

Case Study on WSP Implementation and Lessons Learned: Maynilad Water Services, Philippines

The Maynilad Water Services case study was originally submitted for the IWA 2012 Drinking Water Supply Award, which recognized the effective development, implementation and ongoing revision of WSPs to manage drinking water safety. This version further develops the original case study to include updated information since the Award Submission.

The case study was developed using a case study guide and template which was designed by the World Health Organization to collect important information on the benefits, challenges, and lessons learned associated with the WSP implementation. The case study guide and template is available at

<http://www.wsportal.org/ibis/water-safety-portal/eng/my-toolbox>.

1) Background information and context

Country: Philippines
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Details on authorship and collaborators: This case study was developed by Ms. Thaís Terceiro Jorge during her internship at WHO with the collaboration of Mr. Francisco Arellano (Vice President for Corporate Quality, Environment, Safety and Health, Maynilad Water Services, Inc. Philippines).
General information about the water sector, including regulatory/oversight authorities (general legal framework for oversight, regulation, and enforcement, if applicable) and consumer characteristics. Water services in the Philippines are mainly provided by Local Government Units (LGU), through their engineering departments, or community-based organizations (CBOs), whose efforts are complemented by small-scale independent providers. In Metro Manila, water and wastewater services have been provided since 1997 by two concessionaires on a 25-year agreement: Manila Water Company in the East Zone and Maynilad Water Services in the West Zone. Prior to privatization, the Metropolitan Waterworks and Sewerage System (MWSS), a government agency, was responsible for the provision of water services to Metro Manila; poor service standards, long-standing financial debts, and operational inefficiencies culminated in the 1997 “Water Crisis Act”, which paved the way for privatization. In 2012, 91% of the total population of West Manila was being served by Maynilad (9.3 million). Of these customers 95% have 24-hour access to water services. A majority of Maynilad’s consumers fall under the residential category (90%), followed by semi-business (4%), commercial (5%) and industrial (1%). Guideline values for different physical, chemical and biological impurities are defined in the 2007 Philippine National Standards for Drinking Water. The MWSS Regulatory Office (RO) oversees the compliance of the two concessionaires to the service targets set by the concession agreement. Service obligations include ensuring service quality, water quality at the different distribution points, sewerage and sanitation services, and customer service to the users. Water quality is additionally monitored by the Metro Manila Drinking Water Quality Monitoring Committee (MMDWQMC), which is composed of representatives from the national and local governments, and from the private sector.
General information about the water supplier and their water supply system(s) (e.g. number of systems, type of systems, population served/number of service connections, annual water production, etc.) if the case study is for one water supplier: Maynilad is the largest water provider in the Philippines in terms of customer base. It has exclusive rights to provide water and wastewater services to 17 cities and municipalities in Metro Manila and Cavite Province. In September 2012, Maynilad’s total treatment plant capacity was 2,500 MLD (million liters per day), and there were 1,734,225 water service connections covering more than 8 million people. The company operates and maintains 3 water treatment plants, 3 wastewater treatment plants, 20 pumping stations, 22 reservoirs, over 480 km of sewer lines and more than 6,900 km of water pipes. Around 96% of the raw water supply comes from the Angat-Ipo dam system located north of Metro Manila. The remaining 4% comes from the Laguna lake. The raw water resources are not managed by Maynilad alone. There are various government agencies and other users who are involved in managing the catchment area. Moreover, the surface water source is vulnerable to climate variation phenomena (i.e. El Niño e La Niña) which affect the quality and quantity of source water.

2) Description of the WSP initiative

Rationale and scope of the WSP:
<p>Reason/motivation for WSP implementation, such as voluntary, policy, regulatory, etc.:</p> <p>Maynilad voluntarily developed the first WSP in the Philippines in 2007 following the recommendations of the 2004 World Health Organization (WHO) Guidelines for Water Service Providers. The WSP was adopted to facilitate compliance with national water quality targets and ensure that the company's systems and procedures for treating, storing and distributing water were consistent with the best practices to secure water safety.</p>
<p>Description of any existing legislation/regulations related to WSPs. This includes providing information on whether regulations explicitly promote or require WSPs or an equivalent preventive risk management approach. Please also include details on the name given to the WSP initiative (WSP, risk management plan, HACCP, etc.):</p> <p>In 2007 the Philippine Department of Health (DOH) issued the National Standards for Drinking Water which recommended the formulation of WSP to water service providers as a means to systematically monitor operations and water quality. Whereas the Philippine Government closely monitors and regulates the operations of water service providers, including the quality of the water delivered to customers, to date there is no requirement for water service providers to develop and maintain their own WSP. However, the DOH is currently developing a National Policy on WSP which will make the development and implementation of WSPs by service providers a requirement.</p> <p>There are some laws and regulations that promote and protect sanitation (Sanitation Code of the Philippines), require water quality monitoring (Philippine National Standard for Drinking Water) and designate areas for localized water quality management (Philippines Clean Water Act). Nonetheless, the range of hazards and risks identified/assessed by these laws and regulations are limited compared to a WSP.</p>
<p>Application coverage area (one supply, several supplies, or sector-wide; number and type of systems covered, population served/number of service connections; etc.):</p> <p>The reviewed 2012 WSP covers operations of the three treatment plants and ground water supply from small independent networks. The 2007 WSP document did not include the Putatan Treatment Plant which was inaugurated in February 2011.</p>
<p>Water supply components covered in the WSP (e.g. catchment, water intake, treatment, distribution, storage, consumer point of use, etc.):</p> <p>The Maynilad WSP encompasses all steps in the water supply from catchment to consumer.</p>
<p>WSP steps developed and implemented to-date:</p> <p>All 11 steps on the 2012 WSP document have been implemented:</p> <ol style="list-style-type: none">1) WSP Team assembly: a multidisciplinary WSP team from various operating units has been organized. In total there are 36 members in Maynilad's WSP team; all members have well defined roles and responsibilities.2) Water Supply Description: Maynilad's supply system has been thoroughly described. Detailed diagrams of the treatment plants, distributions systems and catchment areas (surface and ground sources) have been developed.3) Hazard Identification and Risk Assessment: the WSP team has identified potential and existing hazards and hazardous events in the water supply system. The identification has been conducted through

analysis of existing records, historical events, local knowledge and field visits. All potential biological, physical and chemical hazards have been considered. The team used a semi-quantitative risk assessment to develop a priority rank for the identified hazards.

4) Identify/validate control measures and reassess risks: existing and potential control measures have been documented for each identified hazard. The control measures have been validated according to their efficacy through site inspection, manufacturer specification and monitoring, and risks have been reprioritized accordingly.

5) Improvement/Upgrade plan: an improvement plan has been developed for control measures that were identified as ineffective or non-existing.

6) Monitoring of control measures (operational monitoring): a monitoring plan for the entire water supply system has been developed; the plan has established a schedule for monitoring frequency, assigned the responsible parties, and defined performance targets for control measures.

7) Verification (WSP effectiveness): compliance monitoring, internal and external auditing of operational activities and consumer satisfaction surveys are carried out to verify WSP effectiveness.

8) Management procedures: the management procedures that guide operations under normal and incident situations have been clearly and thoroughly documented.

9) Supporting programs: Maynilad periodically carries out awareness programs on watershed management and training on WSP, water treatment processes, chlorine handling, and proper handling of customer complaints. Research and Development initiatives and Hygiene and Sanitation programs further support WSP implementation.

10) Review/Audit: Maynilad's WSP is reviewed annually (at least) and updated if necessary. Internal and external auditors carry out review procedures and examination of records.

11) Revision following an incident: in addition to periodic reviews, the WSP is revised following any incident or emergency.

Other management systems in place within the water provider (ISO 9001, 14001, 220000, etc.):
A number of Maynilad facilities have triple ISO certifications on quality (ISO 9001:2000), environmental (ISO 14001:2004) and occupational safety and health management (OHSAS 18:2007).

Details of the WSP:

General description, timelines (for development, implementation, review, etc.) and milestones achieved (e.g. How were the WSP steps developed, implemented and reviewed?):

In November 2005, Maynilad initiated communication with the DOH concerning a workshop for piloting WSP in the Philippines using Maynilad as the test case. An agreement to conduct training on the development of a WSP using the WHO 2004 Guidelines was signed in February 2006. Initial WSP training began soon thereafter in March 2006. Improvement works began in September 2007 and have been actively implemented since then. Formulation of the Maynilad WSP in 2007 was based on the 10-step WHO Water Safety Plan Manual. In 2012, Maynilad's WSP was reviewed and updated according to the 11-step 2009 WHO/IWA WSP Manual.

WSP Team composition and other stakeholders (including external support organizations/experts) involved in the process (e.g. How was the team formed? What organizations were involved? How did team members/stakeholders become interested in the WSP?) Specific names are not needed:
To ensure that the WSP covers all the critical stages in Maynilad's water operations, employee representatives from the key offices and departments were required to join the WSP Team (i.e. common purpose facilities, water treatment, groundwater sources, and water distribution). To confirm the

health-based performance targets, consultants from the DOH were also included in the WSP Team. Since this was the first pilot WSP in the Philippines, a representative from the WHO was also engaged to provide assistance to the team.

Activities to support development and implementation of the WSP:

- 1) The company's board of directors has been fully supportive of the WSP approach. They have approved the formation of the WSP Team, the drafting and finalization of the WSP document, and other relevant supporting programs.
- 2) Capital expenditure projects have been developed to support the implementation of the priority improvement works identified through the WSP.
- 3) Trainings and workshops regarding WSP and its components have been held for employees. Members of the WSP Team have attended seminars for the improvement of WSP management procedures and water quality. Internal meetings and trainings to facilitate knowledge transfer were also conducted among Maynilad employees.
- 4) Maynilad closely coordinates and collaborates with the concerned stakeholders to reach sustainable management solutions. Several areas and steps of the water supply systems are beyond Maynilad's control. These include watershed, dam and raw water conveyance, among others. For example, the recognition by the Philippine government of the ancestral right of the Dumagats (indigenous people living in the catchment area) over the watershed area of the Ipo and the Angat dams has been a challenge for watershed management. In order to effectively implement its watershed protection and management programs, Maynilad has partnered with the Dumagats to carry out reforestation activities.

Type of data used to inform hazard identification and risk assessment:

Consultations with stakeholders including employees, concerned government agencies, members of academia and a review of historical water quality problems have been undertaken to determine the most common water quality problems encountered by the company.

Mechanisms used to verify progress of the WSP (internal or external reviews, views of consumers, WHO/IWA WSP Quality Assurance Tool, etc.) (e.g. What verification activities took place? How were these activities conducted? What organizations were involved?):

Maynilad verification activities on the progress of the WSP are based on customer satisfaction surveys, internal/external auditing of operational activities and monitoring compliance to water quality targets. Customer satisfaction levels and Maynilad's service performance are measured by the Public Assessment of Water Services (PAWS) Survey which is carried out by the University of the Philippines. Maynilad has been actively participating in the PAWS Survey by providing the necessary financial support, access to the database of customers and other information or documentation required for carrying out the survey. Maynilad also provides a call center for its customers. The relevant staff receive additional training on how to effectively communicate and provide assistance to customers. Internal and external audits of operational activities are conducted annually and are documented as audit reports. External auditing activities are performed by DOH, MWSS RO, municipal health office and independent auditors. As part of its internal auditing activities, Maynilad conducts a yearly Asset Condition Review (ACR) to determine the state and performance of its above-ground and below-ground assets. To effectively conduct such a review, members of the Asset Management Department conduct monthly inspections of each asset, and asset performance is measured vis-à-vis the operational standards set by the ISO and the WSP. The monitoring of water quality is carried out regularly with a range of frequencies: hourly (e.g. physical properties monitoring at treatment plant), daily (e.g. microbial monitoring at treatment plant), monthly (e.g. water quality at customer's tap), and annually (e.g. physical and chemical properties of

groundwater).

The WHO/IWA WSP Quality Assurance Tool has been integrated with the internal auditing activities; it is used to systematically highlight the areas where progress is being made and opportunities for improvement.

Progress on improvements identified through the WSP process:

Implementation of improvement works identified during WSP process began in 2007 and has been continuously carried out since then. Some examples of projects include the installation of back-up pumps or duplicate facilities to ensure continuous operations vis-à-vis emergencies, construction/installation of permanent potassium permanganate facilities for all treatment plants, construction of a permanent system for caustic soda application, engagement of the indigenous communities on sapling programs, among others. Many projects have been completed; others require continuous implementation or have been budgeted for the near future.

Financial mechanism(s) in place/required for development and implementation of the WSP (e.g. Were additional funds required? What are the sources of funds (self-funded, government funded, external support organizations, etc.)? What mechanisms were utilized for distributing funds to finance training, improvement programmes, etc.?) Please do not provide the amount of money that was or is required: Maynilad's 2007 WSP was developed using a WHO grant facilitated by the Australian Agency for International Development (AusAID) through the Philippine DOH. The implementation of the WSP, including the costs of the infrastructure and improvement works, and the WSP revision have been fully funded by Maynilad.

3) Assessment of implementation: benefits and challenges

Institutional Changes (Benefits and Challenges)

1. Improved communication and collaboration between WSP team members, stakeholders, public/customers and/or within the water service provider among staff and management. (If change was observed, between which parties/groups?):
Maynilad staff have been involved in all steps of implementation of the WSP. Obtaining support from key departments (Finance, Human Resources, and Logistics) has been facilitated by the efforts to strengthen collaboration within Maynilad. Communication with other stakeholders has also improved mostly due to the efforts to engage stakeholders in diverse management activities. An example of stakeholder engagement is the collaboration agreement on the best practices of watershed management that has been signed with the Dumagats. Communication with customers has improved due to a call center that has been set up post WSP implementation and trainings on the proper handling of customer complaints.
2. Increased awareness, knowledge, and understanding among water service provider staff/departments (examples of possible knowledge areas include the water supply system and its operations, workplace safety, management procedures (e.g. Standard Operating Procedures (SOPs)) and needed improvements) (If change was observed, within which parties/groups?):
The efforts to assist the company's staff training needs and ensure understanding of how poor practices can imperil drinking water safety have led to an improved understanding within the entire organization, which is reflected on the improved performance indicators (e.g. nearly 100% customer satisfaction). Competency requirements and equipment and process training have further bolstered the personnel's ability and understanding on the water treatment process. Additionally, regular WSP

training for staff has been implemented as part of the ISO awareness agenda, thus facilitating integration of the WSP approach into the company's operations.

3. Improved attitudes and increased acceptance of WSP methodology and/or water safety operations among WSP team members, stakeholders, public/customers and/or within the water service provider among staff and management (If change was observed, within which parties/groups?):
The DOH has adopted Maynilad's WSP as the reference for water districts in the Philippines that wish to implement the WSP approach. As of 2011 seven water service providers had adopted their own WSPs following the training they had received from the DOH and Maynilad. To date 18 workshops on WSP have been conducted; over 190 water districts and 700 participants have been trained.

4. Increased capacity building and training within the water service provider among staff and management (If change was observed, between which parties/groups?):
Workshops and seminars have been organized to train staff on WSP management procedures and effective catchment management. For example between 2007-2011 over 1,100 employees took part in watershed protection activities. The company's annual training activities for internal and external stakeholders predates the WSP, however, the training program now includes modules on documentation and auditing in order to support WSP implementation. As part of the new additions to the training scheme, members of the WSP Team and other concerned units are trained on risk assessment, emergency preparedness, water quality management, and others. An impact evaluation assessment is regularly conducted after the training activities to determine the effectiveness of the training program.

5. Increased overall ownership among levels of staff within the water service provider:
Operators can shape the upgrade and improvement of management and operation systems by making suggestions based on their experience. The WSP clearly defines department responsibilities for each step on the water provision chain; this has called for higher accountability and led to increased ownership among the concerned units.

6. Improved workplace productivity within the water service provider:
By clearly defining the unit responsible for each procedure in the water supply chain, the Maynilad WSP assures that there is no duplication of functions within the operating units. WSP has contributed to improving operational efficiency: personnel cost has been reduced by 37% between 2006 and 2011. Additionally, the WSP approach has led to the identification of more efficient operational procedures. For example, staff in charge of operating the newly established treatment facility (built to mitigate the problem of metals in raw water following an extended drought) have developed indicator methods that allow operation of said treatment facility in a systematic rather than reactive way (as was previously done and at times led to water quality failures and unnecessary dosage of chemicals). Nomograms have also been prepared - based on historical data and various assays - to determine the dosage of chemicals needed to achieve the desired treatment removal of these metals and avoiding overdosing of chemicals.

Operational Changes (Benefits and Challenges)

1. Improved/updated system infrastructure:
Since implementation of the WSP, many infrastructure improvements have been implemented. Some of these include rehabilitation of pumping stations, repairing over 170,000 leaks, laying over 2,500 km of new pipes, decommissioning 1,706 km of old lines, using portable in-line chlorinators

along the distribution lines, installation of water meters and grit removal, among others. Overall, improvement works have targeted all levels along the water supply chain from catchment to consumer tap.

2. Improved management of water supply system (e.g., improved treatment process control, improved source water protection):

Maynilad engages the Dumagats and various public and private organizations to protect the watershed (i.e. continued reforestation activities). Implementation of WSP has been crucial for the treatment plants and the distribution systems to acquire triple ISO Certifications for quality, environmental and occupational health safety, and management, and thus deliver potable water in line with stringent international standards.

Raw and treated water are now monitored every hour for turbidity, manganese levels and residual chlorine. Additionally, the WSP approach led to the identification and implementation of improvement works at the treatment plants (replaced alum dosing system and installed lime and caustic soda at the coagulation points). These measures and improvements have increased control over the treatment process.

3. Improved documentation and implementation of management procedures (e.g. SOPs):

The WSP document has clearly defined management procedures for operations under normal and emergency situations. Furthermore, they highlight specific steps to be followed during emergency incidents to mitigate the impacts of such events and allow the company to restore normal operations at the earliest possible time. Maynilad now implements a Document Control System (DCS) which allows operations personnel to propose changes to improve and update procedures and processes, thus contributing to keeping management and operations staff connected and involved.

4. Improved record keeping and data collection:

The DCS serves as a database of relevant and updated information on control processes. As documents are updated current versions are made readily available while older versions are archived. Similarly, records for the management systems are stored for a definite period.

5. Improved monitoring (operational and verification) and surveillance:

Regular monitoring of control measures is carried out as part of the WSP and is integral part of verification activities. Monitoring activities happen regularly according to an established schedule and specific responsibilities have been assigned. Control measures throughout the entire water supply chain are carefully monitored and recorded. Regular water quality testing had been carried out before WSP implementation, nonetheless it is now thoroughly documented and integrated into operational and management procedures.

6. Improved monitoring of costs and expenditures:

Monitoring of costs and expenditure is carried out as part of Maynilad's usual business operations.

7. Improved formal or informal auditing of operations (internal and/or external):

Internal and external auditing of operations only began after WSP implementation. The auditing activities are carried out according to a set schedule and are performed by experienced auditors. Auditing activities are thoroughly documented and utilized to support management decisions.

Investment Changes (Benefits and Challenges)

1. Better targeting of investments (e.g. Investments based on prioritized risk assessment):

Budgetary allocation now prioritizes improvement works that mitigate hazards identified as high-risk

during WSP implementation. The WSP has also been aligned with Maynilad's ACR so that the budgetary allocation is planned according to the need for preventive maintenance, replacement and upgrading of assets.

2. Increased financial donor support/investment (domestic and/or international support) and/or increased donor awareness for future financial support:
After implementation of the WSP and its supporting programs, members of the private sector have volunteered to provide resources to Maynilad's watershed protection programs. Over the past five years, the company has secured loans from local and international lending institutions to finance its capital expenditure projects. This was possible thanks to Maynilad's improved credit worthiness which was supported by the ameliorated standards, and management systems that resulted from the WSP and ISO-certification, coupled to the marked improvements in water quality and reliability.

3. Increased resource allocation to supporting programs (e.g. training, environmental monitoring, epidemiological surveillance, watershed protection):
Following identification of deforestation as high-risk hazard for water quality, Maynilad has strived to improve watershed protection and management. As part of these efforts, Maynilad has hired over 4,500 Dumagats to assist in the watershed reforestation program.
Investments have been directed to training activities that target customer service, the WSP, and water management. Research and development activities to support decision-making concerning water quality and to design better indicators of contamination, among others, have also been spurred by the WSP.
In addition, a hygiene and sanitation program has been devised to educate the personnel and other stakeholders on the importance of minimizing the introduction of hazards into the water at all levels of the water supply chain.

4. Water supply cost recovery (consumer payment compliance, cost reduction, etc.):
Implementation of the WSP Maynilad brought down the ratio of personnel cost per connection by 37% between 2006 and 2011. Additionally, WSP implementation has supported a reduction of non-revenue water (NRW) from 66% in 2006 to 38% in 2013. This striking reduction in NRW has contributed to the 48% increase in the number of water service connections without immediately having to invest in new, major water sources.

Changes in the 'Enabling Environment' (Benefits and Challenges)

1. Increased promotion and knowledge-sharing of the WSP with other water suppliers, local/national government, and/or others:
Being the first of its kind in the Philippines, Maynilad's WSP has served as a model for the formulation of WSPs in other water districts. The DOH has conducted a total of 18 trainings with over 190 water districts using Maynilad's WSP as a model. Moreover, the company's WSP has been included in WHO's *Training Workbook on Water Safety Plans for Urban Systems* and presented as a case study in international conferences.
2. Improved legislation, regulation(s), standard(s), and/or policy enforcement around water quality guidelines due to WSP implementation:
Maynilad's experience with development and implementation of a WSP has served as guide to the development of national WSP training materials used by the DOH to advocate for WSP among water districts across the Philippines. The lessons learned from WSP approach piloted in Maynilad have also

supported the efforts of the Philippine DOH in developing the National Policy on Water Safety Plan for All Drinking Water Supply Providers, which is currently being finalized and will require water supply providers to develop and implement WSPs.

3. Improved legislation to support or strengthen associated regulation (water allocation, consumer health, industrial and residential wastewater discharge, land use, environmental health, etc.): Although numerous discussions between government agencies have taken place, no policies or legislation on supporting programs have been spurred by WSP implementation in Maynilad.

4. Improved government educational initiatives around water quality aimed at the public: Since the implementation of the WSP, Maynilad has strengthened its partnership with the DOH and the Department of Education in promoting health and sanitation in public elementary and high schools by building drink-wash-stations, launching media campaigns, organizing events, etc.

Water Safety Plan Longer-term Impacts (may overlap slightly with above changes) (Please include an explanation and the source of data, if available, for all items below.)

1. Improved water quality: The updated infrastructure, the adoption of a systematic rather than reactive action plan and more robust operations and management supported by the WSP have led to improved water quality performance. For instance, the number of water quality complaints received by the company's customer service hotline has decreased significantly since the implementation of the WSP, from 2,505 in 2009 to less than 2,100 in 2012. Maynilad's compliance rate to the water quality monitoring carried out by the MMDWQC has been consistently 100% since WSP implementation.

2. Improved water quantity: The WSP approach has led to significant improvements on leakage control and illegal connections, both of which have reduced water losses in Maynilad's water supply system. For example, WSP implementation has contributed significantly to the dramatic decline in non-revenue water (NRW) from 66% in 2006 to 38% in 2013.

3. Improved water service continuity: The WSP-identified improvement works that have been implemented throughout the entire water supply bolstered a remarked improvement in water service continuity: in 2006 only 32% of households had access to a 24-hour water supply, whereas in 2012 95% of customers could enjoy a 24-hour service.

4. Improved water service coverage: The efforts to extend the pipe network and the increasingly improving water supply service contributed to a 17% increase in population coverage, from 78% in 2006 to 91% in 2012. This corresponds to over 2 million people being included in the service area since 2006.

5. Improved water service cost recovery: Maynilad has brought down its personnel cost per connection ratio by 37% between 2006 and 2011. Additionally, the reduction of NRW water allowed the company to expand its consumer base without immediately having to invest in new, major water sources.

6. Improved customer satisfaction: According to the PAWS survey, customers who found their water services to be very good went up from 96.3% to 99.57% between 2006 and 2010.

How were these benefits achieved, evaluated and measured? How long did it take to achieve the benefits? What other longer-term impacts do you expect to see as WSP implementation progresses? How are these benefits communicated between stakeholders and with the public?

The realization of these benefits has been contingent on four counts: 1) efforts to comply to the strict water quality standards set by the Philippine National Standards on Drinking Water Quality, 2) strict internal operational targets in water quality, 3) a robust financial business plan to support implementation of the WSP, and 4) strong management support and employee commitment. These benefits have been achieved over 6 years of incremental improvements which have been supported by the WSP but also other initiatives undertaken by Maynilad.

Were there challenges around WSP activities related to these longer-term impacts? If so, how were they solved/how are they currently being addressed? Were these challenges anticipated? As WSP implementation continues, do you expect any other challenges related to these impacts?

- 1) Incorporating the WSP into Maynilad's entire business and operational plan.
- 2) Maynilad is the largest water and wastewater service provider in the Philippines in terms of customer base. Given the large population, and source waters that are distant from the end-users, there are numerous points where the water may be contaminated. To tackle this challenge, Maynilad has strived to improve its water treatment (in-line chlorinators) and distribution network (rehabilitation and replacement of pipes, fixing leaks), and has subdivided its service area into zones to facilitate monitoring.
- 3) Given that several steps in the water supply chain – mostly related to catchment and raw water conveyance – are beyond Maynilad's control, the company has strived to coordinate closely with stakeholders and address concerns that may affect operations.
- 4) The risk assessment approach requires a shift in paradigm from the part of the water service provider. Specifically it requires the realization of the importance of investing on a safety net and precautionary measures to improve water quality.

4) Assessment of implementation: lessons learned

What were the lessons learned (e.g. technical, institutional, policy, related to the WSP process, outcomes, etc.)? (If you had to start the WSP development and implementation process over, what would you do differently and what would you do the same?):

1. Management support is crucial in the formulation and implementation of a WSP. Without it, securing the necessary resources, employee commitment and financial investments would not have been possible.
2. The WSP should not be considered a stand-alone document but rather be integrated in the company's management systems. Similarly, the WSP must be treated as a living document that is continuously updated according to theoretical or practical developments.
3. Rather than taking an isolated stance on the management of the catchment area in a context of multiple users of the watershed, partnerships should be built to create a more sustainable solution that benefit not only the service provider but also the concerned stakeholders.
4. Continuous capacity-building and training support knowledge transfer and ensure that the operations staff are updated on the latest development in the field of water supply.

Future plans to improve the WSP process based on lessons learned, including training:

1. Continue revising and upgrading Maynilad's WSP regularly and if updated guidelines are released by the WHO. Similarly, continue to revisit the WSP and determine if the risks and the hazardous incidents have been reduced after WSP implementation.
2. Include climate change-related issues in the updated WSP.
3. Further reduce water losses in order to reduce points within the distribution system that are susceptible to contamination.
4. Expand the mentoring program on WSP-development to other water districts, service providers and stakeholders.

5) Links/supporting information

Links, if available on line:

<ftp://ftp.wpro.who.int/scratch/ENH/Maynilad%20WSP/>

http://www.mayniladwater.com.ph/uploaded/signed_pronouncement_oct_2012.pdf