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Unpacking inequalities in rural access to Nepal's safely managed water services

In pursuit of Sustainable Development Goal (SDG) target 6.1, governments are working to achieve universal and equitable access to safe drinking water. This presents a dual challenge. Not only must water services be safe, available, and accessible; they must also be equitable in terms of who can access these services.

This learning brief examines the equity of rural water services in eight municipalities within Dailekh and Sarlahi districts in Nepal.

The analysis is based on data collected during mid-term performance monitoring as part of SNV in Nepal's Beyond the Finish Line initiative supported by the Australian Government's Water for Women Fund.

The analysis explores water quality, quantity, availability, and accessibility in relation to wealth status, gender of household head, and disability within the household.

Key messages

District-level analysis of water service inequalities enables a more nuanced understanding than national-level analysis.

In Dailekh, self-supply is a viable pathway to redress inequitable access to safely managed groundwater services.

Female-headed households are less likely to own a private tubewell in Sarlahi.

Where piped systems are present, measures to enable poorer households to gain piped connections are needed.

Across both districts, disability is associated with poorer water service outcomes, highlighting the need for targeted household support.

Background

This brief focuses on rural areas in the districts of Dailekh and Sarlahi. These two districts present contrasting settings. Dailekh is a hilly district in the west of Nepal, where small gravity-fed piped water systems are common. Sarlahi, on the other hand, is situated in the lower-lying Terai region, where households typically rely on tubewells equipped with a handpump or motorised pump.

The analysis is based on a survey conducted in December 2020 that adopted a multi-stage sampling technique to collect data from households in both districts. The sampled households were selected in wards using simple random sampling, as per the probability proportional to size (PPS) procedure from a list of premises. A total of 778 households were surveyed: 316 in Dailekh and 462 in Sarlahi.

The survey consisted of a structured household questionnaire with 256 questions. It also included collection of water samples at the point of use and semi-quantitative testing for *E. coli* concentration. The questionnaire captured household responses relating to reliability of water, quantity available, accessibility of water on the premises, gender of household head, asset ownership and dwelling characteristics (to enable a wealth index to be constructed), and presence of household members with some form of disability.

The analysis here focuses on the degree to which households enjoy the various water service attributes (including safely managed services as a whole), disaggregated by whether a household: (i) falls within the bottom 40% of the population in terms of wealth, (ii) has a member with a disability, and (iii) is headed by a female. For the purposes of the analysis, a safely managed service was defined as one where four safely managed criteria were achieved contemporaneously (i.e., no *E. coli*, 24-hour supply, enough water, accessible on premises). These criteria are similar to those applied by the World Health Organization (WHO)/United Nations Children's Fund (UNICEF) Joint Monitoring Programme (JMP), albeit with slight variations.¹

The persistence of inequalities in relation to water service access and outcomes has been documented previously in Nepal, thanks in large part to the national-level tracking overseen by the UNICEF/WHO JMP.² These monitoring efforts have consistently shown that, at a national level, the poorest and most marginalised households tend to use the riskiest unimproved water sources. The analysis in this learning brief therefore takes a different tack by focusing on inequalities at a district level, and also within specific cohorts that use the same 'type' of water source. This is important because source types tend to vary geographically in Nepal, with spring sources and gravity-fed piped schemes common in the hilly region and groundwater sources the norm in the lowland region of the Terai.

Findings

The household survey revealed contrasting water supply contexts in Dailekh and Sarlahi districts. Piped water is the norm in Dailekh, with 83.8% of households accessing a piped system for their drinking water. Almost half of households (48.4%) have water piped to the dwelling or yard and 35.4% collect water from a public tap. In contrast, tubewells are ubiquitous in Sarlahi and are relied on for drinking water by more than 95% of households.

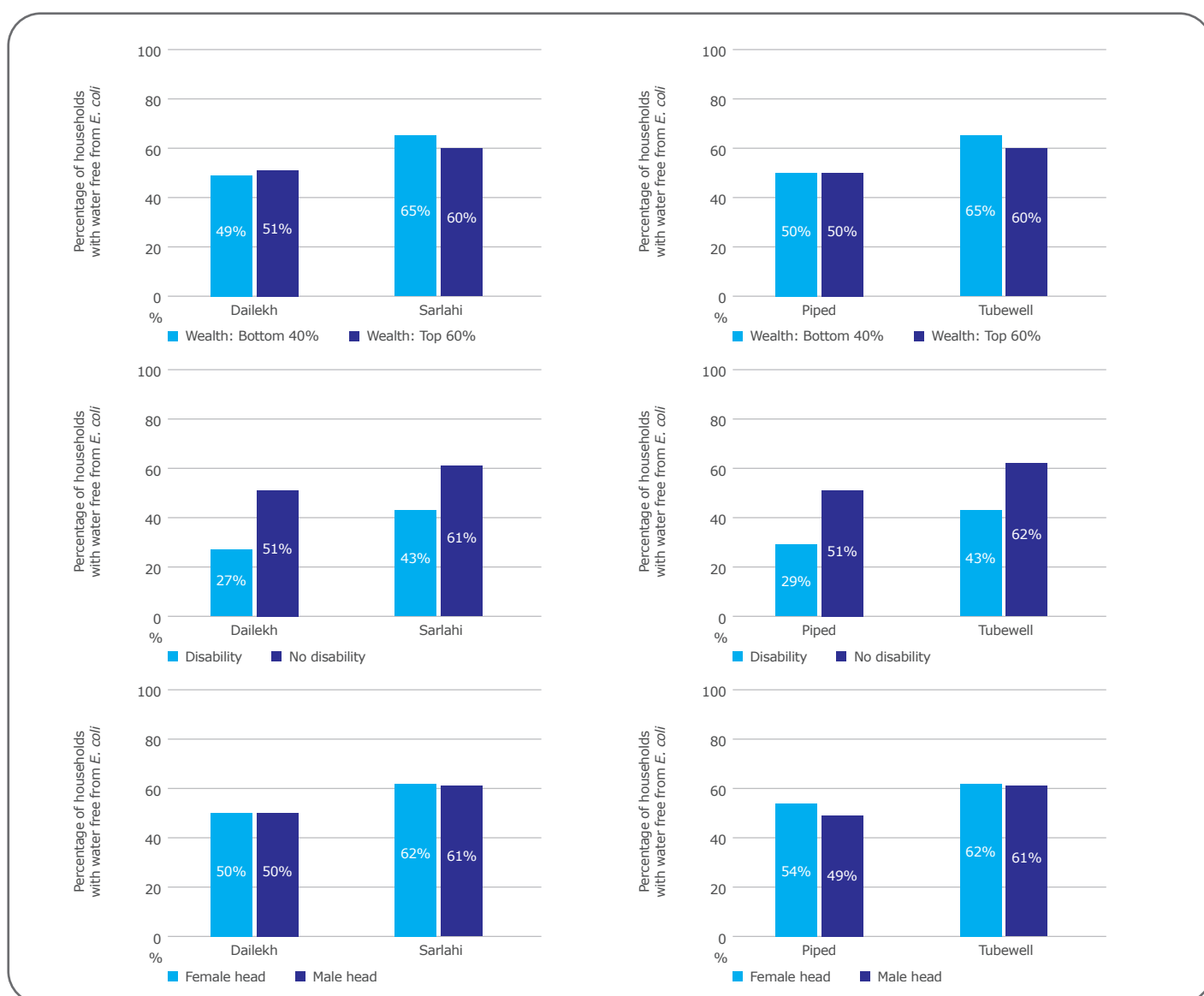
The two districts also differ in terms of equity dimensions and water service levels experienced (Table 1). The surveyed population in Dailekh is poorer than that of Sarlahi, has a higher proportion of households with a disabled household member, and has a higher proportion of households headed by a female. At the same time, the population of Dailekh experiences lower levels of service overall and is three times less likely to have access to a safely managed water service. Relative to their counterparts in Sarlahi, surveyed households in Dailekh are more likely to have *E. coli* in their drinking water and are less likely to have a continuous water supply, enough water for domestic needs and water on premises.

¹ Deviations from JMP are: (i) measuring water quality at the point of use rather than source and (ii) the inclusion of an indicator focused on 'sufficient quantity' of water.

² WHO/UNICEF JMP, *Progress on household drinking water, sanitation and hygiene 2000–2017: special focus on inequalities*, New York, WHO and UNICEF, 2019.

Table 1: Summary statistics for safely managed service criteria and equity dimensions

Dimensions	Dailekh	Sarlahi
Equity dimension		
% Households in poorest two quintiles	67%	17%
% Households with a disability	5%	3%
% Households headed by a female	20%	6%
Water service attribute		
% Households with <i>E. coli</i> absent in water	50%	61%
% Households with 24-hour water availability	68%	99%
% Households with sufficient water for domestic needs	56%	100%
% Households with water on premises	59%	94%
% Households with safely managed water	17%	56%

 Figure 1. Percentage of households with water free from *E. coli*


Free from contamination (Figure 1)

Within the districts, poorer households do not experience substantially higher levels of *E. coli* contamination in their drinking water compared to wealthier households. In Dailekh, and for piped systems generally, frequency of contamination for the poorest households is similar to that of the wealthier households. Counterintuitively, in Sarlahi, the poorest households have slightly better water quality than their wealthier counterparts. Households that include a person with disability experience poorer water quality across both districts and both main source types. Presence of *E. Coli* does not vary much by gender of household head at the district level, although female-headed households have marginally better water quality among households accessing piped water.

Sufficient water when needed (Figures 2 and 3)

In Dailekh, access to a 24-hour supply of water is slightly lower for poorer households compared with wealthier households, although the opposite is true for piped water users specifically. No wealth-based disparity is evident in Sarlahi. Households that include a person with disability are less likely to have a consistent 24-hour supply: this disadvantage is evident among piped water users, tubewell users, and Sarlahi district generally, but it is not apparent in Dailekh district when considering all source types. Gender of household head does not appear to have a major bearing on access to a 24-hour water supply, although in Dailekh female-headed households are slightly more likely to have a continuous supply.

Figure 2. Percentage of households with 24-hour water availability

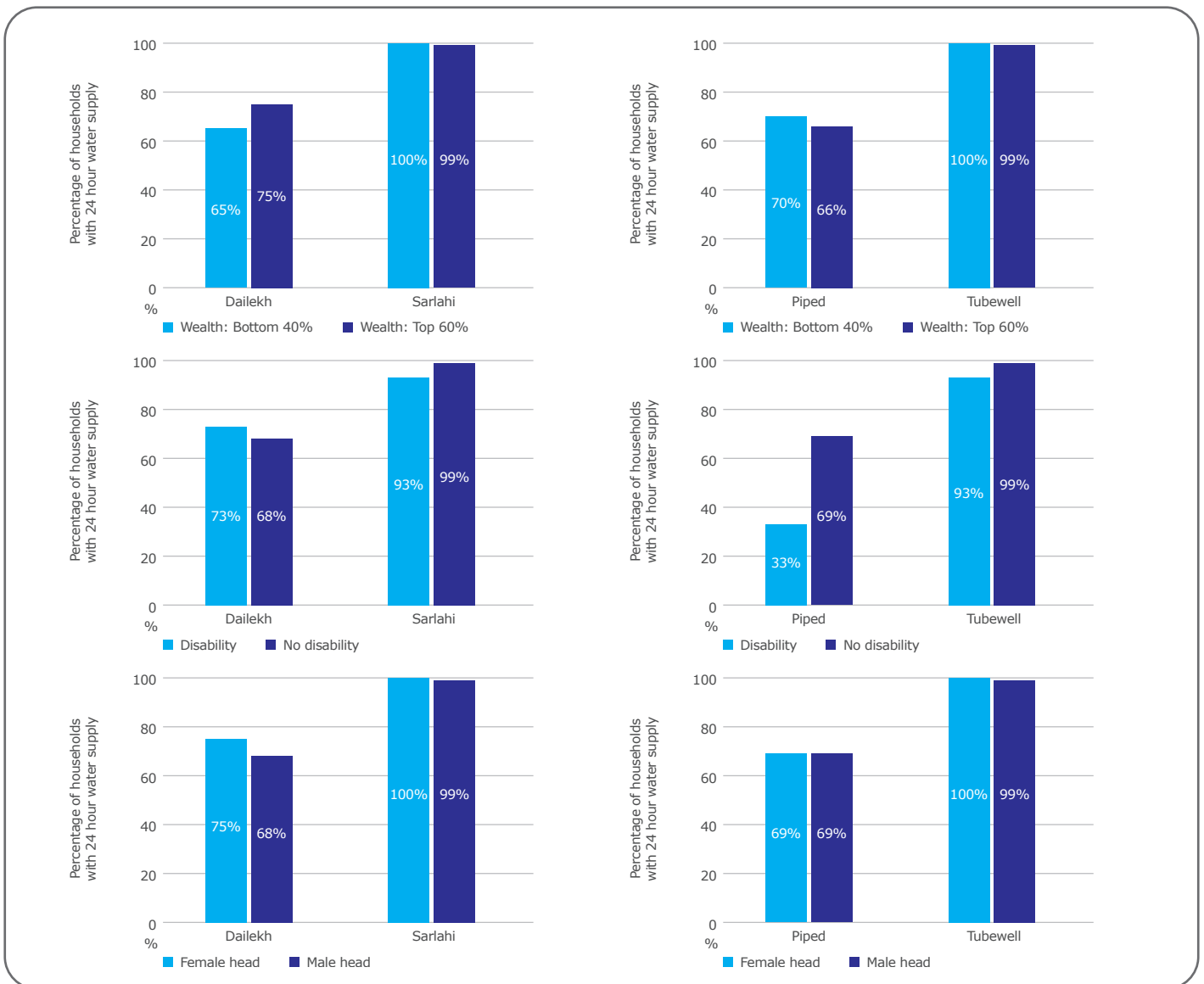
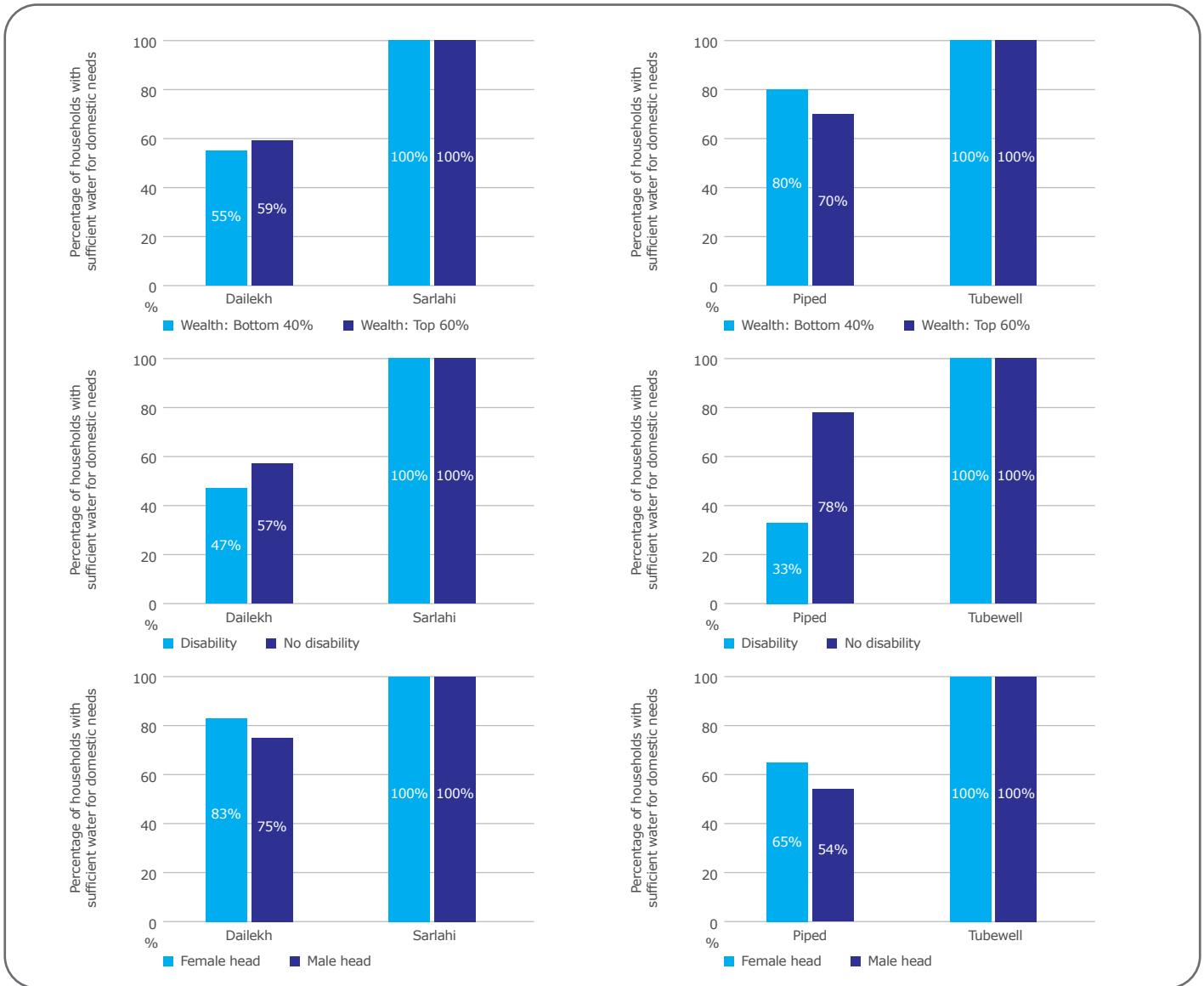


Figure 3. Percentage of households with water sufficient for domestic needs



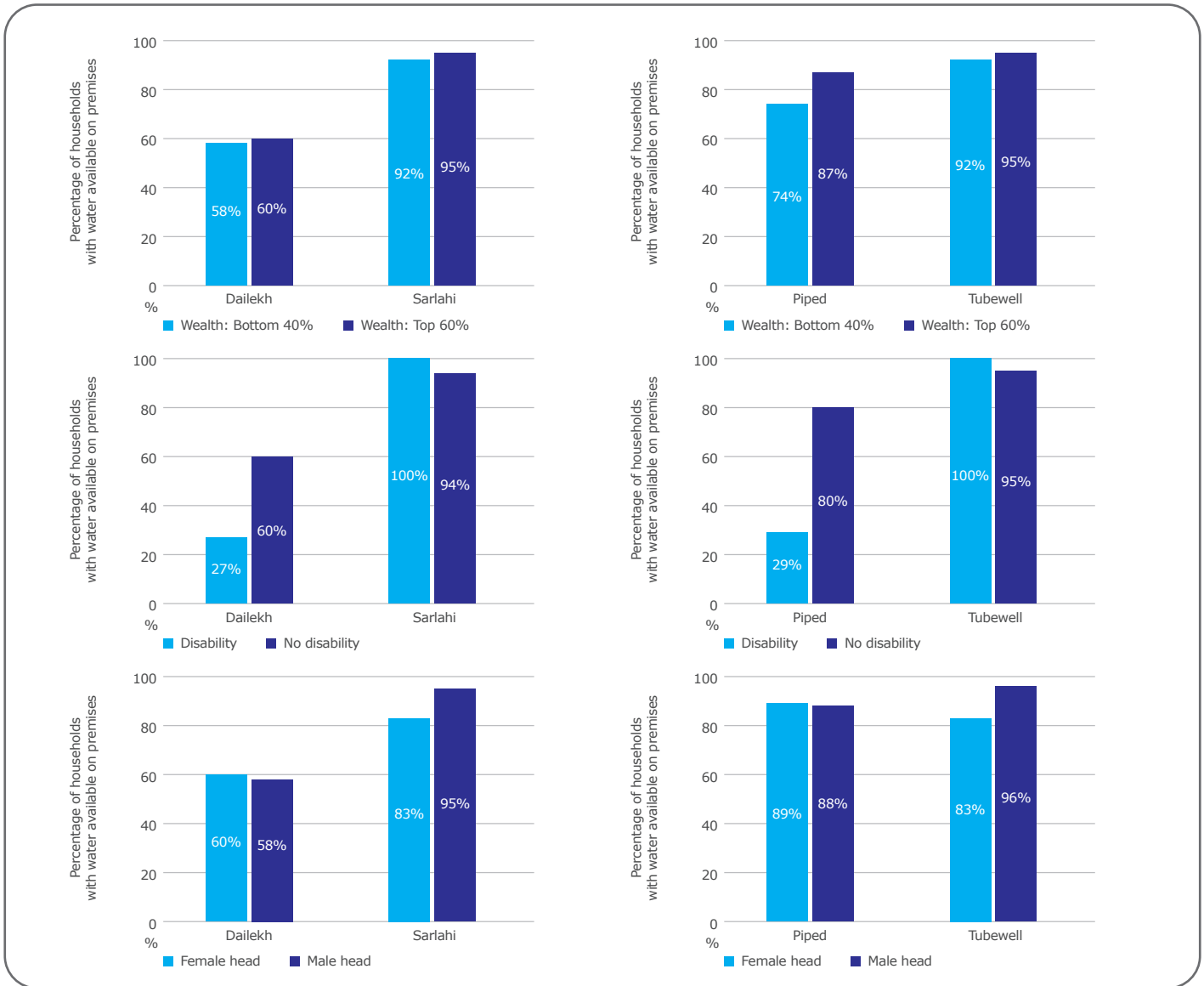
We have observed similar trends among households in Dailekh for access to sufficient quantities of water throughout the year to meet domestic needs. All households in Sarlahi reported having enough water and hence no inequities have been observed in that district. In Dailekh, poorer households are marginally less likely to report sufficient quantities of water, though the opposite is the case for poorer piped water users. Households that include a person with disability are less likely to report sufficient quantities of water: this disadvantage is evident amongst piped water users, and in Dailekh district generally.

In Dailekh – and among piped water users generally – female-headed households are slightly more likely to report sufficient quantities of water for domestic needs.

Accessible on the premises (Figure 4)

At the district level, access to water on premises varies little by wealth status, although the poorest households are less likely to have water supplied on or to the premises among both piped water users and tubewell users. Disparities in terms of disability vary by district and source type. In Dailekh – and for users of piped water services more broadly – households reporting a disability are substantially less likely to have water supplied to the premises. In contrast, 100% of households reporting a disability in Sarlahi have water available on the premises. Female-headed households are less likely to have an on-premises water source in Sarlahi but not in Dailekh.

Figure 4. Percentage of households with water on premises



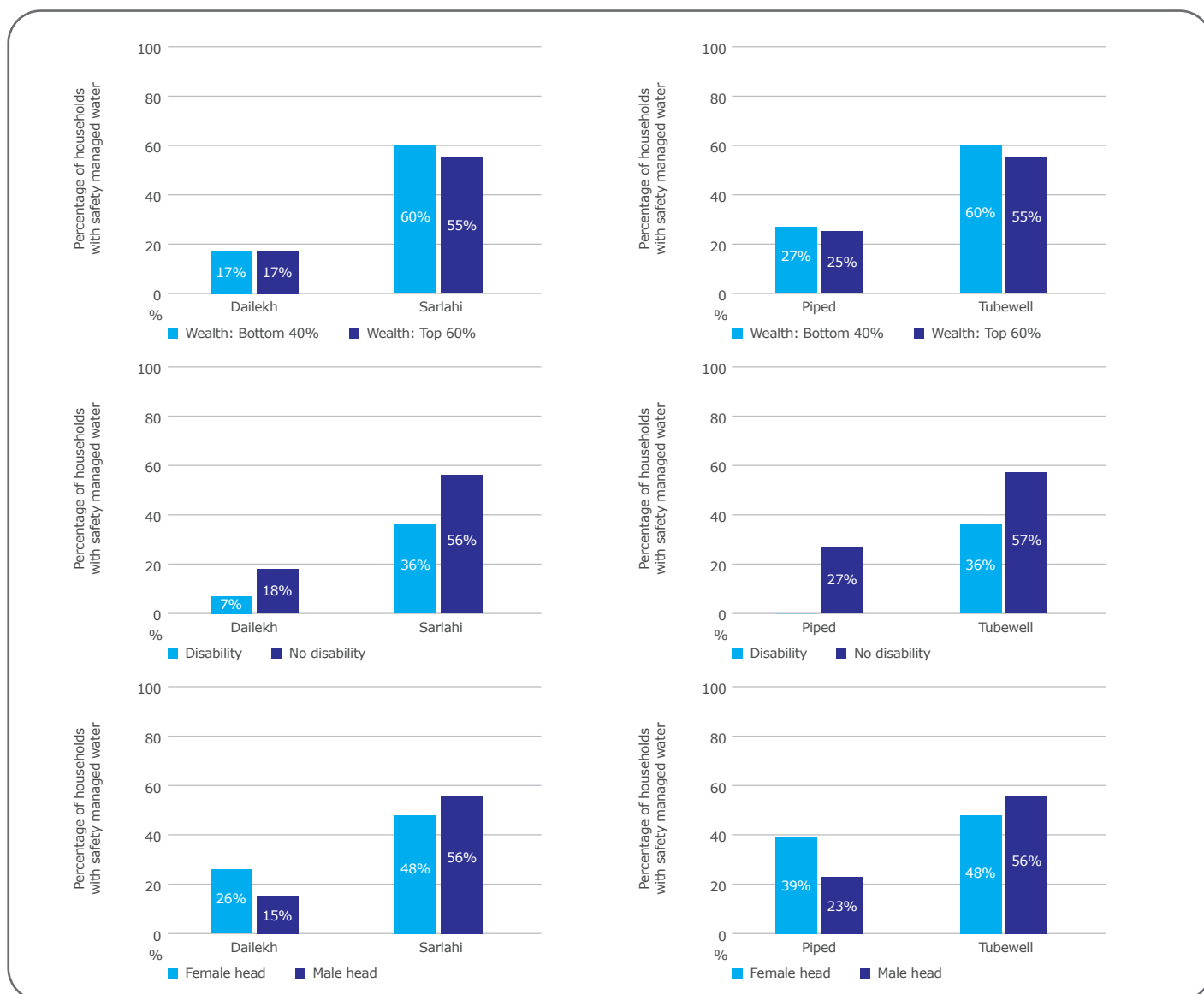
Safely managed water source (Figure 5)

Within both districts, the poorest households are no less likely to access a safely managed water service. Surprisingly, among users of both piped systems and tubewells, poorer households are slightly more likely to enjoy a safely managed water service. Households with a person with disability are considerably less likely to access a safely managed water service in both districts and for both main source types. Associations between gender of household head and safely managed water service differ across the two districts. In Dailekh – and among piped water users more generally – female-headed households are more likely than male-headed households to have a safely managed water service, whilst the converse is true in Sarlahi.

Conclusion and recommendations

Evidence from Dailekh and Sarlahi shows that water service inequalities at a district level are not always predictable or linear. The population in Dailekh faces greater levels of disadvantage than their counterparts in Sarlahi, whilst also experiencing poorer water service outcomes in terms of safety, reliability, and accessibility (and access to safely managed services overall). This is despite a high proportion of the Dailekh population accessing piped water compared with the population in Sarlahi, who make use of (particularly private/self-supply) tubewells. This shows that self-supply can be an important pathway for securing safely managed water services for rural populations, including low-income households. Of particular note is the fact that 100% of households using a tubewell

Figure 5. Percentage of households with a safely managed water service



reported having enough water to meet their domestic needs.

Somewhat unexpectedly, within districts and within source-type cohorts, wealth does not appear to have a major impact on water service levels. The one exception to this is having water supplied on the premises, with poorer piped water users more often needing to collect water from a public tap. This points to the need for pro-poor mechanisms to support lower-income households gain private connections on premises.

Disability is consistently associated with poorer water service outcomes and access to a safely managed service more generally. Understanding exactly why and how this inequality emerges warrants further examination. It is particularly concerning as the service-level needs of people with disability are also typically higher, and

individuals and households reporting disabilities may be less able to adopt coping strategies than other households in the event of water service inadequacies. It also deserves mention that the proportion of households reporting a disability was <5%, and so additional statistical analysis is important to outline levels of confidence for the quantitative findings.

The results in relation to gender present a mixed picture. Female-headed households fare better than male-headed households in Dailekh across specific service attributes and access to safely managed services overall. However, in Sarlahi, male-headed households experience more favourable service levels and are more likely to have a safely managed water service. Further work is needed to understand and explain these divergent findings. However, additional

support may be needed to enable female-headed households to secure a private tubewell that provides water on the premises.

In conclusion, analysis that drills down to district level helps to reveal a more nuanced picture and can support targeted diagnosis of inequalities. The evidence from Sarlahi and Dailekh is that rural water services need to be strengthened across the board to achieve universal access to safely managed water services. Notably, the results show that piped systems are no panacea, with these systems having the poorest service levels and also producing inequalities in terms of water being supplied on the premises. Self-supply in Sarlahi performs relatively well by comparison, which indicates that in areas with accessible groundwater this is a viable pathway for achieving water services that are safely managed and equitable in terms of wealth and disability status. Perhaps of most concern are the inferior service levels faced by households reporting a disability. This requires targeted support to ensure households with persons with disability can access water services that meet their specific needs. In some cases, this may require higher service levels than other households.

Acknowledgements

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Beyond the Finish Line – Inclusive and Sustainable Rural Water Supply Services

BFL – Inclusive and Sustainable Rural Water Supply Services in Nepal aims to improve the health, gender equality, social inclusion and well-being of 40,000 people in the rural districts of Dailekh and Sarlahi by supporting inclusive, sustainable and resilient rural water supply services and hygiene promotion.

The Beyond the Finish Line programme in Nepal is funded by the Australian Government's Water for Women Fund.

SNV

SNV is a not-for-profit international development organisation that makes a lasting difference in the lives of people living in poverty by helping them raise incomes and access basic services. Focusing on three sectors – Agriculture, Energy and Water, Sanitation and Hygiene (WASH) – SNV has a long-term, local presence in over 25 countries in Asia, Africa and Latin America.

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The Institute for Sustainable Futures at the University of Technology Sydney (ISF-UTS) works with industry, government and the community to develop sustainable futures through research and consultancy. ISF-UTS seeks to adopt an inter-disciplinary approach to its work and engage partner organisations in a collaborative process emphasizing strategic decision-making.

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Cover: A person with disability using an accessible handpump in Ramnagar RM Sarlahi

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