



Measuring Environmental Health Inequality between the Rich and the Poor : Evidence from Indonesia.

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Abstract

Universal and equitable access to safe and affordable drinking water and sanitation are fundamental to the health and well-being of the population. Social determinants of health such as the conditions in which people are born, grow, live, work, age, and poverty are responsible for health inequalities. This research aims to measure inequality in the use of drinking better water sources and sanitation facilities between poor and non-poor households in Indonesia and inequality in each province in Indonesia. In addition, because of the importance of looking at inequality between rural and urban households, we also analyze it in this study. Data about access to improved drinking water and sanitation were derived from the 2017 Indonesian National Socioeconomic Survey (SUSENAS) and disaggregated by 510 districts across the 34 provinces of Indonesia. Two summary measures of inequality, mean difference from mean and weighted index of disparity were calculated to quantify within-province absolute and relative inequality, respectively. While the majority of Indonesian households had access to improved drinking water (65.37 %) and sanitation (73.55 %), there were large variations between and within provinces. Inequality in access to improved drinking water between poor and non-poor households was highest in North Kalimantan and lowest in Jakarta. Inequality in access to improved sanitation between poor and non-poor households was highest in Bangka Belitung Island and lowest in Riau Island. Inequality in access to improved drinking water between households in urban and rural areas was highest in Papua and lowest in Bangka Belitung Island. Inequality in access to improved sanitation between households in urban and rural areas was highest in East Nusa Tenggara and lowest in South East Sulawesi. There are inequalities in access to improved drinking water and sanitation between poor and non-poor households and between households in rural and urban areas. Monitoring inequality in these indicators domestically is necessary to identify areas and layers of the population that are underserved. Monitoring is also useful for developing policies to equalize access that can help Indonesia make progress towards the 2030 Agenda for Sustainable development.

Keywords : Environmental Health Inequality, Inequality, Indonesia, mean difference from mean, weighted index of disparity.

BACKGROUND

Universal and equitable access to safe and affordable drinking water and sanitation are fundamental to the health and well-being of the population. The reduction of inequity is a common goal, not only desirable from an ethical standpoint, but also from a practical standpoint (WHO, 2013). There are various things that cause inequality.

The social determinants of health - the conditions in which people are born, grow, live, work and age – are mostly responsible for health inequalities, defined as the unfair and avoidable differences in health status seen within and between countries (WHO, 2009). To see inequality, index measurements are needed. The index was designed to be used for ranking districts by their level of public health development progress, thereby serving as an advocacy and accountability tool for the Ministry of Health (WHO, 2017).

SDGs, specifically in Goal 6: to ensure availability and sustainable water and sanitation management for all. Water and sanitation are also related to several other SDGs, especially those addressing health, poverty, nutrition, economic growth and work. Like the MDGs, the SDGs reflect a conception approach that assesses progress through quantitative indicators, which are applied at the national level. In terms of SDG targets 6.1 and 6.2 about drinking water and sanitation, respectively, new indicators have been developed for SDGs which address the type of infrastructure used and also the quality of services provided.

Sustainable Development which is oriented towards equality targets (SDGs) are universal and fair targets access to safe and affordable drinking water for all', and 'adequate and equitable sanitation and hygiene for all' requires that there be regular domestic inequality monitoring.

The previous research has been investigated in the province of inequality in access to improvement drinking water and sanitation in Indonesia (Afifah T, 2018). So in this study, we want to find out the inequality in access to drinking water and sanitation between poor and non-poor households in Indonesia, and also in every province in Indonesia.

This research aims to measure inequality in the use of drinking better water sources and sanitation facilities between poor and non-poor households in Indonesia and inequality in each province in Indonesia. In addition, because of the importance of looking at inequality between rural and urban households, we also analyze it in this study. This study conveys a new approach to measure district level inequality in water and sanitation between households with different economic conditions and also explains the challenges faced with the adoption of SDG 6 indicators and their application in national contexts Indonesia.

METHODOLOGY

This study uses SUSENAS data, which is a multipurpose household survey conducted twice a year. SUSENAS sample design, used probability samples, allowing for district level estimates scope; thus SUSENAS is the appropriate data a source for monitoring inequality at both district and provincial level. The Indonesian definition further specifies that households are considered to have access to improved drinking water: (a) if the distance between the improved drinking the water source and the wastewater disposal were less than 10 meters, but households used an improved water source for bathing / washing; or (b) if households are used unimproved drinking water sources, including bottled water, refillable packaged drinking water, unprotected well, unprotected spring and river / stream, but used an improved water source for bathing / washing.

Access to improved sanitation facilities is defined as the proportion of households that use improved sanitation facilities. In the Indonesian context, improvement of sanitation facilities including flush toilets or pour toilet flush with disposal of wastewater to wastewater treatment facilities or a tank with or without a cement base.

Data sorted by province ($n = 34$) and district ($n = 510$), according to geographical naming and the boundaries of the Indonesian Ministry of the Interior Affairs. Number of districts in the province ranging from 5 to 38.

Disaggregated data were calculated using SPSS, taking into account the complex survey sampling design, including stratification, cluster sampling and sample weights. Disaggregated data were used to calculate

summary measures of inequality to quantify the levels of inequality [20]. Within each province, the mean difference from mean (MDM) and the weighted index of disparity (IDIS – W) were calculated to measure absolute and relative inequality, respectively, between the districts in that province. MDM and IDIS-W were calculated using Heat Plus (Hosseinpoor, 2018).

RESULTS

Inequalities between provinces

Overall, more than half of households in Indonesia had access to improved drinking water (65.37%) and nearly three-quarter of households had access to improved sanitation (73.55%); performance varied between provinces. Access to improved drinking water was highest in DKI Jakarta (92.88%), and access to improved sanitation was highest in East Kalimantan (86,57%). Access to improved drinking water was lowest in West Kalimantan (25.48%), while access to improved sanitation was lowest in Papua (36,80%).

Inequalities within provinces

Access to improved drinking water and sanitation also varied between districts within each province.

The absolute and relative inequality in access to improved drinking water and sanitation across districts within each province explains the comparison of district disparities in each province.

For access to improved drinking water, relative inequality was highest in Papua and lowest in Bangka Belitung Island. Relative inequality in Papua was 19 times higher in Papua than in Bangka Belitung Island (IDIS – W = 94.6 vs. IDIS – W = 4.8, respectively).

Inequalities between poor and non poor household

Inequality in access to clean water between poor and non-poor households in each province varies widely.

Inequality in access to improved drinking water between poor and non poor households was highest in North Kalimantan and lowest in Jakarta. In East Kalimantan, only 3 out of 10 poor households had access to improved drinking water, while 8 out of 10 non poor households reported access. In Jakarta, 9 out of 10 poor households had access to improved drinking water, and also 9 out of 10 non poor households reported access.

Inequality in access to improved sanitation between poor and non poor households was highest in Bangka Belitung Island and lowest in Riau Island. In Bangka Belitung Island, 0 out of 10 poor households had access to improved sanitation, while 8 out of 10 non poor households reported access. In Riau Island, 8 out of 10 poor households had access to improved sanitation, and 9 out of 10 non poor households reported access.

Inequalities between household in rural and urban

Jakarta was not included in this analysis because there were no villages in Jakarta Province.

Inequality in access to improved drinking water between households in urban and rural areas was highest in Papua and lowest in Bangka Belitung Island. In Papua, 9 out of 10 urban households had access to improved drinking water, while 2 out of 10 rural households reported access. In Bangka Belitung Island, 9 out of 10 urban households had access to improved drinking water, and 8 out of 10 rural households reported access.

Inequality in access to improved sanitation between households in urban and rural areas was highest in East Nusa Tenggara and lowest in South East Sulawesi. In East Nusa Tenggara, 9 out of 10 urban households had access to improved sanitation, while 5 out of 10 rural households reported access. In Bangka Belitung Island, 6 out of 10 urban households had access to improved sanitation, and also 6 out of 10 rural households reported access.

Overall, we found Papua was the province with the highest levels of absolute within-province inequality in both access to improved drinking water and sanitation.

CONCLUSION

In conclusion, the findings of this study demonstrate that access to improved drinking water and sanitation is an urgent problem in certain subnational areas in Indonesia. Some Provinces even face large gaps between poor and non-poor households, as well as between households in cities and villages. Routine monitoring with the state Subnational inequality in Indonesia is very important to track progress towards global and national commitments which aims to ensure universal access to safe places and affordable, and even drinking water sanitation and hygiene for all. The resulting data and analysis can provide input to the central and regional governments for further development policies.

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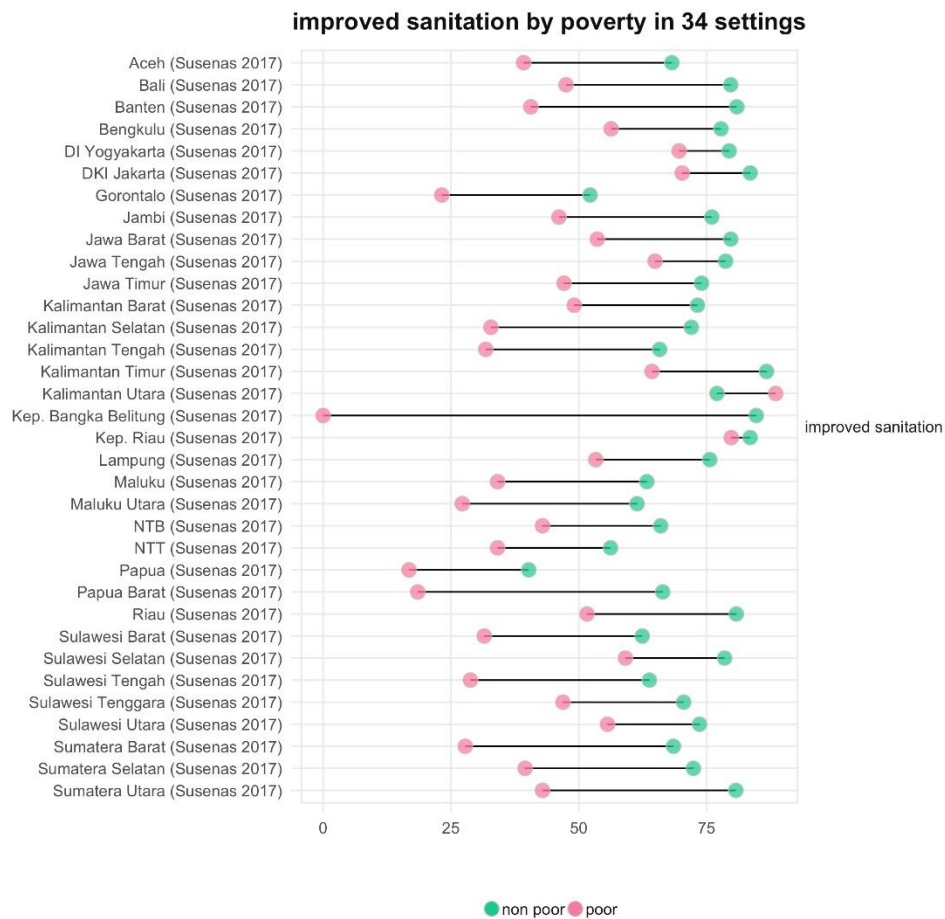
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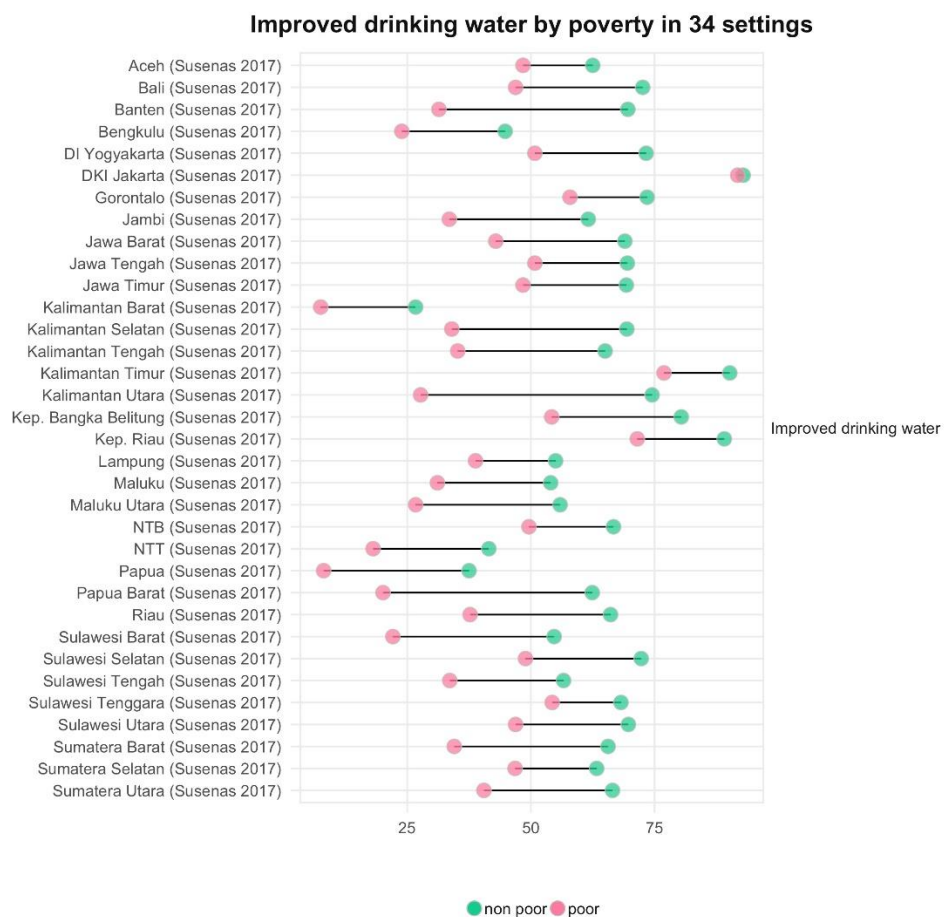
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Indonesia	Improved drinking water		Improved Sanitation	
	Absolute inequality (percentage points)	Relative Inequality	Absolute inequality (percentage points)	Relative Inequality
	Weighted Mean Difference From Mean (MDMW)	Weighted Index of Disparity (IDISW)	Weighted Mean Different From Mean	Weighted Index of Disparity (IDISW)
	5.6	8.5	5.5	7.4

Provinces	Improved drinking water		Improved Sanitation	
	Absolute inequality (percentage points)	Relative Inequality	Absolute inequality (percentage points)	Relative Inequality
	Weighted Mean Difference From Mean (MDMW)	Weighted Index of Disparity (IDISW)	Weighted Mean Different From Mean	Weighted Index of Disparity (IDISW)
Aceh	13.9	22.4	12.5	18.8
Sumatera Utara	20	30.7	13.7	17.4
Sumatera Barat	13.9	21.4	11.5	16.9
Riau	17	26	10.3	12.9
Jambi	14.8	24.5	8.5	11.4
Sumatera Selatan	14.2	23	9.6	13.9
Bengkulu	18	41.4	7	9.1
Lampung	15.3	28.8	7.2	9.9
Kep. Bangka Belitung	3.9	4.8	5.7	6.7
Kep. Riau	11.8	13.2	4.9	5.9
DKI Jakarta	5.3	5.7	5.9	7
Jawa Barat	16.3	24.4	7.9	10.2
Jawa Tengah	10.6	16	5.1	6.7
DI Yogyakarta	6.1	8.6	4.8	6.1
Jawa Timur	12.4	18.7	10.8	15.4
Banten	17.3	25.4	11.7	14.8
Bali	17.1	23.9	8.9	11.4
NTB	11	19.7	5.6	9.2
NTT	14.6	40.3	13.3	26
Kalimantan Barat	10.9	42.9	10.1	14
Kalimantan Tengah	13.2	20.6	14.3	22
Kalimantan Selatan	13.3	19.4	9.9	14
Kalimantan Timur	7.8	8.6	3.4	3.9
Kalimantan Utara	13.7	19.1	6.3	8.1
Sulawesi Utara	15.3	22.6	7.5	10.5
Sulawesi Tengah	10.8	19.9	10.6	17.5
Sulawesi Selatan	14.2	20.9	6.8	9
Sulawesi Tenggara	13.8	21	8.6	12.9
Gorontalo	11.7	16.6	8	17.3
Sulawesi Barat	8.5	17.6	6	10.6
Maluku	12.3	23.4	9.9	16.2
Maluku Utara	15.8	25.7	13.9	23.1
Papua Barat	19	32.6	11	17.9
Papua	31.4	94.6	27.5	74.7
Indonesia	5.6	8.5	5.5	7.4

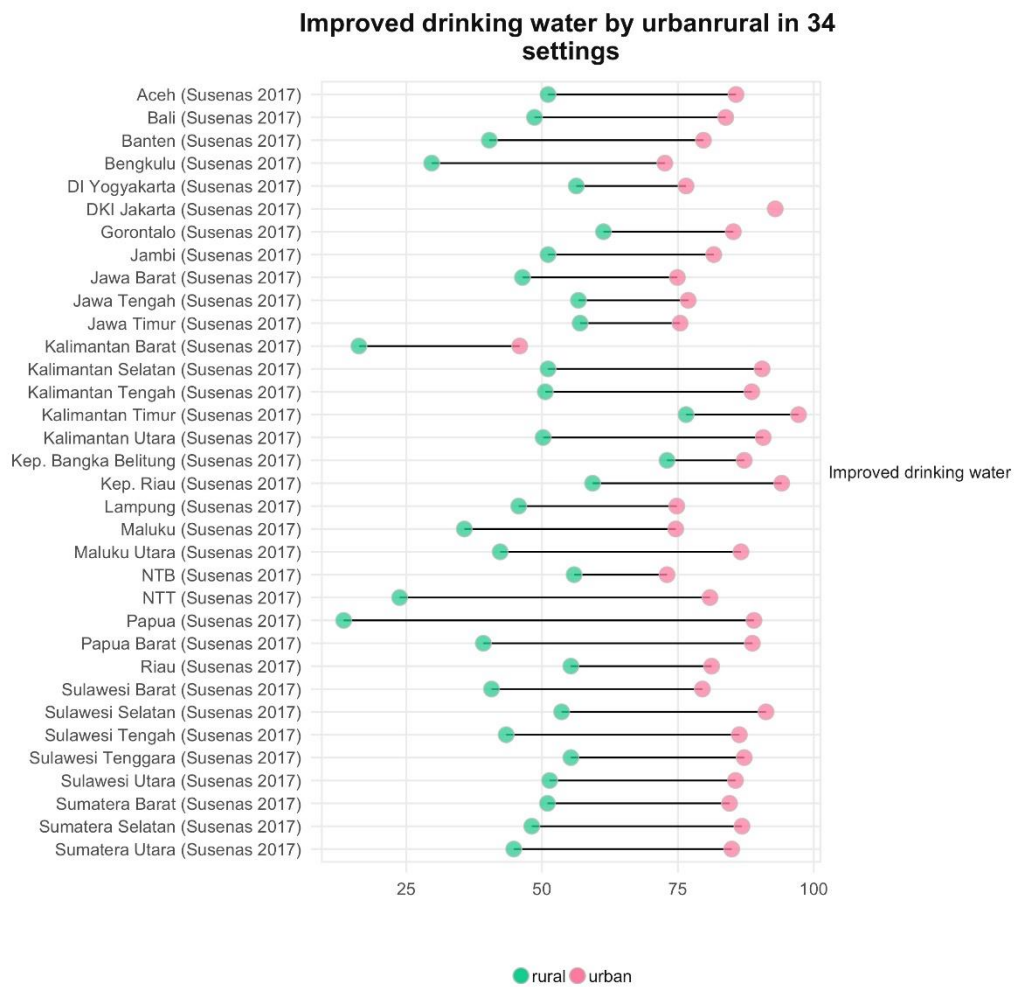


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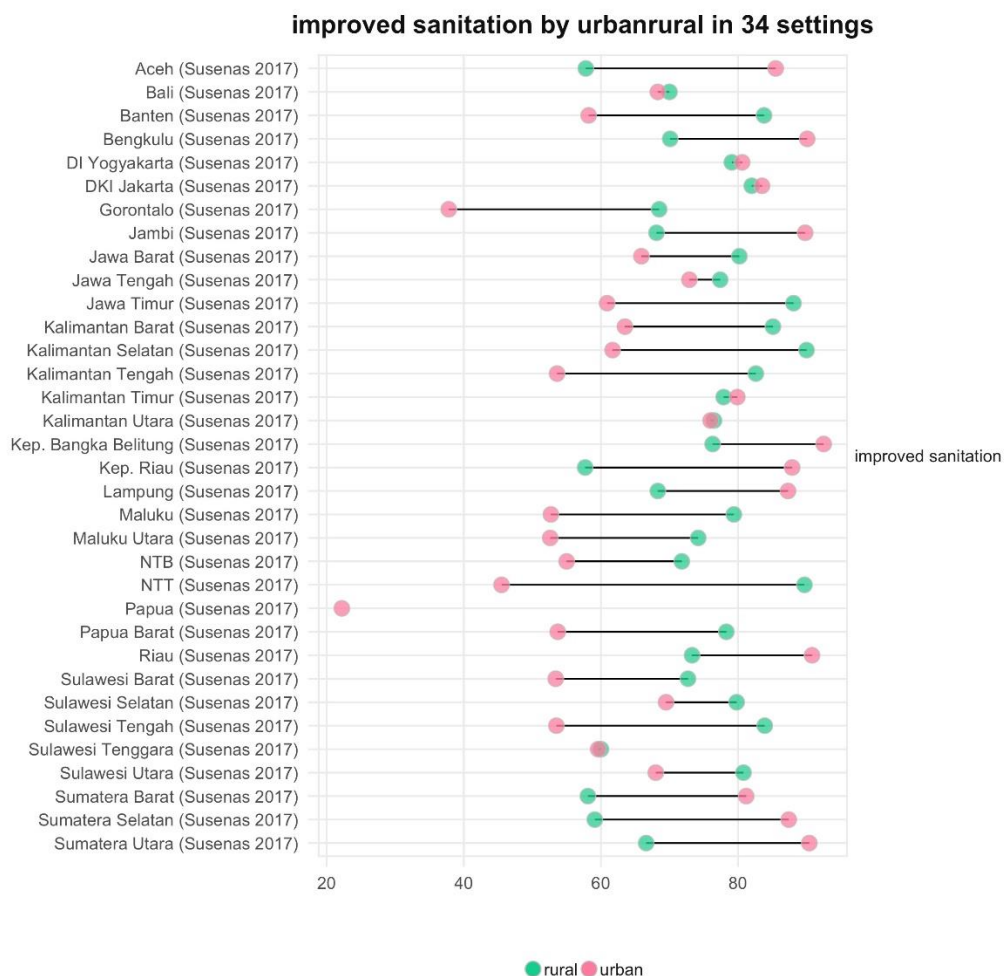
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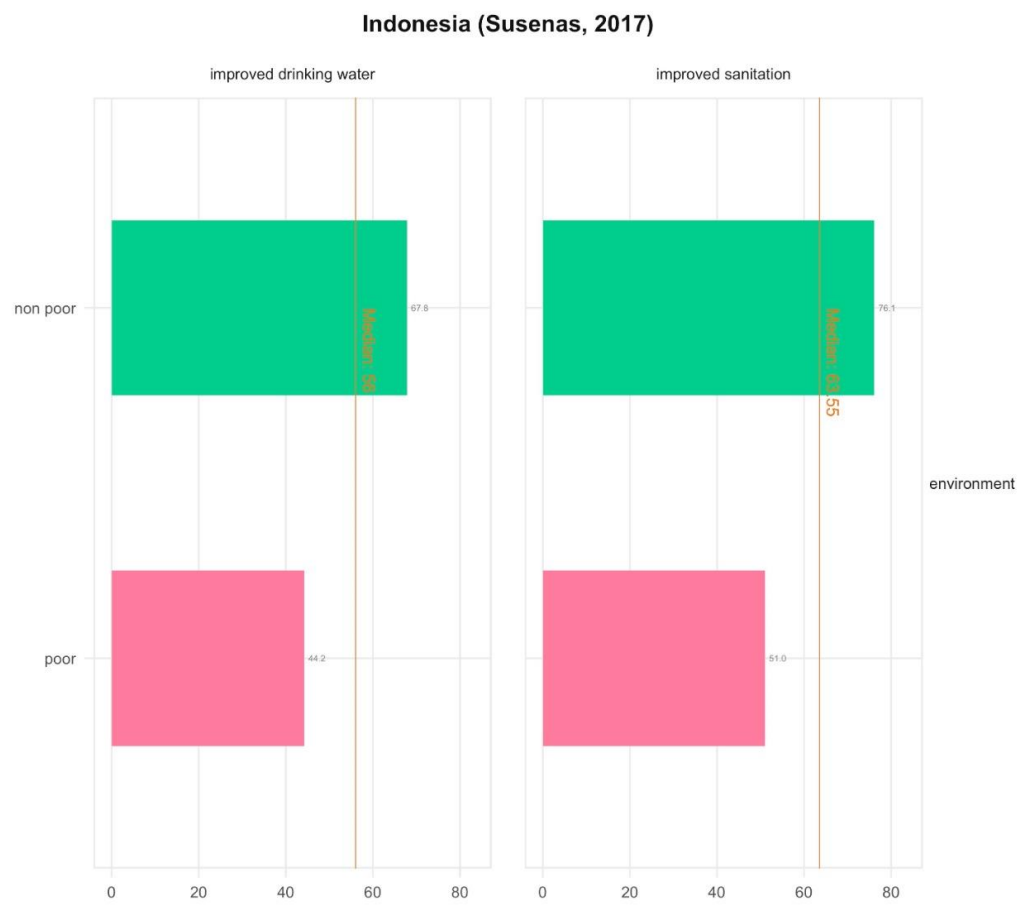


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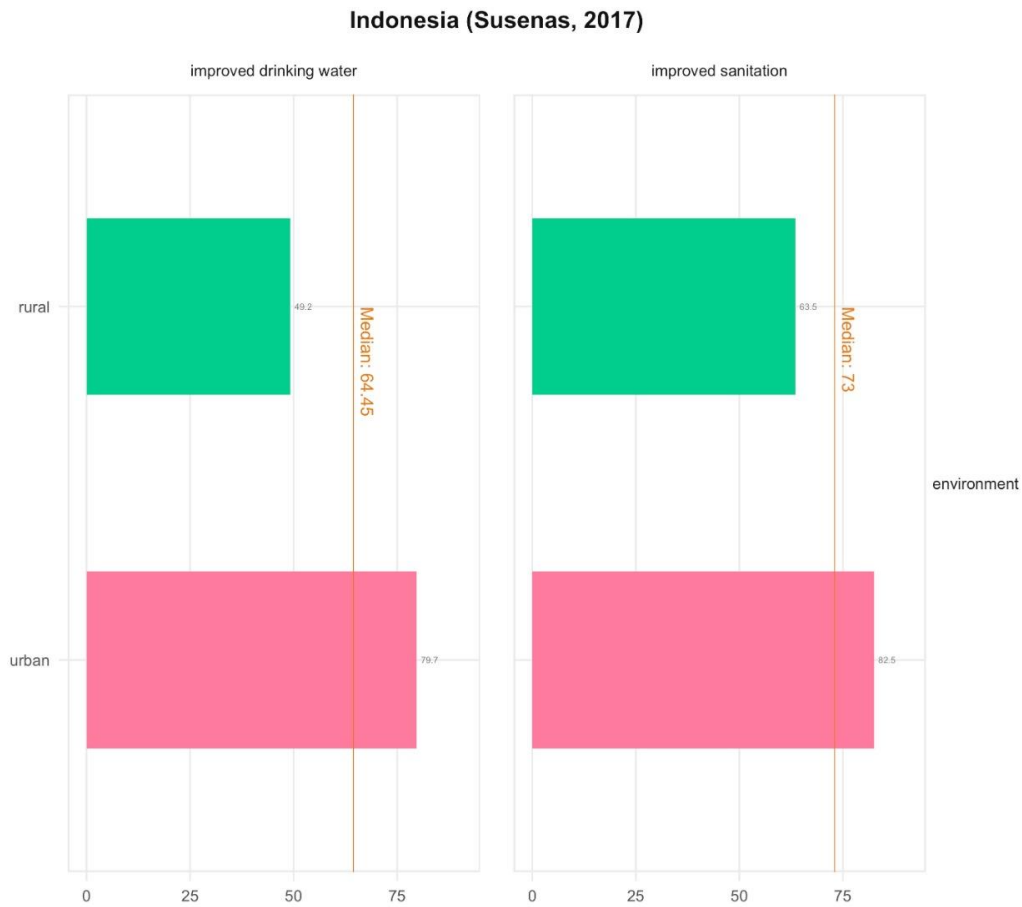
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