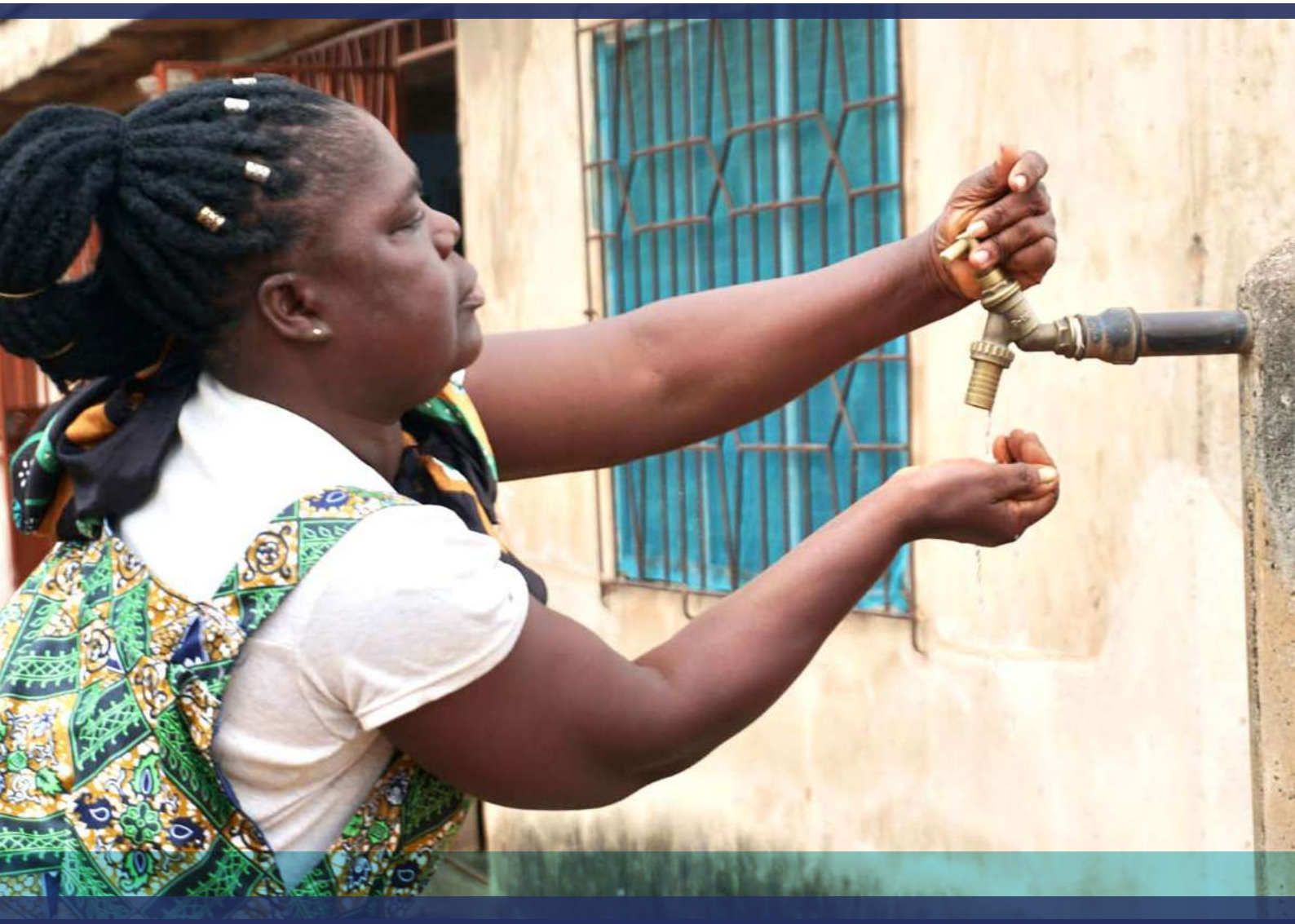
IRC Ghana



Rural Water Utilitisation Project; State of water services in the Western Region

Ghana Report

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Rural Water Utilitisation Project; State of water services in the Western Region

Ghana Report

ADMINISTRATIVE MAP OF GHANA

FOREWORD

The 2030 agenda promises access to safe and sustainable water, sanitation, and hygiene services for all. According to the Joint Monitoring Programme (JMP) 2022, Ghana stands at 63% household access to safely managed services in urban areas. In comparison, rural areas stand at 19% for safely managed and 55% for basic drinking water services. While progress since 2015 is evident, there's still a long way to go to fulfil the promise of Sustainable Development Goal 6.

Since 1998, CWSA has overseen WASH infrastructure development in rural areas, supporting community service providers through the community ownership and management (COM) model. Over 20 years, water coverage surged from 27% (1990) to 62% (2020), yet sustainability issues persist, with many systems facing dysfunction due to inadequate management, leading to breakdowns, water quality issues, high Non-Revenue Water (NRW), energy costs, financial struggles, and accountability problems.

Utilities are increasingly stepping into filling similar gaps across the globe by providing water services in rural areas. In Ghana, the transition of the Community Water and Sanitation Agency (CWSA) from a facilitator and regulator of rural water supply into the national utility for rural service provision has been ongoing since 2017. The idea is that CWSA will improve operational efficiency and ensure sustainable water service delivery through piped water systems in rural communities and small towns.

The Rural 'Utilitisation' project, funded by the Conrad N. Hilton Foundation aims to support CWSA to transition into an efficient utility, prioritising equity, expanding services to households and institutions, and improving monitoring, evaluation and reporting as part of the reform process in the rural water sub-sector of Ghana. The project partners are IRC, Water and Sanitation for the Urban Poor (WSUP), Safe Water Network and CWSA.

This collaboration leverages insights from local and African partners on strengthening utilities, managing safe water enterprises, and advocating for sector reforms.

IRC's role in this project is in enhancing sector learning and systems strengthening. This includes a focus on data management of water systems, fostering partnerships, and improving coordination mechanisms for learning and development.

A key step for providing the necessary evidence for sector engagement was to map water services to gather information on the facilities (functionality, reliability, distance, delivery models in place, operations, and management) and performance of the service providers and authorities.

This report presents the findings of a mapping conducted by the Ghana Statistical Service. It gives a comprehensive overview on water infrastructure, services and stakeholders in the Western Region and aims to support sector strengthening and learning, a key element of supporting CWSA's change journey. Better communications around the progress of CWSA's development into a utility is expected to support increased collaboration and understanding amongst WASH stakeholders in Ghana. These insights are therefore crucial for building and strengthening systems that ensure a financially sustainable and effective rural water service model.

ACKNOWLEDGEMENTS

The Ghana Statistical Service (GSS) would like to express its sincere gratitude to the Conrad N. Hilton Foundation and IRC Ghana for their financial and technical support of the Ghana Rural Water Utilitisation Project (R-WUP). We would also like to thank the core implementing partners namely, Community Water and Sanitation Agency (CWSA), Safe Water Network (SWN), and Water and Sanitation for the Urban Poor (WSUP), for their technical assistance throughout the project implementation process, including reviewing the survey instruments and the report. We would also like to thank the Western Regional Coordinating Council, the Metropolitan, Municipal and District Assemblies (MMDAs) and the water service providers in the region for their contributions to the data collection and validation of the report.

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ACRONYMS

CAPI	Computer Assisted Personal Interview
CIDA	Canadian International Development Agency
CWSA	Community Water and Sanitation Agency
DANIDA	Danish International Development Agency
GoG	Government of Ghana
GSS	Ghana Statistical Service
GWCL	Ghana Water Company Limited
LMSs	Limited Mechanised Systems
MMDAs	Metropolitan, Municipal, and District Assemblies
NGOs	Non-governmental Organisations
PPPs	Public-Private Partnerships
R-WUP	Rural Water Utilitisation Project
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WATSAN	Water and Sanitation committee, this name has been changed to WSMT
WHO	World Health Organization
WSMT	Water and Sanitation Management Team

1. OVERVIEW OF THE PROJECT

1.1. Introduction

The "Rural Water Utilitisation Project" (R-WUP) funded by the Conrad N. Hilton Foundation in Ghana, aims to expand the activities of the Community Water and Sanitation Agency (CWSA) as the leading public sector agency in rural Water, Sanitation and Hygiene (WASH) within the sub-sector. The objective is to facilitate the provision of safe water to Rural Communities and Small Towns through a decentralised Service Delivery Approach.

To achieve this objective, CWSA in 2017, initiated a policy reform, to expand its mandate to include the management of piped water systems in rural areas, and thus, in effect become a rural utility.

Accordingly, the R-WUP aims to support CWSA to establish an effective rural and small-town water utility model/ approach. The project targets four main objectives:

i. Develop a CWSA internal organisational change management process to drive the transition towards becoming a rural utility.
ii. Improve the operational efficiency in the management of water systems.
iii. Develop infrastructure for delivering safely managed water.
iv. Support sector strengthening and learning.

As part of objective 4, the Ghana Statistical Service (GSS) therefore, provided technical services to IRC and CWSA to carry out a mapping assignment with a focus mainly on mapping data on water infrastructure and services in the Western Region to understand what infrastructure and players exist in the space to provide CWSA a broader view of the rural water sub-sector.

1.2. Objectives of mapping water infrastructure and services in the Western Region

The specific objectives of the mapping are to:

i. Identify service delivery models for rural water service delivery in the Western Region.
ii. Establish an inventory of water infrastructure with technical information, service levels, and key performance data in rural water service delivery in the 14 districts in the Western Region.
iii. Develop a database framework for collection, analysis, and updating information for the rural and small-town water sub-sector; and
iv. Develop a database for the small-town water sub-sector.

1.3. Survey methodology

1.3.1. Scope

The scope of the assignment was to map all water service delivery models, water service providers and water service infrastructure in the 14 districts of the Western Region, namely the Ahanta West, Sekondi-Takoradi Metro, Effia-Kwesimintsim, Shama, Wassa East, Mpohor, Nzema East, Ellembelle, Jomoro, Tarkwa Nsueam, Prestia Huni-Valley, Wassa Amenfi East, Wassa Amenfi Central, and Wassa Amenfi West districts.

The data collection involved a physical visit to all water points and schemes and inspection of records and reports, and interviews with all water service providers in the region.

The focus of the mapping was on facilities that provided services to the public and hence, self-supply (household responsible for its own water service provision on premises) was not included in the exercise.

1.3.2. Survey instruments

Four structured questionnaires on specific topics programmed on electronic tablets were used to elicit responses from respondents. A manual, explaining concepts and definitions and procedures for eliciting information was developed. The questionnaires took into consideration previous practices of CWSA and other authorities. The questionnaires used were:

1. Piped schemes questionnaire,
2. Standpipes questionnaire,
3. Handpumps questionnaire, and
4. Handpumps service providers questionnaire.

1.3.3. Pre-test of the instruments

A major consideration during the preparation of a questionnaire is that it should present a clear understanding of the questions, ease the burden on respondents to minimise challenges during field work. To achieve this goal, the questionnaire was pre-tested as part of its preparation. The purpose of the pre-test is to assess the framing (appropriateness in eliciting responses and clarity), sequencing and exhaustiveness of the draft questions. Other issues assessed during the pre-test were the comprehensiveness of the manual, duration for administering the questionnaires and the workings of CAPI.

Trained field officers with an understanding of the questionnaire's concepts and definitions pre-tested the instruments and the methodology for four (4) days.

1.3.4. Recruitment and training

Trainees for data collection were recruited from a GSS enumerators bureau which has a list of GSS survey personnel whose past work was satisfactory, and with the minimum requirement of having a diploma qualification. District Statistical Officers complemented the experienced field personnel. Officers from relevant departments in the district were also recruited. A few more people than required for fieldwork were invited for training. This ensured that the best officers were selected for data collection and that there were standby officers for the field exercise in case of unforeseen challenges. A total of seventy (70) field staff were recruited and trained in the survey instruments and methodology. However, sixty-five (65) were selected for the fieldwork while

the remaining five (5) were put on standby. Thirteen (13) teams were constituted for the facility data collection and each team comprised one (1) Supervisor and four (4) Enumerators. District Statisticians were used as field supervisors and were responsible for the day-to-day activities of the teams such as handling protocols, carrying out spot-checks and editing the work of enumerators.

The training of the enumerators was organised in one central location for six (6) days. Training was carried out using a training manual and PowerPoint presentations. All concepts in the questionnaire and manual were explained to participants and ambiguities were clarified during the training. The trainees were also trained on the use of the Computer Assisted Personal Interview (CAPI) device, which is the tool for data collection. In determining participants' understanding of the training content and their ability to do quality work, some assessments were carried out in addition to mock interviews and field practice. This ensured trainees had a full understanding of the instruments.

1.3.5. Fieldwork and data quality management

Data collection for the assignment started on 20th November 2022 and ended on 11th December 2022. Enumerators moved into the localities, identified water facilities, and administered a questionnaire. Enumerators also identified those managing the facilities and interviewed them. Face-to-face interviews were conducted through personal visits. The field data collection adopted the use of Computer Assisted Personal Interview (CAPI) through a dependable telemetry device that transmits data to a base station's computer. The questionnaire was configured using the mWater platform and loaded onto Tablets. The mWater platform is a free open-source data platform for data questionnaire design, data collection, monitoring, analysis and reporting.

The Interviewers read the questions to the respondents and recorded the responses directly into the device. This electronic data capture takes out the need for post-interview data entry and thus allows for immediate data retrieval. During the transmission to the central data storage, data was first saved to the cloud before being downloaded into the central data storage system. In areas where it was difficult to access internet or where internet signals were not reliable, enumerators first saved the data captured onto the storage device and then moved to a site or area with a reliable internet signal and transmitted the saved data to the central storage facility.

1.3.6 Data processing, analysis and report writing

Data collected and sent to the mWater central server was validated by a team of Data Processing Experts. The team checked the structure of the data, missing data, data inconsistencies and completeness of interviews. They were also responsible for the daily review of data that was sent to the central point and a real-time operational decision to ensure data quality from the beginning to the end of the fieldwork.

The data cleaning was done by imputing missing values and handling outliers or extreme values that can significantly impact the analysis, identifying and correcting any inconsistencies in the dataset, such as conflicting values or discrepancies between related variables. Checking the integrity and accuracy of the data by performing validation checks, such as verifying relationships between variables and finally ensuring the overall consistency and logical coherence of the dataset by examining relationships between variables and verifying data against predefined rules.

A team of report writers was formed who drafted different chapters of the report. Draft chapters were then edited for consistency and coherence and collated into one final report.

1.4 Definition of concepts

1.4.1 Limited mechanised system

These are mechanised boreholes with limited reticulation i.e. only connected to standpipes within a localised area and not to households.

1.4.2 Small town piped system

These are mechanised water supplies with simple to complex reticulation connected to standpipes across dispersed locations and extended to homes.

1.4.3 Groundwater

Water that exists underground in saturated zones beneath the land surface. The upper surface of the saturated zone is called the water table.

1.4.4 Surface water

Any body of water above ground, including streams, rivers, lakes, wetlands, reservoirs, and creeks.

1.4.5 Bulk supply from GWCL

Water supply from Ghana Water Company Limited (GWCL). This is usually pumped into an overhead tank for onward supply to the community.

1.4.6 Standpipe spouts

Standpipe spouts refer to the "heads" or taps on the standpipe.

1.4.7 Extension

Adding additional distribution networks to existing ones to expand services. The target is to increase connectivity.

1.4.8 Expansion

Increase in the production sources of the water system. It includes the drilling of more boreholes and other production sources.

1.4.9 Rehabilitation

Major maintenance work on a water system.

1.4.10 Reconstruction

Complete replacement of an existing system by a new one.

1.4.11 Functionality of the water source

Refers to whether the source of water for the system is currently working, that it is able to supply water to the system.

1.4.12 Leakage

Defined as the amount of water that escapes from the piped network by means other than through a controlled action. The water leakage referred to here is leakage that occurs during the movement of water from the source of production/treatment to the storage point before distribution.

1.4.13 Routine maintenance schedule

Preventive maintenance schedule is a plan for organising company resources to ensure maintenance tasks are performed according to specific time or usage triggers. The primary goal of preventive maintenance is to keep assets in optimal working condition.

1.4.14 Manual standpipe

Refers to mechanical standpipes. Standpipes that are operated by manual force.

1.4.15 Smart tap/water ATM

An off-grid water dispensing and management system that enables revenue collection, water entitlement and sustainable water provision.

1.4.16 Vendor or caretaker

A person that manages the day-to-day activities of the standpipe or handpumps.

1.5 Organisation of the report

The report covers only the mapping of water infrastructure, and the findings are organised into five chapters. Chapter One provides an overview of the project including, objectives and methodology of the survey. Chapter Two covers information on the service delivery models and services providers in the water sector in the region while Chapters Three and Four cover information on piped water and handpump water systems respectively. Chapter Five presents conclusions on the findings of the project.

2. SERVICE DELIVERY MODELS AND SERVICE PROVIDERS

2.1. Introduction

Water service delivery models describe the way water services are provided. They include the management model for providing the service, the type of assets (infrastructure) that provide the services, and the way people can access the service (through public or household facilities).

The broad groups of water service delivery models are shown in the figure below.

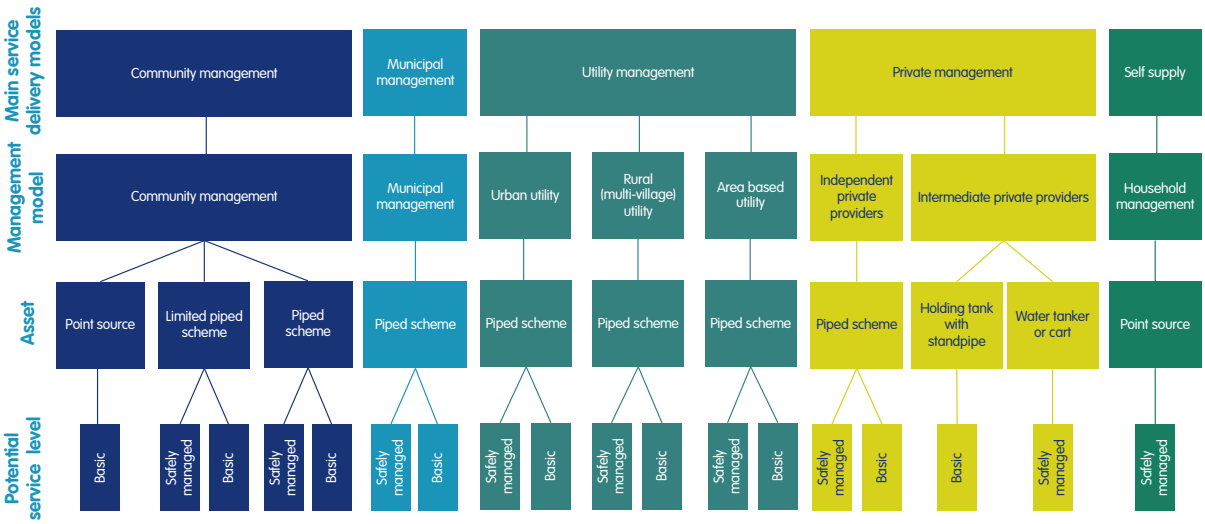


FIGURE 1: BROAD GROUPS OF WATER SERVICE DELIVERY MODELS

a. Utility management (urban, rural, or area based), with public standpipes and / or household connections.
b. Community-management (limited piped schemes, with standpipes and piped schemes, with public standpipes and / or household connections).
c. Private management, with independent service provider, managing a point source or piped scheme; and intermediate service provider, managing point sources or tanker truck sources, with water sourced from service providers under other service delivery models.
d. Institutional management of piped schemes, with public standpipes and / or household connections
e. Self-supply, with households themselves acting as investor and service provider of their own household water service.

The different Service Delivery Models (SDMs) tend to be applied in different types of settlements, depending on contextual factors such as the availability of water resources, geology, demography, and users' choice in the Western Region. A combination of these management models in slightly modified forms is managing water facilities in the region. The prominent types are GWCL, CWSA, institutional, community leaders, WSMTs (formerly known as WATSAN committees), private individuals and private organisations among others.

Management models describe how water service delivery is organised and managed. Service providers, which are part of the management model, are responsible for day-to-day management of water schemes and facilities. Service authorities support service providers. Management models describe the service provider's and the authority's roles, and who is responsible for what. Having clearly defined management (and service delivery) models is critical for ensuring sustainable, accountable and effective water supply (both in urban as well as in rural areas).

2.2. Service delivery models

This section presents the SDMs related to piped scheme water supply and handpump water supply.

2.2.1 Piped scheme service delivery models

Piped schemes include limited mechanised systems (LMS), community piped schemes, serving a population of 2000 people or less, and (small) town piped schemes, serving a population of more than 2000 people.

The total number of limited mechanised systems is 931, and the total number of piped schemes is 68.

The survey revealed that a range of different types of organisations and individuals are involved in providing piped water supply services in the Western Region, reflecting the diverse needs and circumstances of the population.

The different types of service providers who manage piped water supply schemes, along with the number of schemes managed by each type of provider are shown in Figure 2. As shown in the figure, the following piped scheme SDMs have been identified:

Utility management: Utilities are corporate entities directly responsible for providing water services to clients. They have professional (paid) operational and executive staff (Adank et al, 2022). In Western Region, the following utility models have been observed:

- GWCL, as the national utility, traditionally responsible for providing water services in urban areas, providing water services in Western Region through seven (7) schemes.
- CWSA, evolving from being a facilitator and supporter of community management towards (also) being a utility, providing water services directly to clients by having taken over management of some 15 schemes previously under community management.

Community management: Community management involves management of water facilities by a community committee, consisting of volunteers, elected by community members to manage water facilities and provide water services accordingly. In Western Region, the following community management models for piped scheme management have been observed:

- Water and Sanitation Management Teams (WSMTs), managing some 33 piped schemes and 341 LMSs. These Teams consist of an average of six (6) members, elected by the community, responsible for managing the scheme.
- Management of 139 LMSs and 3 piped schemes by community leaders.

Small Water Enterprises: Small Water Enterprises are institutions which are responsible for development, as well as professional management of water supply assets. They can be considered as utilities in the Western Region, the following Small Water Enterprises have been identified for a total of 50 piped schemes:

Private management: Private management involves the provision of water services by private individuals or private organisations or NGOs.

- Private individuals manage three (3) piped schemes and 278 LMS.
- Private organisations or NGOs manage three (3) piped schemes and 87 LMS.

Institutional management: This involves management of water systems by institutions such as health care facilities, religious organisations and schools. Some of these institutions make the piped scheme they manage available to the general public, and these are covered under this assignment. In Western Region, the following models have been identified:

- Religious institutions manage 22 LMS and one (1) piped scheme providing water services to the community;
- Schools manage some eight (8) LMS providing water services to the community;
- Health care facilities manage one (1) LMS and one (1) piped scheme providing water services to the community.

Other management: These are management types that could not be classified under the above categories. Seven LMSs fall into this category.

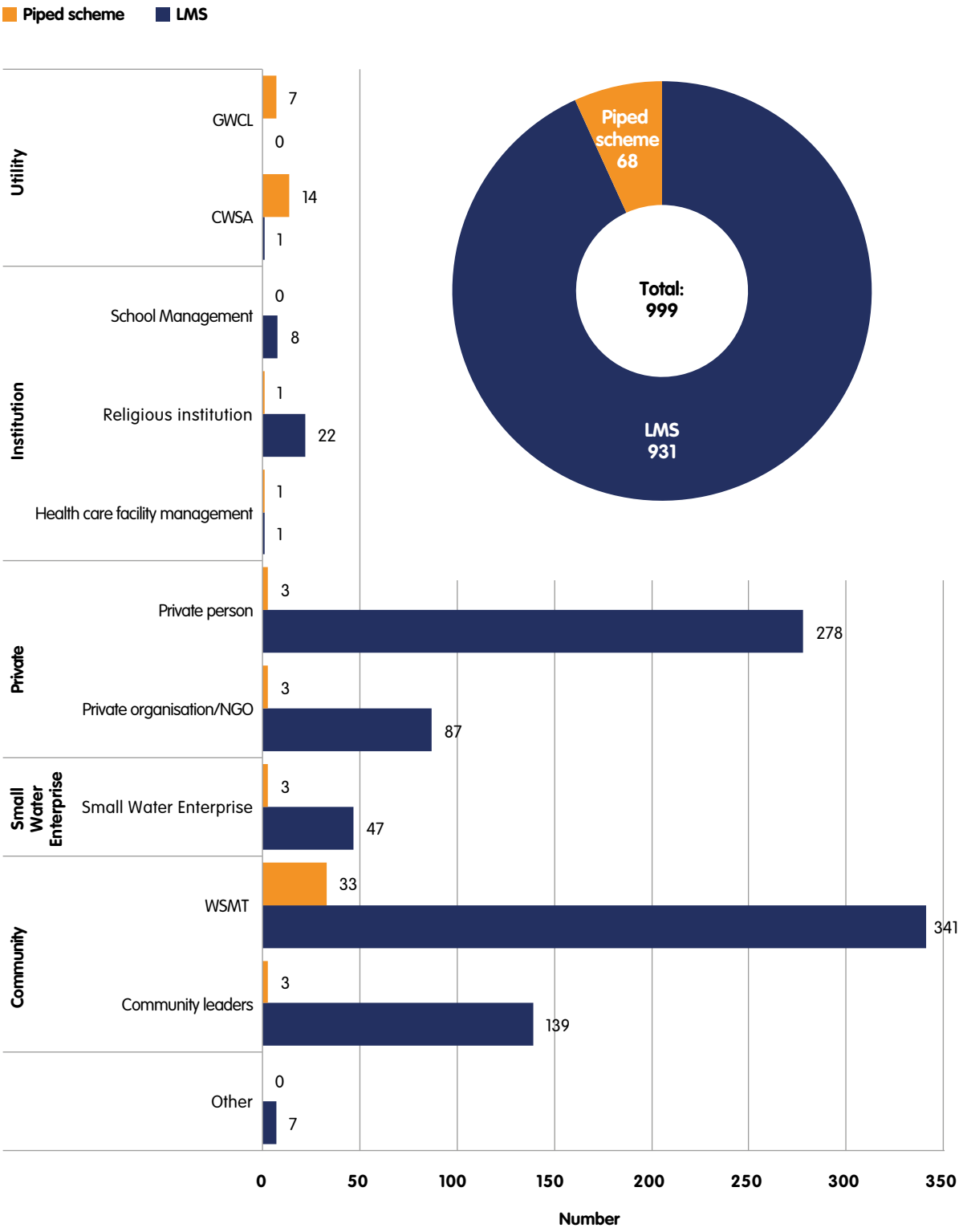


FIGURE 2: NUMBER OF SCHEMES UNDER DIFFERENT SDMS

The figure shows that there are a number of schemes being managed by individuals (278 by private persons, and 139 by community leaders) as opposed to WSMTs, utilities and NGOs which are expected to have governance structures in place.

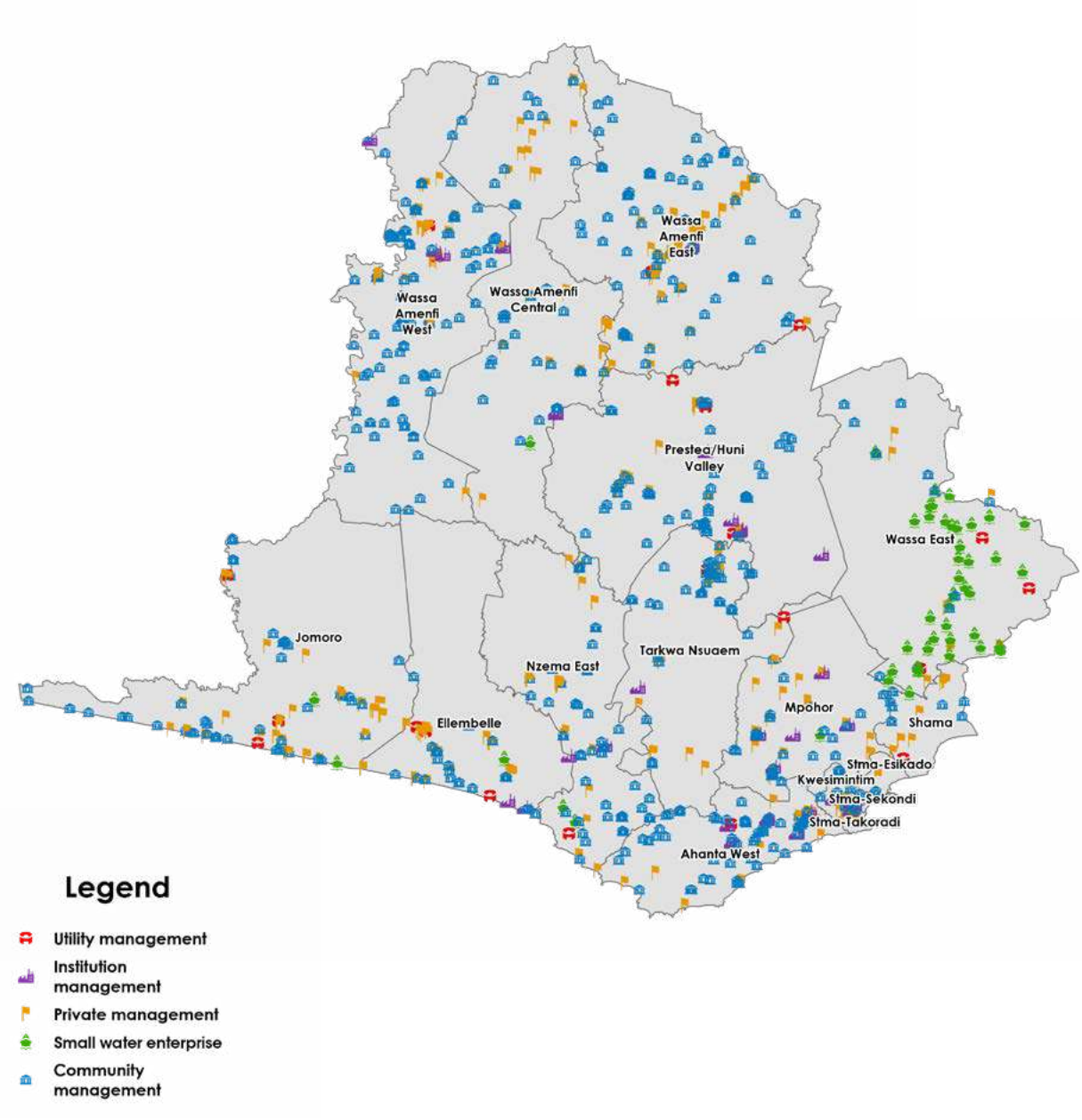


FIGURE 3: DISTRIBUTION OF SCHEMES UNDER DIFFERENT SDMS

The piped water system in the region is mostly managed by communities and private organisations, managing a total of 887 out of the 999 (88.8%) piped schemes. This trend is consistent across the district.

	Utility	Community	Small water enterprise	Private	Institution	Other
TOTAL	**22**	**516**	**50**	**371**	**33**	**7**
AHANTA WEST	1	61	0	18	6	1
EKMA	0	6	1	27	5	0
ELLEMBELLE	3	22	1	31	3	0
JOMORO	3	43	2	37	0	0
MPOHOR	0	26	1	17	5	0
NZEMA EAST	1	45	2	26	1	2
PRESTEA HUNI VALLEY	3	49	0	28	5	0
SEKONDI TAKORADI	0	12	0	10	0	0
SHAMA	1	6	0	12	0	0
TARKWA-NSUAEM	2	37	0	25	1	0
WASSA AMENFI EAST	3	69	0	74	1	3
WASSA AMENFI WEST	2	93	0	34	4	0
WASSA EAST	3	12	42	8	0	0

TABLE 1: DISTRIBUTION OF SCHEMES BY MANAGEMENT TYPE AND DISTRICT

2.2.2 Handpump service delivery models

Figure 4 shows that nine (9) out of 10 handpumps (92.5%) are managed by the community, with community leaders managing the most (1,323). WATSAN committees (also known as WSMTs) manage 409 handpumps, and Piped Scheme Water and Sanitation Management Teams (PS WSMT) manage 145 handpumps.

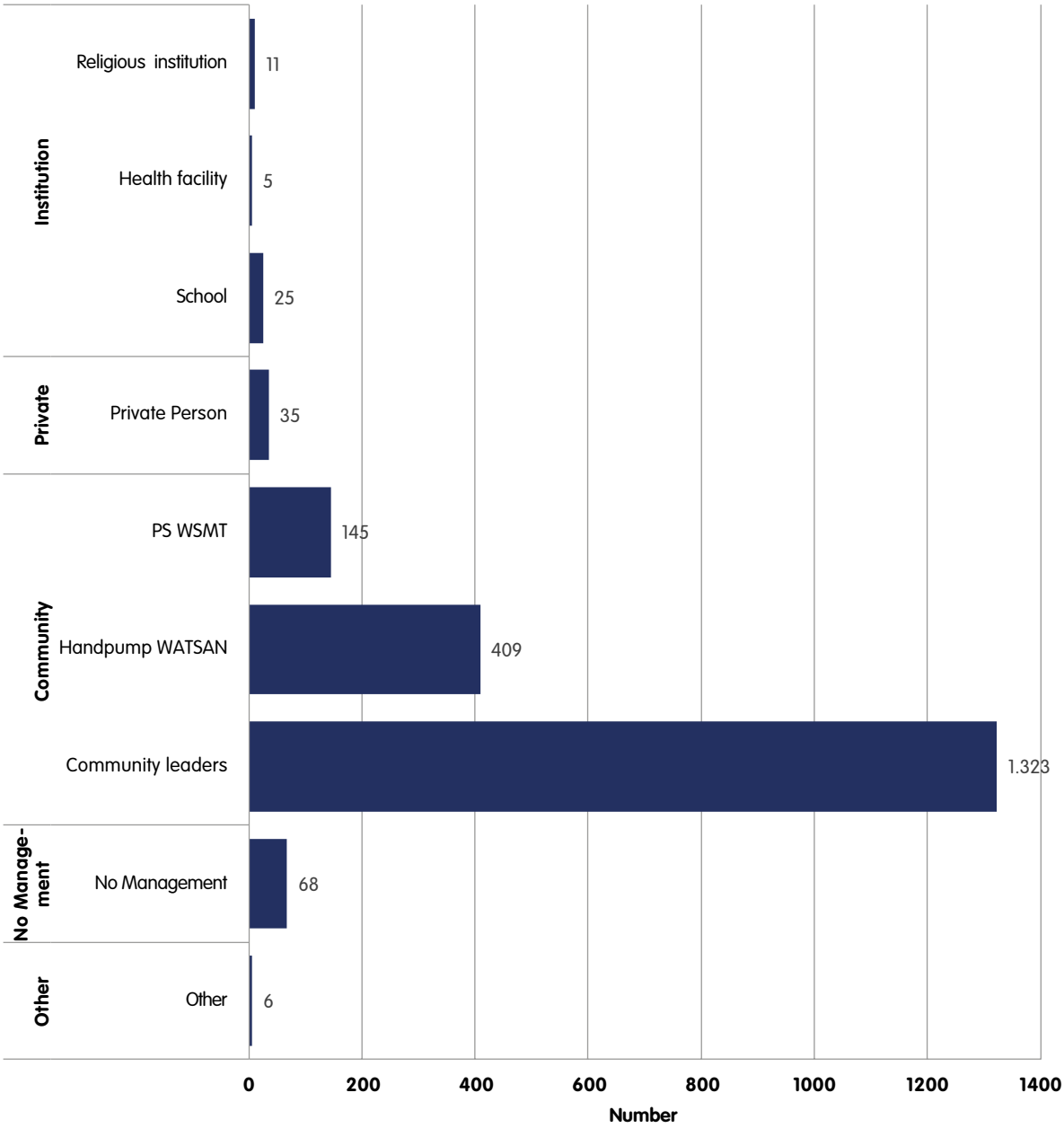


FIGURE 4: DISTRIBUTION OF HANDPUMPS BY MANAGEMENT MODEL AND SERVICE PROVIDER

DISTRIBUTION OF HANDPUMPS BY DISTRICT

Handpumps in the districts are mostly managed by the community (92.7%) with community leaders playing a key role. However, 3 percent (61) of handpumps are under no particular management type, which can have implications if there is a breakdown.

	Institution	Private	Community	No management	Other
TOTAL	**42**	**37**	**1881**	**61**	**6**
AHANTA WEST	0	2	200	6	1
EKMA	0	3	6	0	0
ELLEMBELLE	13	9	136	17	0
JOMORO	0	4	102	3	0
MPOHOR	2	4	60	9	0
NZEMA EAST	0	2	75	3	2
PRESTEA HUNI VALLEY	1	3	198	1	0
SEKONDI TAKORADI	3	0	15	2	0
SHAMA	2	0	45	0	0
TARKWA-NSUAEM	1	2	125	0	0
WASSA AMENFI CENTRAL	1	0	130	1	0
WASSA AMENFI EAST	3	2	293	0	1
WASSA AMENFI WEST	5	1	194	2	1
WASSA EAST	11	5	302	17	1

TABLE 2: DISTRIBUTION OF HANDPUMPS BY MANAGEMENT MODEL AND DISTRICT

2.3. Number of people served

2.3.1. Service levels

Water service level is the level of service provided to a household or community in terms of the source, quality, quantity, and reliability of water.

The Joint Monitoring Programme (JMP) uses a ladder of water service levels to classify them. The ladder has five rungs:

- Surface water - Drinking water directly from a river, dam, lake, pond, stream, canal or irrigation canal.
- Unimproved - Drinking water from an unprotected dug well or unprotected spring.
- Limited - Drinking water from an improved source for which collection time exceeds 30 minutes for a roundtrip including queuing.
- Basic - Drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing.
- Safely managed - Drinking water from an improved water source that is accessible on premises, available when needed and free from faecal and priority chemical contamination.

For the purposes of this report, the service levels captured are safely managed (people served by household connections), basic/limited (people served by public standpipes and handpumps) and underserved or unimproved. The categorisation is due to limitations in the data available in the mapping exercise.

According to the data by service levels, 11.0 percent of the population in the Western Region has access to safely managed water, while 77.0 percent have access to basic or limited services. The remaining 12.0 percent of the population are underserved or use an unimproved water source.

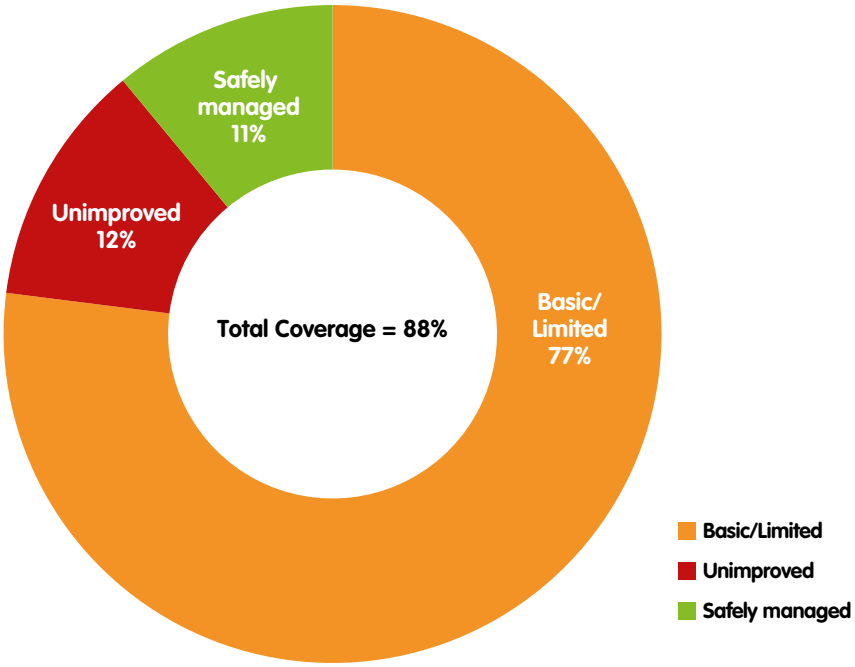


FIGURE 5: SERVICE LEVELS OF WATER INFRASTRUCTURE

2.3.2. People served by facility type

About 88 percent of the people in the Western Region, or 1,804,345 people, are served by handpumps and piped schemes as indicated in figure 8[1]. Of these, 80 percent, or 1,443,476 people, are served by piped schemes.

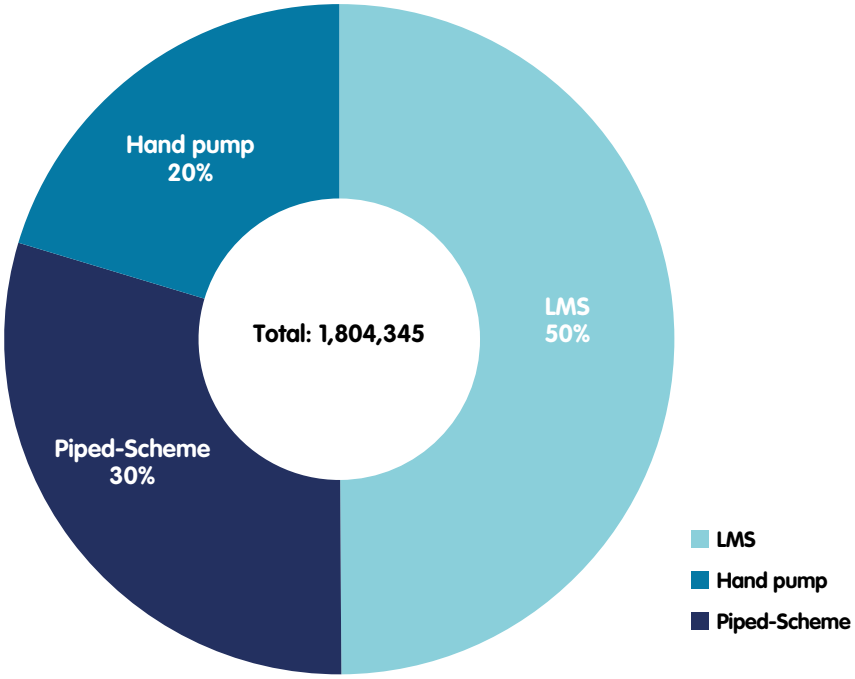


FIGURE 6: NUMBER OF PEOPLE SERVED BY FACILITY TYPE

2.3.3. People served by SDMs

Table 3 shows the number of people served by different piped schemes and handpumps in the Western Region per SDM.

A total of 288,452 people is served by utility managed piped schemes in the region.

- The GWCL-managed piped schemes, though fewer in number (7), serve a total of 190,433 people.
- The CWSA managed piped schemes serve a total of 98,019 people, which is 4.8 percent of the population.
- WSMTs managed piped schemes serve about 28.9 percent (595,559) of the population.
- Private persons and organisations serve 12.6% and 5.4% of the population, respectively.

The table also shows that the number of people served through household connections is highest under GWCL management (121,133), followed by WSMT management (84,959) and CWSA management (14,919).

1. People served is the number of people served by handpumps (functional handpumps X300) and the number of people served by piped schemes (functional standpipe spouts X300 + number served by household)

TABLE 3: NUMBER OF PEOPLE SERVED BY SDM

Management Model	Service Provider	Number of people served by household connection	Number of people served by standpipe spout/taps	Number of people served by handpump	Total number of people served	Proportion of people served by household connection	Proportion of total people served by standpipe spouts	Proportion of total people served by handpumps	Proportion of the population served
Utility	GWCL	121133	69,300	0	190,433	63.6	36.4	-	9.2
	CWSA	14919	83,100	0	98,019	15.2	84.8	-	4.8
Community	WSMT	84959	489,300	21,300	595,559	14.3	82.2	4	28.9
	Handpump WATSAN	0	0	80,400	80,400	-	0.0	100	3.9
	Community leaders	838	107,400	234,900	343,138	0.2	31.3	68	16.7
Small Water Enterprise	Small Water Enterprise	1214	51,600	0	52,814	2.3	97.7	-	2.6
Private	Private organisation/ NGO	2254	108,000	0	110,254	2.0	98.0	-	5.4
	Private person	1667	249,900	9,000	260,567	0.6	95.9	3	12.6
Institution	Religious institution	406	23,700	3,000	27,106	1.5	87.4	11	1.3
	Health care facility	205	1,200	1,500	2,905	7.0	41.3	52	0.1
	School	66	18,600	5,700	24,366	0.3	76.3	23	1.2
No Management	No Management	0	0	10,500	10,500	-	0.0	100	0.5
Other	Other	0	7,800	900	8,700	-	89.7	10	0.4
	Total	**227,660**	**1,209,900**	**367,200**	**1,804,760**	**12.6**	**67.0**	**20**	**87.6**

3. PIPED WATER SYSTEM

3.1. Introduction

Piped water systems are essential for providing people with access to safe and reliable water, which is essential for health, development, and economic growth. In the Western Region, the piped water system is managed by a variety of actors, including the Ghana Water Company Limited (GWCL), the Community Water and Sanitation Agency (CWSA), community Water and Sanitation Management Teams (WSMTs), and other private organisations and individuals.

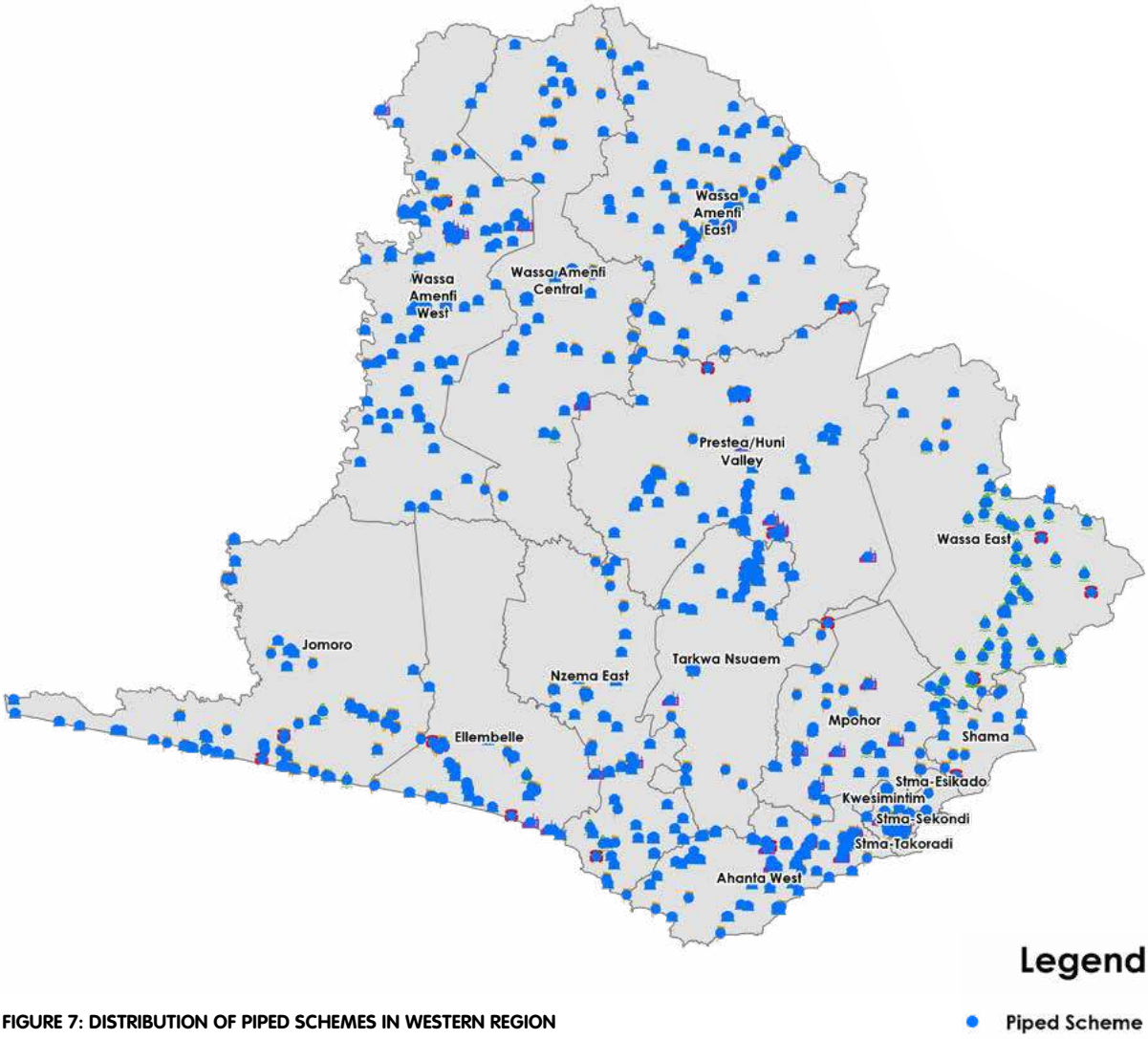


FIGURE 7: DISTRIBUTION OF PIPED SCHEMES IN WESTERN REGION

The piped water system in the Western Region is dominated by limited mechanised systems (LMS). These systems account for 93.2 percent of the 999 piped water systems in the region. The region has only 68 small town piped water schemes, which make up 6.8 percent of the piped water system.

Across the districts, the LMS is the predominant piped water system. It accounts for over 90 percent of the piped water systems in 12 out of the 14 districts in the region. Small town piped schemes occur most in Jomoro (18) and Ellembelle (10) districts, accounting for 41.2 percent of piped schemes in the region.

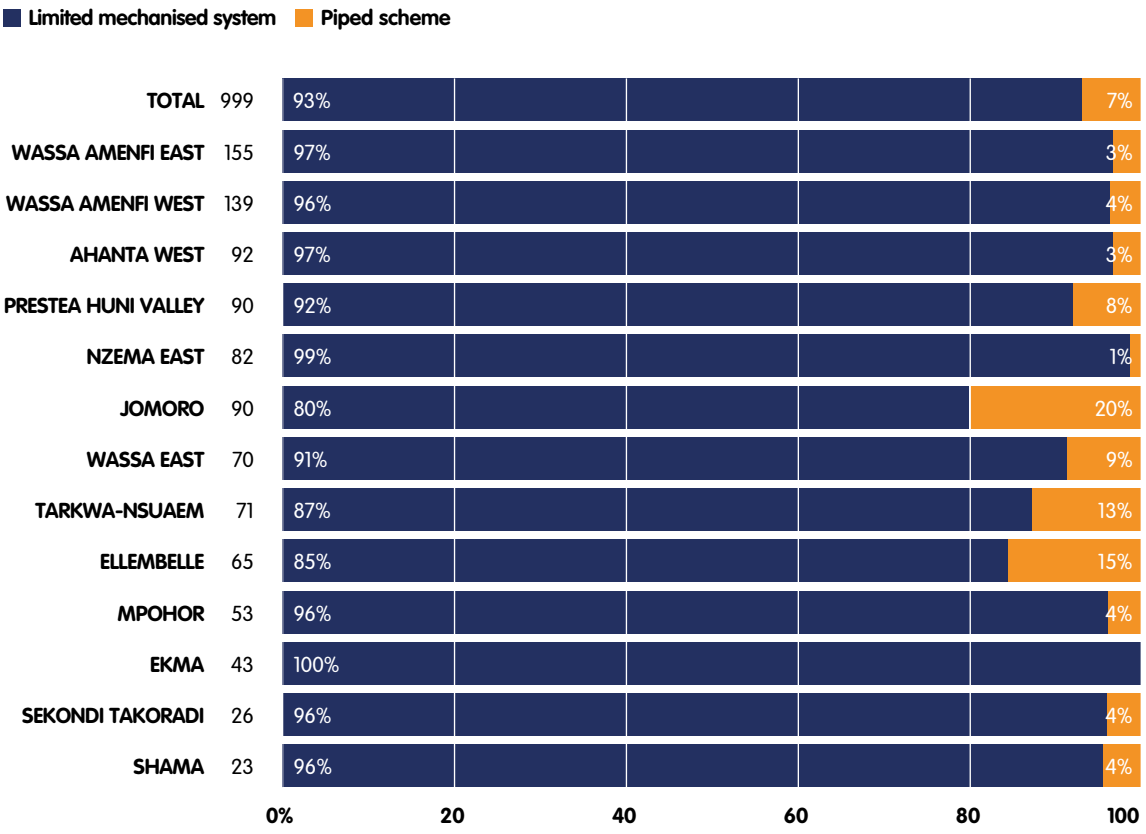


FIGURE 8: DISTRIBUTION OF PIPED SCHEMES BY DISTRICT

3.1.1. Source of water for piped schemes

The specific water sources used for piped schemes depend on factors such as geographical location, water availability, water quality, and the infrastructure available in a particular area. Figure 9 shows the source of water for piped schemes in the region. Over 95 percent of piped schemes in the region take their water from one borehole and close to three (3) percent of piped schemes take their water from multiple boreholes.

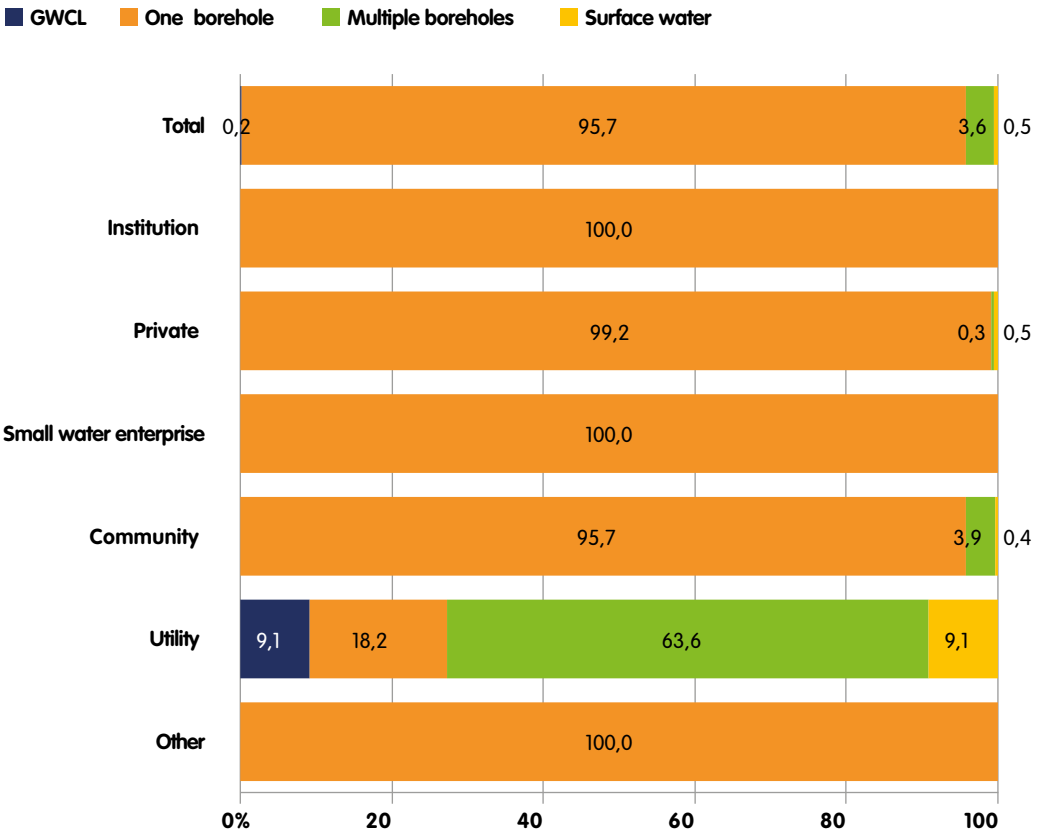


FIGURE 9: SOURCES OF WATER FOR PIPED SCHEMES BY SDM

3.1.1.1. Age of piped schemes

Figure 10 shows the age of piped schemes in the Western Region, by service providers of piped schemes. 16.1 percent of piped schemes are less than two years old, 47.5 percent are between two and five years old, and 17.8 percent are over 10 years old. All GWCL and CWSA piped schemes are over six years old, and 71.4% of GWCL piped schemes and 73% of CWSA piped schemes are over 10 years old.

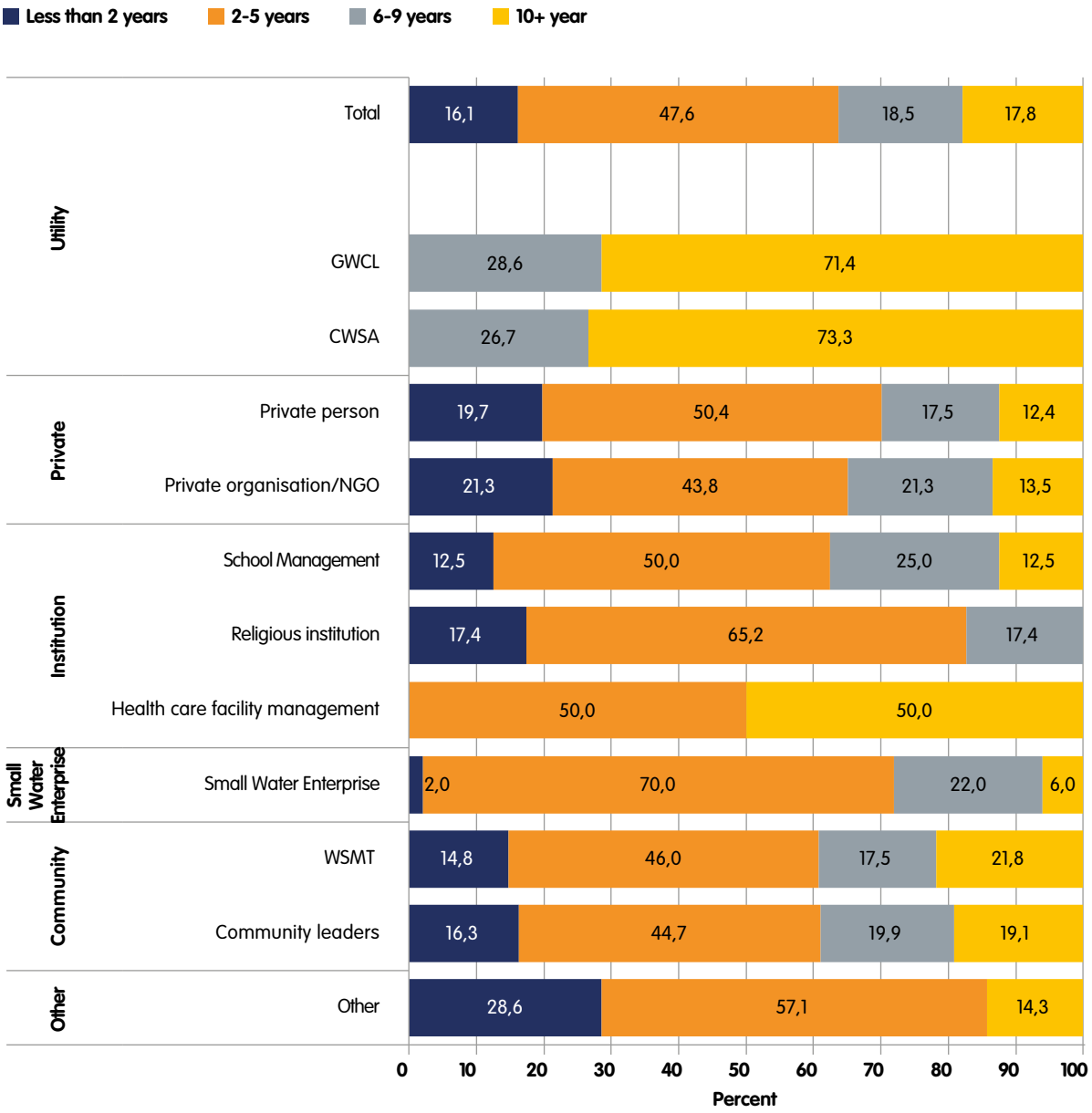


FIGURE 10: AGE OF PIPED SCHEMES

3.2. Funding of water facilities

The funding of water facilities can come from a variety of sources, including government, development partners, non-governmental organisations, private sector companies, and private individuals. Figure 11 shows the various types of entities that have funded piped schemes in the Western Region. This information is important to understand the sources of funding for such projects and the stakeholders involved in providing access to clean water and sanitation in the region.

The survey revealed that private individuals (36%), development partners (DPs) (19%), and NGOs and companies (12%) are the leading funders of many of the piped schemes in the districts. Governments account for only 7 percent of funding for piped schemes. However, piped schemes under the management of utility players are funded by DPs (55%) and government (45%).

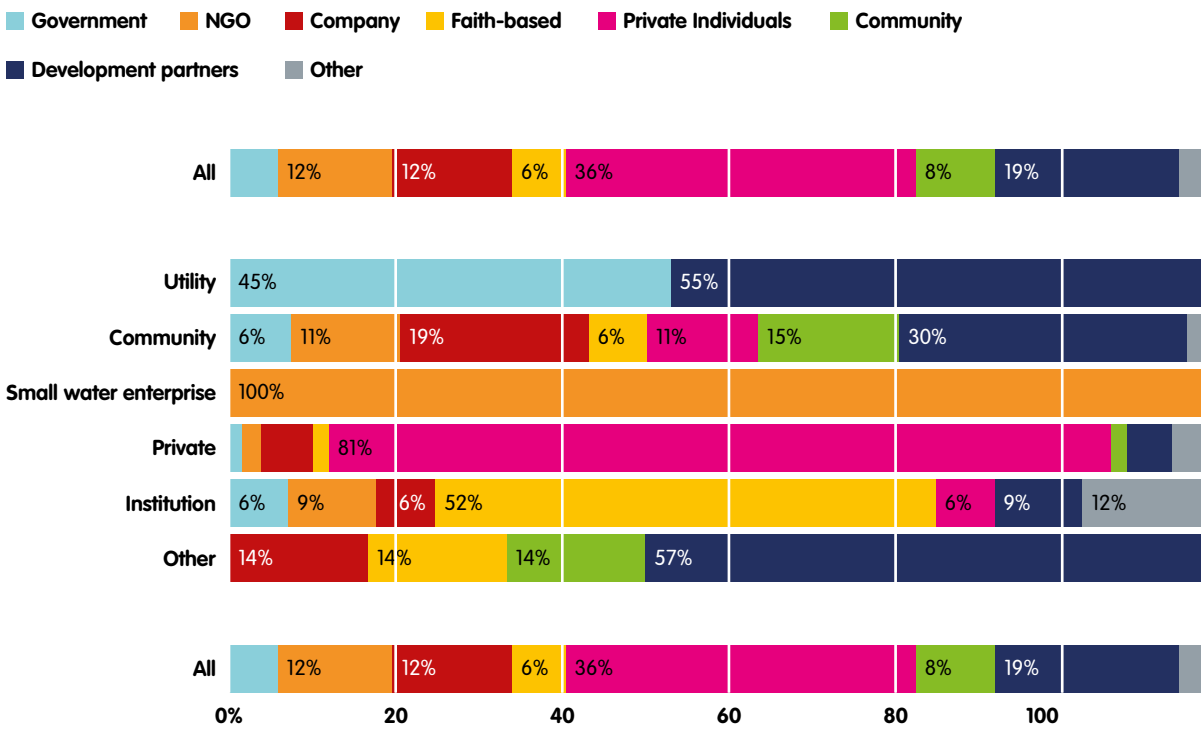


FIGURE 11: FUNDERS OF PIPED SCHEMES IN THE REGION

The financing of piped water schemes is similar across all districts, with private individuals, development partners (DPs), companies, and NGOs all contributing. In eight (8) out of 14 districts, private individuals provide more than 40 percent of the funding, while in the remaining districts, they provide about 40 percent. DPs are the second-largest funders, providing more than 15 percent of the funding in most districts. Government funding is low in many districts, with the highest level of government funding occurring in Jomoro district, which accounts for 15 percent of the funding.

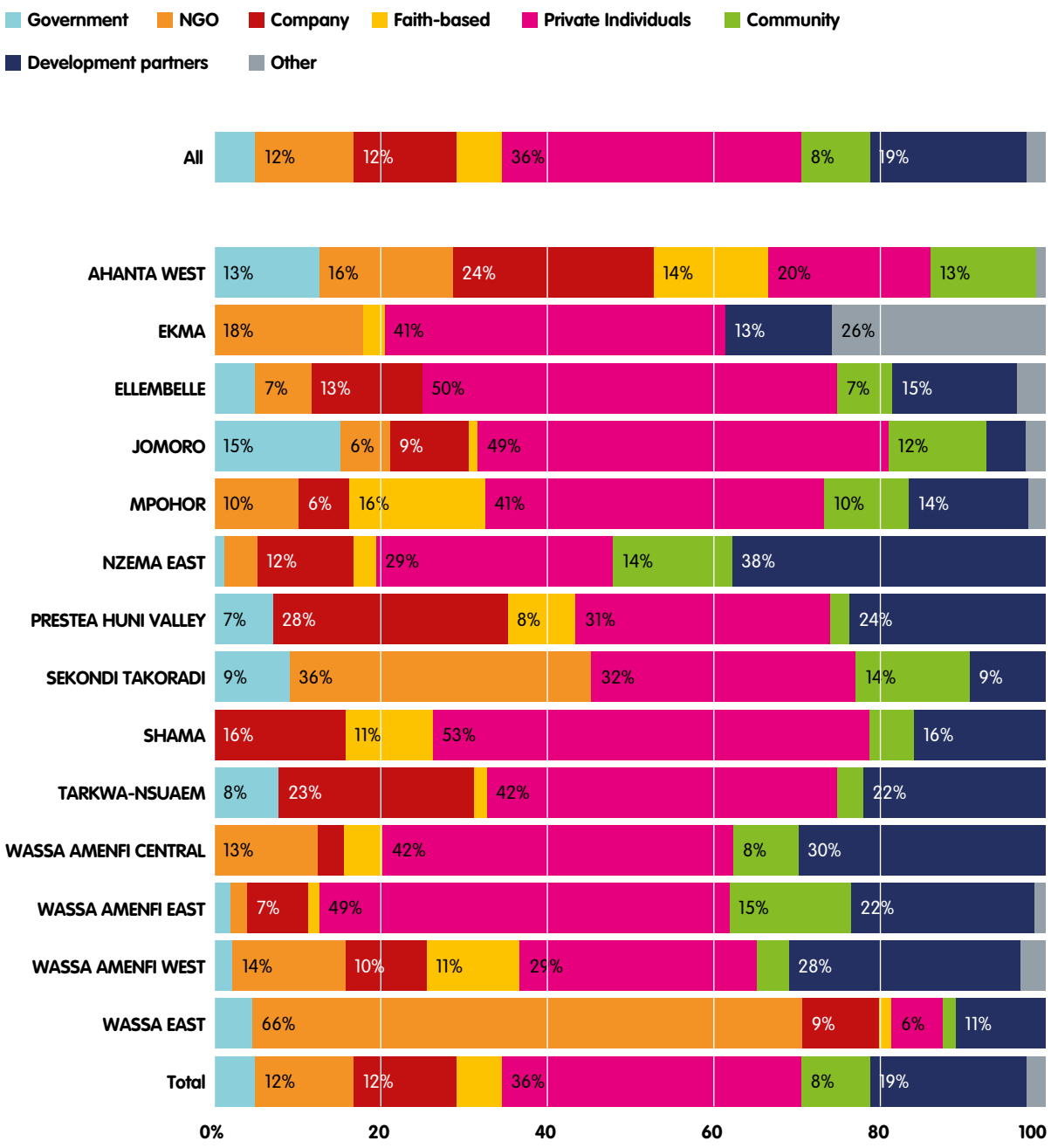


FIGURE 12: FINANCIERS OF PIPED SCHEMES BY DISTRICT

3.3. Number of connections

Collecting and managing data on user connections of piped water is essential for the effective management of water delivery schemes. This data can be used to optimise the system, plan for maintenance, detect leaks, forecast demand, provide customer service, and respond to emergencies. By using this data, managers can ensure efficient water distribution, reduce losses, plan for future needs, provide accurate billing, respond efficiently to emergencies, and determine coverage. Overall, data management plays a key role in providing a reliable and sustainable water supply for the community.

Piped schemes under utility management have the highest number of connections per scheme, with GWCL having 6,258 connections and CWSA having 312. This is closely followed by piped schemes managed by the community, with WSMTs having 69 connections. Table 4 shows all the details on connections and various types of users.

Household connections to piped schemes are higher among utility-managed and small town WSMT-managed piped schemes, accounting for more than 80 percent of total connections to piped schemes.

TABLE 4: NUMBER OF CONNECTIONS BY TYPE OF MANAGEMENT MODEL

Mgt. Model	Mgt. type	Institutional	Household	Commercial	Other	Total	Number of schemes	Average number of connections per scheme
Utility	CWSA	124	4,521	33	-	4,678	15	312
	GWCL	75	36,707	7,025	2	43,809	7	6258
Institution	Health care facility management	1	62	-	-	63	2	32
	Religious institution	6	123	-	1	130	23	6
	School Management	4	20	-	13	37	8	5
Private	Private organisation/ NGO	43	683	1	3	730	90	8
	Private person	4	505	4	2	515	281	2
Small Water Enterprise	Small Water Enterprise	28	368	4	1	401	50	8
Community	Community leaders	3	254	4	-	261	142	2
	WSMT	46	25,745	9	5	25,805	374	69
Other	Other	-	-	-	-	-	7	0
	Total	**334**	**68,988**	**7,080**	**27**	**76,429**	**999**	**77**

3.4. Functionality status of standpipes

Standpipes connected to piped schemes provide a reliable and convenient water source for drinking, cooking, and other domestic uses. The functionality of these standpipes at any point in time is critical if they are to serve their intended purpose of water supply to the community.

3.4.1. Functionality status of standpipes connected to piped schemes under different SDMs

The functionality of the standpipe connected to piped schemes may be influenced by its Service Delivery Model. GWCL-managed standpipes (61.3%) are the least functional, followed by community-managed (26.6%) and health-managed (65.0%). Efficient management reduces downtime and improves functionality.

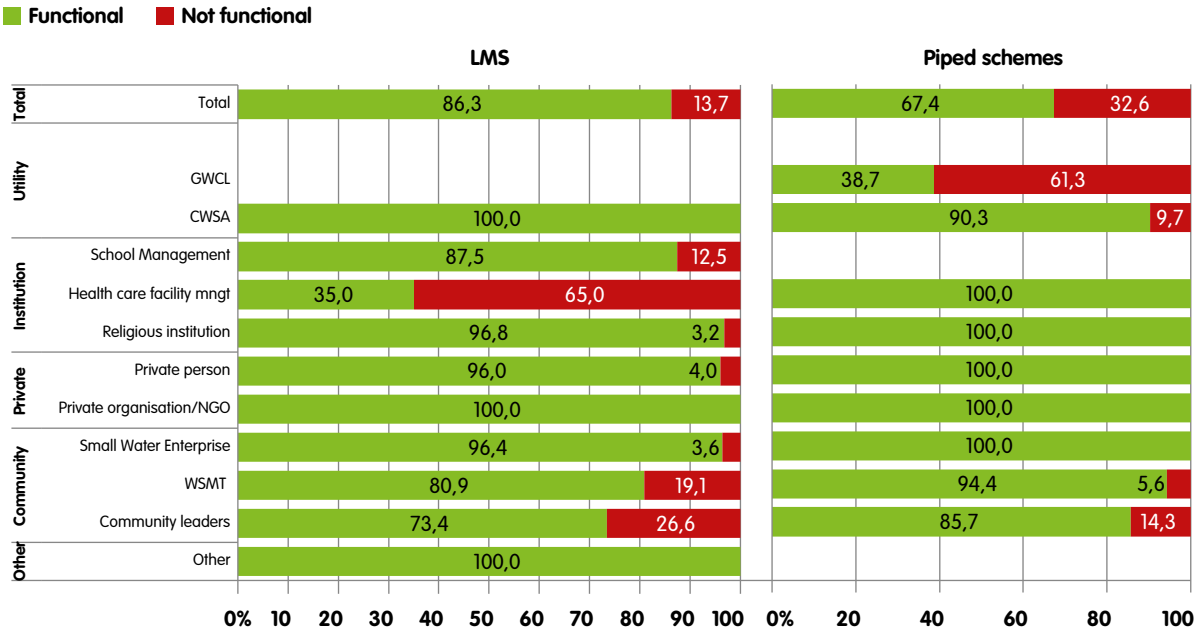


FIGURE 13: FUNCTIONALITY STATUS OF STANDPIPES BY SDM

More than three-quarters (75%) of the standpipes are functional in 12 out of 14 districts. Shama district recorded the highest (92%) proportion of non-functional standpipes followed by Mpohor district where 46 percent of standpipes are not functioning.

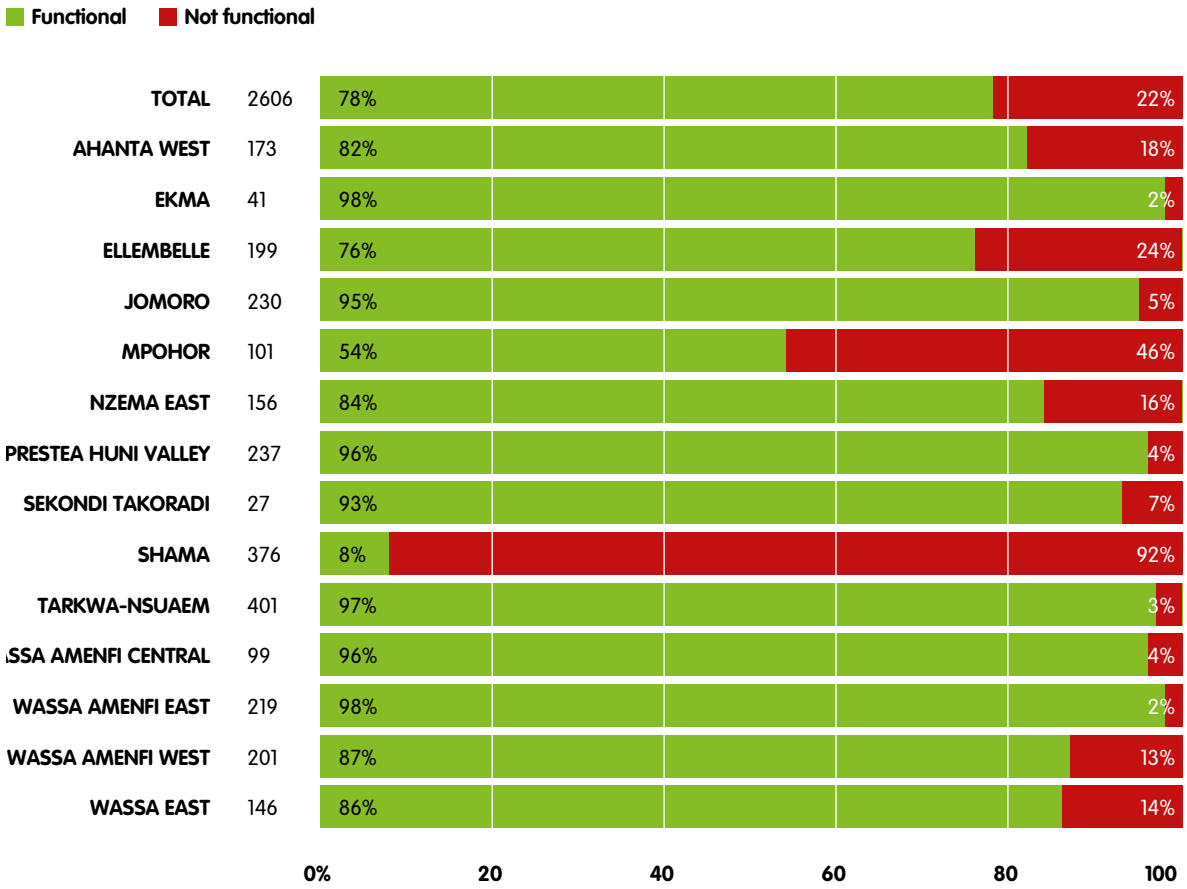


FIGURE 14: FUNCTIONALITY STATUS OF STANDPIPES BY DISTRICT

3.5. Reasons for non-functionality of standpipe

Of the standpipes that were not functional at the time of the visit, 27.8 percent were due to the non-functionality of the piped schemes they are connected to, and 26.1 percent were due to the rotation of water turns. Other reasons included standpipes being broken down, no vendor present, and water not reaching the standpipe.

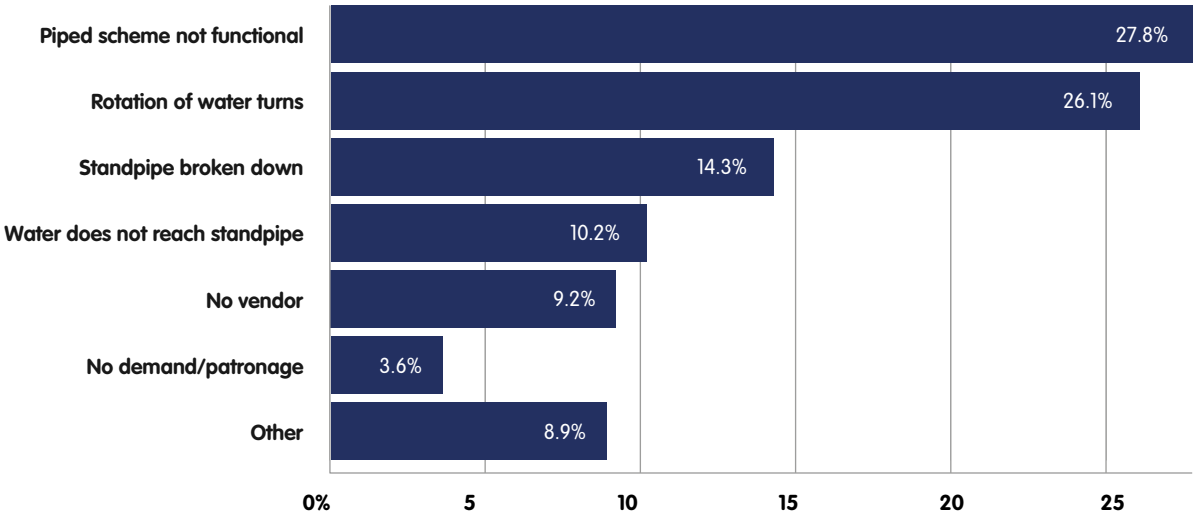


FIGURE 15: REASONS FOR NON- FUNCTIONALITY OF STANDPIPE

3.6. Payment for use of a standpipe

Figure 16 shows the different payment regimes for the use of standpipes under different management units. The following are key takeaways from the figure:

- Community-managed standpipes: 50% of standpipes under the management of community leaders do not require payment for water.
- School-managed standpipes: 93.8% of standpipes under the management of schools do not require payment for water.
- WSMT standpipes: 22.2% of standpipes under the management of small town piped scheme WSMTs do not require payment for water.
- Utility-managed standpipes: All standpipes under the management of GWCL and CWSA (public water utilities) require payment for water (pay as you fetch).
- Private or Small Water Enterprise-managed schemes: More than 75% of standpipes for schemes under private or Small Water Enterprise management require payment for water.

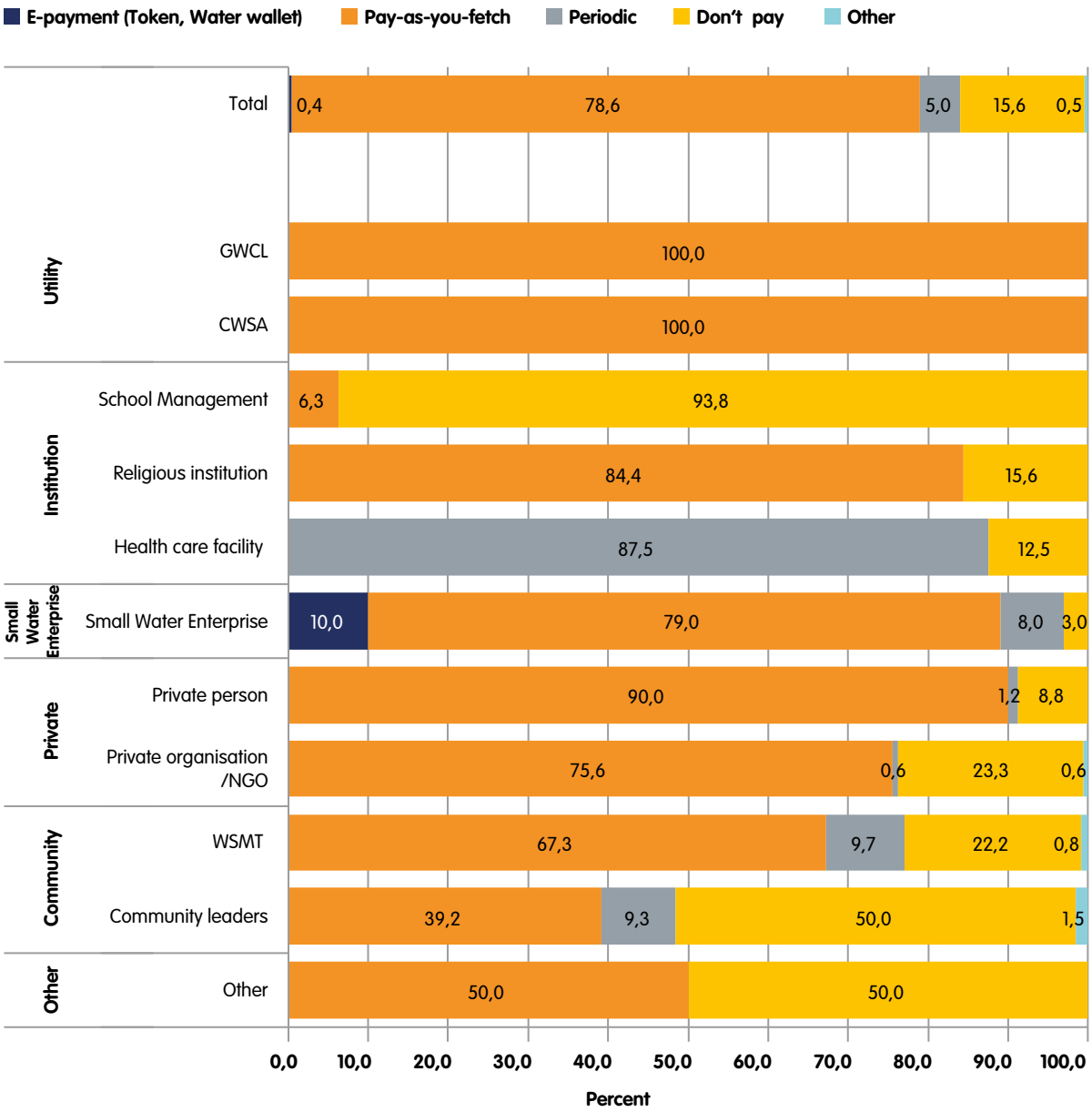


FIGURE 16: PAYMENT FOR USE OF STANDPIPE BY SERVICE PROVIDER

In the districts, most standpipes require payment for water. However, in Mpohor, Wassa Amenfi West, Ahanta West, and Sekondi Takoradi, more than 40% of standpipes do not require payment, which is significantly higher than the regional average of 15.6 percent.

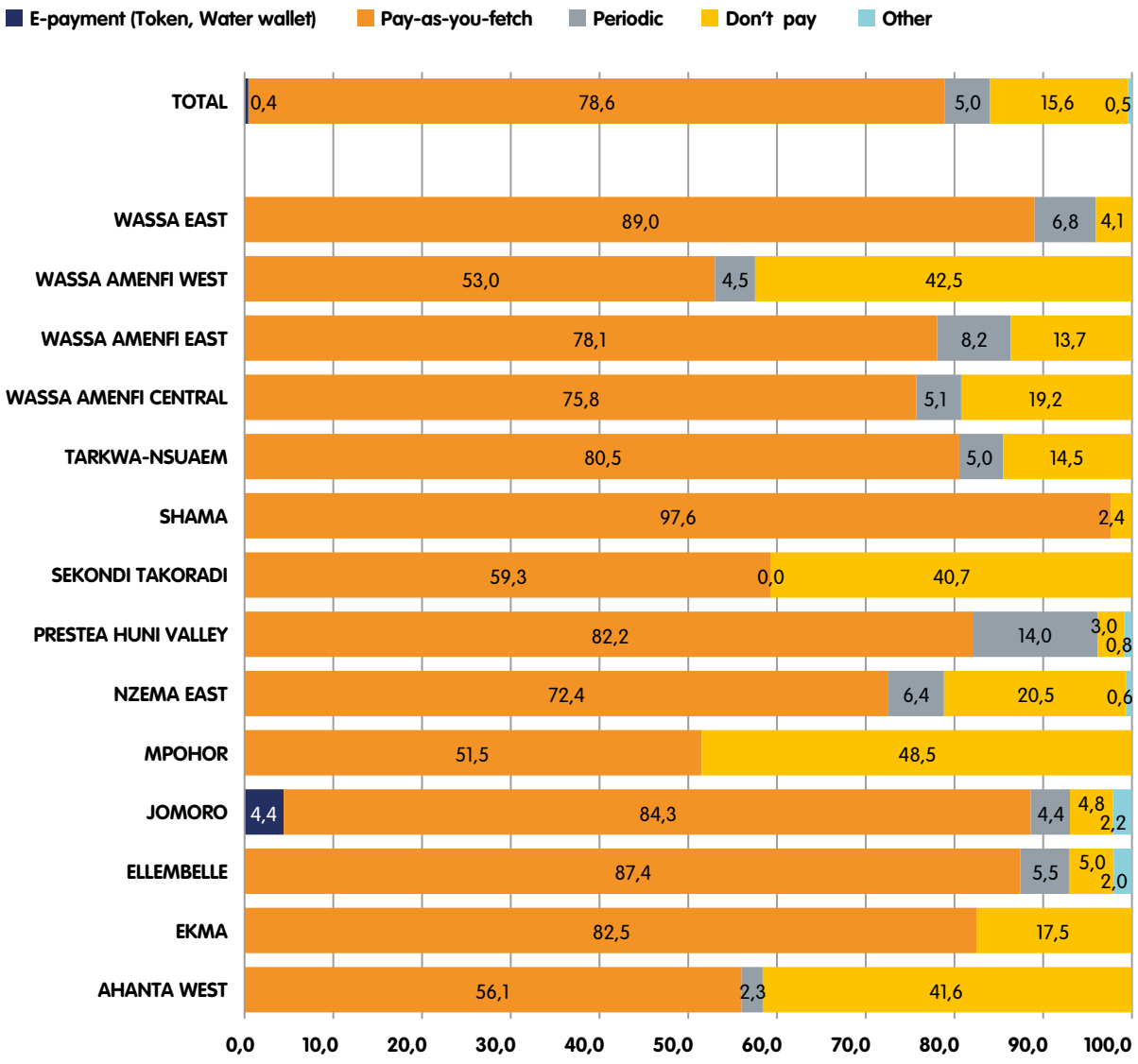


FIGURE 17: PAYMENT FOR USE OF STANDPIPE BY DISTRICT

3.7. Water quality testing

Water quality testing is an important part of ensuring that rural water is safe to drink. It involves testing the water for a variety of contaminants, including bacteria, viruses, parasites, chemicals, and heavy metals.

3.7.1. Frequency of testing

The frequency of water quality testing in rural areas varies and depends on the source of the water and the risks of contamination. In general, water quality testing should be conducted at least once a year in rural areas. However, more frequent testing may be necessary in areas with a higher risk of contamination.

According to Figure 18, 40.2 percent of piped schemes in the Western Region only test their water during construction, while 16.9 percent test yearly and 12.7 percent test monthly. Water from piped schemes managed by GWCL is tested daily, while CWSA-managed schemes are usually tested yearly (62.5%). Most piped schemes under private, institutional, and community management are only tested during construction, which is contrary to the standard of testing water at least once a year.

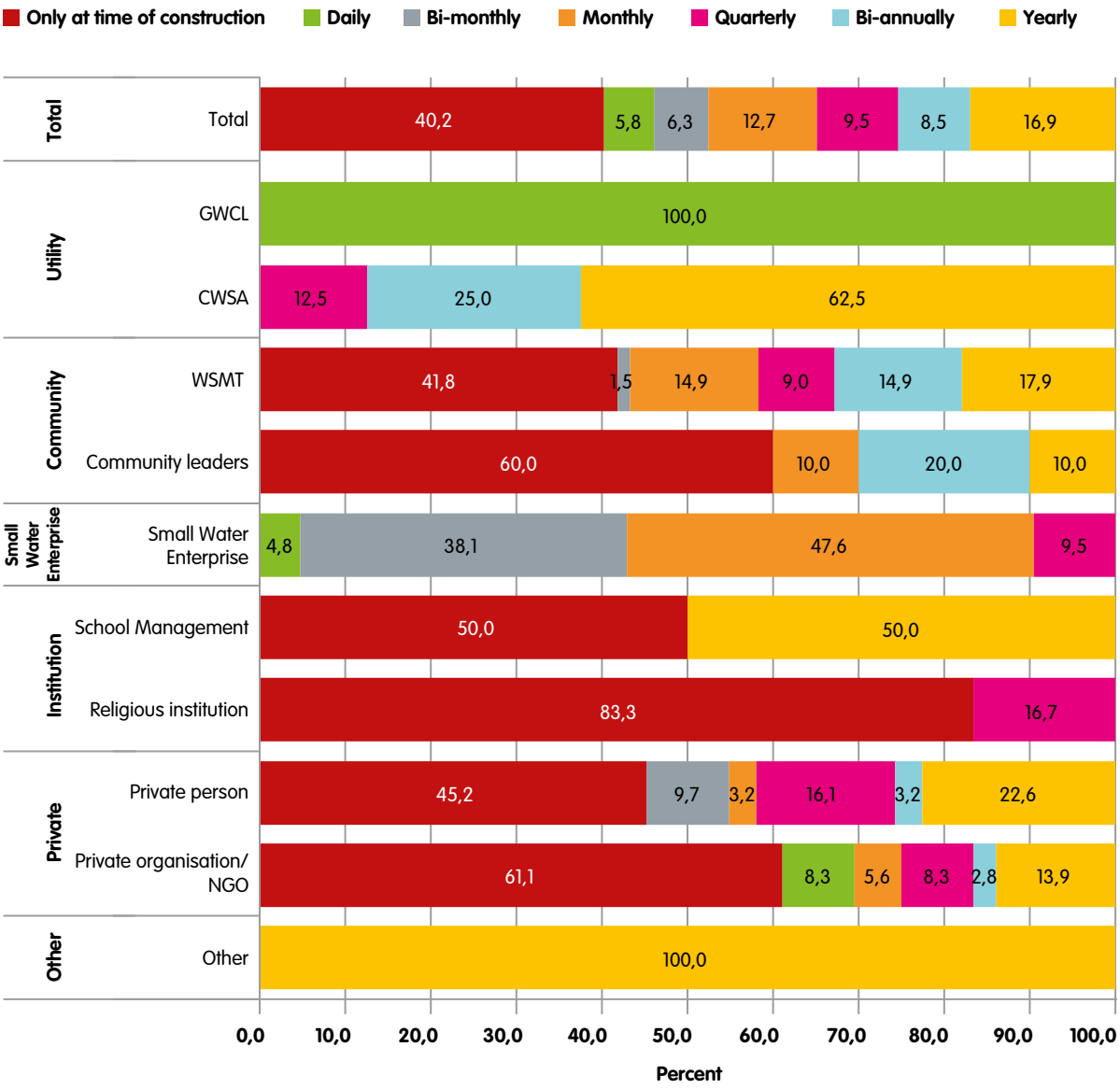


FIGURE 18: FREQUENCY OF WATER QUALITY TESTING BY SERVICE PROVIDER

3.7.2. Water testing body

There are a number of water quality testing bodies for rural water, such as Ghana Water Company Limited (GWCL), the Water Resource Institute (WRI), Ghana Standard Board (GSB), KNUST Lab, SGB, WVI, and others.

The mapping exercise sought to determine who undertakes water quality testing at piped schemes where testing is actually taking place. The results show that 71.4 percent of the testing was done by certified institutions, while 18.5 percent was carried out by the piped schemes themselves. About 50.0 percent of piped schemes managed by private organisations or NGOs carried out water quality testing themselves, while 29.0 percent of privately managed piped schemes also carried out water testing themselves. Thirty-three percent of piped schemes managed by Small Water Enterprises carried out water quality testing through other organisations than certified institutions.

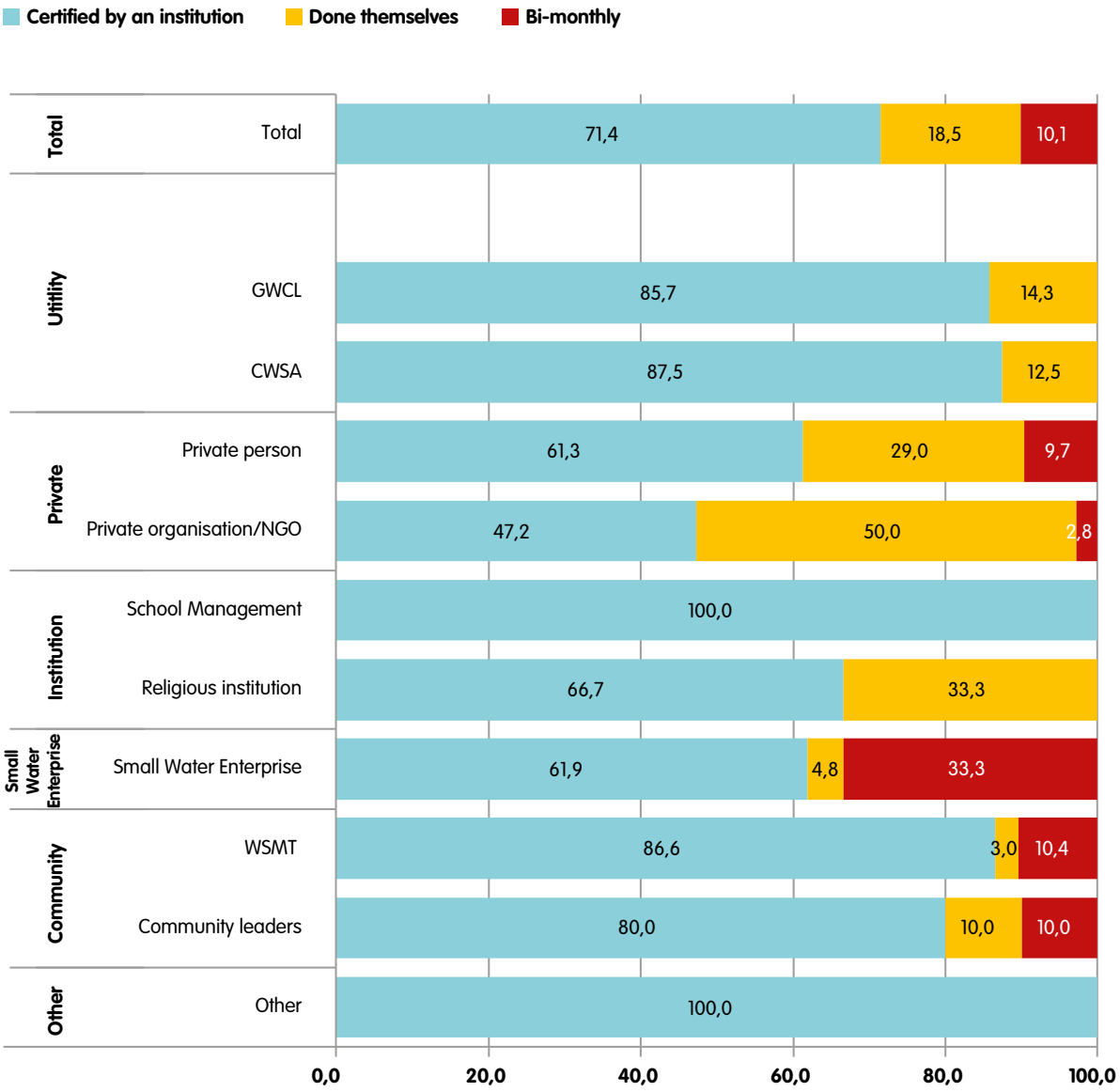


FIGURE 19: POINTS OF WATER QUALITY TESTING BY SERVICE PROVIDER

3.7.3. Quality of water by service provider

The quality of the water provided by piped schemes is an essential aspect of the service level. Access to safe and clean water is crucial for human health, and the quality of water provided by piped schemes is a critical factor in determining the level of service that a community receives.

To measure the quality of water provided by piped schemes, the World Health Organization (WHO) and the United Nations Children's Fund (UNICEF) have established water quality standards, which include parameters such as microbiological, chemical, and physical characteristics of the water. These standards protect people by limiting the levels of contaminants and other substances in drinking water. The results the test conducted by the service providers prior to the survey was accessed and categorised into two (Acceptable and Not acceptable) based on quality standards by the WHO and UNICEF.

The water quality of 93.7 percent of the piped schemes was generally acceptable. However, the water quality from piped schemes managed by CWSA was not as good, with 25 percent of these schemes having water quality that was not acceptable.

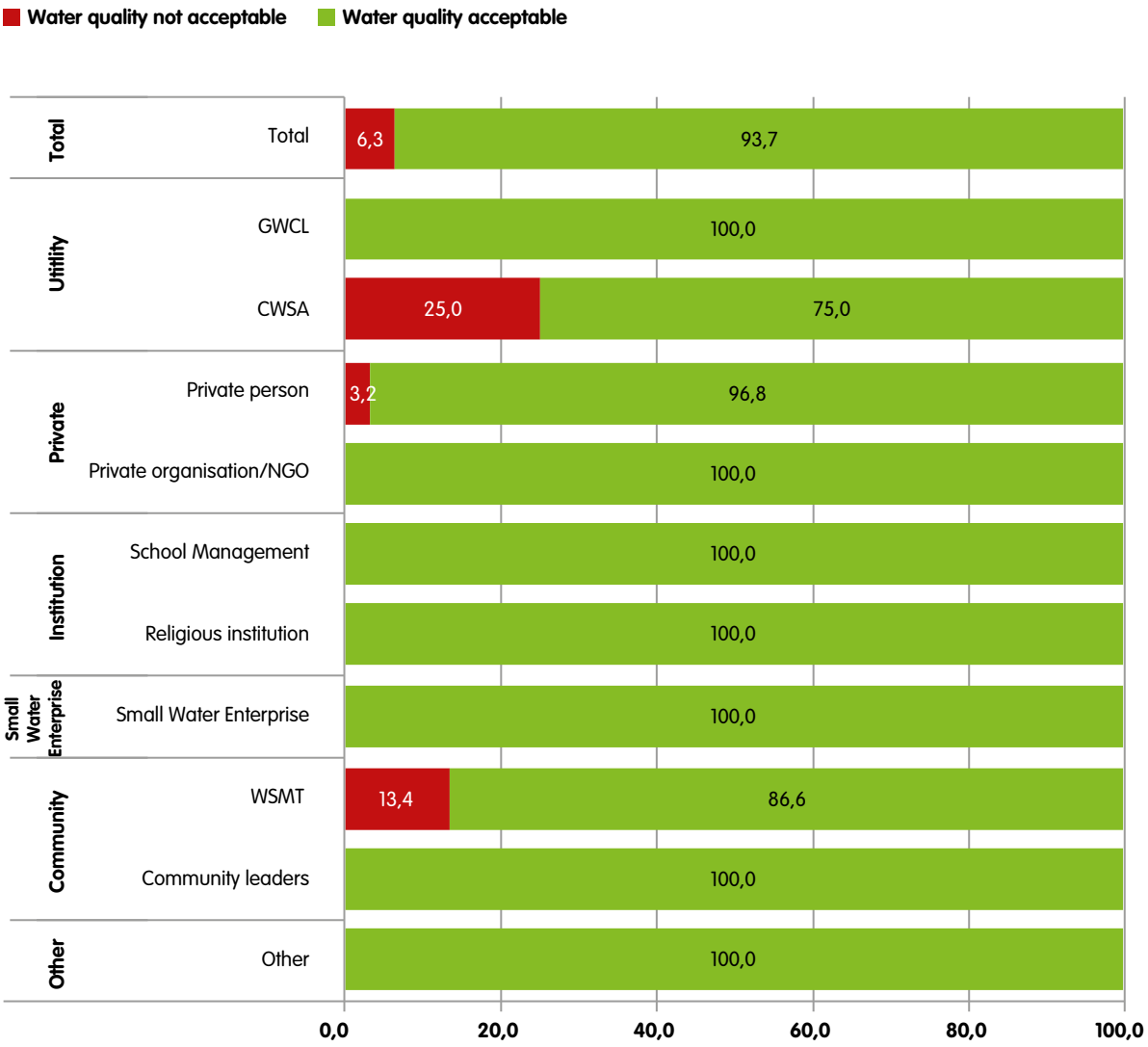


FIGURE 20: WATER QUALITY LEVEL BY SERVICE PROVIDER

3.7.4. Quality of water by district

In the districts, the water quality level for most (93.7%) piped schemes was acceptable, except for Wassa Amenfi East, where about a third (33.3%) of piped schemes had water that was not of acceptable quality. The other districts with water quality levels that were not acceptable and scored above 10 percent were Ellembelle (16.7%) and Wassa Amenfi Central (14.3%).

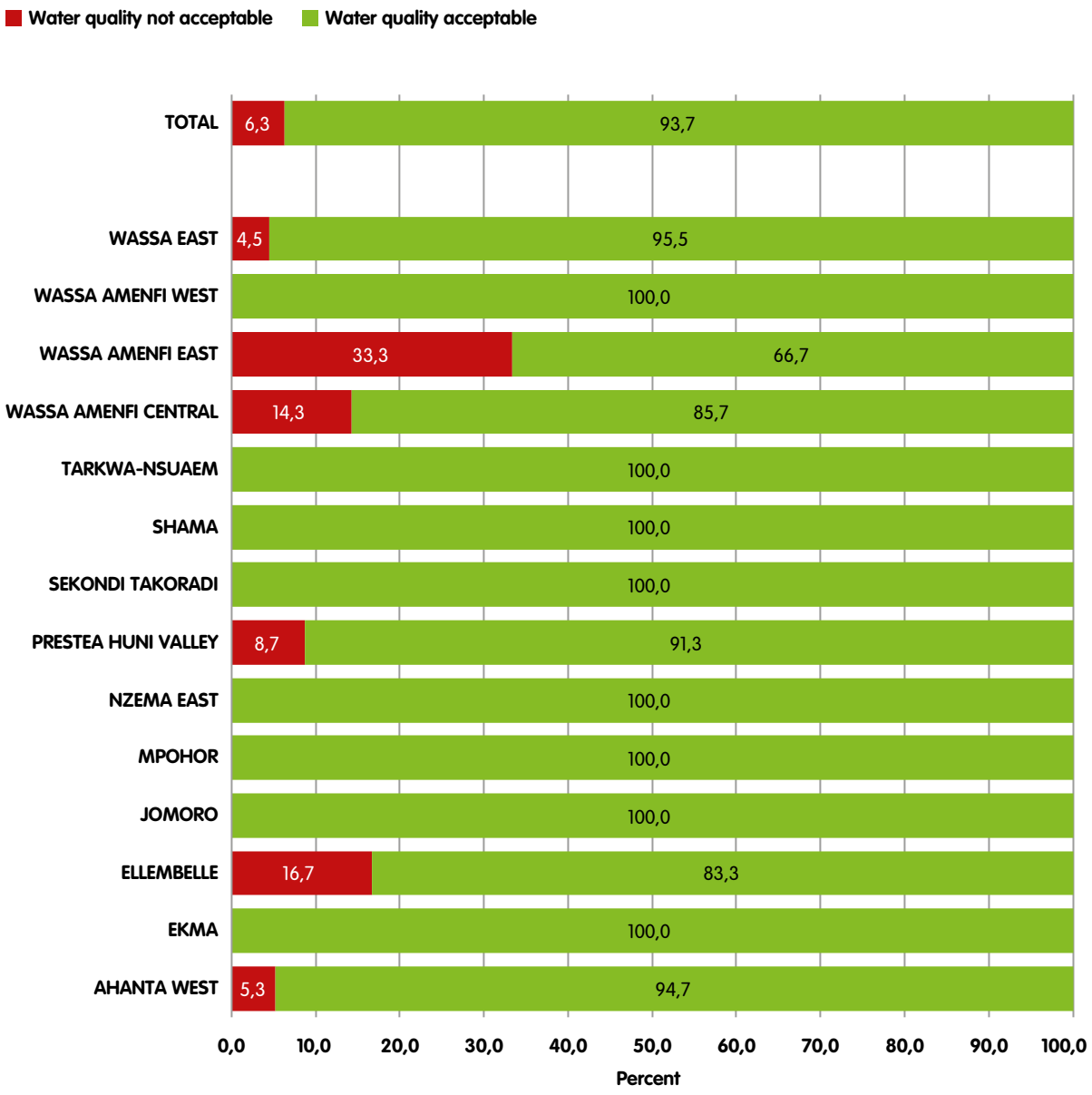


FIGURE 21: WATER QUALITY LEVELS BY DISTRICT

3.8. Reliability of piped schemes

The reliability of piped schemes is a measure of how often the water supply is available and how consistent the water quality is. It is important for piped schemes to be reliable in order to ensure that people have access to safe and clean water.

3.8.1. Reliability by service provider

According to Figure 22, piped schemes managed by utilities, such as GWCL (100%) and CWSA (73.3%), and piped schemes managed by Small Water Enterprises (84.0%) have the highest reliability status. Piped schemes under school (62.5%) and health care facility (100%) management are highly unreliable in terms of supplying water to consumers. Piped schemes under community management also show higher unreliability levels, with WSMTs (48.7%) and community leaders (45.8%) having the lowest reliability status.

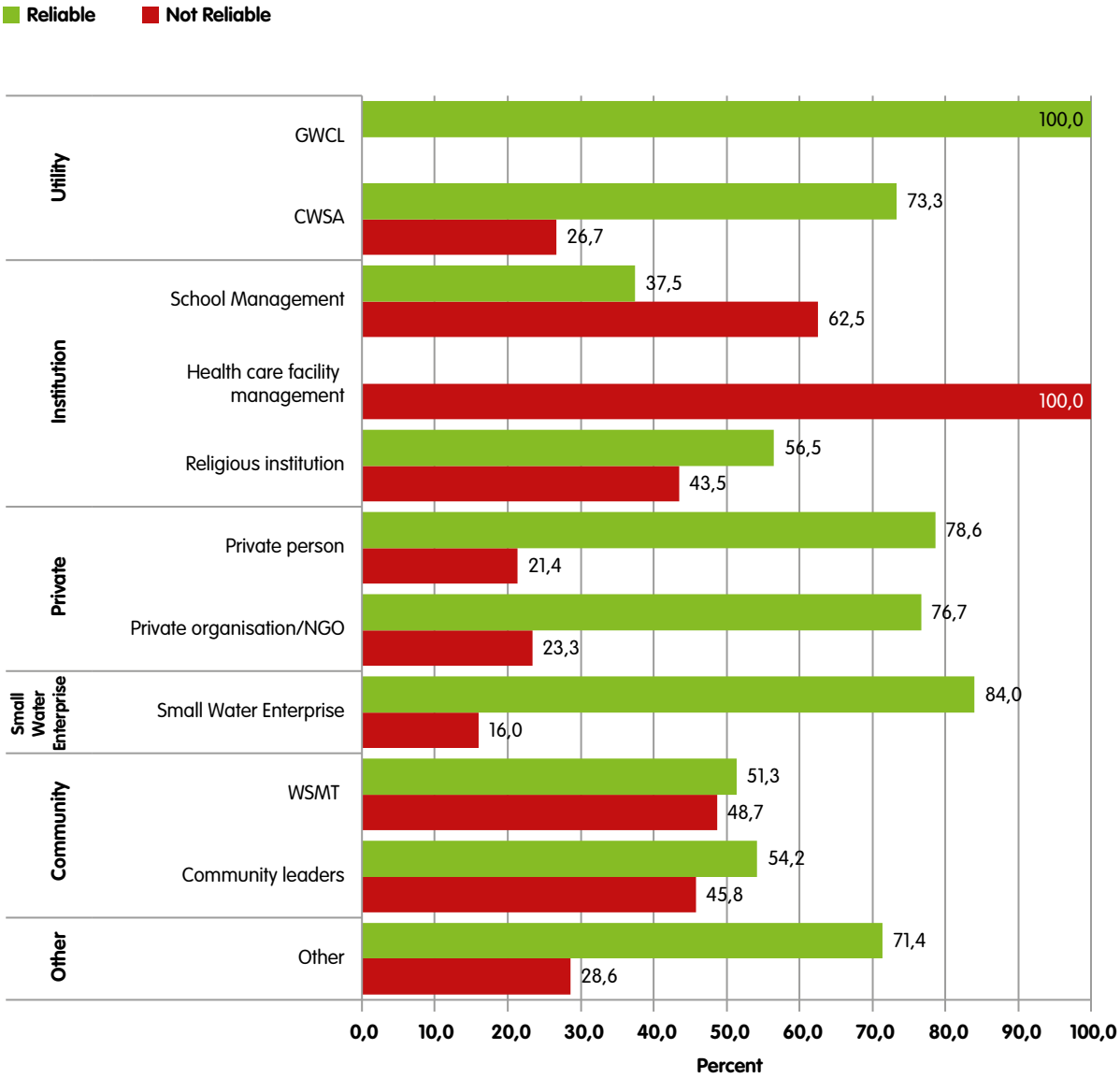


FIGURE 22: RELIABILITY STATUS OF PIPED SCHEMES BY SERVICE PROVIDER

3.8.2. Reliability of piped schemes by district

The reliability of piped schemes varies across districts in the Western Region. Six out of 14 districts recorded reliability levels above the regional figure of 64.1 percent, with Wassa Amenfi Central recording the highest at 81.3 percent. More than half of the piped schemes in Nzema East (55.8%), Ahanta West (54.0%), and Tarkwa-Nsuaem (53.1%) are not reliable.

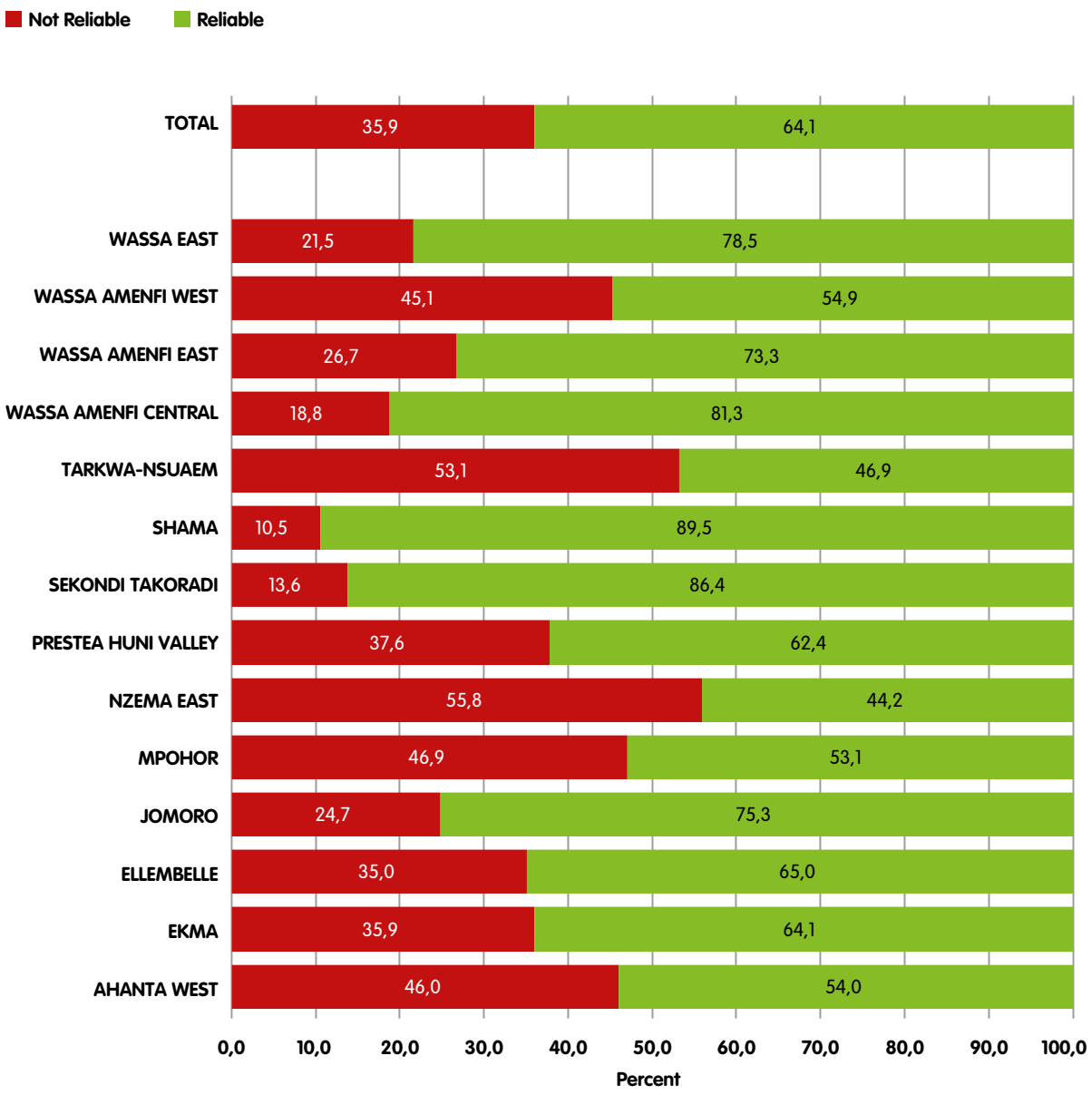


FIGURE 23: RELIABILITY STATUS OF PIPED SCHEMES BY DISTRICT

3.9. Key performance indicators

Key performance indicators (KPIs) are metrics used to measure and evaluate the performance of water utilities or systems. In the rural water sector, KPIs can be used to track progress towards achieving specific goals, such as increasing access to clean water, improving water quality, or reducing water losses. The collection and evaluation of data on the performance indicators enables the service providers to improve their technical, operational, and financial performance. The indicators that are used in this report are adapted from the World Bank Utility Turnaround Framework (2018)[2].

Within the rural water sub-sector, the current legal policy, and regulatory framework of CWSA, benchmarks for key performance indicators measurement have not been set out except for guidelines on the design, operations, and maintenance of water systems. The rural water sub-sector is currently undergoing reforms which will result in revisions to most of the policy, strategies, and guidance documents in line with the new role of CWSA. CWSA is being transformed into a utility company that will operate the water supply systems in small towns, which have previously been managed by WMSTs.

In line with the reform process, CWSA has adopted the following KPIs to measure the performance of the systems that have been taken over and others managed by WSMTs, private operators, and self-suppliers in the Western Region where the mapping exercise took place.

The following are the KPIs measured under the mapping exercise. The analysis is based on limited data from the survey as 51.1% of respondents did not provide information for arriving at these indicators.

3.9.1. Non-revenue water (NRW)

Non-Revenue Water refers to the volume of water that is lost or unaccounted for in the distribution system. It includes both physical losses (leakage) and commercial losses (unauthorised consumption or metering inaccuracies). NRW is typically expressed as a percentage of the total water input into the distribution system.

3.9.2. Billing collection efficiency

Billing collection efficiency is the percentage of the total billed revenue that is successfully collected by the water utility. It reflects the utility's ability to manage customer billing, invoicing, and payment collection processes effectively.

3.9.3. Consumption per person served (lpc)

Consumption per person served is a key performance indicator in the water sector that quantifies the average amount of water consumed by each individual who is served by a water supply system over a defined period. This KPI is measured in litres per capita (lpc)

3.9.4. Water quality index (WQI)

The Water Quality Index is a numerical scale that indicates the overall quality of water based on several water quality parameters, such as pH, dissolved oxygen, turbidity, and the presence of pollutants. It provides a way to assess the safety and suitability of water for various uses.

2. World Bank Utility Turnaround Framework - World Bank Document. Source - Soppe, Gerard, Nils Janson, and Scarlett Piantini. 2018. "Water Utility Turnaround Framework: A Guide for Improving Performance." World Bank, Washington, DC.

3.9.5. Operating cost coverage

Operating Cost Coverage is a financial metric used to assess the extent to which an entity's operating revenues will cover its operating costs. It is often expressed as a ratio and provides insights into the financial health and sustainability of an organisation or project.

3.9.6. Water production cost per cubic metre

Water Production Cost per Cubic Metre is a financial metric used to evaluate the cost efficiency of producing a cubic metre of water within a water supply system. This metric is particularly relevant for water utilities, treatment plants, and organisations responsible for water distribution and management.

3.9.7. Number of staff members per 1000 connections

The Number of Staff Members per 1000 Connections is a key performance indicator used in the water sector to assess the efficiency of staffing within a water utility or organisation. This metric provides insights into the workforce required to manage a certain number of connections within the water supply system.

TABLE 5: KEY PERFORMANCE INDICATORS

Key Performance Indicator	GWCL	CWSA	WSMT	Small Water Enterprise
Average of KPI: NRW	36%	34%	23%	33%
Average of KPI: Energy expenditure ratio	28%	52%	61%	80%
Average of KPI: Billing collection efficiency	73%	71%	65%	-
Average of KPI: Consumption per person served (lpc)	75	54	32	28
Average of KPI: Water quality testing	100	40	24	42
Average of KPI: Operating cost coverage	38.5	3.02	2.61	3.62
Average of KPI: Water production cost per cubic meter (GHC/m3)	900.4	1.49	3.5	0.3
Average of KPI: Number of staff members per 1000 connections	0.8	71.7	6.4	495.1

The industry target for NRW ranges from 22% to 30% for the system. From the table, the target for NRW was not met by all the service providers operating in the Western Region with GWCL recording the highest NRW of about 36%. This clearly shows that improvements are needed to reduce the NRW.

The water production cost for GWCL is very high at GHC 900 per m^3 compared to the cost incurred by the other service providers including CWSA and WSMTs. The data showed that Small Water Enterprises have the lowest cost (0.3m^3) for water production.

Generally, the service providers are not collecting their bills effectively with the billing collection ratio ranging from 65% for WSMTs to 73% for GWCL which is below the benchmark of 80% required to ensure the financial sustainability of service providers.

Water consumption per person served by the service providers is low, except in the case of GWCL where about 75% of its customers are supplied the required quantity of water which is close to the PURC benchmark[3] set at 85%. In case of the Small Water Enterprises, water consumption is as low as 28%. The data revealed that all the service providers are unable to cover their operational costs from the revenues generated. Only GWCL covers a third of its operating costs while the rest of the service providers are covering less than 5% of their cost and this is an indication that the financial health of the systems could be in jeopardy.

GWCL regularly conducts water quality tests and results meet all the standards across the systems assessed in the Western Region. For CWSA and the Small Water Enterprises, 40% of their systems meet the standards. In the case of WSMTs, testing is irregular, and the results generally do not meet the standards.

Staffing ratio (also referred to as staff productivity) is expressed as the number of staff per 1,000 connections. The internationally accepted benchmark for water utilities is less than six (6) staff per 1,000 connections. However, this indicator is well suited for utilities whose customer base is connected exclusively to household connections, not really to systems in Ghana where the majority of customers rely on standpipes. The data showed that GWCL and WSMT have the optimal number of staff in place for managing the systems. With respect to Small Water Enterprises and CWSA, the systems appear to be overstaffed with staff levels far in excess of the industry standard.

3. See for more: 304280-20220817010808.pdf (purc.com.gh), water benchmarks are on pages19-20. PURC for now only regulates GWCL. However, in this report, we can extend the measurements to CWSA and other actors.

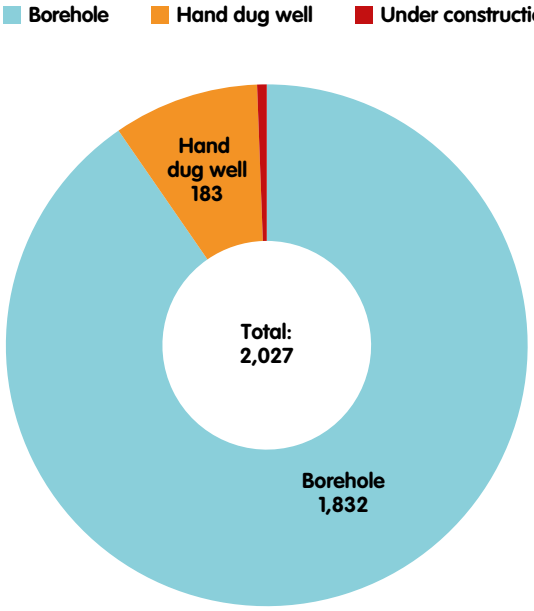
4. HANDPUMP

4.1. Inventory of handpump infrastructure

Maintaining an up-to-date inventory of water infrastructure is key to ensuring that water systems are safe, reliable, and sustainable for the communities they serve.

4.1.1. Handpumps in the region

In the Western Region, there are a total of 1,832 boreholes and 183 hand-dug wells with handpumps. The districts with the highest number of boreholes are Wassa East (305), Wassa Amenfi East (288), Ahanta West (191), and Wassa Amemfi West (190). The districts with the fewest boreholes are Sekondi Takoradi (16) and EKMA (9). Hand-dug wells are also common in Wassa East (30), Nsema East (27), Ellembelle (27), and Tarkwa Nsuaem (24).



	Borehole	Hand dug well	Under construction
AHANTA WEST	191	18	0
EKMA	9	0	0
ELLEMBELLE	147	27	1
JOMORO	100	9	0
MPOHOR	69	1	5
NZEMA EAST	55	27	0
PRESTEA HUNI VALLEY	180	22	1
SEKONDI TAKORADI	16	4	0
SHAMA	47	0	0
TARKWA-NSUAEM	104	24	0
WASSA AMENFI CENTRAL	131	1	0
WASSA AMENFI EAST	288	7	4
WASSA AMENFI WEST	190	13	0
WASSA EAST	305	30	1

FIGURE 24: NUMBER OF HANDPUMPS BY REGION AND DISTRICT

4.1.2. Distribution of handpumps by service provider

In the region, over 90% of handpumps and hand-dug wells are managed by communities. However, there are 57 handpumps that are not managed by anyone, and 11 are under construction.

	Borehole	Hand dug well	Under construction
Community management	1,697	173	11
Private Management	33	3	1
Institution management	39	3	0
No management	57	4	0
Other	6	0	0

TABLE 6: NUMBER OF HANDPUMPS BY SERVICE PROVIDER

4.1.3. Distribution of handpumps by service providers by district

In all districts except Effia-Kwesimintsim Municipal Assembly (EKMA), Mpohor and Sekondi Takoradi, more than 90 percent of handpumps are under community management. In EKMA, 75 percent of handpumps are under private management. In Ellembelle, Mpohor, and Sekondi Takoradi, a significant number of handpumps (10%, 16%, and 8%, respectively) are under no particular management.

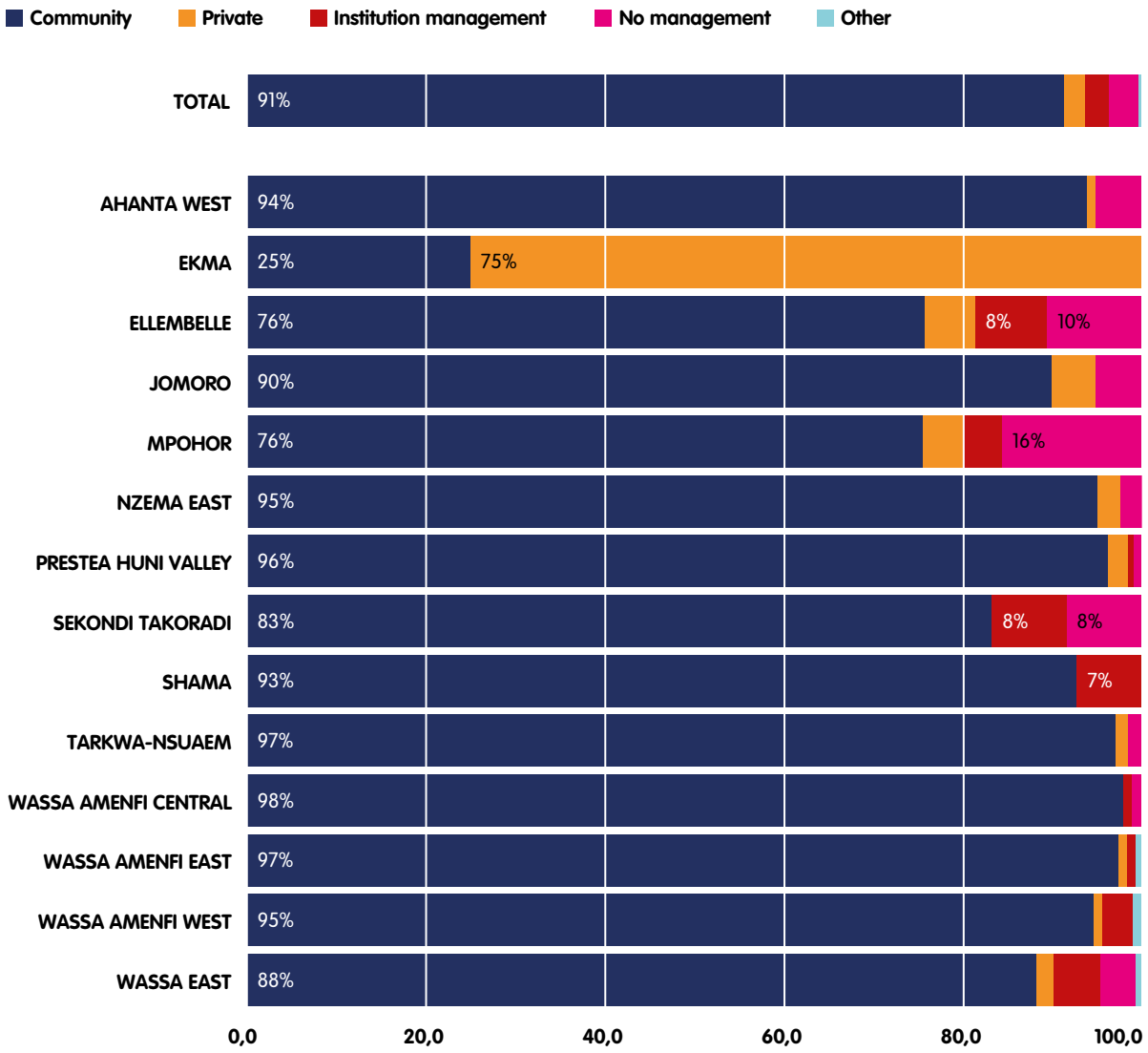


FIGURE 25: NUMBER OF HANDPUMPS BY SERVICE PROVIDER AND DISTRICT

4.1.4. Types of handpumps

The predominant type of handpump in the Western region of Ghana is the AfriDev, accounting for 67.1% of all handpumps (1,361). The Ghana modified India Mark II is the second most common type, with 13.1 percent (265). Other types of handpumps in the region include Solar Pump, Nira AF-85, Nira AF-85D, and Vergnet. These handpumps vary in design, materials, and efficiency, but they all serve the same basic purpose of providing access to clean water for communities that lack access to piped water.

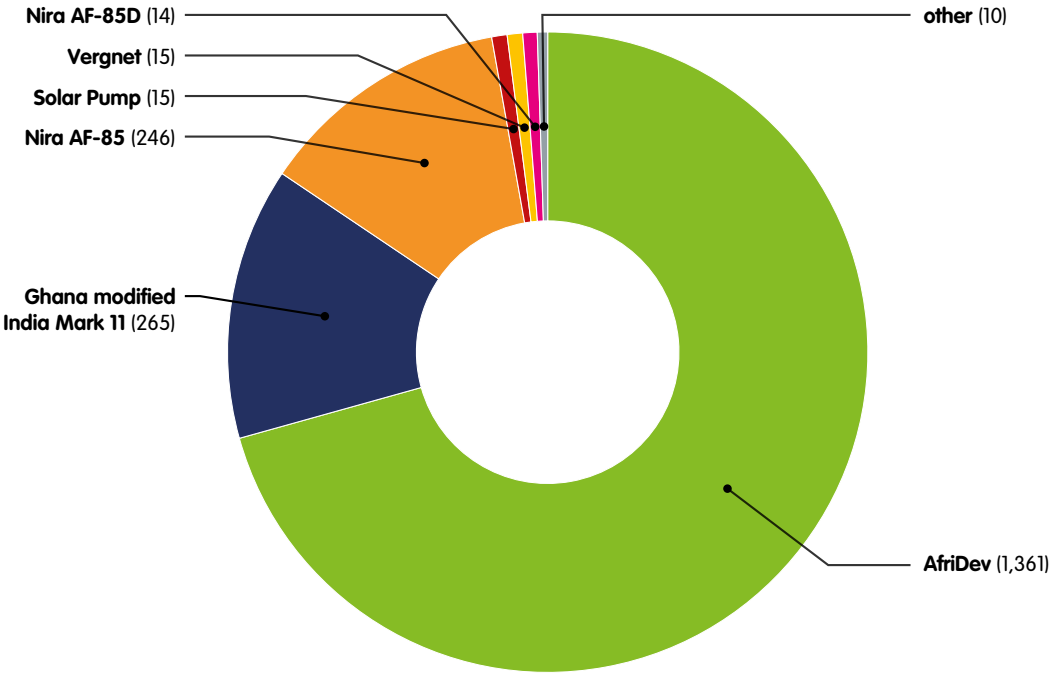


FIGURE 26: DISTRIBUTION OF HANDPUMPS IN THE REGION BY TYPE

4.1.5. Distribution of handpumps by type and district

The most common handpumps across the districts are AfriDev, Ghana-modified India Mark 11, and Nira AF-85. Solar pumps, Nira AF-85D, and Vergnet pumps are uncommon in these districts. (Table 7)

TABLE 7: DISTRIBUTION OF HANDPUMPS BY TYPE AND DISTRICT

DISTRICT	AfriDev	Solar Pump	Ghana modified India Mark 11	Nira AF-85	Nira AF-85D	Vergnet	other	Total	Abandoned	Under construction	Total
AHANTA WEST	66	0	78	11	1	1	3	**160**	46	3	**49**
EKMA	8	0	0	0	0	0	0	**8**	1	0	**1**
ELLEMBELLE	141	2	16	12	0	3	0	**174**	1	0	**1**
JOMORO	83	1	9	10	0	0	0	**103**	5	1	**6**
MPOHOR	54	0	2	18	0	0	1	**75**	0	0	**0**
NZEMA EAST	53	0	15	9	0	2	0	**79**	3	0	**3**
PRESTEA HUNI VALLEY	178	3	9	11	0	2	0	**203**	0	0	**0**
SEKONDI TAKORADI	16	0	0	3	0	0	0	**19**	1	0	**1**
SHAMA	37	2	0	7	1	0	0	**47**	0	0	**0**
TARKWA-NSUAEM	87	5	14	16	1	1	2	**126**	1	1	**2**
WASSA AMENFI CENTRAL	123	0	0	6	0	1	0	**130**	0	2	**2**
WASSA AMENFI EAST	195	2	60	17	10	3	2	**289**	9	1	**10**
WASSA AMENFI WEST	139	0	26	29	0	2	0	**196**	4	3	**7**
WASSA EAST	181	0	36	97	1	0	2	**317**	18	1	**19**
TOTAL	**1.361**	**15**	**265**	**246**	**14**	**15**	**10**	**1926**	**89**	**12**	**101**

4.2. Funding for the construction of handpumps

4.2.1. Funding sources for handpumps and service providers

The Central Government is the largest funder of handpumps in the Western region, providing funding for about 50% of handpumps. NGOs and private companies are also major funders, providing 19% and 15% of funding, respectively.

Fifty-one percent of handpumps under community management are being funded by the government. NGOs and private individuals are the largest funders of handpumps under private management, with more than a quarter of handpumps in this category being funded by these organisations. NGOs and faith-based organisations are the largest funders of handpumps under institutional management, with 26% and 29% of handpumps in this category being funded by these organisations, respectively.

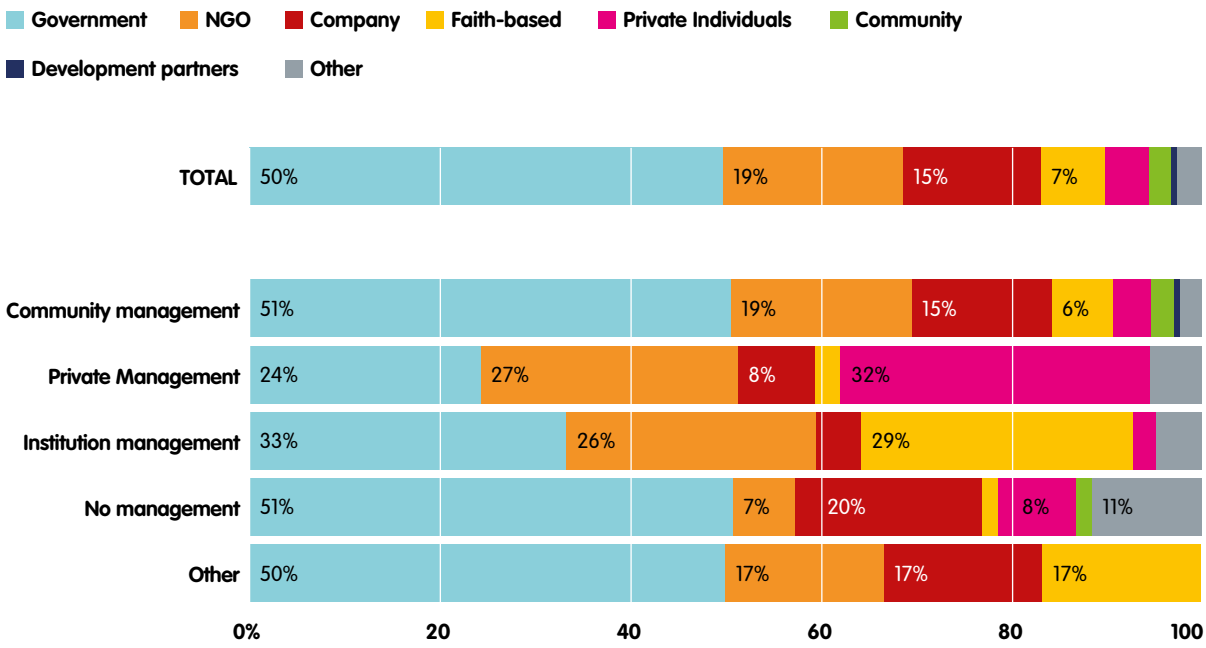


FIGURE 27: FUNDING FOR THE CONSTRUCTION OF HANDPUMPS

4.2.2 Funding for construction of handpumps by district

The funding of handpump construction varies across the districts, with the government being the leading funder in 11 out of 14 districts. However, NGOs and companies have a significant impact in Ahanta West (59% and 16%, respectively), EKMA (11% and 44%), Sekondi Takoradi (50%), and Wassa Amenfi West (18% and 30%). Development partners funded handpumps can be found in Shama, Wassa Amenfi West, and Wassa Amenfi Central.

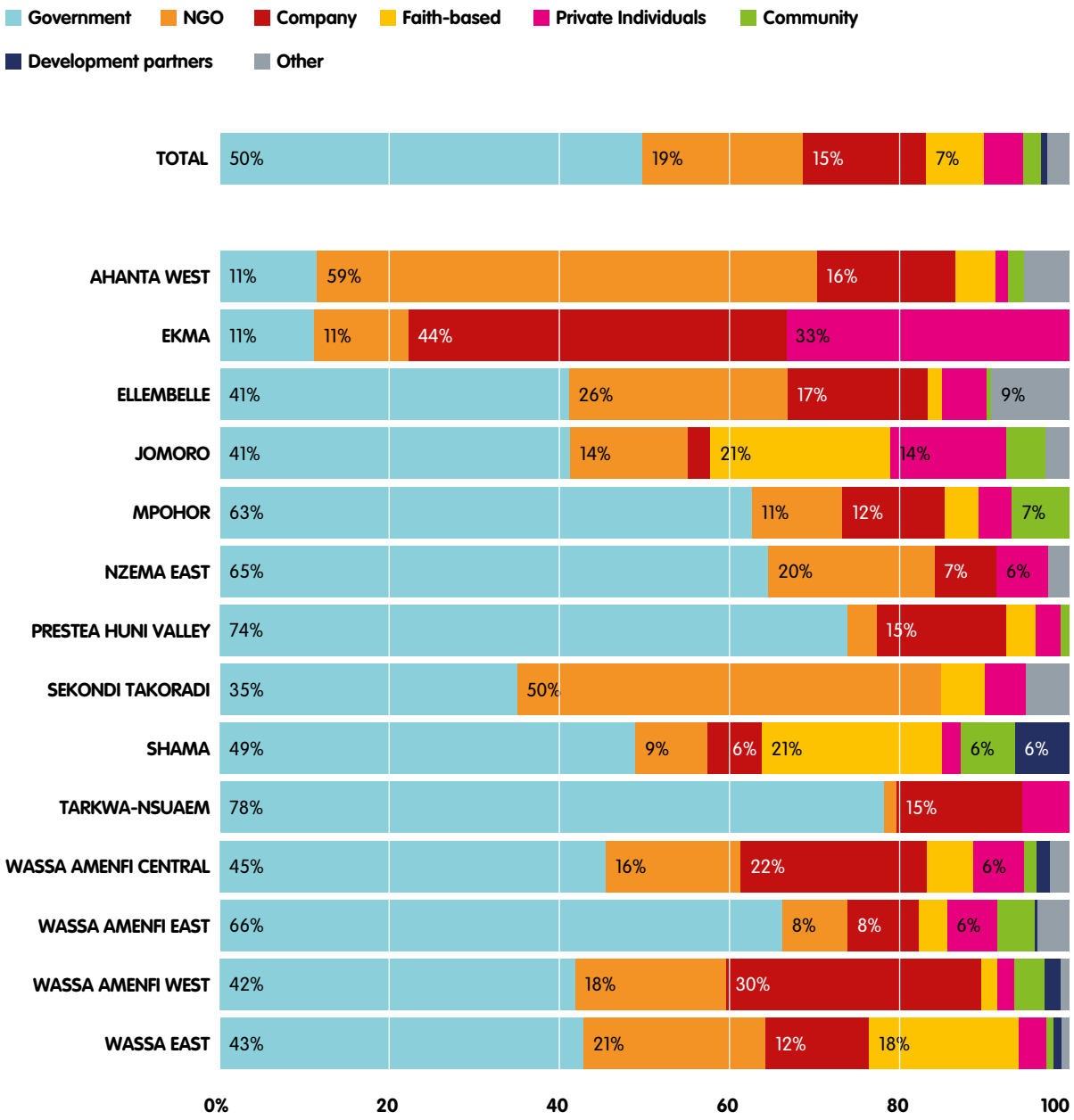
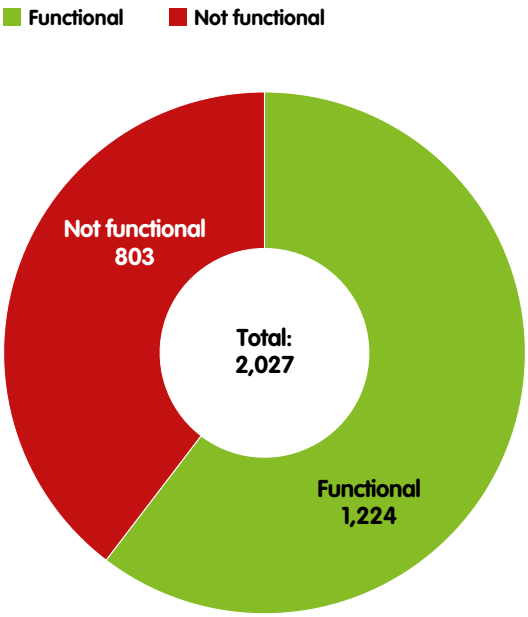


FIGURE 28: FUNDING FOR THE CONSTRUCTION OF HANDPUMPS BY DISTRICT

4.3. Assessing the status and performance of handpump infrastructure and services

4.3.1. Functionality status of handpumps

Figure 29 shows that 60.6% of handpumps in the region are functional, while 39.4% are not functional. The districts with the highest number of functional handpumps are Ahanta West, Wassa Amenfi West, Prestea Huni Valley, Wassa West, and Wassa Amenfi East, with 100 to 197 functional handpumps each. The districts with the highest number of non-functional handpumps are Wassa East (140), Ahanta West (109), and Wassa Amenfi East (104). Some insights into the fact that two districts have both the highest number of functional and non-functional handpumps can be found in figure 34 on payment for use of handpumps.



	Functional	Not functional
AHANTA WEST	100	109
EKMA	4	5
ELLEMBELLE	124	51
JOMORO	60	49
MPOHOR	45	30
NZEMA EAST	42	40
PRESTEA HUNI VALLEY	135	68
SEKONDI TAKORADI	12	8
SHAMA	28	19
TARKWA-NSUAEM	69	59
WASSA AMENFI CENTRAL	99	33
WASSA AMENFI EAST	195	104
WASSA AMENFI WEST	115	88
WASSA EAST	196	140

FIGURE 29: FUNCTIONALITY STATUS OF HANDPUMPS BY DISTRICT

4.3.2. The non-functionality of handpumps

As shown in Figure 30, broken-down handpumps are the most common reason for non-functionality, accounting for about half (51.4%) of non-functional handpumps in the region.

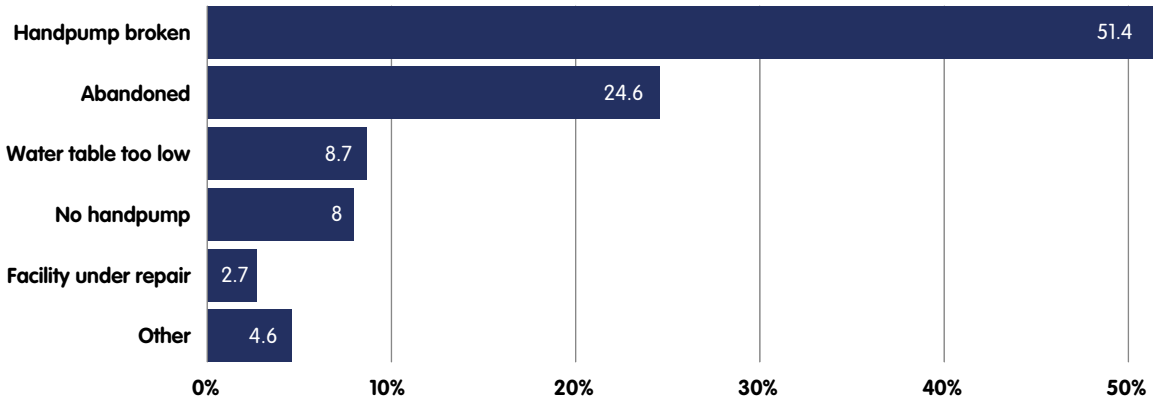


FIGURE 30: REASON FOR NON-FUNCTIONALITY OF HANDPUMPS

4.3.3. Payment for the use of handpumps by district

Only about 20 percent of handpump users in the Western Region pay for their use. This is in contrast to Sekondi Takoradi and EKMA, where residents do not pay any tariff for the use of handpumps. In other districts, the percentage of residents who pay to fetch water ranges from 31 percent in Tarkwa Nsuaem to 10 percent in Mpohor (Figure 31).

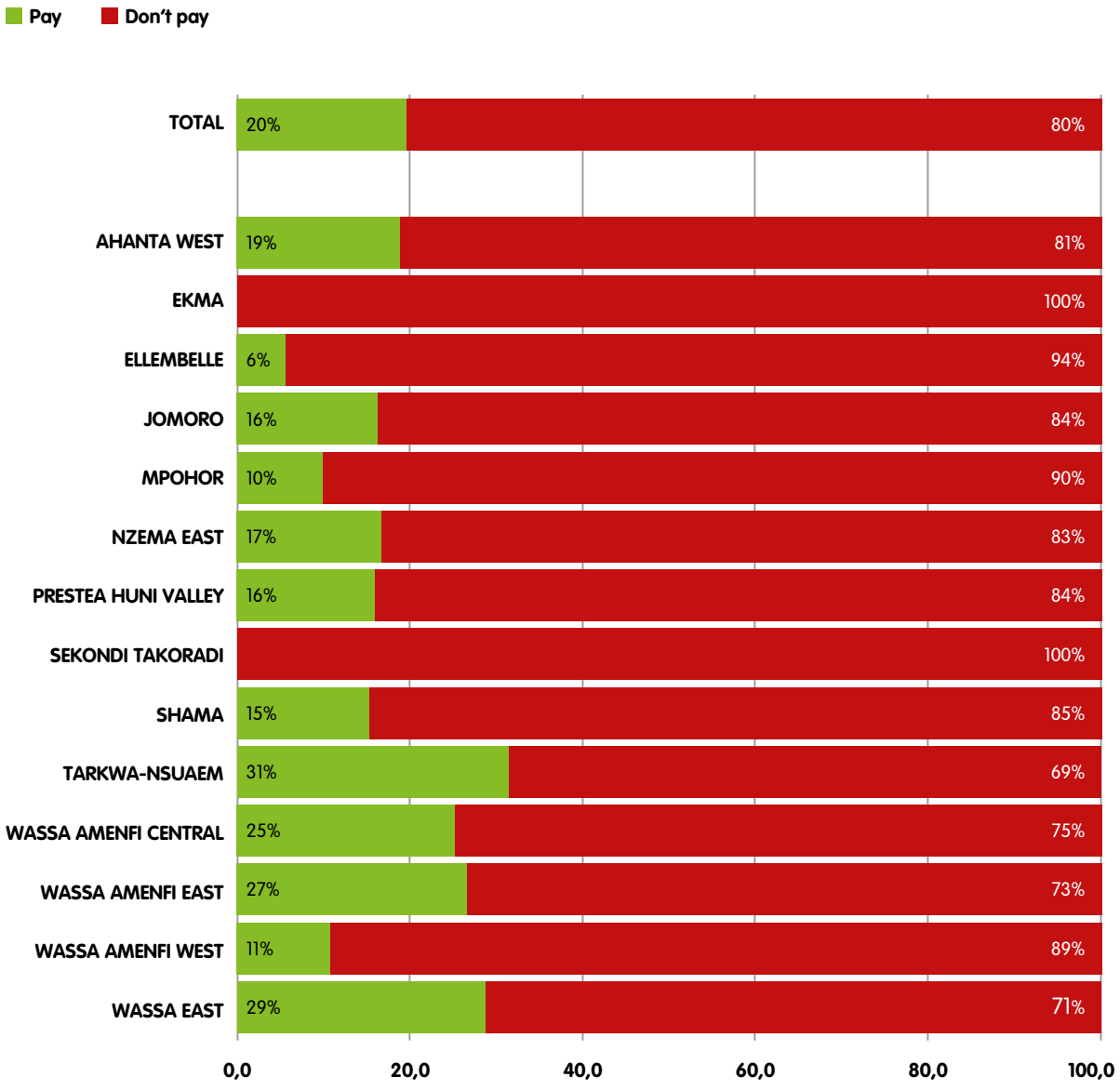


FIGURE 31: PAYMENT FOR USE OF HANDPUMPS

4.3.4. Payment for the use of handpumps by service provider

Figure 32 shows that handpumps managed by handpump WSMTs (31%) and private individuals (30%) have the highest functionality levels. In contrast, more than 80% of handpumps managed by schools, health centres, religious institutions, and other organisations are not functional.

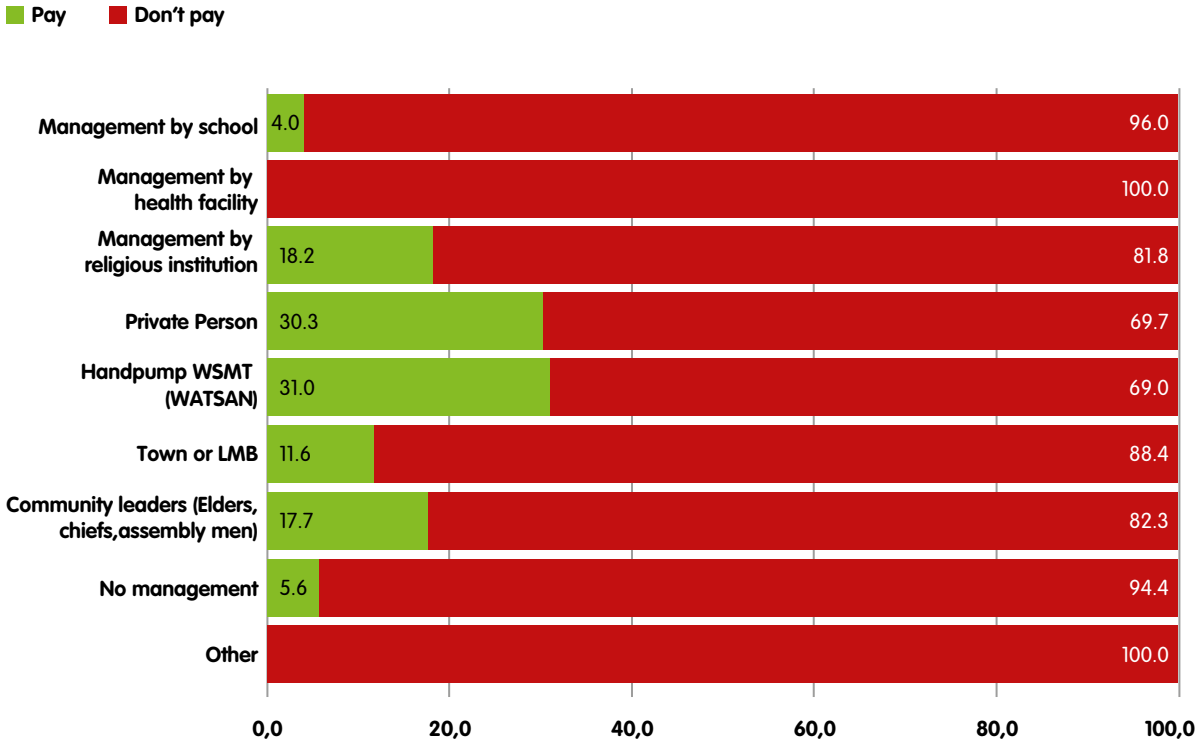


FIGURE 32: FUNCTIONALITY OF HANDPUMPS BY SERVICE PROVIDER

4.3.5. Correlates of functionality of handpumps

The functionality of a hand pump can be influenced by a number of factors, including the management or service provider of the facility, maintenance and repairs, the depth of the water, pump type and design, and the availability of mechanics and spare parts to fix the handpumps when needed.

4.3.5.1. Functionality of handpump as a factor of payment for use of handpump

Payment for use of the handpump is a key factor for their functionality. This is supported by the finding that at 81% of functional handpumps people pay for fetching water, while in 56% of functional handpumps this is not the case (Figure 33). This suggests that payment provides the necessary funds for maintenance and repairs, which can help to keep handpumps in good working order.

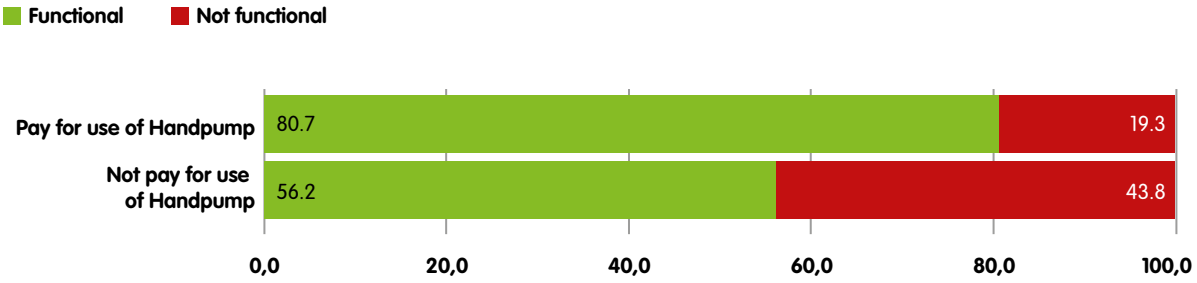


FIGURE 33: FUNCTIONALITY OF HANDPUMPS AS A FACTOR OF PAYMENT FOR USE OF HANDPUMPS

4.3.5.2. Functionality of handpump as a factor of the type of handpump

The design of the handpump and the quality of its components can significantly impact its functionality. A well-designed handpump with high-quality components is likely to be more effective and durable. The type of handpump that is suitable for a particular situation depends on the water requirements, the number of people using the pump, and the availability of maintenance resources.

Figure 34 shows that handpumps such as Vergnet (93%) and Nira AF-85 (52%) have the highest proportion of non-functionality.

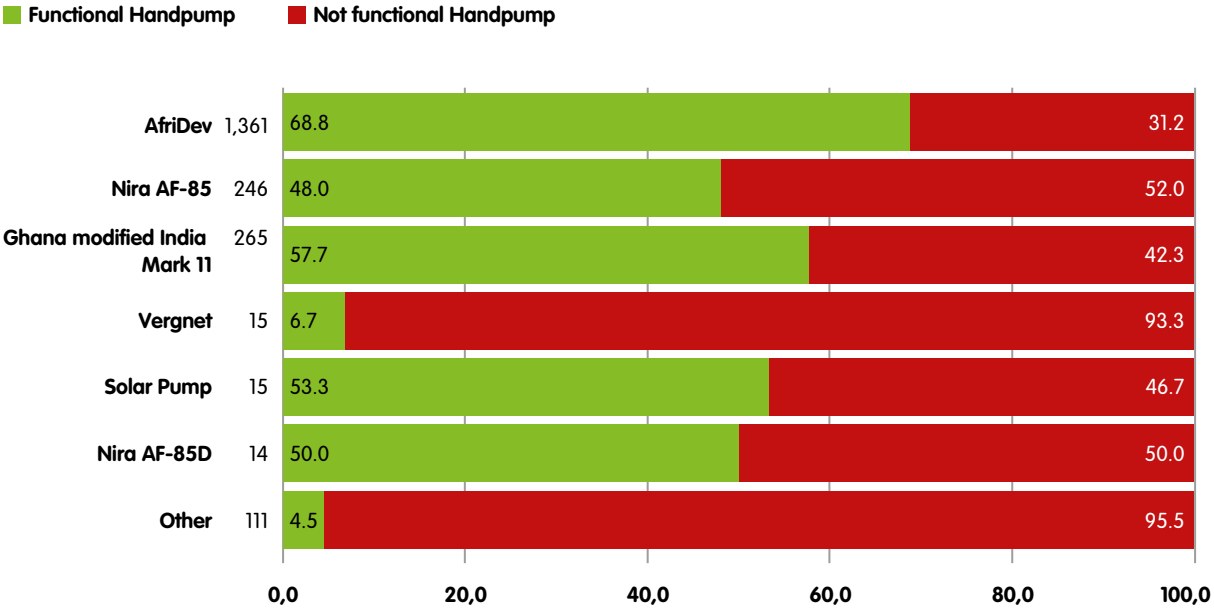


FIGURE 34: FUNCTIONALITY OF HANDPUMPS AS A FACTOR OF TYPE OF HANDPUMP

4.3.5.3. Functionality of the handpump related to the age of handpump

The functionality of handpumps can decrease with age. Older handpumps are more likely to break down and become unusable than newer ones. This is because older handpumps may not have been properly maintained over the years, or the materials they are made of are more prone to wear and tear.

Figure 35 shows that the functionality of handpumps decreases with age. The graph shows that 84% of handpumps that are less than two (2) years old are functional, while only 56% of handpumps that are more than 10 years old are functional.

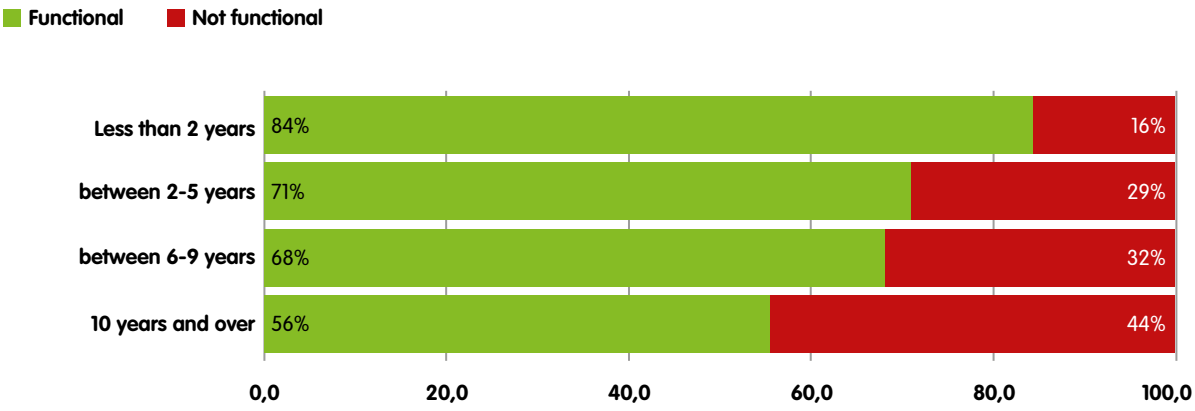


FIGURE 35: FUNCTIONALITY OF HANDPUMP RELATED TO THE AGE OF HANDPUMP

4.4. Level of provided services

Handpumps are a critical source of drinking water for millions of people in rural areas, particularly in developing countries. To ensure that handpumps are functioning effectively and providing safe drinking water, various performance indicators can be used to monitor their performance. Below are some common performance indicators for handpumps in the water sector.

4.4.1. Service level – distance

Distance to a functioning handpumps is one of the performance indicators for evaluating the accessibility of water sources in rural areas.

It is defined as the maximum distance that people have to walk to access a functioning handpump. The exact distance can vary depending on factors such as terrain, population density, and availability of other water sources.

In general, the recommended distance for handpumps is 500 metres, or a 30-minute round trip. This distance assumes that people can carry a 20-litre jerry can of water, which is a common container size for transporting water in rural areas.

In more than 11 districts in the region, 50 percent of the houses are over 500 metres away from a handpump. This is the case in Jomoro (92%) and Prestea Huni Valley (76%) districts, which are both located in peri-urban

areas. This suggests that there is a lack of access to clean water in peri-urban areas, and that more needs to be done to improve this situation (Figure 36). In order to meet Ghana's SDG 6 target of having at least basic services for 100% of the population, we need to explore ways to improve the situation.

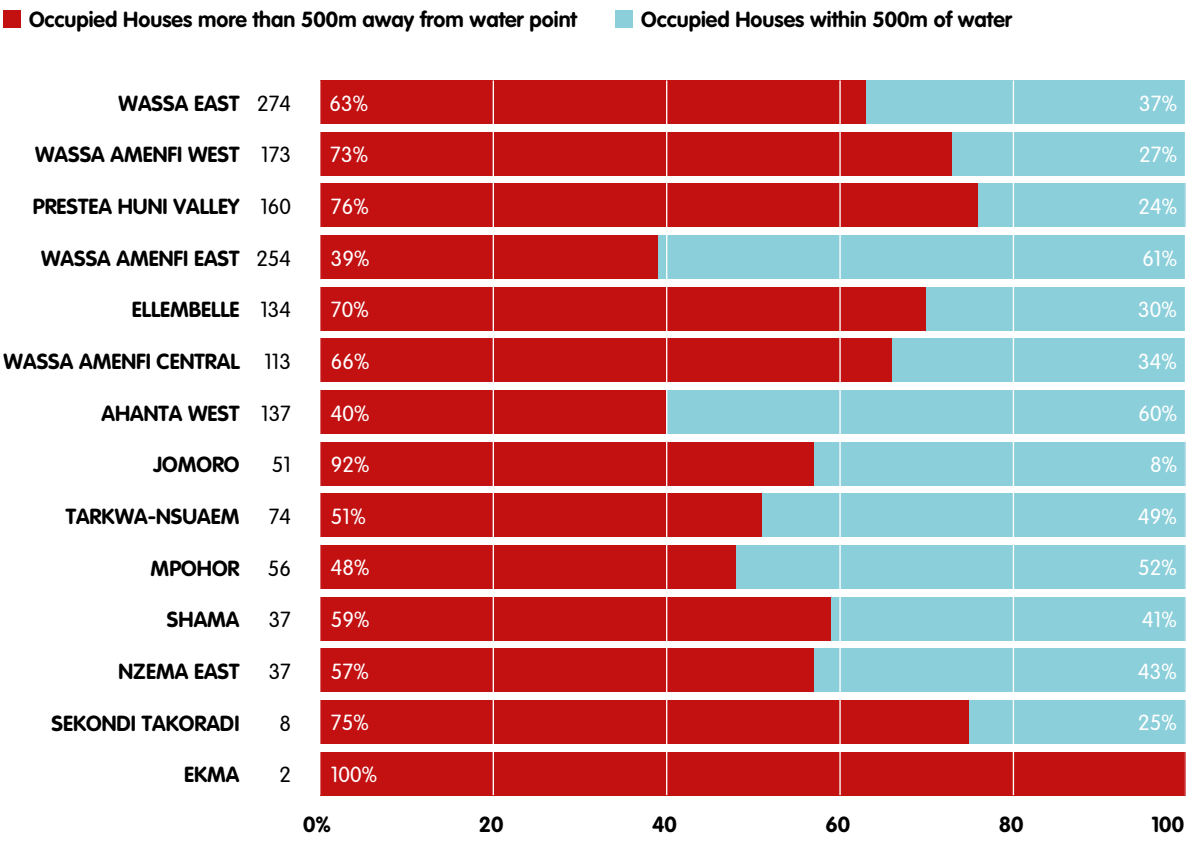


FIGURE 36: SERVICE LEVEL - DISTANCE STATUS OF HANDPUMPS BY DISTRICT

4.4.2. Service level – quality

The quality of water provided by handpumps is another essential aspect of service levels. Access to safe and clean water is crucial for human health, and the quality of water provided by handpumps is a critical factor in determining the level of service that a community receives.

However, in this report, the quality of water from handpumps analysed is based on self-assessment by service providers. Service providers were asked whether the quality of water from the handpumps was acceptable to the community or not. Therefore, the quality reported here is the perception of the service providers.

Figure 37 shows that 27.4% of handpumps managed by community leaders were perceived to have water that is not acceptable in terms of quality. This is equivalent to 324 handpumps. Additionally, 143 (36.9%) of handpumps managed by community leaders were found to be producing water below the acceptable quality.

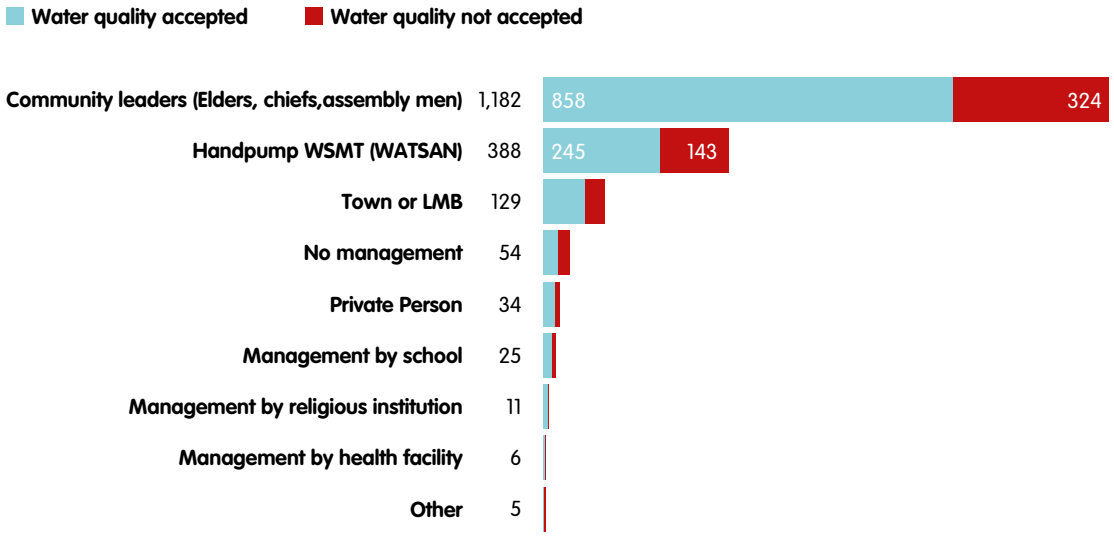


FIGURE 37: PERCEIVED QUALITY OF WATER FROM HANDPUMPS BY SERVICE PROVIDER

Figure 38 shows that the proportion of handpumps that produce water below the acceptable quality standard is more than 10% in all districts. The districts with the highest proportion are Mpohor (51%), Jomoro (41%), Shama (38%), and Wassa Amenfi East (37%).

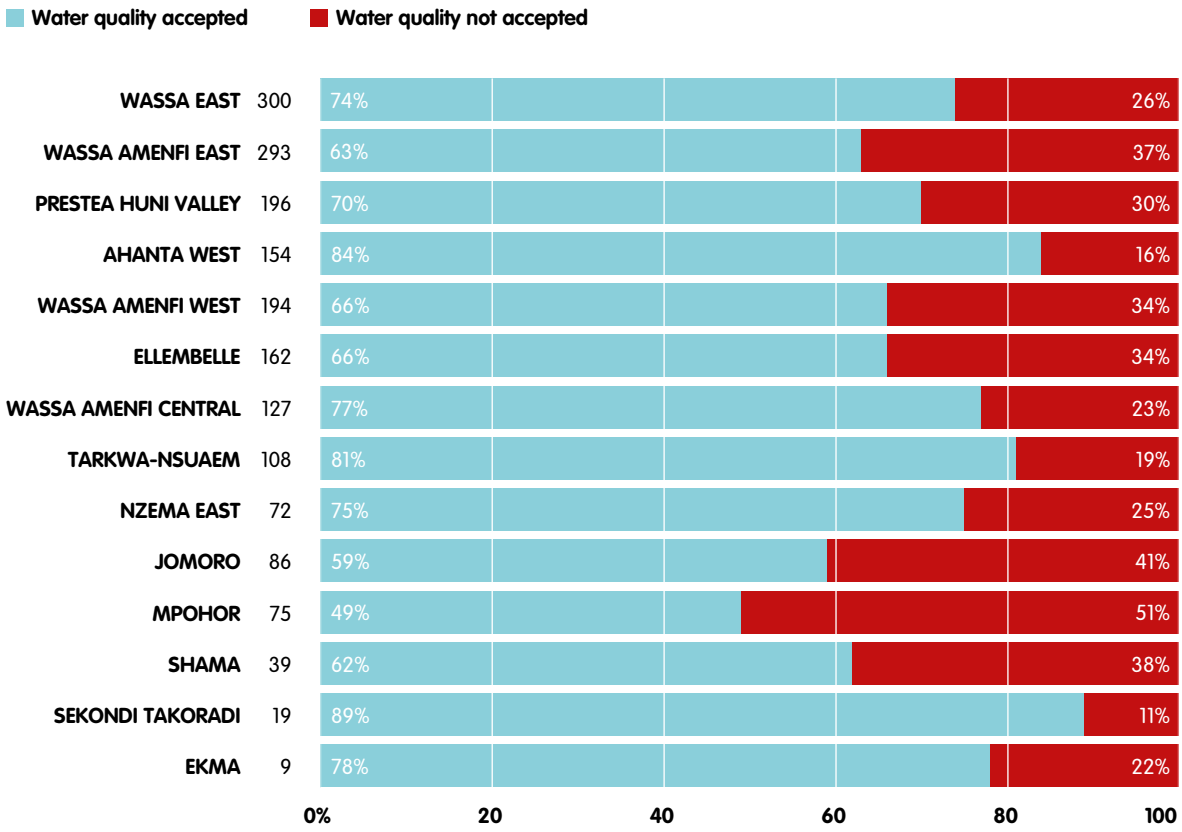


FIGURE 38: PERCEIVED QUALITY OF WATER FROM HANDPUMPS BY DISTRICT

4.5. Handpump service providers

4.5.1. Handpumps WSMTs

There are 188 handpump WSMTs (formerly known as WATSAN committees) in the region. The majority of these committees (54) are in Prestea Huni Valley district. Sekondi Takoradi and Mpohor districts each have only one WATSAN committee.

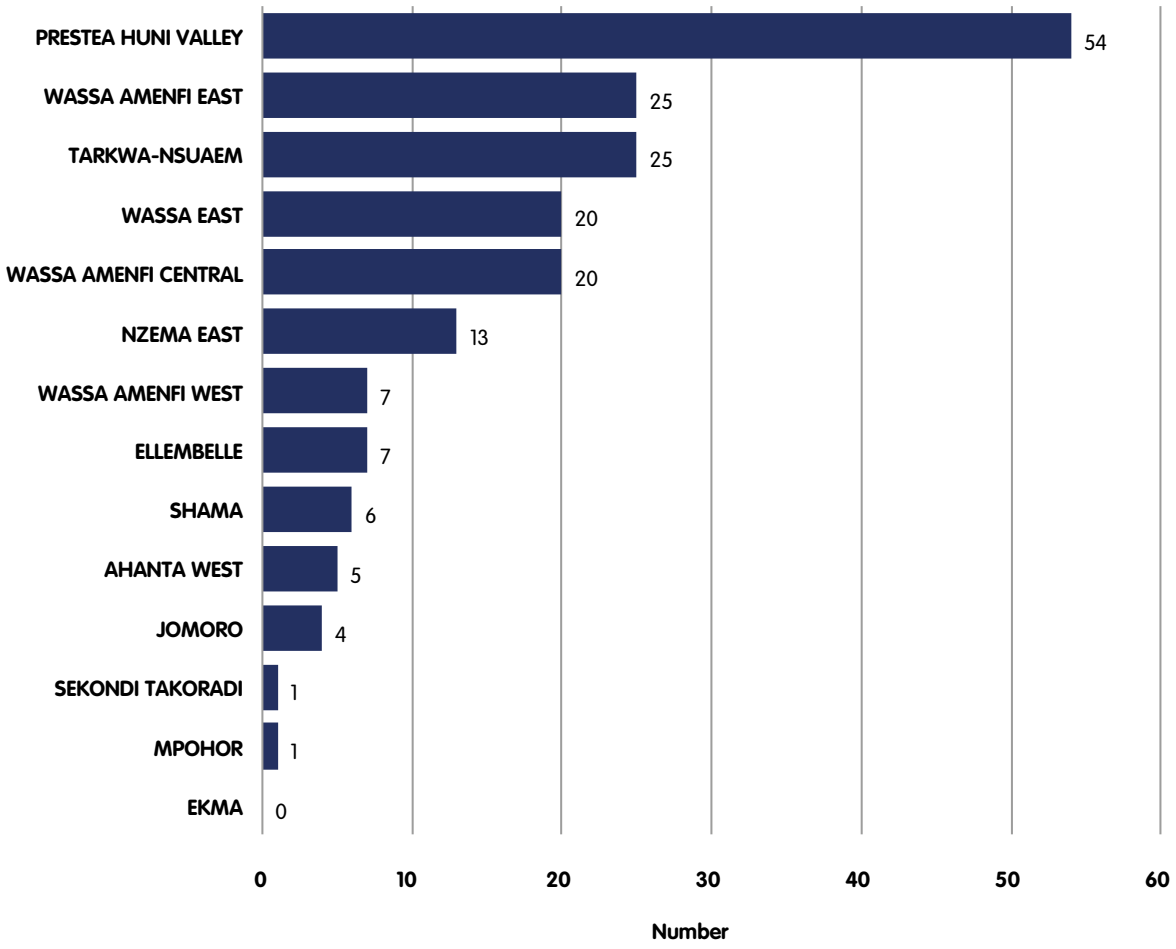


FIGURE 39: DISTRIBUTION OF HANDPUMP WSMTS BY DISTRICT

4.5.2. Training of WSMT members

Training of WSMT members is essential for the smooth operation of handpumps. Figure 40 shows that 44.1 percent of WSMT members did not receive initial training prior to their nomination. Ellembelle district has the highest number of members without initial training (63.3%), while Prestea Huni Valley has the highest number of trained members (16.7%).

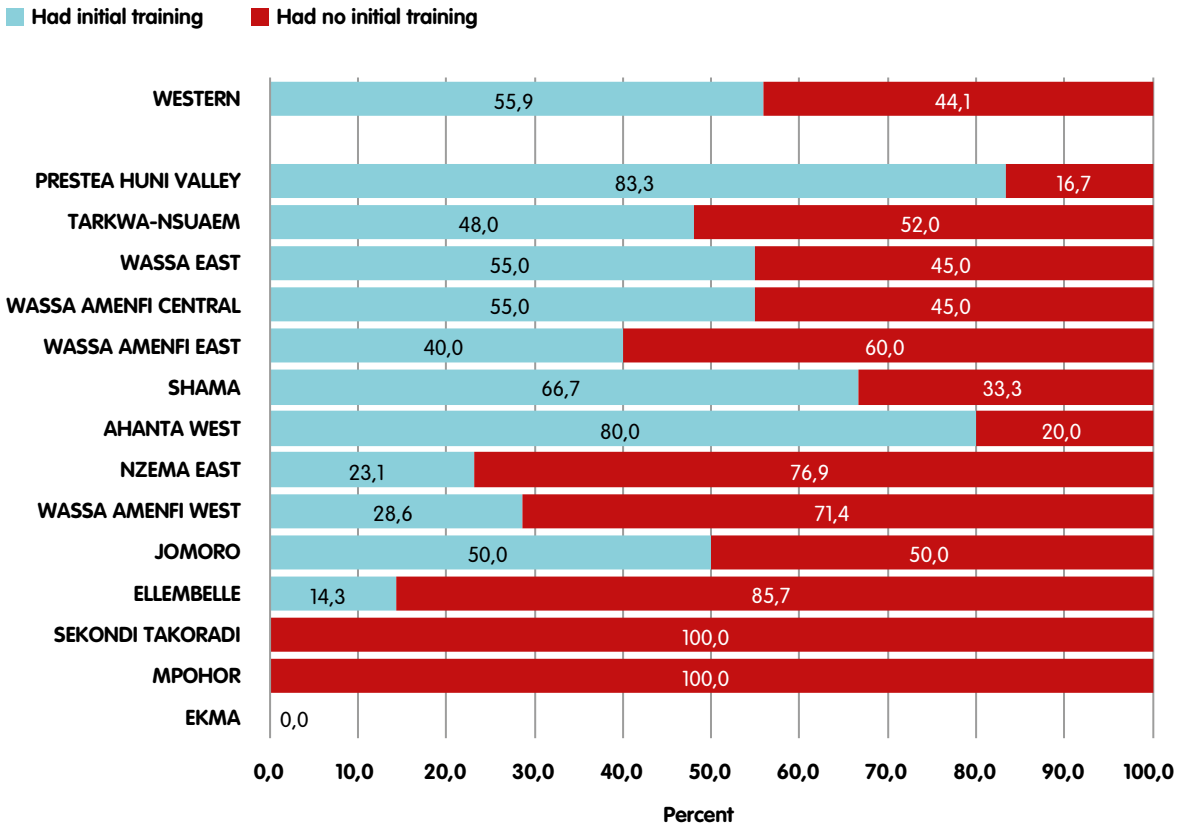


FIGURE 40: TRAINING OF WSMTS BY DISTRICT

4.5.3. Availability of mechanic services and routine maintenance

The availability of mechanic services is essential for the continued functionality of handpumps. However, for the majority (50%) of WSMT members, it takes longer than three days to get the services of a mechanic. This trend is visible in six out of the 11 districts. A third of the WSMTs in Jomoro, Sekondi Takoradi, and Tarkwa-Nsuaem did not have access to the services of a mechanic.

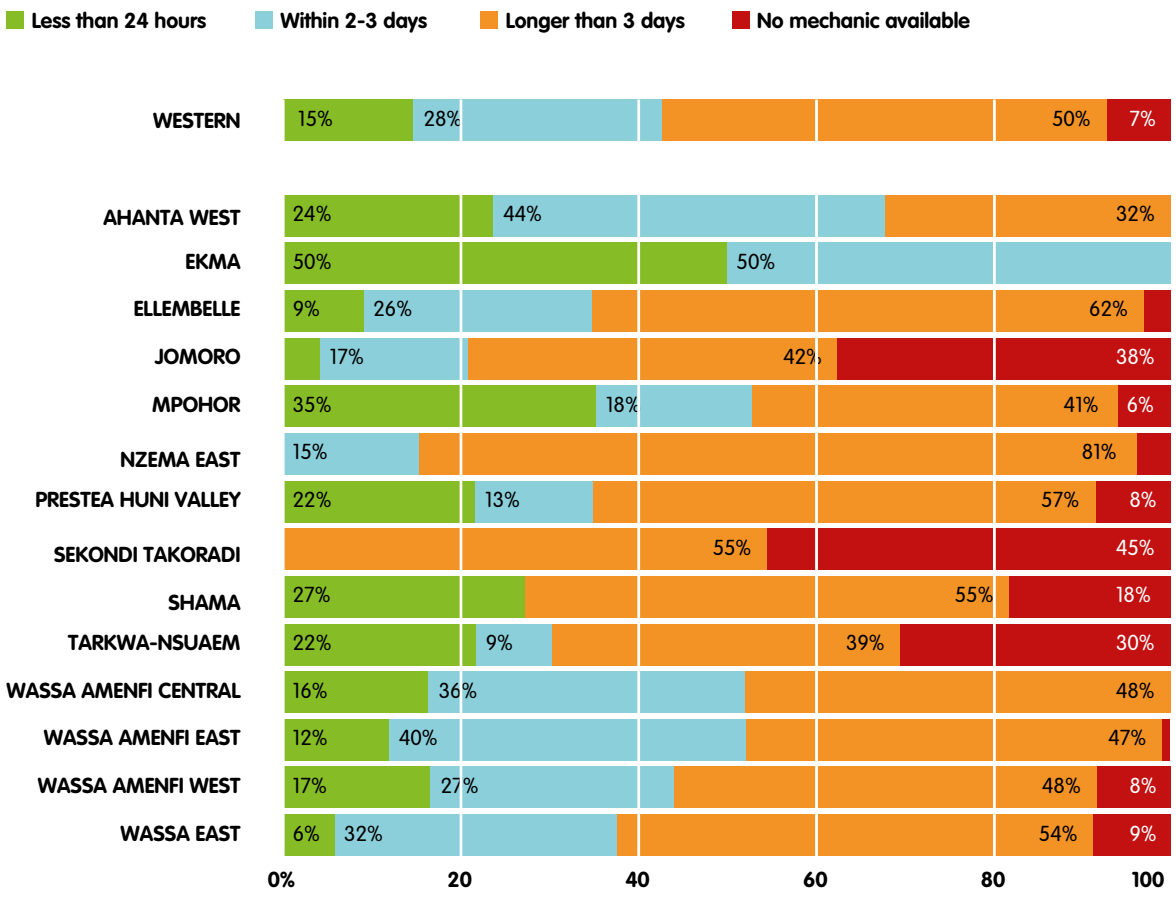


FIGURE 41: ACQUIRING MECHANIC SERVICES FOR HANDPUMPS BY WSMTS BY DISTRICT

Routine maintenance is essential for the proper functionality of handpumps. However, more than two-thirds (68%) of WSMT members do not carry out routine maintenance on handpumps. This trend is highest in Wassa Amenfi West district (85%) and lowest in Prestea Huni Valley district (22%)

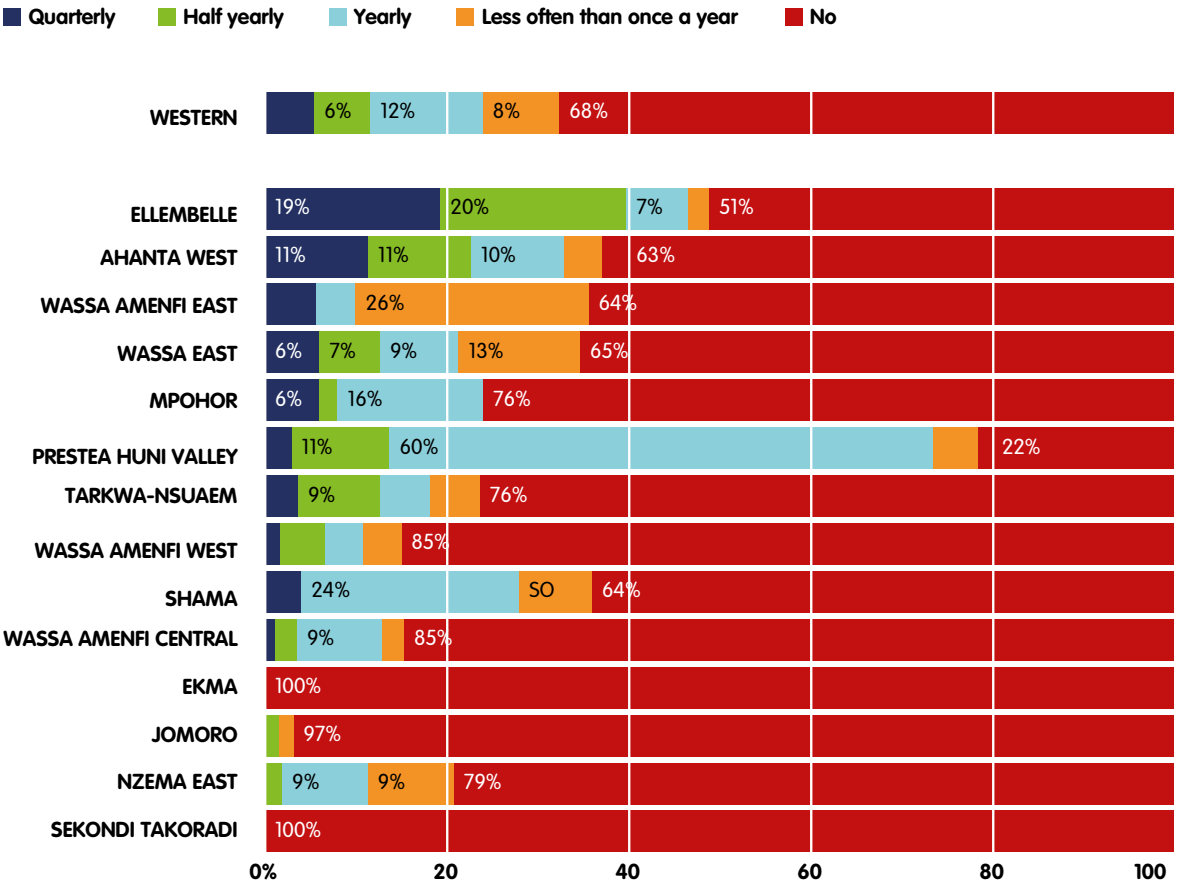


FIGURE 42: ROUTINE MAINTENANCE ON HANDPUMPS BY WSMTS BY DISTRICT

4.5.4. Record keeping

Record keeping in handpump management is crucial for efficient maintenance and timely interventions, minimising downtime and ensuring continuous access to water. Accurate records aid in resource planning, budgeting, and seeking funding, enabling effective allocation of resources and sustainable management practices.

Nearly all WSMTs in the region (88%) do not keep operational records of handpumps. This trend is consistent across all 14 districts, where more than 70% of WSMTs do not keep records on the operation of handpumps in their districts.

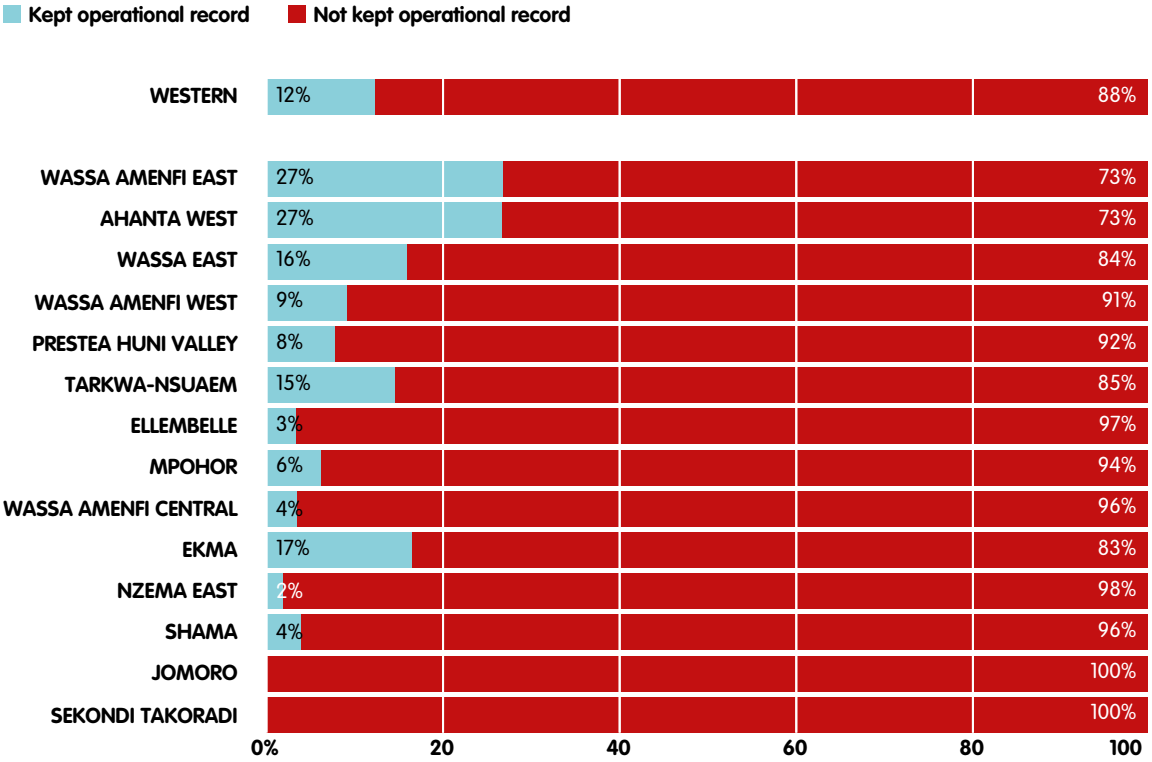


FIGURE 43: OPERATIONAL RECORD KEEPING BY HANDPUMP WSMTS BY DISTRICT

5. CONCLUSION

5.1. Conclusion

This concluding chapter summarises the key findings of the report and discusses the implications for future research and policy.

5.1.1. Management models and service providers

The findings show that there are many different organisations involved in providing water services in the Western Region. The most common type of provider is a community management scheme, which is managed by a group of local people. Community management schemes account for 50% of water service provision in the region.

The Ghana Water Company Limited (GWCL) and the Community Water and Sanitation Agency (CWSA) also provide water services in the region. However, they only serve about 15% of the population. Private organisations and NGOs play a role in providing water services too and account for 18% of the provision.

The findings also show that there is a lack of clear governance structures for many of the private and community-managed water schemes. This can lead to problems with accountability and regulation.

5.1.2. Piped Water System

There are a high number of small and limited mechanised piped systems serving people. Out of the 999 piped schemes in the region, 931 are LMS. Household connections from these LMS are few and mostly operated from public standpipes. Due to their small size and limited reach, these facilities risk not benefiting from economies of scale, and have fewer opportunities to cross-subsidies across systems.

Funders of water facilities come from various sources, such as government entities, international organisations, non-governmental organisations, private sector companies, and individual households. Forward Development and Safe Water Network are the most active NGOs in supporting the construction of piped schemes in Western Region, with Goldfields being the most significant contributor with 71 supported constructions. Other companies such as Golden Star, GREL, Ghana Gas, and Cocoa Board have also provided support. Funding sources include Government budget allocation, donor funding, companies as part of their social responsibilities, and other sources.

5.1.3. Handpumps

Out of a total of 2,027 handpumps in the region, 1229 (60.6%) are functional, with 798 (39.4%) not functional. The reasons for the non-functionality of handpumps include broken down handpumps, abandoned handpumps, water tables too low, no handpumps, and facilities under repair.

Payment for the use of handpumps creates a sense of ownership and responsibility, and the availability of mechanics and spare parts to fix the handpumps when needed. The functionality of handpumps is largely dependent on the service provider who is responsible for maintaining and repairing it. Payment for the use of handpumps is a key factor in its functionality, with 81% of functional handpumps being paid for compared to non-functional and not paid-for handpumps (56%). The type of handpump is also a factor regarding its functionality. Handpumps are a critical source of drinking water for millions of people in rural areas, and performance indicators can be used to monitor their performance. WSMTs have 141 not functional handpumps, representing 34.4 percent of handpumps managed by such teams.

APPENDICES

1. MAIN TABLES

TABLE 8: DISTRIBUTION OF PIPED SCHEME BY SDM

	Utility	Community	Small Water Enterprise	Private	Institution	Other	Total
AHANTA WEST	1	61	0	18	6	1	87
EKMA	0	6	1	27	5	0	39
ELLEMBELLE	3	22	1	31	3	0	60
JOMORO	3	43	2	37	0	0	85
MPOHOR	0	26	1	17	5	0	49
NZEMA EAST	1	45	2	26	1	2	77
PRESTEA HUNI VALLEY	3	49	0	28	5	0	85
SEKONDI TAKORADI	0	12	0	10	0	0	22
SHAMA	1	6	0	12	0	0	19
TARKWA-NSUAEM	2	37	0	25	1	0	64
WASSA AMENFI EAST	3	69	0	74	1	3	150
WASSA AMENFI WEST	2	93	0	34	4	0	133
WASSA EAST	3	12	42	8	0	0	65
TOTAL	22	516	50	371	33	7	999

TABLE 9: DISTRIBUTION OF HANDPUMPS BY SDM

DISTRICT	Institution	Private	Community	No management	Other	Total
AHANTA WEST	0	2	200	6	1	209
EKMA	0	3	6	0	0	9
ELLEMBELLE	13	9	136	17	0	175
JOMORO	0	4	102	3	0	109
MPOHOR	2	4	60	9	0	75
NZEMA EAST	0	2	75	3	2	82
PRESTEA HUNI VALLEY	1	3	198	1	0	203
SEKONDI TAKORADI	3	0	15	2	0	20
SHAMA	2	0	45	0	0	47
TARKWA-NSUAEM	1	2	125	0	0	128
WASSA AMENFI CENTRAL	1	0	130	1	0	132
WASSA AMENFI EAST	3	2	293	0	1	299
WASSA AMENFI WEST	5	1	194	2	1	203
WASSA EAST	11	5	302	17	1	336
TOTAL	42	37	1,881	61	6	2,027

TABLE 10: HANDPUMPS BY DISTRICT AND MANAGEMENT TYPE

DISTRICT	Handpump WSMT (WATSAN)	Town or LMS	Community leaders (Elders, chiefs, assembly men)	Private Person	Management by school	Management by health facility	Management by religious institution	No management	Other	Total
AHANTA WEST	13	1	186	2	0	0	0	6	1	209
EKMA	0	5	1	3	0	0	0	0	0	9
ELLEMBELLE	11	25	100	9	9	2	2	17	0	175
JOMORO	10	3	89	4	0	0	0	3	0	109
MPOHOR	7	0	53	4	2	0	0	9	0	75
NZEMA EAST	18	7	50	2	0	0	0	3	2	82
PRESTEA HUNI VALLEY	132	2	64	3	0	1	0	1	0	203
SEKONDI TAKORADI	6	0	9	0	3	0	0	2	0	20
SHAMA	9	3	33	0	0	0	2	0	0	47
TARKWA-NSUAEM	53	5	67	2	0	1	0	0	0	128
WASSA AMENFI CENTRAL	38	0	92	0	0	0	1	1	0	132
WASSA AMENFI EAST	62	27	204	2	3	0	0	0	1	299
WASSA AMENFI WEST	9	45	140	1	3	2	0	2	1	203
WASSA EAST	41	22	239	5	5	0	6	17	1	336
TOTAL	409	145	1,327	37	25	6	11	61	6	2,027

TABLE 11: NUMBER OF BOREHOLES/HAND-DUG WELLS WITH HANDPUMPS BY DISTRICT

District	Borehole	Hand-dug well	Don't Know
TOTAL	1,832	183	12
AHANTA WEST	191	18	0
EKMA	9	0	0
ELLEMBELLE	147	27	1
JOMORO	100	9	0
MPOHOR	69	1	5
NZEMA EAST	55	27	0
PRESTEA HUNI VALLEY	180	22	1
SEKONDI TAKORADI	16	4	0
SHAMA	47	0	0
TARKWA-NSUAEM	104	24	0
WASSA AMENFI CENTRAL	131	1	0
WASSA AMENFI EAST	288	7	4
WASSA AMENFI WEST	190	13	0
WASSA EAST	305	30	1

TABLE 12: PIPED SCHEME BY MANAGEMENT TYPE

DISTRICT	Utility management		Community management			Small Water Enterprise	Private management		Institutional management				
	GWCL	CWSA	WSMT piped scheme	LMS WSMT	Community leaders	safe water	Private person	Private organisation/ NGO	School Management	Health care facility management	Religious institution	other	Total
AHANTA WEST	0	1	21	16	24	0	11	7	1	0	5	1	87
EKMA	0	0	4	1	1	0	3	25	1	0	4	0	39
ELLEMBELLE	0	3	13	10	0	1	26	5	1	2	0	0	60
JOMORO	1	2	7	15	21	2	34	3	0	0	0	0	85
MPOHOR	0	0	3	23	0	1	12	5	0	0	5	0	49
NZEMA EAST	1	0	4	34	7	2	26	0	0	0	1	2	77
PRESTEA HUNI VALLEY	2	1	16	33	0	0	26	2	2	0	3	0	85
SEKONDI TAKORADI	0	0	2	2	8	0	8	2	0	0	0	0	22
SHAMA	1	0	0	0	6	0	5	7	0	0	0	0	19
TARKWA-NSUAEM	1	1	18	12	6	0	20	5	0	0	1	0	64
WASSA AMENFI CENTRAL	0	0	5	30	1	1	16	8	0	0	2	1	64
WASSA AMENFI EAST	0	3	7	44	18	0	61	13	1	0	0	3	150
WASSA AMENFI WEST	0	2	2	47	44	0	29	5	2	0	2	0	133
WASSA EAST	1	2	5	2	6	10	5	32	0	0	0	2	65
Total	7	15	107	269	142	17	282	119	8	2	23	9	999

TABLE 13: NUMBER OF STANDPIPES BY MANAGEMENT MODEL

DISTRICT	Utility management	Community management	Small Water Enterprise	Private management	Institution management	Other	Total
AHANTA WEST	13	112	0	40	7	1	173
EKMA	0	6	1	28	6	0	41
ELLEMBELLE	51	78	8	52	10	0	199
JOMORO	64	90	14	62	0	0	230
MPOHOR	0	65	2	26	8	0	101
NZEMA EAST	43	60	6	40	2	5	156
PRESTEA HUNI VALLEY	60	140	0	29	8	0	237
SEKONDI TAKORADI	0	16	0	11	0	0	27
SHAMA	342	16	0	18	0	0	376
TARKWA-NSUAEM	96	266	0	36	2	0	400
TARKWA-NSUAEM	0	1	0	0	0	0	1
WASSA AMENFI CENTRAL	0	70	1	25	2	1	99
WASSA AMENFI EAST	46	94	0	75	1	3	219
WASSA AMENFI WEST	35	97	0	59	10	0	201
WASSA EAST	32	33	68	13	0	0	146
Total	782	1,144	100	514	56	10	2,606

TABLE 14: FUNCTIONALITY OF HANDPUMP

DISTRICT	Functional	Not functional	Total
AHANTA WEST	100	109	209
EKMA	4	5	9
ELLEMBELLE	124	51	175
JOMORO	60	49	109
MPOHOR	45	30	75
NZEMA EAST	42	40	82
PRESTEA HUNI VALLEY	135	68	203
SEKONDI TAKORADI	12	8	20
SHAMA	28	19	47
TARKWA-NSUAEM	69	59	128
WASSA AMENFI CENTRAL	99	33	132
WASSA AMENFI EAST	195	104	299
WASSA AMENFI WEST	115	88	203
WASSA EAST	196	140	336
TOTAL	1,224	803	2,027

TABLE 15: MAIN REASON FOR NON-FUNCTIONALITY OF HANDPUMPS

DISTRICT	Water table too low	Facility under repair	Handpump broken	No handpump	Abandoned	Other	Total
AHANTA WEST	3	2	25	23	55	1	109
EKMA	0	0	1	1	0	3	5
ELLEMBELLE	11	2	19	3	13	2	50
JOMORO	2	4	15	0	23	5	49
MPOHOR	2	1	21	3	0	1	28
NZEMA EAST	2	1	24	2	10	1	40
PRESTEA HUNI VALLEY	4	1	49	4	7	3	68
SEKONDI TAKORADI	1	0	6	0	1	0	8
SHAMA	1	0	10	0	8	0	19
TARKWA-NSUAEM	6	0	33	0	20	0	59
WASSA AMENFI CENTRAL	6	1	19	2	5	0	33
WASSA AMENFI EAST	8	2	59	7	6	20	102
WASSA AMENFI WEST	11	4	46	7	9	11	88
WASSA EAST	11	3	76	11	36	3	140
TOTAL	68	21	403	63	193	50	798

TABLE 16: AGE OF HANDPUMP

DISTRICT	Less than 2 years	2-5 years	6-9 years	10 years and older	Unknown	Total
AHANTA WEST	3	19	14	130	43	209
EKMA	1	1	0	0	7	9
ELLEMBELLE	15	74	18	52	16	175
JOMORO	6	19	11	53	20	109
MPOHOR	9	13	8	16	29	75
NZEMA EAST	13	12	4	48	5	82
PRESTEA HUNI VALLEY	4	34	32	128	5	203
SEKONDI TAKORADI	2	6	2	3	7	20
SHAMA	1	12	6	28	0	47
TARKWA-NSUAEM	0	3	24	89	12	128
WASSA AMENFI CENTRAL	5	11	47	59	10	132
WASSA AMENFI EAST	5	34	56	166	38	299
WASSA AMENFI WEST	11	42	44	98	8	203
WASSA EAST	15	79	57	178	7	336
TOTAL	90	359	323	1,048	207	2,027

2. DISTRIBUTION OF PIPED SCHEME BY MANAGEMENT MODEL

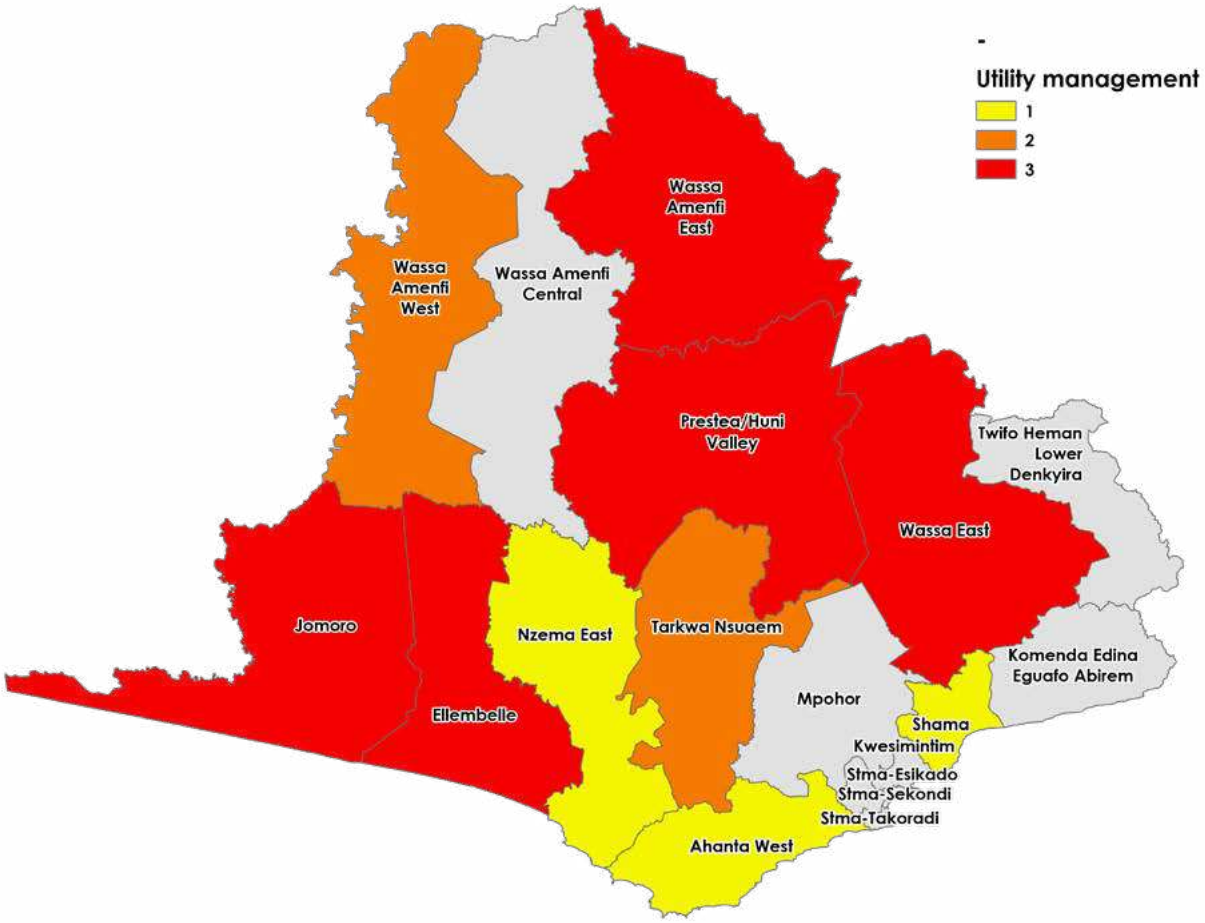


FIGURE 44: DISTRIBUTION OF PIPED SCHEME BY UTILITY MANAGEMENT

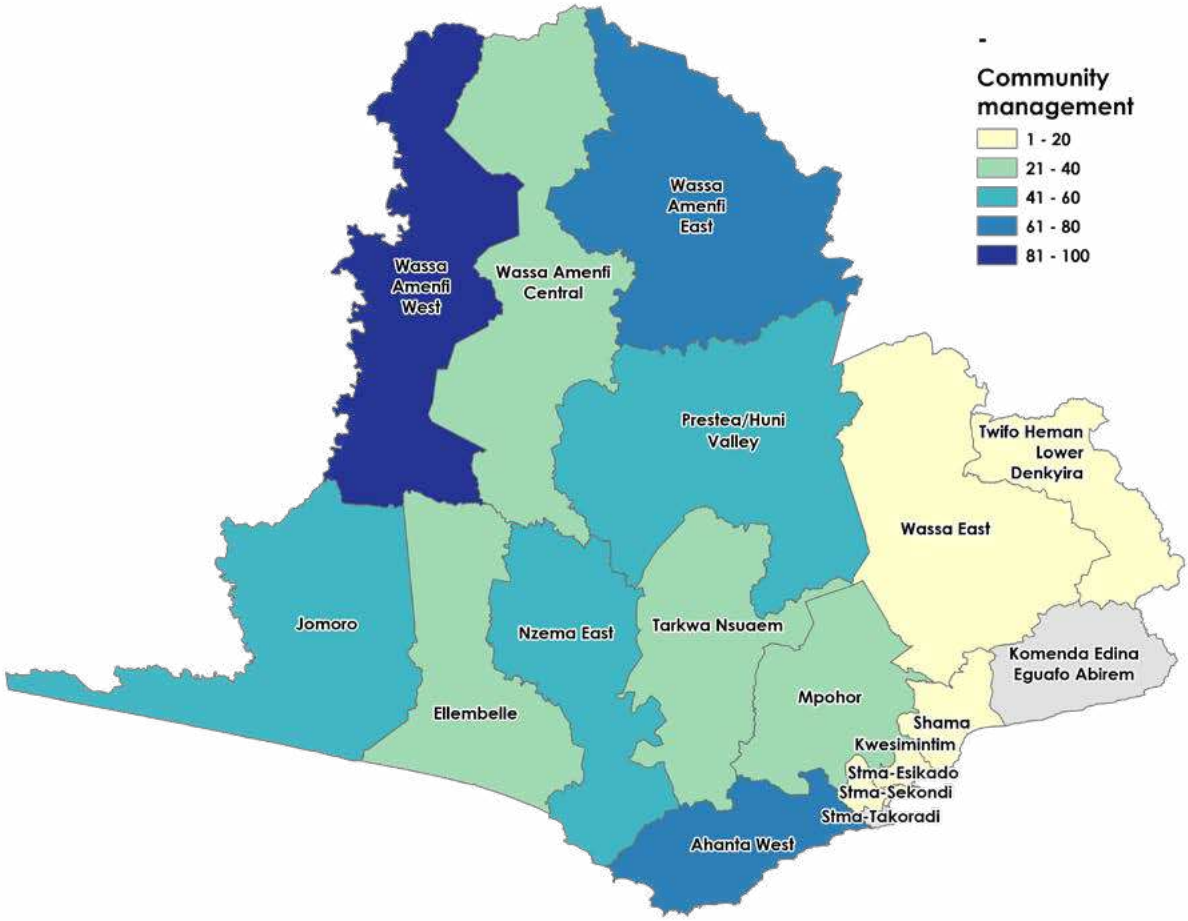


FIGURE 45: DISTRIBUTION OF PIPED SCHEME BY COMMUNITY MANAGEMENT

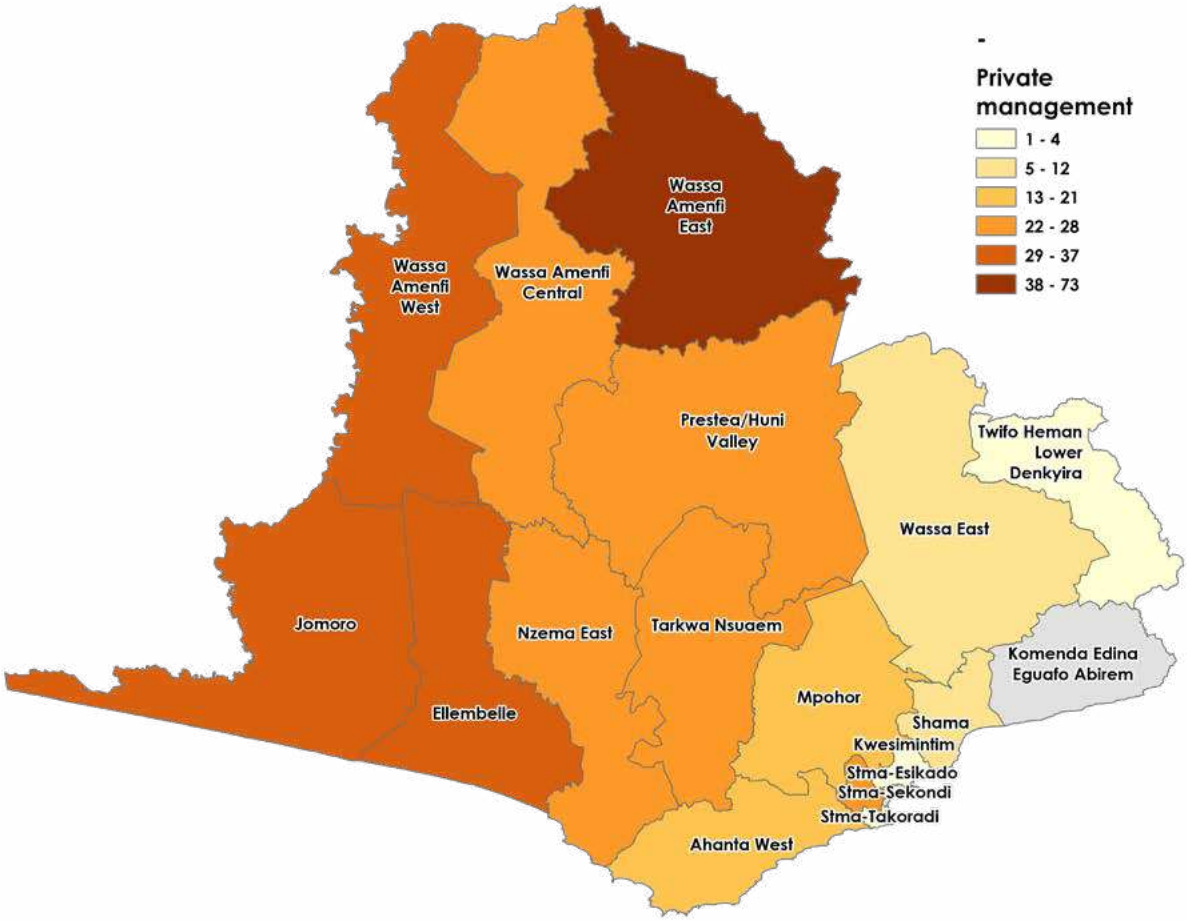


FIGURE 46: DISTRIBUTION OF PIPED SCHEME BY PRIVATE MANAGEMENT

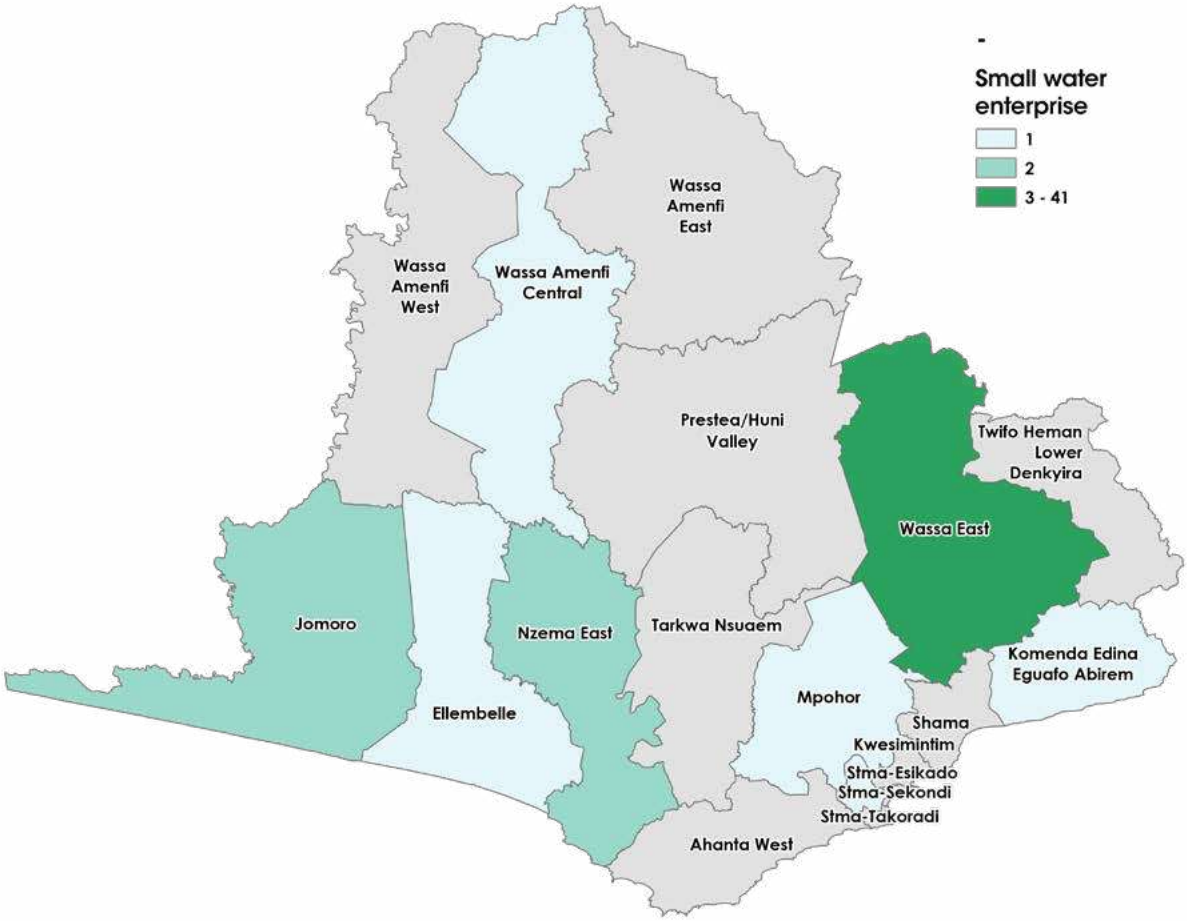


FIGURE 47: DISTRIBUTION OF PIPED SCHEME BY SMALL WATER ENTERPRISE

3. LIST OF CONTRIBUTORS

Name	Institution	Role
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