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Towards an Analytical Framework to Benchmark the Performance of Urban Drinking Water Supply: Preliminary Findings from Ambo, Ethiopia

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This paper aims at identifying strategies to improve the performance of Ethiopian local governments in supplying drinking water. Therefore, a case study of Ambo (Ethiopia) is performed, on basis of document analysis, interview and focus group discussion. This allows operationalizing Pollitt and Bouckaert's (2011) production process model, by defining input, activity, output and outcome indicators relevant for drinking water supply in the context of developing countries. The indicators and their interrelations subsequently allow coining efficiency-improvement and effectiveness-improvement strategies. The paper finds that most performance improvement strategies do not involve a trade-off between efficiency and effectiveness: investing in the maintenance of the water distribution network, involving the community in the production process, ensuring a minimum quality threshold, improving procurement policies, and relying on ground water contribute to both and deserve being implemented. On other aspects, related to commercial policies and the quality of water, local policymakers need to make a choice between pursing efficiency and effectiveness. The paper contributes to the ongoing discussion on the added-value of governance for the 2030 Agenda, and paves the way for benchmarking Ethiopian local governments, and warrants further research onto the added value of participation for development.

Keywords: *Performance, Efficiency, Effectiveness, Participatory governance, Drinking Water supply, Ambo, Ethiopia*

INTRODUCTION

Access to drinking water remains a precondition for the well-being of populations and economic development. This is why UN set a Sustainable Development Goals' (SDG) target to ensure by 2030 a universal access to safe drinking water (UN, 2015). The second Ethiopian Growth and Transformation Plan (GTP) aims at 75% urban drinking water coverage (National Planning Commission 2016: 96).

In Ethiopia, urban local governments are responsible for drinking water supply (Oromia National Regional Government, 2003). Existing studies about their performance in supplying drinking water provide two insights. They indicate, first, that improvements are needed: the country performs poorly, even by African standards (Banerjee et al., 2008), and has the highest absolute number of people without access to improved water – a problem which is even more significant at local government level (Yacob et al., 2010). Second, the different figures provided (only 58,25% access according to MOFED and UN Country Team Ethiopia (2012); 91,5 % coverage within 0,5 km in urban areas according to MOFED (2010), 73,3 % coverage within a 1,5 km radius in urban areas in 2012 according to the World Bank (2013) and 91% urban access in 2014/15 according to National Planning Commission (2016: 39)) shows disagreement on the appropriate indicators to evaluate local government performance in drinking water supply.

Accordingly, this paper aims at answering this research question: "how can Ethiopian local government improve their performance in supplying drinking water?" In order to answer this question, the study builds on Pollitt and Bouckaert's (2011) production process model. The model conceives an organization, program or department as the deployment of inputs into activities, leading to outputs and outcomes. It allows distinguishing efficiency-improvement and effectiveness-improvement strategies, which are considered to involve a trade-off.

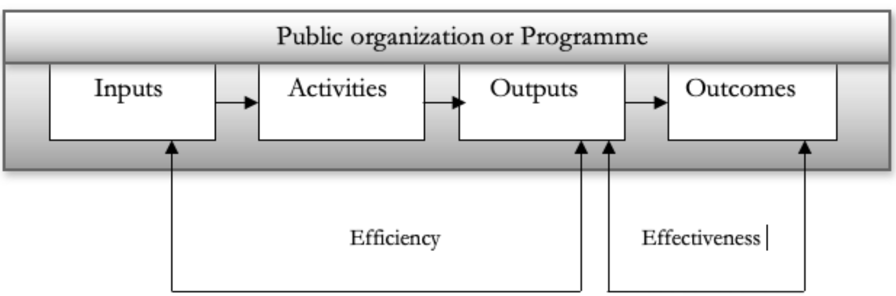
In order to map the production process of drinking water supply, define operational input, activity, output and outcome indicators, understand the interactions among these indicators, and identify strategies to improve the efficiency and effectiveness in supplying drinking water, the paper relies on evidence collected in Ambo town, Ethiopia, through document analysis, interviews with the local water company managers, and a focus group with citizens' representatives.

The paper is organized into four parts. The next section discusses the analytical framework: the production process model. The third section presents the research method used in this paper. The fourth section presents the production process and identifies relevant performance measures and indicators for urban drinking water supply service. The last section discusses the result of the study and formulates policy recommendations.

ANALYTICAL FRAMEWORK

Many studies of performance management and public sector reform program use the production process model developed by Pollitt and Bouckaert (2011). Figure 1 presents the main elements of the production process model and two generic criterion of performance assessment derived from it.

Figure 1: The Production Process Model



Source: Polllitt & Bouckaert, 2011

Inputs refer to resources (human and non-human) that are deployed by organizations to produce output (Pollitt and Dan, 2013) through activities. Activities are of an operational and management nature and include organizational structure and arrangements, allocation of authority and working procedures. Outputs refer to what an organization or a program delivers or produce, and are usually quantifiable. Outcomes are measurements of value and denote what happens in the real world as the result of organizational or program output (Dan, 2014). Outcomes are often triggered by many causes and cannot be simply attributed to a single organization or program action (OECD, 2009).

Performance is usually conceived in terms of certain relationships between these inputs, outputs, and outcomes (Pollitt and Dan, 2013). Efficiency refers to the ratio of inputs to outputs (Van Dooren et al., 2010). Accordingly, an organization/policy is performing well if it maximizes the outputs produced with a given set of inputs (output oriented) or if it minimizes inputs used to produce a given set of outputs (input oriented) (Jacobs et al., 2006; Van Dooren et al., 2010). Effectiveness usually refers to the extent to which the original goals or objectives set for the organization or program have been realized through the outputs provided (Dan, 2014; Pollitt and Bouckaert, 2011; Woodybury and Dollery, 2004; Ammons, 1996).

The dynamic interaction among elements of production process model indicates that performance management is an ongoing and cyclical process. In general, the analytical framework is useful to assess, compare and benchmark performance in the public sector (Van Dooren et al., 2010; Pollitt and Bouckaert, 2011; OECD, 2009). Consequently, the production model is used to identify the relevant input, activity, output, and outcome indicators for drinking water supply, and operationalize efficiency and effectiveness to allow benchmarking the performance of urban local government in drinking water supply in further studies.

Research Method

This paper aims at operationalizing Pollitt and Bouckaert's production process model for drinking water supply or, in other words, at identifying the inputs, activities, outputs and outcome indicators for the drinking water supply process, and coining what an efficient and effective drinking water supply concretely means.

There is abundant international literature detailing the water supply process and devising criterions to evaluate its performance. The United Nations, notably, has adopted a SDG regarding clean water and sanitation (UN, 2015), and has coined a human right to water (UN, 2010). The World Health Organization has set guidelines for technical standards of water quality (World Health Organization, 2004) and developed a risk management tool allowing water companies complying here with (WHO, 2009). The International Water Association has further developed this management approach to drinking water supply (IWA, 2013).

A review and synthesis of international standards would thus have sufficed to answer the research question. However, there was a risk that the performance indicators synthesized this way correspond more to the imperatives of the international community than to the wishes of the local population. To avoid such a bias, collecting input from the local population was needed.

This paper thus relies on a single case study of Ambo Urban local government, in Ethiopia, to explore and understand the interaction between elements of production process model. Ambo has been chosen for two reasons. First, Ambo is representative of the other municipalities in the Oromia National Regional Government. It can thus be expected that the performance indicators relevant for Ambo can apply to the other municipalities of comparable size in the region. Second, the feasibility of the study (time, distance, potential access to relevant data) has been taken into account.

Ambo Urban Water Supply and Sewerage Service Enterprise (AUWSSSE) is responsible for urban drinking water service in Ambo (Oromia National Regional Government, 2004). AUWSSSE's strategic plan, annual plan and performance report were analyzed (AUWSSSE, 2011a, 2011b, 2011c; 2012; 2013).

Moreover, interviews were performed with AUWSSSE's managers, three customers, a hydro-geologist (West Shoa Zone Water, Minerals, and Energy Office) and a Civil Engineer (Ambo University lecturer and researcher). Annex 1 presents the profile of interviewees and the major issues discussed.

Finally, a focus group discussion was organized with representatives of citizens and customers of AUWSSSE to get a better insight into their expectations in terms of water supply. The participants represented NGOs, public sector and university; each having different roles in the community (resident, leader in a church and private health center operator). Annex 2 presents the profile of focus group discussant and the major issues discussed.

Data from the interviews and focus group were complemented by national water policy and economic planning documents and academic literature to synthesize a production model for water supply, and clarify what an improvement of the efficiency or effectiveness of water supply concretely implies.

Ambo Town is located in the Oromia National Regional State (Ethiopia) about 110 km to the West of Addis Ababa. Ambo Town is the capital of West Shoa Administrative Zone of the Oromia National Regional State. The town received a master plan in 1931, due to its strategic position of serving as an administrative, commercial, and transportation centre of Western Shoa. The water supply for the town began in 1952 during the Haile Selasse regime (Shanmughama and Tekle, 2011).

The AUWSSSE was established by the Oromia National Regional Government Proclamation No.78/2004. Table 1 presents the main output figures of AUWSSSE.

Table 1 – Socio-Economic context of AUWSSSE (AUWSSSE, 2013)

Year	Urban Population (Estimate)	Volume of water produced (m^3)	Customers			Revenue ($)	Operating expenditure ($)	Source Urban water
			HH	Gov.	Bus.			
2011		791 541	5565	164	174	151 271	164 981	Surface water and Ground water
2012		975 396	6233	172	171	227 943	176 845	
2013	68 000	1 030 355	7106	174	168	335 839	208 478	

The estimated total population of the town is 68.000. In 2013 the AUWSSSE produced 1.030.355 m^3 of water and served 7.106 households, 174 public institutions, and 168 private business enterprises, and had a 115km water distribution network. The enterprise generated about $ 335.000 revenue with the total expense of $ 210.000 in 2013. The enterprise uses progressive water tariffs for private connection (the higher the consumption, the higher the price for water service), and flat rate for public stand users. Surface (Hulka River) and underground water (4 in number) were the sources of urban drinking water supply (AUWSSSE, 2013).

THE PRODUCTION PROCESS FOR URBAN DRINKING WATER SUPPLY

This section presents the production process for water supply and identifies relevant performance indicators based on the Ambo AUWSSSE case study.

Inputs of Urban Drinking Water Supply

Supplying drinking water requires raw water, human and non-human resources, distinguished as inputs.

The AUWSSSE uses both surface water and ground water to supply drinking water. The case study suggests that ground water is preferable because it requires less treatment and is less subject to variations in terms of quality and quantity (Wutich and Ragsdale, 2008). However, ground water requires more energy to extract and may require treatment such as aeration and softening.

From eight budget lines, AUWSSSE allocates the highest proportion of its budget to general administrative overhead cost, followed by direct material cost, suggesting these are essential components in drinking water supply.

Interviewees told that the human and non-human resources required depend on many factors such as the source and quality of raw water (low quality requires high-level professionals to treat the water), the population served, the design and construction quality of water utilities and the technology used. Aged and deteriorated infrastructure requires continuous maintenance, and hence need the inflow of inputs for maintenance services (see Zhou et al., 2009; Mersha, 2007).

Major Activities in Urban Drinking Water Supply

Urban drinking water supply involves two types of activities: operational activities and management activities. The operational activities include catchment management, water treatment, and distribution.

Catchment management is concerned with ensuring the availability and quality of raw water. It involves protecting the biophysical environment (water, soil, and plant/vegetation) in the upstream areas, and enhancing socio-economic benefits of the community in the area. Proper catchment management helps to protect and develop water resources (streams/springs) and thus enables to sustain water supply. It increases recharge of ground water; reduces the cost of extraction because the water table is closer to the surface. Overall, proper catchment management requires active stakeholder participation.

The intensity of treatment depends on the quality of raw water. According to AUWSSSE's technical staff, surface water first needs to be carried through collection chamber to treatment plants. There, it undergoes two major types of treatments, chemical and mechanical ones. Chemical treatment involves the addition of substances to coagulate suspended materials and fasten the sedimentation process. Mechanical treatment involves the use of sand stones and different filters to screen out fine items, bacteria, and viruses. Filtered water is discharged to the reservoir where disinfection takes places through chlorination. Finally, the chemist (water quality check expert) checks the chemical, biological and physical (colour, odour, temperature) properties and PH of water before it is distributed. Ground water may require aeration, although treatment levels are generally low. Other checks are also performed further down the distribution chain to monitor potential contaminations due to leakages and disconnections.

Treated water is distributed to customers through the distribution network. In general, water distribution is a crucial activity in water supply. It requires avoiding risks of contamination, leakages management and inequitable distribution.

Management activities include investment and maintenance decisions; commercial policies; stakeholders' participation; coordination, quality management, monitoring and control.

Investment decisions concern water utility (design, construction of treatment plants and reservoir, drilling boreholes and extracting water, building public stand pipe, etc.), the water distribution system (including water line connection, expansion, replacement, and maintenance work) and other civil works. These investment decisions are crucial because they impact water losses due to leakages, and the need for maintenance works (Mersha, 2007).

Regarding commercial policies, the most crucial items are water tariff, water meter reading and billing and cost of private water connection. Tariffs and private connection costs, when decoupled from purchasing power, threaten access and lead the poor and the disadvantaged people to use other alternative water sources, including unprotected and unhealthy ones.

Customers also expect a frequent and accurate water meter reading. Frequency allows the customer to pay for what they have consumed in a month, what is particularly important with a progressive tariff policy. Accuracy refers to the trust customers should have that the meter records volumes of water and not of wind in case of interruption of service. Improper meter reading generally results in overcharging customers who can be fined or disconnected if they refuse to pay their bills.

To get a private connection, the customers should pay permission and estimation fees, a technical service charge (usually 40%), and cover the costs of connection materials (see also Fita, 2011). Thus, although the price of water through private connection is lower, the initial cost of private connection may be unaffordable to the poor and even to those people who are living far away from the distribution line.

According to interviewees and focus group discussants, stakeholders' participation is crucial in the water supply. Active participation and cooperation of all actors (including local community living in the catchment area) are essential among others to protect the catchment and enhance resource mobilization.

Outputs of Urban Drinking Water Supply

Interviews and review of official documents of AUWSSSE allow identifying five relevant outputs of the drinking water enterprise: (1) volume of water produced and consumed, (2) water and water service revenue, (3) number of clients served, (4) water utilities constructed and maintained, and (5) outputs related to human resource management.

The amount of water produced by water supply enterprise and consumed by citizens is the main output of the enterprise. The difference between produced and sold water corresponds to water loss, which is due to illegal connections, non-billed water consumption, and leakages in the distribution network. It is thus important to go beyond the leakages' hypothesis for water loss and consider illegal connection and non-billed water as well. It also matters not equating sold water with consumed water, because a water meter can read by the wind instead of water pressure.

In general, the amount of water revenue depends on the volume of water sold, according to the water meter reading. Consumption increases with the quality of water and the wealth of the consumers. It decreases when alternative water sources (e.g. springs) are available. Climate (season, and altitude) and culture also play a role. This indicates that increasing supply of water may not lead to increased water consumption and revenues.

The amount of revenue collected from water-related services (such as water meter rent, permission and estimation fee, and technical service charge) depends on the number of customers and the size of the water meter (the bigger the size, the higher the rent), the number of new connections and the cost of connection materials purchased.

The number of clients served by the enterprise through direct/private connections by customer category (household, businesses, and non-businesses) and public stand pipe is also an output indicator of water enterprise. Informants told that poor people and students usually use public stand pipe. Furthermore, if the public stand pipe is not nearby, citizens may prefer to buy water from resellers in the neighbourhood at a higher price, which in turn forces them to consume less water. This entails that the water supply enterprise should support and encourage private connections, and build public stand pipe at optimal distance to meet its objectives.

The number of constructed and maintained water utilities is another output indicator of water supply enterprise. The number of water utilities constructed and maintained (reservoir, treatment plants, boreholes, public stand pipe), the length of water distribution network and the length of water lines renewed/replaced and maintained can be measured. They depend on many factors such as the financial capacity of the enterprise to expand the distribution network, the settlement pattern of residents (the more scattered the settlement, the higher the length), the urban topography (a plain slope requires less length), the master plan of the town and the position of water utilities (collection chamber, treatment plants and reservoir). Maintenance, renewal/replacement activities are influenced by the quality of constructions, the availability of financial and other inputs (Mersha, 2007). Poor design and construction quality of water utilities lead to frequent maintenance and renewal/replacement, which in turn increase repair and maintenance cost. Furthermore, the availability of qualitative human resources also matter: sometimes people with special skills may be needed for repair and maintenance activities. The local community may contribute in cash or in kind to construct and maintain water utilities.

Outputs of the water enterprise related to people (human resource management functions) are the number of job position filled, the number of staff trained, the quality of internal relationships, and the level of employees' job satisfaction.

Outcomes of Urban Drinking Water Supply

Interviewees and focus group discussants emphasized accessibility, quality, equity, reliability, health (water-borne diseases) and socio-economics as most important outcomes indicators to evaluate the performance of drinking water supply.

Access to improved water can be measured in terms of quantity, affordability, and timeliness. Interviewees and focus group discussants stressed that quantity of water is the most important indicator of water service. When the supply is inadequate, citizens/customers prioritize water consumption (for drinking and cooking first, and sanitation may be totally ignored) or use alternative water source (protected or unprotected, buying from vendors). Regarding affordability, interviewees and focus group discussants reported that people who have no private connection use public standpipe or buy from private resellers, and usually pay a higher price for water than those who have a direct individual connection (Water Utility Partnership Africa, 2003). In terms of timeliness, citizens ideally expect to get water whenever they need without walking more than necessary, and always prefer private connection. The higher the distance, the less accessible the water service is. In general, access (quantity, affordability, and timeliness) is more critical for the poor, children and women and people with special needs. In case of poor access, this target group will pay the highest price (WHO, 2004).

The supplied water should fulfill required quality dimensions (chemical, biological and physical aspect) and should be acceptable to users. For focus group discussants, good water is tasteless, colorless, odorless and cool. They paid much importance to these features.

Ideally, water should be distributed equitably regardless of the socioeconomic status of users and geographic location. In practice, ensuring equitable supply is difficult. Rich people could be better served than poor people because of the initial connection cost which is difficult for the poor to afford. People living in the center of the city could get a better access than people living in hilly areas, in the periphery, and/or in slum areas. The distribution of water could also be affected by the size of the water meter (the bigger the water meter, the better the access). Equitable distribution is an issue, particularly, when there is the shortage of water supply.

Citizens expect uninterrupted, reliable supply of water. Frequent interruption of water service negatively affects daily basic water needs and socio-economic activities. Furthermore, interruptions of water supply often lead to the proliferation of pathogens in the water distribution lines, and contamination of water.

The community uses water for drinking, cooking, sanitation, medication (to treat patients in hospitals and health centers) and business activities (hotels and other private businesses). When accessibility, quality, and acceptability, degree of equitable distribution, reliability of water is insufficient, it thus has consequences for the health and socio economic conditions of individuals. When these quality criterions are not met, individuals tend to use water from unprotected sources, running a risk for their health.

It also affects private business and other organizations. In the worst case, it may result in the total closure of business activities (hotels, other private business). Lack of water with adequate qualities prevents proper sanitation, hindering social interaction because and resulting in an unwelcoming work environment.

In other words, keeping other things constant, communities that have better safe drinking water service will have better health and can run socio-economic activities more successfully. And the water enterprise that can deliver better service will have positive relationships with stakeholders (internal and external) and can effectively contribute towards health and socio-economic activities of the society.

HOW TO IMPROVE THE PERFORMANCE OF URBAN DRINKING WATER SUPPLY?

This paper aimed at identifying performance indicators for comparing Ethiopian local governments' performance in drinking water supply and at examining how to improve local government performance. In the previous section, we detailed the production process of water supply, identifying relevant performance indicators and the way they interact.

This research allows identifying a range of strategies for local governments to improve their performance in supplying drinking water to their citizens. We distinguish between strategies aimed at improving the efficiency and the effectiveness.

Efficiency-Improving Strategies

The Ambo case allowed identifying five possible strategies to improve the efficiency.

First, local water enterprises can lead a commercial policy aimed at cost-recovery, for instance by providing financial disincentives for additional private connections, especially for the poor people and at remote places. The case study indeed reveals that the installation of public pipes has a lower cost but negates the equitability dimension. A minimally frequent meter reading, by allowing saving on related personnel costs, also delivers efficiency gains. Relatively high tariffs, especially for the incompressible part of personal consumption, generate good returns on investments, up to a given threshold where customers shift to alternative sources of water.

Second, procurement policies can deliver significant efficiency gains. Because local water enterprises need to buy significant amounts of materials (chemicals, pipes, meters, infrastructures for storage and treatment) to deliver drinking water, it is of utmost importance that the lowest price is obtained for a given quality of the material. In this regard, two factors deserve attention: the ability of local water enterprises to coordinate their orders, with an eye on increasing their negotiation power vis-à-vis suppliers, and the extent of competition in the suppliers' market. Examining these factors needs further research.

Third, the quality of delivered water must be sufficient to be sold to customers. The Ambo case indeed revealed that customers have alternatives to the monopolistic supply of water by the local government's enterprise: they can collect and consume rainwater on their own, can travel to natural springs to fetch water, or consume bottled beverages. They tend to shift to these alternative sources when they doubt of the water quality due to its color, odor, taste, or water-induced sickness in the neighbourhood. A water enterprise wanting to sell its production can improve the intrinsic quality of water and or improve the perceived quality.

Therefore, stakeholder management is crucial. It consists in sharing the production costs with the community by involving them in the production process. This can happen at least in two ways. On the one hand, many treatment costs flow from polluted water. And pollution mainly results from waste disposal in surface water, or above or near ground water sources. Citizens, businesses, and farmers should be sufficiently informed, incentivized and regulated to avoid such pollution and related costs. Also, because intrinsic and perceived quality of water influence the revenues, customers should be trained to systematically boil the water in case of insufficient quality. Sharing the costs and benefits of water quality management with the community can lead to significant efficiency gains.

Finally, the sources of water used have an impact on efficiency. The Ambo case reveals that the treatment costs are higher for the surface than ground water. Furthermore, ground water has the unique advantage of predictability: its quality and quantity do not depend as much on the last rainfalls and other climatic events as with surface water. Thus, this pleads for a preferential reliance on ground waters, when available.

Effectiveness-Increasing Strategies

To increase effectiveness in supplying drinking water means, for local governments, to improve the accessibility of water, its quality, the equitability of supply, and the reliability of the service. The Ambo case showed some ways of improving effectiveness.

We observed that some strategies allow improving several measures of effectiveness at the same time.

The reliance on ground instead of surface waters is an example of such strategies. Treatment does not always suffice to bring surface waters to acceptable levels of quality. Moreover, the quality of surface waters is subjected to seasonal variation, and an excessive reliance on it can lead to service interruptions. In such cases, the absence of water in the distribution lines leads to corrosion and proliferation of bacteria, ultimately damaging the quality and acceptability of upcoming flows of water.

A proper maintenance of the distribution network appears essential as well. A poor maintenance generally results in leakages. Leakages can lead to contamination of water, interruption of services, and water with bad odor, color, and taste. Maintenance, by preventing and repairing leakages, contributes to the quality, reliability, and acceptability of water.

Stakeholder management can provide a significant contribution to effectiveness, by helping to protect catchment areas and by training to test and improve water quality and enhancing cooperation for sustained inflow of inputs.

The Ambo case also reveals that the equitability is mainly achieved by a reliable supply of qualitative water. Indeed, poor people pay the highest price for a water of insufficient quality or quantity: in extreme cases, they can't afford to buy water from other sources, have hence to travel long distances to collect water elsewhere and or face risks for their health when consuming it

Finally, there exist specific strategies for certain facets of an effective water supply. The chemicals used in the treatment process will significantly impact quality: their quality and quantity matter in that framework. The commercial policies also will have the greatest impact on equitability: the initial costs of private connections can prevent poor people from accessing water, as do the consumption tariffs. Seen through the lens of equitability, the water enterprise, therefore, needs to revisit commercial policies.

On the Added-Value of Citizen Involvement

Willing to provide a local Ethiopian version of the water production process, we notably relied on a focus group with representatives of Ambo citizens to answer our main research question. In this section, we would like to draw some preliminary lessons from this experience.

The focus group discussion showed, first, that there are no particular technical, financial or practical barriers preventing AUWSSSE from routinely collecting input from citizens. Ambo citizens have been perfectly able to provide us with empirical evidence about the water production process and its shortcomings and to consensually agree on the performance indicators they considered most important.

Second, the focus group emphasized that Ambo citizens can significantly impact the water supply process and its performance. For instance, many treatments costs arise out of pollution of water sources by citizens. Also, by boiling distributed water, citizens can share the treatment costs with the water company, and contribute to an overall better performance. This experiment thus suggests that citizen involvement could be a win-win situation.

In fact, the interests of citizens and water companies may not always converge. The clearest example is the commercial policy, where AUWSSSE emphasizes efficiency, at cost of what Ambo citizens consider valuable. For instance, public pipes cost less than the private connections whereas Ambo citizens unambiguously prefer private connections. Similarly, frequent and precise meter reading tends to oppose corporate and citizen interests.

Interestingly, the focus group also emphasized that citizens have alternatives to the monopolistic supply of water by AUWSSSE: when the quality of the water provided is below acceptable standards, they collect water on their own, leading to lower revenues for the company. This shows that Ambo citizens not only have ‘voice’ but can rely on ‘exit’ strategies as well (Hirschmann, 1970).

As a conclusion of the focus group discussion, one participant distinguished two models of water supply service. In the transactional model, producers and consumers exchange a good – water in this case – for money; while in the transformational model, citizens and government co-produce public value through water. The former sees water supply as the end and sets efficiency as the criterion of success. For the latter, instead, water is a mean for an end (health, nutrition, human dignity, economic activity), and the attainment of these final outcomes or the effectiveness should be these criterions by which the co-production process should be evaluated. Indeed, the transformational model involves citizen in all stages of the water supply process: not only in priority setting but also the protection of catchment areas, the complementary treatment of water, etc.

Overall, our focus group in Ambo suggests that the participation of citizens in decision-making is positive for both parties, citizens proving able to provide clear input to the water company as to their preferences. Embracing co-production and the transformational model is, however, one step further: it would imply a preference for effectiveness over efficiency, and a significant contribution of citizens to it.

To put it somewhat differently, a water company that wants to improve its effectiveness is advised to share the whole production process with the citizens. However, further research is needed to confirm the positive impact of citizen participation on local government performance.

CONCLUSIONS AND POLICY RECOMMENDATIONS

Building on a case-study of Ambo urban local government, this paper has operationalized Pollitt and Bouckaert's (2011) production process model for water supply and identified relevant performance indicators.

The paper allowed identifying three input indicators: sources of water, human resources, and other nonhuman resources. These inputs are converted into outputs through two ranges of activities: operational activities, involving catchment, treatment, and distribution of water, and management ones, including investment decisions, commercial policies, and participatory processes with customers or other public organizations; all constitute activity indicators. These activities lead to outputs, essentially: cubic meters of water (produced, sold, consumed and leaked), financial revenues for the enterprise, number of customers, and output related to water utilities and human resource management, all are identified as outputs indicators. This production chain should lead to effective water supply, what customers define in terms of equitability, quality, reliability, accessibility, and acceptability, and which are distinguished as outcome indicators.

Mapping these input, activity, output and outcome indicators of the production process of water supply and the way they interact allowed devising several strategies to improve efficiency and effectiveness of water supply, and activate citizens-local government interaction. Interestingly, while public administration literature has repeatedly emphasized a trade-off between efficiency and effectiveness (Kim, 2000; Pollitt and Bouckaert, 2011), we find in the Ambo case a surprising number of strategies simultaneously contributing to efficiency and effectiveness. As such, they deserve being implemented by local governments' water enterprise:

- Investing in the maintenance of the distribution network to avoid leakages. It contributes to efficiency by reducing water loss, and to effectiveness by avoiding contamination of water, interruption of service and bad color, odor, and taste;

- Involving the community in the production process. External actors influence the performance of water enterprise. For example, farmers' activities can pollute, the poor performance of energy suppliers can lead to interruptions of service, and customers, can test and improve water quality on their own. These actors can help the water enterprise to improve performance in urban drinking water supply, and hence deserve being involved in the production process;
- Ensuring a minimal quality of water. Below that threshold, customers rely on alternative water sources, at their own costs and risks, and it negatively affects the revenues of the water enterprise.

This case study also allowed identifying strategies that contribute to efficiency or effectiveness without negatively affecting the other. Provided that further analysis of precise financial parameters confirms their positive effect, these strategies could be implemented too:

- Improving procurement policies. Water enterprises could get better prices by coordinating their purchases, provided that the market can operate more or less freely;
- Relying on ground water. Overall, the risks for quality, interruption of service and color, odor and taste of water appear to be lower and, above all, more predictable with ground than surface waters.

Finally, there are strategies implying a policy choice between improving efficiency or effectiveness:

- Commercial policies. Increasing coverage happens preferably through public pipes if efficiency is the main concern, and through private connections if an equitable, effective service is preferred. Also, the water enterprise may prefer to serve big consumers to improve efficiency, or aim at equal treatment to improve effectiveness;
- Highest quality of water. Effectiveness requires a continuous improvement of water quality; efficiency recommends not investing in quality above a threshold where customers don't rely on alternative sources anymore.

Finally, the paper emphasizes citizen-local government partnership and participatory local governance to improve performance and accountability. Elements of the production model enable actors to renegotiate goals and improve performance. It enables to ensure a citizen-centred service supply which in turn may consolidate the relationship between citizens and local government. To this end, focus group discussion with citizens clearly revealed that transformational approach is preferred than the transactional approach to structurally integrate citizens into the production process. Nevertheless, to improve the overall performance, balancing transactional and transformational approaches as well as efficiency and effectiveness goals is incontestably advisable (Taylor, 2017). The performance indicators and improvement strategies identified in this paper are a first step in that direction. These findings now need to be confronted with international literature and with other comparable cases in the Oromia region. Then, the framework needs to be tested, in order to better understand the causes of good/poor performance, to create a benchlearning platform for local governments to learn from one another, and, ultimately, to improve water supply and better achieve development goals.

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REFERENCES

Abbink, J. (2017). Paradoxes of electoral authoritarianism: the 2015 Ethiopian elections as hegemonic performance. Journal of Contemporary African Studies, 1-21.

Ambo Urban Water Supply and Sewerage Service Enterprise (2011). Annual performance report (2010/11 fiscal year

Ambo Urban Water Supply and Sewerage Service Enterprise (2011). BSC based Strategic Plan (2011-2015)

Ambo Urban Water Supply and Sewerage Service Enterprise (2012). Annual performance report (2011/12 fiscal year)

Ambo Urban Water Supply and Sewerage Service Enterprise (2013). A 2013/14 fiscal year planning and budget document

Ambo Urban Water Supply and Sewerage Service Enterprise (2011). job and structure document

Ammons, D. (1996). Municipal Benchmarks: Assessing Local Performance and Establishing Community Standards. Routledge

Banerjee, S., Skilling, H., Foster, V., Briceño-Garmendia, C., Morella, E., and Chfadi, T. (2008), Ebbing Water, Surging Deficits: Urban Water Supply in Sub-Saharian Africa, AICD Background Paper, Washington D. C.: World Bank.

Bouckaert, G. and Halligan, J. (2008) Managing performance, international comparisons, Routledge Taylor and Francis Group, London and New York

Dan, S. (2014). The effects of agency reform in Europe: A review of the evidence. Public Policy and Administration, 29(3), 221-240.

Fita, C. (2011). An Assessment Of Urban Water Supply And Sanitation: The Case Of Ambo Town, Oromia Region, Addis Ababa University, Master Thesis, Accessed August, 2014

Hirschmann, A. O. (1970). Exit, Voice, and Loyalty: Responses to Declines. Firms, Organizations, and States, Harvard University Press, Cambridge, MA.

IWA (2013); IWA Water Utility Efficiency Assessment Matrix: A Quick Reference Guide, UK: IWA, 26 p.

Jacobs, R., Smith, P. C., and Street, A. (2006). Measuring efficiency in health care: analytic techniques and health policy. Cambridge University Press.

Kim, P. S. (2000). Administrative reform in the Korean central government: A case study of the Dae Jung Kim administration. Public Performance and Management Review, 145-160.

Leftwich, A. (1994). Governance, the State and the Politics of Development. Development and change, 25(2), 363-386.

Mersha, S. (2007). Evaluation of Technical Sustainability of Rural Water Supply Projects in the Amhara Regional State Case Study In South Wollo, Addis Ababa University, Master's Thesis, Accessed August, 2014

Ministry of Water Resources (MoWR) (1999). Ethiopian Water Resources Management Policy, Accessed August, 2014

MoFED (2004). Ethiopia MDGs Needs Assessment Water Supply Tropics Consulting Engineers Plc.

MOFED (2010), Growth and Transformation Plan 2010/11 – 2014/15, Addis Ababa: MOFED.

MOFED and United Nations Country Team Ethiopia (2012), Assessing Progress Towards the Millenium Development Goals, Addis Ababa: MOFED.

National Planning Commission (2016). Growth and Transformation Plan II (GTP II) (2015/16-2019/20) of the Federal Democratic Republic of Ethiopia, Volume I: Main Text

OECD (2009). Measuring Government Activity, oecd.org

Oromia National Regional Government (2003). Urban Local Government Proclamation (Proc.No.65/2003), Megeleta Oromia, Finfine.

Oromia National Regional Government (2004). A proclamation to Provide for the Establishment of Urban Water Supply and Sewerage Service Enterprise of the Oromia Regional State (Proclamation No. 78/2004 (2004), Megeleta Oromia , Finfine

Pollitt, C., and Bouckaert, G. (2011). Public Management Reform: A comparative analysis-new public management, governance, and the Neo-Weberian state. Oxford University Press.

Pollitt, C., and Dan, S. (2013). Searching for impacts in performance-oriented management reform: A review of the European literature. Public Performance and Management Review, 37(1), 7-32.

Shanmugham, S., and Tekele, S. B. (2011). An assessment on the status of water supply and sanitation in Ethiopia: A case of Ambo town. Journal of Sustainable Development in Africa, 13(1), 23-43.

Taylor, J. (2017). Management of Australian Water Utilities: The Significance of Transactional and Transformational Leadership. Australian Journal of Public Administration, 76(1), 18-32.

UN (2000). The Millennium Development Goals Declaration. General Assembly (55/2)

UN (2015). Transforming our world: the 2030 Agenda for Sustainable Development., General Assembly (70/1)

UN (2010), Resolution adopted by the General Assembly on 28 July 2010: The Human Right to Water and Sanitation, United Nations A/RES/64/292, 3 p.

UN-Habitat, (2003) .United Nations Human Settlements Program: Improving the lives of 100 million slum dwellers; towards the millennium Development Goals, Nairobi Kenya

Van Dooren, W, Bouckaert,G.and Halligan, J. (2010). Performance Management in the Public Sector, Routledge Taylor and Francis Group, London and New York

Water Utility Partnership Africa (2003). Better water and sanitation for the urban poor; Good Practice from Sub-Saharan Africa, Kenya.

Woodbury, K., and Dollery, B. (2004). Efficiency measurement in Australian local government: The case of New South Wales municipal water services. Review of Policy Research, 21(5), 615-636.

World Bank (2013) .Federal Democratic Republic of Ethiopia Public Sector Reform Approach Building the Developmental State – A Review and Assessment of the Ethiopian Approach to Public Sector Reform, The World, USA, Washington DC.

World Health Organization (2004). Guidelines for Drinking-water Quality Vol.1. 3rd, WHO, Accessed August 2014

World Health Organization (2009). Water Safety Plan Manual: Step-by-step risk management for drinking-water suppliers, WHO, Accessed August 2014

Wutich, A., and Ragsdale, K. (2008). Water insecurity and emotional distress: coping with supply, access, and seasonal variability of water in a Bolivian squatter settlement. Social science and medicine, 67(12), 2116-2125.

Yacob, A., Mekonnen, E., Gudisa, D., Achiso, D., O'Meally, S., Calow, R. and Ludi, E. (2010), Governance and Drivers of Change in Ethiopia's Water Supply Sector, London: DI/OSSREA.

Zenewi, M. (2006). African Development: Dead Ends and New Beginnings, Preliminary Draft, accessed on, January 05, 2015.

Zhou, Y., Vairavamoorthy, K., and Mansoor, M. A. M. (2009). Integration of urban water services. Desalination, 248(1-3), 402-409.