

Data Discrepancies

Interpreting Rural Water Data in the Decadal Census

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A study of water sources for 16 villages around Bengaluru points to the discrepancies between house listing data and village amenities data, both from Census 2011, but drawn from different sources, suggesting that users should be cautious while drawing interpretations from census data on rural water.

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The census provides data on access to drinking water sources in urban and rural areas. The data are used by government departments to assess the status of water supply in India, and by researchers to understand access to water sources across regions and among different sections of society. Census 2011 reports that 30.8% of households in rural India access taps for drinking water, and the Ministry of Drinking Water and Sanitation (MDWS) uses this as an indicator of piped water coverage (Government of India 2013). While “access to taps” is the terminology used by the census, “piped water coverage” is the terminology used by the MDWS. The ministry aims to cover 90% of rural households with piped water supply by 2022, at 70 lpcd (litres per capita per day), which includes both potable and non-potable water. In this article, we point out aspects that should be considered while interpreting decadal census data on rural water, drawing upon different components of the census data itself, and a year-long field study conducted in 2013–14 covering 518 households in 16 villages around Bengaluru in Karnataka. First, we show that there are discrepancies in data on water sources between house listing data and village

amenities data, both from the 2011 Census for the 16 villages that we surveyed. Second, we discuss whether census data on access to taps can be used as an indicator of piped water coverage. Third, we look at the reliability of data collected from households related to treated water.

Study Area

We undertook a stratified random sample survey on rural water supply as part of a larger socio-hydrological research project during 2013, which covered 518 households from 16 villages around Bengaluru. The study aimed to understand domestic water use across different socio-economic groups, particularly access to water sources and quantity of water used. All the villages in this region are dependent on groundwater, with each village having a bore well owned by the panchayat, which supplies water to households through a piped network. Households are connected to this piped network by taps within households, by public taps, or through the mini water supply scheme. When water is insufficient in supply or of poor quality, which is generally the case in the summer months, or when there are problems with the panchayat bore well, households rely on secondary sources such as farm bore wells owned by others, tanker water supplied by the panchayat, and water purification units.

Comparing House Listing and Village Amenities Data Sets

Two data sets on rural water supply—house listing and village amenities—are available in the census. The house listing data set, available as tables (“Table HH-14: Percentage of Households to Total

Households by Amenities and Assets”), comes from the Houselisting and Housing Census Schedule which is administered to households. It provides village-wise information on percentage of households accessing 10 different water sources. The village amenities data set provides information on whether a village has access to these 10 drinking water sources, as well as their seasonal availability, which the village accountant, possibly in consultation with the panchayat, provides to the census department.

The 10 options for drinking water sources provided in Question 19 in the Census 2011 Houselisting Schedule on “Main Source of Drinking Water” include tap from treated source, tap from untreated source, covered well, uncovered well, hand pump, tube well/borehole, spring, river/canal, tank/pond/lake and other sources. The census also has an instruction manual that provides instructions for selecting each of these sources. For instance, if households access taps that supply water from bore wells or surface water bodies, then either “taps from treated source” or “taps from untreated source” should be reported, based on whether the water supplied to the taps is treated or not. Tube wells/boreholes should be reported only when groundwater is drawn using electric or diesel pumps.

On comparing the house listing and village amenities data for the 16 villages (Table 1), we came across discrepancies between the two. While the village amenities show the presence of certain sources, households do not report them in the house listing data set. For instance, in Hasanaghatta and Thattekere, village amenities data report the presence of treated tap water while none of the households report it in the house listing data set. All villages have reported handpumps in the amenities data set while none of the households report using handpumps in the house listing data set, except in Kalyandevramatha. This is also the case for other sources such as untreated tap water (in Kalyandevramatha), and river/canal water (in Byrapura and Neralaghatta), which are reported in the village amenities data but not in the house listing data.

During fieldwork, we noted that none of the households in the 16 villages accessed handpumps (which were all defunct) or rivers/canals for drinking purposes. While this was reported correctly in the house listing data, it was not so in the village amenities data, making the house listing data set seem more reliable. One possible reason for this discrepancy is that the data originate from two different sources, the house listing data from households, and the village amenities data from the village accountant/panchayat. The village accountant/panchayat does not seem to have accurate information about the sources of drinking water in villages under its jurisdiction, even though it provides funds for the establishment and maintenance of these water sources.

Is Data on Access to Taps a Good Indicator of Piped Water Coverage?

Data on “access to taps” from the house listing data set includes taps located either within the household premises or away, which get water from treated or untreated sources. This data from the census is used as an indicator for piped water coverage by the MDWs. Out of the 16 villages we surveyed, the census reports a fairly high access to taps (more

than 80%) in 11 villages¹ and low access to taps (less than 50%) in the remaining villages (Table 2). Field consultations indicated that all 16 villages surveyed have had the infrastructure

Table 2: Households Accessing Taps and Bore Wells

Village Name	Household Survey 2013 ^a		Census 2011 ^b	
	Tap	Bore Well	Tap*	Bore Well
Kuntanahalli	70	18	100	0
Medihalli	86	17	100	0
Hasanaghatta	71	29	99	1
Thattekere	90	16	0	100
Bidalur	87	46	0	100
Gundenahalli	88	15	84	16
Tagachaguppe	71	30	99	1
Byrapura	100	4	94.5	5.5
Neralaghatta	90	79	49	51
Halkur	9	75	90	10
Budihal	89	6	100	0
Shidaganahalli	99	22	97	1
Kalyandevramatha	93	28	84	0
Ganalu	100	0	59	41
Marigowdanadoddi	95	25	98	2
Mediagrahaara	92	8	0	100

*Tap: Computed as sum of “tap water from treated source” and “tap water from untreated source.”

Both data in percentage. In the household survey data, since households access multiple sources, tap and bore well do not add up to 100%. In census data, in villages where households access sources other than taps and bore wells, numbers do not add up to 100%.

Sources: (a): Primary data from household survey on access to water sources (drinking and non-potable purpose). b: Census 2011 data on primary access to drinking water sources from “Houselisting and Housing Census 2011, Table HH–14: Percentage of Households to Total Households by Amenities and Assets.”

Table 1: Drinking Water Sources in Census Data

Villages	Village Amenities ^a					House Listing Data ^b				
	Treated Tap Water	Untreated Tap Water	Hand-pump	Tube Wells/Borehole	River/Canal	Tap Water from Treated Source	Tap Water from Untreated Source	Hand-pump	Tube Well/Borehole	River/Canal
	Kuntanahalli	1	1	1	1	0	100	0	0	0
Medihalli	0	1	1	1	0	0	100	0	0	0
Hasanaghatta	1	1	1	1	0	0	99	0	1	0
Thattekere	1	0	1	1	0	0	0	0	100	0
Bidalur	0	1	1	1	0	0	0	0	100	0
Gundenahalli	0	1	1	1	0	1	83	0	16	0
Tagachaguppe	0	1	1	1	0	0	99	0	1	0
Byrapura	0	0	1	0	1	95	0	0	6	0
Neralaghatta	0	1	1	1	1	0	48	0	51	0
Halkur	0	1	1	1	0	0	90	0	10	0
Budihal	1	1	1	1	0	17	83	0	0	0
Shidaganahalli	0	1	1	1	0	45	52	0	1	0
Kalyandevramatha	1	0	1	1	0	10	75	1	0	0
Ganalu	1	1	1	1	1	16	43	0	41	0
Marigowdanadoddi	1	1	1	1	0	0	98	0	2	0
Mediagrahaara	1	0	1	1	0	0	0	0	100	0

Village amenities data denotes presence (1) or absence (0) of specific drinking water source. House listing data shows percentage of households accessing different drinking water sources.

Sources: (a): Census 2011: District Census Hand Book (DCHB) village amenities data for Karnataka, <http://www.censusindia.gov.in/2011census/dchb/DCHB.html>.

(b): Houselisting and Housing Census 2011, “Table HH–14: Percentage of Households to Total Households by Amenities and Assets,” for the Districts Bangalore, Bangalore Rural and Ramanagara, http://www.censusindia.gov.in/2011census/HLO/HL_PCA/Houselisting-housing-Kar.html.

for piped water supply from before 2010, the year when census data were collected. Moreover, all these villages depend on panchayat bore wells for water, for the distribution of which a piped network is necessary. One would thus expect census data to have reported this high access to taps in all 16 villages, which has not been the case.

To understand why the census reports low access to taps even if villages have had piped water infrastructure, we compared our household survey data ($n = 518$)² on access to water sources for potable and non-potable purposes with data from the census on access to drinking water (potable) sources. We focused on the five villages where the census reported low access to taps.

The census reports that 49% of households in Neralaghatta and 59% of households in Ganalu had accessed taps for drinking. During our survey, these villages reported that the quality of water in these taps was poor and they used this water only for non-potable purposes. For drinking purposes, they accessed other sources such as tanker water, bore well owned by others, and water purification units. If the quality of water was equally poor in 2010 as well, then the census, which captures data only on drinking water sources (and not on whether households access taps irrespective of the purpose of use), is reporting that only a few households accessed taps for drinking. Thus, in villages where water quality is an issue and taps are used only for non-potable purposes, census data may be correct, but it is not a good indicator for piped water coverage.

Further, for three other villages, Thattekere, Bidalur and Mediagrahaara, census reports no taps and 100% dependence on bore wells. It is highly unlikely that if a village has taps, all households will report bore well as their source of water. There may be discrepancies in data collection, where there is a lack of conceptual understanding among enumerators and households on the definition of “taps” and “bore wells” as sources of water. The instruction manual states that bore wells should be reported only when groundwater is drawn using electric or diesel pumps. Though not explicitly

stated in the manual, the bore well option should be reported when households collect water directly from a bore well and not when bore wells are connected to a distribution system such as an overhead tank or tap. Hence, panchayat bore wells (such as those present in our study area), which are connected to a piped network, should ideally be reported under “tap from treated source” or “tap from untreated source,” and not as “bore wells.”

Assuming that the enumerators were clear about the definitions, and that the questions were administered correctly, the only other reason (unlikely) for an entire village in the census to have reported access to bore wells (sourcing water directly from bore wells and not from taps) could be that these villages were under severe water stress for most part of 2010, when the census data were collected.³ The instruction manual for the Houselisting and Housing Census states, “If a household gets drinking water from two or more sources, the source availed of more or during the greater part of the year should be recorded” (Government of India 2011a: 46). However, it is not clear what is to be recorded if the village is under water stress for the year when census data are collected.

Census data on access to taps, therefore, may not be a good proxy of piped water coverage if a village is under water stress (insufficient quantity or quality of water) at the time of census data collection. Further, the instruction manual lacks clarity on bore well access. To get a better picture of access to piped network, data on access to non-potable sources is also required, which the census does not capture.

Reliability of Data

The Directorate of Census Operations, Karnataka, in its “Housing, Household Amenities and Assets” report (Government of India 2011b: 3) admits that it is not possible to classify water as safe or unsafe without proper testing, and yet the attempt is made to get data on access to “safe water.” To get this data, “tap water from treated source” and “tap water from untreated source” were provided as separate options in Census 2011.

Instructions for this question in the manual state:

Only after proper treatment, which involves the removal of impurities by filtration and disinfection by chemical treatment, can the water be considered safe. Thus the water being supplied by tap may be directly from a well (covered or uncovered), tubewell, bore-hole, tank, pond, etc. It is important to ascertain whether the tap water is being supplied from a treated source or not.

It is unrealistic to assume that a household will know if the water supplied to them is treated or not, in accordance with the conditions mentioned in the manual. For instance, in the census, all households in Kuntanahalli have reported “tap water from treated source” (Table 1). Going by field observations, however, their water was being supplied from the bore well directly to the taps, without any treatment, as there were no intermediary storage structures such as overhead tanks for water to be filtered and disinfected. Thus, households may not know whether the water supplied is treated or not, and will only be able to report water characteristics such as brackishness or odour of water, which is also not a true indicator of safe water. Therefore, one needs to be cautious while using census data on access to “tap water from treated source.” It may not be truly indicative of access to safe water.

Conclusions

In this article, we have highlighted three points with respect to the decadal census data. First, though village amenities and house listing data sets (both of which are part of the census) provide data on rural drinking water sources, house listing data, which are collected from households, appear to be more reliable than village amenities data, which are reported by the village accountant/panchayat. Second, census data on access to taps for drinking purposes are not a good indicator of piped water coverage, since this data may be influenced by the water supply situation (insufficient supply and quality) at the time of census data collection. Third, the role of the enumerator and respondents/households is crucial in census data collection. The data on access to treated water may

not be reliable, since households may not be in a position to tell if the water supplied to them is treated or not.

Collecting data from a population spread across regions with diverse characteristics is undoubtedly challenging, and the census department does a remarkable job in assembling vast amounts of data. Nevertheless, users of census data need to be careful while drawing interpretations, especially on a regional scale, and addressing the concerns above will improve data quality.

NOTES

- 1 In a few villages such as Kuntanahalli, Byrapura and Shidaganahalli, our survey data report less access to taps than reported in the census. This may be because, during our survey in 2013, fewer households were accessing taps, and the remaining households were accessing other sources such as their own bore wells and bore-wells owned by others.
- 2 Households in each village were stratified into two groups: marginalised and non-marginalised. Population parameters for a village were arrived at by applying weights for each stratum, computed as stratum population/stratum sample.
- 3 This is the case of Halkur, which reports only 9% access to taps in our survey. During the survey, the panchayat bore well had not been

functioning for an entire year and households relied on panchayat tanker water and bore wells.

REFERENCES

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