

Circular Economy – transforming waste to resources

Faecal Sludge Treatment and Resource Recovery: A case study from Lubhu, Nepal

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BORDA 



 Consortium for
DEWATS
Dissemination
Society



Outline

- Context
- FSTP Introduction
- Transforming waste into resources
- Learning
- Challenges
- Way forward

Two major earthquake in 2015

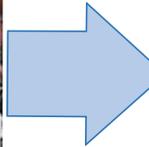
- on **25 April**, with a magnitude of 7.8Mw at 11:56 am Nepal Standard Time
- on **12 May 2015**, with magnitude of 7.3 Mw at 12:50 pm Nepal Standard Time
- Nearly dead and 21,952 injured, 3.5 million homeless



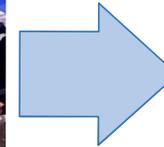
Context



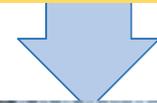
**Devastating Earthquake
in Nepal**



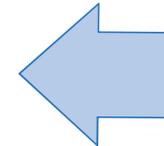
**People residing in
campsites**



**temporary toilets
Construction at campsites**



**Filling up the pit of toilets
in campsites**



- Desludging of faecal sludge by local service provider
- No FS treatment plant
- Public Health risk due to improper disposal of FS
- Environmental Pollution

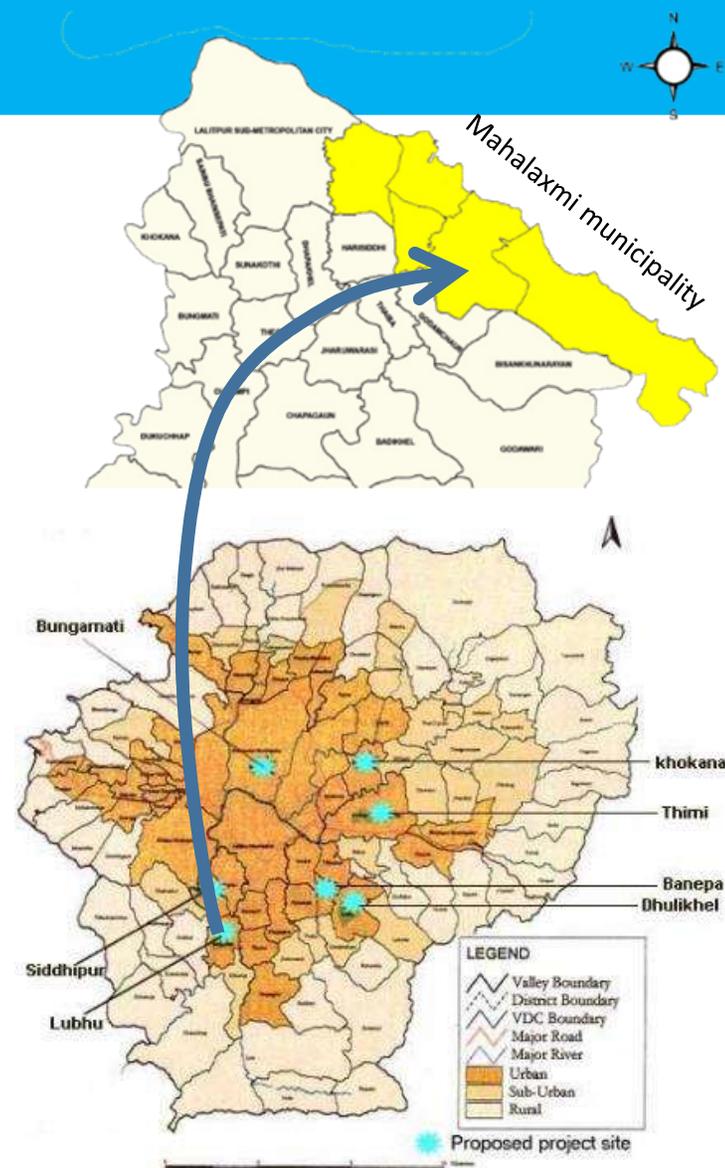
Folie 4

- m1** Another way to consider showing this is just to show the first four steps and illustrate the problem that emerged after the earthquake., And then when describing what was undertaken to show the construction of the treatment plant and construction of FSM treatment

Luisa; 19.06.2017

Conceptualization of project

- Initiated for establishment of FSTP
- Interaction with municipality and local stakeholder
- Mahalaxmi - a newly formed municipality within Kathmandu valley with 2365 HH
- ODF declared municipality with onsite sanitation facility.
- As per a survey conducted
 - single pit (1.5 m³) is most common
 - the average sludge generation estimated is 3.85 cum per day



Story behind land availability

- Series of effort in search of land
 - Major barrier – limited land availability in city, Social acceptance
 - Major driver – Ownership, incentives and technology itself
- Space provided by Saligram Bal Griha, an orphanage (with 42 children) for FSTP.
- Used for vegetable farming for self consumption
- Excess vegetables sold at local market.



Folie 6

m2 Great information but written with a lot of text. Consider using short phrases instead of full sentences. eg. - limited land availability, -land donated by Saligram Bal Griha orphanage with 42 children,- land used for vegetable farming for self consumption, - excess vegetables sold at local market.

Luisa; 19.06.2017

m4 Could this be explained as the barrier and drivers towards the project implementation?

Luisa; 19.06.2017

Story behind land availability

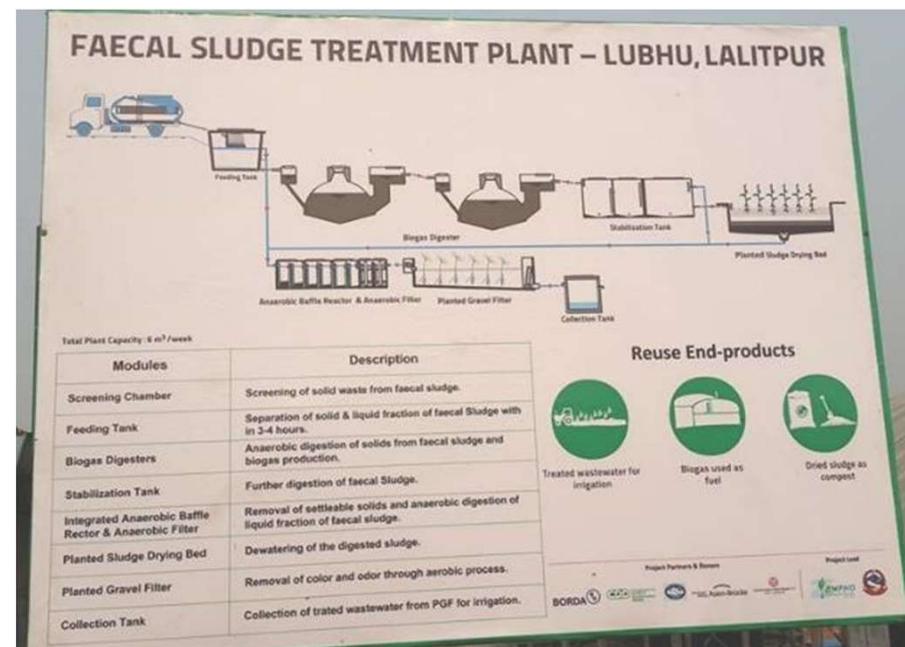
- No intensive use of land due to water scarcity
- Unable to meet the demand of vegetable of orphanage.
- Expenses on fertilizer
- Treated water for irrigation and resource recovery – the major factor behind the land availability
- Land occupied by plant = 300 sqm out of 7150 sqm



Surya, caretaker of land and plant, explaining about the water scarcity for farming

Collaboration for FSTP

- Established in joint collaboration of Mahalaxmi Municipality, ENPHO, Saligram Child Centre, CDD society and BORDA
- Municipality provided leadership and institutional support;
- Orphanage provided space within their land for construction
- ENPHO, CDD Society and BORDA provided technical, financial and logistic supports;



Establishment of FSTP



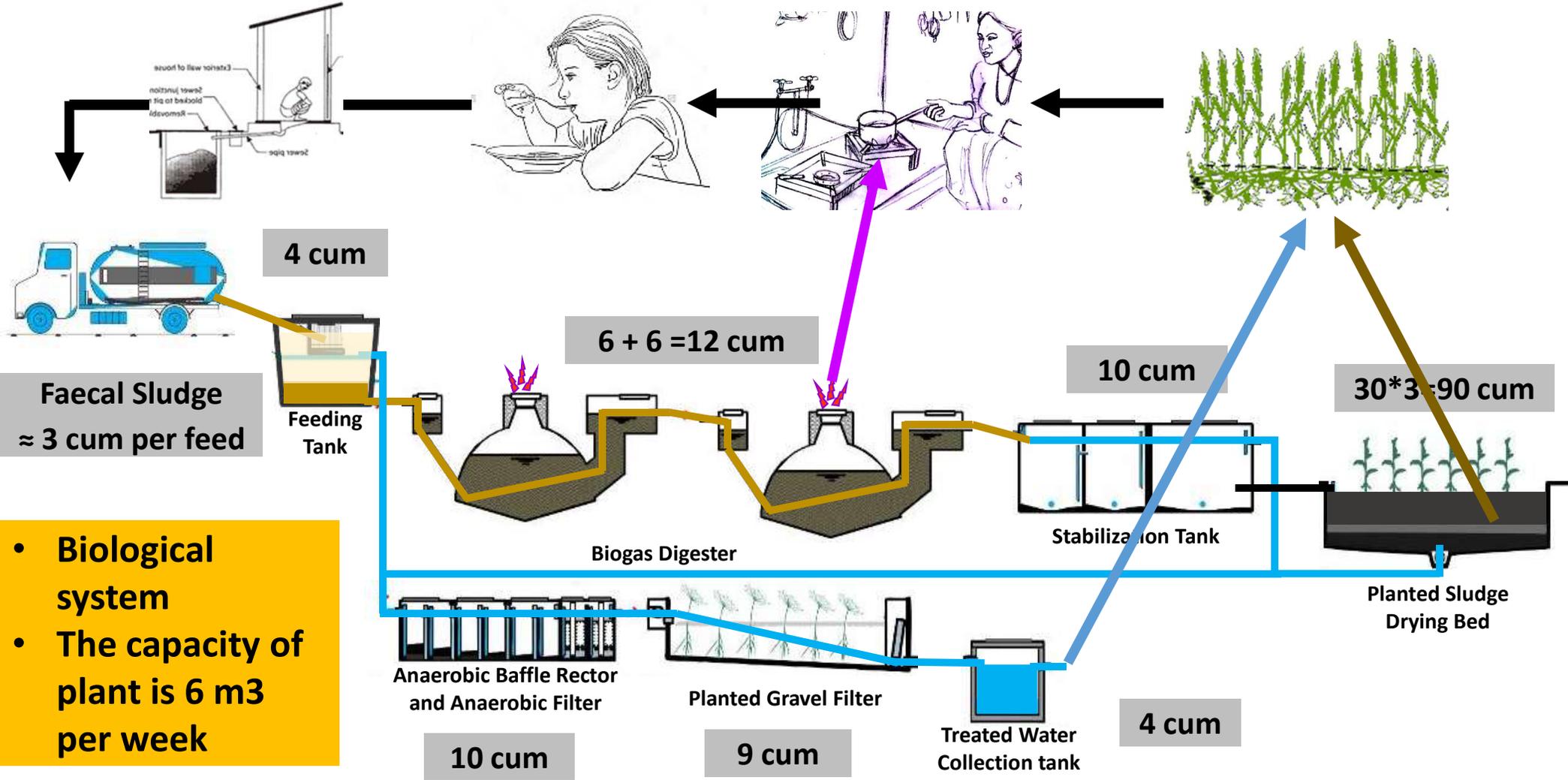
Inauguration of plant by Chief District Officer

- First pre-fabricated FSTP in Nepal
- Only FSTP within the capital city of Nepal
- Established as resource recovery complex
- Besides, FSTP provides facilities for legal disposal of FS to desludging service provider.

This pilot project has demonstrated how faecal sludge can be managed with resource recovery.

m5

FS Treatment and Resource Recovery Complex



- Biological system
- The capacity of plant is 6 m³ per week

Folie 10

m5 Could the financial flows be shown here as well? The materials, water, and energy flows (indirectly) are already nicely depicted here.

Luisa; 19.06.2017

Financial analysis of the FSTP

Cash in

Cash out

Saving from Fuel (Biogas) = \$ 180

Saving from Compost = \$ 500

Income from veg. selling = \$ 600

Saving from Water = \$ 210

Saving from veg buying = \$ 706

Visitor's Charge = \$ 30

Municipal Matching fund = \$ 240

**Yearly
Saving
=
\$ 2195**

Caretaker's charge = \$ 150

Electricity charge for pumping = \$ 20

Regular O and M cost = \$ 100

As a Learning Centre

Several visits were made by national and international Policy makers, Planners, implementers, researchers and journalists



Present status

16 months
of operation and
working well

Volume of FS fed
into the plant
384 cum

Visited by **>50**
national and
international
organizations

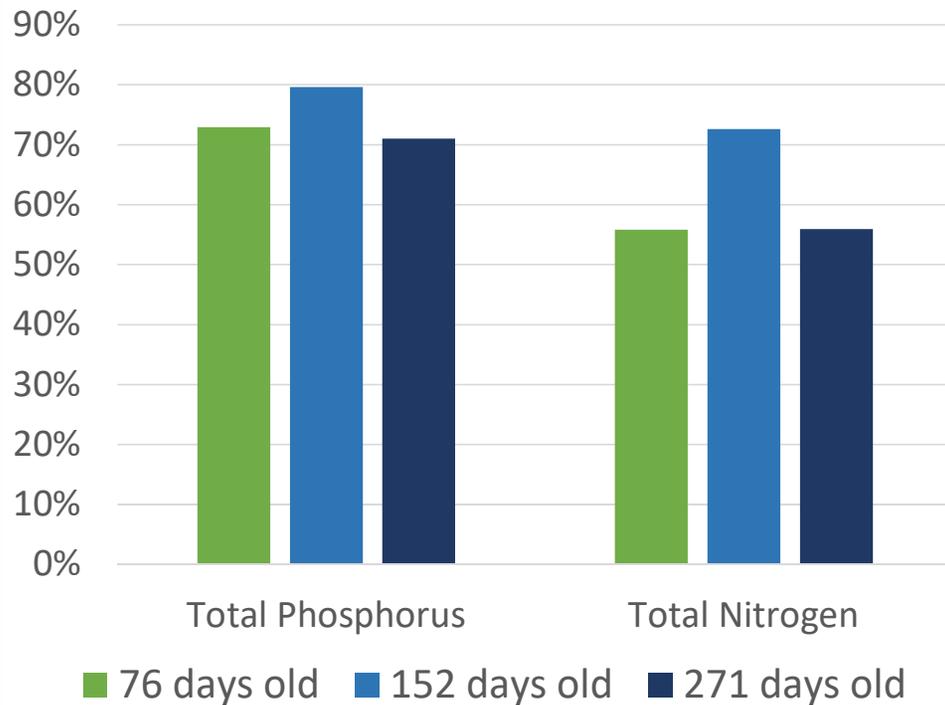


m6 What are the risk and oppurtunities present at the current stage of the project? You also address this in the learnings and challenges slides near the end of the presentation so it may not be necessary to address this here.

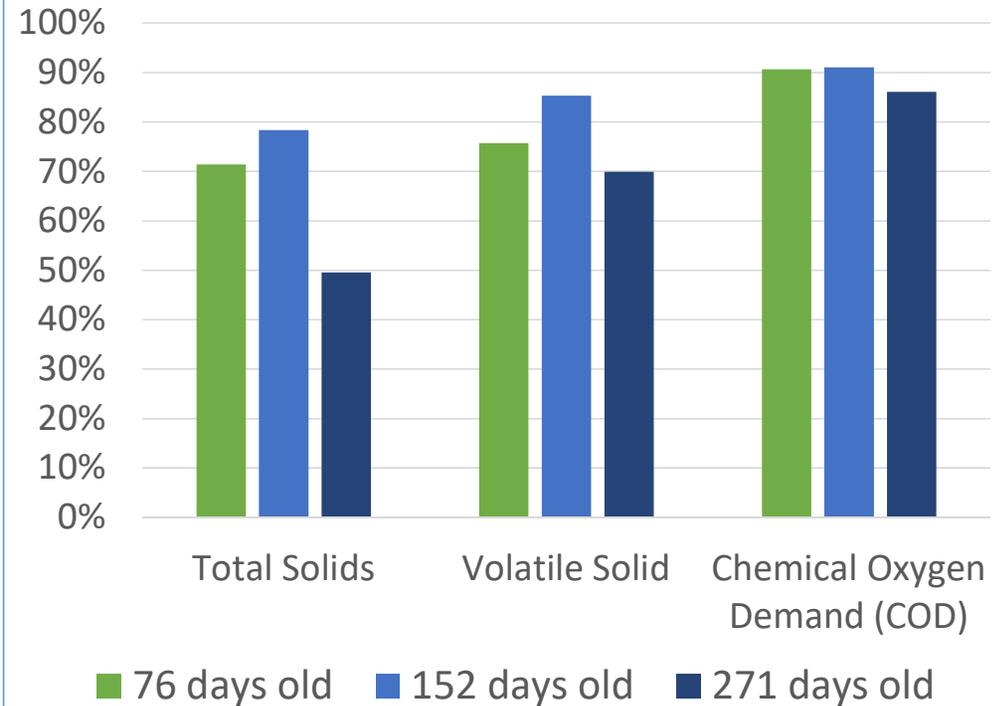
Luisa; 19.06.2017

Performance of treatment plant

Nutrient Removal Efficiency of the Treatment Plant



Solids and Organic Removal Efficiency of the Treatment Plant



Transforming waste into resources



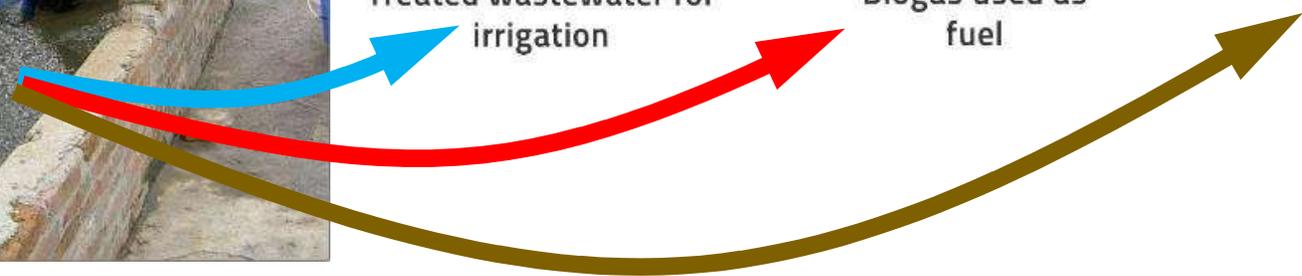
Treated wastewater for irrigation



Biogas used as fuel



Dried sludge as compost



m7 This is a really nice way of showing the circular waste recovery products! Great!
Luisa; 19.06.2017

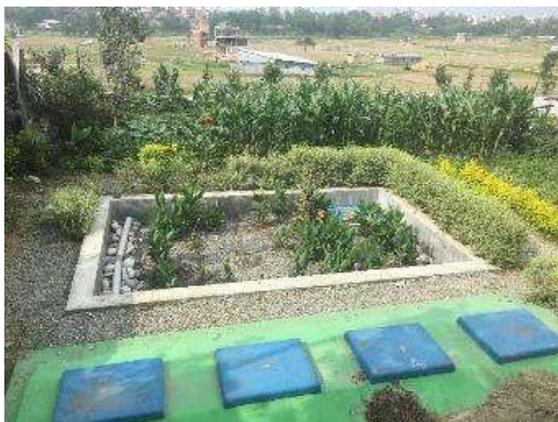
Transforming waste – Water from Faecal Sludge



Treated wastewater for irrigation



Treated wastewater is used for irrigation



ABR, Constructed Wetland and Policing Pond for wastewater treatment

Volume of
treated wastewater
generation
250 cum

Transforming waste – Faecal Sludge into Compost



Dried sludge as
compost



Planted Sludge Drying Bed



Volume of
Sludge / compost
produced
48 cum

Transforming waste – Fuel from Faecal Sludge



Biogas used as fuel



Biogas for cooking



Biogas reactor

Volume of Biogas used for cooking
172+239 cum

m8

m10

- Resource recovery as incentive motivates caretaker;
- Incentive makes easier to convince people m10ring land occurring;
- Aesthetical view of plant site;
- Support and engagement of local stakeholders is essential;
- Equally important the role of desludging service provider;
- Minimum and simple O&M makes system sustained



Folie 19

m8 Nice that the issue of creating demand through incentives and motivating care taker is being addressed. This concept of creating demand for reuse products is a theme we will talk and work with in the workshop.

Luisa; 19.06.2017

m10 The text is overlapping slightly onto the photo here. consider cropping photo,

Luisa; 19.06.2017

Challenges

- Limited design capacity (6 m³ or 2 truck per week);
- Social acceptance of the community towards the faecal sludge management;
- Willingness to pay for FS disposal
- Improper construction of septic tank
- Proper operation of plant
- High cost due to emergency



- Regular monitoring and research on treatment efficiency;
- Comprehensive research on application of treated wastewater, compost in farming;
- Prepare business plan;
- Evidence-based advocacy on FSM;
- Explore replication in other cities.
- Policy and strategies for FSM



Promote Potential Practically
Thank You !

