

Provision of post construction support (PCS) services to state water authorities in Nigeria: constraints and the way forward

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Abstract

Post-construction Support (PCS) services refer to all forms of assistance/support given to water service providers (WSPs) to enable them to detect, correct and maintain water system infrastructure or prevent future system faults. PCS enhances the quality and sustainability of water supply services. This paper examines the provision of PCS to state water authorities in Nigeria. Specifically, we identified the sources of PCS and relevance of PCS; then we discussed the pattern of occurrence of system faults the bureaucracy associated with PCS provision across the sampled states. Finally, we examined the constraints to PCS provision and the options for overcoming the challenges. The study used empirical data derived from questionnaire surveys, through key informant interviews (KIIs) and from published literature. The data were analyzed using descriptive statistical tools. Results of the study revealed the current sources and patterns of PCS provision which vary widely across the sampled states. PCS is provided intermittently based on resource availability and on the willingness of the provider. The constraints and bureaucracies associated with PCS provision cause prolonged and avoidable delays and limit quality service delivery with often great consequences for the end users. WSPs lack legislative, and policy instruments to compel governments to act and ensure that PCS services are provided speedily and in a sustainable manner. The poor quality of service delivery in the area can be traced, in part, to a lack of needed PCS services. Consequently, the way forward for WSPs is to confront the dearth of PCS in the water supply sector frontally. Suggestions on how to surmount the dearth of PCS and improve the quality of service delivery in the area were advanced.

Keywords

Water service providers, Sustainability, Post-construction support, Rural water supply, Water infrastructure, Rural communities, Nigeria

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Highlights for public administration, management and planning:

- Post-construction Support (PCS) services are key conditions for detecting, correcting, and maintaining water system infrastructure and preventing future system faults.
- In total, 60 rural communities were sampled in Nigeria to reveal the perceived operation of PCS services.
- Technical and water infrastructural faults are the most frequent in the studied communities.
- One third of possible water system failure reduction strategies are implemented infrequently, while another 27.8% have never been implemented.
- Measures and instruments to be used by governments and agencies to rethink their policies on PCS provision are outlined.

1 Introduction

Post-construction Support (PCS), refers to the varied forms of assistance and support given to water service providers (WSPs) to enable them to effectively detect, repair and facilitate the repair of dysfunctional water supply systems (Komives et al. 2008). Water service providers (WSPs) at the state or local government level are in charge of field maintenance and repair of broken pipes and other repairs for water distribution in urban and rural area (WASHNORM 2021). PCS assists WSPs to carry out administrative, operation and maintenance functions and by extension fulfill their mandates of providing quality and sustainable water services to end users. Studies in PCS in developing countries have grown by leaps and bounds in the last three decades. Some of the main thrust of studies in the PCS sector as identified by Gibson & Matengu (2010) and Smits et al. (2011) include studies on the sources, forms, relevance, administration and impacts of PCS on water services delivery. There have also been studies on institutional arrangements for the provision of PCS and the policy environments under which PCS are provided in Bolivia (Chitonge 2011).

The relevance of PCS has been discussed extensively in the literature (Cleaver 2001; Ellen & Kellog 2005; Chitonge 2011; Ali 2012). Literature evidence indeed shows that PCS is an essential component of sustainable water supply services delivery and a major step which needs to be taken to correct present and future water system failure. Ellen & Kellog (2005) noted that PCS enhances sustainable provision of water supplies while Kayser et al. (2010) added that PCS improves water supply security. (Chitonge 2011) also observed that WSPs need PCS to tackle technical and non-technical faults that hinder system sustainability. Earlier (Cleaver & Toner 2006) opined that long-term sustainability of water services provision is enhanced by regular and systematic provision of PCS. (Cherlet & Venot 2013), also in their lengthy paper, discovered that PCS is (i) appropriate for all water projects, (ii) improves the quality and sustainability of urban and rural public water supplies, (iii) is essential for success in water system management, (iv) facilitates the transfer of knowledge and ideas on public water supplies, and (v) reduces the damage/ degradation caused to supply systems by maintenance backlog.

The goals of regular provision of PCS as listed in literature are yet to be achieved in the water supply sector of many developing countries. In Nigeria,

for instance, water authorities are unable to meet households' demand for potable water or maintain standards (Ahmed et al. 2016; WASHNORM 2021) and ensure access to safe drinking (SDG 6). About 90 million people or 58% of the Nigerian population lack access to safe and improved drinking water sources (Mburung'a 2018). Nigeria ranks behind many other African countries (Botswana, Rwanda, Ghana, and South Africa) in level of access to potable water (Mburung'a 2018). According to Satterthwaite (2016), only 1% of the Nigerian rural population has access to piped supplies on premises.

The WHO and UNICEF JMR 2015 report showed that many Nigerians live in water stressed areas where it is difficult to get enough water to satisfy the basic human needs. This is despite the large array of institutions and agencies engaged in delivering water supply services to end users in Nigeria (WASHNORM 2021). A significant proportion of the Nigerian rural population continue to use rivers, ponds, lakes and harvested rain as their main sources of water supply (Mburung'a 2018). Adequate and reliable access to potable water supply is very critical and essential for peoples' well-being as well as for the sustenance of socio-economic growth and development (Ezenwaji 2004). It is critical to a community's efforts towards poverty reduction, economic growth, and food security. However, in many rural communities in Nigeria, vast proportion of the rural population remains severely under-served, with majority turning to unprotected sources for their water supplies (Abalaka & Aga 2016).

This study is undertaken to critically examine the formal and informal support received by WSPs in Nigeria to aid sustainability of water service delivery to rural communities. Empirical evidence from 60 rural communities, selected from six widely separated states in the six geopolitical zones in Nigeria was used to assess the current state of PCS activities in the rural water supply sectors in Nigeria. This study is unique in that it was specific to community level, while using consistent, reliable, and rigorous data to discuss the topic. Although the research is limited to Nigeria, the findings may prove beneficial to other developing countries that need to build, maintain, and improve service delivery in the water supply sector. The results of the study may aid policy makers in deciding on new investments needed to promote the sustainable provision of water supply to rural communities. Effective PCS provision has the potential to improve the operational efficiency of water projects and service delivery in the rural water sector as done in in

El Salvador, Colombia, and Ghana (Komives et al. 2008).

1.1 The Current reality of rural Water supply in Nigeria

Many workers and agencies have reported on the current reality of public water supplies in Nigeria. These include Akana & Didei (2017) and Akpen et al. (2019) reported that in Nigeria, potable water remains in dire need in almost all rural communities and sectors. They observed that Nigeria is still one of a handful of countries around the world where access to potable water is falling rather than rising. They noted that only 37% of the nation's population had regular access to potable water in 1990. In 2003 the percentage of the population with regular access to potable water declined to 32% and again to 28% in 2012. They attributed inefficiencies in rural water supply sector in Nigeria to a range of technical, institutional, economic, and social factors.

Akpen et al. (2019) observed that in Nigeria, sustainability of rural water supply systems is an acute problem mainly due to wide-spread water infrastructural decay and frequent system breakdowns. These workers reported that about 130000 under five children die annually from preventable and treatable water related diseases. Nwankwo (2014) discovered that for a sizable proportion of the rural population in south-eastern Nigeria, the major sources of water were unprotected wells, streams, ponds, private boreholes and harvested rain-water. These sources are open to contamination by natural and anthropogenic factors. Recent studies (Ahmed et al. 2016) reveal that public water authorities are unable to meet households' demands for potable water. Over 90 million people, living in urban and rural areas lack access to improved drinking water sources. Ajibade et al. (2015) indicate that the prevalence of water-borne and water-related diseases in the Nigerian rural areas is increasing at an alarming rate.

1.2 The scope and aims the study

This paper focuses on access to PCS by WSPs in six sampled states in Nigeria. We described PCS sources, identified and categorized system faults in the sampled states, examined the bureaucracy associated with PCS provision to WSPs in the study area and discussed how improved access to PCS can improve users' access to potable water and ameliorate the existing mass water poverty in Nigeria. The practical and policy implications of the current

pattern of PCS provision to WSPs were also investigated. The findings of the paper may assist policy makers to develop of project intervention measures that can improve users' access to potable water and improve the flow of feedbacks and interactions between WSPs and end users. Findings may also improve the ability of WSPs to handle their administrative and associated functions as well as improve the sustainability of water services.

2 Methods

2.1 Study Area

Nigeria is located between longitudes 20 49'E and 140 37'E and latitudes 40 16'N and 130 52'N and has an area of 927 339 km² (UN 2007). The country is composed of 36 federating states (see Fig. 1) and has a 2020 projected population of about 210 million people with an annual growth rate of 2.78 % (UN 2007). The country shares boundaries to the north with Niger and Chad, to the east with Cameroon, to the west with Benin Republic and to the south with the Atlantic Ocean. Nigeria has a very rich diversity in climate, biological resources, ethnicity, and culture (Utube 2002). The climate is tropical with high temperatures and high humidity as well as marked wet and dry seasons, though there are variations between north and south (OFOMATA G.E.K. 2002). Precipitation varies widely in both time and space, ranging from less than 250 mm per annum in the extreme north to 2250 mm at the coast (Adelekan 2010). Some rural areas get little or almost no precipitation, while others, like those in the Niger Delta, are among the most water-rich areas on earth (Inyang 1975).

The seasonal variation of rainfall combined with the phenomenal growth of the population creates two important scenarios in the water use pattern. First, direct collection and use of rainwater is more pronounced in the rainy season (Okoroaga 2007). Second, extraction of water from springs and streams are more common during the dry season (Anyadike 1993). The country is drained by numerous rivers, principally the Niger, Benue, Cross River and their numerous tributaries as well as by the Lake Chad basin and the rivers that discharge into it (Inyang 1975). Many of these streams, especially in the drier northern states, are seasonal. Although the country is blessed with abundant natural water resources, water has been the most limiting factor to the development of Nigeria (Okoroaga 2007). Approximately, 78% of the Nigerian popu-

lation live and work in rural areas (Baguma et al. 2013).

2.2 Methods of data analysis

The PCS data used in this study were collected directly from WSPs in the field. First, we selected six study states randomly (see Fig. 1), one each from the six geo-political zones in Nigeria. From the States one Local Government Area (LGA) was also drawn on availability of water scheme or water infrastructure for use in the study. Within the local government areas (LGAs) ten rural communities were purposefully selected for sampling.

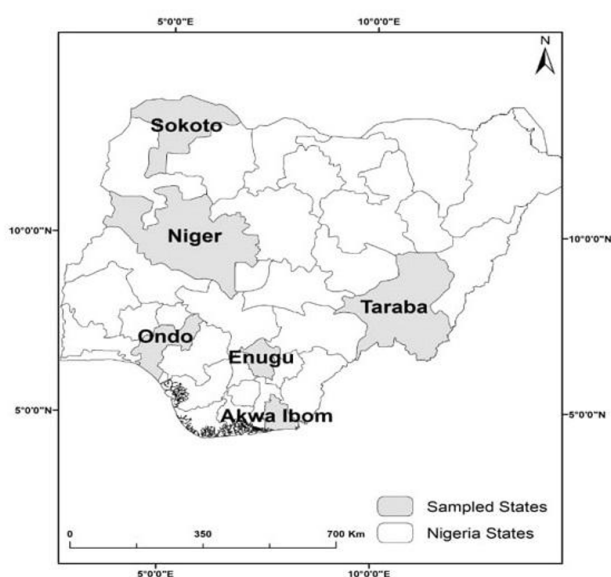


Fig. 1 Nigeria showing the sampled states (GIS LAB. Department of Geography UNN, 2022)

A total of 60 rural communities (10 for each State) were sampled. Sampling was limited to communities that were accessible, had water scheme and was safe (security-wise) for field surveys. Secondly, extensive desk research was undertaken to collect relevant secondary data from published documents as well as from records in states' water authorities. Data collection in sampled states was carried out between November 2019 and March 2020. The type, sources and characteristics of data used in this study are summarized in Table 1.

Eighteen research assistants (3 per state) were trained and used for the study. The research assistants assisted in (1) Identification of local water sources and economic activities (2), interviewing community leaders and VWC members (3) and in questionnaire administration. Within each sampled community, 40 copies of questionnaire were administered at random to household heads that participated in the study. The questionnaire was administered in each state by the research assistants, who were indigenes of the State and University students. The data collected from the sources described above were carefully analyzed. Descriptive statistics (Totals, means, standard deviations, percentages etc.) were used to analyze the data.

3 Results

3.1 Sources of PCS in the sampled states

Findings revealed that there is no uniform institutionalized model to PCS provision in the sampled States. The observed approaches vary widely. In Taraba state, PCS is provided directly but irregularly by local communities, local and state governments. WSPs cannot determine, schedule, quality

Table 1 Data sources

S/NO	Data Types and characteristics	Data Sources
1	Characteristics of water infrastructure/ projects design capacities, age, functionality, type of technology and the age of water systems	States water authorities, filed staff and community leaders, WSPs members and from household questionnaire administration.
2	Secondary data	Published documents- journals, books, government gazettes, project reports, mission reports and the internet
3	Patterns and problems of PCS. Provision, providers, types, regularity, bureaucracies associated with PCS provision and factors limiting provision	States water authorities; filed staff and community leaders, WSPs members and from household questionnaire administration.
4	Impact of the use and non- use of PCS on water services delivery support for sustainability	Through three focus group discussions (FGD). Comprising of the LGA director of water, three borehole managers, three community leaders, and two WSPs members
5	Contemporary water supply situations and service delivery in sampled communities	Questionnaire administration and interviews with field staff of the states' Water authorities

and frequency of PCS provision. In Enugu state, solicited and unsolicited PCS support comes infrequently from state and local Governments, NGOs, communities, faith-based organizations and wealthy

individuals. WSPs don't receive regular PCS and this impact negatively on the quality and sustainability of rural water services in the state.

Table 2 The Sampled States

S/NO	Sampled States	Projected 2020 population	Rural/Urban Ratio	Land Area in km ²	Major public Water sources	Primary Water Source	Dominant economic activities
1	Enugu	3257298	31/69	7,16	vendors, streams, boreholes	vendors	farming, trading, metal work,
2	Niger	3950249	38/62	76,36	streams, wells, vendors,	streams	farming, mining and quarrying
3	Ondo	3441024	66/34	15,50	boreholes, streams, vendors	boreholes	farming, lumbering and fishing
4	Akwa Ibom	3920417	70/50	7,08	streams, wells, boreholes	boreholes	farming, fishing, wood production
5	Taraba	2300736	24/76	54,47	streams, wells, boreholes	streams	farming, quarrying, crafts
6	Sokoto	3696999	28/72	25,97	wells, boreholes, vendors, streams	wells	agriculture, local crafts

Table 3 Reported system faults in the sampled states in 2020

S/N0	Reported faults/challenges	ENUGU	NIGER	ONDO	A/IBOM	TARABA	SOKOTO	TOTAL	%
1	B/H Fault	14	11	8	24	5	32	94	14.5%
2	Col. of B/H walls	8	5	3	7	4	9	36	5.6%
3	Sumo faults	28	14	9	18	3	8	80	12.4%
4	Lack of Grease	5	2	0	0	0	5	12	1.9%
5	Lack of E/oil	6	1	2	0	6	7	22	3.4%
6	Lack of Gas	7	5	3	0	1	5	21	3.2%
7	Elect. Faults	10	0	0	3	0	5	18	2.8%
8	Pipe blocked	22	0	10	9	0	7	48	7.4%
9	Burst pipes	7	3	4	9	0	5	28	4.3%
10	Heavy leakages	5	3	0	4	3	8	23	3.5%
11	Light leakages	9	3	0	0	8	6	26	4.0%
12	Power failure	14	3	1	7	0	4	29	4.5%
13	Lack of Joints	7	0	0	4	0	3	14	2.2%
14	Booster pump failure	13	5	7	4	0	7	36	5.6%
15	Gen. .set fault	9	0	4	5	0	0	18	2.8%
16	Lack of valve	6	3	0	0	0	3	12	1.9%
17	Vandalism	0	13	0	0	15	2	30	4.6%
18	Disputes	0	4	6	6	7	0	23	3.6%
19	Lack of PPE	16	0	5	0	5	11	37	5.7%
20	Tr.r/problems	9	7	10	0	6	8	40	6.2%
Total	TOTAL	196	82	72	100	62	135	647*	
%	Percentage	30.3%	12.7%	11.1%	15.5%	9.6%	20.8%	100%	

Akwa Ibom state is better served because PCS is provided, not immediately on request, by governments (local, state and federal) as well as by

firms, bilateral and multi-lateral agencies and hosts, communities. Various agencies such as NDDC and UNICEF provide helps to improve the quality

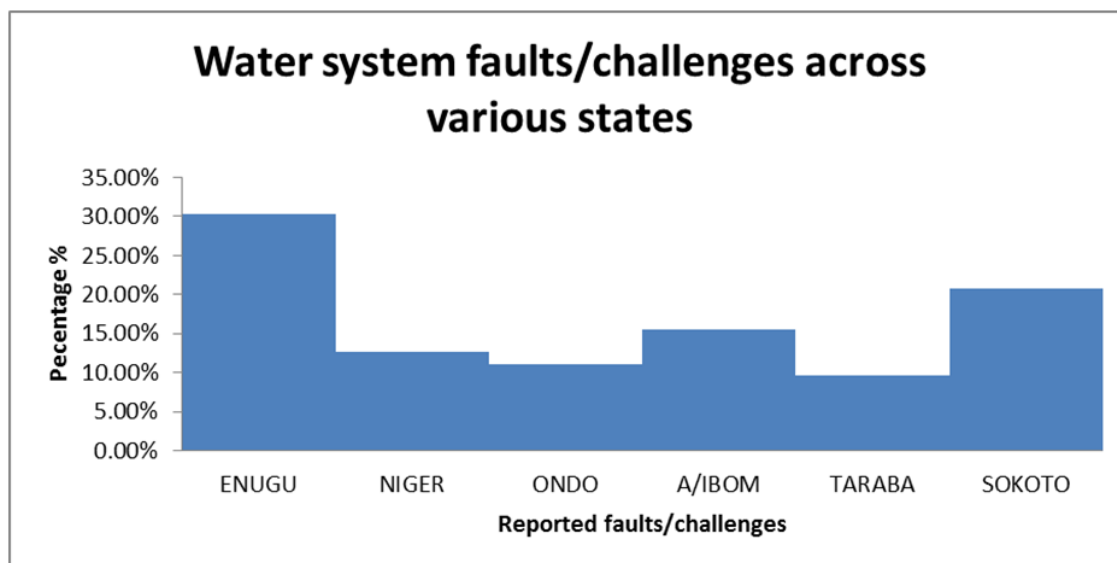


Fig. 2 Number of system faults/challenges that occurred in each sampled States in Nigeria in percentages

and sustainability of rural water services. The Ondo state model closely approximates that of Akwa Ibom except for the noticeable absence of NDDC contributions which respondents attributed to lack of political will. In Sokoto state government contract water system repairs and PCS provisos to specialized corporations who, again contract trained technicians to effect system repairs and provide technical assistance and advice to WSPs. In Niger state, public officers are trained to handle financial, administrative and engineering services and to source PCS from the state water corporations. Private firms are also contracted to repair supply facilities and provide PCS to community-based WSPs in order to improve functionality of water infrastructure.

3.2 Observed system faults limiting the performance of supply facilities

Findings reveal that all the sampled schemes experience faults and received support on request to restore/improve/maintain the functionality of water infrastructure and maintain service delivery. In Enugu state communities occasionally mobilize and use local resources to rehabilitate dysfunctional rural boreholes. Table 3 provides summary information on the of the observed system faults/challenges in the sampled states.

The variations in the number of occurrences of these faults/challenges are summarized state by state in Fig. 2 below. As shown in these figures, technical and water infrastructural faults, such as B/H faults, submersible, and booster pump faults, collapses of B/H walls and blocks of water pipes are the most

frequently reoccurring water system faults experienced by the sampled water authorities in Nigeria.

3.3 Perceived impacts of PCS on water services delivery

WSPs in the study area opine that regular provision of PCS assist in: (1) Early detection of system faults (spot leaks, errors), (2) Improve the technical and administrative competencies of staff, (3) Improve the capacity of staff to handle O & M activities, (4) Extend service delivery, service coverage and prevent future breakdowns, (5) Access needed financing extend the life of water infrastructure; are rarely provided in the study area.

3.4 Implementation of strategies to reduce the prevalence of system failures

Several strategies can restore the functionality of community-based water facilities and/or reduce water system failures and maintain service delivery (Akpen et al. 2019). For instance, communities can mobilize and use local resources to rehabilitate dysfunctional rural boreholes. We review in this section the extent to which the sampled states adopt and implement such strategies. Table 4 provides summary information on the extent to which the sampled states adopt and implement such strategies in 2020. As shown in table 4, 35.0% of water system failure reduction strategies such as regular provision of spare parts, training, technical information, and technical assistance etc. to WSPs in the sampled states are implemented infrequently while 27.8% have never been implemented. The patterns

Table 4 Extent to which the sampled states implement strategies to reduce system failures in 2020

S/N0	PCS Reduction strategies (Red.)	ENUGU	NIGER	ONDO	A/IBOM	TARABA	SOKOTO
1	Training for tech. staff	+	++	+	+	++	+
2	Training for non- tech. staff	+	+	+	+	++	+
3	Training for VWC members	+	—	—	+	—	—
4	Red. purchase of modern drilling equipment.	—	+	+	+	++	+
5	Red. purchase of needed PPE	—	—	+	+	++	+
6	Funding for OM	+	++	+	++	++	+
7	Red. budgetary allocation for OM	+	+	0	—	—	0
8	Red. release of fund for OM	+	+	++	++	++	+
9	Reform to increase access to PCS	—	—	—	+	—	+
10	Collaboration between WSPs	—	+	—	—	—	+
11	Recruitment of new staff	+	++	+	+	++	+
12	Decentralization of PCS outlets	—	—	—	—	—	—
13	Red. purchase. of needed tools for O M	+	++	++	++	++	++
14	Regular inventory of dysfunctional parts	+	+	+	—	++	+
15	Av. of spare submersible (SUMO) pumps	—	+	—	+	0	—
16	Approved schedule for routine maintenance	+	++	+	+	++	+
17	Specific training for O M	+	+	++	++	+	++
18	Av. of Published guides for O M	++	++	++	++	++	+
19	Tariff structure that covers O M costs	—	—	—	—	—	—
20	Laws/legislations that compel govts. to provide PCS	—	—	—	—	—	—
21	Community offices where requests for PCS are made	—	—	—	—	—	—

++ = implemented regularly; + = implemented infrequently; — = implemented in the remote past; -- = Never implemented, 0 = not needed

of provision vary widely. Findings reveal that provisions are generally characterized by prolonged delays and frustrations. Complaints about delays and the difficulties associated with sourcing needed parts to rectify system faults and dysfunctional public water projects were received in all the sampled states.

3.5 Bureaucracies associated with PCS provision

As Table 4 shows, WSPs in the study area do not have decentralized warehouses (at community, district, or local government levels) from where they can receive PCS or laws which can force the governments to provide them with PCS when needed. WSPs in the study, as a matter of tradition, must apply for needed PCS from the headquarters of the State Water Authority. In Enugu and Akwa Ibom states, such application must pass through four to six line officers before approvals can be given; this may take days or weeks before even a single pressure valve can be obtained. And even after approval has been given, actual delivery will depend on the availability of needed parts and the priorities of the officers' in charge. In Sokoto and Ondo states, they may need to solicit or even seek the help of traditional rulers to intervene/facili-

tate the process. Even with the intervention of these influential individuals, WSPs, often fail to receive PCS from governments or receive in an ad hoc manner. This forces some WSPs to turn to non-state agencies or NGOs (with perceived goodwill) for assistance. In Taraba and Niger states, the extent and quality of PCS obtained depends on how proactive the provider requesting assistance is and the extent of public outcry; as well as on the availability of needed spare parts, financial resources, technical capacity and priorities of the provider. Table 3 shows, only few (22.2%) PCS is provided regularly to WSPs by governments in the study area; usually cheap and easy to source PCS like published guides and simple tools used for routine maintenance. Findings suggest that WSPs do not receive high quality PCS but mainly those needed for minor repairs or those needed to prevent total system failures.

3.6 Constraints to PCS provision

Our respondents identified some constraints, which in their view limit PCS provision in the study area. The identified constraints are summarized below.

(1) Historical factors: Conflicts, which occur widely in Taraba, Sokoto and Niger states, were reported to impact negatively on the sustainability of pub-

lic rural water schemes as well as in the provision of support to maintain existing projects.

(2) Technical factors: Lack of engineering skills and capacity hamper members of VWC from detecting, repairing dysfunctional projects as well as in operating and maintaining water projects. Findings reveal that the VWC members are not trained and as result they cannot effectively solve existing and emerging technical problems, especially for relatively older water projects.

(3) Institutional factors: Water authorities in sampled states don't have effective programmes for the provision of PCS; roles and responsibilities are poorly defined; enforcement and regulatory frameworks are inadequate. The governance system does not create strong room for motivation and quality performance; hence the supply system is characterized by poor performance.

(4) Economic factors: Sampled water authorities claim that insufficient and declining financial allocations for rural water supply is a major problem limiting the provision of PCS in the study area. Findings reveal that funds are not released on a timely basis or in the amounts required for project maintenance.

(5) Social factors: The social factors included the reported misapplication/embezzlements of local resources provided to address dysfunctional water projects and disagreements/conflicts between and among members of VWCs.

(6) Organizational/managerial factors: There is currently no national institutional model for the provision of PCS in Nigeria. Each state adopts its own guidelines, modalities, or arrangements for the provision of PCS to WSPs. In view of this, PCS for water project depends largely on how influential/connected or how pro-active the community requesting assistance is.

(7) Environmental factors: Natural disaster such as landslides and flooding were found to destroy water projects and constrain efforts to effect system repairs. They also make local resources mobilization (users contribution for the community O&M fund) more problematic.

4 Discussion

The barriers to the provision of PCS to WSPs in the study area are numerous. The first is that PCS is not considered a fundamental part of efficient water supply requirements during the planning stages of water projects in the study. This explains why firms, contracted to develop water projects are not required to provide host communities with back-up PCS or training in order to enable them

to operate and maintain the system sustainably. Many of the observed dysfunctional water projects in the study area may undoubtedly be to the absence of PCS. In Enugu state, the non-replacement of submersible pumps at two water points (Umundu and Amalla communities) forced the residents to source household water from alternative sources (vendors). Despite public outcries, entreaties, and pressure, the State Water Corporation, was yet to come to the aid of these communities at the end of our field surveys. In Lappai (Niger State) the residents were unable to repair and maintain a project developed (under the Integrated Rural Water Supply Project) in 2001 due to lack of capacity and training. The project stopped functioning since 2004 and is now covered by grasses. Many other such examples exist throughout the study area. Secondly, governments in the study area have not established sustainable sources of funding for PCS or created a separate or sub-agencies, with clearly defined mandate, to promptly repair and rehabilitate dysfunctional water projects. Thirdly, commitment for the provision of PCS on the side of governments appear to be lacking; funds are not set aside for PCS by state governments and WSPs have to source needed spare parts seven from non-state agencies. This limits the capacity of WSPs to undertake regular maintenance and replacement of spare parts.

4.1 The way forward

The way forward is for governments to: (1) Increase budgetary allocation for O and M of water projects and release such funds on timely basis and in amounts required for project maintenance. (2) Seek foreign assistance and raise water tariffs levels to cover operation and maintenance costs. (3) Establish warehouses, where spare parts can easily be accessed and used to undertake regular repairs, maintenance, and replacement of dysfunctional parts. (4) Form pressure groups or lobbies to influence policy making and legislations on PCS to WSPs in the area. They need to present PCS roles in a way which will be clear and attractive to politicians, planners, and administrators so that governments can prioritize the maintenance and rehabilitation of rural water supply schemes and develop robust PCS programs to boost service delivery. (5) Ensure that PCS receive adequate attention/emphasis at the planning stages of water projects. In fact, the national government needs to develop the legislative, policy and institutional framework to guarantee the flow of PCS to community service providers. (6) Promote technical coop-

eration between state and national water agencies as this could catalyze the exchange of ideas and expertise among staff of concerned agencies. (7) Establish a National Agency for Rural Water Infrastructure Rehabilitation to contribute to the rehabilitation of rural water supply infrastructure nationwide. Such an agency may be charged with administering PCS systems and in addition assist in upgrading existing local capacities to enable users operate and maintain public water schemes.

5 Conclusion

Sustainable Development Goal (SDG) 6, target 1, wants to achieve universal and equitable access to safe and affordable water for all by 2030. Using a questionnaire survey, we identified several failures of PCS provisions along with their perceived drivers, and barriers across the states of Nigeria. To achieve these commitments in Nigeria, improvements in the provision of PCS need to be stressed. Governments and agencies need to rethink their policies on PCS provision. Governments in Nigeria can, with the right political will, develop robust PCS programs that may make service provision more efficient. If done properly; it may ensure the availability and sustainable provision of potable water for rural residents in Nigeria.

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