n.d.)
cv_wheat_labour	23.1	NA	23.1	const	Coefficient of variation of labour cost for wheat management	%	(LLG 2016; KTBL n.d.)
cv_wheat_insurance	15.14	NA	15.14	const	Coefficient of variation of insurance cost	%	(LLG 2016; KTBL n.d.)
cv_maize_yield	14.5	NA	14.5	const	Coefficient of variation of maize yields	%	(IT.NRW 2024a, b)
cv_maize_value	25.4	NA	25.4	const	Coefficient of variation of maize value	%	(Statista 2024)
cv_maize_seed_price	12	NA	12	const	Coefficient of variation of maize seed cost	%	(Statista 2024)
cv_maize_fert_price	17.6	NA	17.6	const	Coefficient of variation of fertilizer cost (NPK +Lime)	%	(LLG 2016; KTBL n.d.)
cv_maize_cides_price	20.06	NA	20.06	const	Coefficient of variation of pesticide cost	%	(LLG 2016; KTBL n.d.)
cv_maize_mach_price	23.82	NA	23.82	const	Coefficient of variation of machine cost for maize	%	(LLG 2016; KTBL n.d.)
cv_maize_labour	19.84	NA	19.84	const	Coefficient of variation of labour cost for maize management	%	(LLG 2016; KTBL n.d.)
cv_maize_insurance	17.61	NA	17.61	const	Coefficient of variation of insurance cost	%	(LLG 2016; KTBL n.d.)
cv_barley_yield	12.7	NA	12.7	const	Coefficient of variation of barley yields	%	(IT.NRW 2024a, b)
cv_barley_value	27.2	NA	27.2	const	Coefficient of variation of barley value	%	(Statista 2024b)
cv_barley_seed_price	45.98	NA	45.98	const	Coefficient of variation of barley seed cost	%	(Statista 2024b)
cv_barley_fert_price	8.66	NA	8.66	const	Coefficient of variation of fertilizer cost (NPK +Lime)	%	(LLG 2016; KTBL n.d.)
cv_barley_cides_price	17.73	NA	17.73	const	Coefficient of variation of total pesticide cost	%	(LLG 2016; KTBL n.d.)
cv_barley_mach_price	12.02	NA	12.02	const	Coefficient of variation of machine cost for barley	%	(LLG 2016; KTBL n.d.)
cv_barley_labour	23	NA	23	const	Coefficient of variation of Labour cost for barley management	%	(LLG 2016; KTBL n.d.)
cv_barley_insurance	8.66	NA	8.66	const	Coefficient of variation of insurance cost	%	(LLG 2016; KTBL n.d.)
cv_rapeseed_yield	14.4	NA	14.4	const	Coefficient of variation of rape seed yields	%	(IT.NRW 2024a, b)
cv_rapeseed_price	30.5	NA	30.5	const	Coefficient of variation of rape seed prices	%	(Statista 2024c)
cv_rapeseed_seed_price	24.7	NA	24.7	const	Coefficient of variation of rapeseed seed prices	%	(Statista 2024c)
cv_rapeseed_fert_price	31.41	NA	31.41	const	Coefficient of variation of fertilizer cost (NPK +Lime)	%	(LLG 2016; KTBL n.d.)
cv_rapeseed_cides_price	13	NA	13	const	Coefficient of variation of pestricide cost	%	(LLG 2016; KTBL n.d.)
cv_rapeseed_mach_price	13.78	NA	13.78	const	Coefficient of variation of machine cost for rape seed	%	(LLG 2016; KTBL n.d.)
cv_rapeseed_labour	16	NA	16	const	Coefficient of variation of labour cost for rape seed management	%	(LLG 2016; KTBL n.d.)
cv_rapeseed_insurance	31.41	NA	31.41	const	Coefficient of variation of Cost of insurance	%	(LLG 2016; KTBL n.d.)
chance_extreme_weather	0.05	NA	0.33	posnorm	Chance for the occurence of a yield damaging extreme weather event		
value_if_extreme_weather	0.8	NA	0.9	posnorm	Yield is reduced to the percentage captured in this variable if event occurs		
trees_yield_buffering_effe	0.003	NA	0.006	posnorm	Used to compute the trend, that describes how the AF system buffers arable yield variation with age		
yield_reduc_max	0.7	NA	0.9	posnorm	Used to compute the reduction in arable yield due to competition from trees		
time_to_first_reduction	1	NA	1	const	Used to compute the reduction in arable yield due to competition from trees		
time_to_second_reduction	6	NA	6	const	Used to compute the reduction in arable yield due to competition from trees		
perc_max_first_reduction	1	NA	1.5	posnorm	Used to compute the reduction in arable yield due to competition from trees		
perc_max_second_reducti	4	NA	6	posnorm	Used to compute the reduction in arable yield due to competition from trees		

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