Supplementary Table S1. Method to measure sustainability and indicator used for articles (case studies) related to agricultural LCSA.

No.	Authors	Method to measure sustainability	LCA	LCC	SLCA
1.	Zira et al. [66]	Relative unsustainability points (RusP) for indicators in LCSA with feed-food competition and robustness indicators.	1. Global warming potential 100 2. Freshwater eutrophication 3. Marine eutrophication 4. Terrestrial acidification 100 5. Fossil depletion 6. Land use, cropland 7. Land use, semi-natural pasture 8. Terrestrial ecotoxicity 9. Freshwater ecotoxicity 10. Marine ecotoxicity	1. LCC (costing)	1. Workers 2. Farmers 3. Cattle 4. Local community 5. Society
2.	Stillitano et al. [53]	Expansion of system boudaries with product substitution through sensitivity analyses where the impacts will be assessed through LCA, ELCC and SLCA.	Multiple indicators with assessments according to ReCiPe using SimaPro software.	1. Internal cost (including economic parameters and investment analysis) 2. External cost (such as environmental cost)	Type II: PRF Impact Pathway (SimaPro software)
3.	Abdallah et al. [49]	MCDA methodology based on Analytical Hierarchy Process (AHP) with pairwise comparison according to 4 hierarchy levels.	1. Climate change (Global Warming) 2. Land Use 3. Water Resource Depletion	1. Net present value 2. Internal rate of return 3. Costs of Life Cycle	1. Human toxicity, cancer effects 2. Job creation 3. Agronomic traditions

Supplementary Table S1. *Cont.*

No.	Authors	Method to measure sustainability	LCA	LCC	SLCA
4.	Zira et al. [67]	Relative sustainability points (RSP) from 0 until 1 with low RSP (<0.5)	1. Global warming potential 100 2. Freshwater eutrophication 3. Marine eutrophication 4. Terrestrial acidification 100 5. Fossil depletion 6. Biodiversity damage potential 7. Freshwater ecotoxicity 8. Marine ecotoxicity 9. Terrestrial ecotoxicity 10. Human toxicity potential 11. Soil Carbon loss 100	1. Value Added/(LCC + labor costs) farm 2. Value Added/(LCC + labor costs) slaughterhouse 3. Value Added/(LCC + labor costs) wholesaler and retailer	1. Workers 2. Local community Value chain actors Society 3. Consumer 4. Animal (Pigs)
5.	Hnich et al. [54]	Sustainability comparison between synthetic biofuels and conventional fuels. Environmental and social: Values < 1 indicating better performance. Economic: Values > 1 indicating better performance.	1. Global warming 2. Fine particulate matter formation 3. Terrestrial acidification 4. Freshwater eutrophication 5. Fossil resource scarcity	1. Total production cost	1. Child labour 2. Contribution of the sector to economic development 3. Frequency of forced labour 4. Gender wage gap 5. Health expenditure 6. Women in the sectoral labour force

Supplementary Table S1. *Cont.*

No.	Authors	Method to measure sustainability	LCA	LCC	SLCA
6.	Valente et al. [68]	Visualization through spider diagrams using six impact categories with values in percentages.	1. Climate Change (Global Warming) 2. Cumulative Energy Demand	1. Electricity costs 2. Labour costs	1. Job created 2. Injuries
7.	Nieder-Heitmann et al. [55]	MCDA with multi-attribute utility theory (MAUT) and internal normalisation used with relative weighting (RW). Dimesionless scale (0–100%) was used to transform the LCSA parameters.	1. Carbon footprint (Global Warming) 2. Water scarcity	1. Profitability (measured using net present value (NPV) and internal rate of return (IRR) 2. Total capital investment (TCI) 3. Total cost of production (TCOP) 4. Technical maturity	1. Job creation
8.	Valente et al. [56]	Sustainability comparison between biomass gasification and conventional steam reforming. Values < 1 indicating better performance with interpretation using diagrams.	1. Global warming 2. Acidification	1. Levelised cost	1. Child labour 2. Gender wage gap 3. Health expenditure

Supplementary Table S1. *Cont.*

No.	Authors	Method to measure sustainability	LCA	LCC	SLCA
9.	Contreras-Lisperguer et al. [57]	Separate comparison between 5 MW cogeneration technology and 2.2 MW cogeneration technology.	1. Climate change 2. Ozone depletion 3. Terrestrial acidification 4. Freshwater eutrophication 5. Marine eutrophication 6. Human toxicity 7. Photochemical oxidant formation 8. Particulate matter formation 9. Terrestrial ecotoxicity 10. Freshwater ecotoxicity 11. Marine ecotoxicity 12. Ionizing radiation 13. Agricultural land occupation 14. Urban land occupation 15. Natural land transformation 16. Water depletion 17. Metal depletion 18. Fossil depletion	Impact categories based on three phases of: 1. Agricultural 2. Industrial 3. Co-generation	1. Number of jobs 2. Number/percentage of injuries 3. Presence of policies of equal opportunities 4. Minimum wage 5. Community access and benefit 6. Training 7. Strength of organisational risk assessment 8. Access to employment 9. Employment terms 10. Child labour 11. Fair salary 12. Reduce mortality rate (indoor smoke)

Supplementary Table S1. *Cont.*

No.	Authors	Method to measure sustainability	LCA	LCC	SLCA
10.	Chen and Holden [69]	MCDA with different weighting factors. It was based on the number of indicators analyzed within each tiers. Normalised value for each indicators was carried out in comparison to average values. Analysed data presented in pyramid illustration.	Tier 1 1. Global warming Tier 2 (including) 2. Acidification 3. Eutrophication 4. Water use 5. Land occupation 6. Resource depletion Tier 3 (including) 7. Eco toxicity 8. Human toxicity 9. Ozone depletion 10. Photochemical smog	Tier 1 1. Production cost Tier 2 (including) 2. Profitability Tier 3 (including) 3. Productivity of labour 4. Productivity of land	Tier 1 1. Health and safety Tier 2 (including) 2. Work hours 3. Public living condition 4. Fair wage 5. Age structure 6. Local employment Tier 3 (including) 7. Technology development 8. Education and training 9. Working condition transparency 10. Respect indigenous right 11. Natural and cultural heritage 12. Supplier relationship

Supplementary Table S1. *Cont.*

No.	Authors	Method to measure sustainability	LCA	LCC	SLCA
11.	De Luca et al. [50]	MCDA methodology using AHP technique (pairwise comparison).	1. Climate change 2. Toxicity 3. Land Use	1. Profitability 2. Life cycle cost 3. Investment feasibiliy	1. Social health 2. Job opportunities 3. Contribution to national welfare
12.	Ekener et al. [58]	MCDA with multi attribute value theory (MAVT) based on stakeholder profiles (Egalitarian, Hierarchist, and Individualist).	1. Global warming 2. Water consumption 3. Non-renewable primary energy consumption	1. Environment priority strategies (EPS) 2. Ecovalue (average) 3. Ecovalue (low) 4. Ecovalue (high)	Differentiation by positive and negative social impacts in reference to classifications by social hotspot databae (SHDB), Sustainable Development Goals (SDGs) and number of jobs
13.	Zortea et al. [51]	Dashboard of Sustainability (DoS) or Life Cycle Sustainability Dashboard (LCSD) interpreted by Sustainability Final Index (SFI).	1. Eutrophication 2. Global Warming 3. Acidification	1. Feedstock cost 2. Infrastructure cost 3. Financial expenses	1. Workers • Social benefit • Freedom of association and collective bargaining • Working hours • Social benefits/social security 2. Communities • Community engagement • Local employment 3. Value chain actors • Fair competition • Education and training • Supplier relationship

Supplementary Table S1. *Cont*.

No.	Authors	Method to measure sustainability	LCA	LCC	SLCA
14.	Nguyen et al. [59] and Nguyen et al. [70]*	Inclusive Impact Index (Triple I) framework integrated in LCSA approach.	1. Ecological footprint (EF) 2. Ecological risk (ER) 3. Biocapacity (BC)	1. Cost (C) 2. Benefit (B)	1. Human risk (HR)
15.	Martínez-Blanco et al. [71]	Life Cycle Sustainability Dashboard (LCSD).	1. Abiotic depletion 2. Acidification 3. Eutrophication 4. Global Warming (GWP 100) 5. Ozone layer depletion (ODP) 6. Human toxicity 7. Fresh water aquatic ecotoxicity 8. Marine aquatic ecotoxicity 9. Terrestrial ecotoxicity 10. Photochemical oxidation 11. Cumulative energy demand	1. Fertilizer market price 2. Price of transportation 3. Extra application costs	1. Worker • Freedom of association and collective bargaining • Working conditions (includes Fair salary, Working hours, and Forced labor) • Health and safety 2. Local community • Access to material resources • Safe and healthy living conditions • Local employment 3. Society • Quality, safety and environmental standards • Global compact commitment 4. Consumer • Feedback mechanism • Transparency • Product application

* The articles were published in two parts; some information was obtained in Part II of the journal.