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Monitoring access to water in rural areas based on the human right to water framework: a local level case study in Nicaragua

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Much effort has gone into the recognition of the human right to water. Without doubt, this milestone influences governance and decision making processes at many scales so it is essential now to shift the discussion from the legal and conceptual framework to practice. Along this line, the article proposes a methodology for monitoring access to water in rural areas using the framework of this human right. The practicality of the approach is demonstrated by a case study carried out in Nicaragua. Different criteria of the right to water were included in surveys and structured interviews that were conducted in rural households and water committees, respectively. A discussion analyzes the advantages and challenges of using this framework. Finally, the approach provides elements for policy making that can be used by different stakeholders in the development and human rights sectors.

Keywords: human right to water; rural; monitoring; water policy; composite indices, Latin America; Nicaragua

Introduction

On 28 July 2010, the General Assembly of the UN formally recognized the human right to water and sanitation (United Nations, 2010a), ending the discussion of whether or not they should be considered human rights. Following this, the UN Human Rights Council (United Nations, 2010b) affirmed that they are part of existing international law and confirmed that they are legally binding upon states that have ratified the International Covenant on Economic, Social and Cultural Rights (ICESCR) (see <http://treaties.un.org/> for the status of treaties and the countries that have ratified them). The juridical basis of the right to water in international law derives from Articles 11 and 12 of the ICESCR of 19 December 1966 (Irujo, 2007). Almost four decades later, the committee's General Comment No. 15 (GC15) (United Nations, 2002) meant a giant step in legal interpretation of the right. However, Cahill (2005) suggests that is imperative to clarify as well the relationships between the right to water and related rights. Afterwards, the Office of the United Nations High Commissioner for Human Rights (OHCHR) (United Nations, 2007) and Catarina de Albuquerque, special rapporteur on the human right to safe drinking water and sanitation (during her first mandate) (United Nations, 2009a), worked to clarify the according to the scope and content of the comment. As Irujo (2007) states, "What exists is a right to the supply of water ..., what is proposed is the development of an activity of the state (or by the competent authorities) that aims to provide

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a service of this very object.” Thus, to promote its full realization, the supply of water should meet all aspects of the right: the mandate holder proposes to talk on the one hand about five normative criteria (availability, quality, physical accessibility, affordability and acceptability) and on the other about three cross-cutting criteria (non-discrimination, participation and accountability) (United Nations, 2010c). From the report of the first consultation on developing post-2015 indicators for monitoring drinking water and sanitation (Joint Monitoring Programme, 2011) it may be deduced that these criteria are beginning to be assumed by the water, sanitation and hygiene (WASH) development sector.

An urgent need for monitoring human right to water implementation

Taking into account the human right to water, there is evidence that suggests the necessity of monitoring its implementation. As some authors have suggested (Biswas, 2001; Tortajada, 2010), theoretical and conceptual approaches need to be operationalized and implementable, for example through their inclusion in future targets and monitoring systems (Joint Monitoring Programme, 2011). Obligations of governments at the domestic level can be broken into three simple duties: to respect, protect and fulfil (United Nations, 2002). The first and second mean, respectively, that states must refrain from interfering (directly or indirectly) with the enjoyment of the right and that they must prevent third parties from interfering with it in any way. The duty to fulfil means that governments should take steps in the direction of ensuring universal access, which is known as “progressive realization”. Appropriate policy frameworks are thus required. To talk about effective policy making in this context implies two main issues: to target the most needy when money is allocated (Khadka, 2010) and to measure progress. An essential prerequisite for complying with both aspects is access to consistent information, which is mainly dependent on a set of reliable and objective indicators (Garriga & Foguet, 2010; Molle & Mollinga, 2003). Moreover, Langford (2005) suggests that there is an urgent need for effective monitoring of public and private provision of water, particularly as it affects marginalized and vulnerable groups.

There are many initiatives regarding the creation of appropriate, objective and reliable indicators and composite indices for monitoring the access to water from a human development perspective (Garriga & Foguet, 2010; Jiménez & Pérez-Foguet, 2008; Joint Monitoring Programme, 2000; Sullivan, 2002), and interesting case studies about their applicability (Jiménez & Pérez-Foguet, 2011a; Pérez-Foguet & Giné, 2011; Sullivan, Meigh, Giacomello, & Fediw, 2003), but none of these are based on the human right to water framework. It is not the purpose of this paper to measure the human right to water in its broad spectrum – as other researchers have done in different initiatives related to the human right to health, water or food (Backman, Hunt, & Koshla, 2009; Riedel, 2006; Roaf, Khalfan, & Langford, 2005; United Nations, 2003, 2004) – but to propose a methodology to assess the right to water focusing on outcome indicators. As with the Economic and Social Rights Fulfillment Index (Fukuda-Parr, 2011; Fukuda-Parr, Lawson-Remer, & Randolph, 2008; Randolph, Fukuda-Parr, & Lawson-Remer, 2010), the proposed methodology places its attention on fulfilment rather than on violations and on outcome indicators rather than structural or process ones. Outcome indicators assess the status of the population’s enjoyment of a right (Riedel, 2006), which in this case implies monitoring the extent to which individuals have access to water. In this context, indicators, indices, techniques for building them and ways to visualize them are presented.

Case study

In recent years, ONGAWA, a Spanish non-governmental development organization, has been working in Nicaragua, supporting water supply and water management interventions, using a rights-based approach. In 2009, ONGAWA, in cooperation with a group of local organizations (Coalición de Organizaciones por el Derecho al Agua – CODA), produced a study about the rural water situation in the whole country. A set of research questions was proposed within the right to water framework. The different categories of the right to water were considered in the questionnaire design. Surveys were conducted in 1350 rural households and were complemented with structured interviews in 61 drinking water and sanitation committees (*comités de agua potable y saneamiento* – CAPS). It is estimated that around 1,200,000 people are supplied by these community-based organizations in the whole country. In Nicaragua, the State has committed itself to formally delegating service provision in rural areas through its national Water Law (Government of Nicaragua, 2007), which is complemented with a special law that regulates CAPS organization, constitution, legalization and performance (Government of Nicaragua, 2010).

The study was carried out across the whole country, but the data analyzed here were selected from the departments of Jinotega and Matagalpa in the central-north region. Thus,

Table 1. Territorial and sample information.

Department	Municipality	Community		
		Name	Polled households	Total households
Jinotega	La Concordia	Valle Valerio	11	87
		Santiago Coyolito N°1	12	186
		Chichiguas	10	143
		Los Capules	10	64
		Colón Abajo	10	28
		Las Quebradas	10	63
	SRN	San Marcos	22	300
		La Canasta	10	43
		La Estación/Cerro Grande	9	41
		Suni	10	90
	SSY	Pavona Arriba	11	87
		Las Delicias	10	82
		La Rica	19	105
		El Volcán	12	99
	Jinotega	La Virgen N°1	15	143
		El Sardinal	29	262
		Paso Real	16	145
		La Reforma	12	111
Matagalpa	Muy Muy	Santa Fe	19	40
		Tuma la Dalia	15	296
		Naranjo	10	90
	Matagalpa	Wasaka sureste	13	171
		Aranjuez el porvenir	29	121
		Jucuapa centro	20	68
		Quebrachal	7	87
	San Dionisio	El Zarzal	23	96
		El Zapote	25	237
		El Carrizal	18	168
2	8	28	417	3453

this research utilizes data from 417 households and 28 community-based organizations (CAPS), which involve 2 departments, 8 municipalities and 28 communities (Table 1). The two different sources of information – households and committees – complement each other.

Methodology

First of all, a validation of available data from surveys and interviews was conducted. Then, we defined and proposed a first set of indicators, gathering different complementary information from the two sources mentioned above. They were sorted into six criteria, according to the human right to water conceptual framework. A score between 0 and 1 was assigned to each parameter, where a value of 0 indicates the poorest level and 1 the optimum conditions. International standards, experts, and local stakeholders were consulted during this assessment. Finally, indicators were aggregated into each criterion.

In order to aggregate indicators into subindices for right to water criteria, we considered two different approaches: when variables can compensate each other's performance, and the contrary. Additive aggregation has been used for the former and multiplicative aggregation for the later.

Six criteria (availability; accessibility; affordability; quality; participation and access to information; non-discrimination) feed the composite indicator. A major issue for this task is the choice of the weighting and aggregation model (Garriga & Foguet, 2010). The assignment of weights is crucial because they should reflect the relative importance of all the right to water criteria. Two possibilities were considered: not to assign explicit weights, and assigning statistical weights (based on multivariate techniques). The main argument for no weighting is based on the premise that no objective mechanism exists to

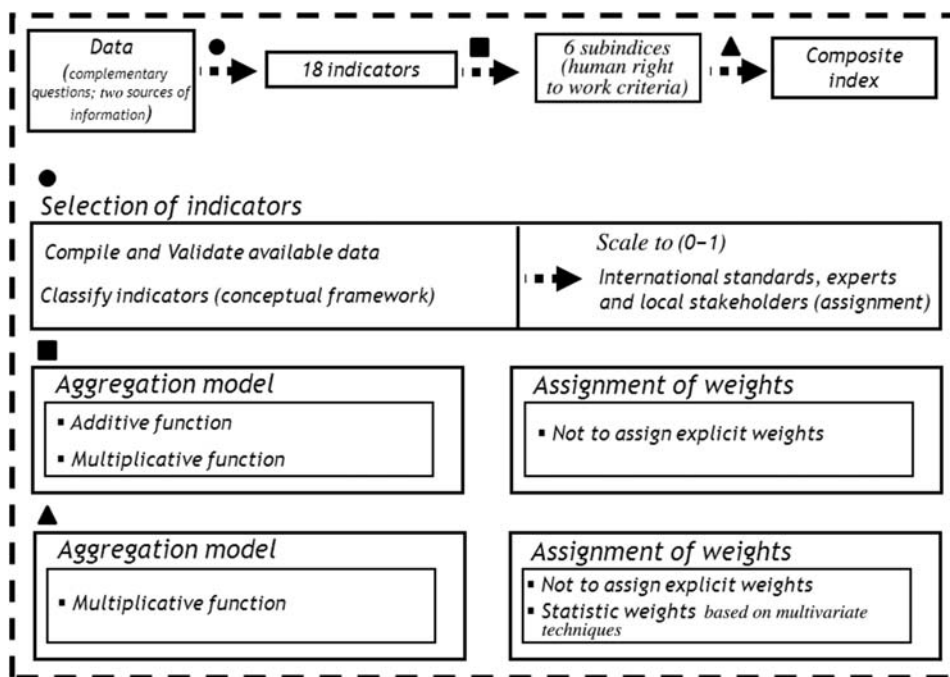


Figure 1. Methodology.

assess the relative importance of the different aspects included in the index (Garriga & Foguet, 2010). Some research highlights that multivariate techniques present an empirical and more objective option for weight assignment. Principal component analysis (PCA) has been used because this methodology determines the set of weights which explain the largest variation in the original variables (Slottje, 1991).

According to the aggregating technique among the six subcriteria for constructing the index, we opted to use a multiplicative function. The weighted arithmetic mean was rejected, mainly for two reasons. (1) This function should be applied only if indicators are mutually independent (Munda & Nardo, 2005). It is obvious that this assumption cannot be admitted in the study because criteria are clearly interrelated. For example, quality depends on continuity and domestic water use depends on physical access (Howard & Bartram, 2003). (2) There is an implicit compensability among the criteria indices of the function (Nardo et al., 2005). A *sine qua non* for right to water compliance is that all criteria be met simultaneously. Therefore, a non-compensatory method is necessary. Figure 1 summarizes the steps in the index design.

Human right to water criteria and indicators proposed

Taking each criterion's definition as the starting point, the indicators selected are presented in this section and compiled in Table 2.

There is consensus about the fact that water supply for each person must be sufficient and continuous for personal and domestic uses (United Nations, 2002); this is known as the availability criterion. Two evident indicators are usually considered for this criterion: rate of domestic water consumption and reliability of supply. Both ideas were considered in the methodology proposed. The availability component is composed of three different variables: (1) sufficient quantity (real water consumption in litres per person per day); (2) survey respondents' perception of water amount availability; and (3) reliability of supply (daily provision of water or not).

According to the physical accessibility criterion, there are two notable issues that have to be measured. On the one hand, "water must be accessible within, or in the immediate vicinity, of each household" (United Nations, 2002). On the other hand, physical security should not be threatened during access to water facilities and services (United Nations, 2002). Both were considered in this study: the physical accessibility criteria combine (1) proximity to the water point, measured as total collection time, and (2) right holders' perceptions about physical security on the way to fetch water.

GC15 states that water and water facilities and services must be affordable for all (United Nations, 2002). The kind of information used for affordability was (1) a continuous quantitative indicator (monthly tariff), and (2) right holders' perceptions of it.

The water required for each personal or domestic use must be safe (United Nations, 2002). Furthermore, GC15 states that water should be of an acceptable colour, odour and taste for each personal and domestic use; this is the acceptability criterion, which is linked with the water quality dimension. These concepts have been translated into four indicators in the tool developed: (1) right holders' and, (2) CAPS water quality perception; (3) whether chlorination is being practiced; and (4) respondents' satisfaction with the water's organoleptic properties.

Water services must be provided without any form of discrimination, and right holders must have the opportunity to participate in decision making relating to their service provision. Furthermore, access to information is essential for meaningful participation. In this study, non-discrimination compiles three variables: (1) right holders' and (2) CAPS

Table 2. Indicators used and sources of information.

Criteria	Indicator	Source of information
Availability	A1: Sufficient quantity	Households
	A2: Sufficient quantity (perception)	Households
	A3: Reliability/continuity	Households
Physical accessibility	PA1: Proximity (spent time)	Households
	PA2: Security	Households
Affordability	AFF1: Monthly tariff (water tariff)	Households
	AFF2: Affordability (perception)	Households
Quality and safety	Q1: Quality (perception)	Households
	Q2: Quality (perception)	CAPS
	Q3: Chlorination	CAPS
	Q4: Organoleptics	Households
Non-discrimination	ND1: Families without service (perception)	Households
	ND2: Families without service (perception)	CAPS
	ND3: Targeting the poor (economic advantages)	CAPS
Participation/access to information	P1: Meeting participation	Households
	P2: Information about meetings	Households
	P3: Water law (knowledge)	Households
	P4: Community participation (perception)	CAPS

appraisals of water discrimination in their communities; and (3) existence of measures within the community aimed at aiding the poor. Finally, participation and access to information were considered as two different issues. Two variables reflect each one: (1) community participation in meetings and (2) CAPS assessment of it on one hand; and (3) people's information about meetings held in their communities and (4) their knowledge about the existence of national water law, on the other. Indicator (3) is especially linked to accountability processes at the community level.

Results

Table 3 shows the average values obtained for each subindex and the resulting composite index. According to the data recorded for the sample studied, affordability, non discrimination and participation are the most critical issues. Availability, physical accessibility and quality seem to be less problematic. Index and subindex average values are relevant but histograms and territorial analysis are essential for the assessment of differences.

Table 4 represents frequencies for the six criteria and the composite index obtained. This type of information is useful because it provides evidence of the main problems

Table 3. Averages of criterion and composite indices.

Criterion index	Average
Availability	0.638
Physical accessibility	0.794
Affordability	0.418
Quality and safety	0.659
Non-discrimination	0.300
Participation/access to information	0.481
Composite index	0.216

Table 4. Criterion and composite index frequencies.

	Availability	Physical accessibility	Affordability	Quality	Non discrimination	Participation and information	Composite index (PCA)
0.0-0.09	60	34	176	22	129	91	279
0.1-0.19	3	0	0	0	0	20	0
0.2-0.29	19	0	21	66	0	7	0
0.3-0.39	23	0	0	0	212	5	4
0.4-0.49	18	94	14	92	0	62	8
0.5-0.59	20	0	43	0	0	92	36
0.6-0.69	41	0	18	0	65	34	40
0.7-0.79	62	0	81	99	0	15	33
0.8-0.89	60	0	3	0	0	8	17
0.9-1.0	111	289	61	138	11	83	0
Total	417	417	417	417	417	417	417

within a concrete situation. According to the area studied, the most salient result is the large number of zeros in the composite index distribution, i.e. a significant percentage of the population whose enjoyment of the human right to water is not being guaranteed. As mentioned above, a geometric function has been used to aggregate criteria to avoid compensability among them. This result allows us to stress the relevance to guarantee every single human right criteria if the objective is to be met. Moreover, it is interesting to stress differences between the criteria and composite index distributions.

Results are consistent with the situation encountered in the area of study. The communities polled have benefited from different water programmes in past years. Most of them provide piped water into dwelling, yard or plot as the source of drinking-water for members of households. Hence, the quantity of water is not usually a problem. As regards quality criteria, it was not possible to do physicochemical analyse, so indicators related to perception and water treatment were used. Complex quality risks, such as pesticide pollution, have not been captured by our study.

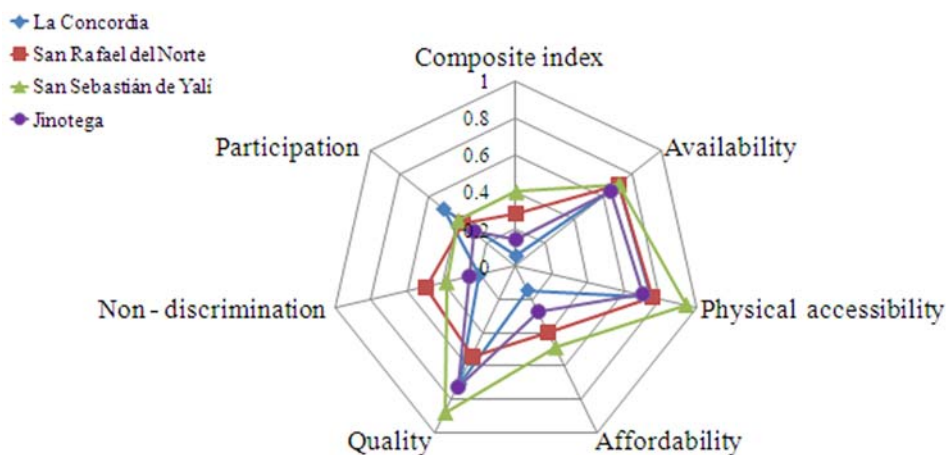
With respect to participation and access to information, Narayan (1995) and many other authors have stressed the importance of right holders' participation, but it is still inadequately dealt with in too many interventions (Schouten, 2003). Furthermore, it has to be mentioned that the poor are frequently less able and have fewer channels to participate in community management of common-pool resources and water supplies (Agrawal & Gupta, 2005; Cleaver, 2005; Jiménez & Pérez-Foguet, 2011b). This is consistent with the rural picture: it is common to find houses or sectors within a community that are not connected to the water supply system that benefits the others. These two deficiencies are shown in Table 4.

Figures 2 and 3 can be used to appreciate differences within the territory. The first aggregates results by municipalities, and the second shows differences among communities in one municipality, taken as example. Figure 2 presents two different graphs: the first shows the situation in municipalities from Jinotega Department, and the second from Matagalpa.

The radar chart in Figure 2 has been used to visualize criterion indices and the composite index. This picture can be applied at any scale (household, community, municipality, department or country), allowing rapid comparison. Physical accessibility shows the highest levels, while non-discrimination seems to be the most problematic issue. While communities polled from San Sebastián de Yalí (SSY) show higher values for most of the criteria, there are several tendencies that show different deficiencies in each

municipality. For example, the La Concordia results reflect important problems of discrimination and economic accessibility while they are among the highest in the other criteria. These outputs are important for policy making because they can be used to particularize support for the solution of problems and thus increase the impact and efficiency of interventions. Furthermore, some authors have shown a lack of pro-poor targeting when money is allocated in the water sector in the international sphere (Jiménez & Pérez-Foguet, 2009) and also at national and local levels (Jiménez & Pérez-Foguet, 2010). Thus, this methodology and the way information is visualized provide useful information for improving territorial equity. This is paramount for right to water because it calls for universal access in a non-discriminative perspective.

MUNICIPALITIES



MUNICIPALITIES

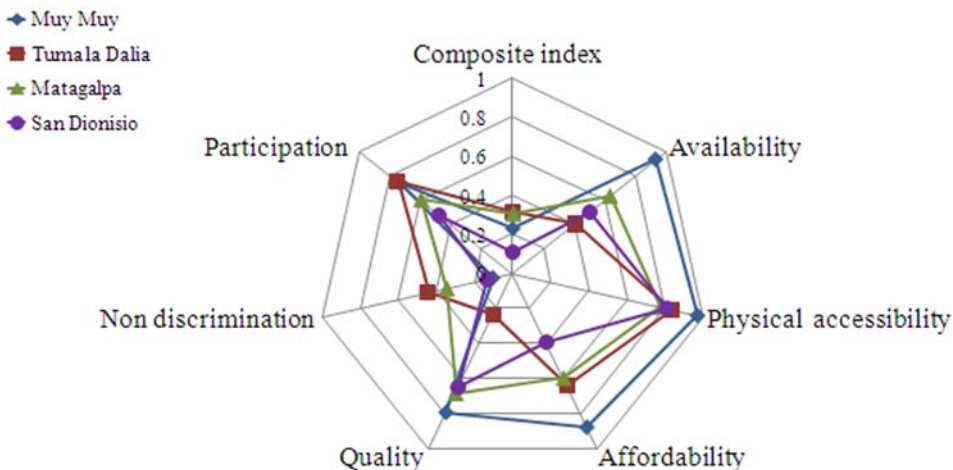


Figure 2. Right to water criteria and composite index for department pilot study: Jinotega (top) and Matagalpa (bottom).

Figure 3 zooms in on the community level, showing the four SSY communities considered in this study. Criteria and the composite index are shown for each community. It stresses again the differences among right to water criteria. Physical accessibility does not seem to be the principal problem in the cases studied. According to the diagnosis, all communities were equipped with water systems. However, all of them show signs of right to water failures; lack of participation, discrimination and affordability are especially critical.

Findings and discussion

This section tackles two main issues. On the one hand, we provide some reflections related to the challenges found during the tool's construction. On the other, achieved results highlighted in previous sections are used to derive some policy implications.

Difficulties in measuring access to water based on human right to water criteria at the local level

With respect to availability, General Comment 15 does not specify a quantity to be made available to all but cites the Gleick (1996) and Howard and Bartram (2003) works on minimum standards recommendations. Gleick (1996) argued for a “basic water requirement” of 50 litres per person per day (lpd) covering four basic needs; he maintained that this limit is irrespective of climate, culture and level of development and technology. Howard and Bartram (2003) considered different service-level categories: no access, basic access, intermediate access and optimal access. Other researchers have considered a similar ladder approach for assessing water service delivery (Moriarty, 2010; Schouten, 2011). “Continuous” means that regularity of the water supply should be sufficient for personal and domestic uses; however, it is not precisely defined in these documents. Moreover, it is not simple to evaluate continuity because its negative effects

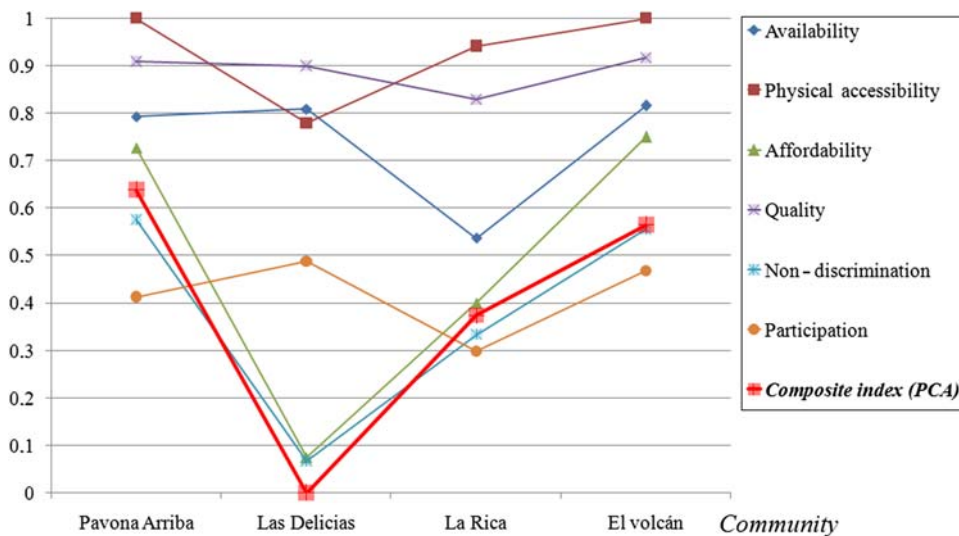


Figure 3. Right to water criteria and composite index for the pilot study in San Sebastian de Yalí municipality.

will depend on the types of system failures and their frequency, as well as households' capacity to store a sufficient amount of water – which usually is lower in poor families. Rietveld, Haarhoff and Jagals (2009) propose a continuity index characterized by two indicators – the number of hours per day of unplanned interruption of the water supply to households, and the number of days per month without unplanned water supply – which require data not always easy to obtain and standards not simple to set up.

As a report from an independent expert to the United Nations (2010c) has pointed out, neither continuity nor the exact quantity required can be determined in the abstract, since individual requirements for water consumption vary, for instance with climatic conditions, level of physical activity and personal health conditions. Standards used in this study have been determined based on international recommendations, experts and local stakeholders, but it is important to deeply research standards definition at the local level.

As was mentioned earlier, it is necessary to measure proximity to the water point and access security as physical accessibility elements. For the former, time spent in water collection is an adequate indicator for assessing accessibility (Cairncross & Feachem, 1993; Garriga & Foguet, 2010; Howard & Bartram, 2003). In our study, we highlight the difficulty of defining and measuring security at water points because it is usually a taboo; several polled families did not answer the question. Furthermore, the perception of security is highly variable among people, and has considerable gender bias and implications, which have not been addressed in this study.

The percentage of household expenditure on drinking water has been established as a common indicator to measure affordability (COHRE AAAS SDC & UN-HABITAT, 2007; Roaf et al., 2005; Smets, 2009; UNDP, 2006); however, the meaning of “an affordable” and its standards have not been precisely defined (COHRE AAAS SDC & UN-HABITAT, 2007; Smets, 2009). Studies have suggested that the percentage of household income paid for water should be kept between 1% and 5% or that 3% should be considered an upper limit (UNDP, 2006). In our experience, it is not easy to determine the affordability index mainly because disposable income is notoriously hard to measure. Polled families usually don't know their actual income; it is highly variable throughout the year, and very often they are reluctant to talk about these economic issues, though they usually have no problem talking about their water tariffs. Hence, we have considered the latter indicator in our study (Nicaraguan Córdobas per month per family spent on water services). Nevertheless, it is necessary to find not-too-complex options that allow us to assess household incomes or their economic status.

The water required for each personal or domestic use must respect WHO water quality standards (WHO, 2011). Quality analyses were not considered during field data collection, so other indicators had to be defined to cover quality/safety criteria, that is respondents' perceptions of quality, although these might not provide very reliable information about actual water quality (Jiménez & Pérez-Foguet, 2012). In general, even if basic water quality parameters are measured, other chemical substances could exist that are more difficult and expensive to analyze and that are receiving inadequate attention even if their presence has become a critical problem (Biswas, 2005). This is the case for pesticides, a widespread threat in many countries and particularly in Nicaragua (Castillo, de la Cruz, & Ruepert, 1997; Castilho, Fenzl, Guillen, & Nascimento, 2000). Thus, water quality data availability can be an important impediment to acquiring a complete picture of access to water, according to the human rights framework.

Discrimination, participation and accountability are aspects difficult to quantify (Joint Monitoring Programme, 2011; Randolph et al., 2010), and as Ashfaq Khalfan states (Joint Monitoring Programme, 2011), it is not viable for global monitoring to collect quantitative

data for every aspect of human rights. Although they are cross-cutting criteria for all human rights, there is still no consensus about the way to measure them. Thus, it is necessary to develop methodologies to quantify them in monitoring access to water in the near future. However, easy qualitative indicators could be chosen as apposite approximations in local-level monitoring systems. Some authors (JMP post-2015 Working Group on Water, 2012) propose to disaggregate information to measure discrimination instead of using additional indicators. However, there are many situations where discrimination occurs deliberately, at both the intra- and inter-communitarian levels and it can affect single families that will never be represented in statistics. Therefore, it is necessary to consider additional questions to pick up the reasons for and characteristics of that discrimination to gather further evidence on this issue. Accountability is more focused on the legal and juridical aspects of the right. Moreover, local accountability is a much broader and more complex issue that is intrinsically linked to consumers' right to accessible and transparent information (Laban, 2007), a cross-cutting criterion for all human rights. Additional indicators were defined in this methodology, as reflected in Table 5.

Policy implications

This conceptual framework has several interesting implications for water governance, as described hereinafter.

Measuring progress

The way progress in access to water is measured at the international level needs to be recalibrated (Jiménez & Pérez-Foguet, 2008) and the improved-vs.-non-improved approach should be superseded. The Joint Monitoring Programme (JMP) as we know it nowadays does not consider the human right to water framework. Furthermore, it is unsatisfactory in some situations, such as the rural Nicaraguan context. If there is a certain level of infrastructure, the JMP's methodology is inadequate because its simplified dichotomy obscures decisive differences. It is a complex task to measure access to water, and it is even more difficult when coverage goes beyond a basic level and differences must be addressed. Nevertheless, it is necessary to acquire a more detailed picture of reality that helps us to move forward. The methodology presented in this paper could offer new visions in this field. Undoubtedly, adopting a measure of access to water based on the human right to water would imply a significant reduction in "coverage", which would have both technical and political implications.

Support for policy development and priority setting

As mentioned, the human right to water framework offers new, pertinent and useful dimensions for the assessment of access to water, compared with other methodologies. Non-discrimination, participation and access to information, affordability, and elements related to physical accessibility, and quality or acceptability provide an opportunity to move forward from previous coverage indicators. If these elements are not measured ad hoc, they won't appear in statistics and important issues for supporting policy development and priority setting won't be addressed. The results displayed in Figures 2 and 3 offer a multidimensional picture of the access to water in rural communities and thus can be used to improve policy development at national and subnational levels. Their

Table 5. Indicators defined in the human right to water methodology.

Criterion	Elements	Indicators (literature)	Standard/indicator references	Indicators (methodology)
Availability	Sufficient access	Domestic water consumption rate (litres per person per day)	Gleick/BWR (1996): 50 lpd	A1: Sufficient quantity* A2: Sufficient quantity (perception)* A3: Reliability/continuity*
	Continuous access (reliability of supply)	No indicator agreed by consensus but continuity index [(1) & (2)] (1) Number of hours per day of unplanned interruption of water supply to the households (2) Number of days per month without water supply	Howard & Bartram (2003); Moriarty (2010); Schouten (2011) Hunter, Zmirou-Navier et al. (2009); Rietveld et al. (2009)	
Physical accessibility	Close access	Water point proximity (time spent vs. water point distance)	Cairncross & Feachem (1993)	PA1: Proximity (spent time)*
	Personal safety	No indicator agreed by consensus		PA2: Security (perception)*
Affordability	Affordable access	Affordability index (% of household expenditure spent on drinking water)	COHRE (2007); Smets (2009)	AFF1: Monthly tariff (water tariff)*
			Some ideas – UNDP (2006); Smets (2009); Garriga & Foguet, 2010 – but no standard agreed by consensus	AFF2: Affordability (perception)*
Quality	Safe access (healthy)	Physiochemical	WHO quality guidelines – but local governments can adapt them to local/national context (WHO, 2011)	Q1: Quality (perception)*
		Micro-organisms		Q2: Quality (perception)**
		Other chemical substances – example: the problem of pesticides?		Q3: Chlorination**

Acceptability	Acceptable access (colour, odour & taste)	No indicator agreed by consensus	Q4: Organoleptics*
<i>Cross-cutting Criteria</i>			
Non-discrimination	No indicator agreed by consensus – difficult to measure – Randolph et al. (2010); Joint Monitoring Programme, 2011		ND1: Families without service (perception)* ND2: Families without service (perception)** ND3: Targeting the poor (economic advantages)** P1: Meeting participation* P2: Information about meetings* P3: Water law (knowledge)* P4: Community participation (perception)**
Participation/access to information			
Accountability			

*Household surveys; ** CAPS interviews.

usefulness in supporting resource allocation and priority setting – based on obligatory content of the human right – is one the most outstanding opportunities for policy making if we take into consideration that lack of investments is one of the important factors of the global water crisis (Biswas, 2005).

Raising public awareness and advocacy

The methodology itself was used for raising right holders' awareness about this emerging human right. Once you start to talk about human rights, public awareness begins to rise. This is an interesting contribution of the data-collection methodology that does not emerge in other methodologies such as JMP or water point mapping. This can lead to advocacy processes carried out by those deprived of their rights.

Apart from the methodological implications, human rights advocacy NGOs have used results based on the study to expose the Nicaraguan sector situation (CODA, 2011). Moreover, the experience was considered a good practice by the special rapporteur (De Albuquerque, 2012).

Conclusions

The human right to water entitles everyone to sufficient, safe, acceptable, physically accessible and affordable water for personal and domestic uses, proscribing any kind of discrimination and defending participation and access to information. Now it is time to consider and discuss ways to translate the conceptual and legal elements of the human right to water into practice. To implement this universal right, mechanisms need to be developed in a variety of fields. In this paper, the focus is placed on how it could modify the way access to water is measured.

There are challenges and barriers that must be to overcome. Indicators used in monitoring the water sector should be easy to get the at local level, accurately defined, standardized and internationally applicable, scalable at all administrative levels and yearly updatable (Jiménez & Pérez-Foguet, 2008). Some elements essential to measuring indispensable human right to water criteria are not simple to obtain at the local level, for example family income and physical security, considered taboo subjects in some communities. There is no consensus about standards for some indicators and some experts recommend that they should be adapted to local conditions. This research provides insights to address this lack of definition. Ultimately, similar research efforts will lead to better monitoring of access to water with a human rights perspective, which will be crucial for future sector policies.

As results confirm, the methodology proposed has important policy implications: the way progress in access to water is measured at the international level is in a period of redesign, and the tool presented can provide appropriate inputs. The indicators and index explained – combined with data about duty bearers' resources and the way those are allocated – could contribute to improving the measurement of progressive realization, a complex and essential concept for those who work in the sector of human rights monitoring. It could be used to support resources allocation and priority setting, improving policy development at different levels. The process of field data collection itself was useful for raising right holders' awareness, and the results obtained have been utilized for advocacy purposes.

Therefore, different types of users among development and human rights sectors can be interested in contributions from this research: local and central governments,

international development agencies, NGOs focused on human development and human rights advocacy, human rights monitoring bodies, research groups and last but not least, the right holders.

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