Table S1 The operative methods (machinery or manual) and facilities for each field operation.

Field operation	Ways	Operative facility				
		Type	Mass (kg)	Tractor power (kW)	Fuel consumption (g kw^{-1} h^{-1})	Work efficiency (h ha^{-1})
Tillage	By machine	Deep turner(160hp)	8890	117.6	200	4.05
		Rotary tiller(96hp)	7090	70.6	200	4.5
Seeding	Manual	Garlic dressing	-	-	-	60
	Manual	Seed planter	-	-	-	420
Plastic film mulching	Manual	Film mulching	-	-	-	628
Fertilization	Manual	Fertilizer	-	-	-	120
Crop Protection	By machine	Drone spraying	50	9	-	1.875
Harvest	Manual	Garlic collecting	-	-	-	1980
Discarded plastic film collection	By machine	Residual film recycles	7163	36.8	200	2.5

Table S2. Summary of the data sources within the four phases of the life cycle for evaluating four phases damage categories in garlic production.

Stage	Inventory items	Data sources
Phase 1: Energy explotatiion	Diesel fuel	Experimental data, Ecoinvent 3.5
	Electricity	Experimental data, Ecoinvent 3.5
Phase 2: Production of materials	Seed	Experimental data, Ecoinvent 3.5; CLCD 0.7
	Plastic film	Experimental data, Ecoinvent 3.5; CLCD 0.7
	Biodegradable film	Experimental data, Ecoinvent 3.6; CLCD 0.7
	Fertilizer	Experimental data, Ecoinvent 3.5; CLCD 0.7
	Pesticide	Experimental data, Ecoinvent 3.5; CLCD 0.7
	Irrigation	Experimental data, Ecoinvent 3.5; CLCD 0.7
	Machinery	Experimental data, Ecoinvent 3.5; CLCD 0.7
	Weight of materials transported	Experimental data
	Distance of fertilizer transported	Experimental data
	Distance of plastic film transported	Experimental data
	Distance of other materials transported	Experimental data
	Transportation facility	Ecoinvent 3.5; CLCD 0.7
Phase 3: Farming production	Emissions of straw returning	[32]
	Emissions of film mulching	[55]
	Emissions from fertilizer application	[41-45]
	Emissions of diesel fuel burning	[44]
	Emissions from pesticide application	[46]
	Emissions of electricity	Ecoinvent 3.5; CLCD 0.7
	Emissions of working	Experimental data;
Phase4: Agricultural waste disposal	Emissions of diesel fuel burning	[44]
	Distance of straw transported	Experimental data;
	Distance of discarded plastic film transported	Experimental data;
	Incineration	Experimental data;
	Electricity generation	Experimental data; [49-52]
	Granulation	Experimental data; Ecoinvent 3.5; [53]

Table S3. Normalized values and weights for six impact categories.

Type	Unit	Standardized benchmarks	Weight
Resource consumption	$MJ \cdot a^{-1}$	2590457	0.15
Global climate change	$kgCO_2$-eq	6869	0.12
Environmental acidification	$kgSO_2$-eq	52.26	0.14
Eutrophication	$kgPO_4^{3-}$-eq	1.88	0.12
Human health	kg1,4-DCB-eq	197.21	0.14
Ecotoxicity	kg1,4-DCB-eq	5.406	0.10