FSM IN NORTHEAST NIGERIA

FECAL SLUDGE TREATEMENT PILOT PROJECT

BRIQUETTE MAKING PRESENTATION.

NCA

Dikwa, Borno State, Nigeria: A group of women carry sticks which they will use to make a fire for cooking.

IDPs risk their lives daily to go in search of wood for survival. Credit: OCHA/Damilola Onafuwa


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WHY FECAL SLUDGE MANAGEMENT

SUPPORT CLTS END OF OPEN FREE DEFECATION STATUS → ENVIRONMENTAL POLLUTION CONTROL → REDUCE THE RISK OF A CHOLERA OUTBREAK

ORGANIZE THE FAECAL SLUDGE MANAGEMENT SECTOR → PROVIDE A LEGAL AND INSTITUTIONAL FRAMEWORK FOR THE FAECAL SLUDGE MANAGEMENT → OPPORTUNITY TO VALORIZE FAECAL SLUDGE TREATMENT PRODUCTS

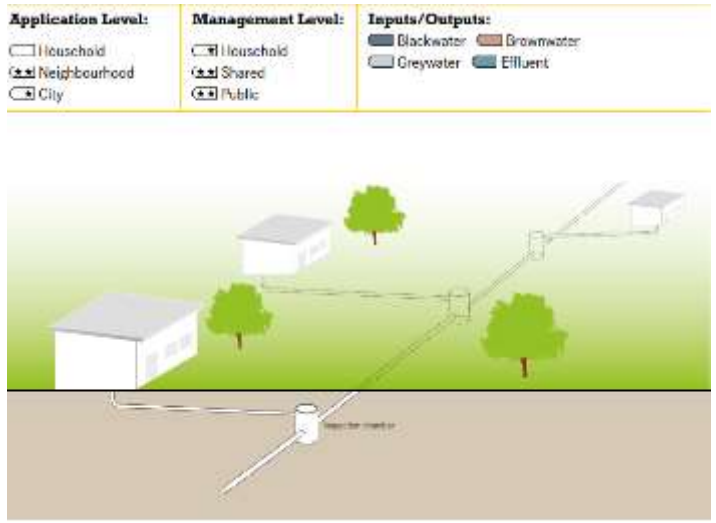
TURNING SEWAGE SLUDGE INTO A RAW MATERIAL FOR ENERGY SOURCES → CONTRIBUTES TO THE FIGHT AGAINST CLIMATE CHANGE BY OFFERING ORGANIC FERTILIZER TO FARMERS → CONTRIBUTING TO POVERTY REDUCTION THROUGH THE RECYCLING OF FAECAL SLUDGE

CONTRIBUTE TO THE REDUCTION OF GBV CASES DUE TO THE SEARCH FOR HOUSHOLDS FUEL AND LACK OF INCOME.

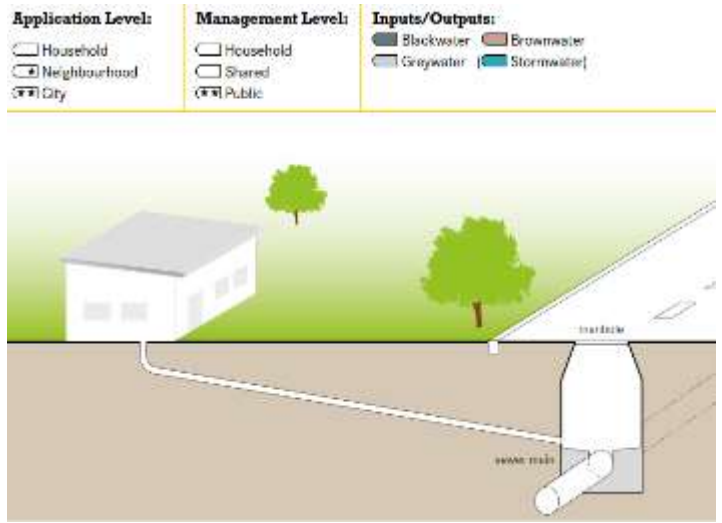
FAECAL SLUDGE TREATMENT METHOD

Sources : Compendium of Sanitation Systems and Technologies (2nd revised edition)

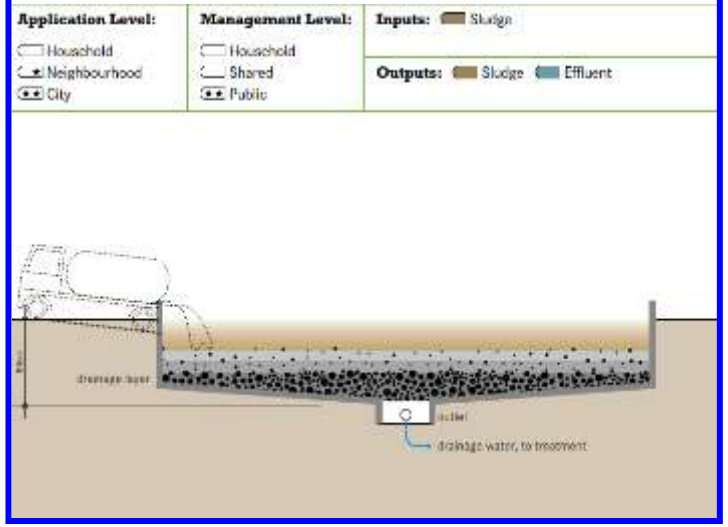
SIMPLIFIED SEWER



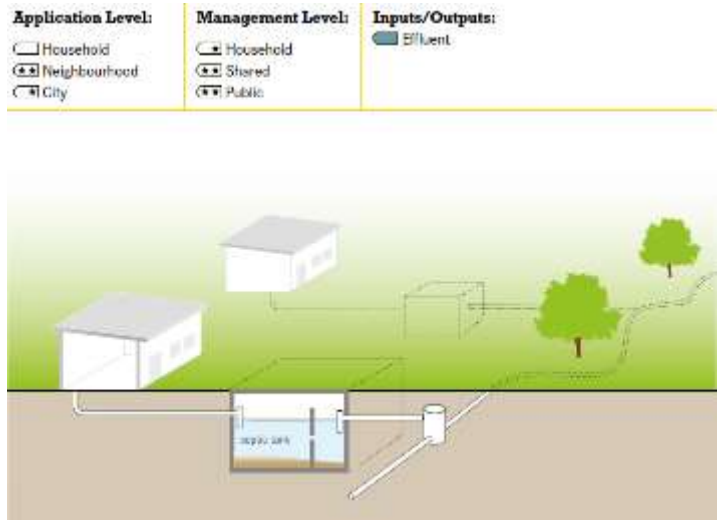
CONVENTIONAL GRAVITY SEWERS



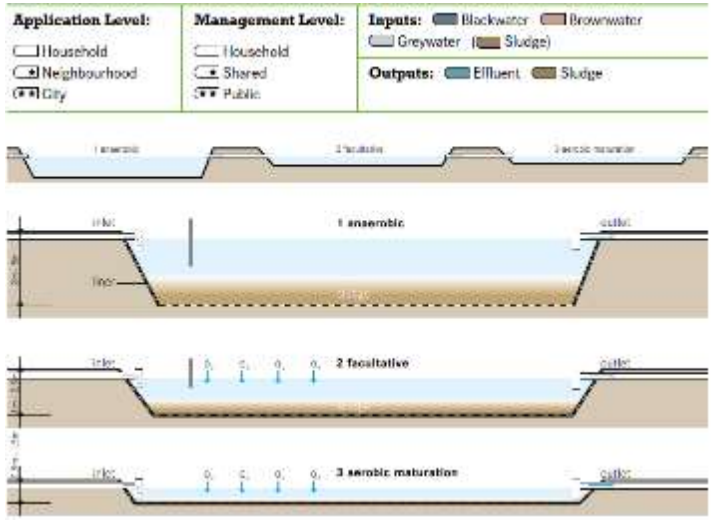
UNPLANTED DRYING BED



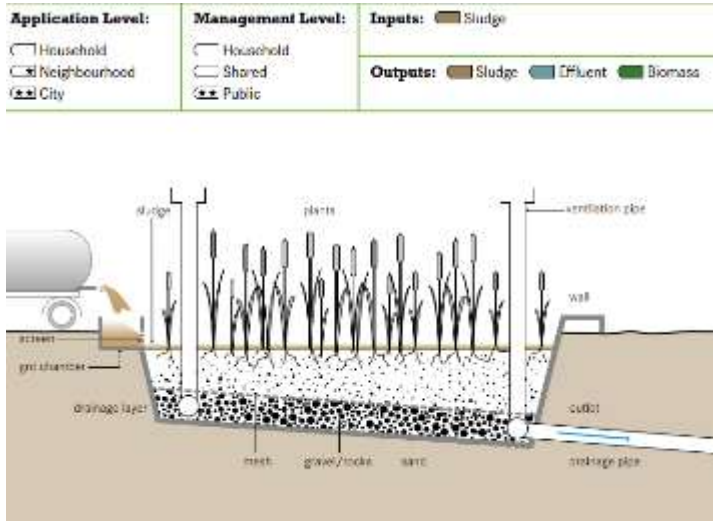
SOLIDS-FREE SEWER



WASTE STABILIZATION PONDS (WSPS)

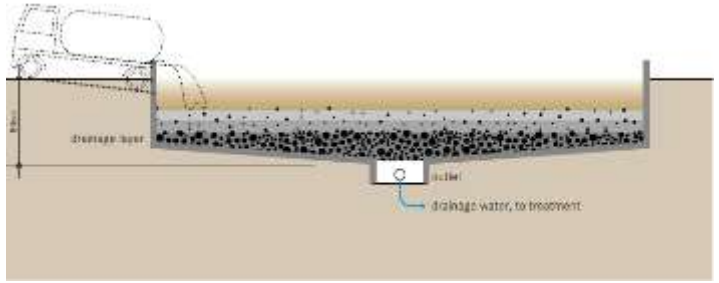


PLANTED DRYING BED



SHANI & BADE FSM UNIT TREATMENT CAPACITY AND DESIGN

UNPLANTED DRYING BED



An unplanted drying bed is a simple, permeable bed that, when loaded with sludge, collects percolated leachate and allows the sludge to dry by evaporation. Approximately 50% to 80% of the sludge volume drains off as liquid or evaporates.

CONSIDERATION:

- Unplanted drying beds are appropriate **for small to medium communities** with populations up to 100,000 people.
- This is **a low-cost option** that can be installed in most **hot and temperate climates.**
- **Need available** space situated far from homes and businesses.
- **Good dewatering efficiency**, especially in dry and hot climates.
- **Can be built and repaired with locally** available materials.
- Relatively low capital costs, **low operating costs**
- **No electrical energy is required**
- **Odours and flies are normally noticeable**

Design, operation and maintenance of Unsaturated Flow Drying Bed (unplanted drying bed) for septic tanks sludge treatment.

Design, operation and maintenance of Unsaturated Flow Drying Bed (unplanted drying bed) for septic tanks sludge treatment.









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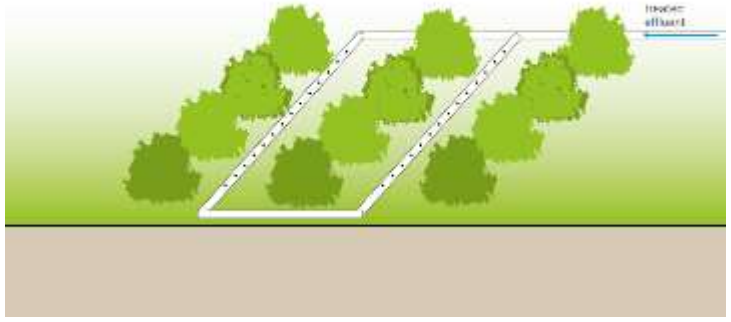
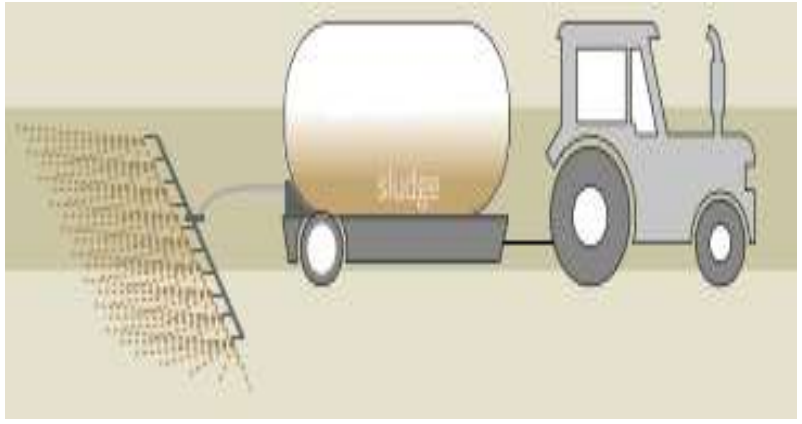
The project set up 02 dry beds around 216 m^2 surface for fecal sludge treatment which corresponds to approximately 40,000 liters of fecal sludge treated per drying cycle estimated every 03 days.

VALORISATION OF FAECAL SLUDGE TREATMENT PRODUCTS IN SHANI & BADE.

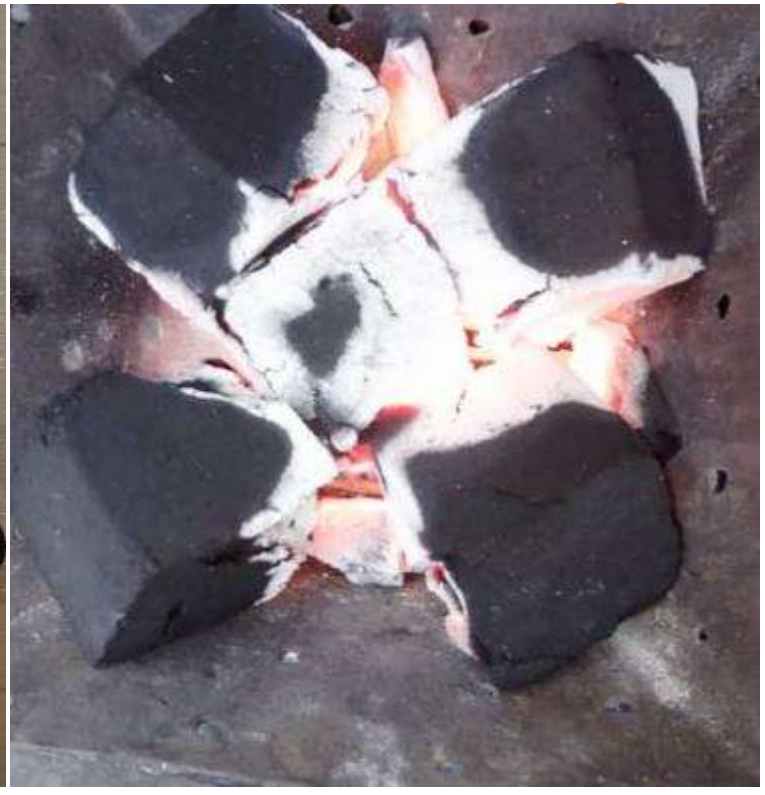
LEACHATE USE FOR

Irrigation





TREATED FECAL SLUDGE PRODUCT CAN BE USED TO MAKE CHARCOAL



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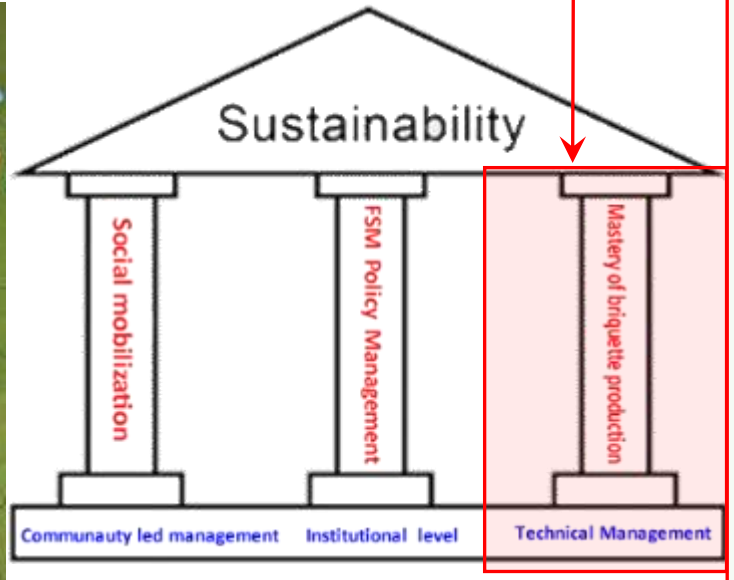
FSM PILOT PROJECT

BRIQUETTE MAKING FROM FAECAL SLUDGE

Collaboration between:

- Norwegian Church Aid - NCA
- Borno State Environmental Protection Agency - BOSEPA

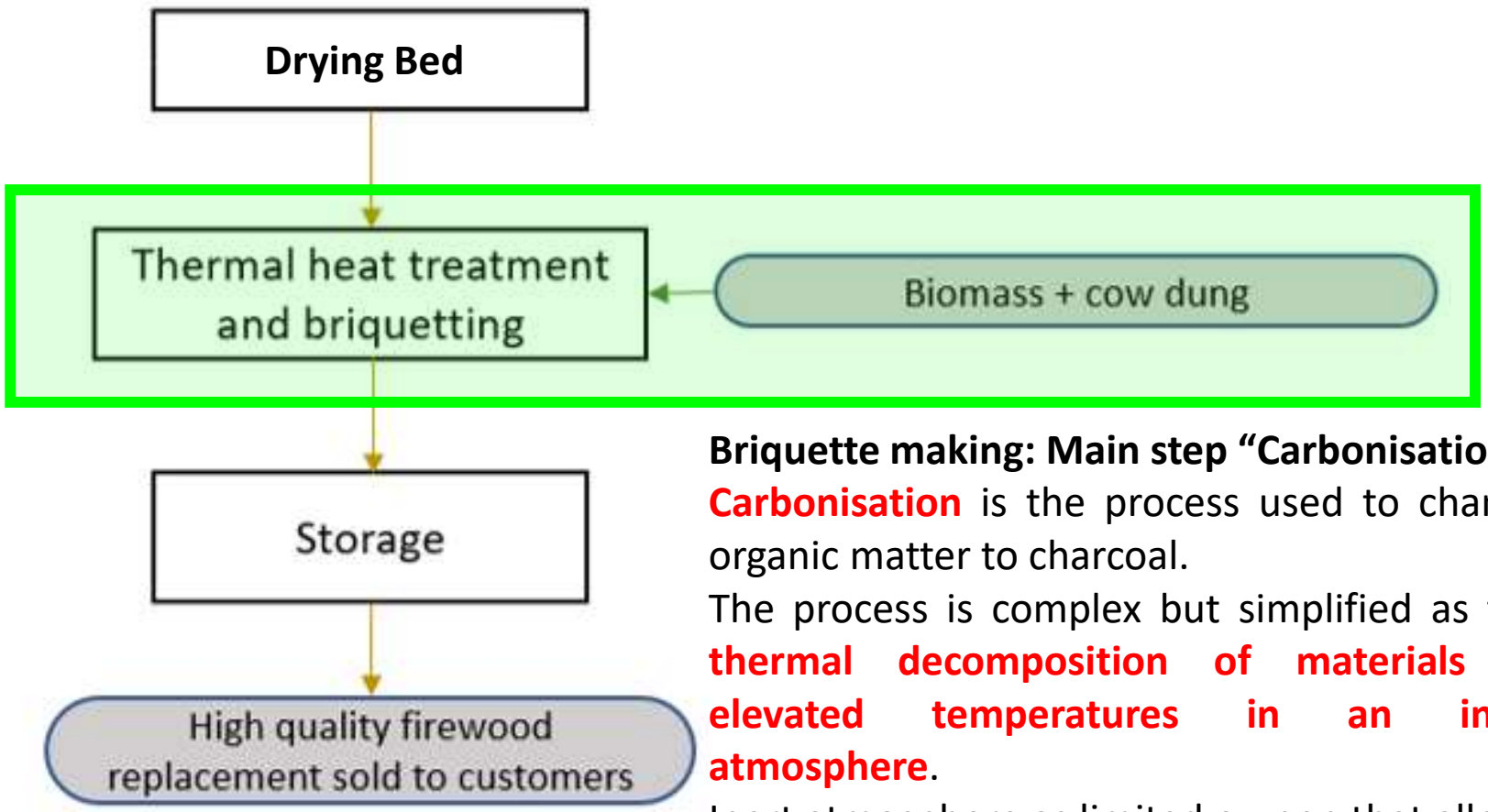


MASTERY OF BRIQUETTE PRODUCTION

Implementation condition

- *Set up fecal sludge treatment technology adapted to the intervention area,*
- *Have available products for mixing with fecal sludge after treatment, such as sawdust or cow dung.*
- *Carry out a sociological study on the perception of the use of briquettes from fecal sludge face to cultural, religious, social norms context, etc. of the beneficiaries communities.*
- *Measure the commitment and interest in briquettes from relevant government authorities.*
- *Ensure the existence of a private operator organized for the fecal sludge management.*

BRIQUETTE PRODUCTION FROM TREATED FAECAL SLUDGE.



Briquette making: Main step "Carbonisation"

Carbonisation is the process used to change organic matter to charcoal.

The process is complex but simplified as the **thermal decomposition of materials at elevated temperatures in an inert atmosphere**.

Inert atmosphere as limited oxygen that allows the carbonisation to take place rather than combustion.

BRIQUETTE PRODUCTION FROM TREATED FAECAL SLUDGE PRODUCT.

BRIQUETTE PRODUCTION FROM TREATED FAECAL SLUDGE .

- COLLECTION AND PACKAGING OF THE FAECAL SLUDGE AFTER TREATMENT
- TRANSPORTATION AND STORAGE OF THE FAECAL SLUDGE READY FOR CARBONIZATION






BRIQUETTE PRODUCTION FROM TREATED FAECAL SLUDGE .

FAECAL SLUDGE CARBONIZATION

Mix Treated Faecal sludge + Saw dust 50 % - 50 %

Barrel stove Method (closed Carbonisation)

The dried material, saw dust / cow manure and faecal sludge are mixed and placed in a 200lt barrel. The top of the barrel can be removed and has been fitted with a flue to allow the flow of hot air thorough the briquettes. A fire is light under the barrel and the hot air passing though the barrel carbonises the briquettes.

The carbonized product is pressed into briquettes using a metal mould and plunger.

BRIQUETTE PRODUCTION FROM TREATED FAECAL SLUDGE .

PACKAGING OF BRIQUETTE FROM FAECAL SLUDGE

BRIQUETTE PRODUCTION FROM TREATED FAECAL LABOLATORY TESTS.

PARAMETER	SAMPLE A % (FM+Saw Dust+Rice Husk)	SAMPLE B % (FM+Rice Husk)	ASTM STANDARD	REMARK
Moisture Content	0.96 %	1.96 %	Method D 3173.	Passed (0% - 15%)
Ash Content	59.4 %	53.46 %	Method D 3174.	Failed (0% - 15%)
Volatile Matter	0.05 %	0.26 %	Method D 3175	passed (0% - 40%)
Fixed Carbon	1.35 %	0.33 %	Method D 3172	passed (0% - 80%)

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DEPARTMENT OF CHEMICAL ENGINEERING

- The ash content is high which affects the efficiency of combustion which despite everything is standard for use as energy sources.
- Use of cassava flour for binding avoid the briquette to smoke during combustion
- Use of Arabic gum is costly and produce smoke

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