# TA 8982-CAM Provincial Water Supply and Sanitation Project

## Poverty, Social Impact and Gender Analysis

**Draft: February 2017**

**CONTENTS**

**APPENDICES**



**TABLES**

**FIGURES**

**ACRONYMS**

| | |
|---|---|
| $ | USD |
| ADB | Asian Development Bank |
| BTB | Battambang |
| BTB | Battambang (Bad Dam Bang) |
| CDIA | Cities Development Initiatives in Asia |
| CEDAW | Convention on the Elimination of All Forms of Discrimination Against Women |
| CICPS | Cambodian Inter Censal Population Survey |
| CRS | Cambodian riels |
| CSES | Cambodian Socio Economic Survey |
| DMF | Design Monitoring Framework |
| EA | Executing agency |
| EGM | Effective Gender Mainstreaming |
| EM | Ethnic minority |
| EMDP | Ethnic Minority Development Plan |
| FGD | Focal group discussion |
| FHHH | Female head of household |
| GAP | Gender Action Plan |
| HHH | Head of Household |
| HH | Household |
| IA | Implementing agency |
| IP | Indigenous People |
| IPP | Indigenous Peoples' Plan |
| KPC | Kampong Cham |
| MIH | Ministry of Industry and Handicrafts |
| MoE | Ministry of Environment |
| MoI | Ministry of Interior |
| MoP | Ministry of Planning |
| MoWA | Ministry of Women's Affairs |
| MoWRAM | Ministry of Water Resources and Meteorology |
| MPI | Multi Dimensional Poverty Index |
| MPWT | Ministry of Public Works and Transportation |
| NESDP | National Economic and Social Development Plan |
| p.a. | per annum |
| PMW | Piped mains water |
| PPP | Purchasing power parity |
| PWSSP | Provincial water supply and sanitation project |
| GoC | Government of Cambodia |
| SES | Socio Economic Survey |
| SHV | Sihanoukville (Sihanouk) |
| SPS | Safeguard Policy Statement |
| SR | Siem Reap |
| UNDP | United Nations Development Program |

| | |
|---|---|
| UNICEF | United Nations Childrens' Fund |
| WATSAN | Water and sanitation |
| WB | World Bank |
| WS | Water supply |
| WW | Waste water |

# I. INTRODUCTION

## A. The Project

1. The Provincial Water Supply and Sanitation Project (PWSSP)[1] is the second project to improve urban water supply services in Cambodian provincial towns. PWSSP will improve and expand urban water supply and sanitation services[2] in selected towns and contributes to the Government's target for 100% urban water supply coverage by 2025, and government targets for urban sanitation.

2. PWSSP is structured in two parts: i) technical feasibility studies, cost estimates, and engineering designs for the selected subprojects are being prepared by the Cities Development Initiative in Asia (CDIA); ii) ADB project preparation and safeguards due diligence are being prepared by consultants under a separate contract.

3. Through a process of rapid assessment, multi-criteria analysis and consultation with the primary stakeholders during the inception and interim phases of the CDIA study, eight (8) candidate towns for water supply improvements have been reviewed and reduced to two selected priority towns. By the same process four priority sanitation subprojects have also been selected. The sub projects are:

- Water supply

  (i) Battambang (BTB): additional water treatment and distribution pipes,
  (ii) Kampong Cham (KPC): additional water treatment and distribution pipes.

- Sanitation

  (i) Battambang: improvement to increase the capacity of the existing waste water treatment facilities, and an extended trunk main and construction of additional waste water treatment facilities. Improved septage management provisions,
  (ii) Kampong Cham: Improved septage management provisions,
  (iii) Siem Reap (SR): Rehabilitation of a 3.7 km length of failed interceptor main through the main town,
  (iv) Sihanoukville (SHV): improvements to double the capacity of the existing waste water treatment plant and extended sewerage reticulation to pick up additional blocks in the town. Improved septage management services.

4. An extensive socio-economic survey (SES) was undertaken in waste water subproject areas of SHK and BTB provinces, sewage interceptor subproject in SR, and water supply subprojects in BTB and KPC. Information regarding septic tank usage was included in the SES but no specific survey was conducted for septage management. The main results of the survey are reported in this document, and a separate report detailing all SES results and findings has been submitted by the survey firm which is also available as a supporting document.

[1] The Project is included in the draft of ADB's *Country Operations Business Plan (*2016–2018).
[2] Sanitation includes septage management and sewerage systems only, solid waste is not included.

5. As a result of the social enquiries, the Provincial Water Supply and Sanitation Project has been assessed as an Effective Gender Mainstreaming (EGM) project and has also been assessed as Category C in terms of the ADB Safeguard Policy Statement (SPS 2009), safeguard area 3 – Indigenous People The project will have no impact on indigenous people or ethnic minorities and although discussed in this report, no further action is proposed for this safeguard area.

## II. CAMBODIAN POVERTY SITUATION

6. Cambodia is a country undergoing rapid change in both urban and rural areas and particularly in regards to urbanization. According to the latest Census data[3], collected in 2013 and published May 2014, the total population of Cambodia is 14,676,591 people, comprised of 7,555,083 women (51.5%) and 7,121,508 men (48.5%). Of the total population some 21.4% reside in urban areas and the majority, 78.6%, reside in rural areas. By comparison, in 2008 the urban population represented 19.5% of the total.

7. New official poverty lines[4] introduced in 2013 show that the poverty rate fell sharply from 47.8% in 2007 to 22.9% in 2009, 19.8% in 2011, and 18.9% in 2012. About 90% of the poor live in rural areas. In 2011, poverty incidence was highest in other urban areas before falling below the rural poverty rate again in 2012. The urban poverty rate in 2012 was 16.3% in Phnom Penh and 14.5% in other urban areas. The most recent 2014 Census indicated that nationally some 13.5% of the country lived under the $1.90 PPP/day[5] poverty line.

8. Literacy varies significantly between urban and rural populations and also varies depending upon sex in both cases. Nationally, and of the population aged 15 years and above, 94.2% of males are literate compared to 73.6% of females. The difference is less in urban areas where 94.2% of males are literate compared to 86.8% of females, but much greater in rural areas where 84.1% of males are literate compared to 69.7% of females.

9. According to the Asian Development Bank, in 2012, some 22% of all households were headed by women[6], and the 2014 Inter Censal Population Survey now indicates that 27.1% of all households (HHs) are headed by women.

### A. Defining Poverty and Identifying the Poor

10. There are different definitions and cut-off lines used by different agencies in defining poverty with many based upon income and consumption. Some definitions will be more appropriate than others given the specific country, region, different population subgroups and different livelihood patterns.

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[3] Cambodia Inter-Censal Population Survey 2013
[4] The new food poverty line is defined as the cost of purchasing food equivalent to 2,200 Kilocalories in a Reference Food Basket (RFB) designed to reflect food consumption patterns in the lowest 5th - 30th quintiles, by consumption distribution from the bottom. There is one single nutritional norm for the whole country. The allowance for non-food items is the average value of non-food items consumed in the 20-30 % (per capita) consumption brackets, separately calculated for rural areas, other urban areas and Phnom Penh. A small token allowance for clean water has been made, for the first time anywhere in developing countries. All calculations are based on the CSES database.
5 World Bank Poverty Line USD$1.90 PPP – Purchasing power parity, October 2015.
6 Cambodia Country Poverty Analysis 2014

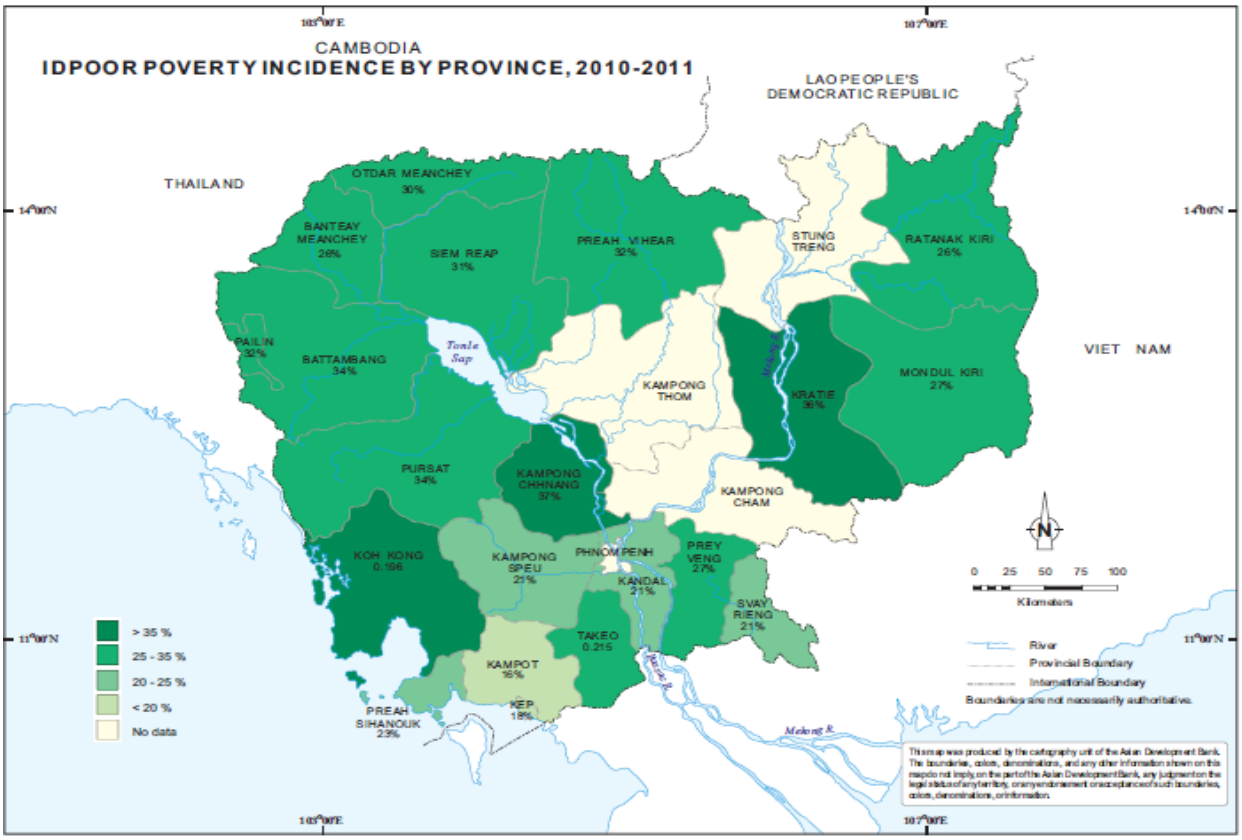
11. The Ministry of Planning (MoP) with collaboration with the Department of Local Administration of the Ministry of Interior (MoI), established the Identification of Poor Households Program (IDPoor), as a national targeting mechanism for poverty. The GoC promulgated Sub-decree No. 291 in December 2011 establishing MoP as the government agency responsible for identifying poor rural HHs and ensuring standard IDPoor procedures nationwide. The sub-decree requires that government and nongovernment poverty reduction programs and projects use IDPoor targeting data for providing services or assistance to poor households. In 2014 the IDPoor was extended to include urban poor.

12. According to the ADB's Cambodia Country Poverty Analysis, 2014, the IDPoor is a proxy means test with participatory elements. It categorizes households as poor category 1 (P1 - very poor), poor category 2 (P2 - poor), or not poor. A village representative group is established to conduct interviews with applicant HHs using their local knowledge to verify whether respondents accurately report their situation, and as such are also best placed to assess any special circumstances. Questions include occupation, education and income as well as health and disabilities of all family members, housing status and conditions, access to watsan facilities, HH debt, economic shocks, vulnerabilities and also any recent factors improving HH livelihoods.

13. IDPoor identification cards are issued to all poor P1 and P2 households and these cards include a photograph. The list of poor households is kept at each commune office, and nationwide data are available from MoP. IDPoor can be used to compare poverty levels in villages, communes, districts, or provinces. However, IDPoor incidence cannot be compared with poverty rates derived from the Commune Database, or with the official national poverty incidence derived from the Cambodia Socioeconomic Survey (CSES), because each measures different things.

14. The IDPoor identification cards are used when people are accessing social services from Health Equity Funds (free health care for poor persons), social land concessions, scholarships and other support for poor children, Food-for-Work and Cash-for-Work Programs, and social cash transfers are also planned for the future, if and when budget provisions allow.

**Figure 1: ID Poor Areas**

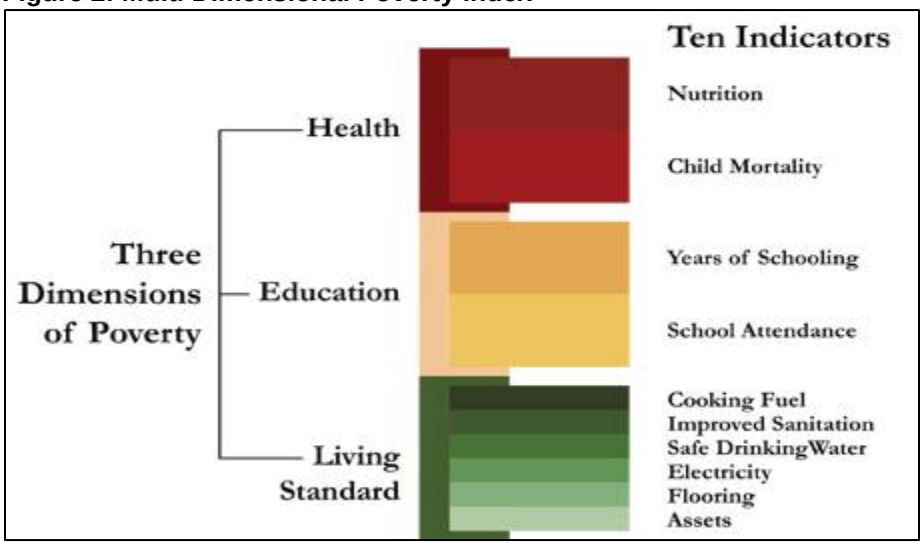



Source: MoP: IDPoor Atlas 2012.

15. Differences in poverty measurement methodology will yield different results. Using the IDPoor classification indicates more of the poorest of the poor live in Kratie, Kampong Chhanang and Koh Kong. However, the map presented below, based upon a multidimensional measuring tool, indicates that the more remote north eastern provinces of Rattanakirri and Mondolkirri, have a higher incidence of poverty, which would appear intuitively correct as these provinces contain more upland and remote areas and host the highest numbers of indigenous ethnic minorities (referred to as “hill tribes” by GoC), whose poverty is better measured using a multidimensional approach as many are not fully integrated into the “cash society”.

16. The global Multidimensional Poverty Index (MPI) was developed by Oxford Poverty and Human Development Initiative (OPHI), with the UN Development Programme (UNDP) for inclusion in UNDP’s flagship Human Development Report in 2010. It complements traditional income-based poverty measures by capturing the severe deprivations that each person faces at the same time with respect to education, health and living standards. The MPI assesses poverty at the individual level. If someone is deprived in a third or more of ten (weighted) indicators (see below), the global index identifies them as ‘MPI poor’, and the extent – or intensity – of their poverty is measured by the number of deprivations they are experiencing.

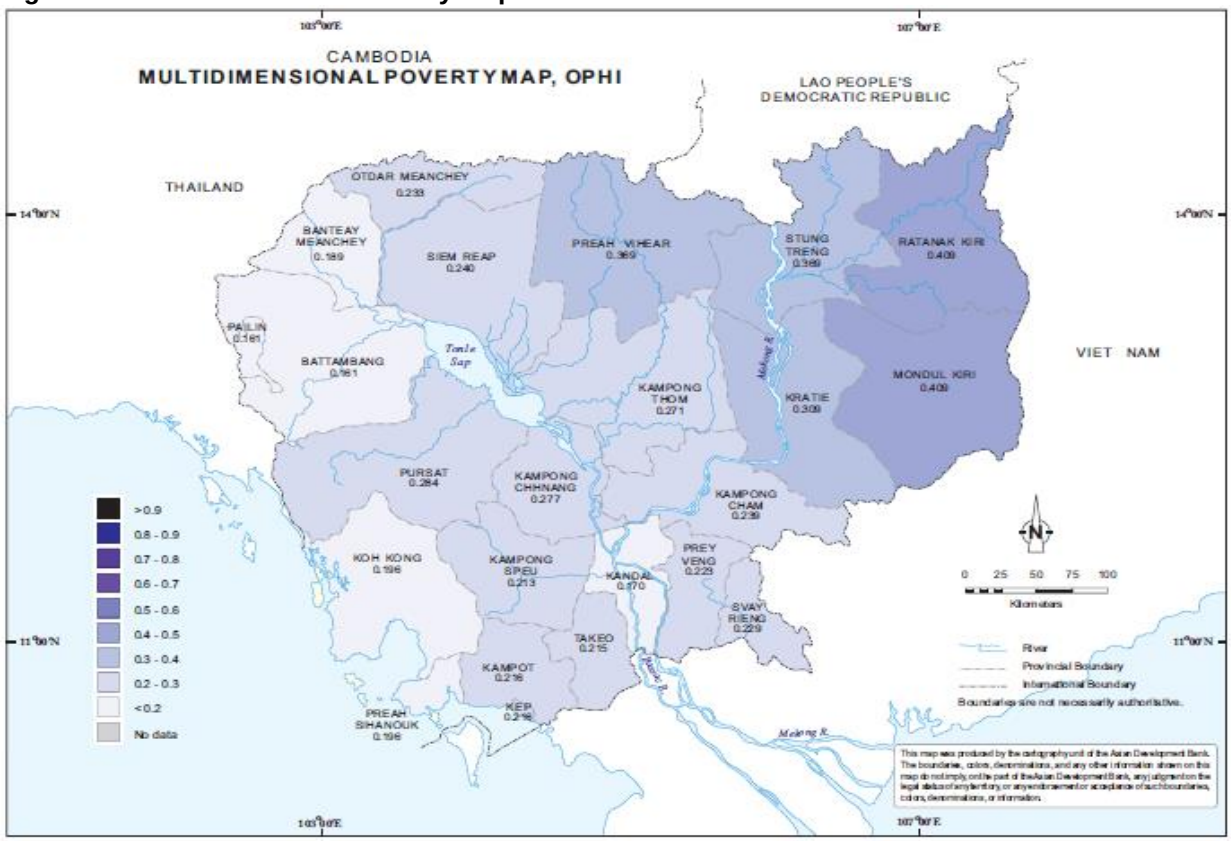
**Figure 2: Multi Dimensional Poverty Index**




Source: Oxford Poverty and Human Development Initiative (OPHI). 2013. *Country Briefing: Cambodia.* Multidimensional Poverty Index Data Bank. University of Oxford: OPHI

17. The application of MPI provides the following poverty incidence and weighting map:

**Figure 3: Multi Dimensional Poverty Map**




Source: Oxford Poverty and Human Development Initiative (OPHI). 2013. *Country Briefing: Cambodia.* Multidimensional Poverty Index Data Bank. University of Oxford: OPHI.

18. The GoC's IDPoor Atlas contains data updated to 2012. The IDPoor system national implementation is being staggered in accordance with budget availability and was not introduced in KPC until 2014/2015, and data from this province has yet to be made available. However, data from the remaining project provinces indicates the following in regards to P1 and P2 poverty:

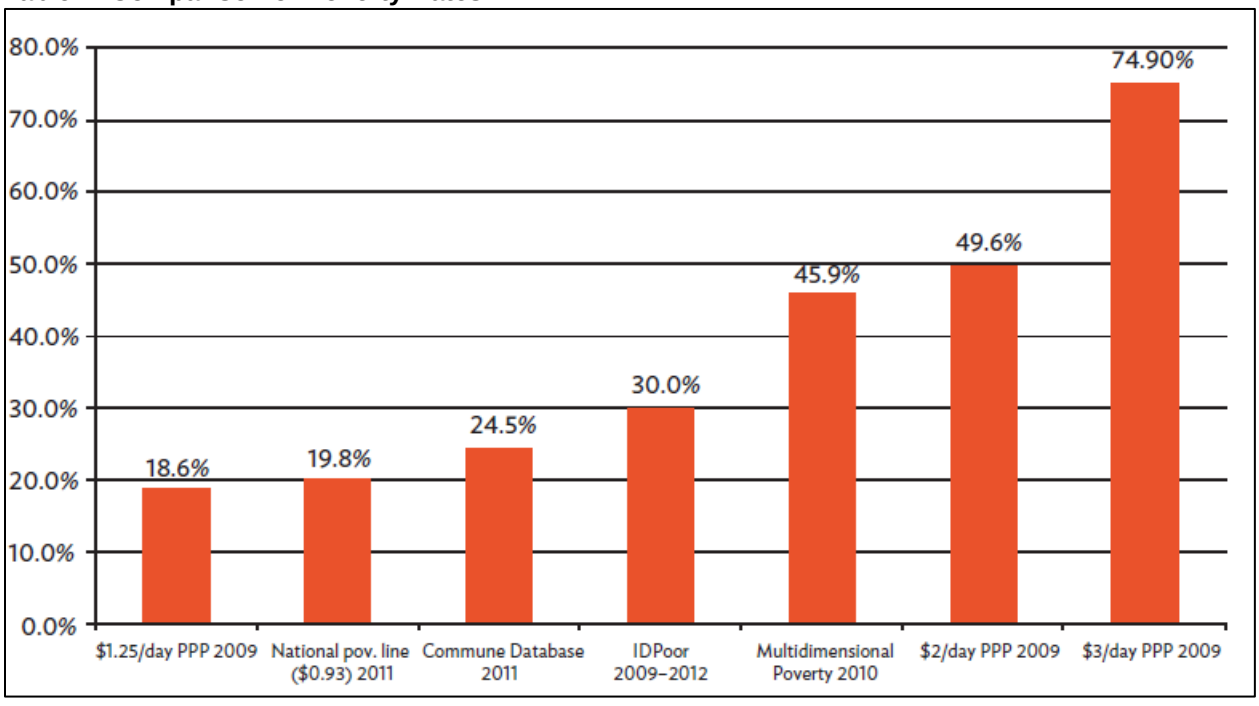
**Table 1: ID Poor HHs in Provinces**

| Province | P1 Poor % of Total Pop. | P2 Poor % of Total Pop | % of Total P1 and P2 are Female HHs |
|---|---|---|---|
| Battambang | 17.4 | 16.7 | 28.4 |
| Kampong Cham | n/a | n/a | n/a |
| Siem Reap | 14.4 | 16.3 | 29.6 |
| Sihanouk | 10.5 | 12.2 | 43.5 |

Source: MoP, IDPoor Atlas, 2012.

19. The ADB's Country Poverty Report (2014) provides a comparison of incidental poverty rates depending upon the poverty line and threshold used. Although the year of measurement does vary to a point, the effect of using different thresholds can be seen quite clearly, whereby the poverty rate increases significantly as the threshold is raised slightly, for example, using the $1.25/day (PPP 2009) shows a national poverty rate of 18.6%, whereas, raising this to $2.00/day (PPP 2009) shows the rate to be 49.6%.

**Table 2: Comparison of Poverty Rates**




Source: ADB: Cambodia Country Poverty Report (2014)

## B. Poverty in Project Provinces

The Commune Database 2015[7] update provides general poverty rate data, averaging at 20.89% across the 4 project provinces as follows:

**Table 3: General Provincial Poverty Rates**

| Province | # Districts | # Communes | # HHs | # People | Poverty Rate (%) |
|---|---|---|---|---|---|
| Battambang | 14 | 102 | 246,376 | 1,173,414 | 23.16 |
| Kampong Cham | 10 | 109 | 246,595 | 1,134,026 | 17.32 |
| Siem Reap | 12 | 100 | 206,385 | 1,042,286 | 23.29 |
| Sihanouk | 4 | 27 | 44,164 | 209,841 | 14.02 |
| Total | 40 | 338 | 743,520 | 3,559,567 | 20.89% |

Source: CDB 2015

## C. Gender and Poverty

20. Articles 31, 35 of the Constitution ensure equal rights for women regardless of race or religion and Article 45 prohibits discrimination based upon gender. A number of laws have been adopted which protect women's interests, such as the law on Prevention of Domestic Violence and Protection of Victims (2005), the law on Suppression of Trafficking in Humans and Sexual Exploitation (2008), and other measures that ensure gender equality has been progressively and effectively integrated into the National Strategic Development Plan (2013-2018).

21. The GoC ratified the Convention on the Elimination of All Forms of Discrimination Against Women (CEDAW) in 1992 without reservation. CEDAW ensures civil rights and legal status of women as follows:

    - their political participation
    - non-discrimination in education, employment and in the economic and social activities
    - the equal rights and obligations of women and men with regards to the choice of spouse, parenthood, individual rights and economic rights.

22. Women's participation in the national labor force is almost on par with their male counterparts, and the % participation rate for women aged between 15 to 64 years is 80%, compared to 84.5% for men[8].However, despite the labor participation rate, national policy and legal foundations, women's equality and equity lags considerably compared to that of men. In general, females from poorer HHs are less likely to complete primary or high school[9]. Women heading HHs are reported as less likely to be able to obtain bank loans, making them more susceptible to higher interest rates charged by money lenders. In 2012, only 18 percent of all elected commune councilors were women.

23. The Inter Censal Population Survey (2014) indicates that 27.1% of all households (HHs) are headed by women. Poverty studies indicate that HHs headed by women tend to be

[7] MPI – April 2015
[8] Cambodia Inter Censal Population Survey 2013, National Institute of Statistics, May 2014
[9] ibid.

significantly poorer than those headed by men, having smaller landholdings, smaller HH labor force, less sources of income and less social capital. A study conducted by the Ministry of Women's Affairs (MoWA) in 2008 based upon the 2004 Consumption and Expenditure Survey indicated that women-led households with more than two children and no adult males were much more likely to be poor and the girls more likely to be working, compared to children of male headed households.

24. According to the ADB 2014 Country Report, evidence of high malnutrition and anaemia among women and a high incidence of domestic violence indicate women's inferior position and disadvantaged access to resources. Women-led households are also likely to experience shocks differently than male-headed households, mainly due to social norms and more limited economic opportunities and income. Although women's participation in the labor force is higher in Cambodia than in neighboring countries, about 70% of employed women are in vulnerable employment (compared to 59% of men), which is defined as the sum of unpaid contributing family workers and own account workers (CSES 2012). Women own 65% of all businesses in Cambodia, but the vast majority of women's businesses are microenterprises: 51% employ only 1 person, and 96% engage 4 or fewer persons[10].

25. Single women from rural areas are often forced by a lack of livelihood options, to migrate to Phnom Penh or larger provincial towns to find employment, and the garment industry is a case in point. According to a 2014 report by UN Women, many females migrating into Phnom Penh are engaged in informal employment where they are subject to low or irregular income and unstable conditions, or at risk of trafficking and exploitation. As an example of their vulnerability, in the 2009 global downturn, an estimated 30,000 mostly female garment industry jobs were lost, with employers reportedly pressuring women to waive their benefits and severance payments knowing that they may not understand their rights, or have the means to protect them.

26. Surveys conducted in rural areas indicate that it is not only men but also women who are migrating to neighboring countries to work, and in particular to Thailand, where they find employment in various occupations such as construction, domestic help, factory work, entertainment and hospitality. This often results in the situation where the elderly are left to look after grandchildren whilst parents are away working for extended periods of time, and it also depletes the available HH labor force.

27. According to the 2013 UNICEF (Cambodia) Annual Report, violence against children and women pose significant developmental challenges. The majority of those studied experienced physical violence before age 12, and 1 in 22 females (compared to 1 in 18 males) experienced sexual abuse in childhood. Although it is difficult to obtain reliable or accurate statistics on the incidence of domestic violence as these statistics are based upon "reported" cases only, it can be safely assumed that the actual incidence is far higher than what is reported. Rural women were almost twice as likely to be victims of violent incidents than their urban sisters. Interestingly, those victims in rural areas were more likely to report the incident and reporting was usually to the village leader.

[10] ibid.

### 1. Women's Time Poverty

28. Women, especially women from poorer HHs and even more so in regards to HHs headed by women, work long hours to provide numerous services in their homes and communities, such as buying and preparing food, cleaning, washing and taking care of children as well as of the sick and elders, collecting water, tending to kitchen gardens as well as looking after small livestock such as poultry. These very time consuming duties are unpaid meaning that women are simply expected to do them, often denying them of other opportunities such as their basic rights to education, healthcare, decent work and leisure time, including time to spend with their children in role of social mentor and teacher. This is often exacerbated in poorer HHs where there are higher numbers of children due to the lack of family planning and use of modern contraceptives. Although the time poverty issue is more acute in rural areas, it also applies to the urban and peri-urban area, especially during rainy periods when the water collection task takes longer. Time poverty acts to perpetuate gender inequality.

## III. WATSAN AS A NATIONAL PRIORITY

29. The latest National Strategic Development Plan (2014-2018)[11] states that the urban population access to safe water should be at least 85% by 2018, and access to improved sanitation in urban areas at least 80%. The ADB is supporting the Government of Cambodia to address the core problem of inadequate water supply and sanitation infrastructure and services. Inadequate urban water supply and sanitation infrastructure and services are highly visible throughout the country resulting in:

    (i) constrained economic growth and tourism development;
    (ii) inefficient services and high nonrevenue water;
    (iii) low levels of water supply and wastewater coverage;
    (iv) environmental degradation; and,
    (v) poor health conditions, especially in poorer communities.

### A. WATSAN Institutions

30. The mainstream agencies involved in the WATSAN sector are the Ministry of Industry and Handicrafts (MIH) General Department of Potable Water Supply, which is responsible for regulating piped urban water supplies and private sector concessions. The Ministry of Public Works and Transport (MPWT) is responsible for drainage, sewage, and wastewater treatment. The Ministry of Water Resources Management and Meteorology (MoWRAM) is responsible for water resources, hydrological flood control and water extraction licenses. The Ministry of Environment (MoE) is responsible for water quality. Other agencies have a supporting role, such as Economy and Finance, Planning, amongst others.

### 1. Gender and WATSAN Institutions

31. In 2013, women occupied some 37% of public service positions in Cambodia[12], and women are concentrated in lower-level positions. Women in management are more likely to hold

[11] National Strategic Development Plan (2014-2018). Royal Government of Cambodia, July 2014.
[12] Statistics Table of Civil Servants in Line Ministries, Ministry of Civil Service, 31, January 2014.

deputy positions. Women represent 11% of staff in General Director positions, 12% in Deputy General Director positions, 10% as Director of Department, 18% in Deputy Director of Department positions, 20% in Chief of Office, and 27% in Vice Chief of Office positions (2013 figures).

32. At sub-national levels, women hold 8.7% of the positions of Director of Provincial Departments, with 45 women of a total 518 positions, 14.5 percent of the Deputy Director of Provincial Departments, with 219 women of a total 1,510 positions, and 19% of Chief of Office, with 466 women of a total 2,459 positions. Women account for 14.52% of the Directors of District Offices, with 330 women of a total 2,272 positions[13]. The NESDP to 2018 contains a target for the proportion of women holding decision making positions in public sector (from director general to office level at national and sub-national levels) of 25%. In 2016 this proportion was estimated at 23%. As shown in the tables below, the PWSSP EAs have very few, indeed if any, women in management positions.

**Table 4: EA Gender Staff Mix**

| Provinces | PDPWT | | | Wastewater Management (Management level) | | |
|---|---|---|---|---|---|---|
| | Total staff | Female staff | Female in management level | Female staff | Female in management level | Female staff |
| Kampong Cham | 103 | 18 | 5 | 6 | 0 | 0 |
| Siem Reap | 76 | 10 | 5 | 12 | 3 | 1 |
| Battambang | 120 | 19 | 2 | 2 | 0 | 0 |
| Sihanoukville | 66 | 10 | 1 | 22 | 4 | 1 |

Source: MPWT 2016

| MIH – Dept Potable Water Supply | Total | Male | % Male | Female | % Female | Management | % Female |
|---|---|---|---|---|---|---|---|
| **PP** | 20 | 18 | 90.0 | 2 | 10.0 | 9-M/0-F | 0% |

Source: UWSS Project from MIH - 2014

## B. Water Supply Connection Policies for the Poor

### 1. Phnom Penh Water Supply Authority

33. Although listed on the PP Stock Exchange, the Phnom Penh Water Supply Authority (PPWSA) remains under the jurisdiction of the MIH. The PPWSA has contributed to GoCs Poverty Reduction Program and initiated the "Clean Water for Low-Income Families" policy since 1999. The PPWSA facilitates connecting poor HHs to mains piped water supply through several mechanisms:

    i) Installment payment policy: 12 months, 17 months and 22 months which can be chosen by the poor based on their financial capacity, and,
    ii) in earlier years, a policy of 20% discount of connection fee for the poor living in suburban communities,

[13] MoWA: Policy Brief 8: Leaders- Women in Public Decision Making and Politics; Cambodia Gender Assessment, 2014.

iii) since 2005 applied a connection subsidy of 30%, 50% and 70% of the total connection fee based on the result of evaluation over the real poverty made by committee in cooperation with local authorities,
iv) even with provision of the 70% subsidy, some poorest families still could not afford to make the installment payment, PPWSA, therefore, has applied an additional category of 100% subsidy for the poorest families since February 2006.

34. The PPWSA does not use the MoP IDPoor classification system as indicated in Subdecree 291, preferring to use its own procedures and mainly because the PPWSA began implementation of its pro-poor policy long before the subdecree was issued in 2011. In implementing this pro poor policy mix, PPWSA has a team to identify location of the poor, poverty evaluation and scoring, a team to broadcast the policy and the application and connection procedure, and a team to facilitate completion of application forms for the poor on-site. A copy of the poor HH identification "Score Card" used by PPWSA is attached at Appendix 4. The score derived will determine the level of subsidy granted. It should be noted that the scare card has been developed over a number of years (current version 3) and is tailored specifically for Phnom Penh, where poverty indicators will vary from those in the target provinces. The following table indicates the number of cases and level of subsidy and assistance provided to poor HHs from 1999 until end of 2014.

**Table 5: PPWSA Pro Poor Subsidies**

| Description | Number of Connections | | | | | | | | | Total Subsidy (Riels) |
|---|---|---|---|---|---|---|---|---|---|---|
| | Beginning | | | Increase in 2014 | | | Ending | | | |
| | Urban | Outskirt | Total | Urban | Outskirt | Total | Urban | Outskirt | Total | |
| ***A. Subsidy*** | ***1,647*** | ***18,169*** | ***19,816*** | ***16*** | ***1,131*** | ***1,147*** | ***1,663*** | ***19,300*** | ***20,963*** | ***5,337,491,760*** |
| **100%** | 283 | 8,074 | **8,357** | 3 | 244 | **247** | 286 | 8,318 | **8,604** | *2,912,569,200* |
| **70%** | 670 | 5,178 | **5,848** | 9 | 385 | **394** | 679 | 5,563 | **6,242** | *1,482,060,770* |
| **50%** | 550 | 3,681 | **4,231** | 3 | 453 | **456** | 553 | 4,134 | **4,687** | *797,397,310* |
| **30%** | 144 | 1,236 | **1,380** | 1 | 49 | **50** | 145 | 1,285 | **1,430** | *145,464,480* |
| ***B. Instalment Payment*** | - | - | ***10,761*** | ***0*** | ***2*** | ***2*** | - | - | ***10,763*** | *Instalment Payment* |
| **SumTotal** | - | - | **30,577** | **16** | **1.133** | **1,149** | - | - | **31,726** | - |

Source: PPWSA: Clean Water for All and Customer Information – Annual Report 2014

### 2. Provincial Water Supply Agencies

35. Different provincial agencies apply different policies in regards to subsidized water supply connections. In BTB the agency makes use of the IDPoor P1 and P2 cardholder system. Whereas the full water connection fee is CRS 500,000, P1 and P2 cardholders will automatically qualify for a CRS 100,000 subsidy. This can be paid up front, or if the HH does not have the money, it can elect to pay by instalments over a 6 or 12 month period. If a HH is poor, cannot afford the connection fee, but does not hold a P1 or P2 card, the HH may request a letter from its Commune Council certifying the HH's economic status as poor and present this to the BTB water supply agency for consideration of the subsidy or instalment payments.

36. In SR by comparison, at present there is no special policy for poor HHs, and each HH must pay the full connection fee.

## IV. GENDER, WATER SUPPLY, AND SANITATION

37. In accordance with gender theory, one can see both practical and strategic needs for women in relation to water and sanitation.

### A. Practical Level

38. Women are the main users of any domestic water supply, due namely to what is referred to as women's "reproductive" role, that of being mother, caregiver, nurse, cook and cleaner within the family. Apart from drinking, women use water when looking after children, the elderly, the sick, for bathing family members, personal hygiene, in food production and home gardens, preparation and cooking, washing clothes, cleaning the house, care of domestic animals, and others.

39. The lack of clean water supply and a waste water and sewage disposal system incurs many social costs and most of these are borne by women and can be typified as:

- Time taken to collect water for washing, cleaning, cooking and drinking, watering home gardens and livestock
- Time taken to nurse those sick from water borne disease and or infections
- Time taken to accompany family members to the doctor and to buy medicine
- Reproductive health issues particularly genital and urinary tract infections

40. Women's "time poverty", already discussed under Gender and Poverty, refers to the amount of women's time taken up by inflexible, routine and non-productive tasks which most often prevent them from participating in other activities and community decision making discussions. Installation of water supply and sanitation helps alleviate women's poverty of time, with reduced time and energy to collect water, disposing of waste, reduced need to look after those HH members sick from water and sanitation related illnesses, and house cleaning therefore allowing more time for participating in decision making, other activities or leisure.

41. Lack of sanitation facilities and poor hygiene cause water-borne diseases, such as diarrhea, cholera, typhoid and several parasitic infections. Moreover, the incidence of these diseases and others linked to poor sanitation – e.g., round worm, whip worm, guinea worm, and *Schistosomiasis* – is highest among the poor, especially school-aged children[14]. Each year, more than 2.2 million people in developing countries die from preventable diseases associated with lack of access to safe drinking water, inadequate sanitation and poor hygiene. The design and the location of latrines close to home may reduce violence against women, which may occur when women have to relieve themselves in the open after nightfall.

[14] World Health Organization (WHO), 1997. Strengthening interventions to reduce helminth infections: an entry point for the development of health-promoting schools. Geneva, WHO.

42. It has been observed that in the absence of private sanitary facilities women will often wait until dark before going to defecate and or urinate in open areas. This has been identified as a cause of urinary tract, bladder and kidney infection. It is also seen as a reason as to why many women will drink less water than is recommended. It may also explain why some women will avoid eating certain fiber rich foods which in itself can lead to bowel and digestive problems.

43. Clean water and sanitation also contributes to improving reproductive health for women and girls through better reproductive hygiene and making it more convenient for women to wash. This not only enhances reproductive health but assists in raising women's self-esteem. The introduction of domestic water supply and sanitation has also been reported as improving relationships between married couples[15].

44. In regards to sanitation and to ensure that people protect themselves from water borne diseases, it is important to raise awareness and peoples' capacity to take preventive action, and that this done early rather than later. The local school provides an excellent opportunity for this capacity raising and water and sanitation education should be included in health education classes at the primary school level. This would cover the importance of clean water supply and sanitation, as well as personal hygiene and the need to use soap when washing hands, and the most important times to wash hands. It would also address a common misperception that grey waste (domestic non toilet) poses no risks to health and this lack of awareness could partly explain why so many HHs let domestic grey waste flow into roadside drains and gutters. It is important that children as well as adults understand the difference between grey and black waste and the health issues attached to both. Awareness raising on sanitation and hygiene also needs to target adult women and men who are new sanitation users – it should not be assumed that this awareness is a "given" in new extended service areas.

45. There is an obvious and direct economic benefit to households connected to sewage and water supply. Mains water supply is cheaper than buying from private vendors (government, non-profit, no transportation costs) and there is no need to pay for emptying or rebuilding septic tanks. Other economic benefits would include reduced medical expenditure and less work days lost due to illness or having to nurse the sick.

46. Where any operations and maintenance training is being provided to communities it is important that women are included on an equal basis as men. Women spend more time in the home, use more domestic water and are more likely to be the adult in the house when there is a water breakdown. They should be given the requisite skills to overcome basic problems and also know who to contact should more complex repairs be needed. Mains water users also need to be aware of the need to conserve water and especially in dry seasons where water sources come under stress due to supply issues, an issue particularly relevant for BTB.

### B. Strategic Level

47. At the strategic level it is important that women play a larger institutional role in the planning and decision making relating to water and sanitation action. Both water and sanitation

[15] AusAID – Team Leader FGD notes – Lao Australia Health and Social Development, 1998.

agencies need to include more women working both as policy makers, planners, managers and technicians. Having more women within the water and sanitation agencies will allow for greater gender responsiveness in terms of both policy and operations, and a better understanding of women's water and sanitation needs. Greater responsiveness will provide for more gender friendly policies in relation to overcoming any financial barriers to connection fees, billing rates, and improved public consultation regarding faucet and or shared toilets, "pay and use" facility placement, and pipe installation and layout.

48. Many of these more strategic objectives will be beyond the scope of the Project now under preparation but as a minimum the Project can ensure that women are involved in all discussions and decision making relating to water and sanitation at the community level. For example, the World Bank's WSP released the findings of two studies conducted in Cambodia in 2008, one on the demand for latrines by consumers, and the other on the supply of latrines by the private sector. The research noted that a latrine purchase decision involves both men and women, in different ways. Whilst men and women could therefore be targeted separately, it was recognized as important to encourage household discussion between men and women on the subject of investments for latrine ownership. The study showed that women in this context were more responsive to consumer messages, while men are more interested in the technical aspects of a sanitation facility and the consequential cost.

49. The following matrix summarizes key gender issues related to WATSAN:

| **Gender Issues and WATSAN** | |
|---|---|
| Demographic | Nationally women constitute 51.4% of the population, and 51.5% of the urban population. This is reflected in the PWSSP project where women account for 51% of the population. The Inter Censal Population Survey (2014) indicates that 27.1% of all households (HHs) are headed by women. The PWSSP SES indicated some 12% of HHs headed by women in sanitation villages, and 14.8% in water supply villages. HHs headed by women tend to be poorer than those led by women, they own and cultivate less land, have less labor, less mobility, smaller and poorer quality housing and command lower incomes. Water and Sewage connection fees if not subsidized, are perceived as expensive for poorer HHs and a disincentive to connect. Project policy will be to provide free sewage connection and subsidized water connection for the poorer HHs. |
| Economic | The labor force participation rate (15 to 64 yrs) for Cambodian women is 80% compared to 84.5% for men. About 70% of employed women are in vulnerable employment (compared to 59% of men). Women own 65% of all businesses in Cambodia, but the vast majority of women's businesses are microenterprises: 51% employ only 1 person, and 96% engage 4 or fewer persons. In BTB 28.4% of P1 and P2 HHs are headed by women, in SR 29.6% and SHV 43.5%. IDPoor data was not available for KPC. HHs headed by women are usually poorer, live in smaller and more temporary house structures and usually have less labor available within the HH. In regards to occupations of women in the project areas, most indicated farming or housekeeping, with a significant number engaged in trading. In general women manage the HH budget and budget decisions are made following discussions by the husband and wife, particularly if considering major HH investments. In regards to property rights, land may be titled to husband and wife, husband only and even wife |

| | |
|---|---|
| | only, depending upon the circumstances at hand, although the matrifocal tradition of property being handed down through women is stronger in rural areas. Women report difficulties in accessing credit and bank loans, especially if they are single and heading a HH. |
| Education and Literacy | Literacy varies significantly between urban and rural populations and also varies depending upon sex in both cases. Nationally, and of the population aged 15 years and above, 94.2% of males are literate compared to 73.6% of females. The difference is less in urban areas where 94.2% of males are literate compared to 86.8% of females, but much greater in rural areas where 84.1% of males are literate compared to 69.7% of females.<br>Adult literacy within the survey villages was reported as 97.92% for BTB and 97.43% for KPC. Enrolment in primary school amongst primary school aged children was reported as 95.4% in the BTB villages and 100% in KPC. The gender ratio was males 48.4% to females 51.4% in BTB villages and 50% male and 50% female in the KPC villages. Enrolment at high school was less, and in BTB the percentage of high school aged children enrolled averaged 66.7%, and in KPC 50.81%. Of this, in BTB some 48.84% were girls and in KPC the ratio of girls was slightly higher at 51.45%.<br>Adult literacy within the sanitation survey villages revealed a similarly high level, reported as being 96.97% in BTB and 9 almost 6.95% in SHV. Enrolment in primary school was reported as being 94.87% of primary school aged children in BTB and 97.74% in SHV. The gender ratio was 46.8% males and 53.2% females in BTB, and 48.05% males and 51.95% females in SHV. Enrolment in high school was reduced as with the water supply villages. In BTB some 79.22% of high school aged children were enrolled and in SHV some 69.8% were enrolled. The gender ratio in BTB was 62.07% male to 37.93% females, and in SHV the ratio was 49.66% male and 50.34% female. Overall findings broadly support the contention that girls are more likely to stop schooling after learning to read and write at primary school, and then staying at home to help the family before getting married. |
| Health | About 45 percent of women say they alone make decisions about their own health care. Cambodia has a relatively high Infant Mortality Rate (under 12 months of age)[16], which is reported as 9/1000 in urban areas, and 38/1000 in rural areas, and the Under 5 Mortality Rate, reported as 15/1000 in urban areas, and 60/1000 in rural areas. Undoubtedly the higher risk of disease contraction in the rural areas which have less access to clean water and sanitation will also be a factor in the variance of life expectancy between urban (76.8yrs) and rural (67.6) dwellers. Poor water and sanitation lead to regular incidents of diarrhea and even dysentery, which are major causes of death in infants. Poor water and sanitation has also been linked to growth stunting in young children. As of 2010, 40% of under-five year old children remained stunted. Lack of sanitation has also been linked to kidney and urinary tract diseases especially in women who may “hold back” rather than go outside at night to urinate. Many HHs report diarrhea in infants up to 5 years’ of age, and by conjecture this is often due to unclean water. Dengue fever is a common disease in Cambodia and a high proportion of HHs do store rain water for use and in many cases the storage vessel is not covered. Increased disease transmission results in women spending more time nursing family members. Hand washing is usually prompted by the visibility of dirt on the hand, rather than following a specific event. The need to hand wash with soap requires wider dissemination. Construction is likely to generate noise and dust – the |

[16] Per 1000 live births

| | |
|---|---|
| | latter possibly giving rise to increased respiratory tract infections or asthma. |
| Time poverty | Women are overburdened with tasks assigned to their reproductive roles of mother, nurse, cook, cleaner, water collector, farmer and others. Although not as acute as in rural areas, urban and peri-urban women are still charged with water collection in HHs that do not have piped supply. The time taken to collect water depends upon the season and the type of water source, but the collection task becomes more odious in rainy periods. Many urban women have employment outside of the HH adding further to their time poverty. |
| Status of Women | Women are afforded equal rights as men by the Cambodian Constitution and also through the GoC's ratification of the CEDAW convention. In actual fact however women are discriminated against and this manifests in different modes such as unequal pay for same work, vulnerable employment, harder to secure bank loans and finance without spouse consent.<br>In 2012, women held 14.75% of seats in the Senate, with nine women of a total 61 seats. This is the same figure as in the first mandate in 1999. Female representation in the National Assembly has more than tripled in two decades, from 6 % in 1993 to 20.33% in 2013. In 2013, women held 10.7% of ministerial positions, with three women of a total 28 positions. This increased from 7.4% in 2008, with two women of a total 28 positions.<br>The proportion of female Secretary of State appointees has increased from 8.08% in 2008, with 16 women of a total 198, to 20.54% in 2013, with 38 women of a total 189, a 12.5% increase. The proportion of female Under Secretary of State positions has increased almost 2%, from 16% in 2008, or 33 women of a total 205 positions, to 17.60% in 2013, or 48 women of a total 273 positions. |
| Gender Roles | Since the conflict years, and at that time with the absence of men from many HHs, Cambodian women have had to assume many tasks and roles previously assigned to men, and this is more evident in rural areas where women had to operate machinery, plough fields and harvest crops. This has helped break down gender stereotypes in regards to some professions however women's reproductive role remains the predominant role and women remain primarily responsible for domestic work and looking after the family. In urban areas women work in a wide variety of occupations ranging from governance, trade and commerce, laboring, services and entertainment. In regards to WATSAN and as confirmed through the SES, women and girls are the HH members primarily responsible for water collection and storage as well as sanitation tasks such as cleaning toilet areas. |
| Water use | Women focal groups consulted indicated a much greater preference for piped water for all domestic uses, particularly drinking, cooking and bathing, as piped water was considered cleaner and better tasting, and was thought to offer less chance of contracting diarrhea or skin complaints. Water from dug wells and bore holes was often regarded as smelly, having a red color, being harder and soap not lathering and particularly more so in the dry season when sources are under stress.<br>The lack of water supply to existing toilets was seen as a main reason for people not always using the house toilet as this would add to the cleaning burden.<br>Women welcome the opportunity of having good quality water available 24 hours a day. |
| Treating water for consumption | About 50% of HHs indicated that they treated water prior to drinking it and of this group, most (90%) boiled the water, and others used a ceramic filter or other method. The mains piped water is supposedly safe to drink without boiling. Women are primarily responsible for treating the water that will be consumed. |
| Water use | In urban situations conflicts seem only to arise when supply is insufficient for demand |

| | |
|---|---|
| conflicts | and people are forced to queue to access supplies, or when HHs closer to the main supply pipe divert flow to private storage vessels meaning other users have to wait longer periods to get water. If the mains system is operating properly, urban water supply should remain constant. HHs with water supply connections often 'sell on' to neighbors who have no connections at increased rates. |
| Water management | HHs newly connected to mains water supply require some information for ongoing management, namely that leaks are pipe breaks must be repaired as soon as detected. Women, being at home for longer periods than men, will have greater chance of detecting water supply irregularities and need to know how to identify suspected underground broken pipes. WSA should ensure repair and maintenance hotlines are advised to all HHs. Dry season water supplies are under stress and HHs should restrict water to essential use and not washing cars, pavements, or keeping dust on road surfaces under control. |
| WATSAN information dissemination | As confirmed through the SES, people prefer receiving WATSAN information via the television rather than a HH meeting. Presumably this is more convenient, and especially for women as they can listen and see the messages even whilst they are busy with domestic duties and do not have to leave the home to receive the information. Most comment that they do not have enough time to attend a WATSAN meeting. |
| Costs of connection and consumption | Some concern was expressed regarding the cost of connecting to water supply and sanitation, and especially by poorer HHs headed. Project policy will be to provide sewage connections free, and in respect of water mains, connections to poorer HHs will be subsidized, ranging from 100%, 70% and 30% depending upon the HH poverty status. Poorer HHs headed by single women would apply for the subsidy.<br>Most HHs are eager to be connected to water and sewage systems, although about 10% of HHs surveyed thought that they did not need piped water and this was due mainly to the existing source providing adequate supply, or a concern regarding paying the monthly tariff. |
| Benefits for women | The benefits of water supply and sanitation for women outweigh those for men, given that women are the main users of domestic water and waste water systems. Women whose HHs are serviced by mains piped water and sanitation will benefit from: reduced time taken to collect water, improved quality of water for drinking and cooking will result in less water borne illness, less time nursing and less expenditure on medicines. Improved sanitation will lead the improved health and hygiene with reductions in time spent nursing and purchase of medicine. Improved sanitation will contribute to improvements in women's health and safety through improved toilet access day and night, rain or sunshine. |

## V. WATER SANITATION AND HIV/AIDS

50. Women comprise the highest percentages of those infected and affected by HIV/ AIDS and are also primarily responsible for caring and home nursing of family members afflicted with the virus. Health messages regarding clean water and sanitation and improved personal hygiene can help build awareness on how to reduce the incidence of opportunistic infection particularly important for people living with HIV/AIDS. Staff of sector agencies themselves will need sensitivity training to enable them to deal effectively with vulnerable clients, and also know when and how to relay appropriate hygiene messages where possible and appropriate. This underscores the importance of coordination between those agencies

responsible for urban water supply (Ministry of Industry and Handicrafts) and sanitation (Ministry of Public Works) and the benefits of linking with the Ministry of Health (MoH), with the latter being able to provide technical information in regards to opportunistic infection.

## VI. POSSIBLE NEGATIVE PROJECT IMPACTS

51. There are few negative impacts on women as a result of clean water and sanitation development, and negative impacts are more than mitigated by the benefits. There may be some economic impacts on those selling bottled drinking water, which is usually sold by women in small stalls and shops, and less from trucking water and emptying septic tanks. Presumably these impacts would be temporary, as with improvements in health there should be reductions in health and medical expenses providing more income to be spent on other items sold by women small traders.

52. Some HHs will experience an increase in monthly expenditures due to paying for mains water consumption and the sewage tariff. This increase will depend upon their existing sources of domestic and drinking water, how water is extracted from the source and whether or not the source provides sufficient water all year round. Dug wells and drilled wells for example can be operated by hand pump, electric or fossil fuelled pump, some wells require no pumping with water being drawn by hand. However, these costs will be offset by increased convenience, savings in time to collect water, savings in having to buy water during periods of shortage, savings in medical expenditure, and savings in emptying or building septic tanks.

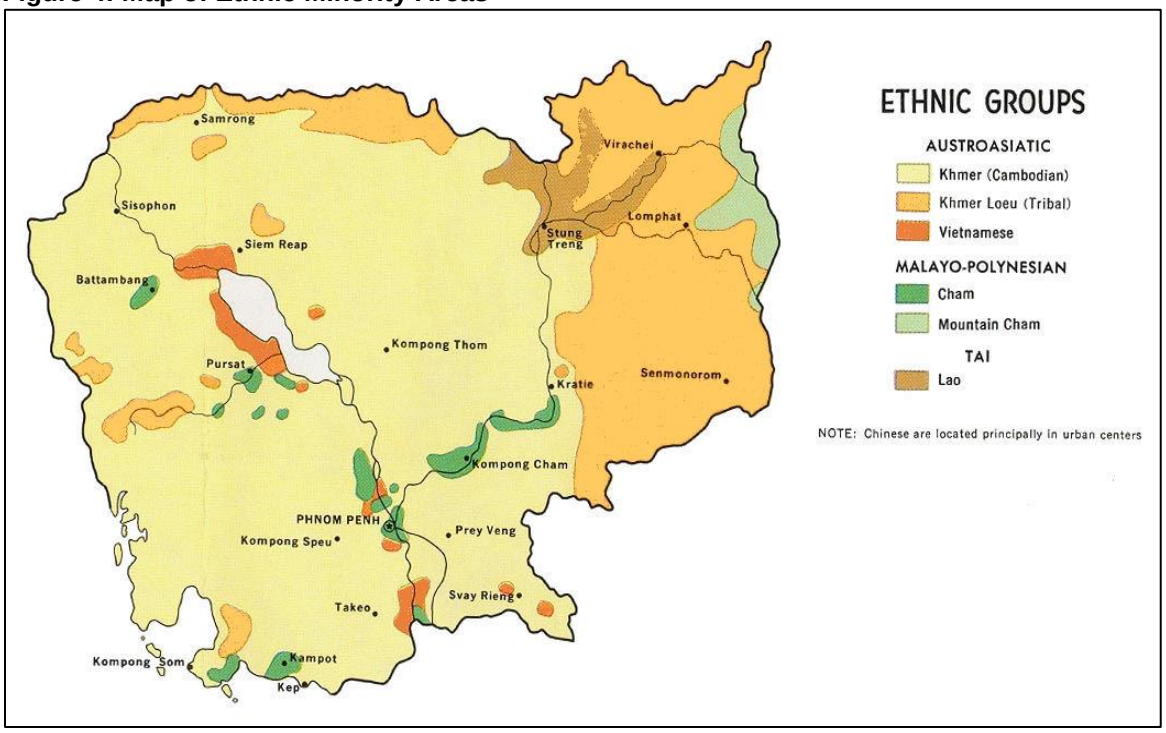
53. Other negative impacts would include access disruption and dust from the construction and installation civil works. This could impact more on women given that they may have to assist young children to get to school, go to the market and also will stay at home to look after sick family members, given the increased dust during construction it is possible that an increase in respiratory disorders (such as asthma, bronchitis) is observed, and these illnesses are more likely to affect the very young and very old. Dust control measures such as spraying water over loose soil is a method commonly used to reduce dust in construction areas and will be requested under civil works contracts for the Project. Any other negative impacts are deemed insignificant.

## VII. INDIGENOUS PEOPLE AND ETHNIC MINORITIES

54. The largest of the ethnic groups in Cambodia are the Khmer who comprise approximately 90% of the total population and mainly live within the lowland Mekong subregion and the central plains. The remaining 10% are non-Khmer ethnic groups, comprising of Chams (predominantly Muslim and originally from Vietnam), ethnic Vietnamese, ethnic Chinese, ethnic Lao, and the indigenous Khmer Loeu (hill-tribes). The non-indigenous ethnic minorities include immigrants and their descendants who live among the Khmer and have mostly adopted, at least nominally, Khmer culture and language[17,18]. The following map indicates areas in which IPs and EMs are found.

[17] http://gutenberg.us/articles/ethnic_groups_in_cambodia
[18] Cambodia Inter Censal Population Survey 2013 – Final Report

**Figure 4: Map of Ethnic Minority Areas**




Source:globalsecurity.org/jhtml/jframe.html#http://www.globalsecurity.org/military/world/cambodia/images/map-cambodia-ethnic

55. Among these non Khmer ethnic groups, only the hill-tribes are categorized as indigenous peoples by the GoC as, according to ADB definitions, these groups maintain their distinct language and other cultural practices. The GoC has formally recognized some 56 minority groups as “Indigenous” and the definition accords with that of ADB or SPS (2009) purposes but excludes ethnic Vietnamese groups. The indigenous ethnic minorities constitute the majority in the remote mountainous provinces of Ratanakiri, Mondulkiri and Stung Treng and Kratie Province. There are no indigenous groups in the project’s target provinces, but there are ethnic Vietnamese and Cham HHs within the target provincial towns. With the exception of the hill-tribes living in more remote upland areas, non-Khmer ethnic groups are generally well assimilated in Khmer society.[19]

56. The Inter-Censal Population Survey 2013 report indicates that highland tribal groups and a few minority religious groups account for 0.6% of the national population. However if based on mother tongue, speakers of ethnic minority languages (including both indigenous and nonindigenous ethnic minorities), will constitute 2.26% of the national populace.

57. Both Cham and ethnic Vietnamese may either live in their own communities or have integrated into Khmer communities but still retain their ethnic character. Cham are in the majority Sunni Muslim and the role of religion, mosque and community leaders within their respective communities is significant and quite distinct from the Khmer. The Cham have

[19] ADB- Indigenous peoples, ethnic minorities and poverty reduction. 2002

resided in Cambodian territory for centuries, use Khmer language within their own communities and are accepted in the wider Khmer society. They were severely persecuted during the Pol Pot regime. The Cham do enjoy Khmer citizenship, whereas the more recent ethnic minority Vietnamese are not afforded Khmer citizenship and therefore do not enjoy equal rights.

58. There are no indigenous people as defined by GoC within the target areas, however there are very small numbers of ethnic minority Cham and Vietnamese HHs who are well assimilated into local communities, fluent in Khmer language and are pursuing the same livelihood activities as the mainstream Khmer. Given the evidence from the field enquiries and SES (where only two such EM HHs were identified), a standalone Indigenous Peoples Plan (IPP) or ethnic minority plan (EMP) will not be required. However, the main issue is that of inclusion and equality, and the EA must ensure that expanded service areas will serve communes and villages with ethnic minority HHs and not withhold the service on that basis. A related issue is that ethnic minority HHs are entitled to the same benefits as their Khmer neighbors (e.g. subsidized water supply connections) where applicable.

## VIII. THE PROJECT

59. Beneficiary provinces of extended sewage service areas are SHV and BTB, and those for water supply are BTB and KPC. These provincial towns will also benefit from improved septage management. SR township will benefit from a replaced sewage interceptor pipeline approximately 3.7 km long that routes through the central business district. Appendix 1 shows the target provinces, districts communes and villages and the related demographics. Appendix 2 provides mapped representation of the existing and the proposed extended service areas.

### A. Proposed Project Beneficiaries

60. The total number of persons and HHs expected to benefit from the extended water supply and waste water subprojects is indicated below. Extended service beneficiaries for water supply and waste water subprojects are estimated at 2022 as this is when the project will have been completed. Based upon these projections, beneficiaries of the extended water supply subprojects will be some 209,055 people (averaging 51.6% female) from 42,636 HHs in the BTB and KPC provincial town urban and peri-urban areas. Beneficiaries from the extended sanitation systems will be some 92,967 people (50.5% female) from 18,956 households in BTB and SHV provincial towns. Direct beneficiaries from the replacement sewage interceptor pipe in SR number at least 25,428 people (51.6% female) from approximately 5,474 households in the areas adjacent to the pipeline. Some 36,031 people (approx. 7,919 HHs) will also benefit from improved septage services in KPC.

**Table 6: Project Beneficiaries**

| Type | Province | Commune | Population | % Women | Connected HHs |
|---|---|---|---|---|---|
| **By Year 2022** | | | | | |
| **Wastewater** | Sihanoukville | 3 | 46,217 | 51 | 10,456 |
| | Battambang | 2 | 46,750 | 50 | 8,500 |

| | | | | | |
|---|---|---|---|---|---|
| | Siem Reap | 1 | 25,428[20] | 51.6 | 5,474 |
| **Total** | | **6** | **118,395** | **50.67** | **24,430** |
| **Improved septage** | Kampong Cham | | **36,031** | **51** | **7,919** |
| **By Year 2022** | | | | | |
| **Water Supply** | Kampong Cham | 8 | 65,194 | 51 | 15,375 |
| | Battambang | 15 | 143,861 | 51.8 | 27,261 |
| **Total** | | **23** | **209,055** | **51.55** | **42,636** |

Source: CDIA reports 2016

*Note: In regards to SR the actual number of beneficiaries residing in 7 villages abutting the pipeline alignment in 2015 is about 25,428. However, the main sewage interceptor pipeline is fed into by a network of feeder pipes passing through many other villages, so the actual number of beneficiary HHs will be much higher if account is taken of these additional villages.

## IX. SOCIO ECONOMIC SURVEY

61. An extensive socio-economic survey was undertaken in the proposed new extended service areas for water supply and sanitation in SHV provincial town, KPC and BTB. A survey was also undertaken in SR of households that would be affected from the installation of a new sewage interceptor pipeline to replace the failed line.

62. A total of 626 HHs were surveyed, comprised of 475 HHs for sanitation (consisting of SR 253, SHV 120, and BTB 102 HHs) and 151 HHs for water supply (BTB 113, KPC 38). Eleven women's focal group discussions (FGDs) were convened in which a total of 154 women participated – providing opinions and priorities on both water and sanitation issues. Four FGDs were conducted for sanitation (SHV 2 groups, 27 participants, BTB 2 groups, 30 participants) and seven FGDs addressed water supply (KPC 2 groups, 30 participants, BTB 5 groups, 67 participants).

63. Appendix 3 details the list of districts, communes, villages and the number of households sampled for survey. A random sample was taken of 5% of the villages in the extended service area and HHs then selected randomly for survey interviews. The number of HHs selected for interview from each sampled village was calculated for 95% confidence level (with a confidence interval of 5) based upon the total population of the 5% of the total villages sampled.

64. The villages surveyed included poor and vulnerable HHs as shown in table 7 below, where women as heads of HH represented 12% of the sanitation surveyed village population and almost 15% of the water supply surveyed communities. In regards to poverty and the poorest of the poor, the sanitation surveyed villages included almost 7% P1 HHs and 13% P1 HHs in the water supply villages, compared to P2 HHs of 7% and 15% respectively.

[20] Based upon 2016 population. The SR population within the pipeline impact area is not expected to increase significantly as the area is already fully built up and is a high congested area within the SR CBD.

**Table 7: Poor and Female Head HHs**

| | Total HH | # FHH | % Total Hh are FHH | # P1 HH | % of Total HH are P1 HH | # P2 HH | % of Total HH are P2 HH |
|---|---|---|---|---|---|---|---|
| **Sanitation** | | | | | | | |
| SHK | 3838 | 303 | 7.89 | 52 | 1.35 | 81 | 2.11 |
| Bttbg | 3464 | 573 | 16.54 | 443 | 12.79 | 448 | 12.93 |
| **Total Sanitation** | **7302** | **876** | **12.00** | **495** | **6.78** | **529** | **7.24** |
| | | | | | | | |
| **Water Supply** | | | | | | | |
| KC | 1043 | 112 | 10.74 | 107 | 10.26 | 109 | 10.45 |
| Bttbg | 3435 | 551 | 16.04 | 466 | 13.57 | 570 | 16.59 |
| **Total Water Supply** | **4478** | **663** | **14.81** | **573** | **12.80** | **679** | **15.16** |

Source: PWSSP SES, 2016

### A. Indigenous and Ethnic Minority People in Project Area

65. During the SES, only two ethnic minority (EM) HHs were encountered (in accordance with their relative demographic representation) and subsequently interviewed. As indicated in the SES there were no attitudinal or economic differences between EM HHs surveyed and those of the Khmer, reflecting their total assimilation into urban and peri-urban communities and lifestyles.

66. Given that there will be no separate or distinct, differential or adverse impacts on the EM HHs within the targeted urban and peri-urban populations, and the relatively few EM HHs in those areas anyway, the Project is assessed as Category C in relation to the ADB Safeguard Policy Statement (SPS 2009)[21] , with no impacts on EMs. The project will extend provincial towns' mains water supply and sewage services in urban and peri-urban areas and the infrastructure layout must follow a basic grid design without room for individual HH variation. After confirming the assimilation and urbanization of those EM HHs living in target townships, there is no need to prepare a separate Ethnic Minority Development Plan (EMDP).

[21] A proposed project is assigned to one of the following categories depending on the significance of the potential impacts on Indigenous Peoples:
(i) **Category A.** A proposed project is classified as category A if it is likely to have significant impacts on Indigenous Peoples. An Indigenous Peoples plan (IPP), including assessment of social impacts, is required.
(ii) **Category B.** A proposed project is classified as category B if it is likely to have limited impacts on Indigenous Peoples. An IPP, including assessment of social impacts, is required.
(iii) **Category C.** A proposed project is classified as category C if it is not expected to have impacts on Indigenous Peoples. No further action is required.

## B. Water Supply Subproject

**Table 8: Water Supply Villages**

| Water Supply | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Province** | **District** | **Commune** | **Village** | **Total HH** | **Total Male** | **Total Females** | **Total Popn** | **% Women** |
| **BBG** | Tma Koul | Ou Ta Ki | Trang | 471 | 995 | 985 | 1,980 | 49.75 |
| | | Chrey | Chrey | 291 | 730 | 724 | 1,454 | 49.79 |
| | Bat Dambang | Kdol Doun Teav | Kdol | 287 | 653 | 684 | 1,337 | 51.16 |
| | | Ou Mal | Dak Sasar | 188 | 552 | 546 | 1,098 | 49.73 |
| | | | Voat Roka | 302 | 771 | 698 | 1,469 | 47.52 |
| | | Voat Kor | Chrab Krasang | 669 | 1,856 | 1,956 | 3,812 | 51.31 |
| | Sangkae | Anlong Vil | Chumnik | 448 | 1,144 | 1,113 | 2,257 | 49.31 |
| | | Ou Dambang Muoy | Ou Khcheay | 441 | 882 | 1,081 | 1,963 | 55.07 |
| | | Voat Ta Muem | Slakram | 338 | 780 | 847 | 1,627 | 52.06 |
| **Sub Total** | | | | **3,435** | **8,363** | **8,634** | **16,997** | **50.80** |
| **KC** | Kampong Siem | Ampil | Krala | 321 | 690 | 776 | 1,466 | 52.93 |
| | | Kaoh Roka | Kaoh Roka Knong | 192 | 699 | 725 | 1,424 | 50.91 |
| | | Krala | Tuol Beng | 251 | 482 | 505 | 987 | 51.17 |
| | | | Trakuon | 279 | 595 | 699 | 1,294 | 54.02 |
| **Sub Total** | | | | **1,043** | **2,466** | **2,705** | **5,171** | **52.31** |
| **Total Water Supply** | | | | **4,478** | **10,829** | **11,339** | **22,168** | **51.15** |

67. The table below indicates beneficiary village demographics for the extended service area from the two provinces SHK and BTB:

### 1. Water Supply Survey Areas

68. The following tables provide demographic information of the villages surveyed for water supply. In all, some 4,478 families reside in 4,191 houses.

**Table 9: Kampong Cham Water Supply Sampling Details**

| Kampong Cham Water Supply Subproject | | | | | | |
|---|---|---|---|---|---|---|
| **District** | **Commune** | **Village** | **Total HH** | **Sample HHs** | **Focal Group** | **% of Tot HHs** |
| Kampong Siem | Ampil | Krala | 316 | 10 | FG | 0.03 |
| | Kaoh Roka | Kaoh Roka Knong | 345 | 11 | | 0.03 |
| | Krala | Tuol Beng | 237 | 8 | FG | 0.02 |
| | | Trakuon | 270 | 9 | | 0.02 |
| **TOTAL** | | | **1168** | 38 | 2 | **0.10** |

**Table 10: Battambang Water Supply Sampling Details**

| Battambang Water Supply Subproject | | | | | | |
|---|---|---|---|---|---|---|
| **District** | **Commune** | **Village** | **Total HH** | **Sample HHs** | **Focal Group** | **% of Tot HHs** |
| Tma Koul | Ou Ta Ki | Trang | 466 | 15 | FG | 0.04 |
| | Chrev | Chrey | 291 | 9 | | 0.03 |
| Battam Bang | Kdol Doun Teav | Kdol | 267 | 9 | FG | 0.02 |
| | Ou Mal | Dak Sasar | 232 | 8 | | 0.02 |
| | | Voat Roka | 301 | 10 | FG | 0.03 |
| | Voat Kor | Chrab Krasang | 638 | 21 | | 0.06 |
| Sangkae | Anlong Vil | Chumnik | 462 | 15 | FG | 0.04 |
| | Ou Dambang Muoy | Ou Khcheay | 432 | 14 | | 0.04 |
| | Voat Ta Muem | Slakram | 370 | 12 | FG | 0.03 |
| **TOTAL** | | | **3459** | **112** | **5** | **0.30** |

69. As mentioned the survey villages combined from both provinces included 14.81% HHs headed by women, comprised of BTB 16.04% and KPC 10.74%. The survey villages also contained poor HHs comprised of a combined average of 12.8% being P1 (BTB 10.26%, KPC 13.57%), and 15.16% being P2 HHs (BTB 10.45%, KPC 16.54%).

### 2. Age Distribution

70. Age distribution across the survey villages are shown in table 11 below. In BTB the average number of family members in male headed HHs was 5, compared to an average of 4 in HHs led by women. There was no difference in family size in KPC. The age ratios are:

**Table 11: Village Age Distribution**

**Number of Male Popn by Age Group**

| | 0-5 yrs | | 6-16 yrs | | 17-45 yrs | | 46-65 yrs | | Over 65 yrs | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Provinces** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** |
| Bttbg | 1097 | 13.18 | 2303 | 27.68 | 2998 | 36.03 | 1369 | 16.45 | 554 | 6.66 | 8321 | 100.00 |
| KC | 286 | 11.46 | 470 | 18.83 | 853 | 34.17 | 524 | 20.99 | 363 | 14.54 | 2496 | 100.00 |
| **Total** | **1383** | **12.79** | **2773** | **25.64** | **3851** | **35.60** | **1893** | **17.50** | **917** | **8.48** | **10817** | **100.00** |

**Number of Female Popn by Age Group**

| | 0-5 yrs | | 6-16 yrs | | 17-45 yrs | | 46-65 yrs | | Over 65 yrs | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Provinces** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** | **N** | **%** |
| Bttbg | 1235 | 14.23 | 2504 | 28.86 | 2681 | 30.90 | 1628 | 18.76 | 628 | 7.24 | 8676 | 100.00 |
| KC | 284 | 10.62 | 470 | 17.57 | 988 | 36.93 | 546 | 20.41 | 387 | 14.47 | 2675 | 100.00 |
| **Total** | **1519** | **13.38** | **2974** | **26.20** | **3669** | **32.32** | **2174** | **19.15** | **1015** | **8.94** | **11351** | **100.00** |

Source: PWSSP SES, 2016

### 3. Adult Literacy, Education and School Attendance

71. In BTB, whereas 17.7% of HH heads reported no formal schooling, the majority completed primary school (34.51%), and some 24% completed lower secondary level, with only 15% completing upper level secondary schooling. In regards to the HHH's spouse, averaging between the two provinces, 16% reported no schooling, 41% completed primary school, 19% completed lower secondary and only 10.3% completed upper secondary level. In KPC

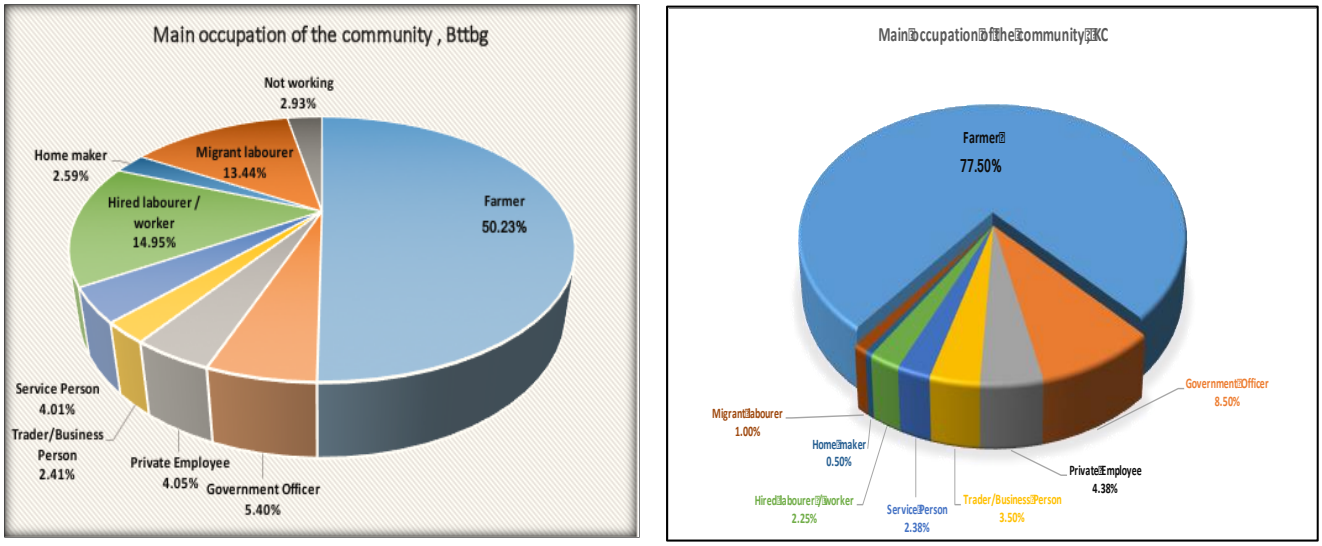
16% of HH heads reported no schooling, 29% completed primary school, 31.6% completed lower secondary and almost 24% completed upper secondary school. In regards to spouses, almost 15% reported no schooling, 47% completed primary school, around 15% completed secondary school and almost 18% completed upper secondary school.

72. Adult literacy within the survey villages was reported as 97.92% for BTB and 97.43% for KPC. Enrolment in primary school amongst primary school aged children was reported as 95.4% in the BTB villages and 100% in KPC. The gender ratio was males 48.4% to females 51.4% in BTB villages and 50% male and 50% female in the KPC villages. Enrolment at high school was less, and in BTB the percentage of high school aged children enrolled averaged 66.7%, and in KPC 50.81%. Of this, in BTB some 48.84% were girls and in KPC the ratio of girls was slightly higher at 51.45%.

### 4. Occupation of Household Head

73. Occupation data was collected at two levels: i) village aggregate from the village authorities, and, ii) HH specific from surveyed HHs. Village aggregated data shows most HHs are farmers (BTB 50%, KPC 77.5%). The second most common occupation in BTB was that of labourer and then migrant labourer (to Thailand). In KPC the second most common was that of government officer followed by private employee. Village aggregates varied slightly when compared to occupations within the surveyed HHs.

**Figure 5: HH Occupations**




Source: PPWSSP SES, 2016

74. Considering the surveyed HHs only, the main occupations of KPC HH heads are those of farmer (32%), trader or private business (18%), government staffs (14%), and services (7%). In the BTB villages the main occupations were that of farmer (45%), services (13%), government officer (10.5%), trader (10.5%), hired labourer or migrant labourer (13%).The relatively high proportion of farmers is probably explained by the growth of the urban sprawl whereby peri-urban areas becomes urban, and rural becomes peri-urban, as the cities grow and populations expand outwards requiring more residential area.

## 5. Household Incomes

75. In the water supply HHs surveyed, some 90% of HHs earn a combined HH income of up to USD$15,000 per year, and within this bracket, 79% are earning less than USD$5,000.

**Table 12: Combined HH Income**

| Combine HH Income | Province | | | |
|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | |
| | N | % | N | % |
| Over USD 35,000 per year | 0 | 0.00% | 9 | 8.00% |
| Between 25,000 to 35,000 per year | 0 | 0.00% | 1 | 0.90% |
| Between 15,000 to 25,000 | 2 | 5.30% | 1 | 0.90% |
| Between 5,000 to 15,000 | 8 | 21.10% | 21 | 18.60% |
| Less than $5000 | 28 | 73.70% | 81 | 71.70% |
| **total** | **38** | **100%** | **113** | **100%** |

Source: PWSSP SES, 2016

76. Women heads of HH are most likely to earn less than HHs headed by a male. In BTB 80%, and KPC 77%, of HHs led by women earn under $5,000 p.a. In HHs headed by men, the percentage earning under $5,000 in BTB was 65% and in 77% in KPC. On average women are getting paid less than men and only one HH led by a woman (in BTB) was found to earn over $35,000, with that HH engaged in private trading business.

## 6. Water Sources

77. In water supply subproject villages, and for both wet and dry seasons, most HHs rely on either bore holes, rainwater or dug wells for both drinking and domestic water. There is a much higher proportion of HHs in BTB who utilize large water jars to capture rainwater used for drinking, and the higher proportion of wells in KPC reflects a higher water table compared to BTB. HHs did complain about water quality and particularly in BTB where the main issue appeared to be that of high iron content resulting in a reddish color and also some taste difference.

**Table 13: Main Sources of HH Water**

**HH main source of drinking water**

| Main Source | Wet Season | | | | Dry Season | | | |
|---|---|---|---|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | | Kampong Cham | | Bat Dam Bang | |
| | No | % | No | % | No | % | No | % |
| Pipe mains water (PMW) | 1 | 2.63 | 2 | 1.77 | 1 | 2.63 | 2 | 1.77 |
| Piped water (Other) | 1 | 2.63 | 3 | 2.65 | 1 | 2.63 | 4 | 3.54 |
| Bore hole (drilled well) | 16 | 42.11 | 12 | 10.62 | 18 | 47.37 | 18 | 15.93 |
| Dug well | 10 | 26.32 | 14 | 12.39 | 10 | 26.32 | 21 | 18.58 |
| River/stream/lake | 0 | 0.00 | 9 | 7.96 | 0 | 0.00 | 11 | 9.73 |
| Rainwater | 2 | 5.26 | 53 | 46.90 | 0 | 0.00 | 23 | 20.35 |
| Bottled water from vendor | 7 | 18.42 | 18 | 15.93 | 7 | 18.42 | 19 | 16.81 |
| Trucked water from vendor | 1 | 2.63 | 2 | 1.77 | 1 | 2.63 | 15 | 13.27 |
| **Total** | **38** | **100** | **113** | **100** | **38** | **100** | **113** | **100** |

**What is the HHs main source of domestic water**

| Main Source | Wet Season | | | | Dry Season | | | |
|---|---|---|---|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | | Kampong Cham | | Bat Dam Bang | |
| | No | % | No | % | No | % | No | % |
| Pipe mains water (PMW) | 1 | 2.63 | 8 | 7.08 | 1 | 2.63 | 9 | 7.96 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Pipe water (other) | 1 | 2.63 | 3 | 2.65 | 1 | 2.63 | 3 | 2.65 |
| Bore hole (drilled well) | 19 | 50.00 | 19 | 16.81 | 21 | 55.26 | 23 | 20.35 |
| Dug well | 14 | 36.84 | 37 | 32.74 | 14 | 36.84 | 40 | 35.40 |
| River/stream/lake | 0 | 0.00 | 10 | 8.85 | 0 | 0.00 | 12 | 10.62 |
| Rainwater | 3 | 7.89 | 27 | 23.89 | 1 | 2.63 | 4 | 3.54 |
| Trucked water from vendor | 0 | 0.00 | 9 | 7.96 | 0 | 0.00 | 22 | 19.47 |
| **Total** | **38** | **100** | **113** | **100** | **38** | **100** | **113** | **100** |

Source: PWSSP SES 2016

78. Water sources are prone to shortages and particularly in the dry season. Water shortages are experienced by those sourcing water from dug wells and streams and rivers. The length of the shortage period varies according to source and season. In BTB during the wet season, of those HHs complaining of shortages 47% indicated the short period was under 1 month and 35% indicated the period of up to 2 months. In KPC, 28.5%% of HHs reporting shortages indicated the period of shortage was under 1 month, 28.5%% indicated up to 2 months and almost 43% indicated shortages for longer than 2 months. In the dry season some 40% of BTB HHs reporting shortages in supply said the period was under 1 month, 33% reported 1 to 2 months and 27% reported being short for more than 2 months. In KPC whilst 33% said the shortage lasted under 1 month, a further 67% of HHs suffering shortages said the period lasted over 2 months.

79. In periods of shortage HHs will first try sourcing water from an alternative well or river during the wet season but are more likely to resort to a private vendor if alternatives are difficult, and private vendors become the main coping strategy in the dry season. Given the need to use vendor supplied water, some 25% of HHs in BTB and 21% in KPC pay for water in the wet season compared with 43% of HHs in BTB and 24% from KPC in the dry season. The majority of HHs in both provinces reported spending less than CRS 50,000 per month in both wet and dry seasons.

80. There are licensed and unlicensed private water supply operators in some of the provincial towns included in the project where there is no public water supply network. In KPC the private operator's domestic water tariff ranges from CRS 1,500 to 2,500 per $m^3$, the same tariff as the provincial mains water supply (PMW) or higher. In most cases, the private operator's water quality is considered to be less reliable than the PMW's since no water treatment is done by the private operator (pumped from the river and supplied untreated via low quality PVC piped network).

### 7. Water Collection, Treatment, Storage

81. The task of water collection falls primarily on adult women and then adult men. Water collection is a secondary task for girls in the HH, presumably falling upon them when adults are busy. Boys on the other hand are largely exempt from water collection duty. Water collection time varies according to location, season and water source. In the wet season 100% of the BTB HHs surveyed collected their water within 10 minutes per trip, however in the dry season this shrinks to 86% and 13% take up to 20 minutes, and 4% take over 20 minutes, each trip. In KPC wet season water collection trips take less than 10 minutes for 81% of HHs, 11% take between 10 to 20 minutes, and 8% take over 20 minutes each trip. In the dry season 76% of KPC HHs take less than 10 minutes, 16% up to 20 minutes and 8% still take over 20 minutes each water collection trip. Two trips per day in the dry season

appears the norm (KPC 92%, BTB 77%) with the remainder taking up to 3 or even 4 trips per day (BTB 5.3%).

82. Most HHs (just over 50% in each province) are not treating water before consumption as shown below, indicating further awareness raising is required to ensure safe consumption of non-mains supplies. If water is treated it is usually boiled.

**Table 14: Treating Drinking Water Before Consumption**

| Do You Treat water | Province | | | |
|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | |
| | No | % | No | % |
| Yes | 18 | 47.37 | 53 | 46.90 |
| No | 20 | 52.63 | 60 | 53.10 |
| **Total** | **38** | **100** | **113** | **100** |

Source: PWSSP SES 2016

**Table 15: Type of Water Treatment**

| Treatment used | Province | | | |
|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | |
| | No | % | No | % |
| Boil | 16 | 88.89 | 51 | 96.23 |
| Use a water filter (ceramic, sand, composite) | 2 | 11.11 | 2 | 3.77 |
| **Total** | **18** | **100** | **53** | **100** |

Source: PWSSP SES 2016

83. Households in both provinces use large jars to store water but these are often not covered which would provide dengue bearing mosquitoes a place to breed. Any WATSAN awareness raising training should include the need to properly cover these storage vessels:

**Table 16: HHs Storing Water for Dry Season Use**

| Store | Province | | | |
|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | |
| | No. | % | No. | % |
| Yes | 34 | 89.47 | 113 | 100.00 |
| No | 4 | 10.53 | 0 | 0.00 |
| **Total** | **38** | **100** | **113** | **100** |

Source: PWSSP SES 2016

**Table 17: HHs Cover the Storage Vessel**

| Covered to Prevent | Province | | | |
|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | |
| | No | % | No | % |
| Yes | 25 | 73.53 | 94 | 83.19 |
| No | 9 | 26.47 | 19 | 16.81 |
| **Total** | **34** | **100** | **113** | **100** |

Source: PWSSP SES 2016

84. Some HHs, although in largely unserviced areas are on the tail end of the existing mains supply, such as in KPC 5% (2 HHs), and BTB 13% (15HHs). In KPC HHs claim to have paid up to CRS 150,000, whilst most of those connected HHs in BTB claimed to have paid over CRS 150,000. These HHs in KPC report receiving piped water every day whilst only 87% of those in BTB reported daily supply. In terms of availability throughout the day, there was no difference between the wet and dry seasons, in KPC 50% of the HHs reported only getting supply for up to 12 hours and 50% indicated 24 hour supply. In BTB 20% of those

connected reported half day availability and 80% reported full day availability. In regards to quality, in KPC 505 reported weak pressure and 50% strong tap pressure. In BTB 87% reported strong pressure and the remaining 13% thought pressure varied but was usually strong.

85. In regards to improving the existing mains supply, KPC HHs recommended improving service quality through supply adequacy (100%), and in BTB some 46% of connected HHs reported the same need. Interestingly some 46% of those HHs connected in BTB thought that the service was already very good.

### 8. Current Sanitation Systems

86. As shown below, most people already use a basic flush to septic tank toilet system, much more so in BTB than KPC where around 26% of HHs report still using the bush. The flush toilets are not always used and this is usually due to lack of water supply to facilitate cleaning. There is little awareness of what happens in the event of septage overflow.

**Table 18: Current Sanitation Facility in Water Supply Villages**

| Type of toilet | Water Supply Vill. | |
|---|---|---|
| | BTB | KPC |
| | % | % |
| HH has own flush toilet | 82.22 | 57 |
| HH shares a flush toilet | 0.00 | 16 |
| HH has a dry pit toilet | 3.33 | 1.25 |
| HH shares a dry pit toilet | 0.00 | 0 |
| HH uses the bush | 14.44 | 25.75 |
| **Total %** | **100** | **100** |

Source: PWSSP SES 2016

87. In regards to domestic waste water, from kitchen and bathrooms, there is usually no system in place other than to discharge the waste directly out onto the roadside street drains, into the house yard or garden area.

**Table 19: HH Waste Water Discharge**

| Waste Water Discharges Where? | Province | | | |
|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | |
| | No | % | No | % |
| Septic system | 1 | 2.63 | 11 | 9.73 |
| Toilet | 0 | 0.00 | 0 | 0.00 |
| Soak pit | 1 | 2.63 | 17 | 15.04 |
| Street drain | 0 | 0.00 | 7 | 6.19 |
| Empties out on to roadside | 4 | 10.53 | 7 | 6.19 |
| Throw on garden/yard | 32 | 84.21 | 71 | 62.83 |
| Don't know | 0 | 0.00 | 0 | 0.00 |
| **Total** | **38** | **100** | **113** | **100** |

Source: PWSSP SES 2016

### 9. Health and Hygiene

88. In regards to handwashing the majority indicated that the most important time was before eating, followed by prior to preparing and cooking food. A surprisingly low number indicated washing after visiting the toilet, indicating that the need for handwashing is more likely

triggered by the appearance of dirt. There were no significant differences in responses when comparing across income groups, education or marital status.

**Table 20: When to Hand Wash**

| Important | Province | | | |
|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | |
| | No | % | No | % |
| Before preparing food or cooking | 14 | 36.84 | 27 | 23.89 |
| Before eating | 22 | 57.89 | 77 | 68.14 |
| Before feeding children | 0 | 0.00 | 2 | 1.77 |
| After cleaning children's bottom | 0 | 0.00 | 0 | 0.00 |
| After defecating | 2 | 5.26 | 7 | 6.19 |
| Don't know | 0 | 0.00 | 0 | 0.00 |
| **Total** | **38** | **100** | **113** | **100** |

Source: PWSSP SES 2016

89. Any WATSAN awareness raising training should include material on the need to wash after using the toilet, amongst other times, and also the importance of using soap in order to kill pathogens. The reported rate of contracting a water borne illness amongst children was lower than expected, and for some reason was higher in BTB, and then, higher in children over 5 years' of age. The lower than expected incidence may be partly explained by the SES being conducted at the tail end of the wet season when water supplies are plentiful, and a higher rate would be expected if the SES was conducted towards the end of the dry season when water supply and quality is at its lowest.

**Table 21: Water Borne Child Illness in HH**

| HH member sick in past 4 weeks | Kampong Cham | | | Bat Dam Bang | | |
|---|---|---|---|---|---|---|
| | Total No | Children Got Sick | % | Total No | Children Got Sick | % |
| Children Under 5 Yrs | 13 | 0 | 0 | 72 | 4 | 5.56 |
| Children Over 5 Yrs | 10 | 0 | 0 | 81 | 10 | 12.35 |

Source: PWSSP SES 2016

90. In relation to community hygiene awareness raising, people indicated that they preferred to get information via 2 main sources, TV (average 75%) or by village level HH meetings (average 12%), with KPC showing a higher rate for TV than BTB, perhaps indicative of more TVs in that province. In any case, TV would appear to be the most efficient as women would not have to leave the house to receive information.

## 10. Willingness to Pay

91. The vast majority of HHs would like to be connected to the mains water supply with only a small number considering it not necessary. The majority of those HH not interested presumably lack interest due to the sufficiency of the existing sources used, although a higher percentage of HHs from BTB thought they would have difficulties paying for the service.

**Table 22: HH Interest in Mains Connection**

| Interest in having Piped water System | Province | | | |
|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | |
| | No | % | No | % |

| | | | | |
|---|---|---|---|---|
| I am interested in having piped water and am prepared to pay for water | 31 | 86.11 | 90 | 91.84 |
| I am not interested in a piped water connection | 5 | 13.89 | 7 | 7.14 |
| Don't know | 0 | 0.00 | 1 | 1.02 |
| **Total** | **36** | **100** | **98** | **100** |

Source: PWSSP SES 2016

**Table 23: HH Reasons for no Interest in Mains Connection**

| Reason for Not Wanting Water Connection | Province | | | |
|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | |
| | No | % | No | % |
| I do not really want/need the piped water service | 3 | 60.00 | 3 | 37.50 |
| I cannot afford to pay for water | 2 | 40.00 | 4 | 50.00 |
| I do not think the system will be managed properly | 0 | 0.00 | 0 | 0.00 |
| I could not trust the water quality | 0 | 0.00 | 1 | 12.50 |
| **Total** | **5** | **100** | **8** | **100** |

Source: PWSSP SES 2016

92. The majority of HHs are prepared to pay for the water supply connection indicating an appreciation of the service convenience.

**Table 24: HH Prepared to Pay for Connection**

| How much prepared to Pay for connection | Province | | | |
|---|---|---|---|---|
| | Kampong Cham | | Bat Dam Bang | |
| | No | % | No | % |
| 0-50,000 | 5 | 16.13 | 14 | 15.56 |
| 50,000-100,000 | 2 | 6.45 | 4 | 4.44 |
| 100,000-200,000 | 7 | 22.58 | 19 | 21.11 |
| 200,000- Over | 17 | 54.84 | 53 | 58.89 |
| **Total** | **31** | **100** | **90** | **100** |

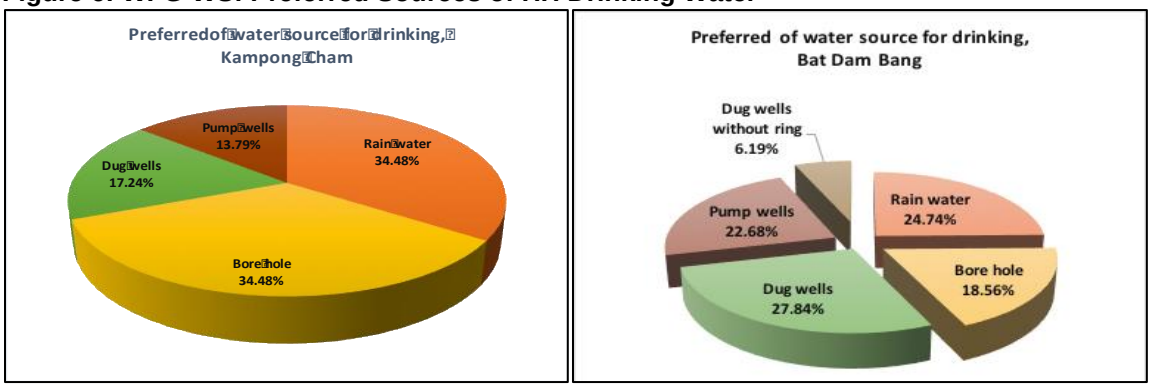
Source: PWSSP SES 2016

93. As discussed later in this report under Gender Action Plan issues, the Project is keen to use the Phnom Penh Water Supply Authority policy of connection subsidies for poor HHs.

### C. Women's Focal Groups - Water Supply (WFG WS)

94. Some 97 women from water supply villages were consulted through the formation of 7 focal groups in different villages; KPC 30, BTB 67. Water sources for wet and dry seasons were confirmed, and the increased reliance on rainwater in BTB compared to wells in KPC was also reiterated. Participants were asked as to their preferred source of water for drinking, cooking and other domestic uses. Rainwater, bore holes and dug wells were the preferred sources and in that order. Water sourced from rivers, lakes and streams and trucked-in water was least preferred due to poor quality (taste and color). This contrasted with supply adequacy, where rivers and lakes were deemed to have sufficient supply, followed by bores and dug wells, and rainwater the least adequate source, presumably due to storage constraints.

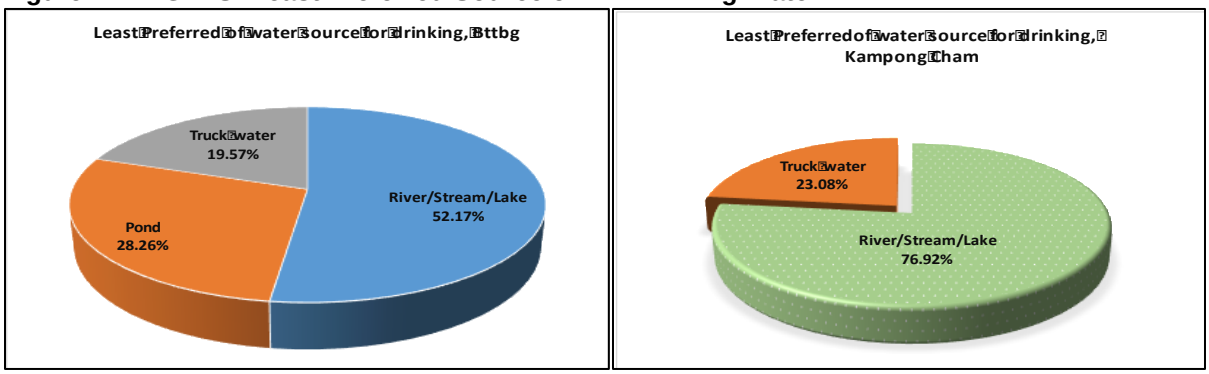
**Figure 6: WFG WS: Preferred Sources of HH Drinking Water**




Source: PWSSP SES 2016

95. Least preferred water sources for cooking are river, lake/pond and also trucked water, as people complain about taste and discoloration. Similar comments were offered in respect to preferences for bathing water, with lake/river/pond and trucked in supplies being least preferred due to contaminants sometimes leading to skin complaints.

**Figure 7: WFG WS: Least Preferred Source of HH Drinking Water**




Source: PWSSP SES 2016

96. Rust discoloration tends to be significantly worse in the dry season when sources are low, and for some reason HHs have reported more “smell” in the wet season.

**Table 25: WFG WS: Quality of HH Domestic Water:**

| **Quality of domestic water used in HHs by each season** | | | | | |
|---|---|---|---|---|---|
| **Quality of domestic water used in HHs** | | **Kampong Cham** | | **Battambang** | |
| | | **No.** | **%** | **No.** | **%** |
| Good Quality of water in wet season | No Smell and satisfied | 5 | 12.82 | 7 | 8.64 |
| | Rain Water so good and clean | 5 | 12.82 | 27 | 33.33 |
| | Water Clean | 29 | 74.36 | 47 | 58.02 |
| Total | | 39 | 100.00 | 81 | 100.00 |
| Bad Quality of water in wet season | Not clean | 9 | 45.00 | 4 | 14.29 |
| | Water has rust and red color | 11 | 55.00 | 8 | 28.57 |
| | Sometime bad smell | 0 | 0.00 | 16 | 57.14 |
| Total | | 20 | 100.00 | 28 | 100.00 |
| Good Quality of water in dry season | No Smell and satisfied | 5 | 19.23 | 9 | 8.33 |
| | Rain Water so good and clean | 5 | 19.23 | 32 | 29.63 |

| | | | | | |
|---|---|---|---|---|---|
| | Water Clean | 16 | 61.54 | 67 | 62.04 |
| Total | | 26 | 100.00 | 108 | 100.00 |
| Bad Quality of water in dry season | Not clean | 10 | 38.46 | 11 | 24.44 |
| | Water has rust and red color | 5 | 19.23 | 21 | 46.67 |
| | Some bad smell | 11 | 42.31 | 9 | 20.00 |
| | Sometime bad smell | 0 | 0 | 4 | 8.89 |
| Total | | 26 | 100.00 | 45 | 100.00 |

Source: PWSSP SES, 2016

97. Focal group participants indicated a better understanding (than demonstrated at HH level) of the need to treat water from different sources prior to drinking and filters used tended to be the ceramic sand variety.

**Table 26: WFG WS: Treating Water before Consumption**

| Type of treat water for drinking | Kampong Cham | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| we need to boil first before drinking | 6 | 50.00 | 24 | 42.86 |
| use water filter type | 6 | 50.00 | 21 | 37.50 |
| Let it stand and settle | 0 | 0.00 | 8 | 14.29 |
| Keep water and waiting until clean | 0 | 0.00 | 3 | 5.36 |
| Total | 12 | 100.00 | 56 | 100.00 |

Source: PWSSP SES, 2016

98. Sufficiency of water varied between areas, and in the main, stored rainwater was insufficient and river/lake/pond source supplies and quality were reduced in the dry season. Overall, deeper wells appeared to provide the more reliable supply. Women thought storing more rainwater was a good coping strategy as it was free and clean. In general women thought that all water sources had supply problems and particularly in the dry season. The most common coping mechanisms were to try to find other wells that still had water and if the HH had money, buy water trucked in to the community. If the HH did not have money, water would be taken from a lake/river as a last resort.

**Table 27: WFG WS: Water Source Supply Shortages**

| Water Source shortage | Kampong Cham | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| **Wet Season** | | | | |
| Bore hold | 3 | 42.86 | 9 | 23.68 |
| Pond | 2 | 28.57 | 15 | 39.47 |
| Dug well | 2 | 28.57 | 10 | 26.32 |
| Pump well | | | | |
| Rainwater | | | 4 | 10.53 |
| Total | 7 | 100.00 | 38 | 100.00 |
| **Dry Season** | | | | |
| Bore hold | 4 | 36.36 | 22 | 46.81 |
| Pond | 4 | 36.36 | 13 | 27.66 |
| Dug well | 0 | 0.00 | 10 | 21.28 |
| Pump well | 3 | 27.27 | 0 | 0.00 |
| Rainwater | 0 | 0.00 | 2 | 4.26 |
| Total | 11 | 100.00 | 47 | 100.00 |

Source: PWSSP SES, 2016

99. Women indicated that it was the man's responsibility to take action when water sources were depleted, and if a solution is not available, the HHs would petition the village chief's assistance.

100. The focal groups identified additional costs in obtaining water such as the cost of fuel and or electricity used when pumping water from bore holes and or from dug wells, the cost of boiling water when supply is not clean, and also the alternative cost of buying bottled drinking water. The groups also indicated that smell and rust color occurred in both wet and dry seasons and largely depended upon the source used to obtain water.

101. In terms of difficulties with existing arrangements for water supply, most women raised the issue of using electricity in proximity to water and feared electric shock when using pumps. Another issue concerned the unavailability of vendors to supply water after hours or on an urgent basis.

**Table 28: WFG WS: Difficulties using Existing Water Supply**

| **Difficulty in using domestic water in household** | | | | |
|---|---|---|---|---|
| **Difficult reason for using water in household** | **Kampong Cham** | | **Battambang** | |
| | **No.** | **%** | **No.** | **%** |
| Use power of electricity by button turn on and turn off and difficult by women every day working | 7 | 31.82 | 18 | 25.35 |
| Fear or worry shook when we use electricity of power | 7 | 31.82 | 22 | 30.99 |
| Difficult to buy water from vendor when we urgent need | 8 | 36.36 | 9 | 12.68 |
| Sometime dirty water or no clean | 0 | 0.00 | 4 | 5.63 |
| Bad smell water | 0 | 0.00 | 7 | 9.86 |
| Far away or long distant from house | 0 | 0.00 | 1 | 1.41 |
| Some season are lack water – not enough to use | 0 | 0.00 | 5 | 7.04 |
| Not much problem | | | 5 | 7.04 |
| **Total** | **22** | **100.00** | **71** | **100.00** |

Source: PWSSP SES, 2016

102. When asked about what they did not like about their existing sources of water, group responses indicated shortages, inconvenience, expense to buy in water when needed, and the negative effect on sanitation without good water supply.

**Table 29: WFG WS: Reasons for Disliking Existing System**

| **Difficult reason** | **Kampong Cham** | | **Bat Dambang** | |
|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** |
| shortage water using | 6 | 25.00 | 19 | 27.94 |
| poor sanitation | 6 | 25.00 | 13 | 19.12 |
| difficult to take water | 6 | 25.00 | 9 | 13.24 |
| spend much money | 6 | 25.00 | 21 | 30.88 |
| never | 0 | 0.00 | 0 | 0.00 |
| effected health | 0 | 0.00 | 2 | 2.94 |
| used labour power for take water | 0 | 0.00 | 4 | 5.88 |
| Total | 24 | 100.00 | 68 | 100.00 |

Source: PWSSP SES, 2016

103. Women are generally not happy with existing bathroom and toilet arrangements, but have become accustomed to the conditions even though they lack privacy, are not convenient, and are not clean.

**Table 30: WFG WS: Attitude to Current Bathing Facility**

| Attitude with current bathroom | Kampong Cham | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Satisfied because is our habit and dont care about problem | 10 | 23.81 | 24 | 21.05 |
| Difficult and embarrassing because no bathroom or wall for privacy | 10 | 23.81 | 25 | 21.93 |
| Place so dirty and ground soggy | 11 | 26.19 | 24 | 21.05 |
| Difficult but are used this place all the time for bath | 11 | 26.19 | 41 | 35.96 |
| Total | 42 | 100.00 | 114 | 100.00 |

Source: PWSSP SES, 2016

104. Privacy and personal safety were issues facing women who had to resort to using open space for bathing instead of a closed bathroom:

**Table 31: WFG WS: Problem with Current Bathing Facility**

| Feeling or problem with river / Stream / lake bath | Kampong Cham | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Difficult at night time or when raining | 6 | 13.64 | 21 | 18.92 |
| Worry about safety | 6 | 13.64 | 17 | 15.32 |
| No problem because it our habit | 6 | 13.64 | 20 | 18.02 |
| Always shy especially with women or girls | 5 | 11.36 | 20 | 18.02 |
| Dirty or not clean water for bath | 6 | 13.64 | 22 | 19.82 |
| Never know or do not know | 15 | 34.09 | 11 | 9.91 |
| Total | 44 | 100.00 | 111 | 100.00 |

Source: PWSSP SES, 2016

105. Similar issues were reported for women who had to use open space for defecation and urination due to not having access to a toilet. Privacy and safety are the main concerns. There is also a recognition of negative impacts on women's health, most likely in reference to the situation where women will "hold back' rather than going outside to urinate during the late night. Excessive retention of urine can facilitate the onset of bladder, kidney and urinary tract infections.

**Table 32: WFG WS: Problem with Current Toilet Facility**

| Problem | Kampong Cham | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Not safety | 9 | 40.91 | 17 | 22.37 |
| More shy and embarrassment | 9 | 40.91 | 35 | 46.05 |
| Problem with women healthy | 4 | 18.18 | 14 | 18.42 |
| Not secret as be room or wall when bath | 0 | 0.00 | 10 | 13.16 |
| Total | 22 | 100.00 | 76 | 100.00 |

Source: PWSSP SES, 2016

106. Women thought that the toilet and bathroom are best located within the house structure or if that was not possible, the bathroom/toilet should be located close to the well as this would facilitate cleaning. In general women preferred that bathroom and toilet are within the same room (not separate rooms) as this would be cheaper and require less space or land.

**Table 33: WFG WS: Locate Bathroom and Toilet Together or Apart**

| Bathroom and toilet place want to build | Kampong Cham | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |

| | | | | |
|---|---|---|---|---|
| Necessary to divide or separate with toilet and bathroom because it easy used | 10 | 24.39 | 26 | 24.53 |
| Build together, because less spending money | 9 | 21.95 | 25 | 23.58 |
| No more land for build , so should be separate toilet and bathroom and must build together | 3 | 7.32 | 3 | 2.83 |
| Build together so good for used in household | 12 | 29.27 | 29 | 27.36 |
| We can bath and defecation only one place ( together not separated) | 7 | 17.07 | 23 | 21.70 |
| Total | 41 | 100.00 | 106 | 100.00 |

Source: PWSSP SES, 2016

107. As shown below, most women thought that sanitation, health and hygiene training and awareness training should be done together because of the obvious linkages.

**Table 34: WFG WS: Water and Sanitation Awareness in Tandem**

| WATSAN Awareness – together or separate - Agree | Kampong Cham | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Absolutely - Support 100% | 17 | 51.52 | 48 | 58.54 |
| Do not know | 11 | 33.33 | 29 | 35.37 |
| Maybe better | 5 | 15.15 | 5 | 6.10 |
| Total | 33 | 100.00 | 82 | 100.00 |

Source: PWSSP SES, 2016

108. During focal group discussions, women indicated a better understanding of the need to wash hands after toilet use. The discussions did not however mention using soap.

**Table 35: WFG WS: When to Wash Hands**

| Time for wash hands | Kampong Cham | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Before eating | 13 | 54.17 | 19 | 23.46 |
| Before preparing food or cooking | 0 | 0.00 | 6 | 7.41 |
| After toilet or defecation | 3 | 12.50 | 30 | 37.04 |
| Feeding children | 3 | 12.50 | 14 | 17.28 |
| When hand look like dirty | 5 | 20.83 | 12 | 14.81 |
| Total | 24 | 100.00 | 81 | 100.00 |

Source: PWSSP SES, 2016

109. Women considered the best solution to water supply issues was connection to piped mains supply seeing it as safe and clean and reliable. All women agreed that paying for HH connection was money well spent. The majority of women suggested that they would start saving to ensure that the HH could pay for the water connection. In regards to subsidies the women felt that these should be available to the poorer HHs, and the availability of subsidies would allow all HHs in the community to connect at the same time. HHs that could afford to pay should use their own resources.

110. The focal groups were also asked about separation of different kinds of HH waste liquid and solid waste and whether or not there was any effort put into separating for recycling or to facilitate collection by service providers. In general there was no separation of different kinds of solid waste.

**Table 36: WFG WS: Separation of Waste**

| Both solid and liquid waste | Kampong | Bat Dambang |
|---|---|---|

| | Cham | | | |
|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** |
| Do not divide or separated waste types | 10 | 34.48 | 26 | 35.62 |
| Yes by solid and liquid waste | 9 | 31.03 | 24 | 32.88 |
| Sometime prepare or separated and sometime not care | 10 | 34.48 | 23 | 31.51 |
| Total | 29 | 100.00 | 73 | 100.00 |

Source: PWSSP SES, 2016

111. Disposal of solid and liquid domestic waste is haphazard to say the least. Women indicated that very little thought was given to environmental or health considerations given to disposal, and people did whatever was easiest. This is one explanation for the excessive amount of trash and litter that can be seen lining all roads in Cambodia and accumulating on the verges of peoples' houses. Women reported that improper disposal created environmental and health and hygiene problems, provided breeding places for mosquitoes and created bad smells.

**Table 37: WFG WS: Solid and Liquid Waste Disposal**

| **Waste water and solid waste disposal** | **Kampong Cham** | | **Bat Dambang** | |
|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** |
| Keep in plastic bag or packing and drain to the waste place | 9 | 30.00 | 24 | 32.00 |
| Throw or drain to free land as we can waste | 11 | 36.67 | 26 | 34.67 |
| Not care anything which place we can throw or drain all the place are free | 10 | 33.33 | 25 | 33.33 |
| Total | 30 | 100.00 | 75 | 100.00 |

Source: PWSSP SES, 2016

112. The women participants also raised concern over the disruption and "mess" created in fro of their homes from the construction works making access difficult, noisy when machines are operating, and also creating very dusty conditions. The extra dust meant more time for cleaning dust from the house and also having to dry clothes in a different area. Young children and the elderly were felt to be more susceptible to respiratory complications from the increased dust.

## X. WASTE WATER SUBPROJECT

113. The total 2016 village populations of the proposed extended service area are shown below:

**Table 38: SHV and BTB Waste Water Extended Service Areas**

| District | Commune | Village_Eng | POP | M | F | HH |
|---|---|---|---|---|---|---|
| SHV Prov Mittakpheap | Sangkat Pir | Phum Muoy | 3,826 | 1,894 | 1,932 | 882 |
| | | Phum Pir | 2,511 | 1,230 | 1,281 | 506 |
| | | Phum Bei | 4,086 | 1,923 | 2,163 | 971 |
| | Sangkat Bei | Phum Muoy | 3,113 | 1,498 | 1,615 | 657 |
| | | Phum Pir | 7,033 | 3,451 | 3,582 | 1,467 |
| | | Phum Bei | 10,832 | 5,264 | 5,568 | 2,253 |
| | Sangkat Buon | Phum Muoy | 6,997 | 3,404 | 3,593 | 1,457 |
| | | Phum Pir | 3,239 | 1,635 | 1,604 | 688 |
| | | Phum Bei | 3,976 | 1,902 | 2,074 | 910 |
| | | Phum Buon | 2,796 | 1,327 | 1,469 | 652 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Total 10 villages** | | | **48,409** | **23,528** | **24,881** | **10,443** |
| BTB Prov<br>Bat Dambang | Chamkar Samraong | Chamkar Samraong Muoy | 4,916 | 2,460 | 2,456 | 877 |
| | | Chamkar Samraong Pir | 4,439 | 2,153 | 2,286 | 881 |
| | | Voat Lieb | 4,164 | 2,062 | 2,102 | 746 |
| | | Voat Rumduol | 2,703 | 1,381 | 1,322 | 471 |
| | | Phka Sla | 2,032 | 1,009 | 1,023 | 332 |
| | Svay Pao | Preaek Moha Tep | 6,894 | 3,591 | 3,303 | 1,082 |
| | | Kampong Krabei | 3,590 | 1,798 | 1,792 | 520 |
| | | Mphey Osakphea | 3,981 | 1,999 | 1,982 | 565 |
| | | Kammeakkar | 6,873 | 3,468 | 3,405 | 968 |
| **Total 17 villages** | | | **39,592** | **19,921** | **19,671** | **6,442** |

Source: PWSSP SES, 2016

### 1. Waste Water Survey Areas

114. The following tables indicate the number of HHs and focal groups surveyed for the waste water subproject:

**Table 39: Waste Water Survey Villages**

**Sihanouk Province Sanitation Subproject**

| District | Commune | Village | Total HH | Sample HHs | Focal Group | % of Tot HHs | Sample HHs |
|---|---|---|---|---|---|---|---|
| Mittakpheap | Sangkat Pir | Phum Muoy | 882 | 46 | FG | 0.08 | 29 |
| | Sangkat Bei | Phum Muoy | 657 | 35 | | 0.06 | 21 |
| | | Phum Pir | 1467 | 73 | FG | 0.13 | 48 |
| | Sangkat Buon | Phum Pir | 688 | 35 | | 0.06 | 22 |
| **SHV TOTAL** | | | **3694** | **189** | **2** | **0.32** | **120** |

**Battambang Sanitation Subproject**

| **District** | **Commune** | **Village** | **Total HH** | **Sample HHs** | **Focal Group** | **% of Tot HHs** | **Sample HHs** |
|---|---|---|---|---|---|---|---|
| Bat Dambang | Chamkar Samraong | Chamkar Samraong Pir | 881 | 44 | FG | 0.08 | 29 |
| | | Voat Lieb | 746 | 37 | | 0.06 | 24 |
| | Svay Pao | Mphey Osakphea | 565 | 28 | FG | 0.05 | 18 |
| | | Kammeakkar | 968 | 48 | | 0.08 | 31 |
| **BTB TOTAL** | | | **3160** | **158** | **2** | **0.28** | **102** |

Source: PWSSP SES, 2016

### 2. House Ownership

115. In BTB some 85.3% of people interviewed owned the property that they lived in. In SHV this was 78.3%. The majority that did not own the house were renting. Ownership is a key factor influencing improvements or investments made in the house structure. Renters usually do not want to spend money improving the house and in any case, generally, owners will not let renters do anything structural to buildings.

### 3. Age Distribution

116. The tables below indicate the HH age distribution by sex. No explanation has been provided for the significantly higher number of males than females in SHV. Although checked with the commune authorities supplying the data, the reasons could lie in either

sampling or transcription error. In any case, the female age groups for SHV seem to reverse the national trend.

**Table 40: Waste Water Survey Village Age Distribution**

**Male Age Groups**

| Province | Age Groups | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-5 yrs | | 6-16 yrs | | 17-45 yrs | | 46-65 yrs | | Over 65 yrs | | Total | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| BTB | 945 | 9.34 | 2357 | 23.30 | 4151 | 41.03 | 1722 | 17.02 | 942 | 9.31 | 10117 | 100 |
| SHV | 823 | 8.25 | 1742 | 17.47 | 5460 | 54.74 | 1133 | 11.36 | 816 | 8.18 | 9974 | 100 |
| Total | 1768 | 7.96 | 4099 | 18.46 | 9611 | 43.28 | 2855 | 12.86 | 1758 | 7.92 | 20091 | |

**Female Age Groups**

| Provinces | Age Groups | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 0-5 yrs | | 6-16 yrs | | 17-45 yrs | | 46-65 yrs | | Over 65 yrs | | Total | |
| | N | % | N | % | N | % | N | % | N | % | N | % |
| BTB | 914 | 8 | 2,248 | 19 | 6,204 | 52 | 1,745 | 15 | 871 | 7 | 11,982 | 100 |
| SHV | 723 | 8.84 | 1854 | 22.67 | 3855 | 47.13 | 973 | 11.89 | 775 | 9.47 | 8180 | 100 |
| Total | 1637 | 9.07 | 4102 | 22.73 | 10059 | 55.74 | 2718 | 15.06 | 1646 | 9.12 | 20162 | |

Source: PWSSP SES, 2016

117. HHs led by women on average are most likely to have 4 family members, whereas those led by men are more likely to have 5. There were no significant differences in relation to ages of family members between male and female headed HHs.

### 4. Literacy and Education

118. In SHV, only 6.7% of male heads of HHs reported no schooling with 25% completing primary school, 31% completing lower secondary and 27% completing upper secondary school. If the head of HH is a female, the level of education is reduced, with some 10% reporting no schooling, 50% completing primary school and 40% completing lower secondary school. In regards to the HHH spouse, 6.67% reported no schooling, just over 32% completed primary school, with around 30% completing lower secondary and about 20% completing upper secondary school.

119. In BTB some 5% of male HHs reported no schooling, about 23.5% completed primary school, 34% completed lower secondary, and almost 24% completed upper secondary school. In regards to women who are heads of HH, around 30% reported no schooling, 30% completed primary school and 30% completed lower secondary.

120. Education levels of spouse indicated no schooling for 6.7% in SHV and just over 8% in BTB, 32% completed primary school in SHV compared to 41% in BTB, 30% completed

lower secondary in SHV and compared to almost 31% in BTB, and 20% completed upper secondary in SHV compared to just over 25% in BTB.

121. Adult literacy within the sanitation survey villages revealed a similarly high level, reported as being 96.97% in BTB and almost 96.95% in SHV. Enrolment in primary school was reported as being 94.87% of primary school aged children in BTB and 97.74% in SHV. The gender ratio was 46.8% males and 53.2% females in BTB, and 48.05% males and 51.95% females in SHV.

122. Enrolment in high school was reduced as with the water supply villages. In BTB some 79.22% of high school aged children were enrolled and in SHV some 69.8% were enrolled. The gender ratio in BTB was 62.07% male to 37.93% females, and in SHV the ratio was 49.66% male and 50.34% female. Overall findings broadly support the contention that girls are more likely to stop schooling after learning to read and write at primary school, and then staying at home to help the family before getting married.

**Table 41: School Attendance**

**% Primary School aged children Attend School**

| **Provinces** | % | **% M** | **% F** |
|---|---|---|---|
| BTB | 94.87 | 46.8 | 53.2 |
| SHV | 97.74 | 48.05 | 51.95 |

**% High School aged children Attend School**

| **Provinces** | **%** | **% M** | **% F** |
|---|---|---|---|
| BTB | 79.22 | 62.07 | 37.93 |
| SHV | 69.84 | 49.66 | 50.34 |

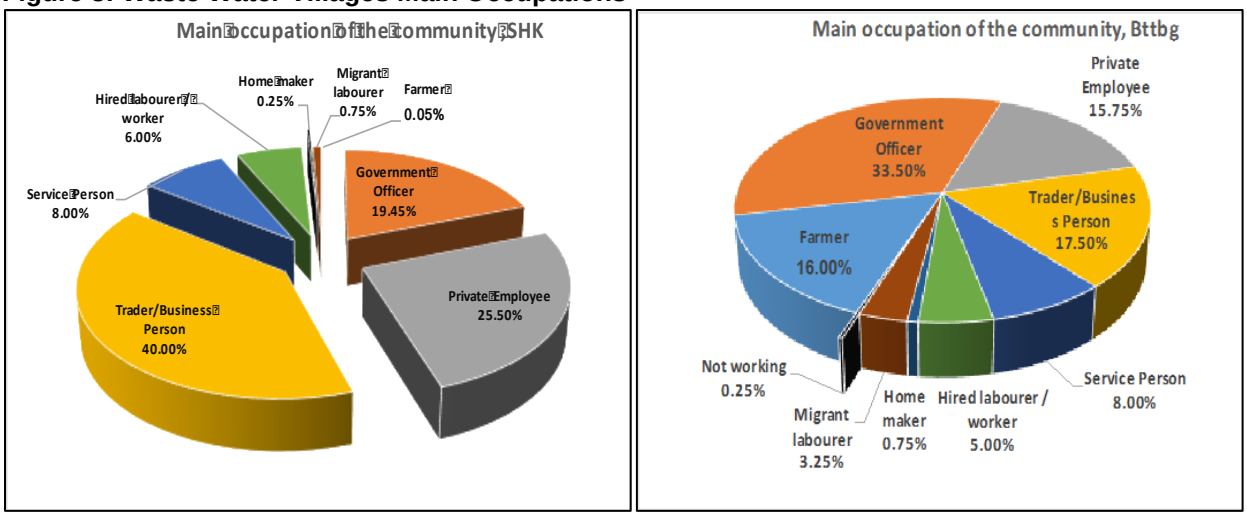
Source: PWSSP SES, 2016

123. School attendance rates support the national trend of slightly higher numbers of females than males (in contract to the age group data), and also support the contention that girls are more likely to finish primary school than high school.

### 5. Occupation of Head of Household

124. Main occupations of HH heads in BTB were government officer, trade and business followed by farmer. SHV on the other hand showed a greater reliance on trade and business, private employee and government worker with very few farmers, most likely reflecting SHV's reputation as a key tourism area.

**Figure 8: Waste Water Villages Main Occupations**




Source: PWSSP SES, 2016

## 6. Household Incomes

125. Some 85% of HHs in BTB realize a total income of up to $15,000 per annum, but within this, some 77% of that group receive less than $5,000 per year. In SHV approximately 93% of HHs earn up to $15,000 per annum and of this group, some 75% earn less than $5,000 per year.

**Table 42: Waste Water Villages HH Incomes**

| Combined Income LeveL | Province | | | |
|---|---|---|---|---|
| | Bat Dambang | | SHV | |
| | N | % | N | % |
| Over USD 35,000 p.a. | 8 | 7.80% | 6 | 5.00% |
| Between 25,000 to 35,000 p.a. | 1 | 1.00% | 1 | 0.80% |
| Between 15,000 to 25,000 p.a. | 6 | 5.90% | 1 | 0.80% |
| Between 5,000 to 15,000 p.a. | 20 | 19.60% | 28 | 23.30% |
| Less than $5000 p.a. | 67 | 65.70% | 84 | 70.00% |
| **Total** | **102** | **100%** | **120** | **100%** |

Source: PWSSP SES, 2016

126. About 71% of HHs headed by women in BTB. and 80% in SHV, earned less than $5,000 p.a. compared to 65% (BTB) and 70% (SHV) of those HHs led by men. On average women are more likely to earn less than men, however in both provinces there were HHs led by women earning over $35,000, and these women were engaged in private business. Some 54% of HHs reported monthly expenditures of about $300 in BTB, compared with 52% reporting about $400/month in SHV. In regards to utilities, in BTB some 60% of HHs reported spending $100 a month on utilities and in SHV, some 68% reported spending $100.

## 7. Current Water Source

127. As probably expected, most HHs are already connected to the main town water supply (approx. 82%) or another piped system, however there remain around 10% obtaining domestic supply from other sources.

**Table 43: Waste Water Villages Main Sources of Domestic Water**

| | Wet Season | | | | Dry Season | | | |
|---|---|---|---|---|---|---|---|---|
| | BTB | | SHV | | BTB | | SHV | |
| **Source of domestic water** | **No.** | **%** | **No.** | **%** | **No.** | **%** | **No.** | **%** |
| Pipe mains water (PMW) | 84 | 82.35 | 97 | 80.83 | 84 | 82.35 | 97 | 80.83 |
| Piped water (Other) | 9 | 8.82 | 4 | 3.33 | 9 | 8.82 | 3 | 2.50 |
| Bore hole (drilled well) | 1 | 0.98 | 8 | 6.67 | 2 | 1.96 | 9 | 7.50 |
| Dug well | 1 | 0.98 | 11 | 9.17 | 1 | 0.98 | 11 | 9.17 |
| River/stream/lake | 1 | 0.98 | | 0.00 | 1 | 0.98 | 0 | 0.00 |
| Rainwater | 4 | 3.92 | | 0.00 | 0 | 0.00 | 0 | 0.00 |
| Trucked water from vendor | 2 | 1.96 | | | 5 | 4.90 | 0 | 0.00 |
| **Total** | **102** | **100.00** | **120** | **100.00** | **102** | **100.00** | **120** | **100.00** |

Source: PWSSP SES, 2016

128. Data obtained at the village level indicated that whilst most people use piped mains water supply for drinking, there is significant reliance on water bought in from outside.

**Table 44: Waste Water Villages Main Sources of Drinking Water**

| **Main Source of drinking water** | **Wet Season** | | **Dry Season** | |
|---|---|---|---|---|
| **Main Source of drinking water** | **BTB %** | **SHV %** | **BTB %** | **SHV %** |
| Piped mains water | 61.25 | 15 | 48.75 | 15 |
| Pipe water (Other) | 0 | 0 | 0 | 0 |
| Bore hole (drilled well) | 2.5 | 0 | 0 | 0 |
| Dug well | 0 | 0 | 0 | 0 |
| River/stream/lake | 2.5 | 0 | 2.5 | 0 |
| Rainwater | 16.25 | 1 | 12.5 | 0 |
| Trucked water from vendor | 17.5 | 84 | 36.25 | 85 |
| **Total %** | **100** | **100** | **100** | **100** |

Source: PWSSP SES, 2016

## 8. Current Toilet Facilities

129. Most HHs, if not all, do already use a pour/flush toilet that empties into a septic tank. In BTB, there was no real difference in toilet facility between married couples HHs and HHs headed by a single woman. In SHV only 3 surveyed HHs did not have a toilet, 2 HHs were of married couples and 1 HH with no toilet was headed by a woman. Where the HH had no toilet, members used the bush, river or a plastic bag. In respect of the 3 HHs in SHV with no toilet, reasons offered for not having a toilet were: not enough money (33%), were already sharing a toilet with neighbor (33%), and living in a rented house with no permission to build a toilet (33%). All three of these HHs did however complain that their current toilet arrangement was not satisfactory (unclean).

**Table 45: Type of Toilet**

| | BTB | | SHV | |
|---|---|---|---|---|
| **Type of Toilet** | **No.** | **%** | **No.** | **%** |
| Flush/Pour flush to septic system | 102 | 100 | 117 | 97.5 |
| No facility, use bush, river, plastic bag | 0 | 0 | 3 | 2.5 |
| **Total** | **102** | **100** | **120** | **100** |

Source: PWSSP SES, 2016

130. Of those with toilets, about 10% of people did not use them all the time. Whether or not the toilet had water supply attached did not seem to make any difference. Reasons for not using the toilet all the time were mainly concerned with not wanting to have to clean the toilet all the time, followed by the toilet being hot and smelly. Most HHs had the toilet either inside the house building or attached to the house (BTB 58%, SHV 74%), and presumably this would influence how often the toilet would be used. Widowed HHs were slightly more likely to have the bathroom located outside in the yard than other HHs.

**Table 46: Toilet Location**

| HH Toilet location | BTB | | SHV | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Inside or attached to this house | 59 | 57.84 | 86 | 73.50 |
| In the yard | 43 | 42.16 | 31 | 26.50 |
| Total | 102 | 100.00 | 117 | 100.00 |

Source: PWSSP SES, 2016

## 9. Septic Tanks

131. Most HHs have little awareness of where wastewater or septic tanks waste water overflow ended up. In some cases HHs have dug channels to drain the water to street drains at the front of the house, contributing to bad smells in the area, as many of these drains are open.

**Table 47: Waste Water Overflow**

| | BTB | | SHV | |
|---|---|---|---|---|
| Wastewater from the septic tank go | No. | % | No. | % |
| To soak pit ( Ring has cover ) | 0 | 0 | 0 | 0 |
| To Street drain | 4 | 3.92 | 15 | 12.82 |
| To sea drain | 0 | 0.00 | 8 | 6.84 |
| Don't know | 98 | 96.08 | 94 | 80.34 |
| Total | 102 | 100 | 117 | 100 |

Source: PWSSP SES, 2016

132. Septic tanks appear to take somewhere between 3 to 5 years to fill before requiring emptying. When full, about 75% of BTB HHs, and 88% of HHs will call a contractor to empty the tank, whereas 20% (BTB) and 13% (SHV) of HHs respectively, will empty the tank themselves. In very few cases, the HH will have to build a new tank (BTB 5%). A new tank seems to cost around $20 to $30 to install and this is using HH labor. The cost of emptying a tank will depend upon its size and the volume being taken out. At a minimum it will cost $25 to empty but the cost can range up to almost $100. Only around 4% of HHs had a bio gas facility feeding from the septic tank (BTB 3.92%).

**Table 48: Frequency of Emptying Septic Tank**

| How Often is Septic Tank full | BTB | | SHV | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Under 3 years | 10 | 9.80 | 3 | 2.56 |
| Once every 3-5 years | 17 | 16.67 | 0 | 0.00 |
| Once every 5 years or more | 17 | 16.67 | 5 | 4.27 |
| Never/not full yet | 56 | 54.90 | 106 | 90.60 |
| Don't know | 2 | 1.96 | 3 | 2.56 |

| | | | | |
|---|---|---|---|---|
| Total | 102 | 100 | 117 | 100 |

Source: PWSSP SES, 2016

133. In general people reported no real problems with the toilets used apart from bad small (BTB 24%, SHV 12%). Although women were usually responsible, the task of keeping the toilet area clean was one often taken care of by other family members.

**Table 49: Responsibility for Cleaning Toilet Area**

| Responsible for Cleaning Toilet | BTB | | SHV | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Adult male in household | 30 | 29.41 | 35 | 29.91 |
| Adult female in household | 42 | 41.18 | 60 | 51.28 |
| Female child in household | 1 | 0.98 | 0 | 0.00 |
| Everyone in household | 28 | 27.45 | 22 | 18.80 |
| No one | 1 | 0.98 | | 0.00 |
| Total | 102 | 100.00 | 117 | 100.00 |

Source: PWSSP SES, 2016

### 10. Domestic waste Water Disposal

134. Around 53% of BTB HHs and 73% of SHV HHs drain domestic waste water into the septic system and just over 10% appear to have special soak pits for domestic grey waste water. Around 10% let the grey waste flow out to street and roadside drains. As many of these drains are open, the result is a smelly environment.

**Table 50: Draining Waste Water**

| HH Domestic Waste water empties into to | BTB | | SHV | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Septic system | 50 | 49.02 | 78 | 65.00 |
| Toilet | 5 | 4.90 | 10 | 8.33 |
| Soak pit | 17 | 16.67 | 13 | 10.83 |
| Street drain | 12 | 11.76 | 11 | 9.17 |
| Empties out on to roadside | 0 | 0.00 | 3 | 2.50 |
| Throw on garden/yard | 15 | 14.71 | 3 | 2.50 |
| Throw to rice field | 1 | 0.98 | 0 | 0.00 |
| for agriculture | 1 | 0.98 | 0 | 0.00 |
| drain to river | 1 | 0.98 | 0 | 0.00 |
| drain to sea | 0 | 0.00 | 2 | 1.67 |
| Don't know | 0 | 0.00 | 0 | 0 |
| **Total** | **102** | **100** | **120** | **100** |

Source: PWSSP SES, 2016

### 11. Toilet Construction

135. Most HHs thought that they would contact local masons or construction workers if thinking of installing a new toilet and very few thought they would contact government agencies. This situation presents an opportunity to improve toilet construction. Given that people do complain about toilet design (ie: don't use it because it is hot and smelly) the provincial DPWT and in conjunction with health and sanitation authorities, could make standardized toilet designs available to local masons free of charge. The design drawings could include easy to follow technical specifications and instructions on septic tank location design and construction, toilet location design and construction, ventilation and drainage etc.

The information could be packaged into easy to read manuals and distributed free and made available at hardware stores.

**Table 51: Advice for Toilet Construction**

| if upgrading toilet - where to get advice | BTB | | SHV | |
|---|---|---|---|---|
| | No. | % | No. | % |
| No one, already know how to build | 24 | 23.53 | 20 | 16.67 |
| Neighbour or relative with a toilet | 4 | 3.92 | 2 | 1.67 |
| DPWT | 1 | 0.98 | 0 | 0.00 |
| PWW | 11 | 10.78 | 12 | 10.00 |
| Mason, Builder, Plumber | 58 | 56.86 | 83 | 69.17 |
| NGO | 2 | 1.96 | 3 | 2.50 |
| Don't know | 2 | 1.96 | | 0.00 |
| **Total** | **102** | **100.00** | **120** | **100.00** |

Source: PWSSP SES, 2016

136. HHs were asked if they would access a special concessionary loan to upgrade the HH toilet. Approximately 66% of HHs in both provinces indicated that they would not access such a loan. In the 3 SHV HHs with no toilet, 100% agreed that they would access a special loan in order to build a toilet. In the case of HHs headed by husband and wife, decisions as to whether to invest and build or upgrade the HH toilet were made by the husband and wife after discussion.

### 12. Hygiene

137. Respondents were asked when they should wash their hands, and although many indicated washing hands before preparing food, less indicated before eating and only a few indicated after visiting the toilet. As mentioned earlier and in connection with water supply villages, awareness raising and training is recommended that also promotes the use of soap, as washing with just water does little to kill pathogens.

**Table 52: When to Wash Hands**

| Wash hands | BTB | | SHV | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Before preparing food or cooking | 57 | 55.88 | 76 | 63.33 |
| Before eating | 41 | 40.20 | 37 | 30.83 |
| After defecating | 4 | 3.92 | 7 | 5.83 |
| **Total** | **102** | **100** | **120** | **100** |

### 13. Water Borne Illness

138. In regards to type of water borne illnesses, around 80% of BTB HHs reported family members occasionally suffering from diarrhea at some time. In the past 4 weeks, some children had gotten sick with the largest group being children over 5 years of age in BTB.

139.

**Table 53: HH Members and Water Borne Illness**

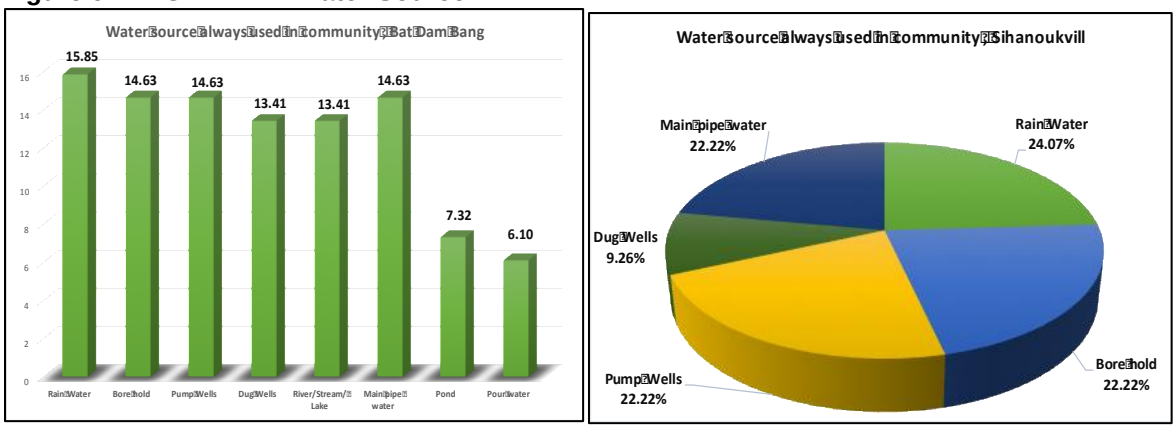
| HH member got sick in past 4 weeks | Bat Dambang | | | Sihanoukvill | | |
|---|---|---|---|---|---|---|
| | Total No | Children Got Sick | % | Total No | Children Got Sick | % |
| Children Under 5 Yrs | 36 | 2 | 5.56 | 50 | 4 | 8.00 |
| Children Over 5 Yrs | 45 | 10 | 22.22 | 58 | 2 | 3.45 |

## 14. WATSAN Information

140. As with the water supply HHs, the majority of HHs preferred getting WATSAN information via the TV (BTB 84%, SHV 85%). Very few preferred HH visits or village meetings and presumably this was due to time. If presented via TV, people are able to watch and hear the information whilst they are relaxing, eating,, looking after children, feeding babies or doing housework. The TV medium would seem more appropriate for urban and peri-urban women as most of not all HHs have a TV.

## B. Women's Focal Groups - Waste Water Villages (WFG WW)

**Figure 9: WFG WW HH Water Source**




A total of 4 women's FDGs were formed with some 57 women participating, comprised of SHV 2 groups with 27 participants, and BTB 2 groups with 30 participants. Wells were seen as supplying more water than other non-piped sources. Water sources used were confirmed as follows:
Source: PWSSP SES, 2016

141. Water supply sufficiency did not appear a major issue in the wet season, however in the dry season, sources such as rainwater, ponds, river/lakes showed shortages. Bore and dug wells seemed to suffer less from shortages. Mains piped water did not show a shortage. Women's groups reported that rainwater and piped mains water were the preferred sources of water for drinking, cooking and bathing, followed then by well water. River/lake/pond water was the least preferred for any purpose due to bad color, taste and sometimes smell, and well water could also suffer from color and smell issues.

142. In regards to ongoing problems with the village water supply, women reported smell and discoloration issues. Presumably the lack of an adequate solid waste disposal system, litter and trash are also affecting water quality from open sources.

**Table 54: WFG WW Water Supply Problems**

| Still problem of | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Water still not clean | 0 | 0 | 0 | 0 |
| Bad smell | 13 | 27.66 | 13 | 27.66 |
| Rust or red color not clean | 14 | 29.79 | 14 | 29.79 |
| More trash and bad smell that difficult for bath and drinking | 6 | 12.77 | 6 | 12.77 |
| Lack sanitation make virus or bacteria | 14 | 29.79 | 14 | 29.79 |
| Total | 47 | 100 | 47 | 100 |

Source: PWSSP SES, 2016

143. Some 22% of women from SHV and 15% of women from BTB HHs indicated that they used mains piped water for all domestic use, and many (71% in both SHV and BTB) are using different sources such as dug and bore wells and also rivers/lakes/ponds. Those not using piped water usually treat it and most commonly by boiling and then filtering.

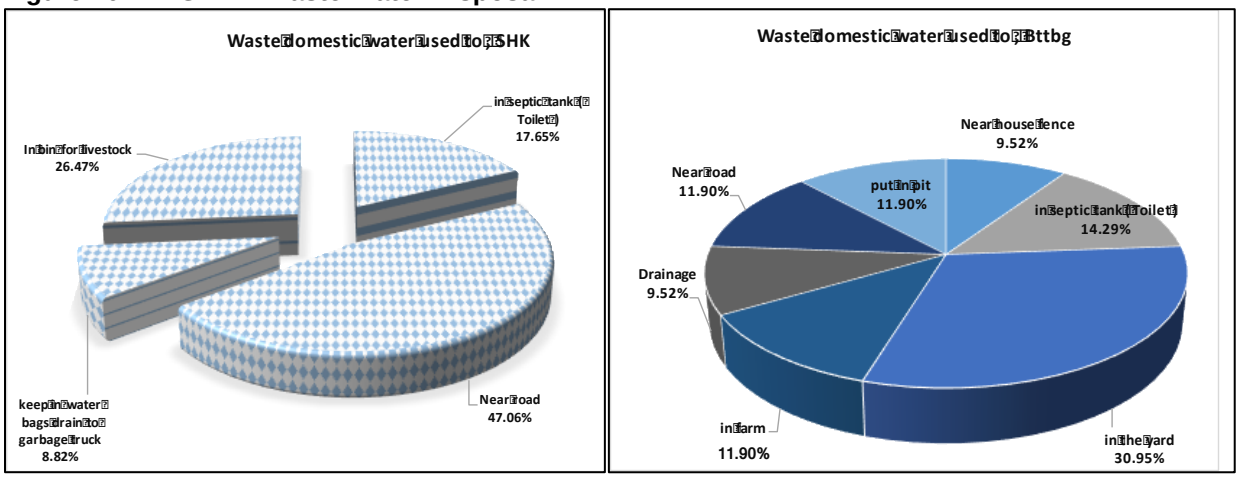
**Table 55: WFG WW Drinking Water Treatment**

| Treat water | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Safer water for filter, boil, strain through cloth | 7 | 14.89 | 15 | 32.61 |
| Store long time in tank, Bassang, or other storage type for water in household | 13 | 27.66 | 11 | 23.91 |
| Boil and Strain it through a cloth | 13 | 27.66 | 13 | 28.26 |
| Lack sanitation make virus or bacteria | 14 | 29.79 | 7 | 15.22 |
| **Total** | 47 | 100.00 | 46 | 100.00 |

Source: PWSSP SES, 2016

144. Domestic waste water was reported to usually be disposed of without any specialized system, either emptying into the yard, or being evacuated into roadside drains. In some cases it is diverted into a septic tank such as in SHV 17.6% of HHs and BTB 14.3%.

**Figure 10: WFG WW Waste Water Disposal**




Source: PWSSP SES, 2016

**Responsibility for HH Domestic Waste Water Disposal**

145. Although women are usually responsible, men will assist to manage domestic waste water if needed, presumably when a disposal method becomes unviable. People recognize problems with their existing disposal methods, especially the smell, unhygienic elements, and the flies and mosquitoes:

**Table 56: WFG WW Responsibility for Waste Water Disposal**

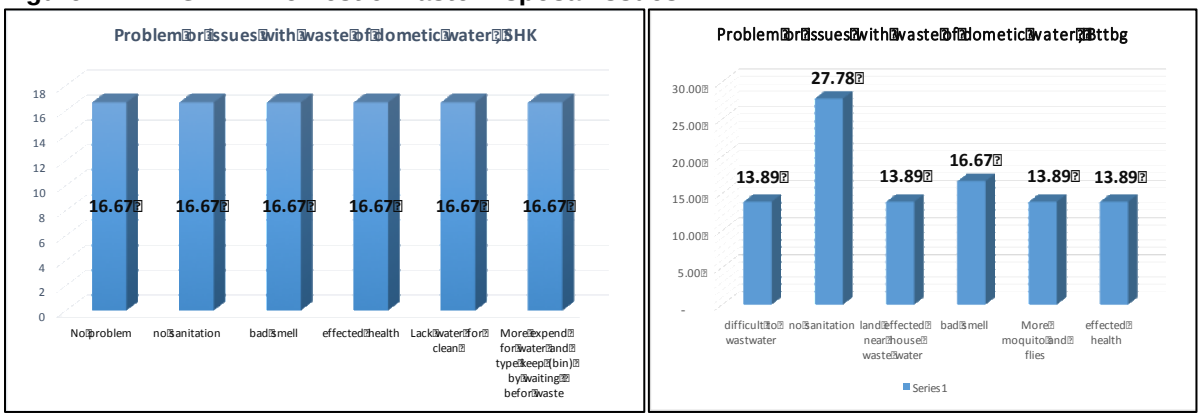
| Responsible for waste domestic water in households | | | | |
|---|---|---|---|---|
| Responsibility | Sihanoukville | | Battambang | |
| | No. | % | No. | % |
| Household head as wife | 20 | 86.96 | 17 | 60.71 |

| | | | | |
|---|---|---|---|---|
| Household head as husband | 3 | 13.04 | 11 | 39.29 |
| Total | 23 | 100 | 28 | 100 |

Source: PWSSP SES, 2016

146. The groups also indicated problems and issues associated with local waste water disposal methods, although most women agreed that the best way to manage domestic waste water disposal was to divert it into a septic tank.

**Figure 11: WFG WW Domestic Waste Disposal Issues**




Source: PWSSP SES, 2016

## Septic waste disposal

147. Septic waste is also likely to flow to an area of the HH yard or roadside drain, reflecting a local practice that was previously viable in a rural environment which has now become unacceptable in a peri-urban environment. Current methods used included:

**Table 57: WFG WW Septic Waste Disposal**

| **Place for disposal of septic waste water** | | | | |
|---|---|---|---|---|
| **Place of disposal of septic waste water** | **Sihanoukville** | | **Battambang** | |
| | **No.** | **%** | **No.** | **%** |
| Drain to sewage | 10 | 43.48 | 4 | 17.39 |
| In the farm behind house | 0 | 0.00 | 10 | 43.48 |
| In pit | 0 | 0.00 | 6 | 26.09 |
| In the toilet (Septic tank of toilet waiting full and emptied) | 13 | 56.52 | 3 | 13.04 |
| Total | 23 | 100 | 23 | 100 |

Source: PWSSP SES, 2016

148. Preferred disposal methods, where sewage was not available, included either installing a septic tank or digging a special pit, or using the waste for fertilizer. The women focal groups considered the benefits of have a waste water disposal and sewage system, and all women thought that waste water and sewage disposal were very important issues requiring priority action:

**Table 58: WFG WW Benefits of Waste Disposal System**

| **Benefit of waste water** | **Sihanoukville** | | **Bat Dambang** | |
|---|---|---|---|---|
| | No. | % | **No.** | **%** |
| Good sanitation and hygiene | 3 | 25 | 10 | 47.62 |
| Good for community development | 0 | 0 | 11 | 52.38 |
| No negative health impacts | 6 | 50 | 0 | 0.00 |

| | | | | |
|---|---|---|---|---|
| Reduce expenses to empty or build septic tank | 3 | 25 | 0 | 0.00 |
| Total | 12 | 100 | 21 | 100 |

Source: PWSSP SES, 2016

149. Problems resulting from poor septage management were also discussed by the groups, and the following issues identified:

**Table 59: WFG WW Issues with HH Septic Waste**

| **Problem or issues with septic waste water in household** | | | | |
|---|---|---|---|---|
| **Problem or issues** | **Sihanoukville** | | **Battambang** | |
| | **No.** | **%** | **No.** | **%** |
| No problem | 4 | 33.33 | 0 | 0 |
| No fresh air or bad environment | 0 | 0.00 | 10 | 26.32 |
| Sanitation problem | 2 | 16.67 | 11 | 28.95 |
| Bad smell | 4 | 33.33 | 11 | 28.95 |
| Affected health | 2 | 16.67 | 0 | 0.00 |
| Many mosquito and flies | 0 | 0.00 | 6 | 15.79 |
| Total | 12 | 100.00 | 38 | 100 |

Source: PWSSP SES, 2016

150. In order to solve waste water disposal issues, the majority agree on the need for a sewage system, although some still would prefer to use the waste for agricultural purposes:

**Table 60: WFG WW Solution for Septic Waste Issues**

| **Proposals to solve the problem or issues of septic waste water in household** | | | | |
|---|---|---|---|---|
| **Propose to solve problem or issues** | **Sihanoukville** | | **Battambang** | |
| | **No.** | **%** | **No.** | **%** |
| Put in sewage | 6 | 50 | 13 | 50 |
| Put in septic tank ( toilet ) | 0 | 0 | 0 | 0 |
| Put in soak pit | 0 | 0 | 0 | 0 |
| Put in farm for agriculture activities | 0 | 0 | 13 | 50 |
| Call to truck of septic pump out or empties | 6 | 50 | 0 | 0 |
| Total | 12 | 100 | 26 | 100 |

Source: PWSSP SES, 2016

151. Women in SHV reported that all HH members apart from children had a responsibility to solve waste water issues whereas in BTB, women tended to think that men were responsible for resolving issues that arose from waste disposal practices.

**Table 61: WFG WW Responsibility for Waste Water Disposal**

| **Whom responsible** | **Sihanoukville** | | **Bat Dambang** | |
|---|---|---|---|---|
| | **No.** | **%** | **No.** | **%** |
| Household head as wife | 6 | 28.571429 | 4 | 20 |
| Household head as husband | 6 | 28.571429 | 13 | 65 |
| Household member | 9 | 42.857143 | 3 | 15 |
| Total | 21 | 100 | 20 | 100 |

Source: PWSSP SES, 2016

152. Septage management involves some expenses such as emptying or rebuilding septic tanks when full. Most HHs will empty old tanks as rebuilding is not always an option depending upon land and the housing structure concerned.

**Table 62: WFG WW Septic Tank Full**

| Septic tank full | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| not yet see full | 6 | 31.58 | 11 | 42.31 |
| 3 to 5 years full | 0 | 0.00 | 9 | 34.62 |
| Don't Know | 13 | 68.42 | 6 | 23.08 |
| **Total** | 19 | 100 | 26 | 100 |

Source: PWSSP SES, 2016

153. Many HHs have not had to empty septic tanks at all, suggesting they are in areas with sufficient drainage and not subject to groundwater infiltration. The majority of HHs will call a contractor to empty the septic tank, very few try to do this themselves (BTB 28%). Most women indicated that they did not have any problems with the septic tanks they had (SHV 85%, BTB 80%).

**Table 63: WFG WW Money Spent on Septic Tank**

| Spending of emptied | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Never spending money | 6 | 22.22 | 10 | 43.48 |
| Sometime spend | 9 | 33.33 | 4 | 17.39 |
| According to Ring wells of septic underground ( 1 Ring well 10000 to 15000 ) | 12 | 44.44 | 9 | 39.13 |
| Spend money when pump out with gasoline or electricity power (Machine) | 0 | 0 | 0 | 0.00 |
| Total | 27 | 100 | 23 | 100 |

Source: PWSSP SES, 2016

154. Regarding separation of recyclable waste or separation for easier collection and processing, women indicated that different types of waste were not separated apart from liquid and solid waste only.

**Table 64: WFG WW: Separation of Waste**

| Both solid and liquid waste | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| No divide or separated waste types | 14 | 34.15 | 14 | 33.33 |
| Yes by solid and liquid waste | 13 | 31.71 | 14 | 33.33 |
| Sometime prepare or separated and sometime not care | 14 | 34.15 | 14 | 33.33 |
| Total | 41 | 100 | 42 | 100 |

Source: PWSSP SES, 2016

155. Little consideration is given to proper solid waste disposal, and no thought given to environmental safety and hygiene, and presumably, as with water supply villages, this apathy is partly responsible for the trash and litter found along all roadsides, verges and in from of people's HHs, although some 33% of women thought there was sufficient space in the community to organize better disposal. Women also agreed that ad hoc disposal was responsible for bad smells, breeding flies and mosquitoes and creating a dirty environment in general. This is despite the fact that women in BTB thought disposing of waste in rivers/lakes and ponds would make the water dirty and also increase viral and bacterial pathogens in the water.

**Table 65: WFG WW: Waste Disposal Area**

| Public waste | Sihanoukvill | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Keep in plastic bag or packing and drain to the waste place | 13 | 31.71 | 12 | 30 |
| Throw or drain to free land as we can | 14 | 34.15 | 14 | 35 |
| Not care anything which place we can throw or drain to any place that is free | 14 | 34.15 | 14 | 35 |
| Total | 41 | 100 | 40 | 100 |

Source: PWSSP SES, 2016

156. Most HHs had a pour flush toilet, however this was not always used, presumably due to a lack of water supply in or near the toilet to facilitate cleaning.

**Table 66: WFG WW: Location of Toilet**

| Location of toilet | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Behind house | 5 | 45.45 | 8 | 40 |
| Inside house | 6 | 54.55 | 12 | 60 |
| **Total** | 11 | 100 | 20 | 100 |

Source: PWSSP SES, 2016

157. All women agreed that improved sewage and septage management were very important issues. Where people did not have toilets or any sanitation system, most either dig holes or use the bush, and in SHV, along the beach becomes an option:

**Table 67: WFG WW: Place of Defecation if no HH Toilet**

| If the people in village have no toilet where do they defecate? | | | | |
|---|---|---|---|---|
| Defecation place | Sihanoukville | | Battambang | |
| | No. | % | No. | % |
| Dug land | 7 | 43.75 | 9 | 45 |
| Into pit | 0 | 0 | 0 | 0 |
| In the farm | 0 | 0 | 0 | 0 |
| Near water or the sea | 3 | 18.75 | 2 | 10 |
| In the forest | 6 | 37.5 | 9 | 45 |
| **Total** | 16 | 100 | 20 | 100 |

Source: PWSSP SES, 2016

158. Women would prefer to use a toilet that was located in or very near to the house as there are privacy and safety issues involved when women do not have access to toilets within the HH. If not located within the house, the bathroom and toilet should be close to the well or water source to facilitate cleaning.

**Table 68: WFG WW: Women's Issues if HH has no Toilet**

| What is the problem with Female when they are no toilet and use other facilities such forest or river/stream/lake | | | | |
|---|---|---|---|---|
| Problem | Sihanoukville | | Battambang | |
| | No. | % | No. | % |
| Not safe | 13 | 32.5 | 13 | 27.66 |
| More shy and embarrassment | 14 | 35 | 14 | 29.79 |
| Problem with women health and issues | 7 | 17.5 | 14 | 29.79 |
| Not private as a walled off room or toilet | 6 | 15 | 6 | 12.77 |

| | | | | |
|---|---|---|---|---|
| Total | 40 | 100 | 47 | 100 |

Source: PWSSP SES, 2016

159. About 75% of women agree that they feel shy, embarrassed and inconvenienced with existing arrangements where the HH does not have a bathroom and have to bathe in the open.

**Table 69: WFG WW: Attitude to Existing Bathing Facility**

| Feeling with current lack of bathing facility | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Satisfied because is our habit and not care about | 14 | 27.45 | 14 | 26.42 |
| Difficult and embarrassment because it no bathroom | 12 | 23.53 | 12 | 22.64 |
| Place are so dirty and ground soggy | 7 | 13.73 | 7 | 13.21 |
| Difficult so much but don't know or how can to do because we are used this place all the time for bath | 12 | 23.53 | 13 | 24.53 |
| More shy for women when take a bath | 6 | 11.76 | 7 | 13.21 |
| Total | 51 | 100 | 53 | 100 |

Source: PWSSP SES, 2016

160. Women participants in general preferred that the toilet was situated in the bathroom and if only for pragmatic reasons such as cost and space.

**Table 70: WFG WW: Locate Toilet and Bathroom Together**

| Bathroom and toilet place to build | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Necessary to divide with toilet and bathroom because it easy used | 13 | 27.66 | 13 | 28.89 |
| Together, because less spending money | 13 | 27.66 | 12 | 26.67 |
| No more land for build by separate toilet and bathroom so just build together | 8 | 17.02 | 5 | 11.11 |
| Together so good for used in household | 7 | 14.89 | 15 | 33.33 |
| We can bath and defecation only one place (together not separated) | 6 | 12.77 | 0 | 0 |
| Total | 47 | 100 | 45 | 100 |

Source: PWSSP SES, 2016

161. Although most HHs with a toilet do not share, some HHs share a toilet with their neighbour, so the toilet is then used between 2 or sometimes 3 families.

**Table 71: WFG WW: HH Shares a Toilet or Not**

| Family share toilet | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| One family | 21 | 87.5 | 12 | 50 |
| Two family | 3 | 12.5 | 9 | 37.5 |
| Three family | 0 | 0 | 3 | 12.5 |
| **Total** | 24 | 100 | 24 | 100 |

Source: PWSSP SES, 2016

162. Women identified the critical times for washing hands, but as with the water supply villages, the groups did not mention the use of soap.

**Table 72: WFG WW: When to Wash Hands**

| Important to wash hand | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| before and after eating | 6 | 30 | 11 | 39.29 |
| after defecation | 6 | 30 | 11 | 39.29 |
| Before and after feeding the children | 5 | 25 | 6 | 21.43 |
| Before and after prepared food | 3 | 15 | 0 | 0 |
| **Total** | 20 | 100 | 28 | 100 |

Source: PWSSP SES, 2016

163. About 66% of the women in SHV and 80% in BTB thought that water and sanitation health and hygiene awareness raising should go hand in hand.

164. Women considered water tariffs equally important as electricity bills when it came to priority for payment and also considered watsan facilities to be worth the investment as it improves the living environment and also contributed to better health. Other advantages from having a waste water sewage system included cost savings from not having to empty the septic tank or rebuild tanks, reduced expenditure on medicines, increased environmental comfort, less flies and mosquitoes.

**Table 73: WFG WW: Advantages of Waste Water System**

| Advantage of the project | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| We no need pump truck to empties septic tank in household | 6 | 20.00 | 10 | 30.30 |
| Reduce spend money with waste water | 7 | 23.33 | 8 | 24.24 |
| good healthy | 7 | 23.33 | 11 | 33.33 |
| Comfortable | 7 | 23.33 | 4 | 12.12 |
| No mosquito and flies or any virus in household or community | 0 | 0.00 | 0 | 0.00 |
| Reduce busy or working with waste water | 3 | 10.00 | 0 | 0.00 |
| **Total** | 30 | 100 | 33 | 100 |

Source: PWSSP SES, 2016

165. Some disadvantages were discussed by the women groups such as those shown below, however, overall, women considered the benefits to vastly outweigh any costs.

**Table 74: WFG WW: Disadvantages of WW System**

| Disadvantages of the project | Sihanoukville | | Bat Dambang | |
|---|---|---|---|---|
| | No. | % | No. | % |
| Land effected when restore septic system | 6 | 26.09 | 6 | 50 |
| Spend money for connection | 6 | 26.09 | 6 | 50 |
| Effected my tree and farm | 5 | 21.74 | 0 | 0 |
| Some problem with sanitation in front of home when broken septic system | 6 | 26.09 | 0 | 0 |
| **Total** | 23 | 100 | 12 | 100 |

Source: PWSSP SES, 2016

## XI. SIEM REAP – SEWAGE INTERCEPTOR PIPELINE

166. A separate survey was prepared for SR as this subproject focuses on the replacement of a failed existing pipeline. The community is already enjoying piped mains water and a waste water and sewage disposal system, however the main interceptor pipe is broken in several places and must be replaced.

167. The immediate impact, and disruption from replacing the pipe, will be felt by the villages and HHs located alongside the pipeline, which cuts through the central part of SR city. The pipeline follows a 3.7 km route along Sivatha Street and Wat Chork Street. There are some 8 villages in the immediate impact area.

**Table 75: SR directly Impacted Villages**

| Province | District | Commune | Village | Total HHs | Total M | Total F | Total Popn |
|---|---|---|---|---|---|---|---|
| Siem Reap | Siem Reap | Svay Dankum | Mondol Pir | 80 | 232 | 231 | 463 |
| | | | Stueng Thmei | 451 | 1254 | 1324 | 2578 |
| | | | Vihear Chen | 1234 | 3307 | 2922 | 6229 |
| | | | Thmei | 292 | 552 | 614 | 1166 |
| | | | Kouk Krasang | 225 | 571 | 574 | 1145 |
| | | | Kantrak | 356 | 1077 | 1068 | 2145 |
| | | Sngkat Sambuor | Sambuor | 240 | 543 | 574 | 1117 |
| | | Srangae | Ta Chak | 88 | 251 | 269 | 520 |
| **Total** | | **3** | **8** | **2966** | **7787** | **7576** | **15363** |

Source: PWSSP SES, 2016

168. A street count on both sides of the alignment indicated some 736 houses, business, and other public buildings abutting the pipeline route. A randomized survey was made comprised of some 253 establishments as shown below:

**Table 76: Siem Reap Total Establishments**

| Code | Type | No. | % of Total | No. to be Surveyed |
|---|---|---|---|---|
| 0 | Education | 2 | 0.27% | 1 |
| 1 | Small Resident | 46 | 6.25% | 16 |
| 2 | Large Resident | 106 | 14.40% | 36 |
| 3 | Small Restaurant | 36 | 4.89% | 12 |
| 4 | Large Restaurant | 34 | 4.62% | 12 |
| 5 | Small Grocery Store | 35 | 4.76% | 12 |
| 6 | Large Grocery Store | 21 | 2.85% | 7 |
| 7 | Small Shop | 126 | 17.12% | 43 |
| 8 | Large Shop | 53 | 7.20% | 18 |
| 9 | Gas Station | 8 | 1.09% | 3 |
| 11 | Free Land | 26 | 3.53% | 9 |
| 12 | Guest House | 9 | 1.22% | 3 |
| 13 | Hotel | 35 | 4.76% | 12 |
| 15 | Public Garden | 2 | 0.27% | 1 |
| 17 | Bank | 9 | 1.22% | 3 |
| 18 | Micro-Finace | 2 | 0.27% | 1 |
| 19 | Service | 176 | 23.91% | 61 |
| 21 | Hospital | 5 | 0.68% | 2 |
| 22 | Education | 3 | 0.41% | 1 |
| 23 | Industrial | 2 | 0.27% | 1 |

| | | | | |
|---|---|---|---|---|
| | **Total** | **736** | **100%** | **253** |

Source: PWSSP SES, 2016

169. The SES interviewed a total of 253 people, comprised of 150 men and 103 women (41%).of the respondents interviewed some 59% were owners of the property, some 30% were renting the property and around 11% were mangers of the business establishment.

**Table 77: SR Summary of Surveyed Establishments**

| **Property Details** | | | | | | | |
|---|---|---|---|---|---|---|---|
| **Type** | **Residential** | **Business and residential** | **Business** | **No house or business** | **Public property** | **Business, temporary living** | **Total** |
| Total | 52 | 148 | 19 | 9 | 1 | 24 | 253 |
| % | 20.55 | 58.50 | 7.51 | 3.56 | 0.40 | 9.49 | 100.00 |

Source: PWSSP SES, 2016

170. In both residential and business buildings, male occupants numbered slightly higher than females.

**Table 78: Sex of Residents and Occupants**

| **Type** | **Residence** | | **Sub Total** | **Business** | | **Sub Total** | **Total** | |
|---|---|---|---|---|---|---|---|---|
| | **Male** | **Female** | | **Male** | **Female** | | **Male** | **Female** |
| Total | 585 | 564 | 1149 | 574 | 536 | 1110 | 1159 | 1100 |
| % | 50.91 | 49.09 | 100 | 51.71 | 48.29 | 100 | 51.31 | 48.69 |

Source: PWSSP SES, 2016

171. Included in the numbers of people residing in the surveyed HHs were some 10 disabled persons (70% male, 30% women) and 6 chronically ill persons (33% male, 67% female). Most inhabitants, male or female, are within the 19 years to 60 years age group, also the most economically active age group.

**Table 79: SR Age Distribution**

| **Types** | **Men and Boys** | | | | **Total** | **Women or Girls** | | | | **Total** |
|---|---|---|---|---|---|---|---|---|---|---|
| | **0 to 5** | **6 to 18** | **19 to 60** | **Over 60** | | **0 to 5** | **6 to 18** | **19 to 60** | **Over 60** | |
| TOTAL | 65 | 150 | 334 | 36 | 585 | 77 | 144 | 314 | 29 | 564 |
| % | 11.11 | 25.64 | 57.09 | 6.15 | 100.00 | 13.65 | 25.53 | 55.67 | 5.14 | 100.00 |

Source: PWSSP SES, 2016

172. Being a mixture of private residences as well as public and private businesses, school aged children are amongst the residents, and these people will need safe and easy access to their houses during the construction period:

**Table 80: SR School Aged Children**

| **Types** | **Children** | | **Total** |
|---|---|---|---|
| | **Boys** | **Girls** | |
| TOTAL | 140 | 128 | 268 |
| % | 52.24 | 47.76 | 100 |

Source: PWSSP SES, 2016

173. Businesses are relatively small with 57% having a monthly wages bill of between $100 to $200, and a further 20% had payrolls between $300 to $1,250 per month. Some 48% of

HH heads earned between $300 to $1,250 per month. Many of these businesses are informal and the majority are not registered with the Tax Office. About 62% of business respondents indicated that they could supply documentary evidence to support their claims of monthly profits.

**Table 81: SR Business Registered with Tax Office**

| Types | Yes | No | Don't know | Total |
|---|---|---|---|---|
| TOTAL | 89 | 99 | 3 | 191 |
| % | 46.60 | 51.83 | 1.57 | 100 |

Source: PWSSP SES, 2016

174. There are some larger businesses but in the main they are small scale as indicated when looking at monthly turnover. Only 46% reported monthly turnover over $500, however this can be taken with a good deal of scepticism as most people will understate earnings, especially when discussing the matter with people perceived as being government agents. As these establishments are used for different purposes, the number of toilets is considerably higher than in a purely residential situation, and the following indicates only that number located within the establishments alongside both sides of the road:

**Table 82: SR Number of Toilets**

| Hotel rooms, restaurant tables, health facility beds, school pupils | | | | | |
|---|---|---|---|---|---|
| Types | Hotel/Guesthouse | Restaurant attached | Clinic/Health facility | School/Kinder | Total |
| | Room | Tables | Beds | No. Student | |
| TOTAL | 1047 | 501 | 13 | 200 | 1761 |
| Total number of toilets 1,570 | | | | | |

Source: PWSSP SES, 2016

175. Owners and managers were asked if they knew whether or not their building was connected to the sewage system, and some 51% responded affirmatively, some 37% thought their building was not connected and some 12% did not know. Residents were then asked if they knew the sewage interceptor pipeline was broken or not. Some 24% of respondents knew of the broken pipe, 62% did not think it was broken and 14% did not know. This lack of knowing there was any problem, and being accustomed to a poor system, may explain why people were reluctant when asked if they would be prepared to pay for a sewage connection.

**Table 83: SR Willingness to Pay**

| Types | Yes | No | Don't Know | Total |
|---|---|---|---|---|
| TOTAL | 100 | 107 | 46 | 253 |
| % | 39.53 | 42.29 | 18.18 | 100 |

Source: PWSSP SES, 2016

176. As seen above, only 21% of the establishments surveyed were solely residential, and of some 191 businesses, 97% are open every day (7 days a week). As one would expect, peoples' main concern was one of disruption to their business and livelihood. All businesses require vehicular access:

**Table 84: SR need for Vehicular Access**

| Does Business Own & Use Vehicles, and Type | | | | | | | |
|---|---|---|---|---|---|---|---|
| Types | Use vehicles that access the premises | | Type of Vehicle Used | | | | Total |
| | | | Truck | Mini Vans | Cars | Motorcycle | |
| | Yes | No | No. | No. | No. | No. | |
| TOTAL | 191 | 0 | 20 | 7 | 84 | 501 | 612 |
| **%** | **100** | **0** | **3.27** | **1.14** | **13.73** | **81.86** | **100.00** |

Source: PWSSP SES, 2016

177. As seen below, not all establishments have alternative access other than the main road, and the lack of access can be assumed to affect business operations and revenue.

**Table 85: SR Establishments with Alternative Access**

| Access Other than Main Road | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Types | Access Road | | Total | Vehicle | | Total | Motorcycle | | Total | Pedestrian | | Total |
| | Yes | No | | Yes | No | | Yes | No | | Yes | No | |
| TOTAL | 99 | 154 | 253 | 92 | 161 | 253 | 95 | 158 | 253 | 96 | 157 | 253 |
| % | 39.13 | 60.87 | 100.00 | 36.36 | 63.64 | 100.00 | 37.55 | 62.45 | 100.00 | 37.94 | 62.06 | 100 |

Source: PWSSP SES, 2016

178. Respondents were asked as to what they thought would be the main negative impacts on their business and livelihood if the pipeline was replaced (main impacts only are shown):

**Table 86: SR Impacts from Construction**

| Main Issues if the Sewage Pipeline is Replaced | | |
|---|---|---|
| **Issues** | Total | **%** |
| Loss of money | 13 | 5.14 |
| Affected road access to house or shop | 14 | 5.53 |
| Affected business | 51 | 20.16 |
| Problem with traffic | 30 | 11.86 |
| Difficult to access road | 20 | 8.01 |
| Less time for business | 8 | 3.16 |
| Difficult for running business | 28 | 11.07 |
| Difficult to go back and forth | 32 | 12.65 |
| Affected land in front of house | 20 | 7.91 |
| No problem and no effect on my family and business | 10 | 3.95 |
| Loss of income when no one can access shop | 17 | 6.72 |

Source: PWSSP SES, 2016

179. People were asked to make suggestions as to how negative impacts could be reduced, minimizing disruption to life and businesses. Only the main suggestions made are shown here:

**Table 87: SR Suggestions to Minimize Disruption**

| **Suggestions** | Total | % |
|---|---|---|
| Make quality drainage system | 20 | 7.91 |
| Please cover drainage system | 4 | 1.58 |
| Big drainage system | 12 | 4.74 |
| Please extend work day for construction | 10 | 3.95 |
| Quick construction | 60 | 23.72 |
| Short construction time for our business | 74 | 29.25 |
| Our community better without problem of sanitation | 16 | 6.32 |

| | | |
|---|---|---|
| Do not throw trash to drainage system | 5 | 1.98 |
| Make strong and good drainage system | 25 | 9.88 |
| **TOTAL** | 253 | 100.00 |

Source: PWSSP SES, 2016

180. In order to minimize disruption to access and business, most respondents (82%) would prefer the underground trenchless technology and for the pipe replacement to be done is 200 to 300 meter stretches rather than the whole road or side of road done at one time. In relation to road closure, people preferred (93%) that only half the road was closed at any one time so as to allow continued vehicle travel.

**Table 88: SR Preferred Construction Method**

| **Preference for Method for Construction** | | | | |
|---|---|---|---|---|
| **Types** | **Construction Method** | | | **Total** |
| | **Open cut trench** | **Underground (trenchless)** | **Don't know** | |
| TOTAL | 40 | 208 | 5 | 253 |
| % | 15.81 | 82.21 | 1.98 | 100.00 |

Source: PWSSP SES, 2016

181. All businesses expect significant disruption to construction operations, but only 17% thought that they may need to close for the duration, around 38% might close temporarily, and 39% would continue as usual and suffer a reduction in revenue.

## XII. BENEFICIARY PERCEPTION OF PROJECT IMPACTS AND BENEFITS

182. HH interviews and women's focal group discussions indicated that people were well aware of the impacts and benefits from improved water supply. The benefits were considered to include convenience in access to water, better quality water for drinking, bathing, cooking and cleaning, improved hygiene and health also leading to a reduction in water borne illness such as diarrhea particularly in younger children, reduced need to look after sick family members and reduced expenditure on medicine. Improved access to water supply would also reduce the time needed to collect water, a task usually delegated to women and girls in the HH, and clean the house. Installation of a bathroom inside the HH will also add more convenience, safety and privacy, when bathing, particularly at night or when raining.

183. Similarly the benefits of improved sanitation and toilet facilities were identified as including improved convenience (particularly at night and in the wet season), improved health and hygiene, need to nurse the sick, reduced medical expenditure and a reduction of bad odours in the residential environment. Other less tangible benefits would include not feeling shy or embarrassed when using the toilet and increased privacy and safety.

184. Surveyed HHs understood the need and recognized the importance of improved water supply and sanitation and especially in the city and urban context. Some capacity building is recommended to ensure that all HHs understand the need for improved hygiene to accompany the water and sanitation improvements, such as handwashing with soap, rather than just water, and particularly after toilet use, before food preparation, eating and prior to handling babies.

185. In Siem Reap most people interviewed were not aware of the broken sewer interceptor (60%) and the majority did not wish to pay any additional fee for waste water (42%). Those surveyed preferred that the project used underground trenchless technology during construction and also preferred that the work be done in 200 to 300 meter stretches rather than all at once (71%). Over 90% suggested that road closure should be restricted to half only. These measures are thought to reduce the impact on business and trading. In general people expressed the need for the construction to be done quickly and also that it be done with quality as they had been through an enormous amount of disruption about 4 years' ago when the sewage interceptor was first installed and now feared they would suffer similar disruption.

## XIII. PWSSP CONNECTION POLICY RECOMMENDATION

186. Sewage connections will be provided free in order to ensure that all HHs use the facilities. In regards to mains water supply, the Project recommends that MIH and its provincial agents adapt and apply a policy similar to that of the PPWSA. Provincial agencies can use the P1 and P2 card system for initial identification of poor HHs to be considered for subsidy, and then use a "Subsidy Score Card" that has been adapted for provincial conditions, to determine the amount of subsidy for each applying HH. Where a HH claims to be poor but does not have a P1 or P2 card, the HH must obtain a letter from its Commune Council confirming its poor status, and submit this to the water supply agency for consideration. The agency will then use the score card system to determine what level of subsidy should be applied, if any. Where HHs are poor, but not deemed poor enough to be awarded a subsidy, that HH can apply to pay in instalments. The repayment period would be determined by the agency's interviewing officer.

187. The provincial "Subsidy Score Cards" will need to be developed at project start up. The project implementation and assistance consultants (PIAC) will work closely with the PIU, in both MPWT and MIH, and the consultant duties will include development of the provincial "score card", in conjunction with MIH and the provincial water supply agencies. Only one score card need be developed for use in the project provinces, rather than using different score cards in each. The proposed provincial score cards must be approved by MIH before use.

188. Provincial water supply agencies will need to appoint and train teams to carry out the poor HH subsidy program. The MIH will assist in organizing training and arranging trainers from the PPWSA to assist in course design and delivery, as well as initial monitoring at start-up. Information regarding the subsidies should be made available to the community as part of the project's public disclosure process, and could also be included in any WATSAN awareness raising campaigns.

## XIV. GENDER ACTION PLAN ISSUES

189. The GAP should address both Practical and Strategic gender issues in order to be responsive to women's needs. Although the PWSSP Project focus is more about Practical Needs it will have some opportunity to address or influence Strategic Needs.

### A. Practical Needs

190. Practical needs are those that can be realized in the short term and address the more immediate daily needs of women. Addressing these daily needs has a more immediate effect in the improvement of women's quality of life, reduction of time poverty and burden of work.

**i) HIV/AIDS and communicable disease**

191. The carrying out of the civil works will entail, presumably, mobilization of several different construction and engineering supervision firms to complete the required works. These firms will need to hire a significant number of laborers to undertake different tasks. Much of the hired labor is unskilled and is also transient, moving from province to province seeking work. Research has shown that this type of transient working population can have higher than normal rates of intravenous drug use and incidence of communicable diseases, posing an potential risk to the community when there is an influx of such transient workers.

192. A traditional approach is to provide HIV awareness training to communities in which the transient workforce will be working and residing. This approach may be more suitable to rural areas than urban and peri-urban areas, as there are more entertainment venues and higher prevalence of sex workers in cities and towns. There is therefore a greater likelihood of male laborers using readily accessible sex workers' services in the urban and peri-urban context. Under this Gender Action Plan, civil works contractors will be required to provide HIV/AIDS awareness training to laborers and issue free condoms to all laborers on a weekly basis. This will be an item that bidders will be asked to include in their proposals and must be clearly indicated in the Instructions to Bidders.

**ii) Dust and noise control during construction**

193. Women's focal discussion groups identified the need for dust control during construction and civil works. Unabated dust circulation has a greater negative effect on women for three main reasons: i) more time cleaning to remove dust from the household and clothing, ii) family members requiring nursing due to respiratory problems such as asthma, lung and sinus infections, iii) medical expenses and time taken for consultation. Machinery and equipment may generate noise which will be largely unavoidable. However, the contractor's Code of Conduct can spell out the time during the day when noisy machinery and equipment can be used – for example from 8.00 am until 5.00 pm.

**iii) Convenient safe access and crossings**

194. Women expressed concern over disruption to daily life and for the safety of elderly and young children accessing buildings and crossing excavated ditches in the construction area. Contractors must provide safe ditch and channel crossings and entrance access to buildings and streets between areas where excavated soil is being stockpiled waiting for ditches and channels to be refilled.

**iv) Health and hygiene and sanitation awareness training**

195. Women have indicated the need for health and hygiene training and as it relates to WATSAN. Issues to be covered would include when washing hands is necessary and the need to use soap to kill pathogens. Many people believed that washing with water was sufficient as hands became visibly clean. Training would also include an awareness of issues concerning waste water and especially grey waste water disposal, septage

management, as well as infrastructure management and the need to quickly report suspected pipe leaks and breakages, as well as maintaining taps and faucets in the household and discouraging wasting water resources particularly in the dry season. As indicated the awareness raining may be best conducted using TV as the preferred media as in provides much more convenience for people and especially women.

**v) Opportunities for local employment for women**

196. Women's focal groups strongly supported that the project provide local employment opportunities for women during the PWSSP project's civil works phase. Women agreed that preference should be given to those women from impacted areas who wished to do such work as it will provide a source of income to those who need it and are willing to undertake laboring jobs. Some women in the surveyed communities have previously worked on road construction projects to earn additional income. Where women do work, contractors must provide the same pay for the same work done – regardless of gender. Any women taking up such opportunities must be discouraged fro bring children to the worksite.

**vi) Free water and sewage connections for poor and vulnerable – single women HHHs**

197. The project will follow GoC policy in regards to water and sewage connection at HH level. To ensure all HHs connect to the sewage system, the HH connection will be provided free of charge. Water supply connections will follow a policy adapted from that used by the Phnom Penh Water Authority (PPWA). The PPWA connection charge is $100 and any HH can apply to PPWSA for a subsidy subject to an assessment based on HH socio-economic indicators (see Appendix 4). The subsidy can be 30%, 50%, 70% or 100% depending upon the HH circumstances. If a full subsidy is not provided, the household can pay the charge on an instalment basis over a period of up to 24 months. It is suggested that the IAs use the P1 and P2 classifications as an initial screen to identify poor HHs and then apply an adapted score card, based upon that used by PPWSA but appropriately adapted for the provincial context, to determine subsidies.

198. It is important that the public be made aware of the subsidy policy and understand the procedures to be followed in applying. This information can be included in "flyers" advising the community of the project, and also included in TV spots disseminating WATSAN information. The Project is also recommending that the services of an NGO be used to assist HHs in completing any application forms if needed. Details of how to contact the NGO would be included in the information disseminated.

**vii) Underground trenchless technology and partial road closure**

199. Women's focal groups also identified the need to minimize the lack of access to businesses, schools and service establishments, for both economic reasons and convenience. The use of underground trenchless technology was much preferred in Siem Reap where the local populace have already had experience with the initial installation of the sewage system. Trenchless technology was seen as a way of minimizing economic disruption and access issues, as well as a better way to control dust.

**viii) Consultation and participation**

200. The GAP stresses the need of equality in regards to inclusion in consultation, participation in training and capacity building, decision making and benefitting from project activities.

### B. Strategic Needs

201. Addressing Strategic Needs is a longer term commitment as this requires a more time to effect institutional change.

**i) Women's equity**

202. The key strategic need is to increase the number of women working in the EA and IAs at national and provincial levels, and particularly getting more women employed in planning and management positions. This building of equity will require the hiring of a greater proportion of women each year, itself dependent upon women studying relevant engineering and management disciplines at the tertiary level, and these graduates being attracted to MPWT, MIH and other relevant agencies.

203. This is beyond the parameters of the PWSSP Project, however training and capacity building will be provided and this training itself will include the importance of gender mainstreaming and the pursuit of gender equality and equity.

204. Attainment of women's Strategic Needs will then facilitate the realization of Practical Needs on an ongoing basis. Women will be in key management and decision making positions and able to ensure that women's practical needs are being identified and addressed.

## XV. PWSSP GENDER ACTION PLAN

**1. Introduction.** The Provincial Water Supply and Sanitation Project (PWSSP) is designed to improve the existing water supply and sanitation system services in selected provincial towns. Based upon projections up to 2022 (project completion), beneficiaries of the extended water supply subprojects will be some 209,055 people (averaging 51.6% female) from 42,636 HHs in the BTB and KPC provincial town urban and peri-urban areas. Beneficiaries from the extended sanitation systems will be some 92,967 people (50.5% female) from 18,956 households in BTB and SHV provincial towns. Direct beneficiaries from the replacement sewage interceptor pipe in SR number at least 25,428 people (51.6% female) from approximately 5,474 households in the areas adjacent to the pipeline. Some 36,031 people (approx. 7,919 HHs) will also benefit from improved septage services in KPC.

The GoC considers improved access to water supply and sanitation to be a condition for poverty reduction. The latest National Strategic Development Plan (2014-2018)[22] states that the urban population access to safe water should be at least 85% by 2018, and access to improved sanitation in urban areas at least 80%.

**2. Gender Classification.** The Project is classified as effective gender mainstreaming (EGM). Women's main benefit will be a reduction in time poverty and improvements in family health. Through access to improved quality water for drinking, cooking and washing purposes, HHs will realize reductions in the time and money needed to collect and buy water, a reduced incidence

[22] National Strategic Development Plan (2014-2018). Royal Government of Cambodia, July 2014.

of water borne illness and the time needed for caring for sick family members, and reduced expenditure on medicines. Mains water supply provides convenience and provides women with more time for participation in other private, public and leisure activities. The Project will raise public hygiene and sanitation awareness and also provide opportunities for employment on project civil works. The project has also established realistic targets for the employment of women in sector agencies and project management.

**3. GAP Purpose and Strategy.** The purpose of the GAP is to ensure that women will benefit from the proposed urban water supply service and sanitation improvements through women's equal participation and consultation in project preparation and management, and will provide measures to mitigate any possible negative impacts and reduce risks associated with the subprojects. An initial task at project start up with be providing gender mainstreaming training and awareness raising to EA and IA staff, both at the central level and also at provincial and district levels. Key elements of the GAP are:

- Organizational strengthening to increase equality and equity through the participation of women in the planning, design and implementation of urban water supply and sanitation services to improve responsiveness to the needs of women;
- Greater gender equality in recruitment for the EA, IA, and project staff; gender sensitization and GAP orientation training to EA, IA, and project staff; and to implement sex-disaggregated monitoring and evaluation within the project performance monitoring system (PPMS);
- Realistic staffing allocations are required whereby 30% of PMU and PIU positions are occupied by women (of which 20% are in management or supervisory positions);
- A target of 30% of the overall agency staff trained in management skills are women;
- Employment targets for women (10%) hired by civil works contractors;
- WATSAN awareness raising will include a hygiene and sanitation, soap and handwashing, and a communicable and water borne disease component as well as information regarding water supply maintenance such as spotting and reporting leaks, faulty meters, and promoting dry season water use economy. The awareness raising is best conducted via TV and will equitably target women as well as men;
- Public information dissemination on project activities will also include information on the process for poor HHs to claim subsidies for water supply connection. This information should also be included in any WATSAN messages provided via local TV;
- An NGO will be hired to assist poorer HHs in completing the application process for water supply connection;
- Contractors' code of conduct to include dust and noise control and also the provision of safe access and ditch crossings for especially the elderly and young children;
- Construction contractors will be required to supply workers with free condoms on a weekly basis and provide HIV/Aids prevention training to all people employed on the civil works. These requirements are to be included in the civil works contracts between the EA and the contractor.

**4. Responsibilities and Monitoring.** MIH and MPWT and respective provincial line agencies will have the overall responsibility of implementing the GAP. A gender focal person will be assigned from the EA to the PMU to coordinate GAP implementation and reporting across all project provinces (national focal point). The IA in each province will also assign a focal person to

be responsible for Gap activity at provincial level and for coordination with the national focal point. A National Gender Specialist (NGS) will be hired for 12 months over the project's duration to support the EA and IA to ensure the GAP is fully implemented. The Specialist will work closely with the PDPWT and PDIH and provide regular updates on the implementation and impact of the GAP through quarterly reports. The EA's project management (PMU) will support and assist the project implementation units (PIUs) in implementing and internal monitoring of the GAP.

**GENDER ACTION PLAN**

| Proposed Gender Mainstreaming Activities and Targets | Primary Responsibility |
|---|---|
| **Output 1: Water supply systems improved and coverage increased in selected provincial towns** | |
| • Ensure at least 50% are women participation in community consultations and meetings. | • DPWT, PDIH, NGS |
| • Community consultation meetings are scheduled at times and places convenient to both men and women. | • DPWT, PDIH, NGS |
| • Ensure the inclusion of sex-disaggregated data in training, baseline surveys, progress, monitoring, and evaluation reports. | • PMU, DPWT, PDIH, NGS |
| • Ensure PPMS includes GAP progress indicators for other project activities that address gender issues and concerns. | • PMU, M&E, NGS |
| • Apply subsidies of 30%, 50%, 70% and 100% to poorer HHs based upon P1 and P2 status and after confirmation using the Poor HH Score Card assessment. | • PIU, DPWT, NGS |
| • NGO services hired to assist poorer HHs to complete the water supply connection subsidy application process. | • EA, IA, NGS |
| **Output 2: Septage management and sewage services provided** | |
| • Ensure that all poor households, especially female-headed households are connected free-of-charge. | • IA, PMU, PIU, NGS |
| • Conduct water and sanitation hygiene awareness targeting women using TV media. | • PMU. PIU. NGS |
| • Ensure at least 50% are women participation in community consultations and meetings. | • PMU. PIU. NGS |
| • Community consultation meetings are scheduled at times and places convenient to both men and women. | • PMU. PIU. NGS |
| • Ensure the inclusion of sex-disaggregated data in training, baseline surveys, progress, monitoring, and evaluation reports. | • PMU. PIU. NGS |
| • Ensure PPMS includes GAP progress indicators for other project activities that address gender issues and concerns. | • PMU. PIU. NGS |
| **Output 3: Strengthened Capacity for Project Implementation, Operation and Maintenance** | |
| • Provide gender awareness (equality, equity and mainstreaming) training to EA, IA and local project staff. | • NGS, DPWT, PDIH. |
| • Appoint 1 woman as gender focal point in the EA | • MIH, MPWT |
| • Ensure training and capacity building participation data is disaggregated by sex. | • MIH, MPWT, DPWT, PDIH. |
| • Ensure at least 1 woman in each target province IA is appointed as gender focal point coordinate implementation of the GAP. | • MIH, MPWT, DPWT, PDIH |
| • Ensure that 30% of the overall management staff trained under the project are women. | • MIH, MPWT, DPWT, PDIH |
| • Ensure 30% of the management positions in the PMU and PIU staff are women, and 20% of these are in management or supervisory roles. | • EA, IA, PMU, NGS |
| • New water user HHs provided awareness training in especially Dry Season water conservation, identifying and reporting leaks and other O&M issues. | • EA, IA, PMU, NGS |
| • Ensure that provisions in bidding documents to employ at least 10% of women in Project construction activities and reflected in contracts signed with contractors. | • EA, IA, PMU, NGS, Contractor |
| • Ensure equal pay for same work between male and female workers, and payments for women are paid directly to them. | • EA, IA, PMU, NGS |

| | |
|---|---|
| • Ensure no child labor is used in any civil works. | • IA, PMU, Contractor |
| • Ensure contractors provide HIV/Aids prevention training and supply free condoms weekly to all construction workers. | • IA, PMU, Contractor |
| • Contractors employ dust and noise control measures in urban areas (hours during which noisy plant and equipment may be used). | • IA, PMU, Contractor |
| • Safe and sturdy ditch/channel crossovers and building access provided especially for children and elderly during construction. | • IA, PMU, Contractor |

MIH = Ministry of Industry and Handicrafts; MPWT = Ministry of Public Works and Transport; PDIH = provincial department of industry and handicrafts; DPWT = department of public works and transport; EA = executing agency; FHH = female headed households; GAP = gender action plan; IA = implementing agency, PMU = project management unit); PIU = project implementation unit; PPMS = project performance management system; NGS = national gender specialist; IEC = information, education and communication

# APPENDIX 1: DEMOGRAPHICS OF TARGET AREAS (2015)

| Kampong Cham Water Supply Subproject - Demographics of Villages in Extended Service Area | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **District** | **Commune** | **Village_Eng** | **Village_Kh** | **CODE** | **WS** | **POP** | **M** | **F** | **AGE<15** | **HH** |
| ampong Sie | Ampil | Cheung Kouk | ជើងគោក | 3060104 | WS | 700 | 327 | 373 | 275 | 150 |
| | | Krala | ក្រឡា | 3060109 | WS | 1537 | 761 | 776 | 388 | 316 |
| | Kaoh Roka | Kaoh Kol | កោះកុល | 3060504 | WS | 0 | 0 | 0 | 0 | 0 |
| | | Kaoh Roka Krau | កោះរកាក្រៅ | 3060601 | WS | 776 | 361 | 415 | 195 | 175 |
| | | Kaoh Roka Knong | កោះរកាក្នុង | 3060602 | WS | 1232 | 620 | 612 | 266 | 345 |
| | | Thmei | ថ្មី | 3060606 | WS | 880 | 481 | 399 | 309 | 181 |
| | Krala | Sdach Non | ស្តេចនន | 3060901 | WS | 449 | 216 | 233 | 114 | 104 |
| | | Tuol Beng | ទួលបេង | 3060902 | WS | 966 | 465 | 501 | 327 | 237 |
| | | Andoung Pou | អណ្តូងពោធិ | 3060903 | WS | 735 | 344 | 391 | 247 | 136 |
| | | Tuol Popel | ទួលពពេល | 3060904 | WS | 838 | 417 | 421 | 239 | 172 |
| | | Trapeang Chrey | ត្រញ៉ងជ្រៃ | 3060905 | WS | 953 | 436 | 517 | 367 | 205 |
| | | Trapeang Tras | ត្រញ៉ងត្រស់ | 3060906 | WS | 810 | 423 | 387 | 289 | 199 |
| | | Trapeang Ruessei | ត្រញ៉ងឫស្សី | 3060907 | WS | 707 | 360 | 347 | 226 | 172 |
| | | Angkuonh Dei | អង្គញដី | 3060908 | WS | 701 | 340 | 361 | 209 | 178 |
| | | Ampil Chrum | អំពិលជ្រុំ | 3060909 | WS | 865 | 430 | 435 | 271 | 210 |
| | | Thmei | ថ្មី | 3060910 | WS | 641 | 310 | 331 | 207 | 159 |
| | | Trapeang Thma | ត្រញ៉ងធ្ម | 3060911 | WS | 647 | 317 | 330 | 178 | 165 |
| | | Trapeang Char | ត្រញ៉ងចារ | 3060912 | WS | 1534 | 811 | 723 | 777 | 210 |
| | | Trakuon | ត្រកួន | 3060913 | WS | 1199 | 557 | 642 | 453 | 270 |
| | Ro'ang | Veal Khsach | វាលខ្សាច់ | 3061102 | WS | 1090 | 519 | 571 | 330 | 248 |
| | | Romul | រមួល | 3061105 | WS | 2675 | 1293 | 1382 | 860 | 550 |
| **Total 21 Villages** | | | | **Total Population** | | **19935** | **9788** | **10147** | **6527** | **4382** |

**Battambang Water Supply Subproject - Demographics of Villages in Extended Service Area**

| District | Commune | Village_Eng | Village_kh | CODE | WS | WW | POP | M | F | AGE <15 | HH |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Banan | Bay Damram | Tuol Chranieng | ទួលច្រនៀង | 2010301 | WS | | 984 | 548 | 436 | 346 | 224 |
| | | Kampong Chaeng | កំពង់ចែង | 2010302 | WS | | 817 | 382 | 435 | 212 | 175 |
| | | Kanhchroung | កញ្ឆោង | 2010303 | WS | | 470 | 228 | 242 | 231 | 102 |
| | | Krala Peas | ក្រឡាពាស | 2010304 | WS | | 1348 | 629 | 719 | 305 | 307 |
| | | Bay Damram | បាយដំរ | 2010305 | WS | | 1762 | 932 | 830 | 547 | 297 |
| | | Ta Song | តាសង | 2010306 | WS | | 658 | 336 | 322 | 151 | 135 |
| | | Sdau | ស្ដៅ | 2010307 | WS | | 788 | 395 | 393 | 153 | 177 |
| | Chheu Teal | Kampong Chhlang | កំពង់ចលង | 2010401 | WS | | 1228 | 552 | 676 | 296 | 278 |
| | | Chheu Teal | ឈើទាល | 2010402 | WS | | 1796 | 864 | 932 | 363 | 388 |
| | | Kampong Srama | កំពង់ស្រមៃ | 2010403 | WS | | 1202 | 591 | 611 | 298 | 270 |
| | | Khnar | ខ្នារ | 2010404 | WS | | 1008 | 503 | 505 | 277 | 240 |
| | | Enteak Chit | តន្លងចិត | 2010405 | WS | | 1344 | 654 | 690 | 348 | 283 |
| | | Bat Sala | បត់សាលា | 2010406 | WS | | 2412 | 1282 | 1130 | 893 | 415 |
| | | Bay Damram | បាយដំរ | 2010407 | WS | | 1331 | 648 | 683 | 276 | 302 |
| | | Svay Prakeab | ស្វាយប្រគាប | 2010408 | WS | | 1101 | 540 | 561 | 272 | 211 |
| | | Anlong Ta Mei | អន្លង់តាមី | 2010410 | WS | | 1498 | 694 | 804 | 365 | 399 |
| | | Chamkar Svay | ចំការស្វាយ | 2010411 | WS | | 1183 | 567 | 616 | 238 | 255 |
| | | Thkov | ថ្កូវ | 2010412 | WS | | 818 | 446 | 372 | 153 | 186 |
| | | Baboh | ប្របុះ | 2010413 | WS | | 914 | 483 | 431 | 242 | 202 |
| | | Doung | ដូង | 2010414 | WS | | 615 | 287 | 328 | 222 | 151 |
| | | Anlok Kaong | អន្លក់កោង | 2010415 | WS | | 662 | 337 | 325 | 178 | 137 |
| Thma Koul | Ou Ta Ki | Ou Ta Ki | អូរតាគី | 2020301 | WS | | 3806 | 1876 | 1930 | 1050 | 842 |
| | | Popeal Khae | ពពាលខែ | 2020302 | WS | | 2874 | 1425 | 1449 | 1074 | 665 |
| | | Prey Totueng | ព្រៃទទឹង | 2020305 | WS | | 1596 | 780 | 816 | 467 | 387 |
| | | Prey Dach | ព្រៃដាច់ | 2020306 | WS | | 1531 | 743 | 788 | 322 | 315 |
| | | Trang | ក្រាង | 2020307 | WS | | 1950 | 981 | 969 | 481 | 466 |
| | | Kakaoh | កកោះ | 2020308 | WS | | 1313 | 671 | 642 | 358 | 326 |
| | Chrev | Chrey Thmei | ជ្រៃថ្មី | 2020401 | WS | | 1186 | 592 | 594 | 434 | 127 |
| | | Chrey | ជ្រៃ | 2020402 | WS | | 1398 | 693 | 705 | 480 | 291 |
| | | Ka Kou | កគោ | 2020403 | WS | | 1906 | 979 | 927 | 662 | 356 |
| | | Prey Totueng | ព្រៃទទឹង | 2020406 | WS | | 1907 | 948 | 959 | 493 | 426 |
| Bat Dambang | Kdol Doun Teav | Chong Preaek | ចុងព្រែក | 2030601 | WS | | 1197 | 549 | 648 | 354 | 240 |
| | | Kdol | ក្តុល | 2030602 | WS | | 1263 | 654 | 609 | 266 | 267 |
| | | Ou Ta Nob | អូរតានប់ | 2030603 | WS | | 1425 | 716 | 709 | 411 | 294 |
| | Ou Mal | Ou Mal | អូរម៉ាល់ | 2030701 | WS | | 843 | 400 | 443 | 215 | 185 |
| | | Dak Sasar | ដាក់សសរ | 2030702 | WS | | 1139 | 521 | 618 | 259 | 232 |
| | | Prey Dach | ព្រៃដាច់ | 2030704 | WS | | 902 | 447 | 455 | 274 | 221 |
| | | Voat Roka | វត្តរកា | 2030706 | WS | | 1471 | 740 | 731 | 310 | 301 |
| | | Koun Sek | កូនសេក | 2030707 | WS | | 645 | 340 | 305 | 242 | 140 |
| | | Andoung Pring | អណ្ដូងក្រឹង | 2030708 | WS | | 1480 | 731 | 749 | 398 | 336 |
| | | Boeng Reang | បឹងរាំង | 2030709 | WS | | 1621 | 801 | 820 | 485 | 366 |
| | | Prey Roka | ព្រៃរកា | 2030710 | WS | | 779 | 368 | 411 | 183 | 202 |
| | Voat Kor | Chrab Krasang | ច្រាបក្រសាំង | 2030802 | WS | | 3547 | 1718 | 1829 | 885 | 638 |
| | | Ballang | បល្ល័ង្គ | 2030803 | WS | | 2595 | 1184 | 1411 | 1046 | 360 |
| | | Khsach Pouy | ខ្សាច់ពោយ | 2030804 | WS | | 2418 | 1122 | 1296 | 494 | 430 |
| | | Kampong Seima | កំពង់សីមា | 2030806 | WS | | 1956 | 984 | 972 | 417 | 322 |
| Aek Phnum | Preaek Norint | Preaek Ta Chraeng | ព្រែកតាច្រែង | 2050101 | WS | | 2448 | 1172 | 1276 | 558 | 533 |
| | Samraong Knong | Samraong Ou Trea | សំរោងអូរទ្រា | 2050204 | WS | | 2727 | 1302 | 1425 | 530 | 643 |
| | Peam Aek | Doun Teav | ដូនទាវ | 2050501 | WS | | 1976 | 1004 | 972 | 187 | 449 |
| | | Suos Ei | សួសអី | 2050502 | WS | | 1954 | 919 | 1035 | 542 | 427 |
| | | Peam Aek | ពាមឯក | 2050503 | WS | | 1829 | 875 | 954 | 473 | 461 |
| | | Kong Tum | គងទុំ | 2050504 | WS | | 1475 | 715 | 760 | 380 | 305 |
| | | Ka Rohal | ករហាល | 2050505 | WS | | 1226 | 586 | 640 | 366 | 272 |
| | | Preaek Chdaor | ព្រែកឆ្នោរ | 2050506 | WS | | 3637 | 1816 | 1821 | 1122 | 749 |
| | | Ta Kom | តាគម | 2050507 | WS | | 1018 | 515 | 503 | 291 | 238 |
| Sangkae | Anlong Vil | Ou Muni Muoy | អូរមុនី ១ | 2080104 | WS | | 1994 | 970 | 1024 | 527 | 474 |
| | | Chumnik | ជំនីក | 2080106 | WS | | 2256 | 1124 | 1132 | 628 | 462 |
| | | Puk Chhma | ពុកឆ្មា | 2080107 | WS | | 857 | 429 | 428 | 231 | 171 |
| | | Spong | ស្ពង | 2080108 | WS | | 872 | 419 | 453 | 227 | 180 |
| | Norea | Ta Kok | តាកុក | 2080204 | WS | | 1202 | 592 | 610 | 206 | 248 |
| | Kampong Preah | Kralanh | ក្រឡាញ់ | 2080503 | WS | | 374 | 170 | 204 | 132 | 70 |
| | Ou Dambang Muoy | Baoh Pou | ចោះពោធិ | 2080802 | WS | | 4079 | 2030 | 2049 | 1283 | 708 |
| | | Ou Khcheay | អូរឆ្ការ | 2080803 | WS | | 2020 | 1013 | 1007 | 380 | 432 |
| | Ou Dambang Pir | Ou Dambang | អូរដំបង | 2080901 | WS | | 2897 | 1392 | 1505 | 729 | 607 |
| | | Dambouk Khpos | ដំបូកខ្ពស់ | 2080905 | WS | | 2380 | 1197 | 1183 | 582 | 508 |
| | Voat Ta Muem | Kampong Ampil | កំពង់អំពិល | 2081001 | WS | | 5225 | 1611 | 3614 | 1380 | 757 |
| | | Kampong Chlang | កំពង់ឆ្លង | 2081002 | WS | | 3410 | 1539 | 1871 | 1360 | 790 |
| | | Ou Khcheay | អូរឆ្ការ | 2081004 | WS | | 2219 | 1028 | 1191 | 637 | 491 |
| | | Sla Kram | ស្លក្រាម | 2081005 | WS | | 1584 | 760 | 824 | 218 | 370 |
| | | Anlong Lvea | អន្លង់ល្វា | 2081006 | WS | | 1274 | 618 | 656 | 358 | 303 |
| **TOTAL** | | | | | | | 117620 | 56657 | 60963 | 31753 | 24517 |

| Battambang Sanitation Subproject - Demographics of Villages in Extended Service Area | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **District** | **Commune** | **Village_Eng** | **Village_kh** | **CODE** | **WS** | **WW** | **POP** | **M** | **F** | **AGE <15** | **HH** |
| Bat Dambang | Tuol Ta Aek | Ou Ta Kam Muoy | អូរតាកាំ ១ | 2030101 | | WW | 4012 | 1914 | 2098 | 972 | 875 |
| | | Ou Ta Kam Pir | អូរតាកាំ ២ | 2030102 | | WW | 5278 | 2496 | 2782 | 2202 | 1066 |
| | | Ou Ta Kam Bei | អូរតាកាំ ៣ | 2030103 | | WW | 1697 | 836 | 861 | 469 | 283 |
| | | Tuol Ta Aek | ទួលតាឯក | 2030104 | | WW | 6011 | 2855 | 3156 | 1233 | 1187 |
| | | Dangkao Teab | ដង្កោទាប | 2030105 | | WW | 2146 | 933 | 1213 | 654 | 382 |
| | Chamkar Samraong | Chamkar Samraong Muoy | ចំការសំរោង១ | 2030401 | | WW | 4916 | 2460 | 2456 | 1129 | 877 |
| | | Chamkar Samraong Pir | ចំការសំរោង២ | 2030402 | | WW | 4439 | 2153 | 2286 | 933 | 881 |
| | | Voat Lieb | វត្តលៀប | 2030403 | | WW | 4164 | 2062 | 2102 | 579 | 746 |
| | | Voat Rumduol | វត្តរំដួល | 2030404 | | WW | 2703 | 1381 | 1322 | 297 | 471 |
| | | Phka Sla | ផ្កាស្លា | 2030405 | | WW | 2032 | 1009 | 1023 | 386 | 332 |
| | Ou Mal | Sala Balat | សាលាបាឡាត់ | 2030703 | | WW | 1150 | 562 | 588 | 330 | 250 |
| | Voat Kor | Damnak Luong | ដំណាក់ហ្លួង | 2030805 | | WW | 2419 | 1224 | 1195 | 545 | 428 |
| | Ou Char | Ou Char | អូរចារ | 2030901 | | WW | 4142 | 2013 | 2129 | 981 | 681 |
| | | Kab Kou Thmei | កាប់គោថ្មី | 2030903 | | WW | 4465 | 2334 | 2131 | 1970 | 665 |
| | | Andoung Chenh | អណ្តូងចេញ | 2030904 | | WW | 2234 | 1179 | 1055 | 626 | 369 |
| | | Anhchanh | អញ្ចាញ | 2030905 | | WW | 2767 | 1336 | 1431 | 807 | 445 |
| | | Ang | អង់ | 2030906 | | WW | 2977 | 1473 | 1504 | 1189 | 493 |
| **TOTAL** | | | | | | | 57552 | 28220 | 29332 | 15302 | 10431 |

| Sihanoukville Sanitation Subproject - Demographics of Villages in Extended Service Area | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **District** | **Commune** | **Village_Eng** | **WW** | **POP** | **M** | **F** | **AGE <15** | **HH** |
| Mittakpheap | Sangkat Pir | Phum Muoy | WW | 3826 | 1894 | 1932 | 875 | 882 |
| | | Phum Pir | WW | 2511 | 1230 | 1281 | 425 | 506 |
| | | Phum Bei | WW | 4086 | 1923 | 2163 | 1029 | 971 |
| | Sangkat Bei | Phum Muoy | WW | 3113 | 1498 | 1615 | 841 | 657 |
| | | Phum Pir | WW | 7033 | 3451 | 3582 | 2188 | 1467 |
| | | Phum Bei | WW | 10832 | 5264 | 5568 | 2816 | 2253 |
| | Sangkat Buon | Phum Muoy | WW | 6997 | 3404 | 3593 | 1823 | 1457 |
| | | Phum Pir | WW | 3239 | 1635 | 1604 | 780 | 688 |
| | | Phum Bei | WW | 3976 | 1902 | 2074 | 1354 | 910 |
| | | Phum Buon | WW | 2796 | 1327 | 1469 | 757 | 652 |
| **Total 10 villages** | | | | **48409** | **23528** | **24881** | **12888** | **10443** |

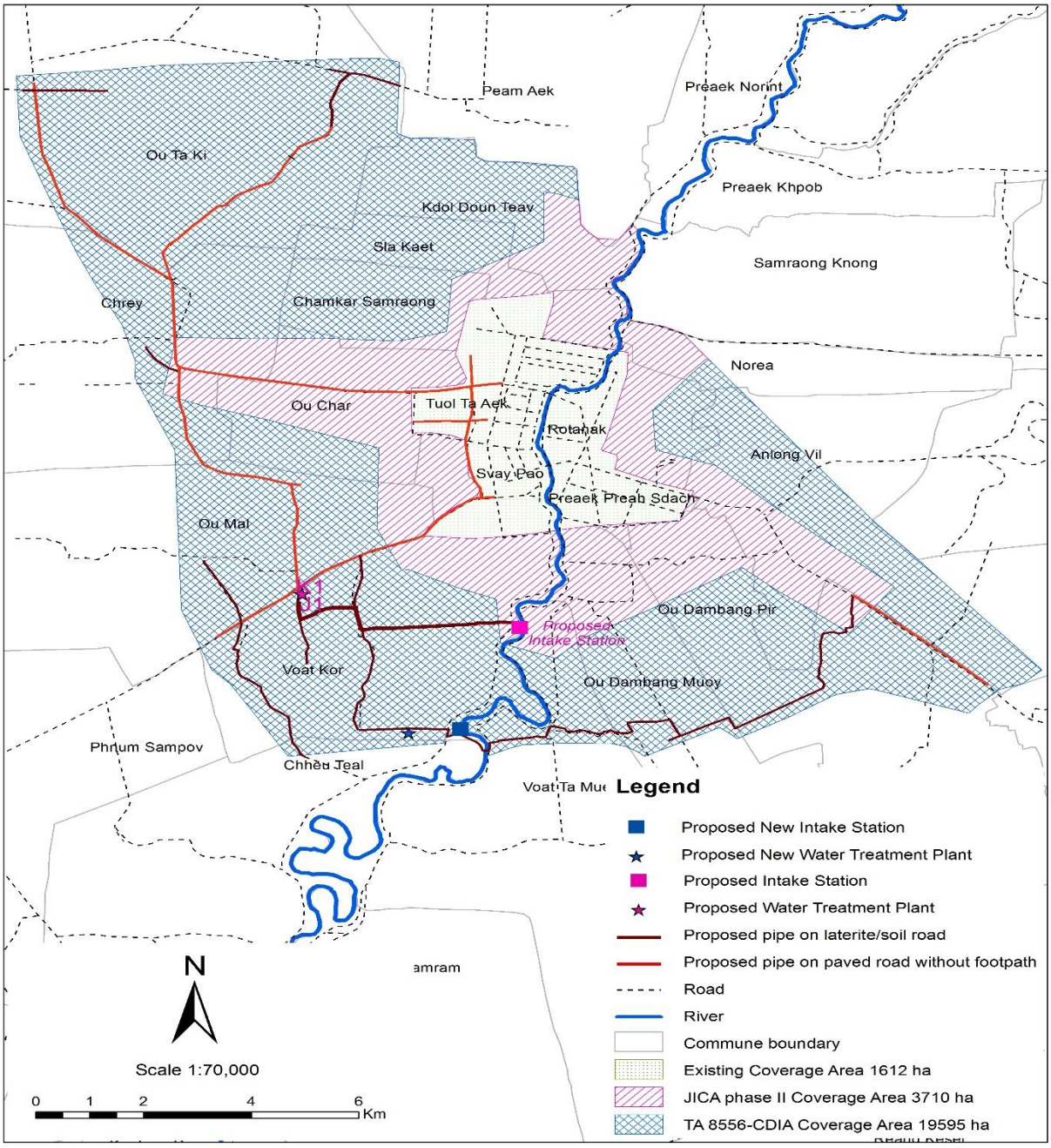
**Siem Reap: Interceptor Pipeline**

| Villages | | | | | | | Population and HH (baseline) | |
|---|---|---|---|---|---|---|---|---|
| | **2013** | **HH** | **2014** | **HH** | **2015** | **HH** | **2016** | **HH** |
| Phnhea Chey | 1152 | 226 | 1376 | 279 | 1554 | 338 | 2,038 | 493 |
| Thmei | 1691 | 332 | 1786 | 348 | 1996 | 404 | 2,316 | 539 |
| Vihear Chen | 6274 | 1202 | 6815 | 1252 | 6503 | 1303 | 7,012 | 1,542 |
| Stueng Thmei | 4368 | 690 | 4523 | 726 | 4646 | 743 | 4,423 | 802 |
| Mondol Muoy | 2789 | 534 | 2821 | 545 | 2847 | 551 | 3,158 | 701 |
| Mondol Pir | 644 | 118 | 658 | 123 | 675 | 127 | 961 | 263 |
| Ta Phul | 4974 | 915 | 5046 | 929 | 5115 | 953 | 5,520 | 1,134 |
| ***Total*** | | | | | | | ***25,428*** | ***5,474*** |

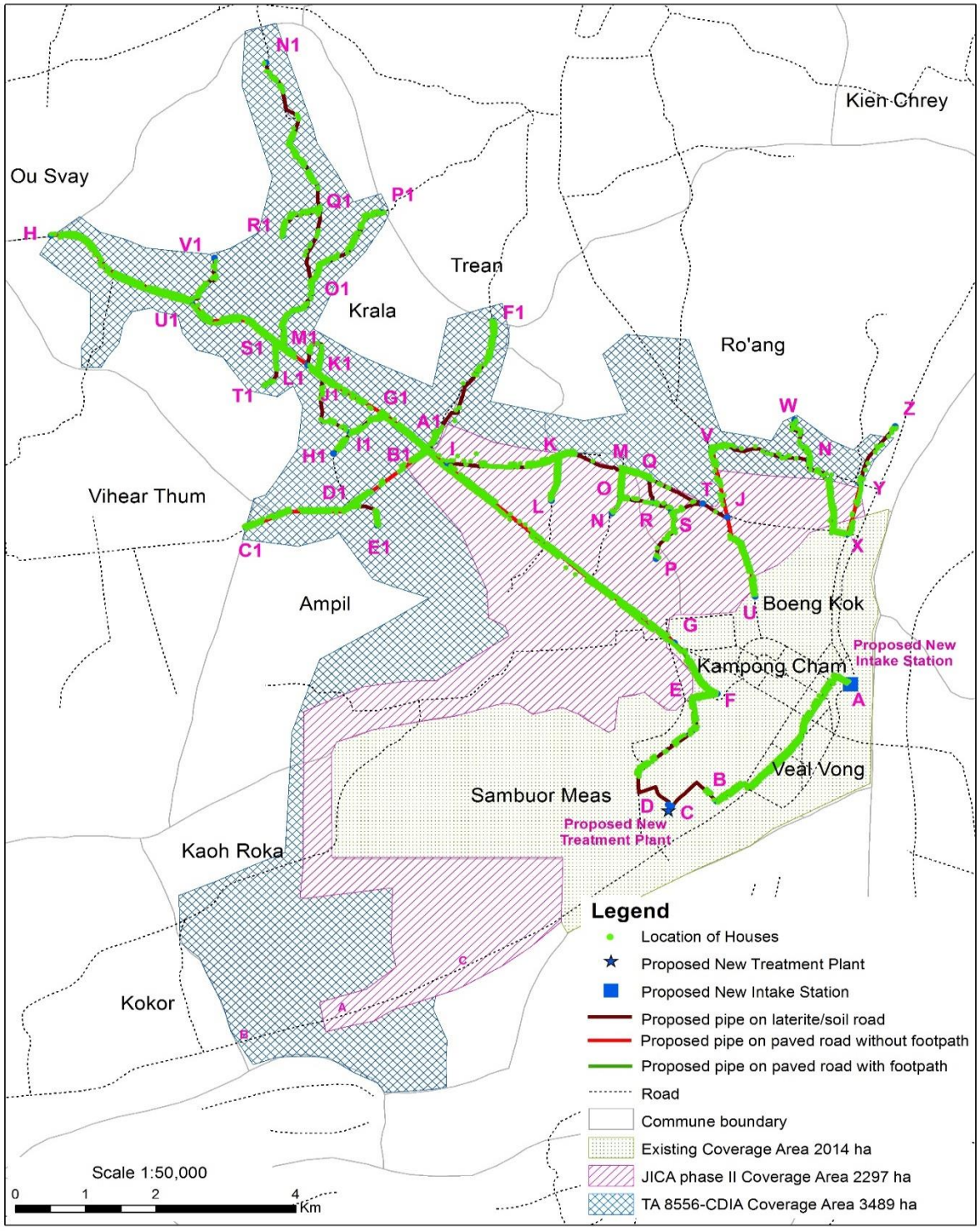
Commune database 2016

# APPENDIX 2: MAPS OF EXISTING AND EXTENDED SERVICE AREAS

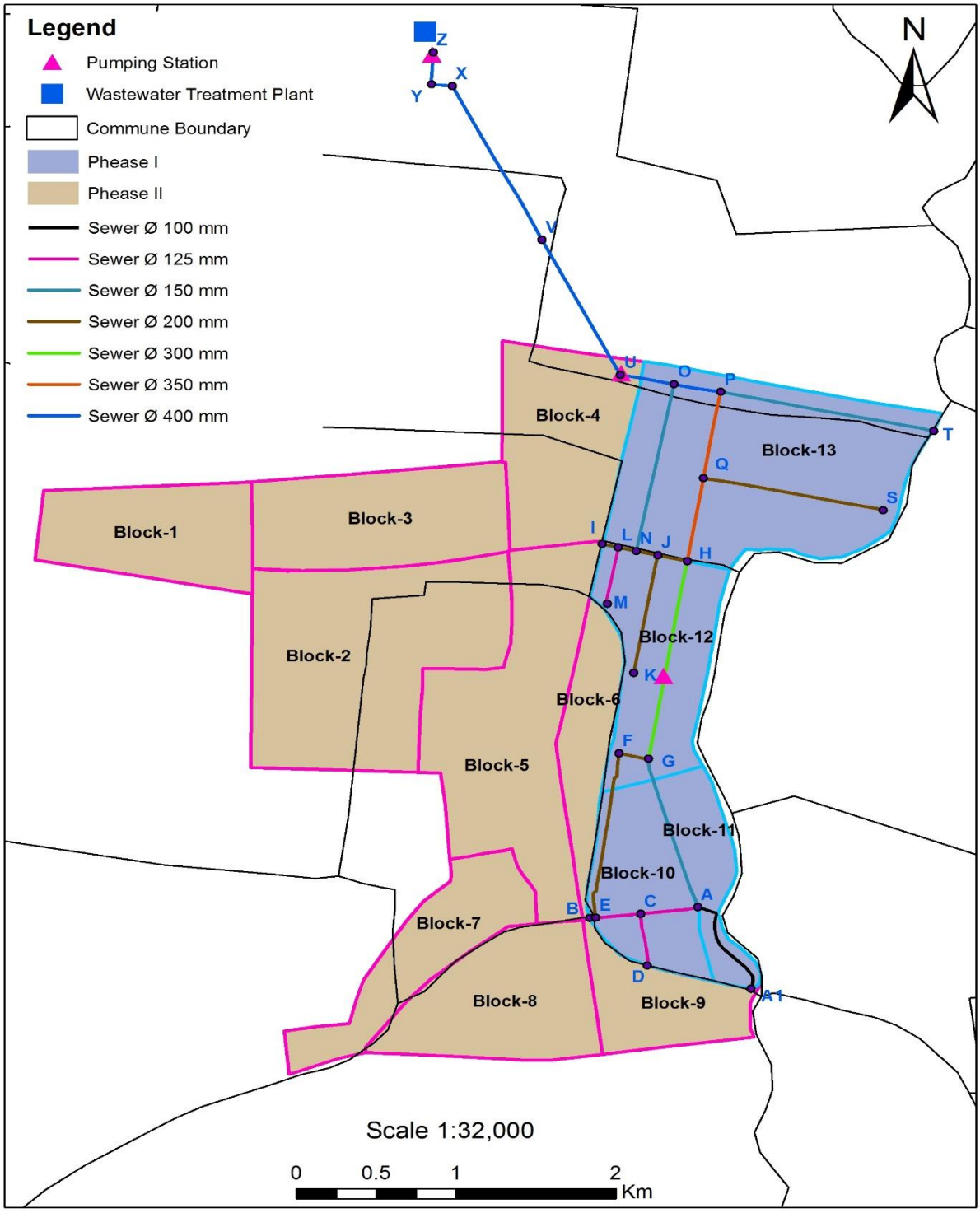
## PROPOSED WATER SUPPLY PIPELINES IN BATTAMBANG



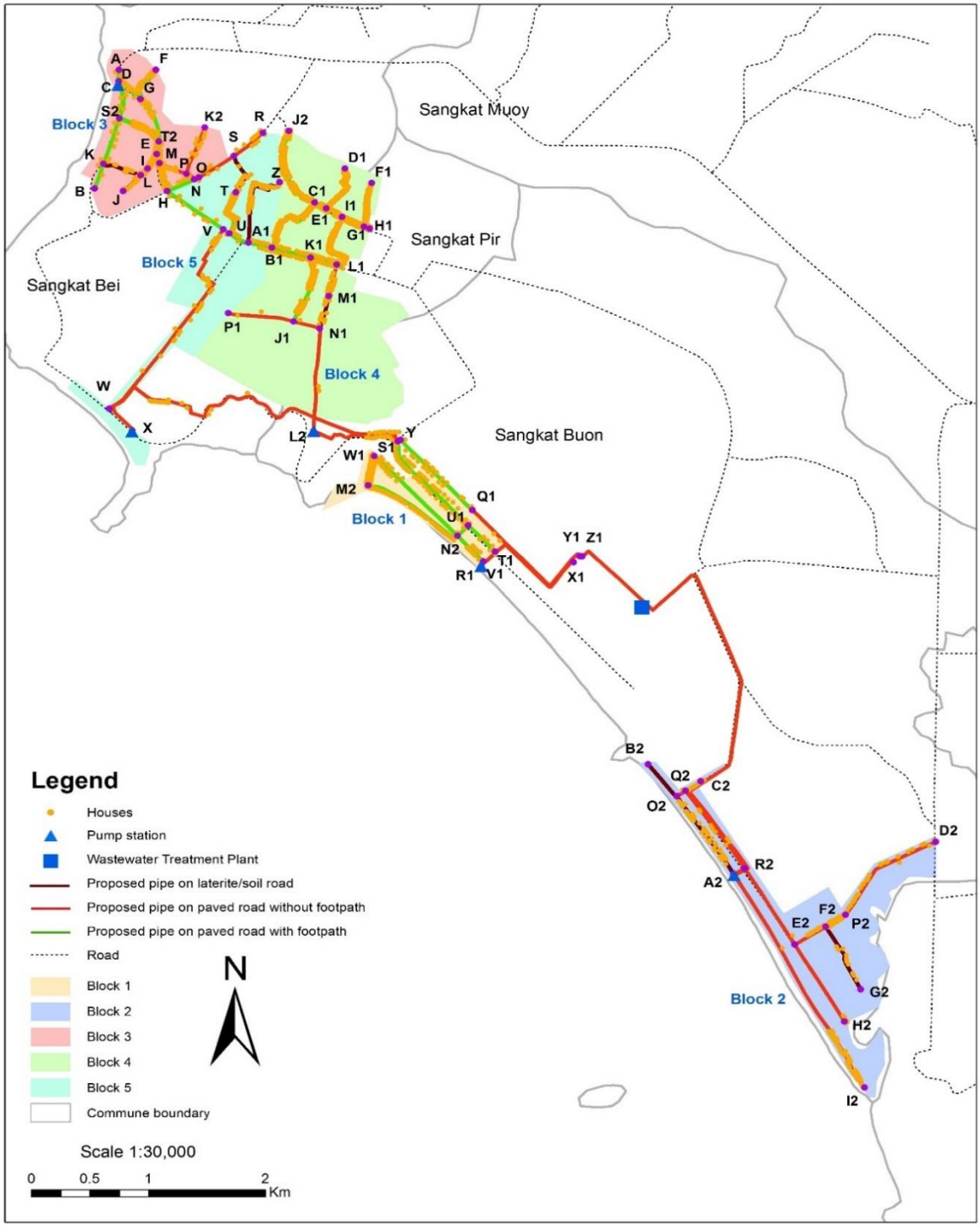
**PROPOSED WATER SUPPLY PIPELINES WITH HOUSEHOLDS IN KAMPONG CHAM**



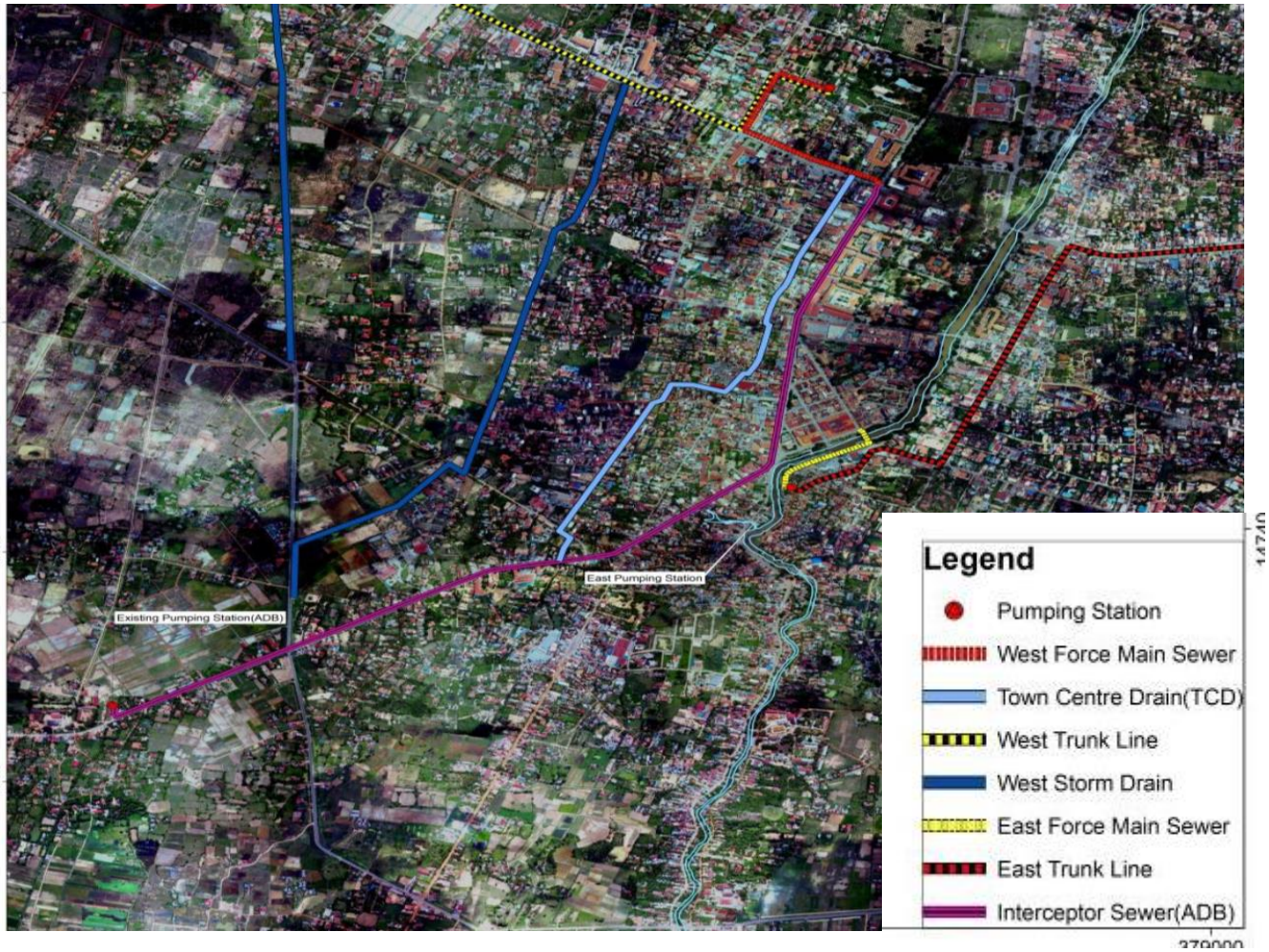
## PROPOSED WASTEWATER SYSTEM IN BATTAMBANG

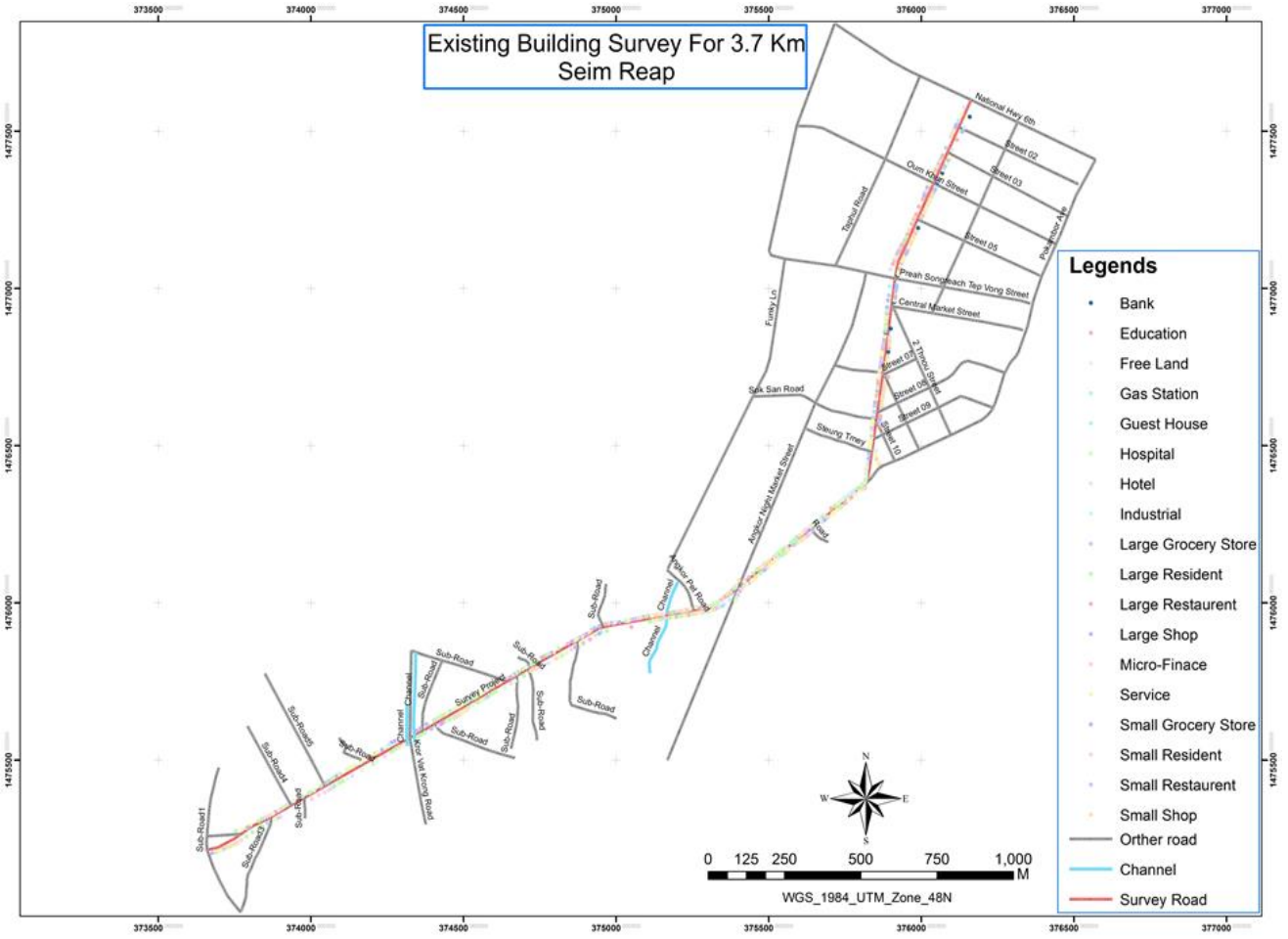


## PROPOSED TRUNK SEWERS IN SIHANOUKVILLE



## Siem Reap – Sewage Interceptor Pipeline




Existing Building Survey For 3.7 Km
Seim Reap
Legends
Bank
Education
Free Land
Gas Station
Guest House
Hospital
Hotel
Industrial
Large Grocery Store
Large Resident
Large Restaurent
Large Shop
Micro-Finace
Service
Small Grocery Store
Small Resident
Small Restaurent
Small Shop
Orther road
Channel
Survey Road
0 125 250 500 750 1,000
M
WGS_1984_UTM_Zone_48N

## APPENDIX 3: SURVEY LOCATIONS AND NUMBER OF HOUSEHOLDS INTERVIEWED

The total HHs in villages selected for the water supply and sewage service extension survey is 11,481 and total number of HHs selected for HH level interviews is 372.

In Siem Reap, the number of residences/establishments affected by replacing the sewage feeder pipeline is 736 from which a total of 253 were selected for the survey.

**Sihanouk Province Sanitation Subproject**

| District | Commune | Village | Total HH | Sample HHs | Focal Group | % of Tot HHs |
|---|---|---|---|---|---|---|
| Mittakpheap | Sangkat Pir | Phum Muoy | 882 | 29 | FG | 0.08 |
| | Sangkat Bei | Phum Muoy | 657 | 21 | | 0.06 |
| | | Phum Pir | 1467 | 48 | FG | 0.13 |
| | Sangkat Buon | Phum Pir | 688 | 22 | | 0.06 |
| **TOTAL** | | | **3694** | 120 | 2 | **0.32** |

**Battambang Sanitation Subproject**

| District | Commune | Village | Total HH | Sample HH | Focal Group | % of Tot HHs |
|---|---|---|---|---|---|---|
| Bat Dambang | Chamkar Samraong | Chamkar Samraong Pir | 881 | 29 | FG | 0.08 |
| | | Voat Lieb | 746 | 24 | | 0.06 |
| | Svay Pao | Mphey Osakphea | 565 | 18 | FG | 0.05 |
| | | Kammeakkar | 968 | 31 | | 0.08 |
| **TOTAL** | | | 3160 | 102 | 2 | **0.28** |

**Kampong Cham Water Supply Subproject**

| District | Commune | Village | Total HH | Sample HH | Focal Group | % of Tot HHs |
|---|---|---|---|---|---|---|
| Kampong Siem | Ampil | Krala | 316 | 10 | FG | 0.03 |
| | Kaoh Roka | Kaoh Roka Knong | 345 | 11 | | 0.03 |
| | Krala | Tuol Beng | 237 | 8 | FG | 0.02 |
| | | Trakuon | 270 | 9 | | 0.02 |
| **TOTAL** | | | **1168** | 38 | 2 | **0.10** |

**Battambang Water Supply Subproject**

| District | Commune | Village | Total HH | Sample HH | Focal Group | % of Tot HHs |
|---|---|---|---|---|---|---|
| Tma Koul | Ou Ta Ki | Trang | 466 | 15 | FG | 0.04 |
| | Chrev | Chrey | 291 | 9 | | 0.03 |
| Bat Dam Bang | Kdol Doun Teav | Kdol | 267 | 9 | FG | 0.02 |
| | Ou Mal | Dak Sasar | 232 | 8 | | 0.02 |
| | | Voat Roka | 301 | 10 | FG | 0.03 |
| | Voat Kor | Chrab Krasang | 638 | 21 | | 0.06 |
| Sangkae | Anlong Vil | Chumnik | 462 | 15 | FG | 0.04 |
| | Ou Dambang Muoy | Ou Khcheay | 432 | 14 | | 0.04 |
| | Voat Ta Muem | Slakram | 370 | 12 | FG | 0.03 |
| **TOTAL** | | | **3459** | **112** | **5** | **0.30** |

## Siem Reap: Replacement of sewage feeder pipeline

### Survey sample

| | | | | |
|---|---|---|---|---|
| **Code** | **Type** | **No.** | **% of Total** | **No. to be Surveyed** |
| 0 | Education | 2 | 0.27% | 1 |
| 1 | Small Resident | 46 | 6.25% | 16 |
| 2 | Large Resident | 106 | 14.40% | 36 |
| 3 | Small Restaurent | 36 | 4.89% | 12 |
| 4 | Large Restaurent | 34 | 4.62% | 12 |
| 5 | Small Grocery Store | 35 | 4.76% | 12 |
| 6 | Large Grocery Store | 21 | 2.85% | 7 |
| 7 | Small Shop | 126 | 17.12% | 43 |
| 8 | Large Shop | 53 | 7.20% | 18 |
| 9 | Gas Station | 8 | 1.09% | 3 |
| 11 | Free Land | 26 | 3.53% | 9 |
| 12 | Guest House | 9 | 1.22% | 3 |
| 13 | Hotel | 35 | 4.76% | 12 |
| 15 | Public Garden | 2 | 0.27% | 1 |
| 17 | Bank | 9 | 1.22% | 3 |
| 18 | Micro-Finace | 2 | 0.27% | 1 |
| 19 | Service | 176 | 23.91% | 61 |
| 21 | Hospital | 5 | 0.68% | 2 |
| 22 | Education | 3 | 0.41% | 1 |
| 23 | Industrial | 2 | 0.27% | 1 |
| | **Total** | **736** | **100%** | **253** |

# APPENDIX 4: PPWSA POOR HH SUBSIDY SCORE CARD

Kingdom of Cambodia
Nation Religion King

Annex 3

Phom Penh Water Supply Authority

## Minute
## on the Evaluation of Low-Income Household's Condition
(in term of Subsidy on House Connection Fee)

Householder's Name ..... House #..... Street.....

Village..... Commune..... District.....

| Criteria | Score | Actual Condition and Score | |
|---|---|---|---|
| **A. Householder's Status** | **50** | | |
| A1. Widow / retiree / disabled / elderly / chronic patient | 15 | | |
| A2. Civil servant without secondary labor / jobless | 15 | | |
| A3. Several dependant (over 3 persons) | 10 | | |
| A4. Elderly parents under his/her support | 10 | | |
| **B. Housing Conditions (Select only ONE of the 3 items, B1-B3)** | **20** | | |
| B1. Thatched or tented home | 10 | | |
| B2. Wooden or concrete ground-level house with a size of smaller than 4.00m x 6.00m | 7 | | |
| B3. Collective house (Several families live under one roof) | 7 | | |
| B4. Using battery or purchase electricity from distributor | 5 | | |
| B5. Means of transport to do business (Only cart, motorcycle or bicycle but no motor tricycle or car) | 5 | | |
| **C. Income and Debts** | **30** | | |
| C1. No regular job | 15 | | |
| C2. Household daily income of less than 20,000 Riels (~ $5.00) | 10 | | |
| C3. In debt (Check out the amount and reasons) | 5 | | |
| | | **Total Score** | |

Observer's comment: ☐ No subsidy ☐ Allow for installment payment ☐ Subsidy.....%

Reason: .....

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-7 /7-