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Gender and women's participation in water management in the rio sabinal and cañon del sumidero watersheds in berriozabal, Chiapas, Mexico

Abstract

This paper presents a gender-focused study about female participation in community water management committees in Rio Sabinal watershed and Cañón Del Sumidero in Chiapas, Mexico. We found that the division between public-male and private-female limited the female participation. This female participation is only possible when water management committee activities are considered of low prestige among men. Despite this, we propose that water management by women is possible in order to achieve both true gender equity and sustainable development.

Keywords: gender, water, female participation, comprehensive management, chiapas

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Introduction

Acknowledgment to female participation in water management

The topic "gender and water" has increased its relevance in United Nations Summit meetings, conferences and international forums.[1] This topic has been addressed in key conferences such as the Earth Summit, which took place in Rio de Janeiro in 1992; Water and Environment International Conference, celebrated in Dublin in 1992; IV Women World Conference, in Beijing in 1995; Millennium Summit in Johannesburg, among others. The progress made in these events reflects the commitments of the governments and other social actors. From this platform, new strategies were proposed in order to keep strengthening the international and Latin American water and gender agenda.

Until 2006, in Mexico the Environment and Gender Network[2] wrote the Women's Blue Agenda, in which the problems of Mexican women, with respect to their gender´s relationship with water management, were made explicit. In this agenda, the issue that women and men have a different relationship with water was explored. Women face specific barriers, which until now are barely understood and there is a lack of proper policies in place, which requires more research and analysis. The Blue Agenda proposes the creation of interlocution and negotiation spaces with institutions and decision makers to discuss water policies in our country. It also proposes to deepen and enrich the study of the issues raised, setting the interest of both women and different organizations concerned with sustainable usage, democratic and equitable resource management, in the center of the debate.[1]

Social participation

Participation is currently a vogue term used in political discourse, as in environmental or community speeches. It is a mandatory topic of governance, especially when related to the social agenda, that has gained prominence as a subject of study and is considered an essential component of democracy and development.[3] In light of theoretical discussions, participation is a word that can have different meanings attached to its own consequences, due to its relationship with power, as it relates to the access to power of a social group or society (Faundez, 1993). According to Faundez (1993), the critical, active and permanent participation of the whole society should turn into power, otherwise "participation that does not transform into power, isn't effective participation"; therefore it should be able to influence the history of a society. In this way, power is accumulated in the organizations that control the flow of information and in people controlling or possessing more knowledge of high social, economic or political value.

In environmental issues, Pacheco & Vega[4] propose the existence of two citizen participation modalities: one is the formation of environmental coalitions in order to build social capital, primarily through networks of environmental NGOs; and the other is the consensus-building processes that occur through multi-participatory roundtables. The difference between both modalities lies in the transmission mechanisms of social pressure that participating organizations use to obtain resources and achieve their objectives: coalitions use social pressure mechanisms, while consensus-building processes use a variety of mechanisms to induce the change. Whatever the mode of participation, the involvement of society in the construction, design and implementation of environmental policy

is no longer an option, but an essential component for sustainable development.

According to Faundez (1993), analyzing power is to look beyond what we see. Therefore the results of the participatory processes should be assessed in terms of power, the dynamics of the participatory process, the conflicts, how they were solved and what was the eventual outcome of this process for all parties involved.

The water management participation analysis in this research has been made from a gender perspective, in order to understand the forms of civil society representation, how they are built, articulated and reproduced, and identify how the difference between men and women participation forms as a result of power relationships conditioned by the gender perspective itself.

Water management participation and gender equity

For about two decades, in Mexico, as in most Latin American countries, water management, understood as a series of actions carried out in a comprehensive manner by the actors for the conservation, management, water supply and disposal, to ensure the quality and quantity for sustainable development of society,[5] has been changing. In the eighties, a decentralized model was adopted, transforming federal government centralization to decentralization, giving more attributions and functions to the state and municipal governments in resources management. Likewise, the other current conceptual base of water management is now co-responsibility; that is, achieve a kind of "democratization" of water management, in which everyone involved is responsible for their good or bad actions in resource usage. In this way, participation of stakeholders, particularly women in the context of "gender and water" described in the first part of this document, becomes important to such a degree that it is necessary to ensure the participation of women. Therefore, it has been suggested that in the process of transferring control of the state to localities, it is necessary to ensure the participation of women in the technical meetings and decision-making processes.[6]

In spite of the discourse of inclusion of women in water management, Ivens[7] argues that although such participation can help to improve efficiency in the management of drinking water, and the fact that their access to water improves their health and their children's health; there is no clarity about how this participation, particularly in decision-making in the management process, that can directly contribute to their personal welfare, empowerment and, finally, to gender equity. Moreover, due to the lack of clarity of the purpose of their participation, the author believes that without a change in traditional gender roles, such as domestic activities, the participation of women in management and community water management mean additional working hours to add to the everyday inequities they already have.

Meanwhile, Briadotti[8] suggests the need to carry out simultaneous programs of equity in access to productive resources like land, water or employment opportunities within a strategic plan to generate a change in gender relations both inside and outside home. Nazar et al.,[6] mention that the latter is a key element of the institutional and social relations but difficult to implement because it involves, in addition to the redistribution of power between men and women, the need to rethink development schemes which are responsible for both environmental degradation and growing social inequalities.

Women participation in water management: Context of the Rio Sabinal and Cañón del Sumidero watersheds

Generally, there are few studies that analyze from an empirical basis the participation of women in water management in the context of current national and international policies. Particularly in the four southern border states of Mexico, Belize and Guatemala, there are practically no studies on the participation of women in water management schemes despite the recent occurrence of a series of climatic events as well as social and political issues related to water. The state of Chiapas is one of the Mexican states with the largest water resources and contributes 40% of the hydroelectric energy of the country. In 2005, the 71.1% of homes in this state had piped water.[9] In the 2010 census, this percentage rose to 73.5%,[10] which represents a minimal increase (2.4%) and probably below the existing demand in the state. In Chiapas, there are springs that dry up for long periods, affecting low-income rural women the most, due to the fact that during drought, they are forced to carry water to their homes from sources even further away. The lack of water is also associated to deforestation, pollution and overexploitation of aquifers. To face this situation, Land Management Programs (POET – Programs de Ordenamiento Territorial) and emergency plans have been implemented, as in the case of the Rio Sabinal watershed.

The importance of this watershed is strategic due to the fact that it provides drinking water to Tuxtla Gutierrez, the capital of the state of Chiapas, which has grown rapidly over the last decade and currently has a population of 533,374 inhabitants.[10] It is also important for ecological reasons, since in the watershed of the Rio Sabinal, there are relicts of mesophyll forest that are confined to narrow areas in mountainous region, where the clouds are often found at the same level as vegetation. Additionally, in the Rio Sabinal and Cañón del Sumidero watersheds, a natural protected area, ranked as a conservation area is found, named "La Pera". It is also part of the Cañón del Sumidero-El Ocote Jungle biological corridor, which is integrated by other protected areas such as the Cañón del Sumidero National Park, Villa Allende Forest Protection Zone; the ecological conservation area known as Belgica Lagoon and El Ocote Biosphere Reserve. The biological corridor El Ocote-Cañón del Sumidero Jungle is important due to the fact that it allows the continuation of ecological function and natural genetic dispersal. Considering the above and within the context of the Rio Sabinal watershed and Cañón del Sumidero in the state of Chiapas, the purpose of this study was to review the magnitude and nature of women's participation in water management. Some aspects that favor or prevent women participation in such management were explored and it is analyzed if this participation contributes, or not, to gender equity. The results are analyzed from the Gender in Development perspective, which emphasizes the need for the integration of the gender perspective in the design and implementation of policies and programs to achieve equity.

Methods and materials

Study Area

The town of Berriozábal, Chiapas, is located in the Central Depression and bordered on the north by the municipality of Copainala and Tecpatán, to the east by Tuxtla Gutiérrez and San Fernando and to the west by the municipality of Ocozocoautla Espinoza and has a total territorial extension of 300.6 km^2. Its average altitude is 900 meters above sea level and is found at the geographic coordinates of latitude

of 16°48 ' North and a longitude of 93°16' West. This municipality has an estimated population of 43,179 inhabitants (21,562 men and 21,617 women). It has 9,242 registered households, from which 56.7% have piped water and 42.8% do not have this service. It belongs to the 30th hydrological region (RH30) in Grijalva-Usumacinta basin "E", including Tuxtla Gutiérrez-Rio Sabinal watershed.[11]

Design and data gathering methods

The breadth of this study includes all the 55 marginal rural and urban communities of Berriozábal, Chiapas, Mexico. 49 out of 55 are rural communities and six are marginal urban settlements. During data gathering, it was only possible to include 46 communities out of 55 due to the fact that in some cases, access was not available due to the bad conditions of the dirt roads as a result of the rainy season, when fieldwork was carried out; and also, due to the fact that some communities were uninhabited. Fieldwork was conducted during the months of May, June and July 2011 with the objectives of identifying sources of water supply for domestic use and for food production (corn and beans), the water supply infrastructure, the perceived quality of the water resource by the actors, as well as to evaluate the participation of women in water management committees. We also inquired about the participation of women in other community committees as a reference for their participation in these type of activities within the communities. The methodologies from which the information was obtained were:

i. Participatory observation.

ii. Application of a structured questionnaire with questions about water committees in each community, which included questions about how it is structured and what roles they play.

iii. Recorded interviews with key actors, in which we deepened knowledge about their roles in the water committee and their opinions about the participation of women.

For the respondents who participate in water committees, they were questioned about their functions and their opinion about what the rest of the community members think about their participation in these committees. We also asked about their personal feelings and motives with respect to their participation in the committees.

The sampling site was composed by the total number community committees (N=245) from the 46 communities where fieldwork was undertaken and which are distributed in both watersheds considered in the study of the municipality of Berriozábal, Chiapas. In this way, the analysis unit was constituted by each water committee from each community (n), in which gathering data instruments were applied.

Once we determined the presence or absence and the type of community committee (according to their type of social management, such as water, electricity, health, schools, etc.), communities were classified according to the characteristics and presence of water committees in three circumstances:

a. Those with water committee and participation of women (y=1),

b. Those with water committee but no women participation (y=2) and

c. Those that have various committees but no water's (y=3). This resulted in only 24 communities having water management committees (n), of the total 46 communities studied, meaning in 22 communities there were no water management committee.

To perform the analysis of the generated information in this study, we constructed a database of socio-economic variables obtained from the Population and Housing Census of 2010.[10] The database included variables grouped into three categories: education, housing / services, and religion. From them, we conducted a comparison of means test and ANOVA one-way between the communities of each of the three conditions (y=1, y=2 and =3) and in order to find if there was any suggestion of a relationship between these variables and the existence of any of the three types of conditions. The results indicated the value of probability of type I error or alpha (α) and used the test for homogeneity of variances Levene.[12] In the socioeconomic variables for which the Levene test showed heteroscedasticity variance, the Games-Howell test[12] was used for multiple comparisons.

Results

Types of community committees

In total 46 communities were considered in this study. We found a total of 245 community committees (N) divided into 17 types (Table 1). The most frequent committees found in all communities were: elementary school committee (14.7%), committees required for the federal government social development program, 'Oportunidades' (14.7%), primary school (14.7%), school breakfasts (14.7%), surveillance committees (13.9%), health (11.2%), water (10.2%), the planning committee for municipal development (COPLADEM) (7.8%) and while the lower frequency were: food program committee (PAL) (1.6%), kindergarden (1.2%) and agricultural and livestock committee (0.4%). Chiapas solidarity committees, community kitchen, committee on citizen participation, different community and SSS-livestock, only represent 0.4% each (Table 1).

Table 1 Number of community committees by type of committee

Type	Number of committees	Percentage
Health	27	11.02
Water	25	10.20
Chiapas solidario	1	0.41
Commmunity kitchen	1	0.41
Committee of citizen participation	1	0.41
Agricultural and livestock committee	2	0.82
Different community committees	1	0.41
Surveillance committees	34	13.88
Planning committee for municipal development	19	7.76
School breakfasts	35	14.29
Primary school	36	14.69
secondary school	2	0.82
kindergarden	3	1.22
Lighting	17	6.94
Oppurtunities	36	14.69
food program committees	4	1.63
Agriculture and livestock	1	0.41
Total	245	100.00

Source: own data based on fieldwork, 2011.

Characteristics of communities in which have women participate in water committees

Of the 46 communities, only 8 had the condition y=1 where women participate in water management committees, representing 17.4% of this total; of these, six are located in the Sabinal watershed and two in the Cañón del Sumidero; 16 of them had the condition y=2 (water committee but without women participation), and they represent 34.8% of the total, their geographic distribution is nine in the Rio Sabinal watershed and the remaining seven were in the Cañón del Sumidero. In 22 communities there were no water committees, constituting 47.8% of all communities presenting this condition y=3, 17 are located on the Rio Sabinal watershed and 2 in the Cañón del Sumidero watershed (Table 2). From the information presented above it is shown that there is no particular geographical distribution of the absence of women participation in water committees in both watersheds.

Table 2 Total number of community committees and the composition of their members by sex and watershed

Watershed	Community	Total number of inhabitants	Total number of committee per community	Total of community committee members	Total number of men who participate in all the committees	Total number of women who participate in committees	Number of committees in which women participate	Presence of Water management committees and participation of women*
Cañón del Sumidero	Las Maravillas	1339	7	22	13	9	4	1
Cañón del Sumidero	Nuevo Montecristo	252	7	14	7	7	2	2
Cañón del Sumidero	El Danubio	159	8	26	18	8	2	2
Cañón del Sumidero	Rio Blanco	75	5	17	10	7	2	2
Cañón del Sumidero	Ignacio Zaragoza	1354	6	20	13	7	3	2
Cañón del Sumidero	Buena Vista	106	6	10	9	1	1	2
Cañón del Sumidero	Benito Juárez	228	7	23	19	4	1	2
Cañón del Sumidero	Nuevo Chacacal	130	7	24	17	7	2	3
Cañón del Sumidero	Nuevo progreso	69	5	8	2	6	4	3
Cañón del Sumidero	Unión Hidalgo	153	8	21	15	6	2	3
Cañón del Sumidero	Paso Limón	35	5	9	7	2	2	3
Cañón del Sumidero	Chucumbac	55	4	4	3	1	1	3
Cañón del Sumidero	El Eden	413	8	37	22	15	5	3
Cañón del Sumidero	Efrain A. Gutiérrez	576	8	27	9	18	5	2
Subtotal Cuenca	**14**	**4944**	**83**	**235**	**155**	**80**	**31**	
Sabinal	Joaquin Miguel Gutiérrez	357	9	28	17	11	5	1
Sabinal	Divisadero	90	4	15	5	10	4	1
Sabinal	Colonia Ejidal	190	3	8	1	7	3	1
Sabinal	Ejido San Isidro	111	4	14	7	7	4	1
Sabinal	San Miguel	SD	3	14	8	6	2	1
Sabinal	lindos aires	61	2	2	0	2	2	1
Sabinal	El Sabinito	177	6	17	3	14	4	2
Sabinal	Las Camelias	72	8	27	21	6	2	2

Citation: Villalpando VG, Beutelspacher AN, Martelo EZ, et al. Gender and women's participation in water management in the rio sabinal and cañon del sumidero watersheds in berriozabal, Chiapas, Mexico. *Int J Hydro.* 2018;2(4):454–464. DOI: 10.15406/ijh.2018.02.00111

Table Continued

Watershed	Community	Total number of inhabitants	Total number of committee per community	Total of community committee members	Total number of men who participate in all the committees	Total number of women who participate in committees	Number of committees in which women participate	Presence of Water management committees and participation of women*
Sabinal	Benito Quezada	92	6	20	16	4	1	2
Sabinal	Amendú	453	6	30	26	4	1	2
Sabinal	Tierra y Libertad	496	7	21	9	12	3	2
Sabinal	Agua Escondida	32	5	18	16	2	1	2
Sabinal	Vista Hermosa	237	6	23	14	9	3	2
Sabinal	San Antonio Bombano	91	8	17	13	4	4	2
Sabinal	Gracias a Dios	42	4	14	8	6	2	2
Sabinal	Santa Martha	110	6	23	9	14	3	3
Sabinal	Fracción El Carmen	16	2	4	3	1	1	3
Sabinal	Las Limas	20	4	11	3	8	3	3
Sabinal	Palo Alto	19	0	0	0	0	0	3
Sabinal	Berling	410	8	18	9	9	3	3
Sabinal	Nueva Esperanza	236	5	12	8	4	2	3
Sabinal	San Martín	6	7	17	13	4	3	3
Sabinal	El Tirol	78	6	21	19	2	1	3
Sabinal	El Caracol	60	7	19	13	6	2	3
Sabinal	El Limón	16	6	19	14	5	2	3
Sabinal	Ovegería	18	1	3	3	0	0	3
Sabinal	La Caridad	193	3	12	10	2	1	3
Sabinal	El Palmar	161	5	9	4	5	4	3
Sabinal	San Isidro (cab Muni	8	4	13	0	13	4	3
Sabinal	Barrio La Piedad	SD	3	8	7	1	1	3
Sabinal	Barrio Miravalle	SD	3	15	7	8	3	3
Sabinal	Barrio San José	SD	3	14	5	9	2	3
Subtotal Watershed	32	3852	61	180	112	68	28	
Total	46	15,214	114	342	215	127	53	

Source: own data based on fieldwork, 20011.

Citation: Villalpando VG, Beutelspacher AN, Martelo EZ, et al. Gender and women's participation in water management in the rio sabinal and cañon del sumidero watersheds in berriozabal, Chiapas, Mexico. *Int J Hydro.* 2018;2(4):454–464. DOI: 10.15406/ijh.2018.02.00111

Explanatory factors of the participation of women in water committees by community condition and socioeconomic category

We made an analysis of the mean values for variables for the three socioeconomic categories (education, housing/services and religion) for each of the three conditions of community (y=1, y=2 y=3), which it is summarized in Table 3. From the identification of relational trends between socioeconomic status and conditions arising from this community, we assessed the effect of independent variables on the participation of women through an analysis of variance where the community conditions were contrasted with having a community water committee (y=1 and y=2), and socioeconomic variables of apparent relationships: men's schooling, housing conditions and equipment and non Catholic religion. The results of this variance analysis are presented in Table 4 where it is shown that in the communities with water committees (conditions y=1 and y=2), greater participation of women can be explained by socioeconomic variables of two categories: education and housing / services.

Table 3 Characteristics of communities according to the existence or absence of water committees and participation or lack of women's participation in them

Variables	Average in committees with water management committee and with women participation (y=1)	Average in communities with water management committees but without women's participation (y=2)	Average in communities without water management committees (y=3)	p value*
Literacy				
Percentage of illiterate men 15 years and older	26.60	44.90	34.60	**0.025**
Percentage of illiterate women 15 years and older	55.28	55.12	51.68	0.861
Percentage of men who have not completed primary school	45.14	48.44	41.40	0.410
Percentage of women who have not completed primary school	42.56	51.56	44.97	0.356
Percentage of men who have completed primary school	41.43	54.38	49.46	0.407
Percentage of women who have completed primary school	39.21	45.63	41.45	0.749
Percentage of men who have not completed secondary school	51.14	46.36	29.48	0.193
Percentage of women who have not completed secondary school	38.86	53.64	25.07	**0.037**
Percentage of men who have completed secondary school	53.10	63.23	42.15	0.125
Percentage of women who have completed secondary school	39.03	30.53	30.56	0.707
Percentage of men who have higher education	51.03	41.72	30.24	0.376
Percentage of women who have higher education	24.10	33.28	19.76	0.427
Housing and services conditions				
Access to health services	58.03	53.05	40.11	0.160
Electricity supply	94.54	91.02	67.60	**0.054**
With piped water inside the home	45.45	73.60	15.66	**0.000**
With drainage	91.30	63.58	59.25	**0.064**
With cement or ceramic floor	81.93	70.41	57.17	**0.092**
With radio	56.24	54.56	53.29	0.963
With television	74.94	66.50	53.67	0.157
With refrigerator	55.04	32.98	33.60	**0.082**
Religion				
non-catholic religion	48.25	34.70	19.28	**0.020**

Source: calculations based on data from general population census. INEGI,[10].

*In comparing the means of each attribute of the three community groups, the ANOVA one-way test was used..The results indicated the value of probability of type I error or alpha (α).The test for homogeneity of variances Levene (Daniel, 2010) showed the existence of heteroscedasticity in the variances so a Games-Howell test was used for multiple comparison in the illiteracy variables in men of 15 years or older (p = 0.025), women who completed secondary (p = 0.037), with piped water inside the home (p = 0.000) and religion (0020).The Levene test showed that there are equal variances which used least significant difference (LSD) for multiple comparisons in other variables.

Citation: Villalpando VG, Beutelspacher AN, Martelo EZ, et al. Gender and women's participation in water management in the rio sabinal and cañon del sumidero watersheds in berriozabal, Chiapas, Mexico. *Int J Hydro.* 2018;2(4):454–464. DOI: 10.15406/ijh.2018.02.00111

Table 4 Analysis of variance to explain the participation of women in water committees

Variables	Communities with water management committees		
Literacy	**With the participation of women**	**Without the participation of women**	**p value***
Percentage of illiterate men 15 years and older	26.60	44.88	0.003
Percentage of illiterate women 15 years and older	55.28	55.12	0.989
Percentage of men who have not completed primary school	45.14	48.44	0.562
Percentage of women who have not completed primary school	42.56	51.56	0.111
Percentage of men who have completed primary school	41.43	54.38	0.097
Percentage of women who have completed primary school	39.21	45.63	0.409
Percentage of men who have not completed secondary school	51.14	46.36	0.751
Percentage of women who have not completed secondary school	38.86	53.64	0.324
Percentage of men who have completed secondary school	53.10	63.23	0.420
Percentage of women who have completed secondary school	39.03	30.52	0.434
Percentage of men who have higher education	51.03	41.71	0.555
Percentage of women who have higher education	24.10	33.28	0.485
Housing and services conditions			
Access to health services	58.03	53.05	0.612
Electricity supply	94.53	91.01	0.692
With piped water inside the home	45.45	73.60	**0.052**
With drainage	91.30	63.58	**0.004**
With cement or ceramic floor	81.93	70.41	0.100
With radio	56.24	54.56	0.869
With television	74.94	66.51	0.367
With refrigerator	55.04	32.98	**0.020**
Religion			
non-catholic religion	48.25	34.70	0.314

Source: calculations based on data from Censo General de Población, INEGI,[10];

*Women participation in water committees: The test for homogeneity of variances Levene (Daniel, 2010) showed the existence of heteroscedasticity in the variances so a Games-Howell test was used for multiple comparison in the illiteracy variables in men 15 years old or above (p=0.003), with home drainage (p=0.004), with refrigerator (p=0.020). Levene test showed that there are equal variances. So a least significant difference (LSD) was used for multiple comparisons in other variables.

In the education category, the lowest illiteracy rate among men (20.6%, p 0.003) associated with a lack of access to higher education, seems to correspond with increased participation of women in water committees, increasing it by 4.4% for each educational level of the men (B=4.45, p=0.036, R^2=0.63). It was also found (as shown in Table 5, Figure 1), that education of women correlates inversely with the participation of women in water committees. In the communities of condition y=1, it decreases 4.77% with increasing educational level of women (B=-4.77, p=0.016, R^2=0.75). Thus, it is possible to suggest that for women in communities with a water management committee, participation in these committees is not a desirable activity or it is not prestigious, which could explain why it remains an activity for those who have a lower educational level.

In the category of housing / services, greater female participation in the committees is associated with the lower proportion of piped water inside the dwelling (45.5%, p=0.052) as well as the communities with a higher socio-economic status (expressed as percentage of households with refrigerators (55.0% with p=0.020) and households with drainage (91.3%, p=0.004). With regard to the category of religion, we found that it is possible that the presence of non-Catholic religious organizations promote the social organization of communities to relate this variable with the condition y=2 (with 39.21% and p=0.010), the presence or lack of religious catholic groups, have no influence on the participation of women in these committees (48.3%, p=0.314).

Table 5 Trend analysis of the educational levels of men and women according to the condition of the communities

Education /Type of community	R2	F	P	B
Men in communities with water management committees with the participation of women	0.63	9.62	0.036	4.45
Women in communities with water management committees with the participation of women	0.75	16.25	0.016	-4.77
Men in communities with water management committees without the participation of women	-0.23	0.08	0.791	0.584
Women in communities with water management committees without the participation of women	0.598	8.432	0.044	-4.69
Men in communities without water management committees	-0.158	0.317	0.604	-1.129
Women in communities without water management committees	0.868	33.77	0.004	-6.26

Source: Own data based on fieldwork, 2011.

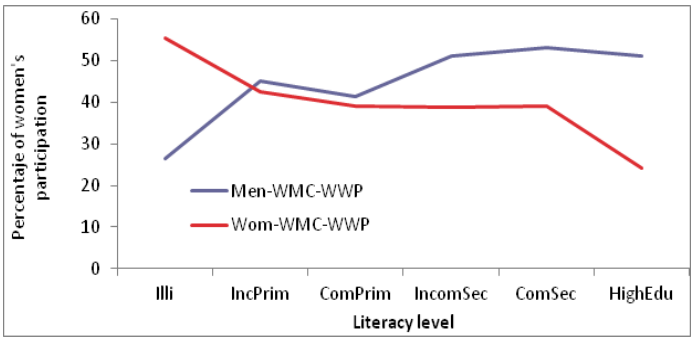

Figure 1 Percentage of women´s participation in water management committees (y axis) against education levels of men and women in communities with water management committees (WMC) and women´s participation (WWP).

Source: own data based on fieldwork, 2011.

Characteristics of women who participate in water management committees

There were 16 women who participated (n=4) or currently participating (n=12) in the water committees in their community. Of these, only two have served as president for very short periods (up to three months). The rest has served as secretary, treasurer or member, the last two of those positions were held longer. We did not find any pattern in characterization related to age, religion or the number of dependent children or grandchildren. In terms of education, from the twelve women who currently hold a post in the committee, nine have not completed primary school, only one has finished primary school and only two have completed high school or a technical career. This confirms the results of the analysis of variance which shows the trend that women who participate in water committees usually have low education levels (Table 6).

Interviews with women who previously occupied a position within the water committee only served a short time in that position. Some of the reasons referred were: social pressure caused by the opinions of community members who declared that "they did not perform these activities well" and that "it is hard work that men should do" and the fact that such activities have lost its prestige status and have no economic or community benefits, turning into a undesirable activity for men. However, the women who participate in the committees consider that it is a job they can do well, and even express their enjoyment of the job. The following interviews fragments show evidence of these ideas: "None of the men wanted to be part of the committee, they say they it takes up alot of time and voluntarily I offered myself for the position, taking the chance that they would accept me, because I cannot read or write", (Guillermina, Secretary of the water management committee of Joaquín Miguel Gutiérrez).

"Men no longer want that responsibility because it takes time away from their jobs, besides of the responsibility to collect the fees, also people do not always pay, and they do not like going from home to home to collect the money". (Esperanza, Treasurer of the water management committee of Las Maravillas)."There were comments claiming that we did not do the job well and we were very slow, that this type of job was for men and not for women. I considered I did not do my job at 100% performance, but it was enough and it was a great joy and something I do from my heart. I left the position due to the negative comments I received from people" (María del Rosario, ex-member of the water management committee of El Sabinito)."… Now there are no women in water committees because it is a hard job for them, because they have to walk around the whole community, but previously some women had participated, but they did not have a good performance due to the demanding work." (Ariosto, President of the water management committee of El Sabinito).

Thus, the possibility of participation of these women in water committees seems to be immersed in gender norms on the one hand, being a voluntary, unpaid and low-prestige activity left to women, particularly to those with the lowest level of schooling. Secondly, the women faced community opposition to their participation, as it was considered a man's job. In this sense, the focus seems to be the traditional gender division of labor, because the participation of women in community water committees implies working outside their home and involves extensive travelling outside their homes and their communities which, as stated, is not accepted by the communities. This is in contrast to the issue of water management within a home, which is an activity understood by both genders as the woman's responsibility. Although, having piped water inside their homes benefits both men and women and the rest of their families. From the perspective of gender and equity, responsibility for water management should be shared by men and women. The following excerpts show that these considerations have been taken into account.

"The community has benefited from the participation of women, as the housewives are those who use more water, and before when there was no water in the house, they were the ones who carry it from

wells and even today when there is no water, women keep carrying it" (Aarón, El Edén). "Concerning water, in the community, women carry water from the river, and when the river dries out, wells have to be made at the riverbank to obtain water, and when it is very dry, the water does not come, so 5 or 6 families have to work together to make a well, and they try to look after it in order to have water during all the dry time, and everything is carried using buckets by women (Eliacin, Unión Hidalgo). Concerning interviews with women occupying a position in the committee during the development of the study, they expressed a variety of opinions regarding their participation in the water committee, some of them said they felt capable and proud for their job as it expressed their personal capacities and others said they were unhappy with their position. For others, the main motivation was the perception of their need for water in their homes; some of them had to face male opposition in order to occupy these positions: "My participation in the water committee has benefited the community, because I received the position with debt of the committee and now I have paid it off, and I have even saved some money for the committee". (Blanca, Treasurer of the water management committee of El Edén). "The participation of women in the water committee is great, because women fight more and they suffer more, and because they spend more time at home they are aware of all the needs and it is a big responsibility. There is no better choice than a woman in charge of water committee or representing it. I would like that women remain participating in water issues" (Martha, President of the management committee Lindos Aires) "My motivation for participating was to stop carrying water from the river, and no longer have the need to go to the river to wash my clothes". (Guillermina, Secretary of the water management committee of Joaquín Miguel Gutierrez). "In the past there was a lot of machismo in the community, for example one time in a meeting, a woman asked me to be a member of the committee and I accepted; but some men do not agree". (Esperanza, Treasurer of the water management committee of Las maravillas).

Table 6 Characteristics of women currently involved in community water committees

ID number of woman participant in water management committees	Position	Time held in position (months)	Age	Marital status	Women literacy	Religion	Number of children	Number of children under 13 years of age	Literacy of spose
1	Treasurer	7	44	Married	Not completed primary school	Seventh Day Adventist	4	0	Completed secondary school
2	Treasurer	12	33	Liberal union	Not completed primary school	Seventh Day Adventist	0	0	Incomplete primary school
3	Secretary	10	49	Married	Not completed primary school	Seventh Day Adventist	7	0	Incomplete primary school
4	Secretary	1	23	Married	Not completed primary school	Catholic	1	1	Completed primary school
5	Member	12	29	liberal union	Not completed primary school	Catholic	2	2	Incomplete primary school
6	Member	6	34	liberal union	Not completed primary school	Catholic	4	2	Incomplete primary school
7	Secretary and chief water pumper	12	28	Married	Completed sixth form	Catholic	1	1	Completed secondary school
8	President	3	39	widowed	Completed primary school	Pentecost	2	1	Not applicable
9	Secretary	3	44	liberal union	Not completed primary school	Seventh Day Adventist	4	4	Incomplete primary school
10	Treasurer	3	34	Married	Not completed primary school	Seventh Day Adventist	3	1	Completed primary school
11	Treasurer	1	42	Married	Not completed primary school	Catholic	2	0	None but literate
12	President	3	55	Married	Technician´s training	Catholic	1	6	Completed secondary school

Source: Own data based on fieldwork, 2011.

In some Tsotsil indigenous communities such as Vista Hermosa, Amendu, Nuevo Chacacal and Nuevo Monte Cristo, the participation of women in the water committee has been banned in their regulations or meeting agreements; most of the men interviewed in these communities say they would not like the participation of women in these committees. Also, in the other communities where most of their members are not indigenous, similar opinions were found. "In this committee no women participate, this is by regulation and due to the jobs that have to be done. The source of water is far and it has to be cleaned. I would not like the participation of women; they can participate only in easier things. The community has 12 years with water and with a committee and no women have ever participated."(Martín, tsotsil, Vista Hermosa). "Women could not do the heavy work and their participation would be frowned upon, that is why men exist, to do it. I would not like the women participation in the future (Genaro, tsotsil; Amendu). "This committee does not involve women, because we are only men and as it is a complicated job, because we have to go to the mountain and is more difficult for them". (Rigoberto, El Danubio).

Discussion and conclusions

In terms of community management of water, in the study area there were 24 committees characterized by low female participation, which can be explained because of a widespread perception that expresses the management of water as a public activity. Following Nazar et al.,[6] it is considered that the separation between public and private, although ambiguous in many cases, reinforces the idea that water intended for domestic use and tasks such as carrying water into the home, as stated by those interviewed, is an activity for women, as opposed to the masculine nature of participation in water committees (having found an emphasis in this belief among the Tsotsil indigenous communities). In this respect, the same authors.[6] explain that women face limitations to participation in public decision making, due to them being homebound and their disadvantage in community relations as a result of patriarchal marriage rules. They argue that although the law states that the participation of users in different organizational areas should be encouraged, it does not include women because their access to irrigated water is generally informal, as they generally don't have property rights to land. The law does not explicitly eliminate them, but they left out of land deeds, by tradition and because they themselves are marginalized in decision bodies.[5] In this study we found that this pattern is repeated within the community water committees of the Rio Sabinal and Cañón del Sumidero watersheds, where most of their members were men.

From this and the rest of the findings of the analysis can be stated as arising from Nazar et al.,[6] the complexity and diversity of the issue of access to water and the administrative handling of it, shows how difficult it is to achieve greater equity in these areas where there is such a marked gender inequality in society. This is to such a degree that even in cases of respondents who have had the opportunity to access activities in water management committees, face opposition from their communities, particularly by male actors. This is despite the benefits shown, among which are the contribution to the female empowerment and well-being that many of them expressed when undertaking these activities and those resulting from having access to water within the home for themselves and for all the community members. Very similar cases have been reported by Flores[13] for Peruvian communities.

It is important to mention that the possibilities of access to participation in committees by women, can be explained in turn by the low prestige status that the water management activities currently have among men, and that this situation creates the "opportunity" of female participation. This aspect makes power negotiation more complex between genders. Despite the social opposition to women's participation in community management of water (because for some, it is an obligation or a husband imposition and it only represents more work) in Berriozábal communities, women participation in committees has recently (in the last three years) and gradually increased. The ideas they have built themselves around their participation are very important in order to increase their participation or deter participation. Because of this, we found prospects that indicate a positive trend in Berriozábal, because women consider their participation valuable for their own person, family and community. The challenge ahead, as raised by the water committee chairwoman of the community "The Chompipe" in Nicaragua, is that women participation is very valuable due to the domestic perspective they give to the perceived needs of resources. Therefore, from now on, their inclusion is essential in areas of greatest decision-making, whether at local, municipal, state or national level.[14]

This generates reflection in the light of the strategic proposal of Gender in the Development approach,[15] regarding the participation of women in management and promotion activities. The question of power lies precisely in the center: Who has it? Who controls the resources? How do I access to them? How do I access to the structures where decisions are taken and we have interference in such matters? How do women benefit from their work and participation in water management? According to Zapata, more work should be done on this perspective as it advances the creation of a new social and subjective configuration in which gender equity exists. The goal is not only transform inequality, but it is also important to address immediate needs to improve conditions where gender relations of power are shown in contexts of poverty.

Questioning procedures and structures of development as an institution of power and include the perspective of women in them, is where all investigation interested and concerned with the social world should begin.[16] In this sense, this work has noticed how in the watersheds of the municipality of Berriozábal, Chiapas, Mexico, in reference to the structures of power between the genders with regard to water management, traditional ideas prevail about the gender roles. These roles are divided between public-male and private- female and this division has helped to keep women out of decision-making spaces that are traditionally regarded as male. The opportunities of female participation are only generated when these activities have low prestige among men. However, it is argued that promoting women's participation in water management committees is a possibility in the construction of gender equity, not only for the subjective well-being expressed by performing these tasks, but the possibility that the value and benefits of women's participation in water committees contribute to achieve a true gender equality.[17-25]

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Conflict of interest

The author declares there is no conflict of interest.

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