

Onsite and Offsite Sanitation Facilities, including Sewer Systems and Faecal Sludge Management

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Kathmandu

Types of Toilets used in Nepal

Types of toilet used in Nepal according to sanitation facilities

- Flush toilet (public sewerage)
- Flush toilet (septic tank)
- Ordinary toilet

Percentage of Households using different types of toilets

Types	Urban	Rural
Flush Toilet (Sewerage)	30	3
Flush toilet (Septic tank)	48	30
Ordinary toilet	12	21
Without toilet	9	45
Not stated	1	1

Source: Central Bureau of Statistics (Population Census 2011 : National Report)



Figure 20 Toilet connected to leach pit with provision for overflow into ground



Onsite Sanitation



Figure 27 Toilet above septic tank



Figure 26 Toilet outlet connected to two pits

No Soak away (infiltration) System

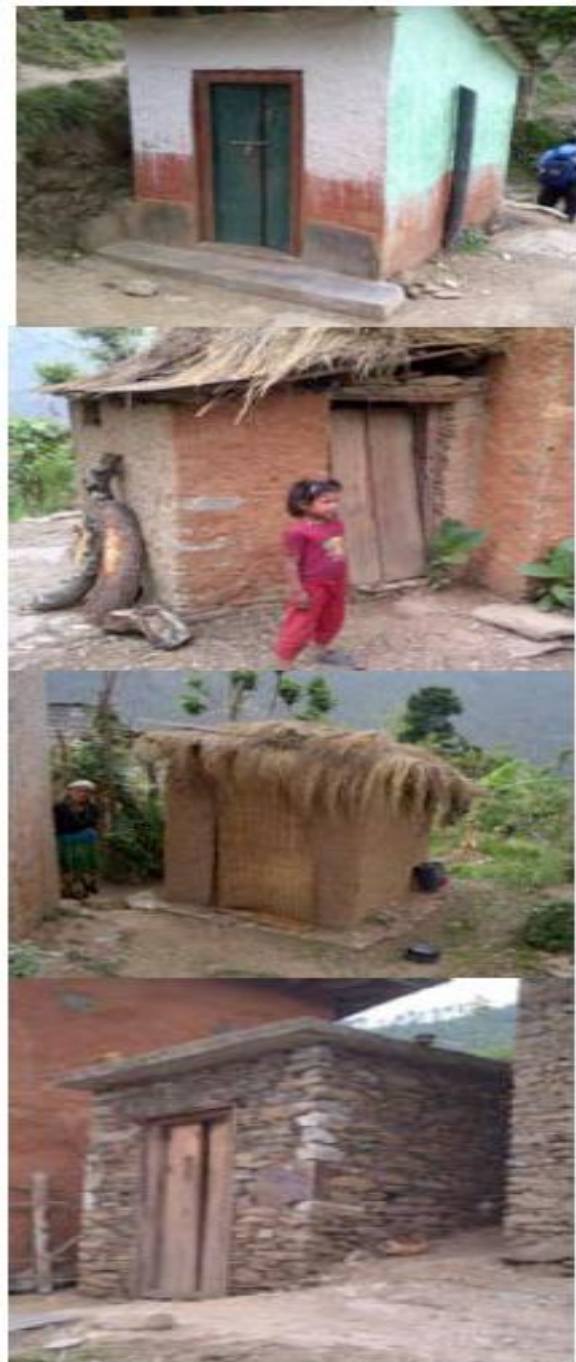
- Infiltration is achieved through unlined bottom, porous side wall or through all sides



Figure 4 Toilet connected to pit



Figure 5 Septic tank at school



Some communities reveal a range of latrine options



Typical roadside settlements and district head quarters of hilly districts



Onsite Sanitation is Challenging

Terai

Very high water table

Hill

Seepage from hill slope

Kathmandu Valley

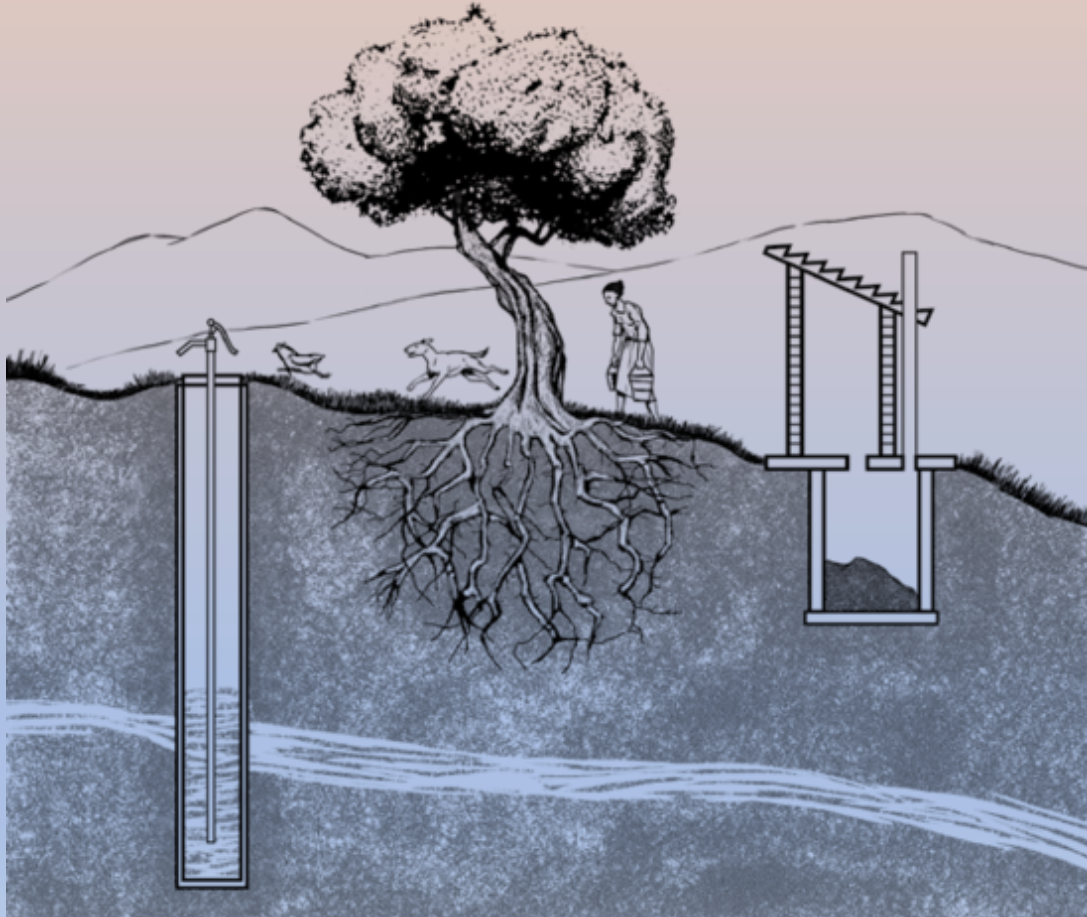
Shallow water extraction for household consumption including drinking, high density-small plot size

Common Practices of Onsite Sanitation



- Unlined ST with/without soak-away system
- Lined ST with/without soak-away system
- Type: Pit with single or double vault
- Sizes: Vary widely, 1.6 m^3 to $>11 \text{ m}^3$, why?
- Need based desludging

Onsite Sanitation Consequences

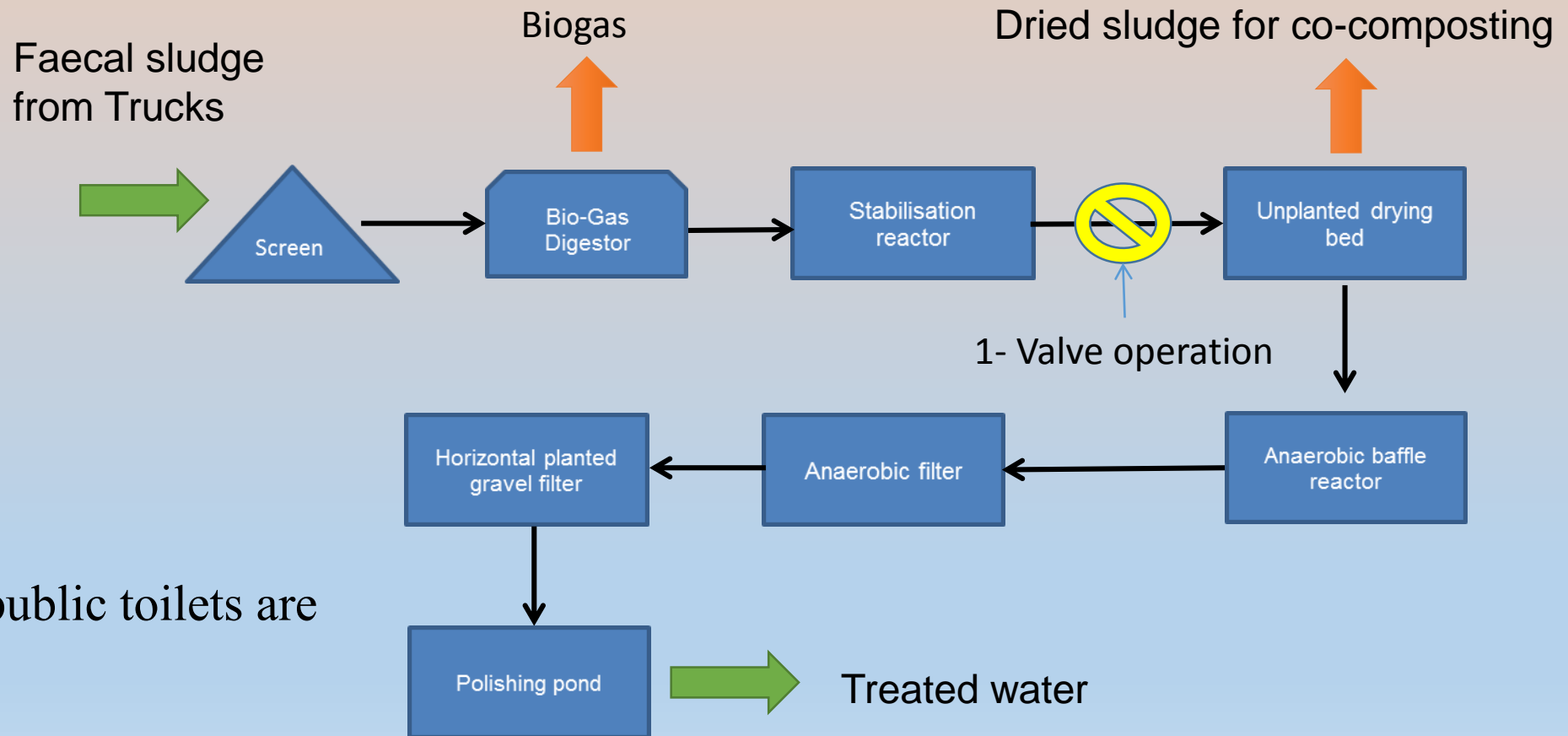


- Increased number of source contamination
- Higher incidences of water borne diseases especially during wet season

Onsite Sanitation: New Initiatives

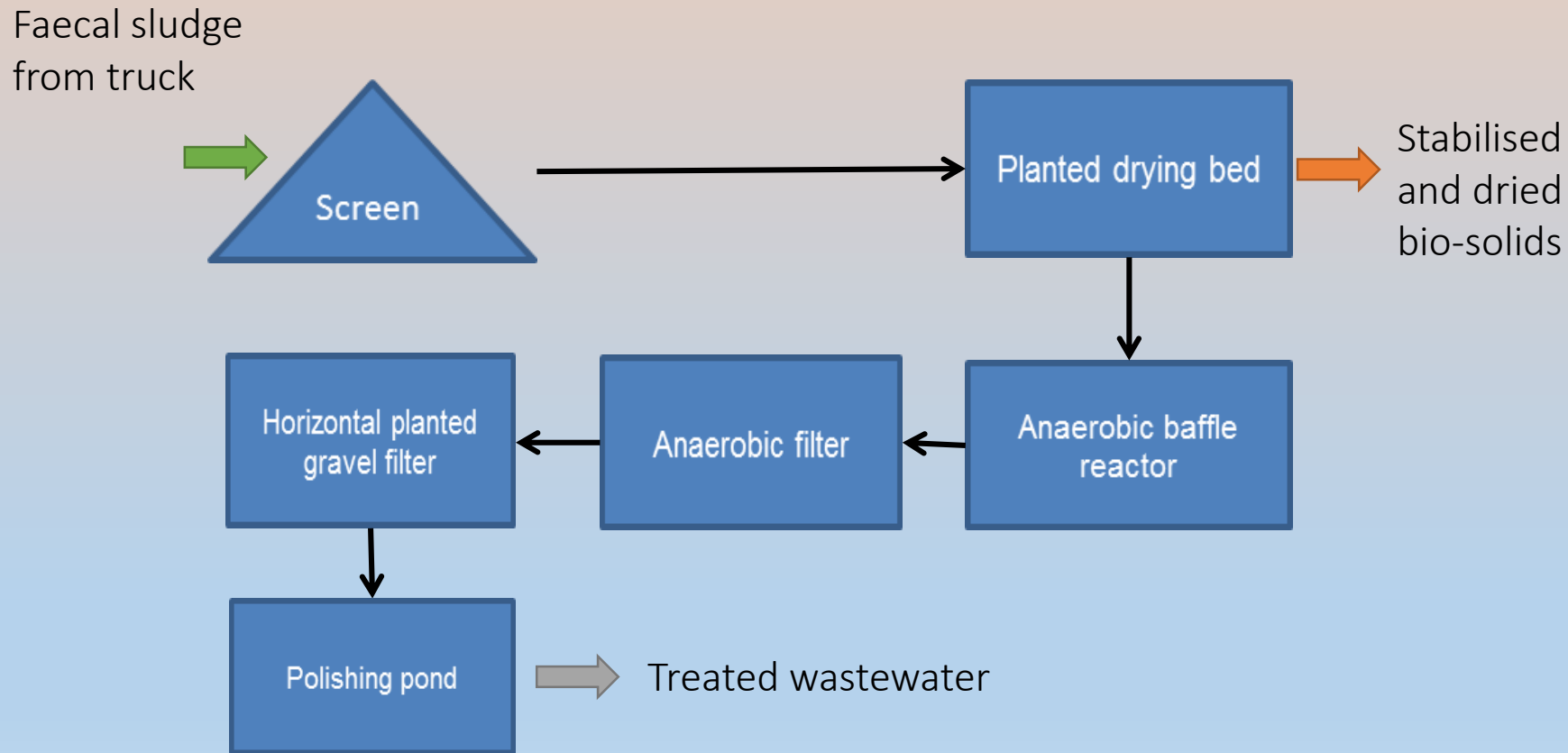
- Partial faecal sludge (FS) treatment in 7 small towns
- Full scale FS treatment plant in 4 towns

Design Flow for Kakarvitta Treatment Plant



- Number of public toilets are very less
- Highly stabilized solids from household

Design Flow for Charali Treatment Plant



Offsite Sanitation

Total length of sewer: 1191.5 Km

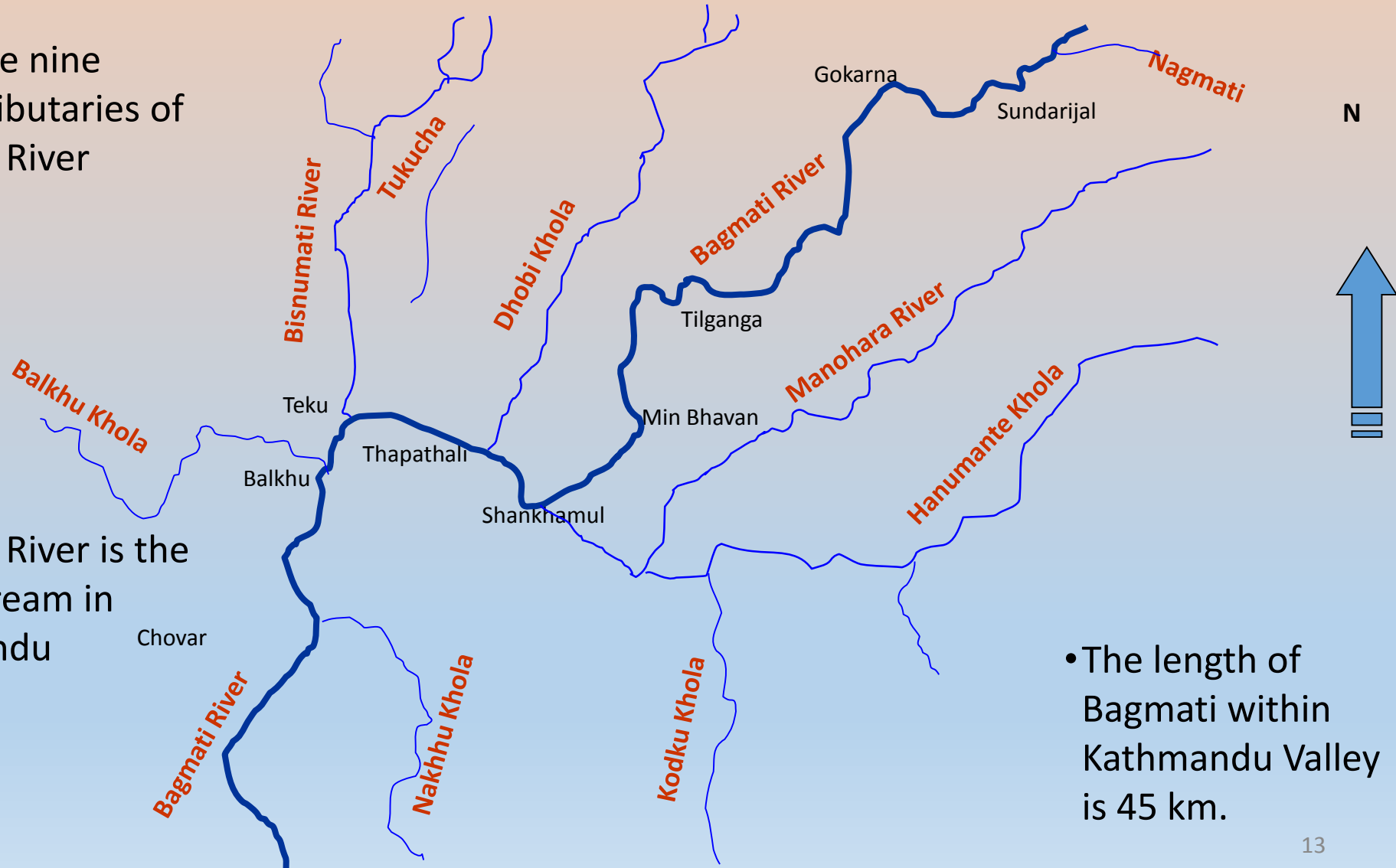


- All most all were laid as Storm Drain
 - Combined sewer or separate?
 - Though inadequate to today's capacity 4 Wastewater Treatment Plants were installed.
- They failed because of
- Inadequate maintenance
 - Knowledge & skills
 - O&M cost

Offsite Sanitation: New Initiative

- There are nine major tributaries of Bagmati River

- Bagmati River is the Main Stream in Kathmandu



- The length of Bagmati within Kathmandu Valley is 45 km.

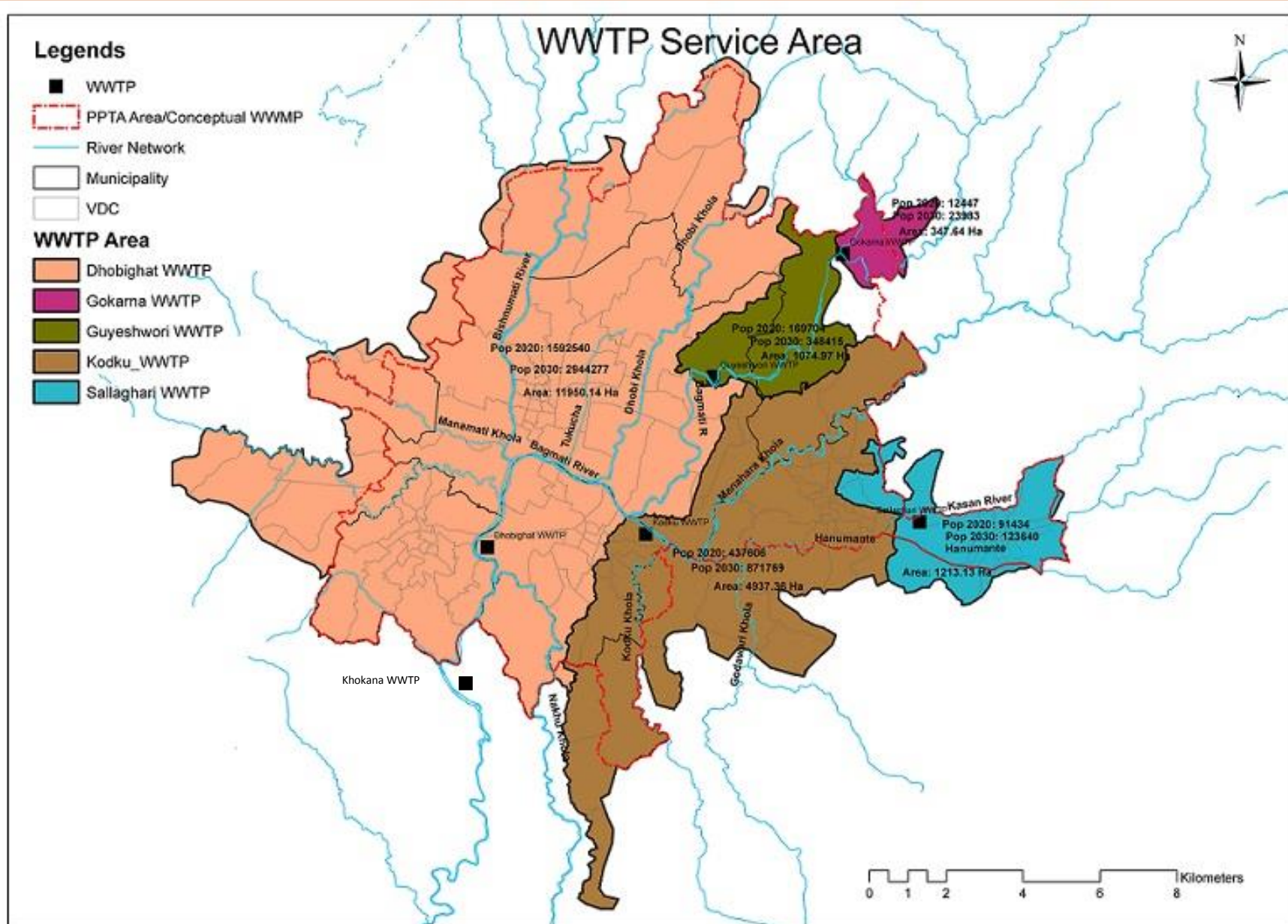
Offsite Sanitation



Municipality	WWTP	C. Area (km²)	Wastewater Discharge (MLD) 2030
Bhaktpur	Sallaghari	12	14.2
Kathmandu	Guheshwori	14	48.6
Lalitpur	Kodku	5	35.0
Kathmandu	Dhobighat	61	110.0
Kathmandu	Khokana	122	295.0
Total sum		195	502.8

- Septic Tanks are common- mandatory through Building Code
- Combined treatment of WW and Feacal Sludge or separate treatment?

Wastewater Management : Treatment Plants



My thoughts

- Onsite sanitation is partial and many times problematic
 - Guidelines are required for different geographic regions
 - Protection of water sources
 - Faecal Sludge Treatment system should be simple to operate and maintain
- Offsite sanitation
 - Acceptance of the reality- sewers are combined
 - Treatment plants are there- do we need septic tanks?
 - Equal priority should be given to the sustainability of WWTP- tariff is the key

Thank You