

Accelerating Methane Reduction in South Asia: Regional Stocktake and Roadmap for the Waste Sector (2026 - 2035)

“Accelerating Waste Methane Mitigation for Climate, Health, and Development Co-Benefits”

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Structure of the Regional Roadmap and the Five Building Blocks

The Regional Roadmap follows the CCAC M-RAP Five Building Blocks framework,
providing a systematic pathway from emissions measurement to verified mitigation outcomes.

Roadmap Structure

 Parts 1–2: Context — Why methane matters & South Asia's waste challenge

 Parts 3–7: Five Building Blocks — Emissions to MRV

 Part 8: Implementation Timeline (2026–2035)

 Part 9 + Annexes: Country Agendas & Data for all 8 SACEP Members

Framework backbone: Five Building Blocks, ensuring systematic progression from data to action to verification

Five Building Blocks

1

 **Emissions Profile**
Part 3 — Baseline quantification of methane by country & sub-sector

2

 **Analytics and Mitigation Assessment**
Part 4 — Mitigation potential, cost structure, barriers & enablers

3

 **Regional and National Targets**
Part 5 — $\geq 30\%$ by 2030 and differentiated by country typology

4

 **Implementation Pathways**
Parts 6 & 8 — Governance, financing, capacity building & phased timeline

5

 **Monitoring, Reporting and Verification**
Part 7 — Regional MRV platform



SACEP · IGES · GLOBAL METHANE HUB | 2026–2027

Assessment of Methane Emissions from the Waste Sector

A Regional Questionnaire Survey across eight South Asian countries



PURPOSE OF THE SURVEY

Why this Questionnaire

Part of the SACEP–IGES–Global Methane Hub Regional Stocktaking & Methane Reduction Roadmap Development (2026–2027). The information collected is used to support four objectives:

1

Establish a baseline

A comprehensive picture of waste-sector methane emissions across South Asia.

2

Identify gaps & needs

Data gaps, institutional capacity needs, and policy opportunities.

3

Inform the Roadmap

Feed the SACEP Regional Methane Reduction Roadmap for the Waste Sector.

4

Align to global goals

Support the Global Methane Pledge and emerging NDC 3.0 processes.



SCOPE & COVERAGE

Two Sub-sectors - Eight Countries

The survey covers two municipal sub-sectors of the waste sector, completed by focal experts in each participating SACEP member state.



Municipal Solid Waste (MSW)

Landfills, dumpsites, open burning, composting and recycling.



Municipal Wastewater

Domestic treatment systems, sludge management and effluent disposal.

EIGHT PARTICIPATING COUNTRIES

● Afghanistan

● Bangladesh

● Bhutan

● India

● Maldives

● Nepal

● Pakistan

● Sri Lanka

STRUCTURE OF THE QUESTIONNAIRE

Six Sections, from Policy to Priorities

Respondents complete all six sections (A–F), moving from the national policy context, through the two waste sub-sectors, to capacity, finance and forward-looking priorities.



Country Context, Governance & Policy

Institutional setup, national policies, NDC status and methane regulations.



Municipal Solid Waste (MSW)

Generation, composition, disposal, emissions and mitigation measures.



Municipal Wastewater

Sanitation coverage, treatment, sludge, biogas and emissions.



MRV, Data Capacity & Training

GHG inventory systems, monitoring, technical capacity and training needs.



Finance & Investment

Funding sources, expenditure, climate-finance access and barriers.



Priorities, Cooperation & Roadmap

National priorities, technology interest and regional cooperation inputs.

Context & Solid Waste Data

A

Country Context & Policy Governance and enabling environment

- Population, urbanisation, GDP and growth
- Lead ministries for waste & wastewater
- National GHG inventory / methane focal points
- Key policies with methane provisions
- NDC status and methane targets
- National methane roadmap progress
- Methane-specific waste regulations

B

Municipal Solid Waste Generation to mitigation

- MSW generated & per-capita rates
- Waste composition by weight
- Collection coverage & source segregation
- Disposal & treatment methods and sites
- Methane estimates (Gg CH₄, CO₂e, IPCC tier)
- Data availability, quality and gaps
- Landfill-gas recovery & carbon finance
- Mitigation measures and key barriers

Wastewater & National Capacity



Municipal Wastewater Sanitation to emissions

- Domestic wastewater volumes generated
- Sanitation systems & population served
- Treatment levels before discharge
- WWTP infrastructure & installed capacity
- Sludge management pathways
- Biogas capture at treatment plants
- Methane estimates (Gg CH₄, CO₂e, tier)
- Data availability, mitigation & barriers



MRV, Capacity & Training Measuring, reporting, verifying

- National GHG inventory system status
- Waste-sector data collection methods
- Real-time / automated methane monitoring
- Technical capacity self-assessment
- Priorities for strengthening capacity
- Training and capacity-building needs
- IPCC methods, MRV design & finance skills

Finance & Forward Priorities



Finance & Investment Paying for mitigation

- Primary funding sources (MSW & wastewater)
- Annual expenditure by sub-sector
- Climate-finance access and applications
- Barriers to mobilising finance
- Creditworthiness & bankable pipelines



Priorities & Roadmap Inputs to the regional roadmap

- Top national methane priorities to 2030
- Methane targets and NDC 3.0 plans
- Support needed for NDC integration
- Technology interest and adoption barriers
- Financing preferences & project pipeline
- Key stakeholders and development partners
- Coordination and regional cooperation needs

Part 1. CONTEXT

Why Waste-Sector Methane Demands Urgent Attention

Methane's short atmospheric lifetime of ~12 years **means deep cuts today translate into measurable cooling within a single planning cycle, making waste-sector action unusually valuable.**

~12 yrs

CH₄ atmospheric lifetime, near-term climate lever

~0.3°C

warming averted by 2045 with 45% anthropogenic cut

~20%

of global anthropogenic methane from waste, 3rd-largest source

- ❑ **GWP₁₀₀ = 27.0** (biogenic/waste CH₄, IPCC AR6); GWP₂₀ = 79.7;
→ Each tonne of CH₄ cut today delivers outsized near-term benefit
- ❑ South Asia's contribution growing fastest in Asia, **urbanization outpacing infrastructure investment**
- ❑ **20–30%** of waste methane reductions achievable at **negative cost**;



South Asia's MSW System Gaps

109.42M

Tonnes of MSW reported annually
Across 8 assessed countries

58.1%

Average organic share
Methane-prone feedstock dominates

54.2%

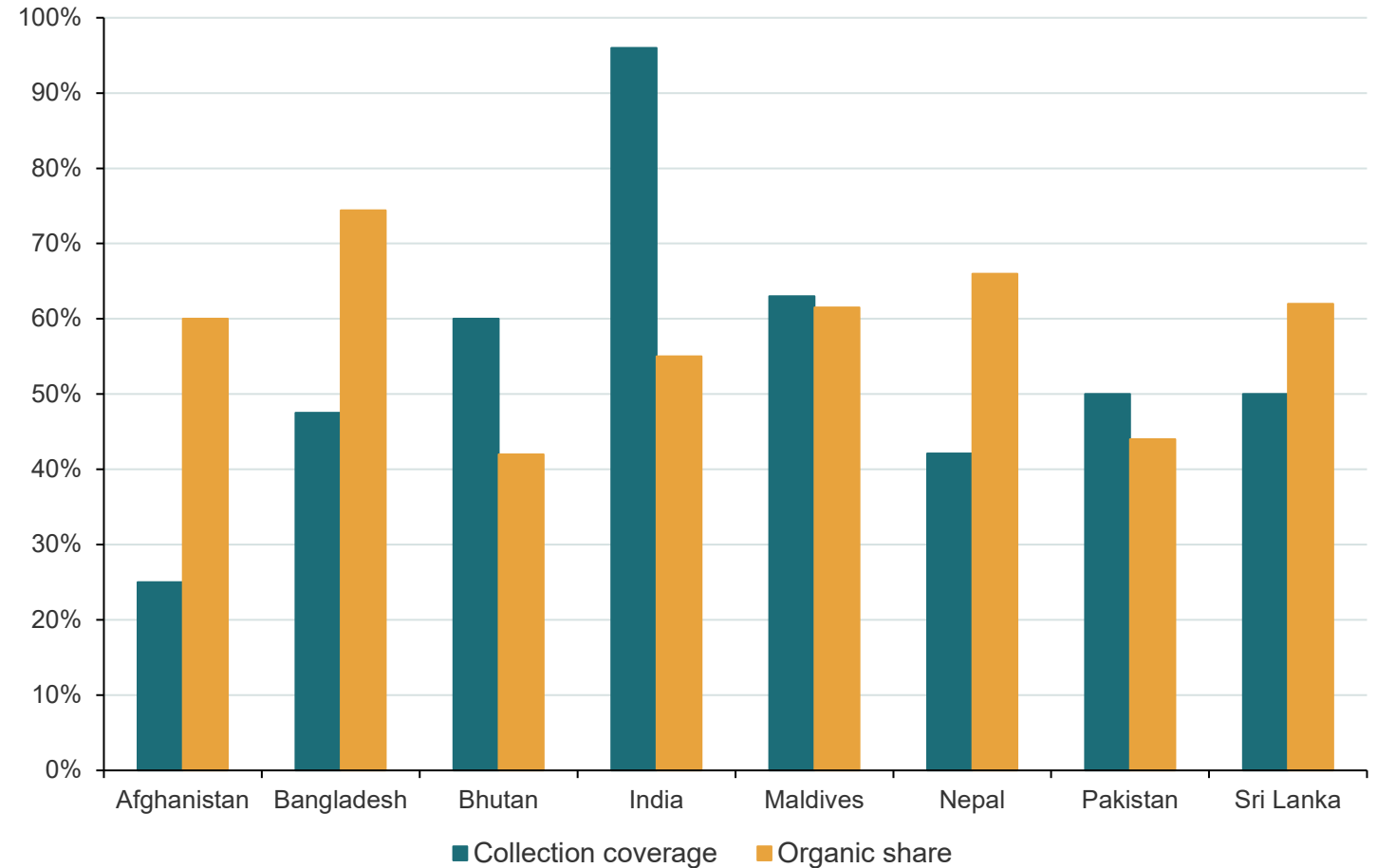
Average collection coverage
Large country and urban-rural gaps

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Countries with no LFG capture
Bangladesh planned; India limited

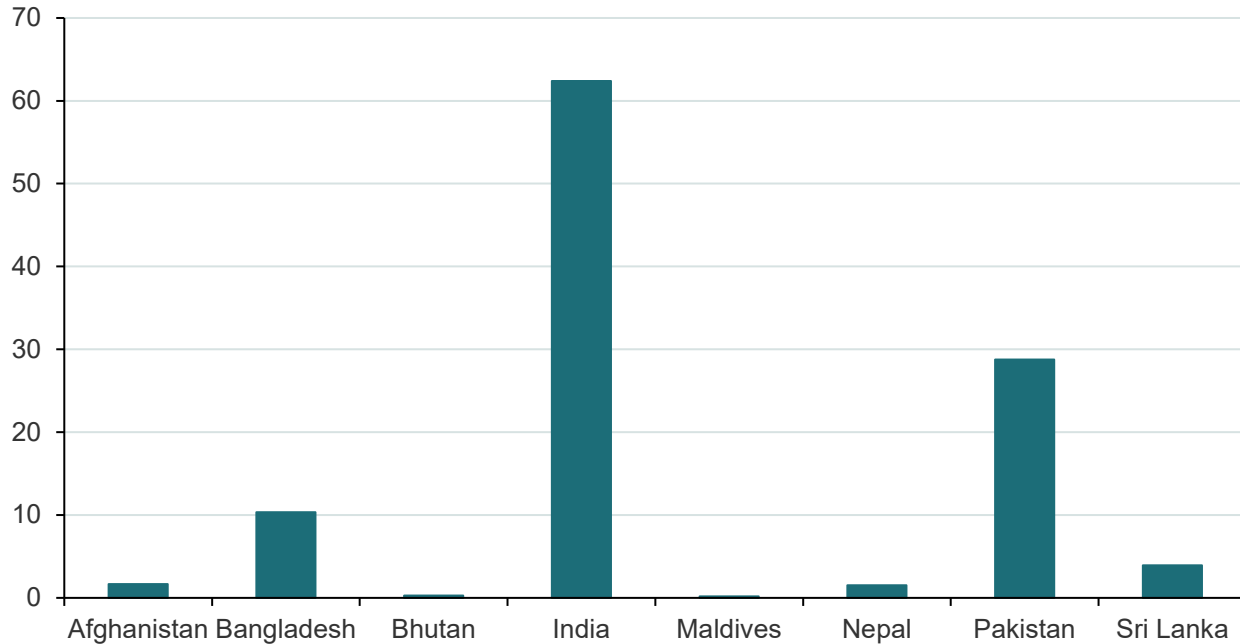


Collection Coverage vs. Organic Share



South Asia's Structural Waste Methane Challenge: MSW

MSW Generation (M tonnes/yr)



India 62.4 Mt/yr

Pakistan 28.8 Mt/yr

Bangladesh 10.3 Mt/yr

Eight countries report about **109.42 million tonnes** of MSW annually on a comparable midpoint basis; **India, Pakistan and Bangladesh** account for more than **90%** of the total.

❑ **Organic fraction:** 58.4% in average

❑ **Bangladesh:** 60% open dumped; 12.5% open burned (in average).

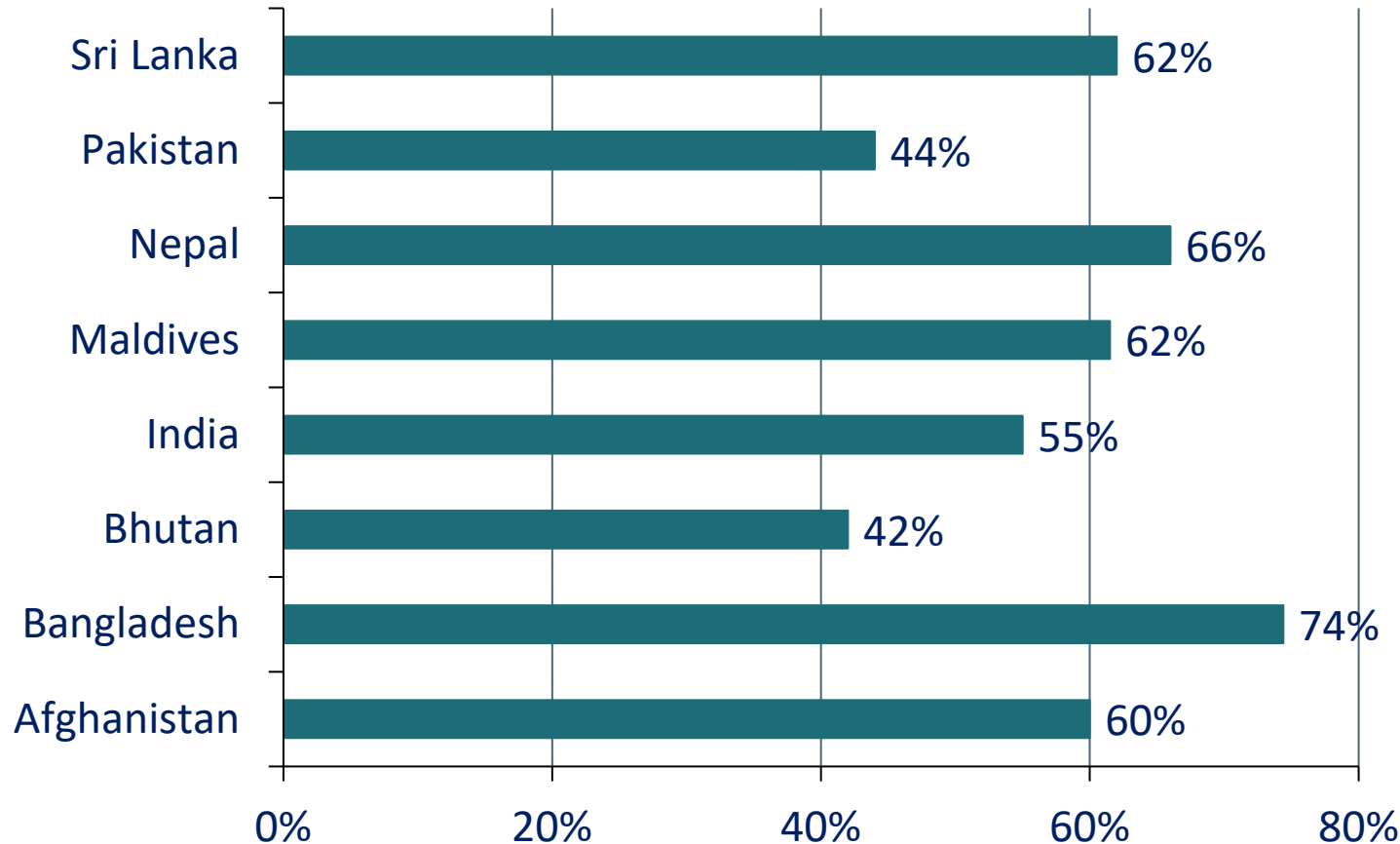
❑ **India:** 96% collected; 17.5% open dumped; 1.5% open burned (in average).

❑ **Pakistan:** 50% collected; 75% open dumped; 12.5% open burned (in average).

The Organic Challenge

Organic feedstock remains the structural methane multiplier

Organic share



58.1%

Organic Share (in average)

42–74%

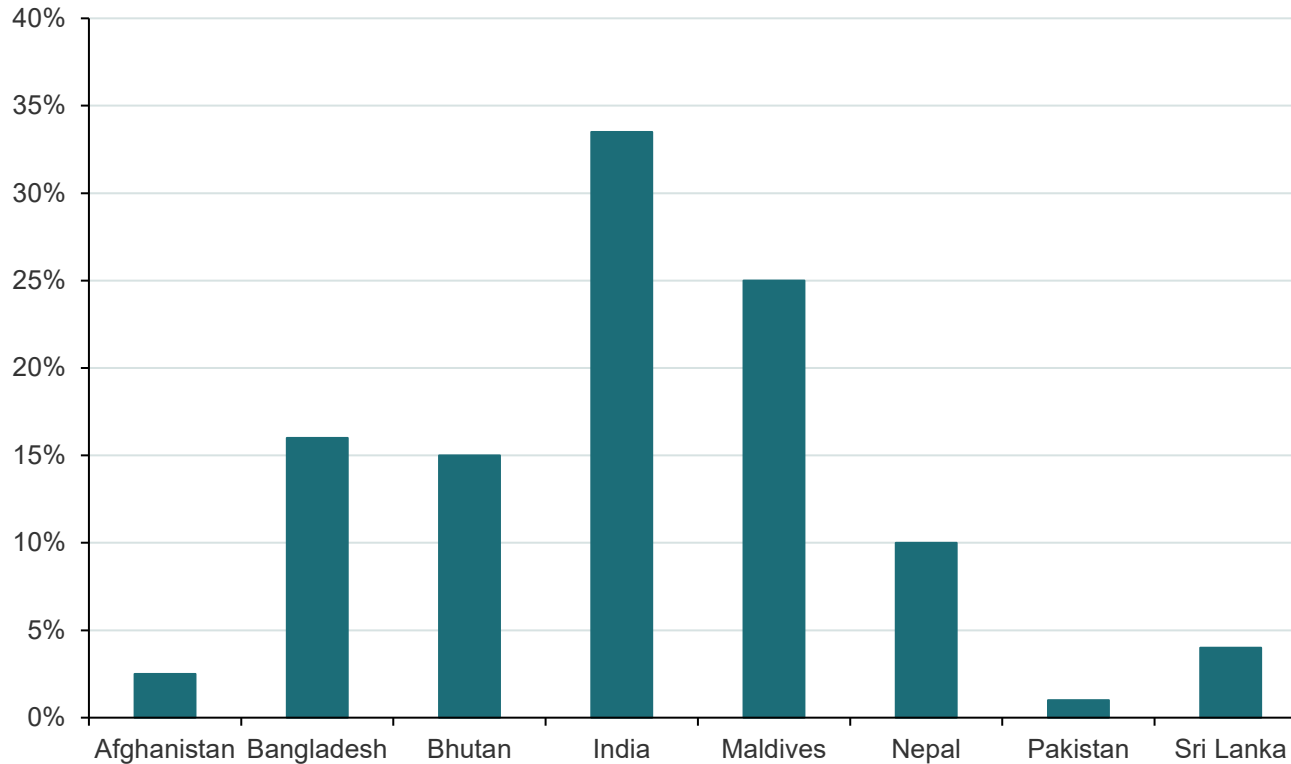
Organic Share (in range)

Bangladesh 74% · Nepal 66%

Sri Lanka & Maldives: 62%

South Asia's Structural Waste Methane Challenge: Wastewater

Secondary Treatment Coverage (%)

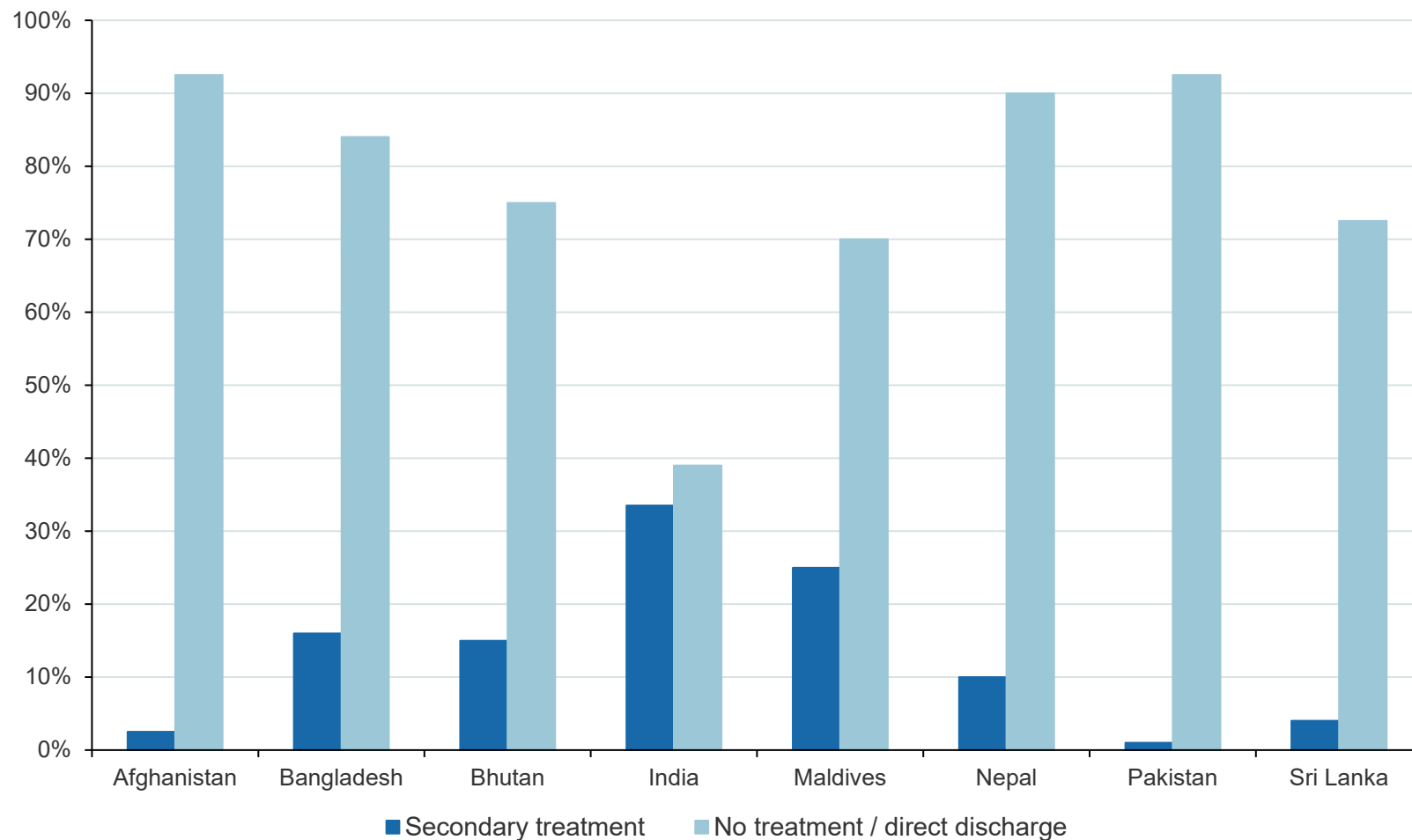


Across 8 South Asia countries, **13.4%** (on average) receives secondary treatment

- ❑ **Bangladesh:** 16% secondary treatment; 84% untreated/direct discharge
- ❑ **India:** 33.5% operational treatment; 39% untreated/direct discharge
- ❑ **Pakistan:** 1% secondary treatment; 92.5% untreated/direct discharge

Infrastructure Gaps: Wastewater

Across 8 South Asia countries: 13.4% average secondary treatment; 76.9% untreated/direct discharge.



76.9%
average untreated

India 39%

**Seven other countries:
More than 70%
untreated
(on average)**

Purpose, Scope, and Target Users of the Roadmap

This Roadmap is a practical tool for ministry officials, MDB teams, and climate finance practitioners, **NOT** a research document, but an actionable planning framework with five clear objectives.

Geographic Scope

Afghanistan Bangladesh Bhutan India Maldives Nepal
Pakistan Sri Lanka

Country Typology

Type A India, Pakistan, Bangladesh ≈95% of regional emissions

Type B Sri Lanka, Maldives (island countries) with growing infrastructure needs

Type C Afghanistan, Bhutan, Nepal: small emitters; focus on inventory & basic infrastructure

Sub-sectors MSW & Wastewater/FSM

Five Primary Objectives

- 1 Establish a Regional Quantitative Baseline**
Explicit documentation of data gaps across all 8 countries
- 2 Propose Differentiated National Targets**
Aligned with Global Methane Pledge and COP29 Declaration on Organic Waste
- 3 Identify Technically & Financially Feasible Measures**
Across MSW and wastewater/FSM sub-sectors
- 4 Propose a Phased Implementation Pathway**
With milestones for 2028, 2030, 2035, and vision to 2050
- 5 Establish a Regional MRV Framework**
Aligned with UNFCCC Enhanced Transparency Framework

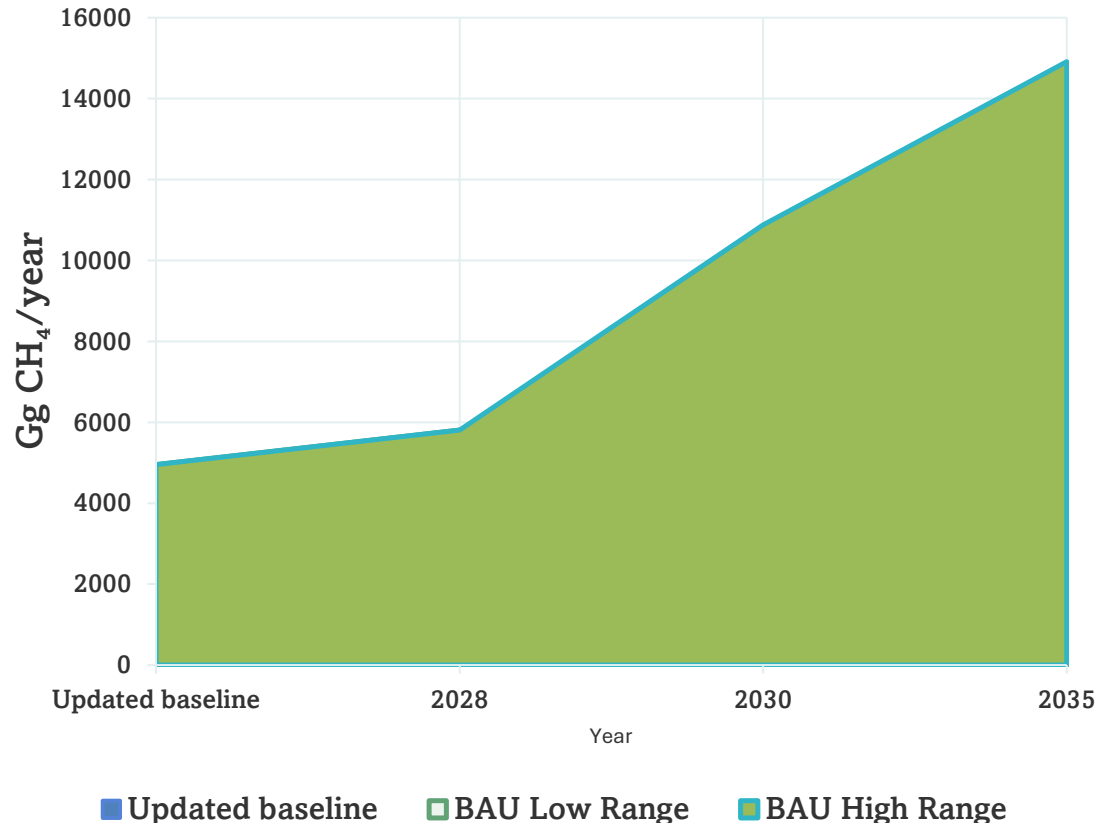
Alignment with Global and Regional Initiatives

The Roadmap aligns with global methane and organic-waste commitments and the latest national NDCs.

Initiative / Framework	Status / Coverage	Key Linkage to This Roadmap
Global Methane Pledge	Bangladesh, Nepal, Pakistan and Sri Lanka: Signatories; Afghanistan, Bhutan, India and Maldives: Not signatories.	Regional ambition can use the $\geq 30\%$ GMP benchmark while differentiating obligations for non-signatories.
COP29 Declaration on Reducing Methane from Organic Waste Bhutan signatory	November 2024 — 30+ countries, ~47% of global organic waste methane	Provides additional political mandate for organic waste methane reduction; Bhutan's signatory status anchors Type C commitments in the Declaration framework.
SDGs Multi-goal alignment	SDGs 3, 6, 11, 12, 13	Waste methane mitigation directly advances: SDG 3 (health - air quality), SDG 6 (wastewater treatment), SDG 11 (sustainable cities), SDG 12 (responsible consumption), SDG 13 (climate action).
SACEP/IGES Waste Management Roadmap (2019–2030) Foundational framework	Regional waste management framework across all SACEP member countries	This Roadmap adds the methane-specific quantification and climate finance dimension absent from the 2019–2030 framework, building on its institutional architecture.
CCAC M-RAP Five Building Blocks Structural backbone	CCAC Methane Roadmap Action Programme framework	Five Building Blocks (Emissions Profile → Analytics → Targets → Implementation → MRV) provide the structural backbone of this entire Roadmap, ensuring international methodological coherence.

Part 2. URBANIZATION, WASTE GROWTH, AND INFRASTRUCTURE GAPS

Illustrative BAU - Updated total (Gg CH₄/year)



Infrastructure investment is not keeping pace with growth. Re-basing the prior deck's growth assumptions to the latest inventory total gives a transparent scenario range, not an empirical forecast.

□ Total population (combined): ≈1.94 billion
India urban share: 36.9% · Pakistan: 38–39%

Updated inventory baseline:

4,955 Gg CH₄/year

Illustrative 2035 BAU range:

12,900–14,900 Gg CH₄/year

if prior growth ratios persist.

REGIONAL EMISSIONS OVERVIEW

INVENTORY-BASED TOTAL

4,955.2

Gg CH₄ / year

Equivalent to

138,746 Gg CO₂-eq at

GWP₁₀₀=28

67.2%

from wastewater

94.6%

from India, Bangladesh &
Pakistan

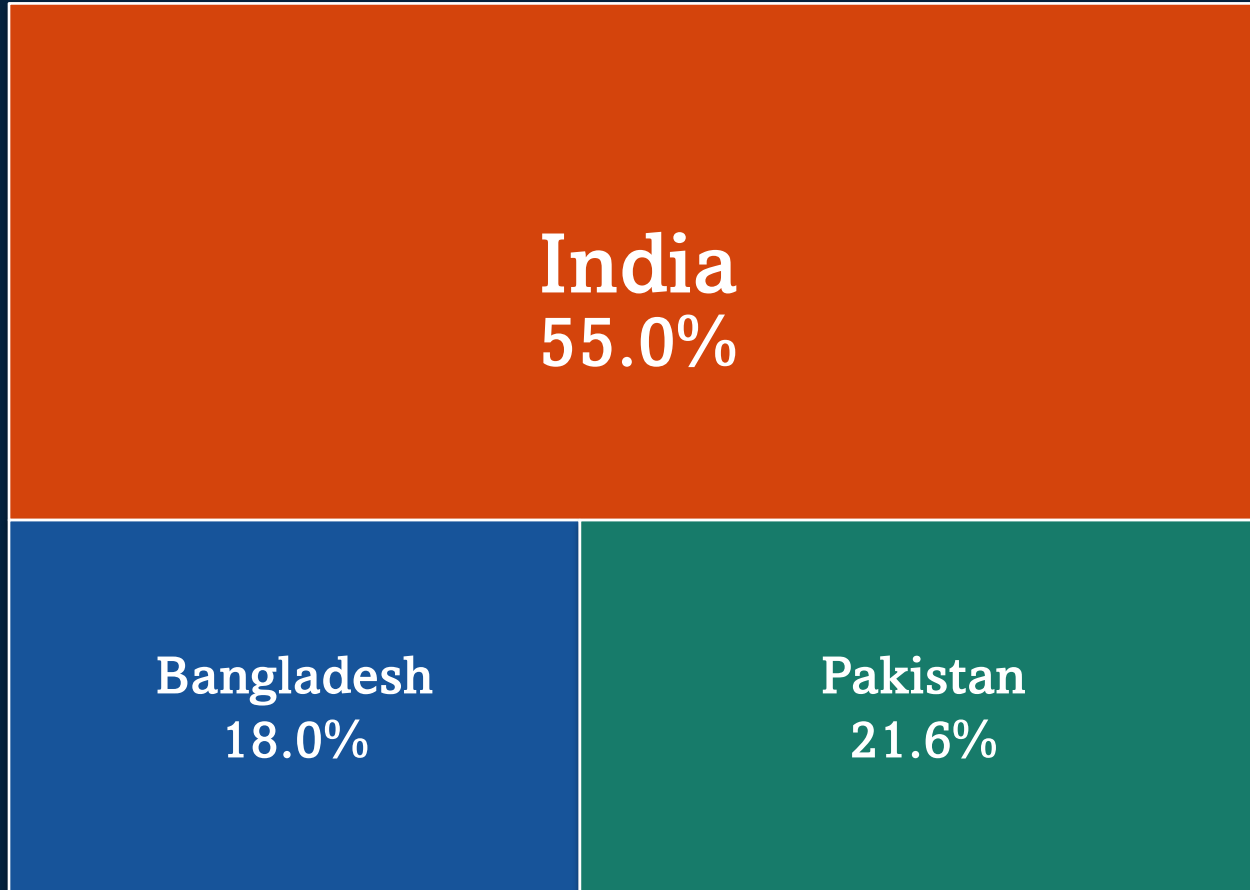
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countries covered

→ A conservative total assembled from national inventories with mixed base years and predominantly Tier 1 methods.

THE 94.6% CONCENTRATION

Targeting the core of the updated regional profile



→ Mitigation must focus on these three systems: wastewater in India and Bangladesh; solid-waste disposal plus wastewater in Pakistan.

Part 3. BUILDING BLOCK 1: EMISSION PROFILE

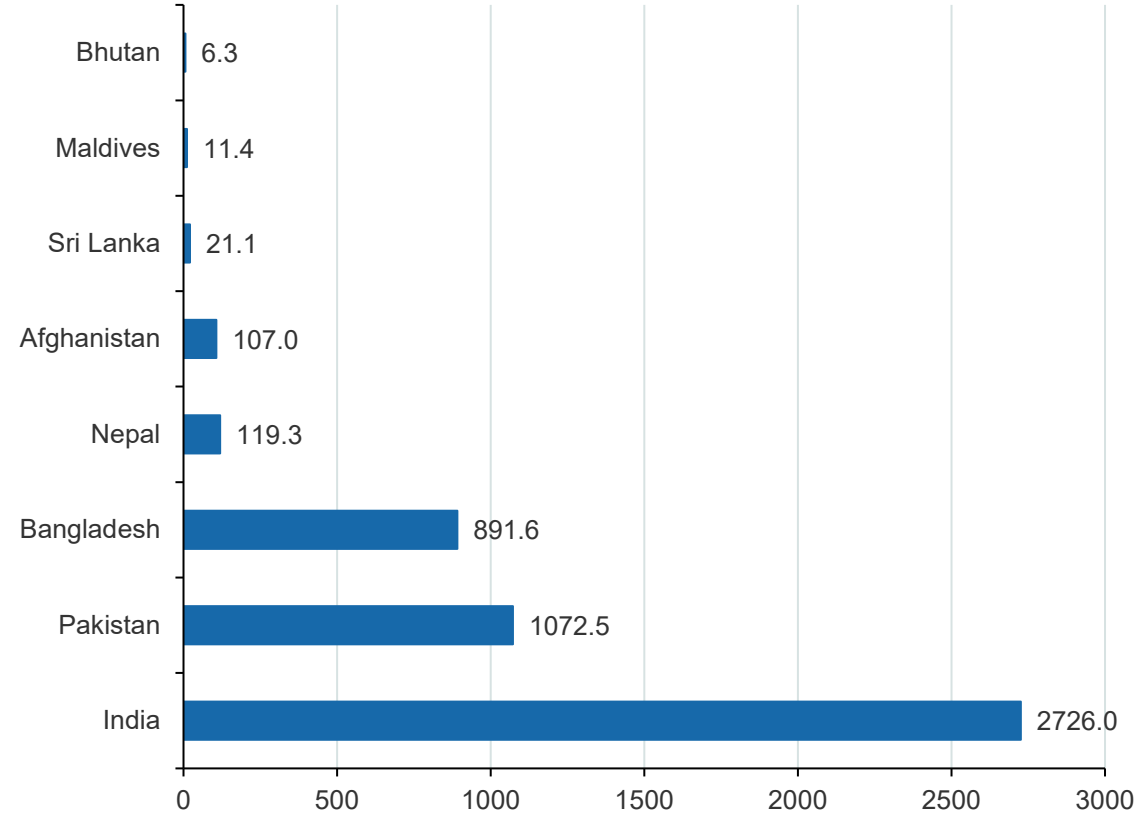
Default Methodologies (Tier 1)

Waste-Sector CH₄ Baseline by Country

MSW + wastewater; national inventory values with mixed base years

4,955.2
Gg CH₄/year

Total Waste-Sector CH₄ Emission

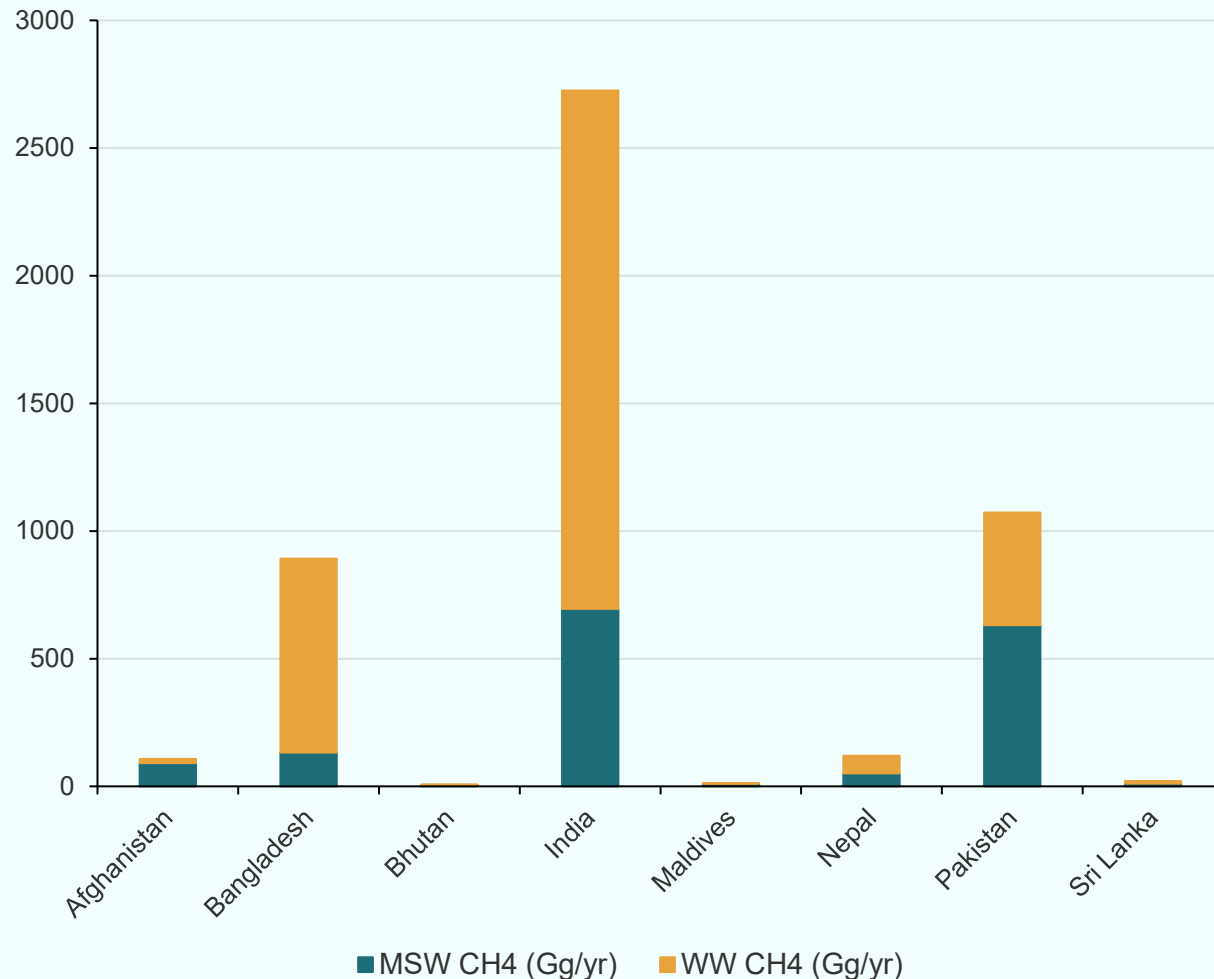


Country	WW	MSW	Total	Share
India	2,030.5	695.5	2,726.0	55.0%
Pakistan	441.4	631.1	1,072.5	21.6%
Bangladesh	759.6	132.0	891.6	18.0%
Nepal	68.7	50.6	119.3	2.4%
Afghanistan	16.0	91.0	107.0	2.2%
Sri Lanka	10.1	11.0	21.1	0.4%
Maldives	0.5	10.9	11.4	0.2%
Bhutan	1.1	5.2	6.3	0.1%

Wastewater contributes 67.2% of the regional total; India alone contributes 55.0%.

Part 3. BUILDING BLOCK 1: EMISSION PROFILE

Waste Methane Emissions by Source



Sub-Sector Emissions Profile

- ❑ Wastewater accounts for 67.2% of the updated regional total and dominates India and Bangladesh;
- ❑ MSW remains critical in Afghanistan, Maldives, Pakistan and Sri Lanka.

→ National inventories use mixed years and mostly Tier 1 methods.

Key Takeaways and Findings from the 1st Regional Consultation Workshop

Colombo, 15th – 17th July 2026



1st South Asia Regional Consultation Workshop – Colombo, Sri Lanka | 15th – 17th July 2026

Priority Areas for Improvement and Needs Assessment

COUNTRY	 Capacity Building	 Technology Transfer	 Financial Instruments	 Data / MRV Systems	 Policy & Regulatory
Bangladesh	Tier 2; DOC/MCF/B ₀	LFG/biogas; STP/sludge	GCF/GEF/MDB; Article 6/JCM	National waste MRV	Methane rules/mandates
Bhutan	Tier 2/3; project prep	LFG/biogas; engineered landfills	Bankable pipeline; carbon credits	Regional MRV repository	Stronger institutions
India	Tier 2; WW quantification	LFG/biogas; STP recovery	Blended/MDB; Article 6	Digital CPCB/MoHUA MRV	Local EFs/monitoring
Maldives	Tier 2; finance structuring	Regional WtE; composting; WW	GCF/MDB; blended	Island waste platform	SIDS-fit standards
Nepal	Tier 2; project prep	Engineered landfills/LFG; WW/FSM	Concessional; blended/carbon	National waste MRV	Methane legal framework
Pakistan	Tier 2; annual activity data	SWDS/LFG; WW pathways	MDB; Article 6/blended	2021 BTR; digital MRV	Close LFG/WW gaps
Sri Lanka	Tier 2; country EFs	LFG/AD; WW recovery	Blended; carbon markets	Local-to-national MRV	Methane rules/enforcement

MOST REQUESTED

IPCC Tier 2/3 methodology training and dedicated MRV data platforms are most universally and near-term requested support across all seven countries.

Roadmap Priorities & Recommendations

Country	Top priority actions	Timeline	Priority
Bangladesh	Implement NDC 3.0 waste actions: LFG recovery, WtE and recycling · expand STPs/sludge treatment · Tier 2 MRV	To 2035	High
Bhutan	Engineered landfills and LFG · source segregation/composting · sewerage expansion · strengthen MRV and project pipeline	To 2035	High
India	Scale biomining, LFG and AD/CBG · expand treatment and wastewater biogas · Tier 2 inventory and digital MRV	2026–2035	Med–High
Maldives	Regional waste systems and WtE · composting · sewerage beyond Malé · island data platform and carbon-finance readiness	2025–2035	High
Nepal	Segregation/composting · engineered landfills/LFG · 510 MLD wastewater and FSM expansion · Tier 2 MRV	To 2035	High
Pakistan	Use 2021 BTR baseline · controlled disposal/LFG pilots · improve wastewater pathways and treatment · Tier 2 digital MRV	2025–2030	High
Sri Lanka	Sanitary landfill/LFG demonstration · AD/composting · wastewater methane recovery · Tier 2 MRV and blended finance	2026–2035	High

Shared Priorities Across the Countries



SHARED PRIORITIES ACROSS THE REGION

- 1 Upgrade Tier 1 → Tier 2/3 IPCC methodologies
- 2 Close MSW/Wastewater data & MRV gaps
- 3 Mobilize climate finance (GCF · GEF · blended · carbon markets)
- 4 Source segregation & composting → Top near-term MSW action
- 5 Landfill-gas capture & engineered sanitary landfills
- 6 Regional cooperation via SACEP · CCAC · IGES

THE BOTTOM LINE

Despite differing emission profiles; all countries converge on three needs: **higher-tier MRV systems, climate-finance access, and source segregation / composting** as the most replicable near-term action.

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