

# Women Members of Local Government Led Rural Sanitation in Bangladesh: Policy and Technology

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**Abstract:** Sustainable Development Goals (SDG) aims sanitation for all. The SDG will create access among population having no latrine and maintains it. Although local government is often responsible for sanitation and women play important roles in sanitation, women have rarely led sanitation representing the institutions. A randomized controlled trial was implemented to learn whether Women Members of the institution (WMUPs), with community women's groups (CWGs), could lead sustained sanitation programs in high sanitation achieved rural Bangladesh representing local government Union Parishad (UP). All 64 Unions (32 intervention and 32 comparison) were selected with >70% sanitation. All members of UPs and CWGs received training on sanitation related policy, gender and social aspects in intervention unions. The outcomes were assessed by comparing the structure of UPs and conditions of household latrines during baseline and end line surveys. Randomly selected approximately 1,143 households in intervention and 1,134 in comparison areas were observed. WMUP led UP sanitation structure changed from 6% to 97% in intervention area while remained same in comparison area (25%). The 'basic' latrine use was significantly different/higher in intervention than comparison during end-line survey (77.7% vs 69.3%, C.I. 0.047 to 0.120,  $P < 0.0001$ ); while it was similar (44.0% vs 46.3%, C.I. -0.018 to 0.063,  $P = 0.273$ ) during baseline survey. The water-seal maintenance rate was significantly higher in intervention than in comparison area (75.2% vs 62.7%,  $P < 0.0001$ ). WMUP led sanitation representing UP proven. Policy update and research on WMUP demanded roles recommended.

**Keywords:** Sanitation; Local Government; Women Members; Community Women's Group; Operation- maintenance; SDG

## 1. Introduction

Discussion of sanitation facility (such as latrine) importance and its proper use among underprivileged/needful people is decades old concept (Fewtrell et al., 2005; Aziz et al., 1990; Feachem et al., 1983; Hoque et al., 1999; Julian, 2016; Perez, 2014; Institute of Development Studies, 2011). The Millennium Development Goal (MDG) focus was on access to and use of improved latrine (UNICEF and World Health Organization, 2015). Yet, the Joint Monitoring Program by UNICEF and WHO (JMP) reported in 2015 that 32% of the populations of the world were using unimproved facilities. The report also stated; 50% of rural populations and 18% of urban populations lacked access to improved sanitation (World Health Organization and UNICEF, 2017). The sanitation coverage in rural areas significantly fell back in urban areas. Importance of promoting women's participation in sanitation programs has been recognized (Institute of Development Studies, 2011; Hanchett et al., 2011; SIDA, 2015; Movik and Mehta, 2010; Daalen et al., 2014; Hoque et al., 1994a, 1994b). Women motivate young and adult members of a family to use latrines, cleaning the latrines, collecting water for cleaning, disposal of children's feces, and operation and maintenance of latrine. Community Led Total Sanitation (CLTS) has been recognized as one of the most remarkable approaches to sanitation and to 'end open defecation' in the developing world during recent years (Institute of Development Studies, 2011; Hanchett et al., 2011; Movik and Mehta, 2010; Petra Bongartz et al., 2016). In CLTS and most of the other community based sanitation programs, program/women expressed primary concerns about access to latrine related safety, privacy, dignity and health. Women have been involved in household sanitation program as natural leaders (Movik and Mehta, 2010; Daalen et al., 2014; Hoque et al., 1994b; Petra Bongartz et al., 2016). The SDG goal adds sustainable management of sanitation for all, with attention to the needs of women, girls

and those in vulnerable situations, among its various targets and indicators (SDGs, 2015).

The local government is responsible for promoting water and sanitation in many developing countries (Institute of Development Studies, 2011; Hanchett et al., 2011; Movik and Mehta, 2010; Policy Support Unit, 2011; Femke 2017; Monica et al., 2006). To meet the costs for realizing SDG targets, it is critical to maintain the existing sanitation facilities (Hutton et al., 2016). Local government institutions have played important roles in CLTS also (Hanchett et al., 2011; Movik and Mehta, 2010; Policy Support Unit, 2011). Open defecation free status (ODF) is debated as the first stage in a process of change and improvement towards sustainable sanitation (Petra Bongartz et al., 2016). To achieve the universal sanitation and to meet the SDGs 16.7 on "responsive, inclusive, participatory and representative decision-making at all level", it is logical that the women in local government own the capacity to lead sanitation representing the institution. We failed locating information in literature on policy, social and technological issues found important for satisfactory performance of women in decision-making for sanitation program by local government institution in Bangladesh or in other countries.

Bangladesh "had sanitation programs longer than those in most countries that can provide valuable lessons" (Hanchett et al., 2011). Open defecation reduced to about 1% in 2015 from 42% in 2003. In addition, around 57% of the rural population used an improved sanitation facility in 2014 (Local Government Division 2016). The experiences presented here are gained during an applied research carried out by us to learn if Women Members (WMUP) of rural grass-root local government (Union Parishad) can lead sustainable sanitation in Bangladesh representing UP. It is high time to establish evidence about scopes for WMUP led sanitation in MDG to SDG.

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## 2. Methods

### 2.1 Local Government and Union Parishad

In Bangladesh, the local government includes three tiers. They are - Zila (District) Parishad, Upazila (Sub-district) Parishad, and Union Parishad (UP). The UP, is the only local government institution that is active in rural areas for long time. Union is the smallest grassroot-level rural administrative and local government unit. And the Parishad is the Council responsible for the respective administrative unit (Ministry of Law, 2009). A Union is formed of 9 Wards. Each Union, on average, contains approximately 25,000 population. At present, there are approximately 4,543 Unions are existing in Bangladesh. A UP includes 13 elected members-one Chairman, 9 male/ female Ward Members (one Member per Ward), and 3 Women Members (WMUP) for 3 reserved seats (one Member for per three Wards). It also has the power to enforce corrective measures like monetary 'fine' for polluting environment (like air, water), creating public health hazards and in other anti-social issues. In general, all UP roles and responsibilities are led through 13 specified Standing Committees against 13 grouped programs. The Standing Committees plan, monitor, recommend, facilitate with participation of respective Ward members. The activities are documented for UP meeting presentation. Each of the 13 elected UP Members (9 Ward, 3 reserved and 1 Chairman) chairs one Standing Committee. A Standing Committee is formed of 5-7 members from the UPs and the local community. The Bangladesh Union Parishad Act 2009 states that the 3 WMUPs will chair in one-third of the 13 Standing Committees (committees not specified). The Chairman of the UP assigns and designates this role. Standing Committees are scheduled to meet in every two months. All developmental, voluntary and other instructions are to be initiated, discussed, planned, and reviewed in respective Ward meetings. And those should be done in presence of voters. The relevant Ward Member and WMUP are Chairperson and Advisor respectively, of the Ward meetings. A Ward sub-committee comprises of 10 members (maximum). And at least 3 of the members should be from community women of the Ward.

The provision of water and sanitation services constitutes an important part of the overall mandate of the Ups (Policy Support Unit, 2011; Ministry of Law, 2009). Of the 13 Standing Committees of an UP, one is for WASH function. The UP receives annual block grants for water and sanitation, and can generate revenue by levying taxes and fees. UPs work and coordinate with Department of Public Health Engineering (DPHE) in rural WASH through relevant Water and Sanitation Committee (WATSAN), formed of representatives from UP, related departments and local leaders (Monica et al., 2006).

### 2.2 The Intervention

The sanitation educational intervention was implemented in 32 intervention Unions. The intervention leveraged the

scopes for gender mainstreaming in UP after Bangladesh Union Parishad Act 2009. The educational intervention, in the intervention areas, was carried out at two levels. The levels are - UP level and community level. The UP level included various training about sanitation among all members of 32 intervention UPs, development of community women groups (CWG) and training of CWGs by the project staffs. And the community level included creation of awareness about sanitation by the empowered WMUP and CWG among approximately 52,000 households. Standard sanitation programs by the government and NGOs continued in both the intervention and comparison areas.

The sanitation education addressed various issues together in different mix. Project staffs in UP level; sensitized and educated all men and women members and secretary of UPs (in total 448 members) about sanitation, UP Act, sanitation in UP Act, Bangladesh sanitation strategies and related policies, the project, why as well as how to let WMUPs lead the sanitation function and about development of CWGs by the UP members after demarcation of every Ward area into three parts based on community maps (distribution) of households. In Wards, the concerned UP members and WMUPs formed CWGs (3 per Ward) with 6 women volunteers per CWG, and the chair of every CWG (3 per Ward) was incorporated into the Ward Sanitation sub-committee. The education was given over one main and two refresher training. The WMUPs were trained, with CWGs, about why, what and how to create awareness about sanitation, hygienic latrine use, operation and maintenance of latrine. The WMUPs were also trained about their roles and responsibilities and ways to lead UP sanitation program through the gender mainstreamed arrangement.

The training methods include - classroom lecture, group game and discussions and real-life demonstration. Printed, pictorial and audio aids were used during the trainings. In community level; the empowered WMUPs, CWGs and respective Ward members created awareness at household level about the sanitation and other activities representing UP. The project developed and distributed various educational and communication tools to the WMUPs and CWGs like training aids, lecture sheets, posters, leaflets, flash cards, billboards, folk songs etc. after local need assessment. The trained WMUPs and CWGs distributed the communication materials among households and used those during their promotional activities. The intervention flow may be schematically presented as shown in Figure 1.

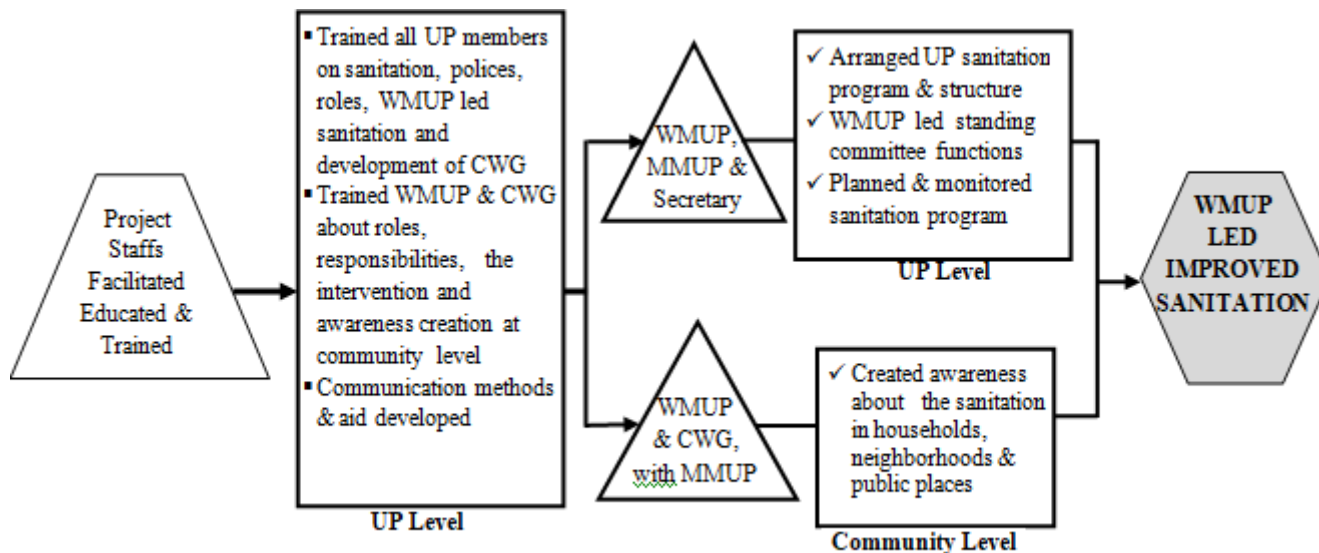


Figure 1: The Intervention Process Flow Chart

The WMUPs and CWGs, both jointly and separately created awareness and motivation about sanitation and impacts, ODF, building own latrines, latrine operation and maintenance, and related simple policies among households. The activities were completed through courtyard meetings, mass meetings, household visits, demonstration about adequate latrine operation and maintenance and spot visit monitoring of the existing situations for reporting to the Standing Committee.

### 2.3 The Study

We adopted randomized control trial (RCT) method. The RCT was designed to compare the differences in sanitation related aspects between intervention and comparison areas at UP institutional level and community level. Sixty-four similar Unions in terms of sanitation coverage (approximately 75%) and household characteristics from Cumilla (32 Unions) and Dinajpur (32 Unions) districts of Bangladesh were randomly assigned to intervention (16 in Cumilla and 16 in Dinajpur) and to comparison (16 in Cumilla and 16 in Dinajpur) areas. In Cumilla district, two Upazilas were selected. They were - Debidwar (9 intervention and 6 comparison Unions) and Muradnagar (7 intervention and 10 comparison Unions). Similarly, in Dinajpur district, four Upazilas were selected. Those were - Biral (6 intervention and 2 comparison Unions), Birganj (4 intervention and 7 comparison Unions), Kaharole (2 intervention and 4 comparison Unions) and Parbatipur (4 intervention and 3 comparison Unions).

The key outcomes were assessed by comparing the changes between the intervention and comparison areas considering the baseline (August 2012) and endline (March-April 2015) surveys. The surveys were conducted at the 64 UP sanitation functional level and at community level. Randomly 1,143 households in intervention areas and 1,134 households were selected in comparison areas during baseline. The minimum detectable impact of the RCT was 10 percent between the baseline and endline survey. About 36 households from 3 Wards per Union were randomly selected for baseline and endline surveys. The data was collected for 2,222 households during endline. Among the households 1,110 were in

Cumilla and 1,112 were in Dinajpur. A third party was engaged to complete the baseline and endline surveys. We conducted Focus Group Discussions (FGDs), randomly sampled household surveys (with check list) and Key Informant Interviews (KIIs) at about 6-8 months intervals.

The project was implemented from May 2012- May 2016. Although the project was planned for 2 years starting from 2012, untoward national political disturbances hampered it seriously. And it led to an additional year on 'no-cost' extension.

### 2.4 Data analysis

We analyzed the data by comparing the rates of specified indicators between the intervention and the comparison areas under baseline and endline conditions. We also compared the rates of the indicators between baseline and endline situations within the same areas (intervention or comparison). Chi-square test with continuity correction was employed to test the differences between the rates in any two groups of data.

The sanitation indicators were selected and/or formulated as follows: (i) indicators in the JMP ladder for sanitation 2017 including; open defecation (OD), unimproved, limited, basic and safely managed sanitation (World Health Organization and UNICEF, 2017). (ii) operation indicator in terms of cleaned latrine (no feces on the latrine). The cleaned latrine indicator was included because presence of feces inside latrine was found significantly associated with deaths from diarrhoeal diseases among children aged under five-years-old in rural Matlab, Bangladesh (Hoque et al., 1999). (iii) maintenance indicator in terms of presence of a water seal, lid or flap between the sitting/ squatting and excreta pit/ system units to block contact route between human and excreta. Bangladesh Sanitation Strategy suggested hygienic latrine should include 'the minimum standard of a pit latrine with a water seal, lid or flap' to 'effectively control the fecal oral route of disease transmission' (Policy Support Unit, 2011). Breaking of water seals or absence of water seal, lid, flap or pits in latrines has been reported (Policy Support Unit, 2011; Hoque, 2016). JMP improved/ basic sanitation

includes 'hygienic separation of human excreta from human contact' through flush/ pour flush to piped sewer system, septic tanks or pit latrines, ventilated improved pit latrines, composting toilets or pit latrines with slabs; irrespective of the blockage in the the route (UNICEF and World Health Organization, 2015).

### 3. Results

#### 3.1 Socio-economic characteristics

Selected social, demographic, economic and other characteristics of the community households and of the UP members (WMUP and MMUP) in the comparison and the intervention areas are presented in (Table 1).

The results were more or similar by intervention and comparison areas. The primary source of income for about half of the families (47% in intervention areas and 51% in

comparison areas) was day-labor or a similar level of profession, such as daily van-puller, etc. compared to 6% among the UP members. Approximately 80% households had at least one cellphone at home. Over half of the households were out of electricity access.

The characteristic of UP members were about similar between both areas but different than those of the community households in regard to some variables. Out of randomly interviewed 120 UP members (60 WMUP and 60 MMUP), all of the members had up to 5 years of schooling. About 90% of the MMUP and 76% of the WMUP had schooling for over five years. The key earning source was different types of business among approximately 46% and 31% MMUP and WMUP respectively. Electricity service was available to about 81% MMUP and 56% WMUP households. Basic latrines were observed among about 98.3% WMUP and 100% MMUP households.

**Table 1:** Demographic and social variables among households in the intervention and the comparison areas

Variable	Intervention	Comparison	p-value
No. of sampled households	1143	1134	
No. of total households	52147	55923	0.9412
Mean age of the housewives/female family caretaker (interviewees)	37.31	36.76	0.94127
% of main source of income (profession)			
- Farmer	26	25	0.5833
- Service and business	27	23	0.0272
- Day-labor and others	47	51	0.0557
% of households with at least one child ≤10 years of age	75	73	0.2756
% of households with mobile phone	80	79	0.5536
% of households with electricity	48	44	0.055
% of housewives/female family caretakers, with years of schooling			
- ≤ 5 class	70	73	0.1121
- > 5 class	30	27	0.1121
Access to improved/basic sanitation	44.0	46.3	0.273

#### 3.2 Union Parishad Structure and Reach

The structures or involvement/ arrangement of WMUP in UPs for sanitation in both intervention and comparison areas were similar in 2013, before the intervention (Table 2). The WASH Standing Committees in the intervention areas were revised and became significantly different from the comparison areas after the intervention. The rate of WMUPs as chair in the UP WASH Standing Committees in the intervention areas was significantly higher than in the comparison areas during (97% vs 25%;  $p < 0.0001$ ; CI: 0.48 to 0.85) the endline survey. The UPs formed WASH Standing Committees after the UP Act, as opposed to the project suggested Sanitation Standing Committee. WATSAN Committees were found not active in all intervention and comparison Unions.

In the intervention areas, on average 10 WASH Standing Committee meetings (minimum 9 and maximum 11) were held per Union with WMUP as chair in 2014-2015 (over about 16 months period). The committees mostly discussed and worked on issues related to access to latrines, water-seal, open defecation and safe water supply in arsenic-affected areas. In the comparison areas, 0-2 WASH Standing Committee meetings per Union were held during that period and none was chaired by WMUP.

**Table 2.** Institutional activities for sanitation by the Union Parishads (UPs), Committees and Ward Sanitation sub-committees

Parameter	Intervention	Comparison
No. of Unions	31	32
WASH Standing Committee present		
• 2013	8	17
• 2015	32	32
WMUP as a member in WASH Standing Committee		
• 2013	6	11
• 2015	18	11
WMUP as Chair in WASH Standing Committee		
• 2013	2	8
• 2014-2015	31	8

The meeting resolutions were documented in the WASH Standing Committee register. Those were discussed in the UP meetings when it was included in the agenda and preserved in UPs by the Secretary. In the intervention areas, all the UPs had formed Ward Sanitation sub-committees by October 2014 compared to none in the comparison areas. On average, 03 Sanitation sub-committee meetings per Ward were held between October 2014 and September 2015. Also average, two representatives from the CWGs attended every Ward Sanitation sub-committee meeting.

Approximately 66% and 47% endline survey interviewees (community women) reported that the CWGs and WMUPs respectively, conducted at least one courtyard meeting/activity on the sanitation in the last one year (during 2014-2015). Also, the WMUPs helped to replace or fix water seals and damages in pipes/slabs. In the comparison areas, the reported rates of visits by WMUPs or any community women volunteer for sanitation were 'nil' during the same endline survey. However, WMUPs from 29 out of 96 Wards (30%) in the intervention Unions claimed some tensions with the respective Ward members (mostly males, MMUP) on warning the open defecation-practicing households by the WMUP and/or by the MMUPs.

About 98.3% of the WMUPs in the intervention areas and 53.8% of the WMUPs in the comparison areas believed that WMUPs could lead the UP WASH program countrywide, provided that is specified in the UP Act and all the UP members were properly trained. Approximately 97% of the interviewees in the intervention areas and 77% in the comparison areas supported the project intervention concept of developing and connecting CWGs to WMUP. Approximately 94% of the interviewees (household level) and 71% of the UP members did not mention any barrier in accepting WMUP led sanitation program. They supported the idea basically for they believed that local women felt comfort in discussing the issues with women (WMUP/CWG) as opposed to men members. The rest mentioned relatively lower education/schooling among WMUP than MMUP as a problem and were not sure about WMUP ability to understand policies and documents.

According to the UP Chairman of all intervention and comparison Unions, negligible funds was allocated from the annual development budget of the Government for latrine construction for the poor during 2014-2016. Of the interviewees in the endline survey, 23% in the intervention area and 29% in the comparison area reported that other NGO (like BRAC, HEED, World Vision) distributed latrines and discussed sanitation issues with them during the project period.

### 3.3 Sanitation

Rates of the basic sanitation were similar in intervention (44%) and comparison (46%) areas during baseline surveys (Table 3). The rates of basic sanitation in the intervention areas (77.7%) differed/higher from the rate (69.3%) in comparison areas significantly (C.I. 0.047 to 0.120,  $p < 0.0001$ ) during endline survey. The rates of basic sanitation improved significantly between baseline and comparison areas inside the same intervention (44% to 77.7%;  $p < 0.0001$ ) or comparison (46.3% to 69.3%;  $p < 0.0001$ ) areas.

The rates of OD in the intervention and comparison areas were similar; about 17% (192/1143 and 196/1134) and about 13% (137/1110 and 137/1112) during the baseline and endline surveys respectively. The households practicing OD claimed that they could not afford to buy latrines (80%) and had limited or in some cases no space (20%) to install a latrine.

**Table 3: Rates of sanitation in intervention and comparison areas**

Latrine type	Survey	Intervention %	Comparison %	p-value (CI) by chi-square with continuity correction		
				Int. vs Con.	In intervention: BL vs EL	In comparison: BL vs EL
OD	BL	16.8	17.3	0.8 (-0.03 to 0.04)	0.046 (0.01 to 0.07)	0.001 (0.02 to 0.08)
	EL	13.7	13.3	0.804 (-0.024 to 0.032)		
Unimproved	BL	1.4	4.2	<0.0001 (0.014 to 0.042)		
	EL					
Limited	BL	37.8	32.2	0.005 (0.016 to 0.09)	<0.0001(0.258 to 0.323)	<0.0001(0.112 to 0.182)
	EL	8.6	17.4	<0.0001(0.060 to 0.115)		
Basic	BL	44.0	46.3	0.273(-0.018 to 0.063)	<0.0001(0.298 to 0.373)	<0.0001 (0.189 to 0.268)
	EL	77.7	69.3	<0.0001(0.047 to 0.120)		
Sample-size : BL (Intervention-1143 and comparison-1134) and EL (Intervention-1110 and comparison-1112)						

BL=Baseline, EL=Endline;

### 3.4 Operation and maintenance of the latrine facilities

The rates of all operation and maintenance indicators (presence of water seal, cleaned latrine and presence of both water seal and cleaned latrine) among basic sanitation households in intervention areas were significantly different than the same in comparison areas ( $p < 0.0001$ ) during endline survey, while those all were similar during baseline survey (Table 4). Also all of the rates between baseline and endline surveys differed/ increased significantly ( $p < 0.0001$ ) inside intervention area. But the rates were more or less similar for water seal at  $p = 0.381$ , cleaned latrine  $p = 0.017$  and both water seal and cleaned latrine  $p = 0.099$  between baseline and

endline surveys inside comparison area. The practice about burying pit contents when pit filled up was reported by almost all interviewees. However, unannounced observational visit among randomly selected 25 households (in total 50) by us revealed that the rates of de-sludging (pit emptying) during dry season by scavenger or self-buried were about 71% and 52% in intervention and comparison households. But the rates were only 9% in intervention and 6% in comparison areas during heavy rainfall. The rest indiscriminately let the contents flow/leak out to surrounding or flood water during rainy season. They claimed that they could not afford or /find scavengers.

**Table 4:** Rates of operation and maintenance among basic sanitation households in the intervention and comparison areas

Variable	Survey	Int (%)	Con (%)	Chi-square with continuity correction p-value (CI)		
				Int vs Con	Int: BL vs EL	Con: BL vs EL
Functional/maintenance						
• Water seal	BL	61.9	60.2	0.581 (-0.040 to 0.073)	<0.0001(0.084 to 0.182)	0.381 (-0.028 to 0.079)
	EL	75.2	62.7	<0.0001 (0.079 to 0.169)		
• Cleaned latrine	BL	76.9	77.9	0.721(-0.040 to 0.057)	<0.0001(0.114 to 0.191)	0.017 (0.010 to 0.098)
	EL	92.1	83.2	<0.0001(0.056 to 0.121)		
• Wate Seal + Cleand latrine	BL	54.2	51.4	0.369 (-0.030 to 0.086)	<0.0001(0.116 to 0.217)	0.099 (-0.008 to 0.101)
	EL	70.9	56.1	<0.0001 (0.101 to 0.195)		

Sample size : BL (Intervention-603 and comparison-520) and EL (Intervention-802 and comparison-770)

#### 4. Discussion

Sanitation by local government has been a widely promoted important strategy but its in needs of strengthening in many developing countries (Perez, 2014; Hanchett et al., 2011; Petra Bongartz et al., 2016; Policy Support Unit, 2011; Alejandro, 2014; Femke 2017; Monica et al., 2006; Rosensweig and Kopitopoulos, 2010). Also, it is recommended to ‘get genders back on the WASH agenda but do it with sustainable results in mind’ (Vera et al., 2014). Concerns about sustained use of latrine facility in post CLTS, moving up on sanitation ladder and operation and maintenance of the facilities have been reported (UNICEF and World Health Organization, 2015; Hanchett et al., 2011; Petra Bongartz et al., 2016; Policy Support Unit, 2011). The importance of women participation in sanitation/WASH and in its related decision-making processes is clear from the sustainable development goals, targets and indicators (Hanchett et al., 2011). Our findings clearly show potentials in WMUP in taking a lead in UP WASH program and achieving satisfactory results. The purpose of the study was to investigate the potentials of WMUP to lead UP sanitation as opposed to whether or not they are better than male UP members. The trained WMUPs were empowered through involvement in sanitation decision-making level (UP WASH Standing Committee Chair) based on the opportunities in the existing Bangladesh UP Act 2009 and approval of the Government to the research proposal. In the intervention unions, significant change in UP WASH Standing Committee structure occurred towards WMUP leadership between baseline and endline. The rate of WMUP chair in UP WASH Standing Committee increased from 6% to 97% in intervention area between baseline and endline survey. Out of the 32 unions in intervention area, all UPs (except one) had revised their UP WASH Standing Committees. One union (UP Chairmen) was upset that the project had no provision for financial support to OD/not sanitary latrine use practicing poor households and pulled it out of the study. In comparison area, the rate of WMUP as chair in WASH Standing Committee remained the same (25%) between endline and baseline surveys. The rates of meetings and activities conducted by the UP WASH Standing Committee and Ward Sanitation sub-committee, with CWGs, in intervention unions were also significantly higher than that in comparison areas. In the community level, the rates of the basic sanitation were similar in intervention (44%) and comparison (46%) areas during baseline surveys. The basic sanitation rates between intervention (77.7%) and comparison (69.3%) areas differed/higher significantly (C.I.

0.047 to 0.120,  $p < 0.0001$ ) during endline survey. The intervention and comparison areas showed approximately 75% sanitation (similar) coverage during baseline survey (before intervention). That indicates significantly higher sanitation results achieved in the intervention than in comparison area.

Reportedly, higher starting coverage level may ‘constrains the absolute increase in coverage to be smaller as there is less room for improvement’ (Joshua et al., 2017). On the sanitation ladder the basic sanitation (use of improved facilities which are not shared with other households) increased by 07 percent point higher in intervention area than in the comparison area.

The UP Act does not specify WMUPs or MMUPs for Union Standing Committees. The UP Chairman assigns the functions to WMUPs or MMUPs. In a rural action research project on community, based arsenic mitigation and water supply conducted by us, less than 30% of the total participants in the training by the project were women (Hoque et al., 2017). We requested the UP Chairmen to send WMUPs and community women participants to the training. But the local UPs claimed that they made the decision to send mostly male participants to the training based on community rights to participate in WASH projects after Bangladesh National Drinking Water and Sanitation Policy (Local Government Division, 1998). In the project, we had specifically described the scopes of WMUPs in WSS Standing Committee with reference to UP Act and national gender policies in our proposal, which the Government of Bangladesh approved for the project. The government approval on the proposal and the training motivated the UPs in the intervention areas to place WMUPs in the Standing Committee or in leading decision-making roles within the water and sanitation local government framework. We therefore, recommended updates of the UP Act, national policies, strategies and other guiding documents based on equitable and demand-based engagement of WMUPs in WASH as well as in other Standing Committees and activities.

Also, demonstrated how to expand the reach of UP/WMUP among community households and build local champions for sanitation through CWGs. We found significant improvements in sanitation among households in intervention areas compared to the comparison areas (in almost all components in the JMP sanitation ladder and on operation and maintenance) and no societal barrier to accepting the WMUPs. The WMUPs worked with the CWGs to promote sanitation in household level. We had

connected the empowered CWGs to the WMUPs and UPs based on the UP Act suggestions about incorporating at least 03 local women representatives in Ward Sanitation Committees. In fact, the realization of the UP Act scopes helped to expand the reach of UPs at community level and open-up the scopes for natural leaders.

The rate of OD practices did not reduce significantly and remained similar (approximately 13%) in both areas. Here the MMUPs or Chairmen of UPs were not interested to cooperate with WMUPs in warning the OD practicing households as they did not appreciate that the project had no provision for financial assistance or subsidy to the OD practicing poor households. Harvey P.A. (2011) found that the villages, which had experienced previous hardware subsidies, might show the least progress in sanitation. Subsidy for sanitation among identified poor households is often practiced in Bangladesh and India. Some tensions between MMUPs or Chairmen (mostly men) and the WMUPs observed regarding whether to warn OD practicing households. During the peak CLTS program in Bangladesh, when the country showed remarkable success in sanitation, such written warning were served by UP Chairmen and is allowed in the UP Act 2009. However, the fact that the OD rates were similar in the two areas during both baseline and endline surveys indicate that the problem was not associated with WMUPs led sanitation.

Operation and maintenance (O&M) of sanitation facilities will be one of the main strategic requirements for sustainable development goal sanitation (SDGs, 2015; Hutton and Varughese, 2016; Local Government Division, 2016). In addition to the SDG recommended physical and latrine use indicators, we included water seal and cleaned latrine maintenance in the educational messages as well as in the monitoring of the conditions of the latrines used. The importance of presence of water seal with no leakage in hygienic latrines and cleaned latrines in Bangladesh and India earlier documented (Hoque et al., 1999; Policy Support Unit, 2011; Hoque, 2016). Water seals often broken and not placed by users to reduce the volume of water needed to clean pit latrine/or for the ease of latrine cleaning. The replacement or placement of water seal indicates that households undertook special efforts for sustained sanitation, which costs money and are tough to replace. Cleaned latrine (observed unannounced) also indicate efforts for hygienic use of latrine. Those variables helped to measure the higher regular interest in operation and maintenance of latrines among the households in the intervention area than in the comparison area. We observed urgent needs for research and development of appropriate intermediate monitoring and evaluation indicators for Bangladesh/ national level in line with the SDG.

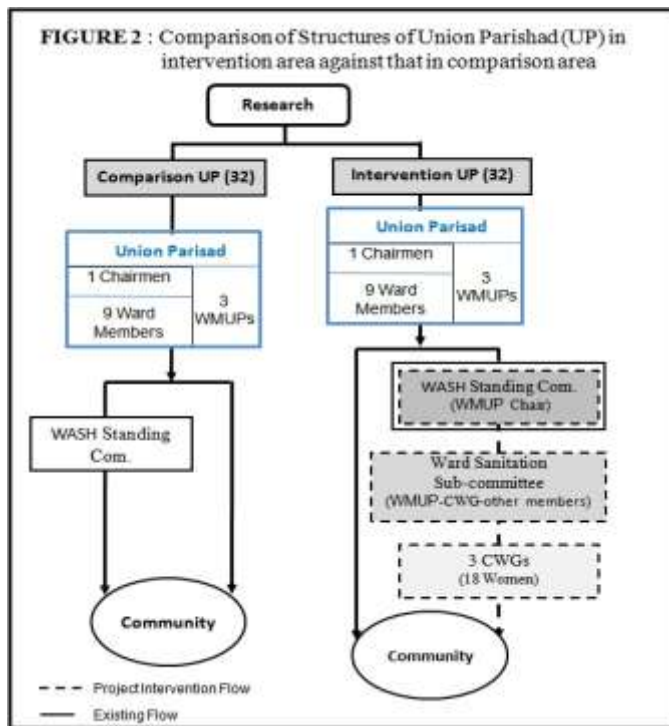
The SDG indicators in complete task were not promoted in the project, as it was designed before the SDG indicators were accessible to us. The safely managed sanitation service in SDG means, that excreta are safely disposed in situ or transported and treated off-site (SDGs, 2015). We only educated about burying the pit contents as usual. Almost all interviewees reported in both areas that they buried it. But the unplanned simple qualitative observation indicated that many households indiscriminately

dumped/leaked out the sludge/pit contents to the surrounding water bodies during rainy season. Lack of access to appropriate fecal sludge treatment/disposal technology and system among the densely covered non-sewerage sanitation were found again critical barrier to safe environmental sanitation through-out a year again (Hoque et al., 1989).

Training was the cornerstone of the WMUP, with CWG, led sanitation. We underlined the essentiality for WASH specified but comprehensive and needs based targeted proper training, with proper educational methods, about policies, access to, use by all, implementation, operation and maintenance and monitoring indicators after national as well as SDGs commitments. We recommended further research and development of women, representing local government, led comprehensive and holistic sanitation/WASH under different sanitation coverage, environmental, technological, vulnerable, integration with other sectors, policy and other conditions.

## 5. Conclusion

WMUPs, with CWG, led rural sanitation proven in UP sanitation framework. In intervention Unions, WMUP involvement to lead/ decision-making level through Standing Committees as well as, with CWG, in expanded community information, education and communication reach observed. A schematic drawing on UP arrangement and involvement for WASH program in intervention and comparison Unions during post-intervention period presented in Figure-2. The operation and maintenance practices improved significantly inside intervention area while, remained more or less similar inside comparison area. The WMUPs, with CWGs, carried out the awareness creation activities at communities representing the UPs. The program was highly acceptable. The scopes for strengthening UP on WASH within UP framework towards SDGs increased in intervention unions while it remained unchanged or less than intervention unions in comparison Unions. We also showed how to achieve the changes at the UP and community level. The acceptance rate of the WMUP, with CWG, led sanitation was high while there was no societal barrier.



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