DISTRICT DEVELOPMENT PLAN SHAMLI

PHYSICAL INFRASTRUCTURE

KEY ISSUES | PROPOSALS | STRATEGIES

Group Members

1. Aatish Kumar
2. Anupreet Kaur
3. Nulu Shanmukha Dheeresh
4. Vemulakonda Poorna Venkata Manikanta

4th year 7th Semester
Bachelor of Planning
2018 – 2022
School of Planning and Architecture

KEY ISSUES & PROPOSALS

ASPECT	KEY ISSUES	PROPOSALS
WATER	• Drinking water supply in villages is lower than required. • In rural there is high dependency on groundwater for drinking • Metered water connections are not available in in the district. • Groundwater withdrawn exceeds the ground water availability • Exploitation of Groundwater and Declining ground water levels • Water Treatment Plant: Absent; No Physical/ Chemical/ Bacteriological tests and treatment of water • No water testing at consumer point	• 100% Piped metered water connection in rural and urban households from treated source. • Frequency of supply to be improved • Water to be tested at consumer point rather than at the source. • Provision of water testing lab in urban areas and towns • Increase in the treatment capacity of water testing and treatment labs . • Rainwater harvesting to be done for ground water recharge
SEWERAGE & SANITATION	• Lack of drainage system in the district. • Existing drainage system is also open drainage system only. • Lack of latrine facilities in both shamli sub district and Kairana sub district in rural areas. • In Rural areas, there is no sewerage treatment is happening and the waste water is directly disposed into the water bodies without treatment.	• Drainage facilities such as proper drainage system including dual water system should be installed. • Provision of Sewerage Treatment plants and decentralised wastewater treatment plants in all the urban areas. • Provision of wastewater treatment Plants at village level. •
SOLID WASTE MANAGEMENT	• **Incomplete and inefficient waste collection** (62% of Domestic waste in urban areas is not collected)**.** • **No specified location** for the solid waste disposal in rural areas. • **No Scientific Treatment** of solid waste in Shamli District. • Accumulation of waste at open spaces, street sides/ drains, leading **environmental degradation**. • **Segregation of solid waste is absent** in both Rural and Urban areas. • Non-Biodegradable wastes, Bio-medical and hazardous wastes are being dumped in open sites and landfill sites which is leading to Environmental degradation.	• **Street Sweeping** and road side drain cleaning supervised by ULBs & GPs. • Initiate **Door to Door** waste collection. • **Three Bin system** (Organic, Recyclable and Hazardous) • Replacement of current open dumping sites with Solid Waste Management Site. • **E-waste storage unit** in SWM site. • **Vermi-composting unit-** to be established at ward level in urban areas and one unit at village level and managed by local NGO's or RWAs. • **Waste to energy Plant** at regional level. • Provision of **Common Bio-medical Waste Treatment Facility**. • **E-Waste Recycling Plant** at regional level.
POWER	• Even though all the villages in the district are fully electrified, **48% of households** in the district are using other sources than electricity for the purpose of lighting. • During the **FY 2018-2019** the **power loss** noted was **55%** in the entire district. • **No Renewable form of energy** production till date except biomass.	• **Grid Connected Solar Rooftop System** should be installed in the residential, commercial and industrial units on the roof of their premises/area, the regulations as notified by Uttar Pradesh Electricity Regulatory Commission. • **Regional Level Solar Park** can be installed with the capacity given by MNRE under UP Solar Energy Policy. • **Industrial Waste based Power Projects** under UP Bio Energy programme in the industries like paper mills, sugar mills, food processing, Dairy,etc. • **Reduction in AT&C losses** by following the Methods suggested by Niti Ayog,2021.

RURAL

	Std. Water Req.(Lpcd)						
CD Blocks		**Shamli**	**Kairana**	**Kandhla**	**Thana Bhawan**	**Un**	**Total**
Projected Population		192600	307400	310500	354700	393600	**1558800**
Year 2041	70	13.5	21.5	21.7	24.8	27.6	**109.1 Mld**
supply (2011)		1.4	2.4	2.8	3.2	3.2	**13.1 Mld**
Total Demand							**96.0 Mld**

- **Water supply in rural in 2011 is approximately 13.1 MLD**
- By **2041**, the **demand in Rural** will increase to approximately **109 MLD in Shamli district**

URBAN

	Std. Water Req.(LPCD)							
CD Blocks		**shamli**	**kairana**	**kandhla**	**thana bhawan**	**un**	**Total**	
projected Population		379200	164800	84100	105500	48000	**781600**	
Year 2040	135	51.2	22.2	11.4	14.2	6.5	**105.5**	**MLD**
present		11.5	6.8	4.7	5.9	2.4	**31.4**	**MLD**
Total demand							**74.1**	**MLD**

- **Water supply in urban in 2011 is approximately 31.4 MLD**
- By **2041**, the **demand in Rural** will increase to approximately **105 MLD in Shamli district**

PROPOSALS

	Std. Water Req.				
Year			**2041**		
projected Population			Urban	Rural	Total
			6,00,000	16,00,000	22,00,000
Domestic		**@135 LPCD (towns)**	81	112	**193 MLD**
		@70 LPCD (villages)			
Non- Domestic	**Industrial &**	**30% of total demand**			57.9
	Commercial				
	Public Use	**5% of total demand**			9.65
	Fire Fighting	**1% of total demand**			1.93
	Losses	**15% of total demand**			28.95
Total Demand					**291.43**
Supply(2011)			31.42	26.2	**57.62**
Gap					**233.81**

Source: URDPFI Guidelines, 2015; Indian Standard Code Of Basic requirements for Water Supply, Drainage and Sanitation

- By **2041**, the **demand** will increase to approximately **291 MLD in Shamli district**
- **Water supply in Shamli district in 2011 is approximately 57.62 MLD**

PROPOSALS

ASPECT	PROPOSALS	STRATEGIES TO IMPLEMENT
Drinking Water	1. 100% Piped metered water connection in rural and urban households from treated source. 2. Frequency of supply to be improved from onece in a week, twice in a week to daily in all the urban areas.	1. Promoting sustainable use of water in rural and urban areas with free water supply up to 7500 litres (rural) & 17000 liters (urban) per household per month above which water tariffs will be collected. 2. priority is to be given by state government to provide protected drinking water to all urban local bodies by strengthening existing infrastructure and improving service levels.
Water Quality	1. Water to be tested at consumer point rather than at the source. 2. Provision of water testing lab in urban areas and towns 3. Increase in the treatment capacity of water testing and treatment labs .	1. Rural Water Supply and Sanitation Department will ensure the quality standard of water supplied in the rural areas.
Irrigation and Ground Water Recharge	1. More water potential for irrigation to be created with rainwater harvesting. 2. Rainwater harvesting to be done for ground water recharge.	1. Gabion structures and Contour Bunds will be made in the streams to recharge ground water in the streams at every 25 - 30 meters. 2. Recharge pits will be constructed in all buildings having roof area of 100 sqm. and above in urban areas to recharge ground water.

- **Explore and identify sources of surface water** to reduce dependency on depleting groundwater resource
- **Setting up of new Water treatment Plant(s) and storage tank(s)** as per need to achieve universal coverage of treated water supply
- **Conservation, Revival and renovation** of water bodies

- **Wastewater** from domestic households and industries **to be treated** before disposal to prevent pollution of Krishni River and ground water
- **Provision of effluent treatment plants** to prevent pollution of Krishni River and ground water
- **No polluting activity** to be permitted, which may result in the significant degradation of any water resource

- **Setting up a Lab** for online water testing, monitoring system and water testing van
- **Recycling of treated wastewater for industrial, public, commercial use, horticulture etc.**
- Laying of **new systems of distribution** of water supply with **dual pipe system for potable & recycled water** especially in new areas.

Gabion structures and Contour Bunds

- A gabion is semi permeable barrier, made of boulders in a mesh of steel wires and anchored to the stream bank, to slow but not stop, the flow of storm water in a small watercourse so to favor water infiltration to groundwater and help prevent soil erosion.
- The height of such structures is around 0.5 m and 1m wide, and is normally used in the streams with width of less than 10 m.

PROJECTIONS (2041)						
DOMESTIC DEMAND	Projected Population 2041	No. of Households Proposed (2041)	Assumed average Household Size (2041)	Norms as per NBC 2016 and CPHEEO Manual	Water Requirement Per Day (MLD)	Sewage Generation per Day (MLD)
Shamli Urban Area	6,00,000	102002	4.5	135 Litres per person per day	61.96	49.57
Shamli Rural Area	16,00,000	235230	5	70 Litres per person per day	82.33	65.86
Shamli District	22,00,000	337231	4.75		144.29	115.43

Technology		No. of Plants	Cost (in Rs. Million per MLD)	Area requirements	Current (HA)
UASB	Upflow anaerobic sludge blanket (UASB) technology	16	2.8-3.2	0.42	20.81
WSP	Wastewater Stabilization Ponds	10	1.4-1.8	1.5	74.35
BIOFAR	Biofar tanks, bio filter tanks with sludge settling, removing technology	2	6.5-7.0	0.38	18.83

GAP ANALYSIS & ESTIMATED DEMAND FOR 2041

URBAN AREAS

Existing STP in District: Nil

Current Gap (2011): The gap of STP in the urban areas comes around 41 MLD (Approx.) which requires minimum of 17.22 Ha of land. (*cost effective and area effective method*)

PROJECTED DEMAND (2041): The Estimated requirement for STP for 2041 in the urban areas comes around 50 MLD (Approx.), requires minimum of 20.81Ha of land.

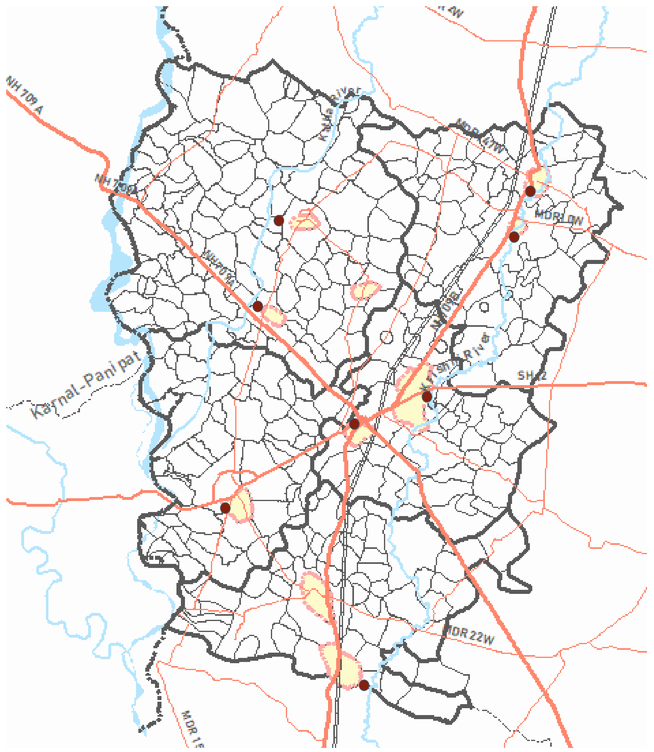
RURAL AREAS

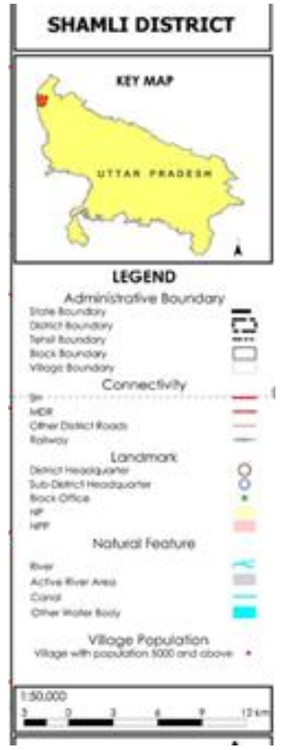
Existing Method: No Treatment

Current Situation (2011): Under the Lilon Gram Panchayat Development Plan, it was observed that all the houses are connected to the drain (open drain) which leads the sewerage to the open ponds/ lakes of the village.

PROPOSED TECHNIQUE (2041): WWTPs at Community level, Village level

POTENTIAL LOCATIONS FOR STP (URBAN AREAS)





Demand for Industrial Units

EXISTING SITUATION 2021:

CASE STUDY: *Upper Doab Sugar Mills Ltd. (800TCD) with* 26.6 HA area.

Wastewater generation: 1600KLD

Waste water treatment Method: ETP Capacity(2100MLD)

ETP comprises of Multi Bed Filter, Oil & Grease separator tank, Zig zag Pit(Equalization), Acreation tank with diffused aeration system, Clarifier, Sludge Drying Bed.

Wastewater Discharge: Treated water will be discharge after treatment and also to be used for horticulture within premises.

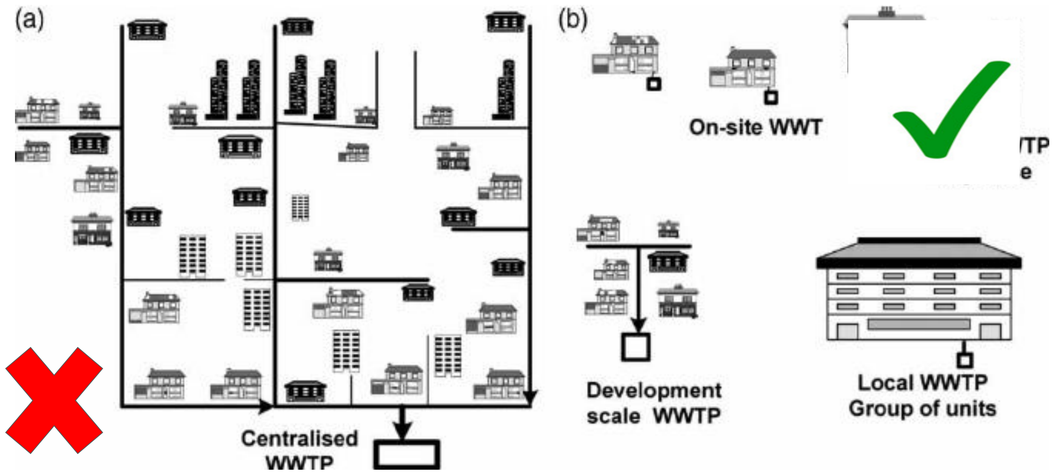
PROPOSED TECHNIQUE (2041): DEWATS Installments in all the Industrial units of the District

PROPOSALS FOR SEWERAGE TREATMENT

URBAN AREAS

Decentralised System

Decentralised system should be used instead of centralised system in sewage treatment.



INSTALLATION OF DEWATS

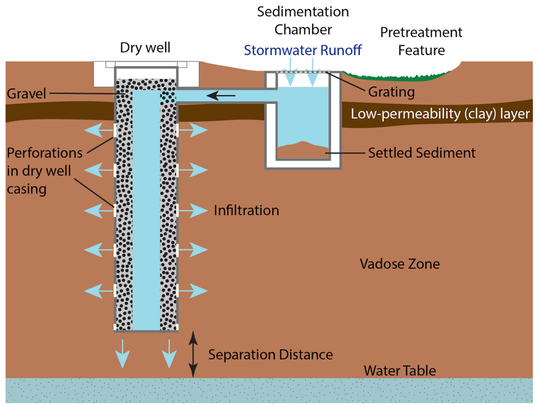
- If Industries and other non residential buildings treat their own sewage through septic tanks, then the overall pressure on centralised system will reduce.
- For village settlements also, decentralised methods at community level could be used. (treating approx. around 13 MLD in just **0.6 HA**)
- further, this treated water can be used back in dual pipe system of water supply.
- It would perhaps be helpful in increasing groundwater table yet there would affect the quality of groundwater.
- Possibility of recovering energy/ gas as fuel from sewage could be also explored.

SCALE	Population	waste water generation	Area Requirement
Individual Building	8	1 KLD	2.8sqm
housing area level	5000	0.6 MLD	500 sqm
neighborhood level	10000	1.39 MLD	600 sqm
community level	100000	13 MLD	6000 sqm

RURALAREAS

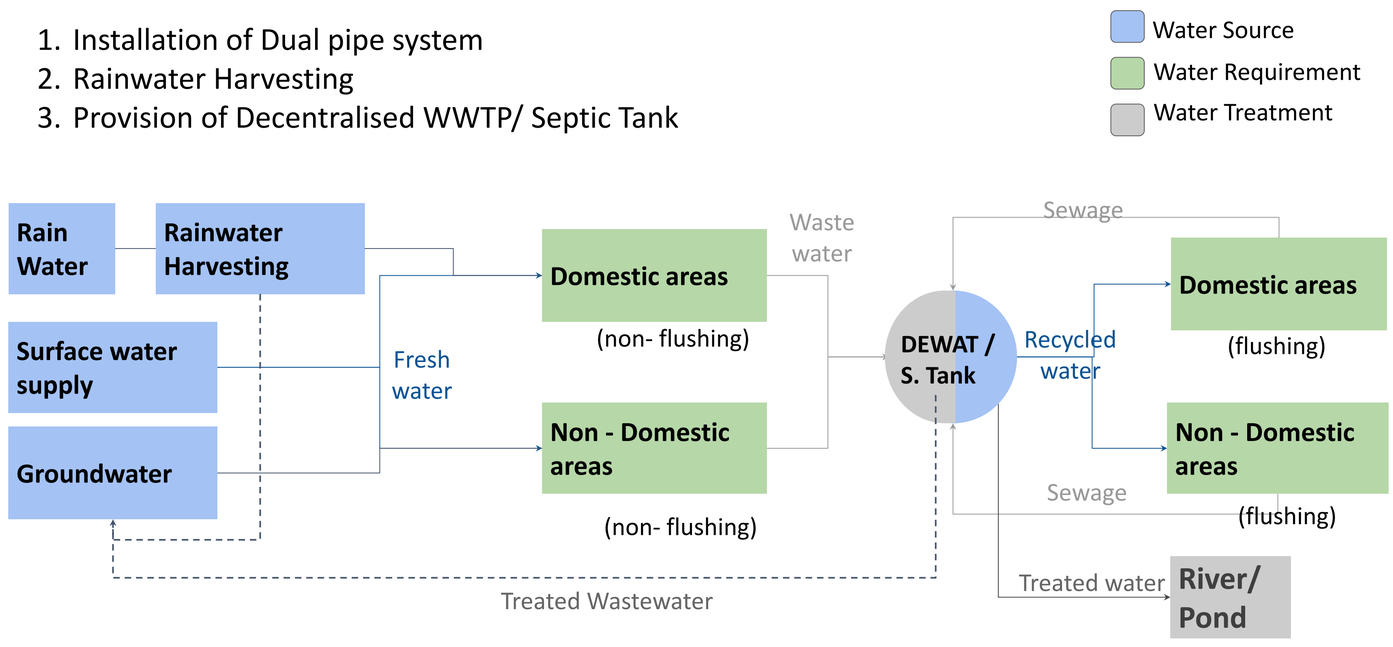
SOAK PITS

A soak pit, also known as a soakaway or leach pit, is a covered, porous-walled chamber that allows water to slowly soak into the ground. Pre-settled effluent from a collection and storage/treatment or (semi-) centralized treatment technology is discharged to the underground chamber from which it infiltrates into the surrounding soil. Groundwater Recharge takes place.



PROPOSAL OF DUAL PIPE SYSTEM

1. Installation of Dual pipe system
2. Rainwater Harvesting
3. Provision of Decentralised WWTP/ Septic Tank



SOLID WASTE MANAGEMENT PROPOSALS

Generation

- Source Segregation & Responsible Disposal
- Awareness activities will be conducted in the initial phases for household segregation of waste (primary segregation).
- Street Sweeping and road side drain cleaning supervised by ULBs & GPs

Primary Disposal Facilities

- Three Bin system (Organic, Recyclable and Hazardous)
- Strategic Placement of Dustbin (Neighbourhood and Community)

Collection of Waste

- Door to Door waste collection
- Segregated Collection
- Dedicated Vehicles and workers
- Timely Monitored Process

Transportation of Waste

- Service delivery team with a collection vehicle with two separate compartments (bio-degradable and non-biodegradable) will collect waste from households, community dustbins and clean streets, then transport to final disposal point.

Processing

- Replacement of current open dumping sites with Solid Waste Management Site (SWM site should be located in such area where it can fulfill all the criteria).

- Vermi-composting unit- to be established at ward level in urban areas and one unit at village level and managed by local NGO's or RWAs.

- E-waste storage unit in SWM site.
- Waste to energy Plant at regional level.
- Provision of Common Bio-medical Waste Treatment Facilities.
- E-Waste Recycling Plant at regional level.

PROJECTIONS (2041)

	URBAN/ RURAL	Projected Population 2041	Projected Number of Households	Average Waste Generated per HH per day (URDPFI)	Total Estimated Waste Generated per day
Shamli District	Urban	6,00,000	1,02,002	2.75 KG	281 TPD
	Rural	16,00,000	2,35,230	0.6 KG	141 TPD
	Total	22,00,000			422 TPD

Current Population: 12 lacs
Waste Generated per day: 260 Tonnes

Projected Population: 22 lacs
Estimated Waste Generation per day: 422 Tonnes

- **User chargers to be collected by ULBs & GPs from residents and shop owners. ULBs & GPs help providing equipments to welfare associations and pay volunteers.**
- **Increase Public Awareness and Participation - Information, Education and Communication (IEC) Activities.**

Prohibited Activities:

- Prohibition of Littering of Waste.
- Burning of Waste.
- Open Defecation.

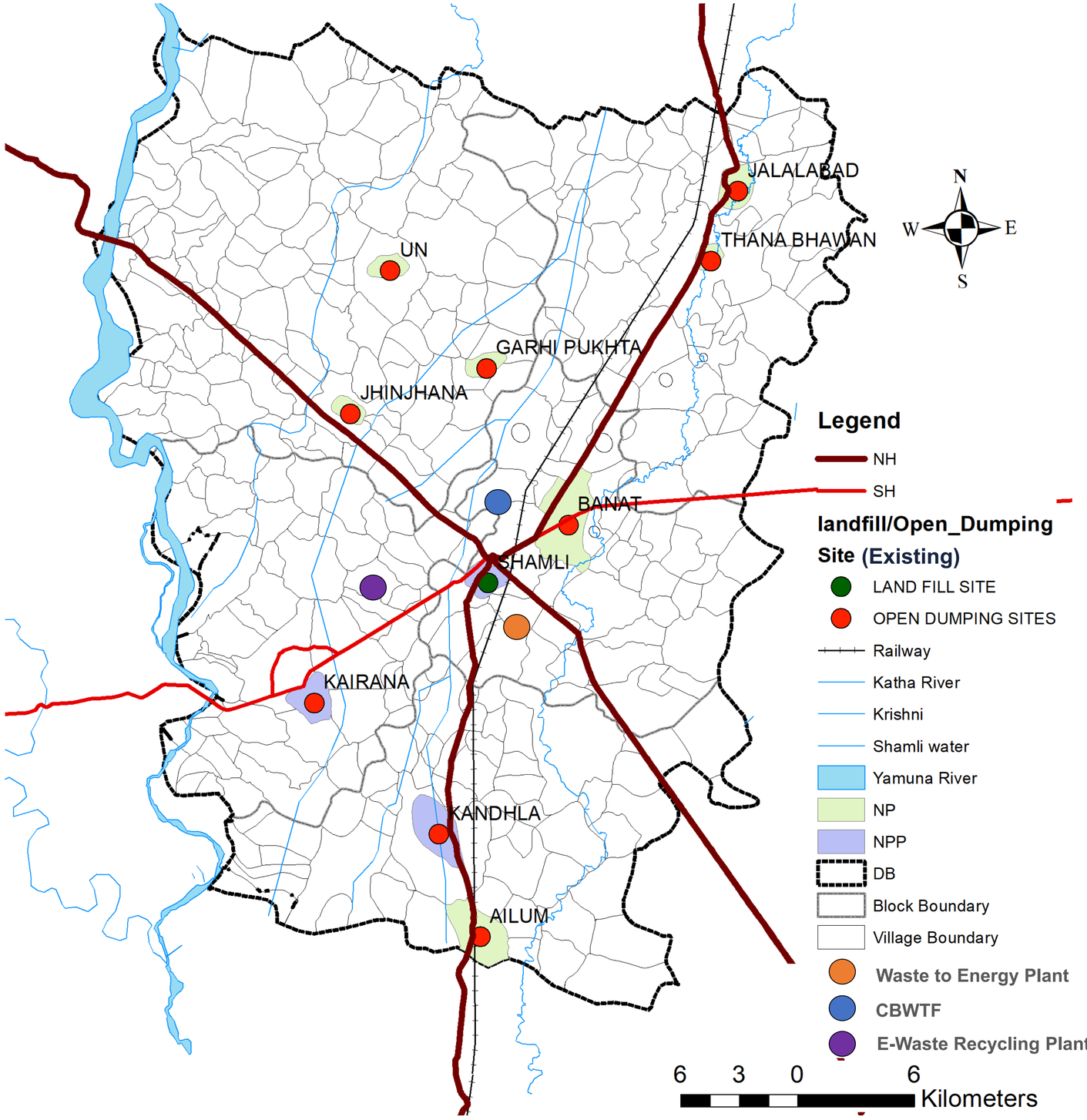
SWM Site Criteria:

- The **water level in ground water table** should be sufficient below the base of any excavation to enable landfill development.
- **No residential development** should be near the boundaries of landfill site. The waste disposal site must be very away from residential or commercial areas and water resources.
- **No major power transmission** or other infrastructure like sewers, water supply lines should be crossing through landfill developmental area.
- No landfill should be constructed **within 200 m of the right of way of any state or national highway.**

V Poorna Venkata Manikanta
BP/775/2018

SOLID WASTE MANAGEMENT PROPOSALS

Location of Existing Open dumping Sites and Landfill site, Proposed CBWTF and Waste to Energy Plant



Proposal for Common Bio-medical Waste Treatment Facility (CBWTF):

- Number of CBWTF required - 1 (for 10,000 beds).
- Area Required- 0.5Ha (for one CBWTF including all facilities)
- Total Beds till 2041 inn whole Shamli District - **8,652**
- Total CBWTF required- **1**
- Total Area Required- **0.5Ha**

Proposal for Waste to Energy Plant:

- Capacity: 500 MT/Day
- Generate: 5-6 MW/Day
- Area: 7.62 HA (for different treatment technology)
- For landfill site: 3.21 Ha
- Total area required: 10.83 Ha

Proposal for E – Waste Recycling Plant:

- Capacity: 100 MT/Day
- Total Area Required: 5 Ha

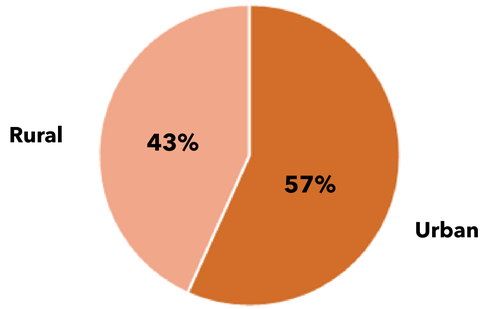
PROJECTIONS				
	Population (2011)	**Power Requirement in gWh/yr**	**Population (2041)**	**Projected Power Requirement in gWh/yr**
District Shamli	13,13,650	1586	22,00,000	**2657**

PROPOSALS

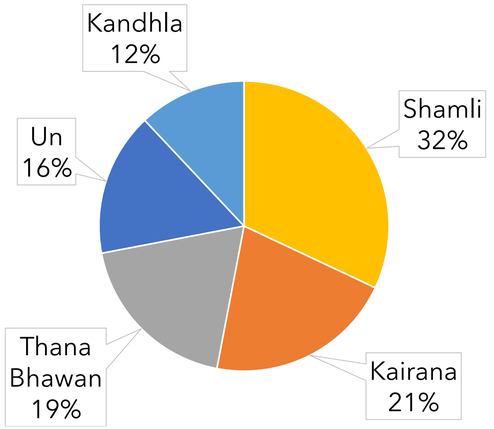
- **Grid Connected Solar Rooftop System** should be installed in the residential, commercial and industrial units on the roof of their premises/area, the regulations as notified by Uttar Pradesh Electricity Regulatory Commission.

CD block	Additional Rural HHs	Estimated Solar Energy Produced per year (RURAL) in MW	Additional Urban HHs	Estimated Solar Energy Produced per year (URBAN) in MW
Kairana	26056	26056	16844	16844
Shamli	8758	8758	55824	55824
Kandhla	19511	19511	5599	5599
Thana Bhawan	28874	28874	9089	9089
Un	32112	32112	531	531
Average Power Generated by 1 kwh Solar Rooftop Plant for a household in a year				2MW/year
Estimated Power Generation from Upcoming Households				**203 GW/year**

Urban-Rural Composition



Percentage share of Solar energy generated among the Blocks

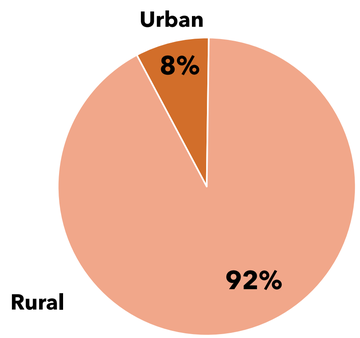


- If a 1 kwh Solar Rooftop system installed in all the upcoming households estimated for 2041 will be able to generate **203GW / year**.

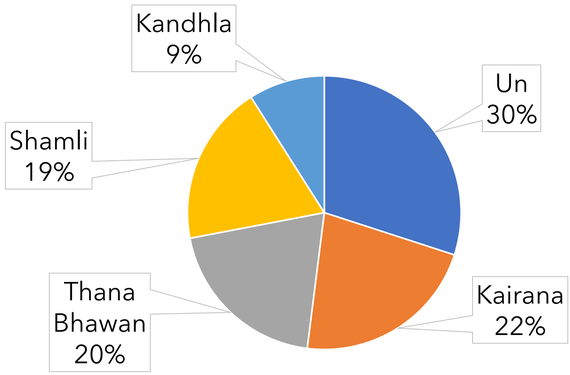
- **Agriculture Waste and Animal Waste based Energy Generation Plant (through Biogas)**

Agriculture Waste produced	4-5 Tonnes/ Acre
Biogas generated from 1MT of Agriculture Waste	330 m^3
Electrical Energy generated from 1MT waste from Agricultural Land	706.2 kwh
Total Estimated Energy Generated from the Agricultural Land in Shamli District	**1.8 gwh/ year**

Urban – Rural composition



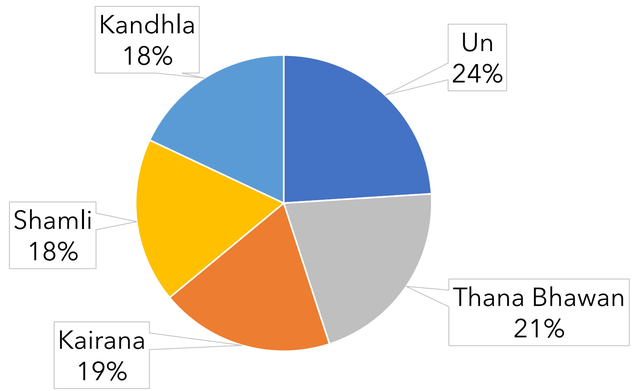
Percentage share of energy generated among the Blocks



- **Animal Waste based Energy Generation Plant (through Biogas)**

Average Animal Waste generated per day	27kg
Biogas Generated from 1MT of cow dung	50m³
Electrical energy generated from 1MT cow dung	100 kWh
Total Estimated Electricity generated from the cow dung in Shamli District	**0.83 gWh**

Percentage share of energy generated among the Blocks



- **Industrial Waste based Power Generation Projects**, **Domestic Waste to Energy generation Projects** under UP Bio Energy programme in the industries like paper mills, sugar mills, food processing, Dairy,etc.

Industry	Co-generation plant installed
Upper Doab Sugar Mills	40 MW
Superior Food Grains Pvt. Ltd.	33 MW
Bajaj Hindustan Sugar Ltd.	10 MW

- **Domestic Waste to Energy generation Projects** under UP Bio Energy programme
- Waste produced per day in the entire district is around **422 MT.**

Waste to energy generation plant of capacity 500 MT which can generate up to 1.8 gWh/Yr

Source	Estimated Energy produced in gWh per year
Solar Energy	203
Agricultural Waste based Energy Generation	1.8
Animal Waste based Energy Generation	0.83
Industrial Waste based Energy Generation	0.083
Domestic Waste based Energy Generation	1.8

Total Estimated Energy generated from different sources

207.5 gWh / year → **7.8%** of Total power demand in 2041

Methods to Reduce AT&C Losses

Technical loss 16.37%

By replacing incorrectly sized transformers, improving the connection quality of conductors (power lines), and increasing the availability of reactive power by installing capacitor banks along transmission lines.

Commercial loss 38%

Using Smart Metering Devices to avoid Power Thefts.

Increasing efficiency in Bill Collection.

54.37% ----> Aiming to reduce the loss to 25% (By 2041) will be able to save

780.4 gWh /year → **30%** of Total power demand in 2041