Start-up Meeting on CCAC Agriculture Initiative's Livestock and Manure Management Component

Organized by
Food and Agriculture Organization of the United Nations
Wageningen UR Livestock Research
United States
CATIE
SEI and ILRI

Topic: Present Status Livestock & Manure Management of Bangladesh

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Table 1: Profile of Livestock in Bangladesh

Species	Number (Lakh) *						
	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	Growth rate (%)
Cattle	228.0	228.7	229.0	229.76	230.51	231.21	0.28
Buffaloes	11.6	12.1	12.6	13.04	13.49	13.94	3.66
Goat	199.4	207.5	215.6	224.01	232.75	241.49	3.83
Sheep	25.7	26.8	27.8	28.77	29.77	30.02	3.22
Total Livestock	464.7	475.1	485.0	495.58	506.52	516.66	-
Chicken	1948.2	2068.9	2124.7	2213.94	2280.35	2346.86	3.61
Duck	381.7	390.8	398.4	412.34	426.77	441.20	2.92
Total Poultry	2329.9	2459.7	2523.1	2626.28	2707.12	2788.06	3.50

- Bangladesh Economic Review 2012 ;

Growth is calculated considering the base year 2005-06

Number of Livestock Population and Emission Coefficient used for Calculating Methane Emission

Sl No.	Animal Type	Number of Heads (million)	Enteric Fermentation (kg/head/yr.)	Manure Management (kg/head/yr.)
1.	Local dairy cattle	4.200	15	5.00
2.	Improved dairy cattle	0.320	28.33	6.00
3.	Local non-dairy cattle	17.550	15	2.00
4.	Improved non-dairy cattle	1.320	28.33	2.00
5.	Local buffalo	0.800	24.0	5.00
6.	Improved buffalo	0.004	36.0	5.00
7.	Local sheep	0.740	5.0	0.21
8.	Improved sheep	0.003	5.0	0.21
9.	Local goat	24.55	5.0	0.22
10.	Improved goat	0.032	5.0	0.22
11.	Poultry	122.57	NA	0.023

Yearly Methane Emission from Livestock Sector (Gg)

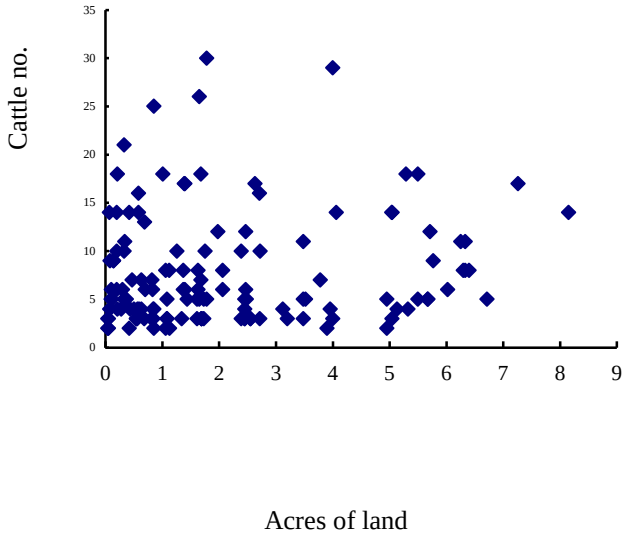
Type of Livestock	No. of heads (million)	Enteric Fermentation (Gg)	Manure Management (Gg)
Dairy cattle	4.52	73.06	22.92
Non-dairy cattle	18.87	300.65	37.74
Buffalo	0.804	19.34	4.02
Sheep	0.743	3.72	0.16
Goat	24.58	122.91	5.41
Poultry	122.57	NA	2.82
Total	**172.09**	**518.68**	**73.06**

Country wise concentration of bovine population

Country	Number of animals/Sq. Km
Bangladesh	145
India	90
China	14
Brazil	20
Ethiopia	30

Household wise concentration of bovine and poultry species

Type	Number /household	Coverage of households (million)
Cattle	1-2	5.10
Cows	3-4	2.10
Buffaloes	Above 5	0.95
Poultry	Less than 249	0.015
	250-999	0.08
	Above 1000	0.021
Total Ref. Need		8.25



Based on this livestock population, Bangladesh has the capacity to produce 4,80,000 tons of bioslurry as dry matter (DM) basis per year

Relation between organic manure and chemical fertilizer

Production of bioslurry (tons)	Equi. of fertilizer
4,80,000	21,600 tons of Urea
	60,000 tons of TSP
	7680 tons of MP

Relation between organic manure and chemical fertilizer

Noted that

- Govt. of Bangladesh is providing subsidy for commercial fertilizer

Subsidy is needed to:

- Manure management to stimulate organic fertilizer
- Pilot project further improve the use of organic fertilizer

Present status of manure management in Bangladesh

Broadly divided into:

Liquid system- mixed with washing water and urine directly to biogas plant

Dry system- can use in many ways

- Solid storage
-dry feedlots
-Dip pit stacks
- Daily spreading of the manure in the fields during grazing

Theoretical aspects of GHG emission from Manure

SLCPs	Condition	Sources
CH4	Anaerobic	liquid waste lagoons, liquid/slurry storage systems, or large stockpile systems
N_20	Aerobic & Anaerobic	Manure
		Nitrification –denitrification process
		NH4 → Nitrate Nitrate → N_20

Comparative emission of SLCPs

Type of SLCP	Compost	Slurry or Stock plies
NH_4, N_20	Less	More
Incase animal of Type		
Dairy	-	Slurry emits 1.6 times more than compost
		Stockpiled 1.5 times more than compost
Beef	-	Slurry emits 4.6 times more than compost
		Stockpiled 1.3 times more than compost

Manure used in Milk Pocket Areas

❖ **Normal Land**

Manure type	Manure use (%)		
	Farm type		
	Small (< 5 cows)	Medium (5-10 cows)	Large (> 10 cows)
1) Compost (%)	30	20	40
2) Direct crop Field (%)	5	-	-
3) Direct Vegetable Land (%)	-	5	5
4) Direct Grass Land (%)	-	-	-
5) Direct Fuel (%)	30	25	30
6) Biogas (%)	-	-	15
7) Others*	35	50	10

*Direct sell, sell as fuel etc., %= No. of farmers

Sarker, (2013)

Make Use as fuel

❖ **Bathan Land**

Manure type	Manure use (%)		
	Farm type		
	Small (< 50) cows	Medium (50-100) cows	Large (> 100) cows
1) Direct Fuel	40	40	15
2) Direct Sell	40	45	15
3) Unused	20	15	-
4) In return of work	-	-	70

%= No. of farmers

Livestock Rearing Systems in Bathan

Manure management systems in Bathan areas

Main share of household's fuel by different farm categories

Item	Main Share (%)		
	Farm categories		
	RCT	Non-RCT	Landless
Wood	4.0	2.0	3.0
Straw	16.0	20	22
Dung	50	58	62
LPG	0.00	0.22	0.00
Others	30	20.00	13

Sarker et *al*, (2006)

Types of biogas plants available in Bangladesh

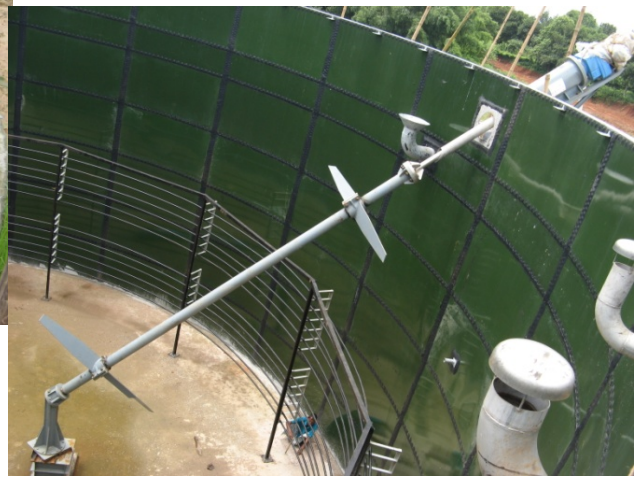
SL. No.	Type	Characteristics
1.	Household biogas plant	Having 4-5 bovine animals or 200 poultry birds
2.	Community based biogas plant	Having 200-250 households covering in a mohalla or partial village (RDA is implementing this project
3.	Commercial biogas plant	Parent stock or breeder poultry farm and or dairy and fattening farms

Household support biogas plant

Community based biogas plant

Commercial Biogas plant

- **HEEE** - 120 KW ; 260 KW



Paragon -1

- Location : Chamiadi, Valuka, Mymensingh
- No. of birds: 130,000 Parent Stock
- Amount of litter: 15 tons/ day
- Biogas production: 1350m^3 (Cubic meter)
- Electric power: 2430KW.h

Paragon-2

- Location: Memberbari, Sreepir, Gazipur
- No. of birds: 250,000 Parent Stock
- Amount of litter: 30 tons/day
- Biogas production : 2700m^3 (cubic meter)
- Electric power generation : 4860KW.h

Mixing tank

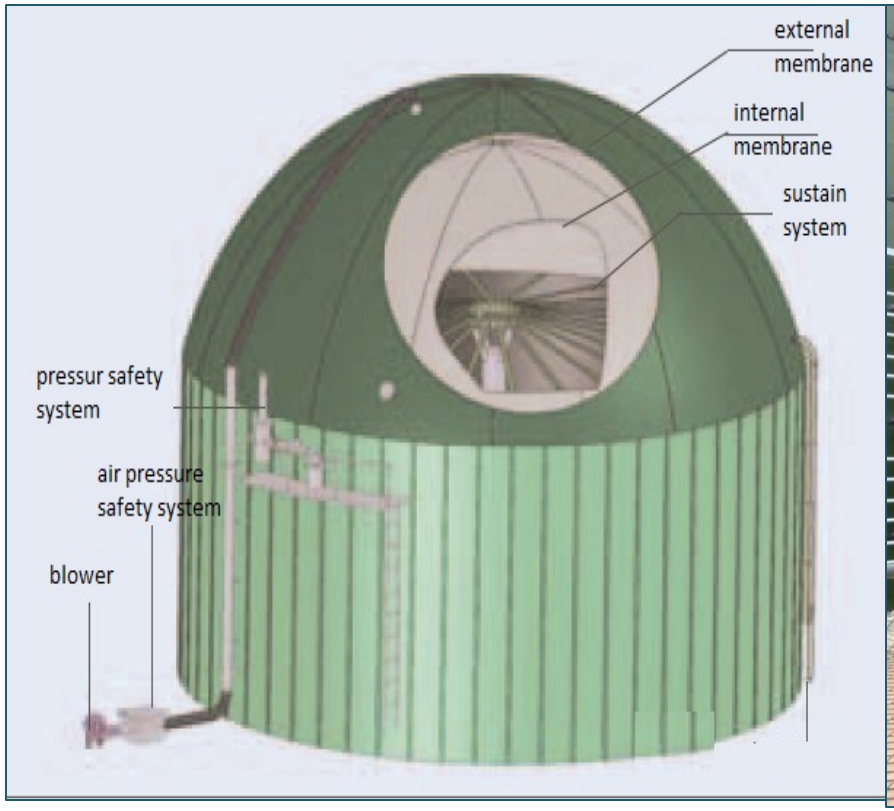
Pump room

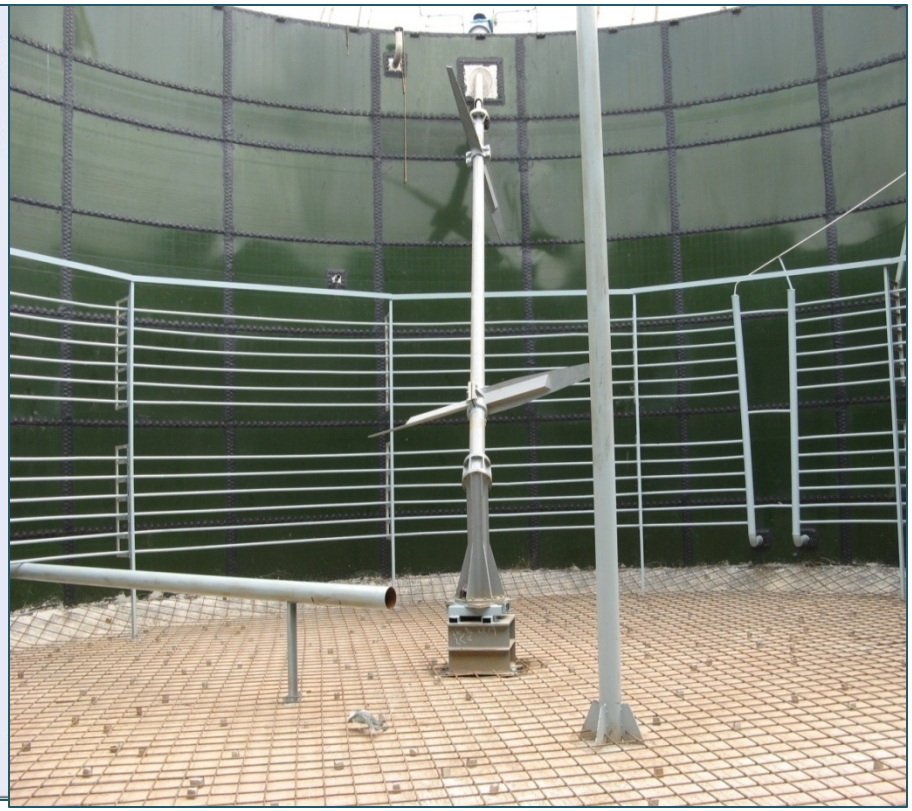
CHP system

Desulfurization System

Digesters

Biogas storage system



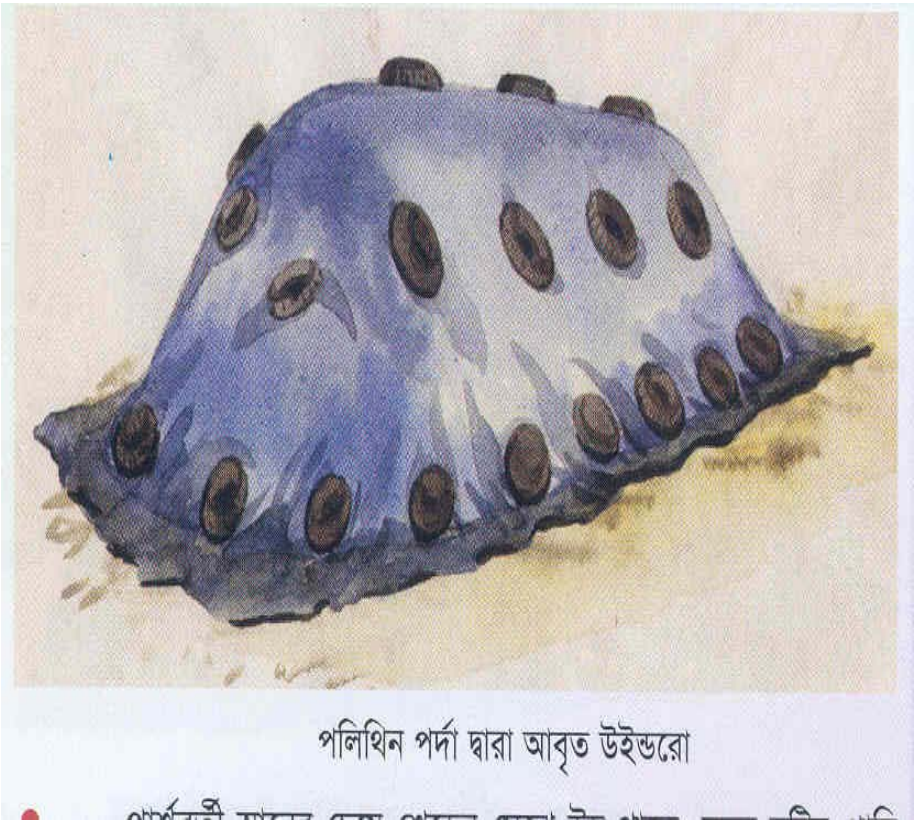


Composting with Hyacinth

Compost bed preparation

Composting

Aerobic compost



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Vermi composting

Relevant National laws, Rules and Policies for Protection of Environment

1. The Water Pollution Control Ordinance,1970
2. The Environment Pollution Control Ordinance, 1977
3. The Bangladesh Environment Conservation Act, 1995 (Revised 2010)
4. The Environment Conservation Rules, 1997
5. The Environment Court Act, 2000
6. Bangladesh Climate Change Strategy and Action Plan (BCCSAP), 2009
7. National Environment Policy, 1992 (under reconstructions)
8. The Bangladesh National Action Plan (NAP) for reducing Short Lived Climate Pollutant (SLCP)
9. International Environment Law And Policy
10. National Water Policy

Constitutional obligation:

Article 18A. Protection and improvement of environment bio-diversity

The State shall endeavour to protect and improve the environment and to preserve and safeguard the natural resources, bio-diversity, wetlands, forests and wild life for the present and future citizens

Under NAP

There is a specific program to SLCPs Abatement from livestock

M2: Promote control of methane emission from livestock through anaerobic digestion of rumen from cattle and Poultry

This is relevant to present investment strategy to SLCPs

Cont.

Under NAP for SLCPs

As per UNEP (2011), 16 key abatement measures have been identified;

7 for reducing BC (Black carbon)

9 for reducing CH4

Cont.

SL No.	Key abatement	Categories
1	BC	Three broad Sector Transport, Industry and Residential
2	CH4	Fossil fuel production and Thermal, Waste management, Agril. And Livestock

Relevancy of the program

Present policy and action plan of Govt. Of Bangladesh on SLCP reduction, further enhance its activity if Bangladesh will take part as a participant of the project.

Area Coverage

Fifteen (15) milk pocket areas have identified in Bangladesh where cattle rearing is one of the major actor of livelihood of farmers

Hence, 100% farmers of those areas will be covered under improved manure management program

Output from engagement of the project

- Increased awareness of the potential of manure management amongst key stakeholders, farmers and policymakers
- Improved stakeholders capacity to implement the best practices
- Introduction of policies enabling improved manure management
- Active linkage among practitioners and organizers
- Share experiences and generate partnership that accelerate manure management in livestock
- Launching projects and partnerships to improve manure management by providing information, experts, knowledge exchange, and access to resources;
- Establishing an internet-based information infrastructure to serve as a searchable repository for global and regional knowledge on manure management.

Common ground among stakeholders

- Sharing of Experiences and Knowledge about the existing manure management
- Methods followed to reduce SLCP
- Policy implementation on SLCP
- Role of International agency to support policy implementation

Lesson Learned

- Existing manure management practices followed by different stakeholders
- Awareness building about manure practices
- Policy issues of manure management for future improvement
- Sharing of knowledge & information
- Institutional arrangement of manure management among stakeholders

Govt. rule to enabling environment

Sixteen Govt. and NGOs organization are presently involved manure management through Biogas production, namely,

SNV-IDCOL

IDCOL

GS

MATI

RDA

GIZ

Muslim-Mission etc.

Cont.

	Present Status of Biogas plant (No.)	Capacity (m^3)
	60,000	2-6
	Potentiality	Excreta and gas
	4.0 million (24.51 bovine manure)	245.00 million kg
		33.09 billion meter

Authors calculation (2013)

Challenges

(1) a lack of awareness of manure's potential by some farmers and policy makers;

(2) a lack of an enabling environment (service infrastructure, policy);

(3) inadequate spatial planning;

(4) dispersed expertise;

(5) a lack of resources to invest in effective manure management; and

(6) a lack of adequate investment in the products of effective manure management

Thank you All