LANKA BIOGAS

POLICY BRIEF

A production of Lanka Biogas Association

On-Farm Biogas Systems:

A Climate-Smart Solution for Agriculture & Energy Security

Agriculture Sector:

Agriculture sector which strengthens the food security of the Country, employed 26.1% of Sri Lanka's workforce in 2023 while contributing 9.3% to the GDP. The provisional values of agricultural land use & cost of agriculture & dairy related imports of Sri Lanka in 2023 provide a snapshot of the country's agriculture & livestock sectors (Sri Lanka Annual Economic Review 2024 & Socio-Economic Data 2023, Central Bank of Sri Lanka; Department of Census & Statistics - DC&S). The contribution of the livestock sector in terms of livestock farmers in 2024 (Provisional) were: Cattle: 144,642; Buffalo: 19,291; Goat: 56,108; Swine: 5,393; & Poultry: 230,439 (DC&S).

Crop	Extent ('000 Ha)
Paddy	1,318
Maize	76.0
Manioc	22.0
Gingelly	13.8
Sugar Cane	13.7
Greengram	12.7
Cowpea	12.2
Chillies	12.1

Agricultural land use 2023

Crop	LKR (mil)	USD (mil)
Rice	5,603	17
Flour	25,104	76
Sugar	142,301	435
Wheat and Maize	109,887	338
Milk & Milk Products	88,624	274
Fertilizer	76,113	235

Cost of agriculture & dairy related imports 2023

Anaerobic Digestion (AD) Technology & Biogas Systems:

Biogas systems are so designed to convert organic matter (crop residues, animal manure, food processing by-products, wastewater & municipal garbage etc) into useful energy & agricultural input products. In a biogas system, organic matter breaks down by biochemical decomposition under oxygen-free (anaerobic) conditions in the presence of methanogenic bacteria. This process, called anaerobic digestion (AD), generate biogas, a mix of methane (CH_4) dominant gaseous fuel which is a renewable energy source, while leaving a digestate, which is a bio-fertilizer, a key agricultural input. This process usually occurs in a specialized tank or vessel called the anaerobic digesters. Landfills gas generated at landfills are also generated due to the AD process.

On-Farm Biogas Systems

On-Farm Biogas Systems are integrated waste-to-energy technologies installed on agricultural & farm land that use AD process to convert farm-based wastes such as animal manure, crop residues, energy crops like maize silage & co-digested organic wastes like food processing by-products etc.,. into value added biogas for heat, electricity (combined heat & power - CHP), or renewable natural gas (RNG) & digestate for use as bio-fertilizer. Organic wastes can naturally generate methane & escape into the atmosphere as they decompose where appropriate conditions prevail. Methane has a Global Warming Potential (GWP) of $\approx$ 84–87 over 20 years (IPCC 5th Assessment). Biogas Systems can prevent this happening, by capturing methane while generating renewable energy & bio-fertilizer, as value added outputs.

Benefits of On-Farm Biogas Systems

- Organic fertilizer: Nutrient-rich digestate improve soil health, fertility & crop yields by recycling nitrogen, phosphorus & potassium, hormones, enzymes & micro nutrients.
- Circular farming: Convert agri-waste to valuable inputs, close nutrient loop & reduce need for chemical fertilizer.
- Soil conditioning: Digestate enhance soil moisture retention, prevent erosion & contains beneficial plant hormones.
- Reduce pollution: Manage manure & organic waste safely, minimize runoff, leaching & groundwater contamination.
- Costs: Reduce expenses on commercial fertilizers & waste disposal, offer potential income from digestate sales.
- Sustainability: Integrate with circular economy & nature-based solutions, improve farm's resilience & environmental stewardship; make farms resilient to droughts & erratic weather patterns.

Policy Recommendations

- Setup quality standards, eco-labels, application guidelines & certification for digestate - organic fertilizer.
- Implement an On-Farm Biogas Program with model farm pilots, technical assistance & farmer-support initiatives.
- Integrate Biogas into climate-smart agriculture & organic transition, & climate & circular economy programmes.
- Enable cooperative & cluster farms (manure & feedstock pooling, shared infrastructure viz digesters, biogas hubs).
- Provide incentives & subsidies, concessionary loans & attractive feed-in tariffs for electricity generated from biogas & renewable gas produced from biogas.
- Embed multifaceted On-Farm Biogas Systems in cross-sectoral policies, strategies, plans & programmes.
- Promote R&D, extension services, training & partnerships with farmers emulating innovation ecosystems.

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