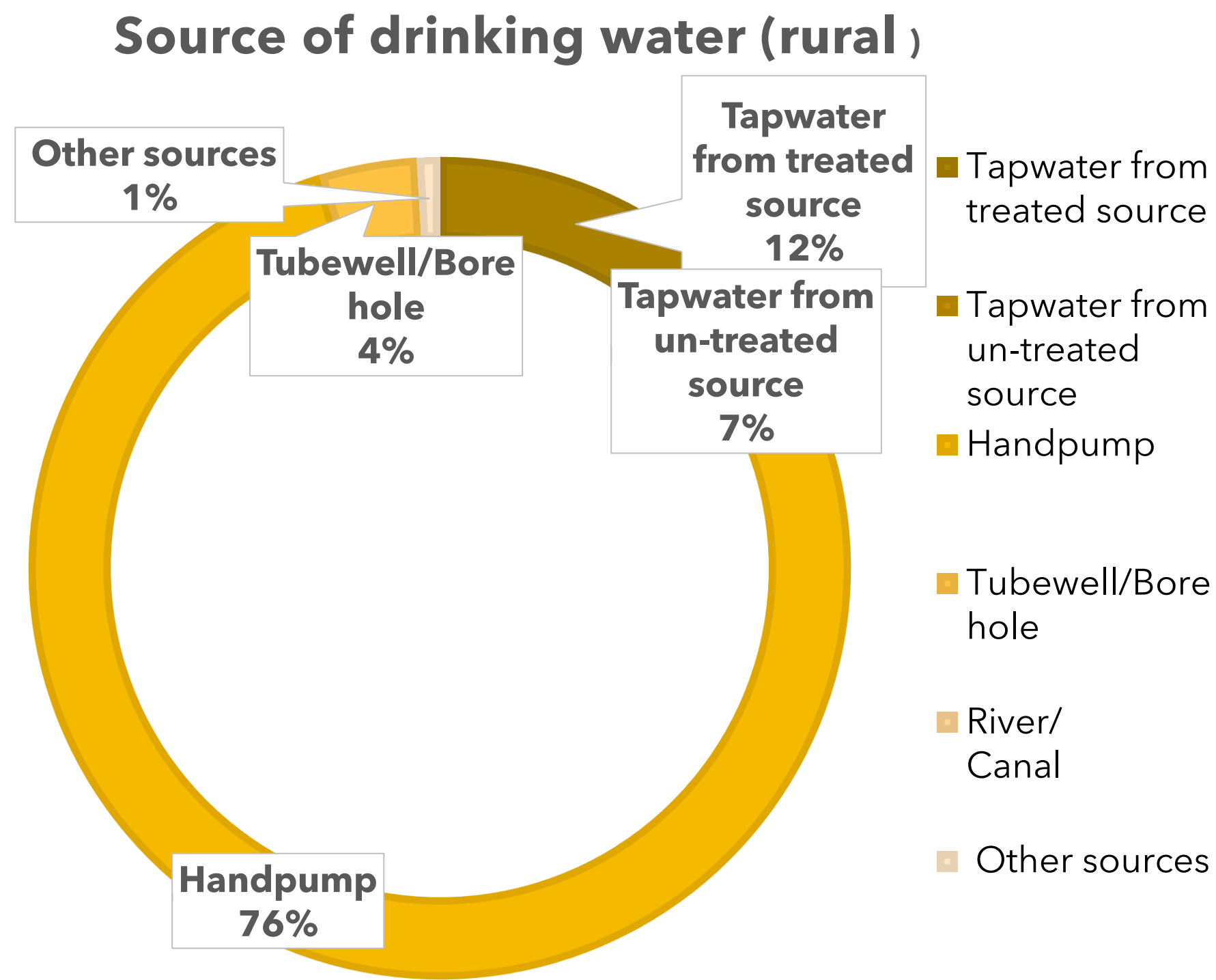


SOURCE OF DRINKING WATER SUPPLY (RURAL)

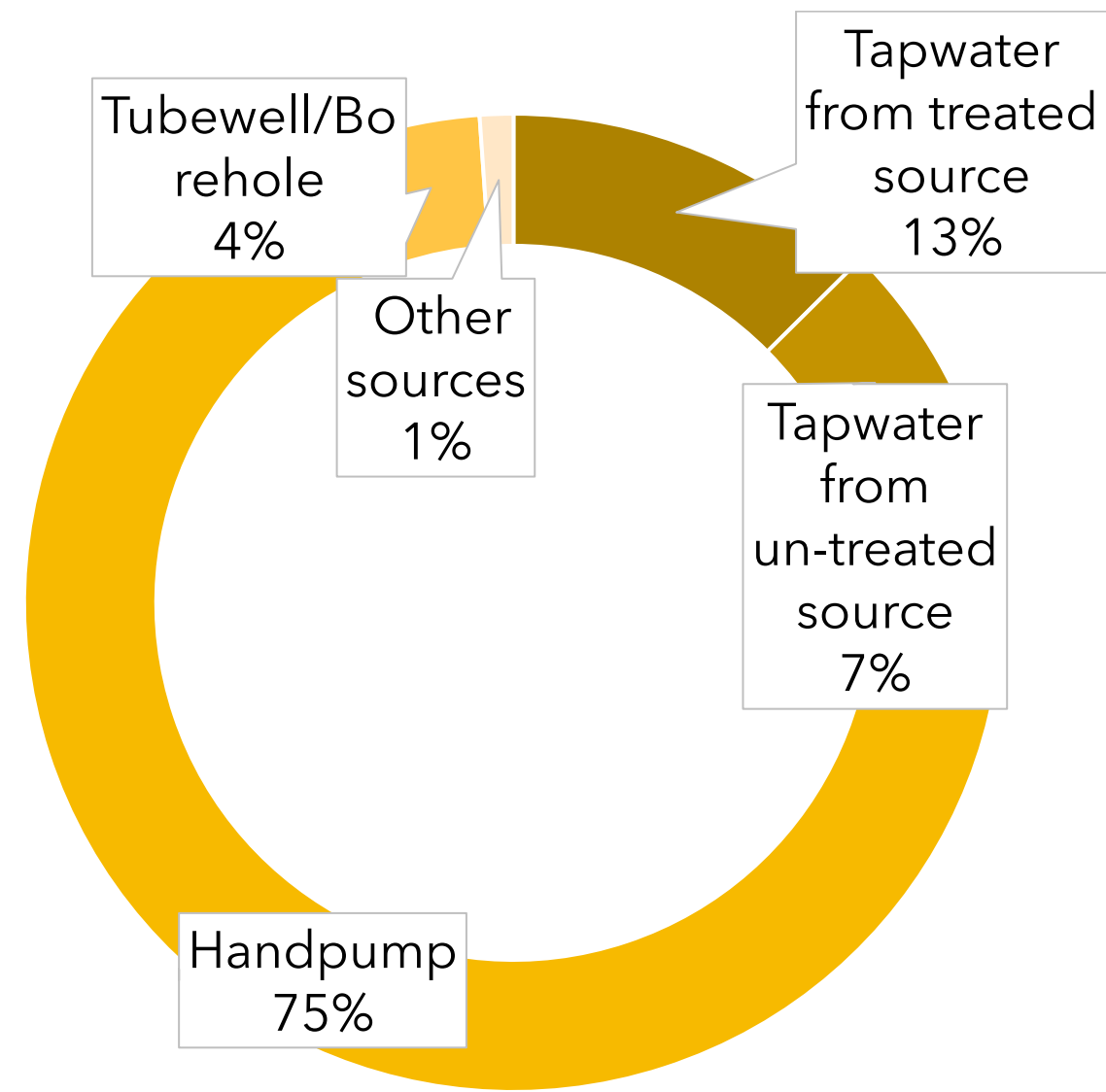


rural cd blocks	Main Source of Drinking Water (Rural)									
	Tapwater from treated source	Tapwater from un-treated source	Covered well	Un-covered well	Handpump	Tubewell/Bore hole	Spring	River/ Canal	Tank/ Pond/ Lake	Other sources
shamli	16814(11.3%)	3422(2.3%)	744(0.5%)	148(0.1%)	113236(76.1%)	13094(8.8%)	0	0	148(0.1%)	1339.2(0.09%)
kairana	24426(13.8%)	10443(5.9%)	531(0.3%)	0	135405(76.5%)	5487(3.1%)	0	0	0	885(0.5%)
kandhla	24696.4(11.6%)	15115.9(7.1%)	638(0.3%)	0	162868(76.5%)	7877(3.7%)	0	0	0	1703(0.8%)
un	29125(12.5%)	17242(7.4%)	699(0.3%)	0	173352(74.4%)	9320(4%)	0	0	466(0.2%)	2563(1.1%)
thana bhawan	21871(10.4%)	23974(11.4%)	630(0.3%)	0	159617(75.9%)	1682(0.8%)	0	0	210(0.1%)	2313(1.1%)
total population	116932.4(11.9%)	70196.9(6.8%)	3242(0.3%)	148(0.0%)	744478(75.9%)	37460.4(4.1%)	0	0	824(0.1%)	8803.2(0.9%)

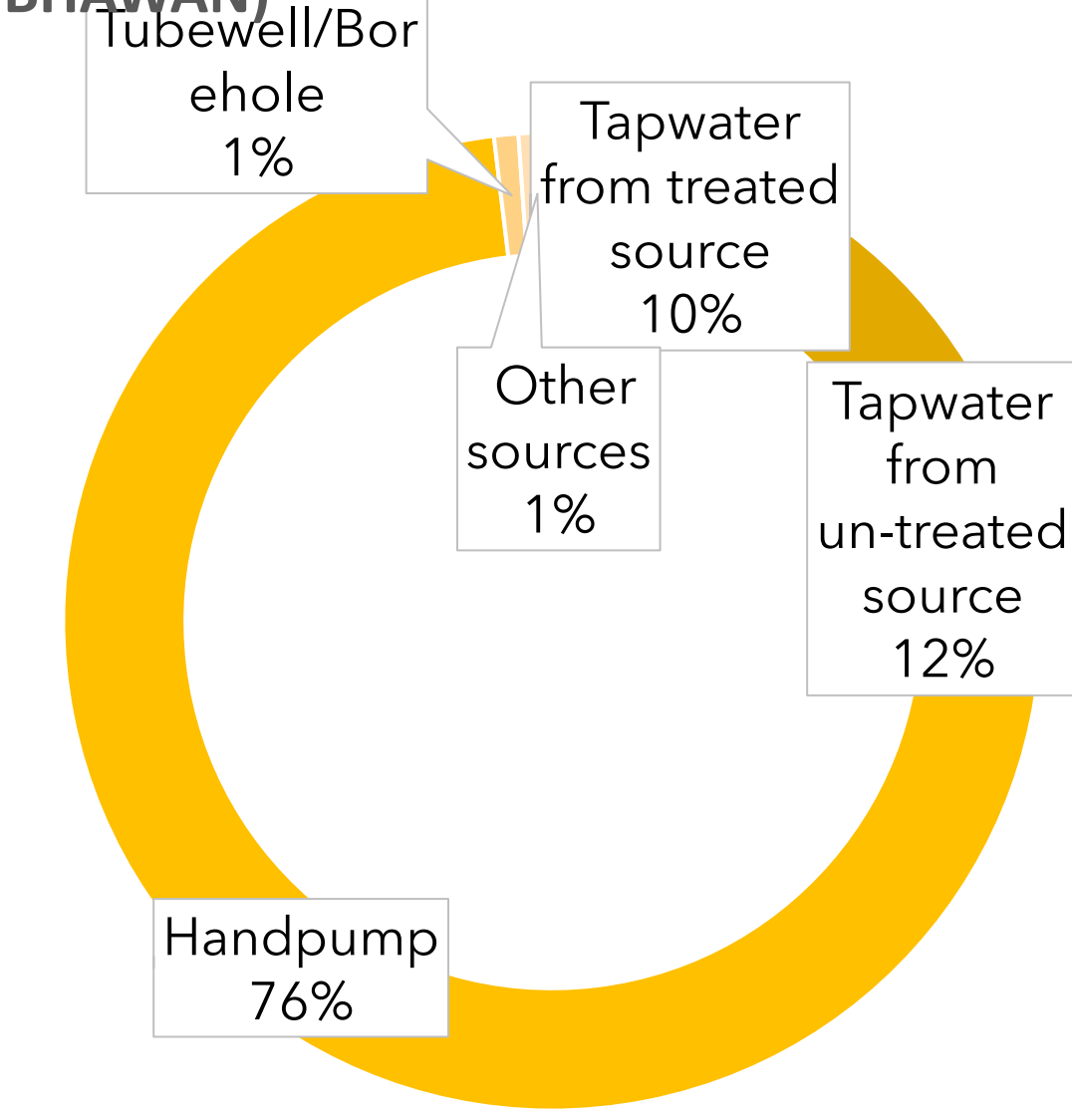
Key observation

- There is a heavy reliance on groundwater as a source of drinking water in villages.
- In Shamli tube well use is significantly higher than other blocks that is 9%.
- Water supply in villages is less than what is necessary.
- Only 12% of the people have access to treated tap water.
- In rural areas about 75% of water use is through groundwater handpumps.

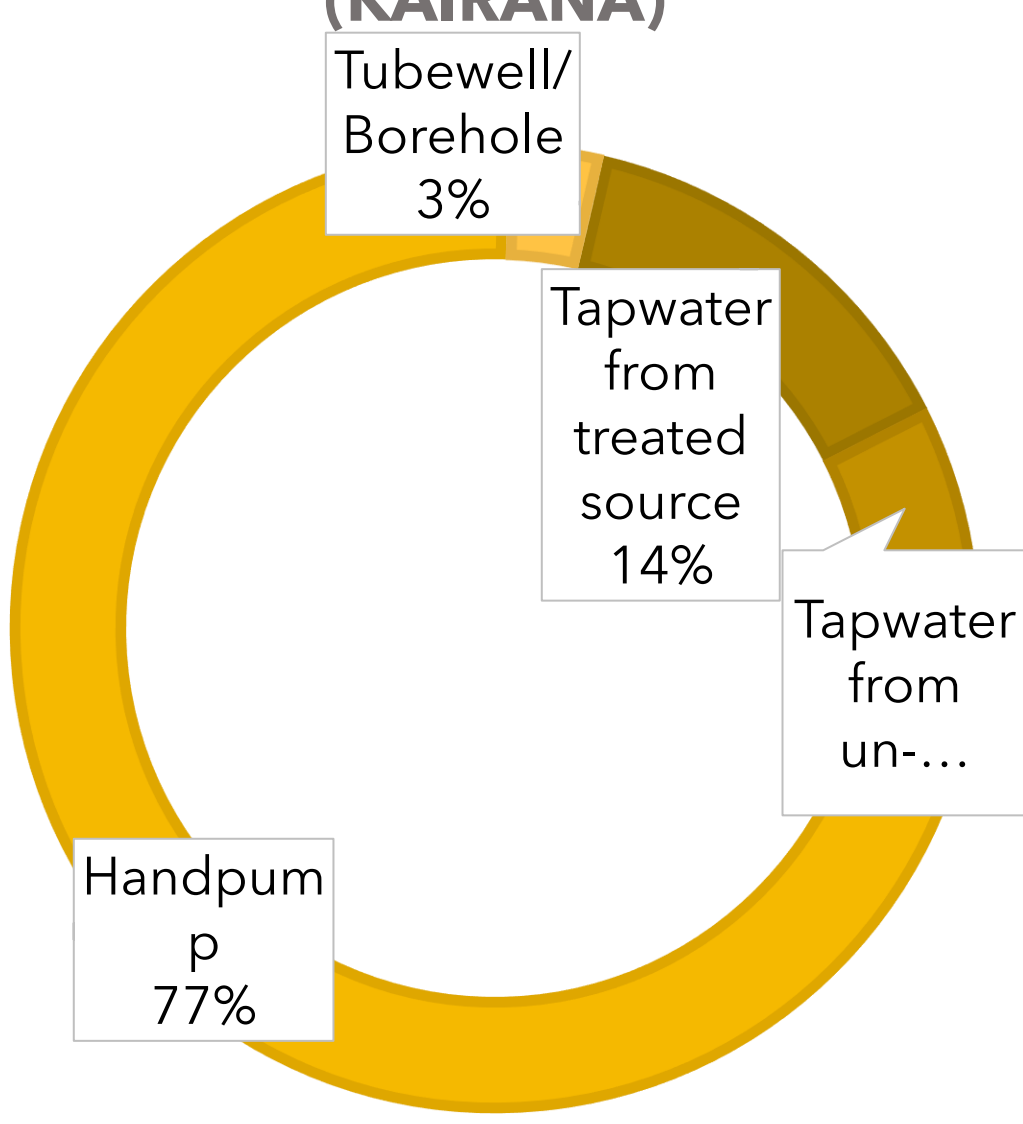
SOURCE OF DRINKING WATER SUPPLY (UN)



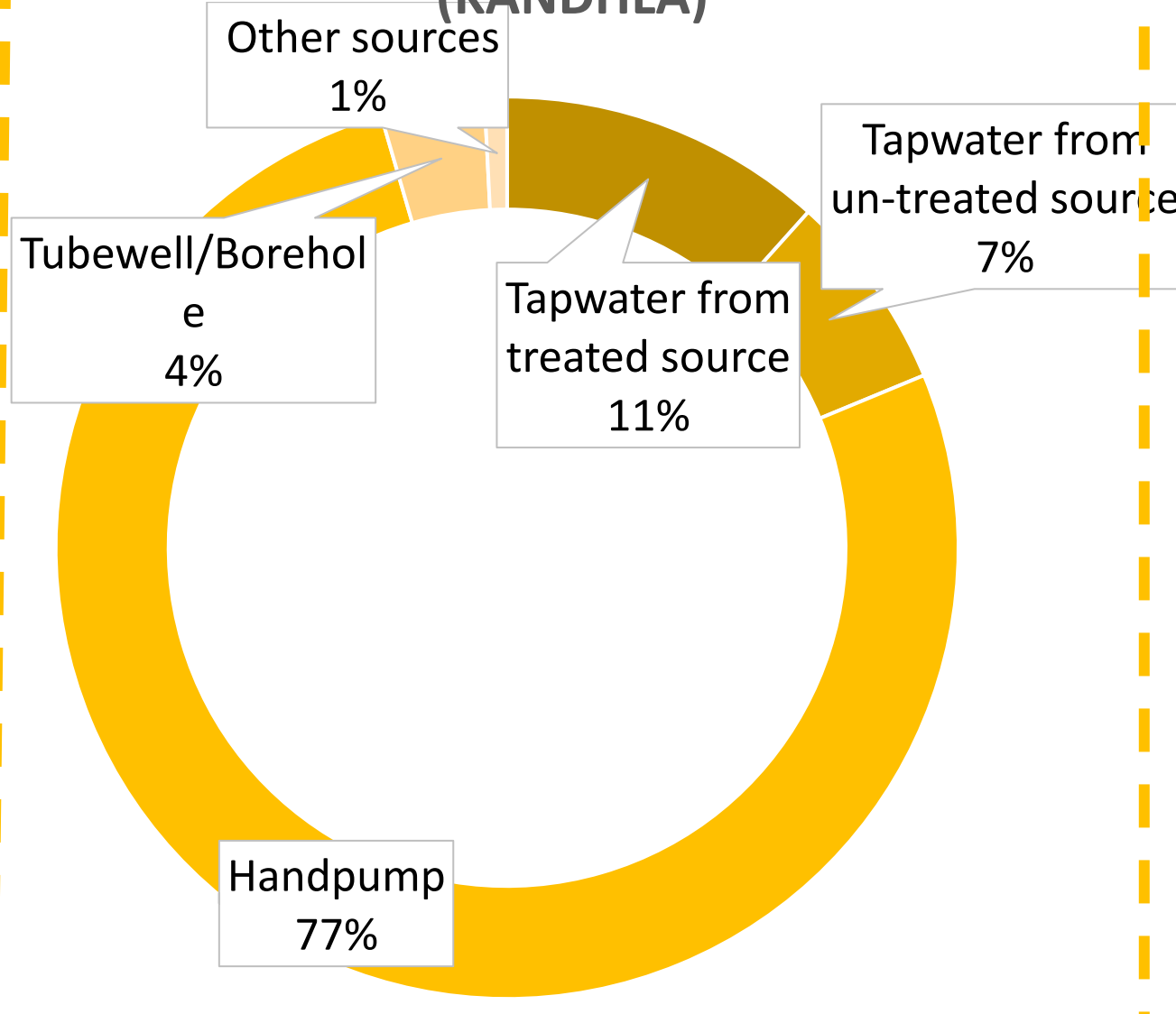
SOURCE OF DRINKING WATER SUPPLY (THANA BHAWAN)



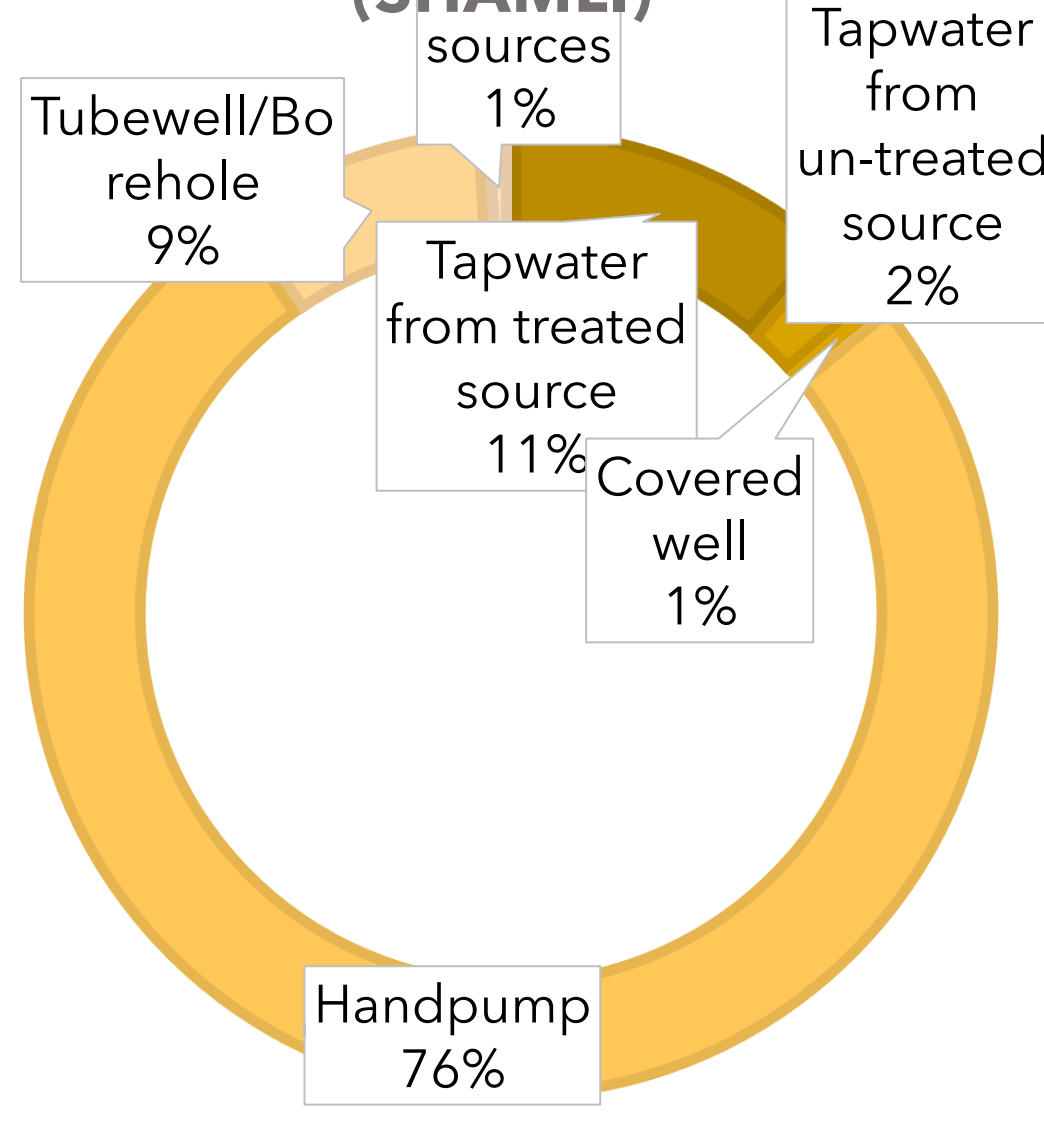
Source of drinking water supply (KAIRANA)



SOURCE OF DRINKING WATER SUPPLY (KANDHLA)



SOURCE OF DRINKING WATER SUPPLY (SHAMLI)

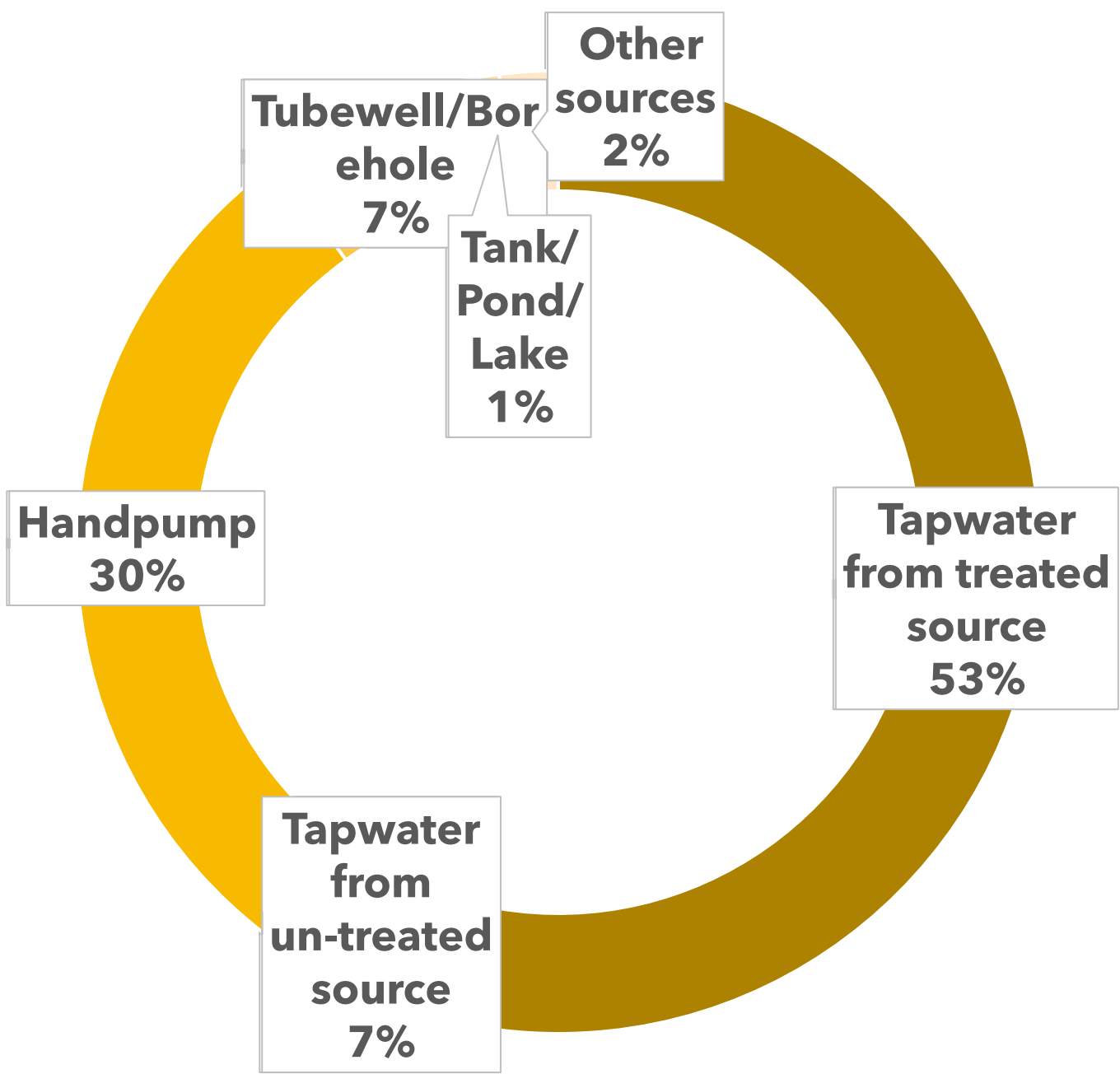


District Census Handbook, Muzaffarnagar, 2011



SOURCE OF DRINKING WATER SUPPLY (URBAN)

Source of drinking water (urban)



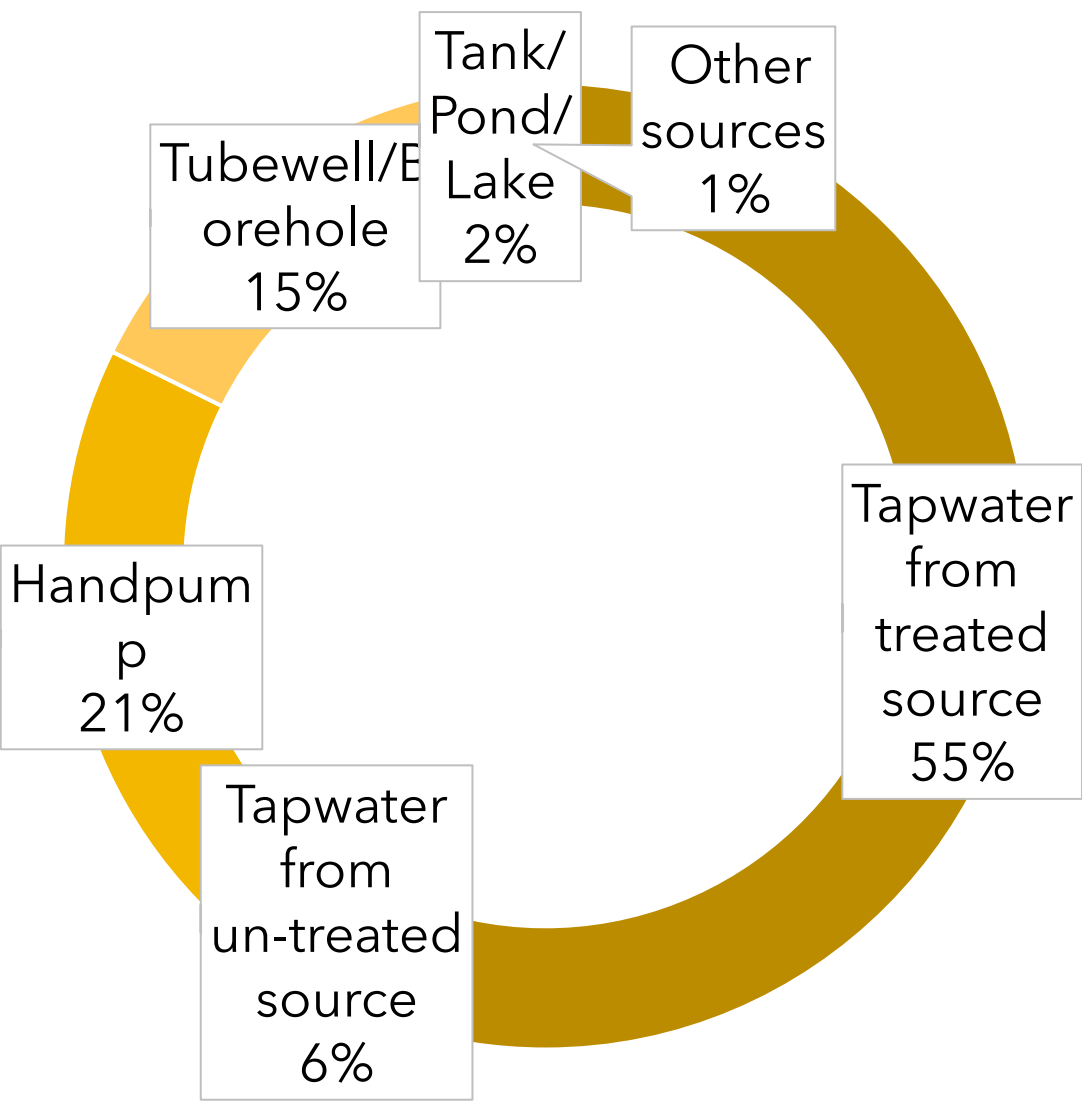
- Tapwater from treated source
- Tapwater from un-treated source
- Handpump
- Tubewell/Borehole
- Tank/Pond/Lake
- Other sources

urban cd blocks	Main Source of Drinking Water(Urban)									
	Tapwater from treated source	Tapwater from un-treated source	Covered well	Un-covered well	Handpump	Tubewell/Borehole	Spring	River/ Canal	Tank/ Pond/ Lake	Other sources
shamli	76415(54.7%)	9080(6.5%)	419(0.3%)	0	28917(20.7%)	21094(15.1%)	0	0	2235(1.6%)	1257(0.9%)
kairana	44411(49.9%)	5874(6.6%)	356(0.4%)	0	31595(35.5%)	3916(4.4%)	0	0	70(0.1%)	2759(3.1%)
kandhla	33396(56.7%)	1708(2.9%)	58(0.1%)	53(0.1%)	20909(35.5%)	2161(3.7%)	0	0	58(0.1%)	530(0.9%)
un	14170(41.8%)	3695(10.9%)	135(0.4%)	52(0.1%)	16215(43.2%)	485(1.6%)	0	0	101(0.3%)	610(1.8%)
thana bhawan	38114(59%)	5875(9.1%)	193(0.3%)	64(0.1%)	17054(26.4%)	775(1.2%)	0	0	145(0.3%)	2390(3.7%)
total	206506(52.4%)	26232(7.2%)	1161(0.3%)	169(0.0%)	114690(32.2%)	28431(5.2%)	0	0	2609(0.5%)	7546(2.1%)

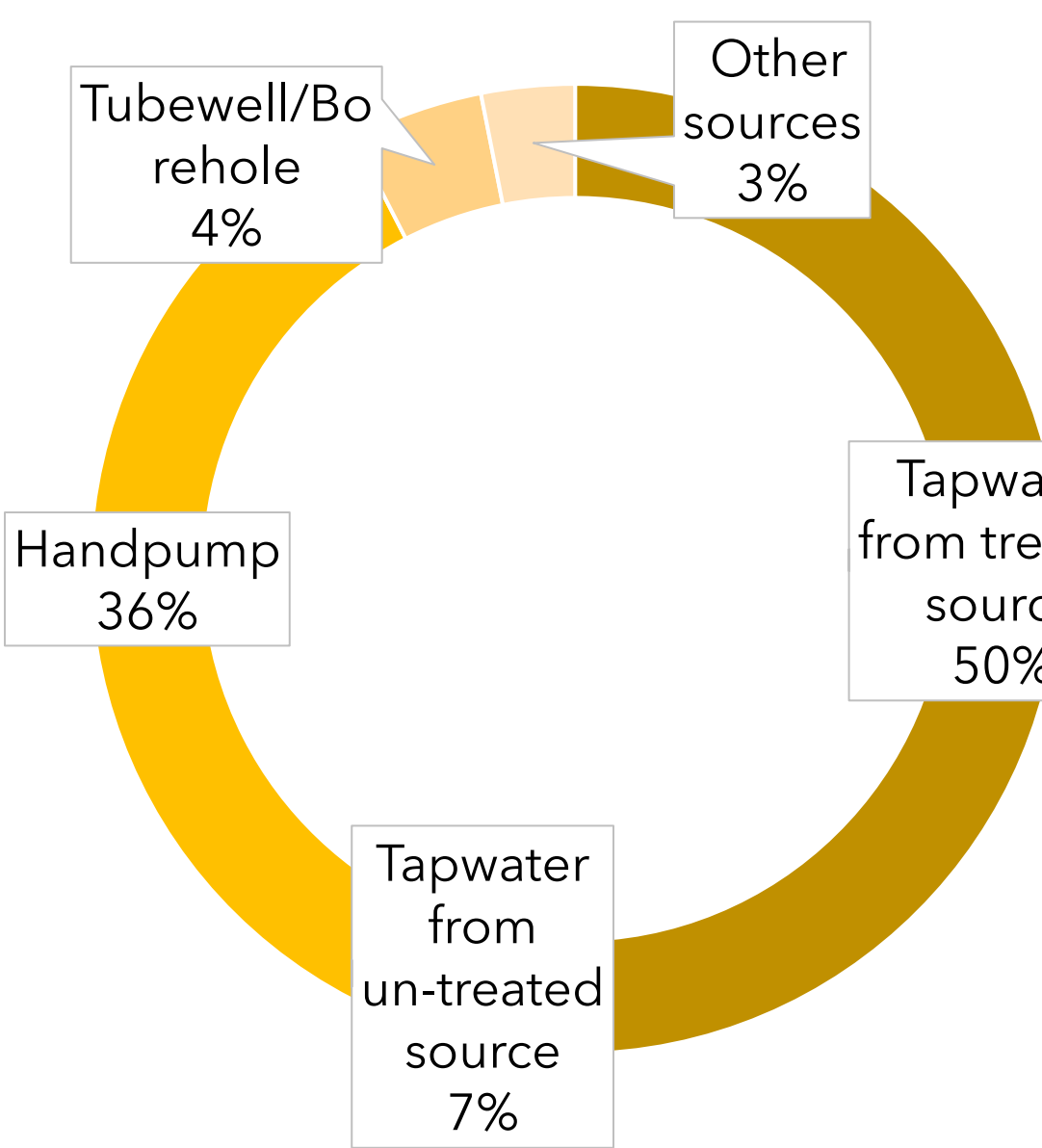
Key observation

- A significant reliance on groundwater as a source of drinking water
- In urban areas about 52% of water use is through tap water treated source, however handpump use is also about 30% which is through groundwater.
- Water supply availability in urban areas is less than what is necessary.
- 7% of the population still gets its drinking water from untreated sources.
- In Shamli tube well use is significantly higher than other blocks that is 15%.

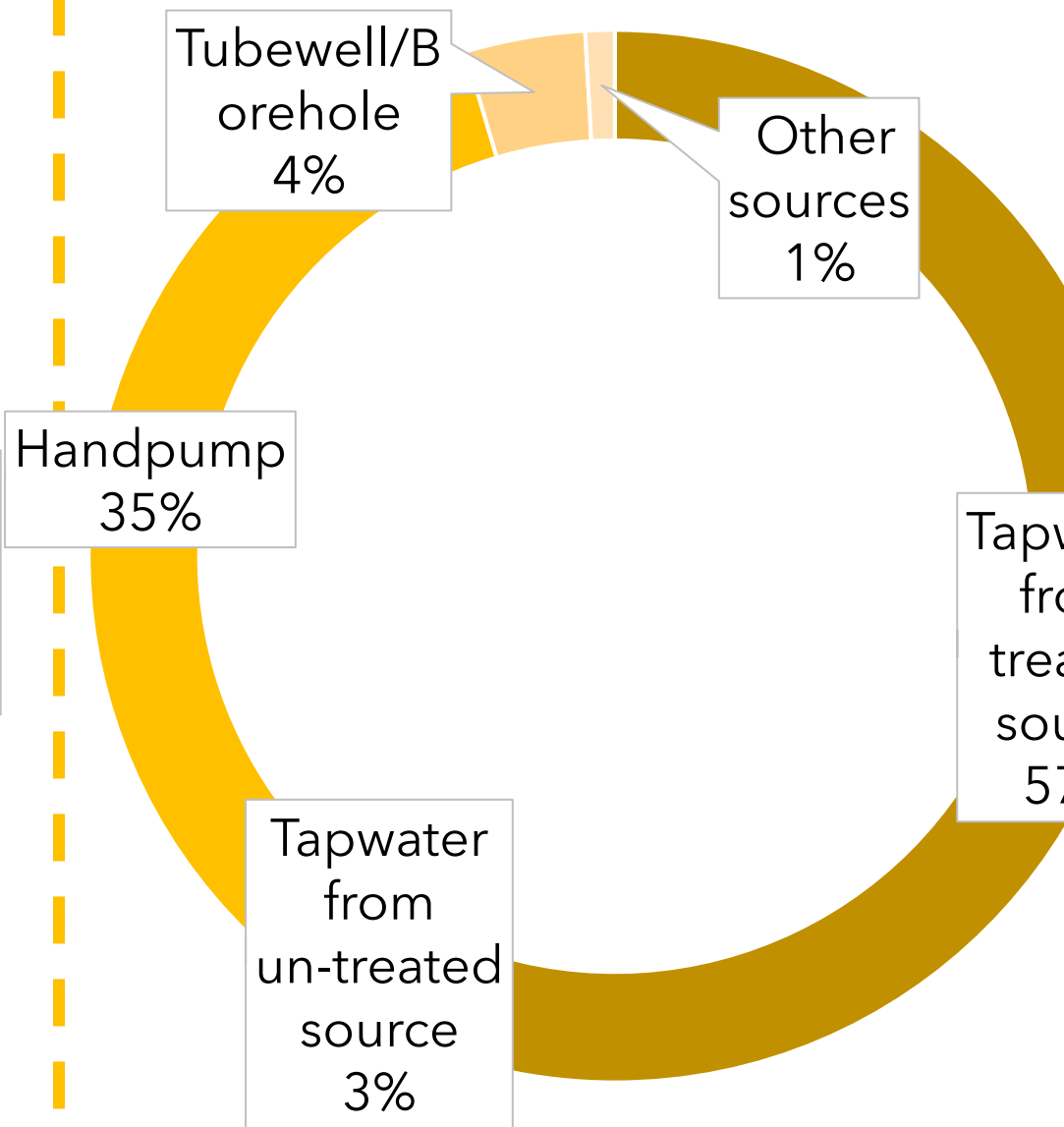
SOURCE OF DRINKING WATER SUPPLY (SHAMLI)



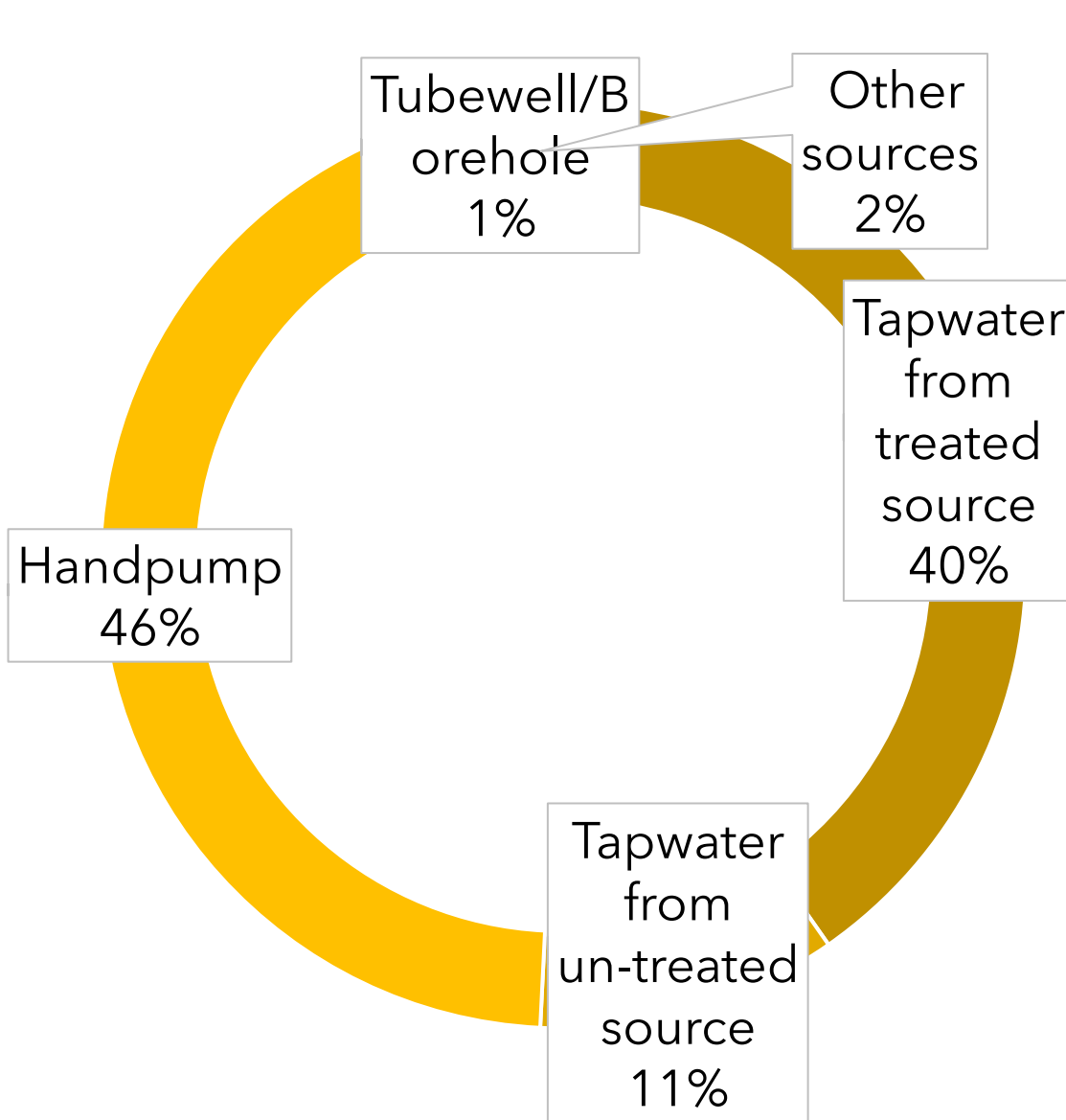
SOURCE OF DRINKING WATER SUPPLY (KAIRANA)



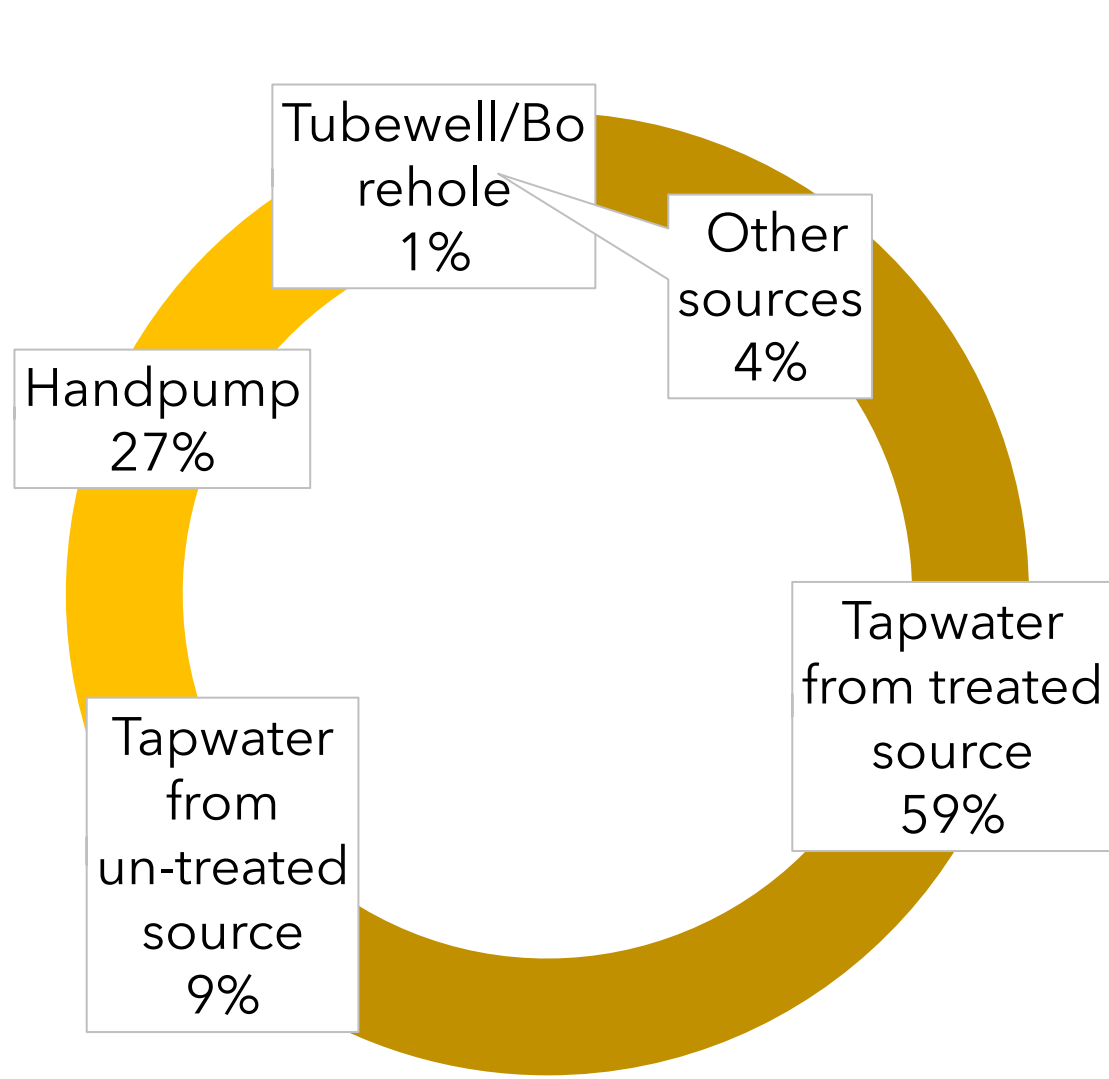
SOURCE OF DRINKING WATER SUPPLY (KAIRANA)



SOURCE OF DRINKING WATER SUPPLY (UN)



SOURCE OF DRINKING WATER SUPPLY (THANA BHAWAN)



District Census Handbook, Muzaffarnagar, 2011

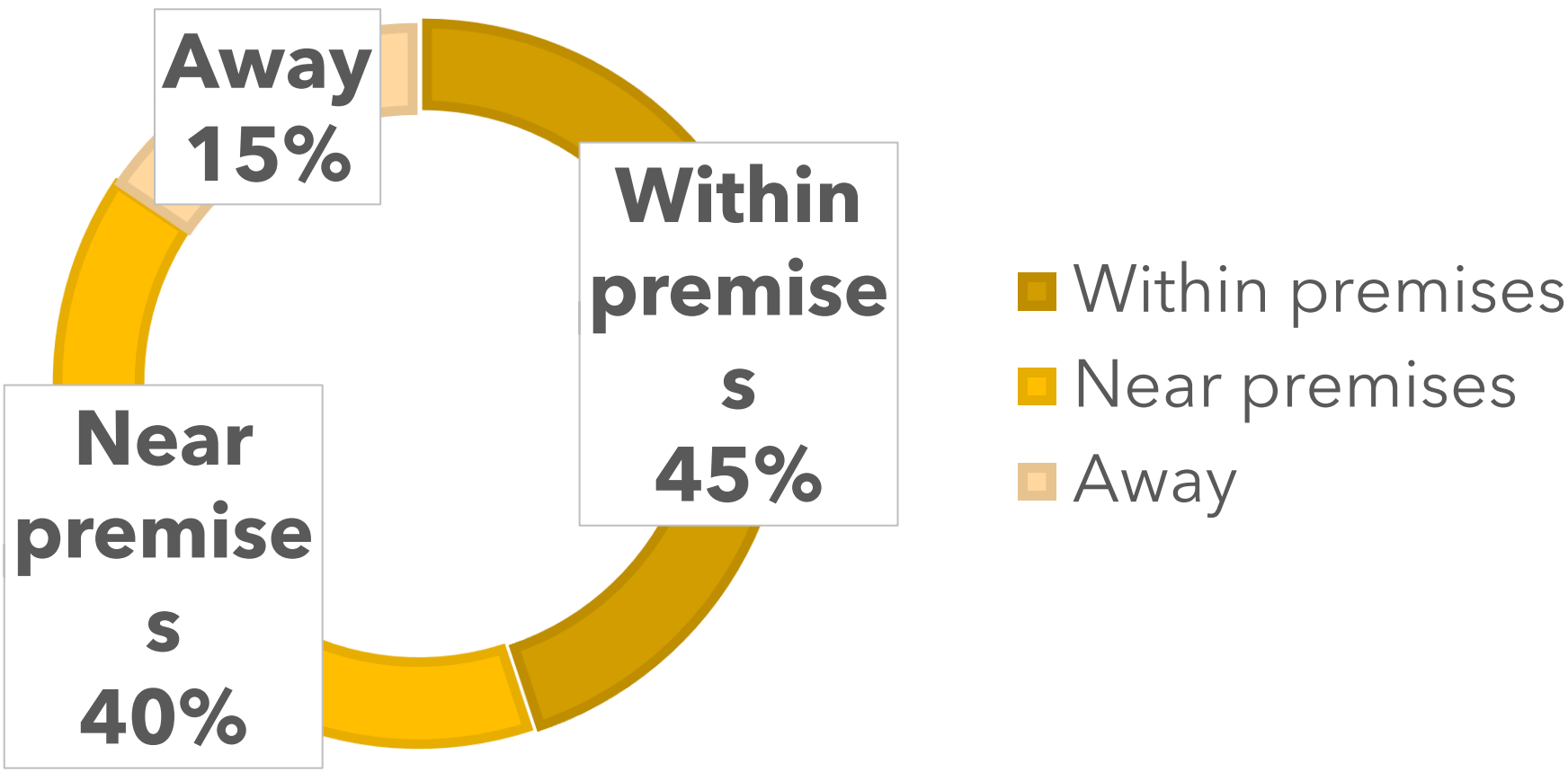


LOCATION OF DRINKING WATER SOURCE (RURAL)

Location of drinking water source (rural)

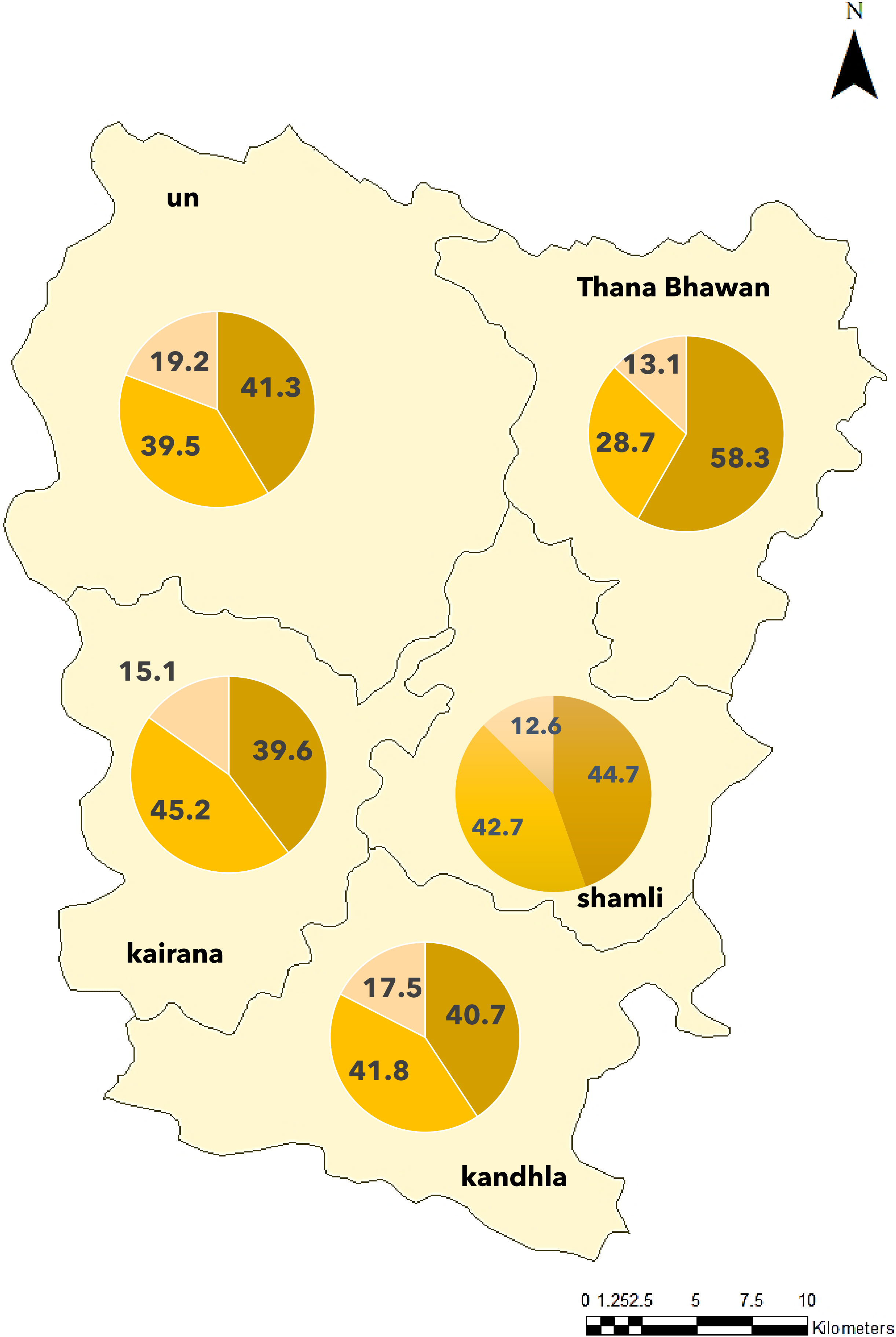
CD BLOCKS	Location of drinking water source		
	Within premises	Near premises	Away
SHAMLI	66513(44.7%)	63537(42.7%)	18748(12.6%)
KAIRANA	70092(13.6%)	80004(45.2%)	26904(15.1%)
KANDHLA	86650(40.7%)	87866(41.8%)	37452(17.5%)
UN	96229(41.3%)	91569(39.5%)	44736(19.2%)
THANA BHAWAN	122604(58.3%)	60356(28.7%)	27549(13.1%)
TOTAL	442088(44.9%)	383332(39.6%)	155389(15.5%)

LOCATION OF DRINKING WATER SOURCE (RURAL)



Key observation

- Thana Bhawan has the greatest rate of access to drinking water inside its premises (58.3 percent), while Kairana has the lowest rate (39.6 percent).
- 19.2 percent of the people in the Un does not have direct access to water.

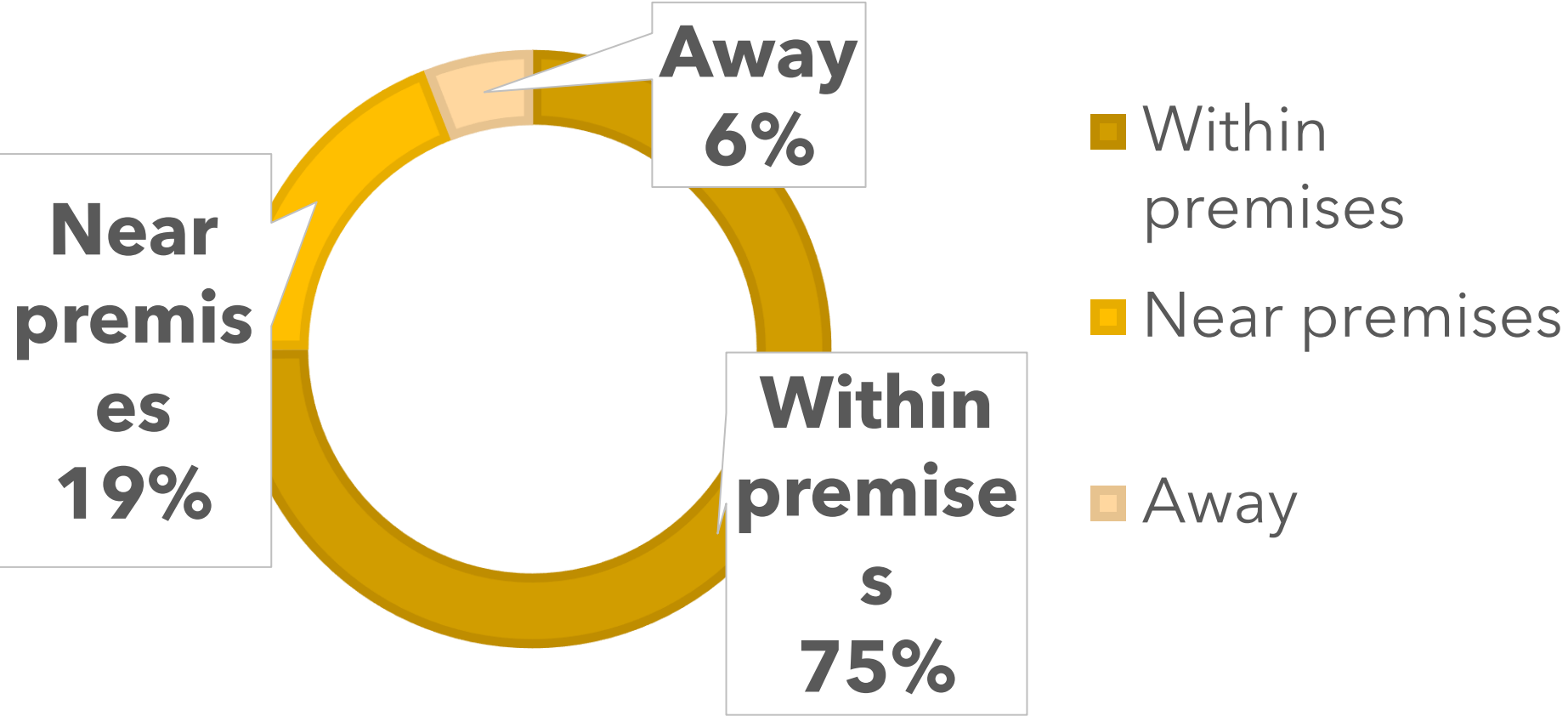


LOCATION OF DRINKING WATER SOURCE (URBAN)

Location of drinking water source (urban)

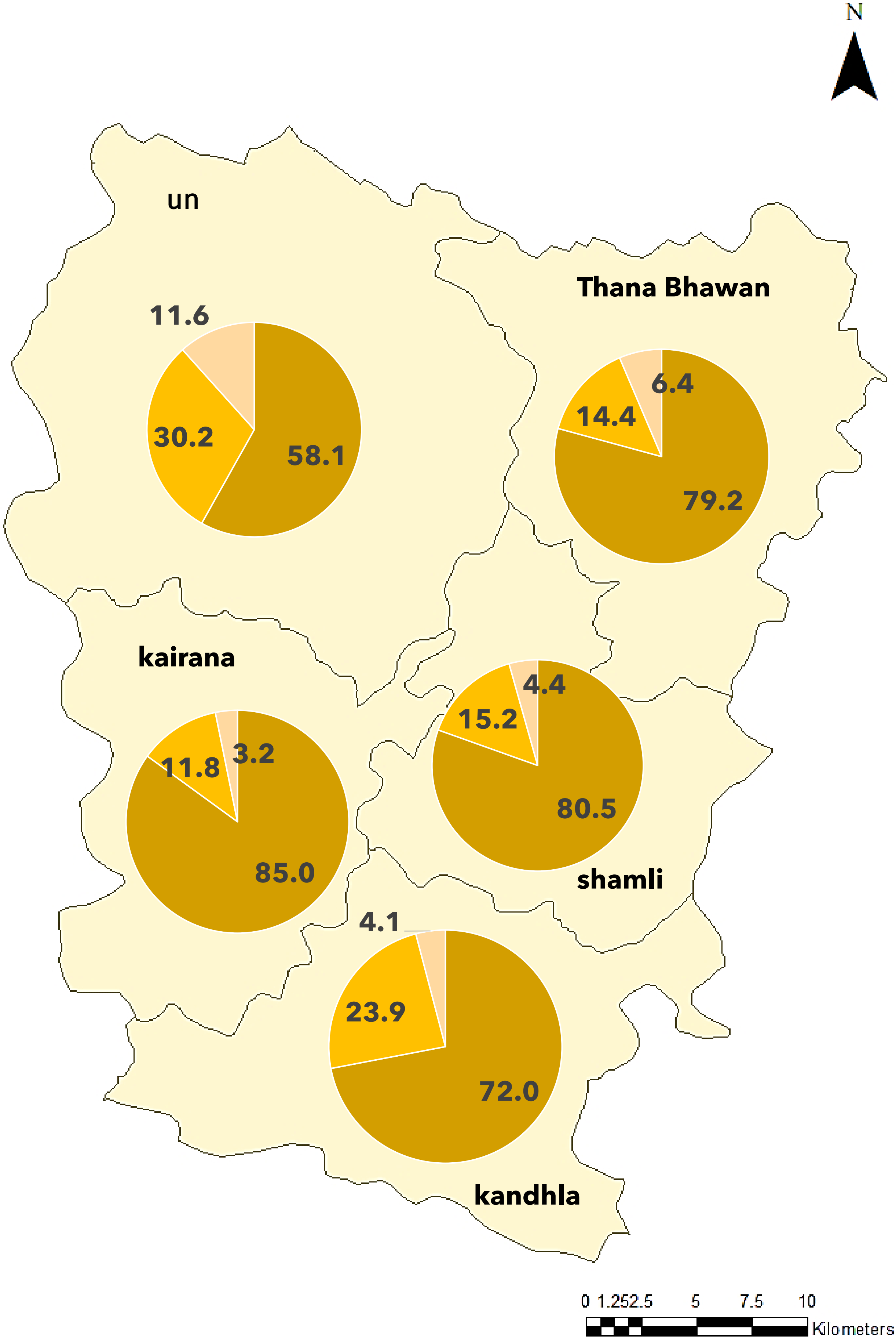
cd blocks	Location of drinking water source		
	Within premises	Near premises	Away
shamli	112458(80.5%)	21234(15.2%)	6286(4.4%)
kairana	75650(85.0%)	10502(11.8%)	2848(3.2%)
kandhla	42408(72.0%)	14077(23.9%)	2414(4.1%)
un	19695(58.1%)	10237(30.2%)	3932(11.6%)
thana bhawan	51163(79.2%)	9302(14.4%)	4134(6.4%)
total	301374(75%)	65352(19.1%)	19614(5.9%)

LOCATION OF DRINKING WATER SOURCE (URBAN)



Key observation

- high dependency on groundwater as a source of drinking water source
- Water supply provision in urban areas are lower than the required
- 7% of the population still getting drinking water from untreated source



Groundwater Quality

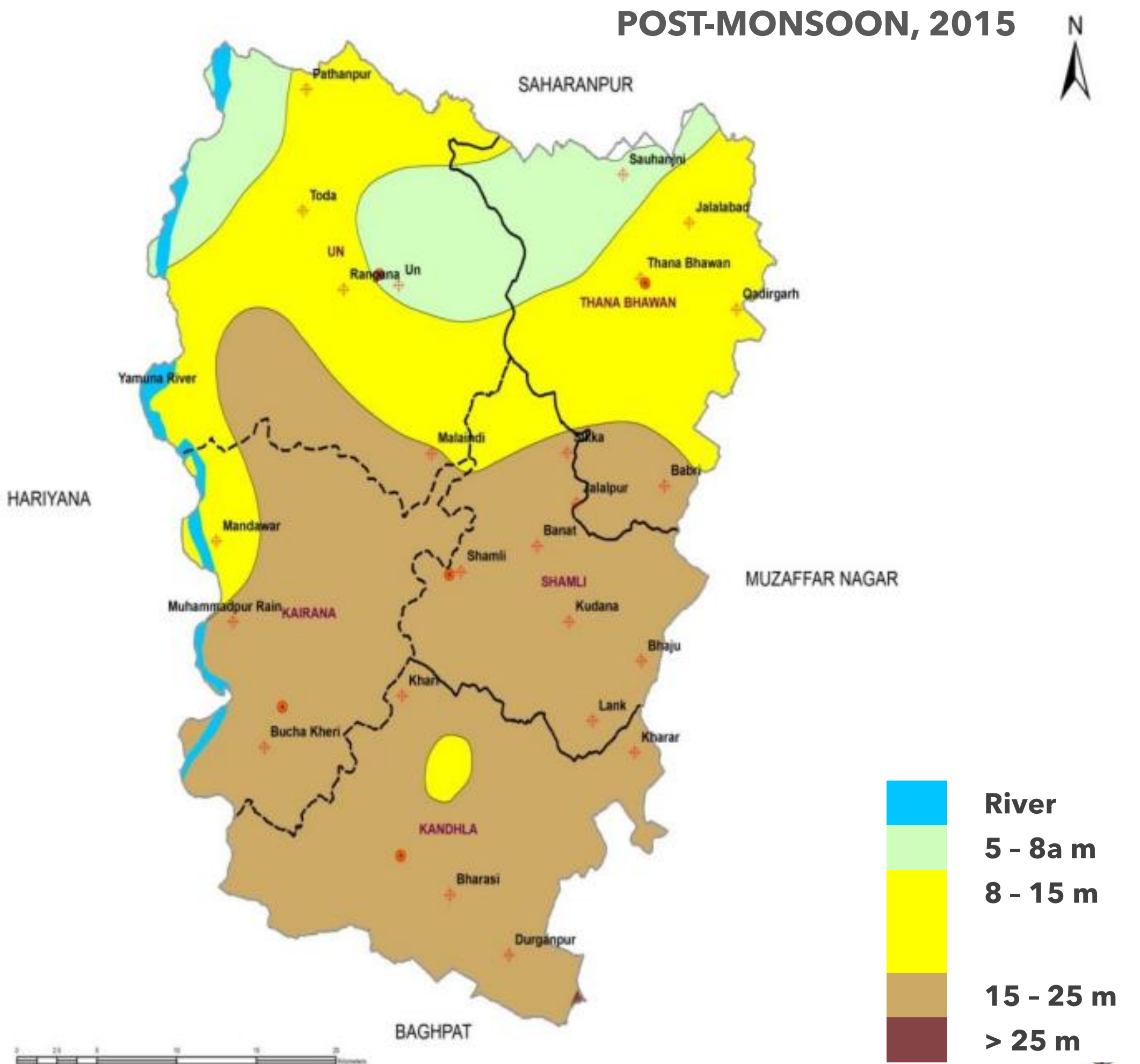
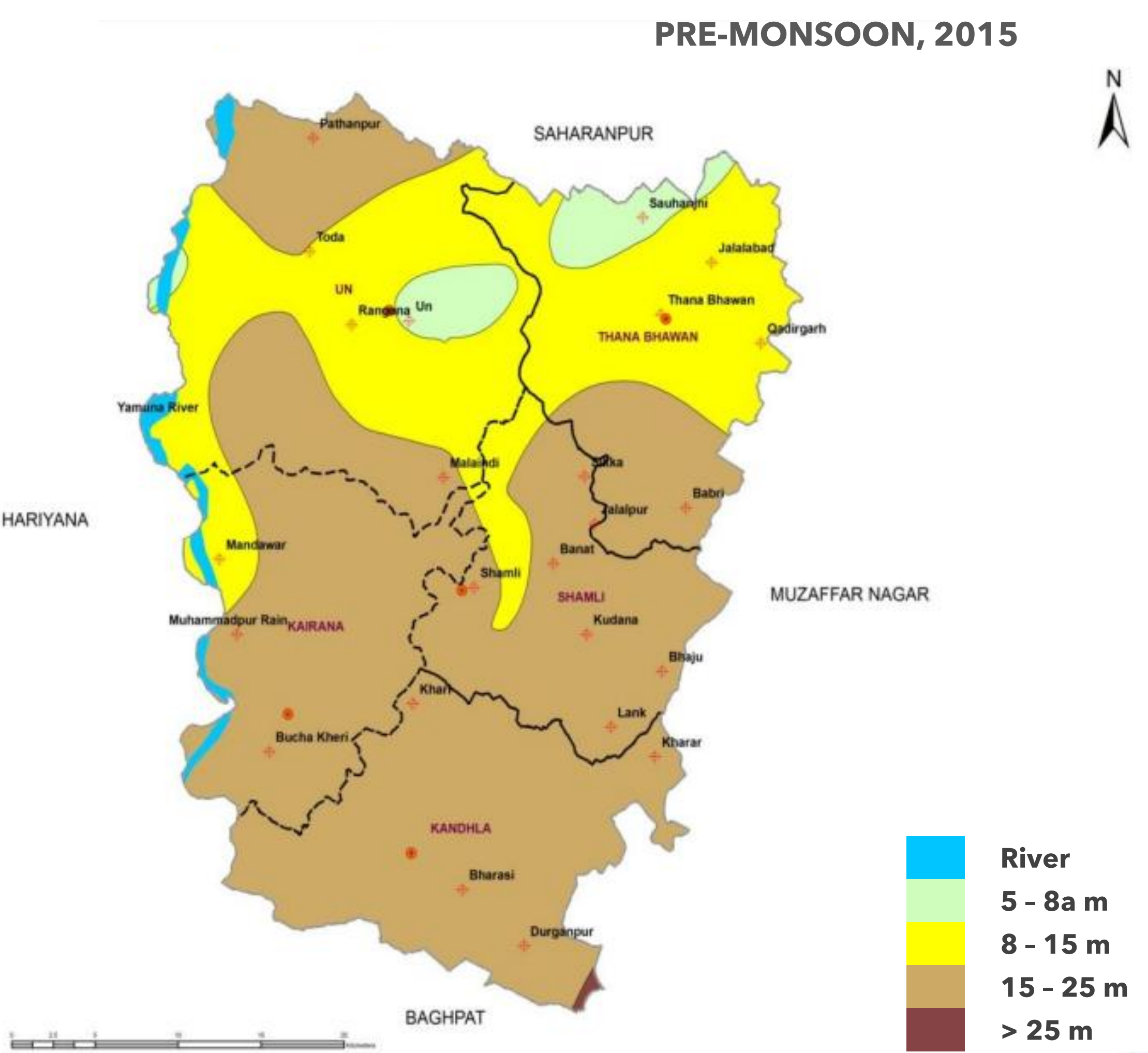
District Level (2015):

Ground water in phreatic aquifer: colourless, odourless, slightly alkaline

71% groundwater are of pristine quality;
22% falling the category of 'good';
6% groundwater require treatment and
1% unsuitable for all purposes

Out of 5 blocks,
3 blocks (Un, Kairana, and Kandhla): Over Exploited
(stage of ground water dev.: >100%)
2 blocks (Shamli and Thana Bhawan): Critical
(stage of ground water dev.: >90% & <=100%)

Presence of **chemical constituents** but not more than permissible limit (e.g. EC, F, As, Fe) except iron.
Iron content: 0.2 mg/l < Fe < 1.7 mg/l
(should not exceed 0.3 mg/l as per URDPFI Guidelines, MoHUA)
Phosphate is absent.



Ground Water Level:

- Long term water level fluctuations for the period 1998-2007 indicates both rise & fall in water level in the area.
In pre-monsoon the rise was of 8cm/year; fall ranges from 7-47 cm/year.
In post-monsoon no rise seen; only fall between 6-64cm/year.

Trend analysis of historical ground water level data indicates a long term fall in most of the wells in the district,

Key observation

- Quality: Excessive content of Iron (0.2 -1.7 mg/l, should not exceed 0.3 mg/l as per URDPFI Guidelines, MoHUA)
- Groundwater Draft exceeds the ground water availability
- Declining ground water levels, drying up of shallow wells, decrease in yield of bore wells and increased expenditure and power consumption for withdrawing water from progressively greater depths.
- Excessive use of fertilizers and pesticides in agriculture has resulted in localized enrichment of Nitrate in the phreatic aquifer.
- Domestic & industrial wastewater discharged into the Krishni River has severely affected the groundwater of the surrounding land.

CGWB Report on AQUIFER MAPPING AND GROUND WATER MANAGEMENT PLAN Shamli District, U.P., 2015



ISSUES

Aspect	Issues
Water supply	1. Drinking water supply in villages is lower than required. 2. In rural there is high dependency on groundwater for drinking purpose. 3. Metered water connections are not availabe in in the district.

Water Quality	• Groundwater withdrawn exceeds the ground water availability • Exploitation of Groundwater • Declining ground water levels • Water Treatment Plant: Absent; No Physical/ Chemical/ Bacteriological tests and treatment of water • No water testing at consumer point.
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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								
c	Std. Water Req.(Lpcd)							
CD Blocks		Shamli	Kairana	Kandhla	Thana Bhawan	Un	Total	
Projected Population		379200	164800	84100	105500	48000	781600	
Year 2041	135	51.2	22.2	11.4	14.2	6.5	105.5 Mld	
Supply (2011)		1.4	2.4	2.8	3.2	3.2	13.1 Mld	
Total Demand							92.4 Mld	

- Water supply in urban in 2011 is approximately 57.62 MLD
- By 2041, the demand in Rural will increase to approximately 105 MLD in Shamli district



	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 & Commercial	30% of total demand			57.9
	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 once 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.

