

Supplementary material A

The units of the following results were the inputs of per live pig.

Table S1. Emergy inputs and outputs details of ecological livestock production systems

Percentage of the maize silage added				0%		10%		40%		60%		80%	
Item	Unit	RNFa	UEVb	Raw data	Emergy	Raw data	Emergy	Raw data	Emergy	Raw data	Emergy	Raw data	Emergy
Raising period				60 days									
Natural environmental inputs													
sun c	J	1.00	1.00E+00	3.25E+09	3.25E+09	2.60E+09	2.60E+09	3.25E+09	3.25E+09	2.59E+09	2.59E+09	2.59E+09	2.59E+09
wind c	J	1.00	1.86E+03	9.00E+05	1.67E+09	7.14E+05	1.33E+09	8.94E+05	1.66E+09	7.20E+05	1.34E+09	7.14E+05	1.33E+09
Rain c	J	1.00	2.35E+04	1.82E+06	4.27E+10	1.45E+06	3.41E+10	1.82E+06	4.27E+10	1.45E+06	3.41E+10	1.45E+06	3.41E+10
Ground water	J	0.00	1.86E+05	1.60E+06	2.97E+11	1.91E+06	3.55E+11	1.60E+06	2.96E+11	1.92E+06	3.56E+11	1.91E+06	3.55E+11
Local materials													
Silage maize(dry weight)	kg	0.24	1.65E+11	0.00E+00	0.00E+00	1.58E+01	2.61E+12	5.24E+01	8.64E+12	6.98E+01	1.15E+13	1.01E+02	1.67E+13
Maize	kg	0.24	5.87E+11	1.07E+02	6.26E+13	1.11E+02	6.49E+13	4.58E+01	2.69E+13	2.33E+01	1.37E+13	0.00E+00	0.00E+00
Soybean meal	kg	0.33	1.42E+12	2.13E+01	3.04E+13	2.37E+01	3.37E+13	1.96E+01	2.80E+13	1.74E+01	2.48E+13	1.90E+01	2.70E+13
Wheat bran	kg	0.41	8.32E+11	1.42E+01	1.18E+13	7.90E+00	6.57E+12	1.31E+01	1.09E+13	5.81E+00	4.84E+12	6.33E+00	5.27E+12
Purchased materials or services													
Piglet	Kg	0.21	9.02E+12	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14
Disinfectants	g	0.00	1.27E+09	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10
Vaccine	g	0.00	1.89E+10	1.05E+00	1.98E+10	9.84E-01	1.86E+10	3.58E-01	6.75E+09	9.84E-01	1.86E+10	9.84E-01	1.86E+10
Micro-biological additives	¥	0.20	3.11E+11	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12
Electricity	J	0.09	2.17E+05	1.39E+06	3.01E+11	1.39E+06	3.01E+11	1.39E+06	3.01E+11	1.39E+06	3.01E+11	1.39E+06	3.01E+11
Steel	g	0.00	3.52E+09	7.20E+02	2.54E+12	7.20E+02	2.54E+12	7.20E+02	2.54E+12	7.20E+02	2.54E+12	7.20E+02	2.54E+12
Concrete	g	0.00	4.42E+08	5.13E+03	2.27E+12	5.13E+03	2.27E+12	5.13E+03	2.27E+12	5.13E+03	2.27E+12	5.13E+03	2.27E+12
Glass	g	0.00	2.90E+07	2.63E+01	7.63E+08	2.63E+01	7.63E+08	2.63E+01	7.63E+08	2.63E+01	7.63E+08	2.63E+01	7.63E+08
Building	¥	0.05	3.11E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11

Facilities	¥	0.05	3.11E+11	6.24E+00	1.94E+12	6.24E+00	1.94E+12	6.24E+00	1.94E+12	6.24E+00	1.94E+12	6.24E+00	1.94E+12
Medicine	¥	0.05	3.11E+11	3.50E+01	1.09E+13	3.44E+01	1.07E+13	1.07E+01	3.34E+12	1.48E+01	4.59E+12	1.48E+01	4.59E+12
Labor	J	0.60	5.73E+06	1.75E+06	1.00E+13	1.77E+06	1.01E+13	1.75E+06	1.00E+13	1.77E+06	1.01E+13	1.77E+06	1.01E+13
Outputs	body weight	kg		71.77958		72.58556		71.27186		70.94967		71.85844	
Total emergy					4.98E+14		5.01E+14		4.60E+14		4.42E+14		4.36E+14
Raising period			120 days										
Natural environmental inputs													
sun c	J	1.00	1.00E+00	6.49E+09	6.49E+09	5.20E+09	5.20E+09	6.49E+09	6.49E+09	5.18E+09	5.18E+09	5.18E+09	5.18E+09
wind c	J	1.00	1.86E+03	1.80E+06	3.34E+09	1.43E+06	2.65E+09	1.79E+06	3.32E+09	1.44E+06	2.67E+09	1.43E+06	2.65E+09
Rain c	J	1.00	2.35E+04	3.64E+06	8.54E+10	2.90E+06	6.82E+10	3.64E+06	8.54E+10	2.90E+06	6.82E+10	2.90E+06	6.82E+10
Ground water	J	0.00	1.86E+05	3.20E+06	5.95E+11	3.83E+06	7.11E+11	3.19E+06	5.92E+11	3.84E+06	7.13E+11	3.83E+06	7.11E+11
Local materials													
Silage maize(dry weight)	kg	0.24	1.65E+11	0	0.00E+00	38.78611	6.40E+12	129.9134	2.14E+13	153.2924	2.53E+13	228.9723	3.78E+13
Maize	kg	0.24	5.87E+11	232.0325	1.36E+14	271.5028	1.59E+14	113.6742	6.67E+13	51.09747	3.00E+13	0	0.00E+00
Soybean meal	kg	0.33	1.42E+12	46.4065	6.61E+13	58.17916	8.29E+13	48.71753	6.94E+13	38.3231	5.46E+13	42.93231	6.11E+13
Wheat bran	kg	0.41	8.32E+11	30.93767	2.57E+13	19.39305	1.61E+13	32.47835	2.70E+13	12.77437	1.06E+13	14.31077	1.19E+13
Purchased materials or services													
Piglet	Kg	0.21	9.02E+12	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14
Disinfectants	g	0.00	1.27E+09	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10
Vaccine	g	0.00	1.89E+10	2.10E+00	3.96E+10	1.97E+00	3.71E+10	7.15E-01	1.35E+10	1.97E+00	3.71E+10	1.97E+00	3.71E+10
Micro-biological additives	¥	0.20	3.11E+11	2.50E+01	7.76E+12	2.50E+01	7.76E+12	2.50E+01	7.76E+12	2.50E+01	7.76E+12	2.50E+01	7.76E+12
Electricity	J	0.09	2.17E+05	2.77E+06	6.03E+11	2.77E+06	6.03E+11	2.77E+06	6.03E+11	2.77E+06	6.03E+11	2.77E+06	6.03E+11
Steel	g	0.00	3.52E+09	7.20E+02	2.54E+12	7.20E+02	2.54E+12	7.20E+02	2.54E+12	7.20E+02	2.54E+12	7.20E+02	2.54E+12
Concrete	g	0.00	4.42E+08	5.13E+03	2.27E+12	5.13E+03	2.27E+12	5.13E+03	2.27E+12	5.13E+03	2.27E+12	5.13E+03	2.27E+12
Glass	g	0.00	2.90E+07	2.63E+01	7.63E+08	2.63E+01	7.63E+08	2.63E+01	7.63E+08	2.63E+01	7.63E+08	2.63E+01	7.63E+08

Building	¥	0.05	3.11E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11
Facilities	¥	0.05	3.11E+11	6.24E+00	1.94E+12	6.24E+00	1.94E+12	6.24E+00	1.94E+12	6.24E+00	1.94E+12	6.24E+00	1.94E+12
Medicine	¥	0.05	3.11E+11	7.00E+01	2.18E+13	6.89E+01	2.14E+13	2.15E+01	6.68E+12	2.95E+01	9.18E+12	2.95E+01	9.18E+12
Labor	J	0.60	5.73E+06	3.50E+06	2.01E+13	3.54E+06	2.03E+13	3.50E+06	2.01E+13	3.54E+06	2.03E+13	3.54E+06	2.03E+13
Outputs	body weight	kg		110.1206		121.9301		112.142		103.9724		104.6843	
Total emergy					6.47E+14		6.83E+14		5.88E+14		5.27E+14		5.17E+14
Raising period			180 days										
Natural environmental inputs													
sun c	J	1.00	1.00E+00	9.74E+09	9.74E+09	7.79E+09	7.79E+09	9.74E+09	9.74E+09	7.78E+09	7.78E+09	7.78E+09	7.78E+09
wind c	J	1.00	1.86E+03	2.70E+06	5.01E+09	2.14E+06	3.98E+09	2.68E+06	4.98E+09	2.16E+06	4.01E+09	2.14E+06	3.98E+09
Rain c	J	1.00	2.35E+04	5.45E+06	1.28E+11	4.36E+06	1.02E+11	5.45E+06	1.28E+11	4.36E+06	1.02E+11	4.36E+06	1.02E+11
Ground water	J	0.00	1.86E+05	4.81E+06	8.92E+11	5.74E+06	1.07E+12	4.79E+06	8.89E+11	5.76E+06	1.07E+12	5.74E+06	1.07E+12
Local materials													
Silage maize(dry weight)	kg	0.24	1.65E+11	0.00E+00	0.00E+00	6.68E+01	1.10E+13	2.15E+02	3.55E+13	2.20E+02	3.63E+13	3.30E+02	5.44E+13
Maize	kg	0.24	5.87E+11	3.40E+02	2.00E+14	4.68E+02	2.75E+14	1.88E+02	1.10E+14	7.33E+01	4.31E+13	0.00E+00	0.00E+00
Soybean meal	kg	0.33	1.42E+12	6.81E+01	9.69E+13	1.00E+02	1.43E+14	8.06E+01	1.15E+14	5.50E+01	7.83E+13	6.18E+01	8.80E+13
Wheat bran	kg	0.41	8.32E+11	4.54E+01	3.78E+13	3.34E+01	2.78E+13	5.38E+01	4.47E+13	1.83E+01	1.53E+13	2.06E+01	1.71E+13
Purchased materials or services													
Piglet	Kg	0.21	9.02E+12	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14
Disinfectants	g	0.00	1.27E+09	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10
Vaccine	g	0.00	1.89E+10	3.15E+00	5.94E+10	2.95E+00	5.57E+10	1.07E+00	2.02E+10	2.95E+00	5.57E+10	2.95E+00	5.57E+10
Micro-biological additives	¥	0.20	3.11E+11	3.74E+01	1.16E+13	3.74E+01	1.16E+13	3.74E+01	1.16E+13	3.74E+01	1.16E+13	3.74E+01	1.16E+13
Electricity	J	0.09	2.17E+05	4.16E+06	9.04E+11	4.16E+06	9.04E+11	4.16E+06	9.04E+11	4.16E+06	9.04E+11	4.16E+06	9.04E+11
Steel	g	0.00	3.52E+09	7.20E+02	2.54E+12	7.20E+02	2.54E+12	7.20E+02	2.54E+12	7.20E+02	2.54E+12	7.20E+02	2.54E+12

Concrete	g	0.00	4.42E+08	5.13E+03	2.27E+12	5.13E+03	2.27E+12	5.13E+03	2.27E+12	5.13E+03	2.27E+12	5.13E+03	2.27E+12
Glass	g	0.00	2.90E+07	2.63E+01	7.63E+08	2.63E+01	7.63E+08	2.63E+01	7.63E+08	2.63E+01	7.63E+08	2.63E+01	7.63E+08
Building	¥	0.05	3.11E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11	1.25E+00	3.89E+11
Facilities	¥	0.05	3.11E+11	6.24E+00	1.94E+12	6.24E+00	1.94E+12	6.24E+00	1.94E+12	6.24E+00	1.94E+12	6.24E+00	1.94E+12
Medicine	¥	0.05	3.11E+11	1.05E+02	3.26E+13	1.03E+02	3.21E+13	3.22E+01	1.00E+13	4.43E+01	1.38E+13	4.43E+01	1.38E+13
Labor	J	0.60	5.73E+06	5.26E+06	3.01E+13	5.31E+06	3.04E+13	5.26E+06	3.01E+13	5.31E+06	3.04E+13	5.31E+06	3.04E+13
Outputs	body weight	kg		1.44E+02		1.84E+02		1.53E+02		1.29E+02		1.28E+02	
Total emergy					7.79E+14		9.00E+14		7.27E+14		5.99E+14		5.85E+14
	Raising period			240 days									
	Natural environmental inputs												
sun c	J	1.00	1.00E+00	1.30E+10	1.30E+10	1.04E+10	1.04E+10	1.30E+10	1.30E+10	1.04E+10	1.04E+10	1.04E+10	1.04E+10
wind c	J	1.00	1.86E+03	3.60E+06	6.68E+09	2.86E+06	5.30E+09	3.58E+06	6.64E+09	2.88E+06	5.35E+09	2.86E+06	5.30E+09
Rain c	J	1.00	2.35E+04	7.27E+06	1.71E+11	5.81E+06	1.36E+11	7.27E+06	1.71E+11	5.81E+06	1.36E+11	5.81E+06	1.36E+11
Ground water	J	0.00	1.86E+05	6.41E+06	1.19E+12	7.66E+06	1.42E+12	6.38E+06	1.18E+12	7.68E+06	1.43E+12	7.66E+06	1.42E+12
	Local materials												
Silage maize(dry weight)	kg	0.24	1.65E+11	0	0.00E+00	94.30547	1.56E+13	284.4084	4.69E+13	259.0082	4.27E+13	385.6342	6.36E+13
Maize	kg	0.24	5.87E+11	411.1193	2.41E+14	660.1383	3.88E+14	248.8573	1.46E+14	86.33605	5.07E+13	0	0.00E+00
Soybean meal	kg	0.33	1.42E+12	82.22386	1.17E+14	141.4582	2.01E+14	106.6531	1.52E+14	64.75204	9.22E+13	72.30642	1.03E+14
Wheat bran	kg	0.41	8.32E+11	54.81591	4.56E+13	47.15274	3.92E+13	71.1021	5.92E+13	21.58401	1.80E+13	24.10214	2.01E+13
	Purchased materials or services												
Piglet	Kg	0.21	9.02E+12	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14
Disinfectants	g	0.00	1.27E+09	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10
Vaccine	g	0.00	1.89E+10	4.20E+00	7.92E+10	3.94E+00	7.42E+10	1.43E+00	2.70E+10	3.94E+00	7.42E+10	3.94E+00	7.42E+10
Micro-biological additives	¥	0.20	3.11E+11	4.99E+01	1.55E+13	4.99E+01	1.55E+13	4.99E+01	1.55E+13	4.99E+01	1.55E+13	4.99E+01	1.55E+13
Electricity	J	0.09	2.17E+05	5.54E+06	1.21E+12	5.54E+06	1.21E+12	5.54E+06	1.21E+12	5.54E+06	1.21E+12	5.54E+06	1.21E+12

Steel	g	0.00	3.52E+09	1.44E+03	5.07E+12	1.44E+03	5.07E+12	1.44E+03	5.07E+12	1.44E+03	5.07E+12	1.44E+03	5.07E+12
Concrete	g	0.00	4.42E+08	1.03E+04	4.53E+12	1.03E+04	4.53E+12	1.03E+04	4.53E+12	1.03E+04	4.53E+12	1.03E+04	4.53E+12
Glass	g	0.00	2.90E+07	5.26E+01	1.53E+09	5.26E+01	1.53E+09	5.26E+01	1.53E+09	5.26E+01	1.53E+09	5.26E+01	1.53E+09
Building	¥	0.05	3.11E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11
Facilities	¥	0.05	3.11E+11	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12
Medicine	¥	0.05	3.11E+11	1.40E+02	4.35E+13	1.38E+02	4.28E+13	4.30E+01	1.34E+13	5.90E+01	1.84E+13	5.90E+01	1.84E+13
Labor	J	0.60	5.73E+06	7.01E+06	4.01E+13	7.08E+06	4.05E+13	7.01E+06	4.01E+13	7.08E+06	4.05E+13	7.08E+06	4.05E+13
Outputs	body weight	kg		1.66E+02		2.47E+02		1.84E+02		1.42E+02		1.40E+02	
Total emergy					8.81E+14		1.12E+15		8.51E+14		6.56E+14		6.39E+14
	Raising period			300 days									
	Natural environmental inputs												
sun c	J	1.00	1.00E+00	1.62E+10	1.62E+10	1.30E+10	1.30E+10	1.62E+10	1.62E+10	1.30E+10	1.30E+10	1.30E+10	1.30E+10
wind c	J	1.00	1.86E+03	4.50E+06	8.35E+09	3.57E+06	6.63E+09	4.47E+06	8.30E+09	3.60E+06	6.68E+09	3.57E+06	6.63E+09
Rain c	J	1.00	2.35E+04	9.09E+06	2.13E+11	7.26E+06	1.71E+11	9.09E+06	2.13E+11	7.26E+06	1.71E+11	7.26E+06	1.71E+11
Ground water	J	0.00	1.86E+05	8.01E+06	1.49E+12	9.57E+06	1.78E+12	7.98E+06	1.48E+12	9.60E+06	1.78E+12	9.57E+06	1.78E+12
	Local materials												
Silage maize(dry weight)	kg	0.24	1.65E+11	0.00E+00	0.00E+00	1.16E+02	1.91E+13	3.29E+02	5.43E+13	2.78E+02	4.59E+13	4.11E+02	6.79E+13
Maize	kg	0.24	5.87E+11	4.49E+02	2.64E+14	8.12E+02	4.76E+14	2.88E+02	1.69E+14	9.26E+01	5.44E+13	0.00E+00	0.00E+00
Soybean meal	kg	0.33	1.42E+12	8.99E+01	1.28E+14	1.74E+02	2.48E+14	1.23E+02	1.76E+14	6.95E+01	9.89E+13	7.71E+01	1.10E+14
Wheat bran	kg	0.41	8.32E+11	5.99E+01	4.98E+13	5.80E+01	4.82E+13	8.23E+01	6.84E+13	2.32E+01	1.93E+13	2.57E+01	2.14E+13
	Purchased materials or services												
Piglet	Kg	0.21	9.02E+12	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14
Disinfectants	g	0.00	1.27E+09	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10
Vaccine	g	0.00	1.89E+10	5.25E+00	9.90E+10	4.92E+00	9.28E+10	1.79E+00	3.37E+10	4.92E+00	9.28E+10	4.92E+00	9.28E+10
Micro-biological additives	¥	0.20	3.11E+11	6.24E+01	1.94E+13	6.24E+01	1.94E+13	6.24E+01	1.94E+13	6.24E+01	1.94E+13	6.24E+01	1.94E+13

Electricity	J	0.09	2.17E+05	6.93E+06	1.51E+12	6.93E+06	1.51E+12	6.93E+06	1.51E+12	6.93E+06	1.51E+12	6.93E+06	1.51E+12
Steel	g	0.00	3.52E+09	1.44E+03	5.07E+12	1.44E+03	5.07E+12	1.44E+03	5.07E+12	1.44E+03	5.07E+12	1.44E+03	5.07E+12
Concrete	g	0.00	4.42E+08	1.03E+04	4.53E+12	1.03E+04	4.53E+12	1.03E+04	4.53E+12	1.03E+04	4.53E+12	1.03E+04	4.53E+12
Glass	g	0.00	2.90E+07	5.26E+01	1.53E+09	5.26E+01	1.53E+09	5.26E+01	1.53E+09	5.26E+01	1.53E+09	5.26E+01	1.53E+09
Building	¥	0.05	3.11E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11
Facilities	¥	0.05	3.11E+11	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12
Medicine	¥	0.05	3.11E+11	1.75E+02	5.44E+13	1.72E+02	5.36E+13	5.37E+01	1.67E+13	7.38E+01	2.30E+13	7.38E+01	2.30E+13
Labor	J	0.60	5.73E+06	8.76E+06	5.02E+13	8.85E+06	5.07E+13	8.76E+06	5.02E+13	8.85E+06	5.07E+13	8.85E+06	5.07E+13
Outputs	body weight	kg		1.78E+02		2.97E+02		2.04E+02		1.49E+02		1.45E+02	
Total emergy					9.44E+14		1.29E+15		9.32E+14		6.90E+14		6.71E+14
	Raising period			360 days									
	Natural environmental inputs												
sun c	J	1.00	1.00E+00	1.95E+10	1.95E+10	1.56E+10	1.56E+10	1.95E+10	1.95E+10	1.56E+10	1.56E+10	1.56E+10	1.56E+10
wind c	J	1.00	1.86E+03	5.40E+06	1.00E+10	4.28E+06	7.95E+09	5.36E+06	9.96E+09	4.32E+06	8.02E+09	4.28E+06	7.95E+09
Rain c	J	1.00	2.35E+04	1.09E+07	2.56E+11	8.71E+06	2.05E+11	1.09E+07	2.56E+11	8.71E+06	2.05E+11	8.71E+06	2.05E+11
Ground water	J	0.00	1.86E+05	9.61E+06	1.78E+12	1.15E+07	2.13E+12	9.58E+06	1.78E+12	1.15E+07	2.14E+12	1.15E+07	2.13E+12
	Local materials												
Silage maize(dry weight)	kg	0.24	1.65E+11	0	0.00E+00	130.1504	2.15E+13	353.6409	5.84E+13	286.2076	4.72E+13	422.1369	6.97E+13
Maize	kg	0.24	5.87E+11	467.8725	2.75E+14	911.0528	5.35E+14	309.4358	1.82E+14	95.40252	5.60E+13	0	0.00E+00
Soybean meal	kg	0.33	1.42E+12	93.57449	1.33E+14	195.2256	2.78E+14	132.6153	1.89E+14	71.55189	1.02E+14	79.15068	1.13E+14
Wheat bran	kg	0.41	8.32E+11	62.38299	5.19E+13	65.0752	5.41E+13	88.41022	7.36E+13	23.85063	1.98E+13	26.38356	2.20E+13
	Purchased materials or services												
Piglet	Kg	0.21	9.02E+12	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14	4.00E+01	3.61E+14
Disinfectants	g	0.00	1.27E+09	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10	2.78E+01	3.54E+10
Vaccine	g	0.00	1.89E+10	6.30E+00	1.19E+11	5.90E+00	1.11E+11	2.15E+00	4.05E+10	5.90E+00	1.11E+11	5.90E+00	1.11E+11

Micro-biological additives	¥	0.20	3.11E+11	7.49E+01	2.33E+13	7.49E+01	2.33E+13	7.49E+01	2.33E+13	7.49E+01	2.33E+13	7.49E+01	2.33E+13
Electricity	J	0.09	2.17E+05	8.32E+06	1.81E+12	8.32E+06	1.81E+12	8.32E+06	1.81E+12	8.32E+06	1.81E+12	8.32E+06	1.81E+12
Steel	g	0.00	3.52E+09	1.44E+03	5.07E+12	1.44E+03	5.07E+12	1.44E+03	5.07E+12	1.44E+03	5.07E+12	1.44E+03	5.07E+12
Concrete	g	0.00	4.42E+08	1.03E+04	4.53E+12	1.03E+04	4.53E+12	1.03E+04	4.53E+12	1.03E+04	4.53E+12	1.03E+04	4.53E+12
Glass	g	0.00	2.90E+07	5.26E+01	1.53E+09	5.26E+01	1.53E+09	5.26E+01	1.53E+09	5.26E+01	1.53E+09	5.26E+01	1.53E+09
Building	¥	0.05	3.11E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11	2.50E+00	7.77E+11
Facilities	¥	0.05	3.11E+11	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12	1.25E+01	3.88E+12
Medicine	¥	0.05	3.11E+11	2.10E+02	6.53E+13	2.07E+02	6.43E+13	6.44E+01	2.00E+13	8.86E+01	2.75E+13	8.86E+01	2.75E+13
Labor	J	0.60	5.73E+06	1.05E+07	6.02E+13	1.06E+07	6.08E+13	1.05E+07	6.02E+13	1.06E+07	6.08E+13	1.06E+07	6.08E+13
Outputs	body weight	kg		1.84E+02		3.30E+02		2.14E+02		1.52E+02		1.47E+02	
Total emergy					9.87E+14		1.42E+15		9.85E+14		7.16E+14		6.95E+14

^a:The baseline used in this study is12.00E+24seJ/year standard.

^b: Only the highest value of wind and rain was considered.

^c: Compound fertiliser was calculated by its composition of N,P,K.

Supplementary material B

Table S2. Cost details of ecological livestock production systems (per pig)

Group	Items	Units	Raising Period (days)					
			60.00	120.00	180.00	240.00	300.00	360.00
Group A	Piglet	¥/kg	800.00	800.00	800.00	800.00	800.00	800.00
	Silage maize	¥/kg	0.00	0.00	0.00	0.00	0.00	0.00
	Maize	¥/kg	79.52	173.12	253.90	306.73	335.26	349.07
	Soybean meal	¥/kg	4.04	8.80	12.91	15.59	17.04	17.75

	Wheat bran	¥/kg	45.47	99.00	145.20	175.41	191.72	199.63
	Vaccine	¥/g	3.09	3.09	3.09	3.09	3.09	3.09
	Disinfectants	¥/g	1.58	3.15	4.73	6.30	7.88	9.45
	Micro-biological additives	¥.per pig	12.48	24.96	37.44	49.92	62.40	74.88
	Electricity	¥.J	0.21	0.42	0.63	0.84	1.05	1.26
	Steel	¥/g	3.74	3.74	3.74	7.49	7.49	7.49
	Concrete	¥/g	0.95	0.95	0.95	1.90	1.90	1.90
	Glass	¥/g	0.06	0.06	0.06	0.11	0.11	0.11
	Building	¥.per pig	1.25	1.25	1.25	2.50	2.50	2.50
	Facilities	¥.per pig	6.24	6.24	6.24	12.48	12.48	12.48
	Medicine	¥.per pig	34.98	69.96	104.94	139.92	174.90	209.88
	Labor	¥.J	5.55	11.11	16.66	22.22	27.77	33.32
Group B	Piglet	¥/kg	800.00	800.00	800.00	800.00	800.00	800.00
	Silage maize	¥/g	1.89	4.63	7.98	11.27	13.85	15.55
	Maize	¥/g	82.48	202.56	349.00	492.52	605.46	679.73
	Soybean meal	¥/g	4.49	11.03	19.01	26.83	32.98	37.03
	Wheat bran	¥/g	25.27	62.06	106.92	150.89	185.49	208.24
	Vaccine	¥/g	3.09	3.09	3.09	3.09	3.09	3.09
	Disinfectants	¥/g	1.48	2.95	4.43	5.90	7.38	8.86
	Micro-biological additives	¥.per pig	12.48	24.96	37.44	49.92	62.40	74.88
	Electricity	¥.J	0.21	0.42	0.63	0.84	1.05	1.26
	Steel	¥/g	3.74	3.74	3.74	7.49	7.49	7.49
	Concrete	¥/g	0.95	0.95	0.95	1.90	1.90	1.90

	Glass	¥/g	0.06	0.06	0.06	0.11	0.11	0.11
	Building	¥.per pig	1.25	1.25	1.25	2.50	2.50	2.50
	Facilities	¥.per pig	6.24	6.24	6.24	12.48	12.48	12.48
	Medicine	¥.per pig	34.44	68.88	103.32	137.76	172.20	206.64
	Labor	¥.J	5.61	11.22	16.83	22.44	28.05	33.67
Group C	Piglet	¥/kg	800.00	800.00	800.00	800.00	800.00	800.00
	Silage maize	¥/g	6.26	15.52	25.69	33.98	39.31	42.25
	Maize	¥/g	34.18	84.81	140.40	185.67	214.79	230.87
	Soybean meal	¥/g	3.72	9.24	15.30	20.23	23.40	25.15
	Wheat bran	¥/g	41.89	103.93	172.05	227.53	263.21	282.91
	Vaccine	¥/g	3.09	3.09	3.09	3.09	3.09	3.09
	Disinfectants	¥/g	0.54	1.07	1.61	2.15	2.68	3.22
	Micro-biological additives	¥.per pig	12.48	24.96	37.44	49.92	62.40	74.88
	Electricity	¥.J	0.21	0.42	0.63	0.84	1.05	1.26
	Steel	¥/g	3.74	3.74	3.74	7.49	7.49	7.49
	Concrete	¥/g	0.95	0.95	0.95	1.90	1.90	1.90
	Glass	¥/g	0.06	0.06	0.06	0.11	0.11	0.11
	Building	¥.per pig	1.25	1.25	1.25	2.50	2.50	2.50
	Facilities	¥.per pig	6.24	6.24	6.24	12.48	12.48	12.48
	Medicine	¥.per pig	10.74	21.48	32.22	42.96	53.70	64.44
	Labor	¥.J	5.55	11.11	16.66	22.22	27.77	33.32
Group D	Piglet	¥/kg	800.00	800.00	800.00	800.00	800.00	800.00
	Silage maize	¥/g	8.34	18.31	26.29	30.94	33.20	34.19
	Maize	¥/g	17.35	38.12	54.72	64.41	69.11	71.18

	Soybean meal	¥/g	3.31	7.27	10.43	12.28	13.18	13.57
	Wheat bran	¥/g	18.60	40.88	58.68	69.07	74.10	76.32
	Vaccine	¥/g	3.09	3.09	3.09	3.09	3.09	3.09
	Disinfectants	¥/g	1.48	2.95	4.43	5.90	7.38	8.86
	Micro-biological additives	¥.per pig	12.48	24.96	37.44	49.92	62.40	74.88
	Electricity	¥.J	0.21	0.42	0.63	0.84	1.05	1.26
	Steel	¥/g	3.74	3.74	3.74	7.49	7.49	7.49
	Concrete	¥/g	0.95	0.95	0.95	1.90	1.90	1.90
	Glass	¥/g	0.06	0.06	0.06	0.11	0.11	0.11
	Building	¥.per pig	1.25	1.25	1.25	2.50	2.50	2.50
	Facilities	¥.per pig	6.24	6.24	6.24	12.48	12.48	12.48
	Medicine	¥.per pig	14.76	29.52	44.28	59.04	73.80	88.56
	Labor	¥.J	5.61	11.22	16.83	22.44	28.05	33.67
Group E	Piglet	¥/kg	800.00	800.00	800.00	800.00	800.00	800.00
	Silage maize	¥/g	12.10	27.36	39.38	46.07	49.15	50.43
	Maize	¥/g	0.00	0.00	0.00	0.00	0.00	0.00
	Soybean meal	¥/g	3.60	8.14	11.72	13.71	14.63	15.01
	Wheat bran	¥/g	20.25	45.79	65.91	77.13	82.27	84.43
	Vaccine	¥/g	3.09	3.09	3.09	3.09	3.09	3.09
	Disinfectants	¥/g	1.48	2.95	4.43	5.90	7.38	8.86
	Micro-biological additives	¥.per pig	12.48	24.96	37.44	49.92	62.40	74.88
	Electricity	¥.J	0.21	0.42	0.63	0.84	1.05	1.26
	Steel	¥/g	3.74	3.74	3.74	7.49	7.49	7.49

	Concrete	¥/g	0.95	0.95	0.95	1.90	1.90	1.90
	Glass	¥/g	0.06	0.06	0.06	0.11	0.11	0.11
	Building	¥.per pig	1.25	1.25	1.25	2.50	2.50	2.50
	Facilities	¥.per pig	6.24	6.24	6.24	12.48	12.48	12.48
	Medicine	¥.per pig	14.76	29.52	44.28	59.04	73.80	88.56
	Labor	¥.J	5.61	11.22	16.83	22.44	28.05	33.67

Table S3. Economic indices of ecological livestock production systems (per pig)

Group	Items	Units	Raising period (days)					
			60	120	180	240	300	360
A	Price	¥	30.0	30.0	30.0	30.0	30.0	30.0
	Cost	¥	2153.4	3303.6	4313.3	4980.3	5342.4	5518.2
	Profits	¥	1154.2	2097.8	2921.6	3435.8	3696.8	3795.4
	Profits per kg live body weight	¥/kg	16.1	19.0	20.3	20.7	20.8	20.6
B	Price	¥	30.0	30.0	30.0	30.0	30.0	30.0
	Cost	¥	2177.6	3657.9	5523.2	7397.1	8896.6	9892.8
	Profits	¥	1193.9	2453.9	4062.3	5671.1	6960.1	7799.4
	Profits per kg live body weight	¥/kg	16.4	20.1	22.1	23.0	23.5	23.7
C	Price	¥	30.0	30.0	30.0	30.0	30.0	30.0
	Cost	¥	2138.2	3364.3	4591.7	5532.8	6117.2	6434.0
	Profits	¥	1207.3	2276.4	3334.4	4119.7	4601.3	4848.2
	Profits per kg live body weight	¥/kg	16.9	20.3	21.8	22.3	22.6	22.6
D	Price	¥	30.0	30.0	30.0	30.0	30.0	30.0
	Cost	¥	2128.5	3119.2	3855.9	4269.8	4466.7	4552.8
	Profits	¥	1231.0	2130.2	2786.8	3127.4	3276.8	3322.8

	Profits per kg live body weight	¥/kg	17.4	20.5	21.7	22.0	22.0	21.9
E	Price	¥	30.0	30.0	30.0	30.0	30.0	30.0
	Cost	¥	2155.8	3140.5	3827.5	4187.4	4348.0	4414.5
	Profits	¥	1269.9	2174.8	2791.5	3084.7	3201.7	3229.9
	Profits per kg live body weight	¥/kg	17.7	20.8	21.9	22.1	22.1	21.9