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RESEARCH ARTICLE

## **Evaluation of the impact of the Science and Technology Backyard initiative on the rice production system in the Erhai Lake Basin based on emergy analysis**

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## **SUPPLEMENTARY MATERIALS**

**Table S1** Environmental and purchased flows and their unit energy values and renewability

Item	Conversion factor	Efficiency of emery transformity	Renewable factor	Source
<b>Input</b>				
Renewable environmental inputs				
Solar energy		1 (sej·J <sup>-1</sup> )	1	[1]
Rainfall chemical energy	$4.94 \times 10^3$ (J·kg <sup>-1</sup> )	$2.20 \times 10^4$ (sej·J <sup>-1</sup> )	1	[2]
Earth rotation	$7.00 \times 10^{-2}$ (W·m <sup>-2</sup> )	$4.40 \times 10^4$ (sej·J <sup>-1</sup> )	1	[2]
Nonrenewable environmental inputs				
Soil organic matter reduction	$4.19 \times 10^3$ (J·kcal <sup>-1</sup> )	$9.40 \times 10^4$ (sej·J <sup>-1</sup> )	0	[3]
Purchased inputs				
Nitrogen fertilizer		$4.83 \times 10^9$ (sej·g <sup>-1</sup> )	0	[1]
Phosphate fertilizer		$4.96 \times 10^9$ (sej·g <sup>-1</sup> )	0	[1]
Potassium fertilizer		$1.40 \times 10^9$ (sej·g <sup>-1</sup> )	0	[1]
Manure		$2.96 \times 10^8$ (sej·g <sup>-1</sup> )	0.8	[1]
Pesticide	$2.08 \times 10^8$ (J·kcal <sup>-1</sup> )	$1.97 \times 10^6$ (sej·J <sup>-1</sup> )	0	[4]
Fuels	$5.15 \times 10^7$ (J·kcal <sup>-1</sup> )	$8.39 \times 10^4$ (sej·J <sup>-1</sup> )	0	[5]
Human labor	$1.96 \times 10^6$ (J·kcal <sup>-1</sup> )	$2.22 \times 10^6$ (sej·J <sup>-1</sup> )	0.1	[6]
Seeds	$1.47 \times 10^7$ (J·kcal <sup>-1</sup> )	$6.03 \times 10^4$ (sej·J <sup>-1</sup> )	0.43	[7]
<b>Output</b>				
Paddy rice	$1.47 \times 10^7$ (J·kcal <sup>-1</sup> )	$6.03 \times 10^4$ (sej·J <sup>-1</sup> )		[8]
Straw rice	$6.70 \times 10^6$ (J·kcal <sup>-1</sup> )	$6.03 \times 10^4$ (sej·J <sup>-1</sup> )		[8]

Note: Blanks in the “Conversion factor” column denote that the efficiency of emery transformity is expressed directly per original physical unit (e.g., g), making a separate conversion factor unnecessary.

**Table S2** Descriptive statistics of smallholder surveyed in the Erhai Lake Basin ( $n = 171$ )

Item	Description	Frequency	Percentage (%)
Age (year)	30–40	17	9.94
	40–50	25	14.62
	50–60	69	40.35
	60–70	55	32.16
	70–80	5	2.92
Gender	Male	91	53.22
	Female	80	46.78
Educational attainment	Up to primary education	35	20.47
	Middle school	81	47.37
	High school or above	55	32.16
Planting scale (ha)	< 0.13	48	28.07
	0.13–0.33	88	51.46
	0.33–0.67	24	14.04
	> 0.67	11	6.43
Proportion of agricultural income	0%–20%	43	25.15
	20%–50%	85	49.71
	50%–80%	31	18.13
	80%–100%	11	6.43
Number of family members	1–4	34	19.88
	4–8	117	68.42
	8–12	23	13.45
Years of rice cultivation	< 20	17	9.94
	20–40	94	54.97
	> 40	60	35.09

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