 Recommendations:

1. To build a staff awareness and Consensus

2. All staff, from senior management to the crew, should understand the SCADA and

automation systems

3. Building the understanding of top-level management on Automation

4. Middle management and staff must understand their roles and responsibilities on

automation, since it requires a long-term, combined effort from all departments in the

utility.

5. to establish any automation specially SCADA and related work should follow the

guideline and verified by SCADA team

6. Automation experts and SCADA team should supervise, advice and updating the technology as required. Every year should be check the technological change and after 5 years could be rebuild the master plan.

7. All project and stockholder should follow the guideline of Government and DWASA Automation Masterplan.

8. Intensive training should be organized on SCADA and Automation.

8.0 Conclusion:

However, SCADA is not only brand-new concept using ICT but also ordinary management-based concept. Therefore, primary and systematic operation and maintenance of water supply system is very critical issues above all. Integrated Water operation control and command platform is a future oriented water management strategy by integrating ICT based water management technology. So, it is managing the entire process of the water production source as well as water cycle scientifically and systematically above all.

Aligning with master plan for automation will best impact on Smart water management

systems. The outcome will be sustainable provision of a more reliable, improved and climate-resilient water supply in Dhaka city. Sustainable managerial capacity of district metered areas enhanced DWASA's managerial and technical capacity will be strengthened to keep Smart Water management Systems.

But OPC DA is older technology, less secured and only suitable for Windows operating system / server platform only.

In future this Dhaka WASA link – 16162 will also be used as a management tool helping employees and internal services also- as an efficient Call Center Solution for better complaint & employee management for Dhaka WASA.

Improve the DWASA mobile APP, take feedback from users.

***Major Problems of Dhaka WASA***

***System Loss:***

In a given time the difference between total water production and total bill made is called the system loss. The technical reasons behind it are – leakage in water line, not working meters these problems create mechanical system loss. Administrative system loss are – illegal connection, weak billing system etc. Dhaka WASA has taken significant steps to reduce the system loss. Various steps in revenue billing and collection process have brought least success in reducing the system loss. According to water production and billing the total present system loss is 35.65%. DWASA yearly system loss is shown in a graph below –

***Steps to Reduce System loss:***

To make logical reduction of system loss Dhaka WASA is continuously taking contract billing and collection and other necessary activities. Dhaka WASA zones 3, 4 and 5 are already leased to establish it as a service oriented commercial organization.

***Water Shortage***

***Causes*** ***of Water Shortage***

1. Incapability of Dhaka WASA to ensure water production and infrastructure development for water distribution to fulfill the increasing demand with the unnatural increase of population.
2. Water production system is deep tube well basis that is not capable of distributing.
3. It is difficult to meet up the demand of increasing population depending on tube-well technology.
4. Presently 84% water of Dhaka city is being distributed from deep tube-well or ground water. For mechanical reason it is needed to excavate deep tube-well and ensure 2000 feet distance from one another as it decreases production of water if placed in short distance.
5. Continuous water lifting causes decrease of water level as well as decrease the capacity of deep tube-well in water lifting.
6. Inadequate preserving capacity and defecting old water lines hindrance proper water distribution. As a result, in dry season WASA cannot supply adequate water in compare to demand.

***Controlling Water Quality:***

Dhaka WASA regularly examines ground and surface water quality by its quality control and research department. To prevent the pollution of ground water, chlorination system is running in every water source. Moreover, the surface water also chlorinate after purifying.

Dhaka WASA also examine the arsenic of ground water and also the poisonous chemical of water like chromium, cadmium, lead, zing, mercury, aluminum monthly. Moreover, Ammonia, Nitrate, Phosphate, sulfate, BOD and COD of water also examined in case of necessity. Presently Dhaka WASA has no scope to examine all those. So they take the help of BUET, Bangladesh Industry Research, Atomic Power Commission and Soil Wealth Institution.

To check out the distributed water Dhaka WASA collect water source and distribution line and examine these in Quality Control and Research Department. If the tests give negative report WASA takes necessary steps to solve the problems. Except water sources and distributing lines, the ground and roof tanks of customers can also be polluted by poisonous bacteria. Dhaka WASA propagates in media and advertises to raise awareness among the customers. Dhaka WASA and Ministry of Environment has a mutual committee to check out all the sources and distributing lines of water monthly and takes necessary steps operated by the committee.

***Sewerage System:***

For a healthy city life a proper sewerage system is indispensible. Since 1923 sewerage system started to develop gradually in Dhaka city. All the areas of Dhaka city could not brought under this facility because of lack of wealth. Mirpur, Mohammadpur, Shaymoly, Kallayanpur, Uttara and Baridhara including a large part of northern zone of Dhaka city were out of the facility of sewerage system. A big plan is taken to include these areas and provide sewerage service. A short description of sewerage system in Dhaka is given below –

Sewerage Purification Plant 1

Sewerage Lift Station 29

Sewerage lines 882 km

Sewerage Connection 60277

***Existing Sewerage problems:***

Empty plastic bottles, poly bags and various solid wastages create obstacles in manhole and sewerage line and dirty water come out of it. Moreover, illegal surface drain connected with sewerage line which causes severe pollution. To solve these problems Dhaka WASA has taken various steps including awareness building among mass people that nor to throw waste in manhole and connect illegal surface drain with sewerage line. For this Dhaka WASA advertise in radio, television and in newspaper. Sewerage lines were established in old Dhaka many years ago which is now insufficient and imperfect in compare to demand. High rise buildings have brought natural and environmental change. From this perspective, reconstruction of water and sewerage lines became an important issue.

Sewerage system is so expensive that many areas of Dhaka city in still out of this facility. But Dhaka WASA has taken effective steps to construct this system all over the city.

***Drainage System:***

Dhaka city was established in the reign of Mughols near to Buriganga river about 400 hundred years ago. There were enough canals in Dhaka city from which Paribagh, Dhanmondi, Begunbari, Dholaikhal, Shegunbagicha, Arambag, Jarani, Manda, Kallayanpur, Ibrahimpur, Shutivola ect are mentionable.

These canals were connected with each other and used as the water ways. There were no such mentionable problems of water blockage. In last 50 years various infrastructure development project of Dhaka city filled most of the canals and caused drainage problems.

***Main Reasons of Water Hindrance:***

  Unplanned urbanization.

  Illegal possession of canals, shrinking of canals.

  Insufficient management for solid wastage removal.

  Solid wastes dump in low lands and at the side of drainage line.

  Domestic disposals are thrown directly in the surface drain, manhole, sewerage canals and drainage network.

  Filling up the canals and establishing cross roads by insufficient formation of pipe lines shrink canals.

  Shrinking canals by establishing roads at the side of the canals.

  Internal ponds, canals, channels became filled with soil in Dhaka city.

  The manholes became filled with soil and disposals.

  Sands and various obstacles get into drainage line during the construction of road and foot ways.

  The solid rubbishes of surface drain directly entered into drainage line.

  Ignoring necessary rules and regulations related with drainage system.

  Lack of machineries and vehicle to clean drainage line and box-culvert.

  Less powerful pumping management than produced runs off.

Dhaka WASA established 42 years ago but started to make drainage system in only 17 years before. In 1946 the drainage activities of Dhaka WASA started under Public Health and Engineering Department (DPHE). From 1989 Dhaka WASA conducts the drainage activities. Water blockage of city is decreasing than before.

Water blockage is a big problem for Dhaka city. To eradicate the water blockage Dhaka WASA has taken various steps and improved this condition. Presently Motijheel, Secretariat, Segunbagicha, Kakrail, Bijoynagar, Ramna, Rokeya Sorony and most of the areas of old Dhaka are now free of water blockage. Government took project named “Eradication of Water Blockage in DhakaCity” to reduce water blockage in other parts of the city.

***Dhaka*** ***WASA already accomplished some activities to solve drainage problems –***

* 150.00 km pipe drain cleaning
* 8.60 km pipe drain construction
* 21 km open canal development
* 7 km box-culvert cleaning
* 100 meter box-culvert build up
* Cleaning of 13 canals
* 10pcs KVA generators have been used.

***a)    Permanent Pump Station:***

* 22.00 cubic meter powerful Dholaikhal pump (conducted by Dhaka WASA)
* 10.00 cubic meter powerful Kallayanpur pump station (conducted by Dhaka WASA)
* 22.00 cubic meter powerful Goran pump station (Conducted by Water Development Board)

***b)    Temporary Pump Station (Dhaka WASA):***

* Rampura                :           43, 5 cusec pump

5, 25 cusec pump

* Kamlapur highway:           25, 5 cusec pump

3, 25 cusec pump

Dhaka WASA also constructed 57 pump stations in different areas of the city comprising Mirpur, Golartek, Hazaribagh, Rayerbazar, Sikdar medical, Soyarighat, Kalunagar etc. In last Dhaka WASA settled 25 pump stations in DND areas to help water development board.

***Existing Drainage System:***

Since 1964 different drainage infrastructure are constructed under small and large projects that can be shown below –

|  |  |
| --- | --- |
| **Storm water line** | **265 km** |
| **Box-culvert** | 8.5 km |
| **Open canal development** | 65 km |
| **Water drainage pumping station** |  |

1. **1.      Kallayanpur**
2. **Dholaikhal**

2

10 cubic cm

22 cubic cm**Areas under drainage system**160 square km

 To solve water blockage in the city street in rainy season Dhaka WASA set-up some temporary pump station. As a result the water blockage of Dhaka city is now in tolerable position.

***Clients’ Complaints and Solution:***

Dhaka WASA collects complaints from its clients of all 11 zones relating water shortage, leakage in water line, bad smell in water, leakage in sewerage line, overflow of sewerage line, water blockage in street etc. Dhaka WASA takes quick initiatives to solve the complaints. It has a trial to solve as much complaints as it can to satisfy clients.

***Critical Assessment***

In the critical assessment of Dhaka WASA we tried to focus on two broad aspects: (i) organization structure and governance; (ii) budget and financial management systems. For each of these dimensions the main constraints are identified and some recommendations are proposed for further development of effectiveness of the organization.

***(i)    Constraints of Organization Structure and Governance of DWASA:***

***Government Interference:***

Although the provisions contained in the Act aim at ensuring full autonomy of DWASA’s management vis-à-vis the Government, institutional backlogs in the application of the Act and Government interference in the decision making process hamper the Board’s autonomy and jeopardize efficient service delivery from the part of DWASA.

***Lack of Rules and Regulations:***

Efficient administration of DWASA is also hindered by lack of rules and regulations that have been approved by the Board but are awaiting Government approval as well. Absence of operational rules and regulations creates a breach for the Government to bypass the Board’s authority especially in what concerns recruitment of the WASA Managing Director (MD) and Deputy Managing Directors (DMD). Government interference in appointment of MD and MD has affected DWASA management since the appointees are often on secondment from the civil service rather than being recruited from the private sector and hardly complete a full three years mandate.

***Remuneration/Promotion is not merit-based:***

According to the Act the Board has the authority to create new posts for officers and staff of DWASA and also to define the level of salaries and benefits. This provision however has not been applied either since the salary and benefits of DWASA staff follow the Government structure; hence remuneration and promotion mechanisms are not merit-based but seniority driven with negative effects on the incentives and the performance of the employees.  The Board’s authority in recruiting new staff from the open market is also limited by the influence of the Trade Unions which limits the availability of qualified technical staff within WASA.

***Board can adjust only 5% of tariff:***

In principle the Act gives to the Board the authority to impose or adjust tariffs though in practice this is another area that falls under the realm of Government approval. This reduces the Authority’s ability to adjust tariffs and to achieve full recovery of its operational costs. The Board enjoys full autonomy to adjust tariffs up to a maximum of 5% only in case of increase in the electricity tariff.

***Zones’ management is not integrated:***

Besides government interference, DWASA efficient management is also hampered by its internal articulation into 7 zonal offices to which operation and maintenance functions and billing and collection activities have been decentralized. Although decentralization of responsibilities to local offices may be justified from the point of view of increased efficiency in service delivery due to spatial proximity to consumers, the performance of the zonal offices has been far from efficient. DWASA’s zone offices have a dualistic structure since operation and maintenance activities are under the responsibility of 7 MODS (Maintenance, Operation and Distribution Services) offices which report to the Operation and Maintenance Division, while billing and collection activities are performed by 7 zone revenue offices which report to the Commercial Management unit of the Finance and Accounts division. As a result, though the MODS and revenue offices share the same premises, the zone’s management is not integrated nor coordinated with serious consequences on the quality of service delivery. In addition neither the MODS nor the revenue offices are held accountable for their performance vis-à-vis their central office thus leading to an inefficient decentralization of responsibilities.

***Large Revenue Leakage:***

Efficiency in service delivery varies across zones and in some of them billing and collection has been contracted out to staff cooperatives with significant improvements in collection efficiency. Nonetheless, DWASA as a whole suffers from large revenue leakages which are due to both technical and administrative reasons. On the technical side physical leakages are due to poor quality of materials and insufficient maintenance and repair works while on the administrative side there is significant fraud and corruption from the part of the revenue inspectors. Delayed billing is quite common in some zones as it allows revenue inspectors to grant discretionary reductions over the accumulated bill in exchange for bribes with negative effects on both consumer welfare and DWASA revenues.

***Weak Capacity of Officers and Staffs:***

A major constraint to the efficient functioning of DWASA is the weak capacity of its staff both technical and administrative. This is due to the management inability to recruit new staff and to the absence of a human resources development policy on recruitment and training needs. The DWASA training center, that was setup in 1980 on the basis of the recommendations of an IDA Appraisal Mission. Nowadays, however, the training center is not effective in providing training as it suffers from lack of financial and human resources, poor career plan for trainers and lack of facilities, equipment and transport for field training.

***(ii) Constraints of Budgeting Process and Financial Management:***

***Lack of efficient Allocation of Scarce Resource:***

In the case of DWASA, the external audit report shows that the financial statements produced by the Accounting and Finance Division of DWASA are perceived more as a ritual annual presentation of financial information about operating receipts and expenditures, assets and liabilities rather than as a tool for efficient allocation of scarce resources. The information contained in the financial statements is often incorrect so that revenues and profits are overstated while expenditures and liabilities are understated, thus failing to provide a true and fair view of the DWASA fiscal situation.

***Budget approval in not in the hand of Dhaka WASA Board:***

According to the Act the Board has the power to approve both the Annual and the Supplementary Budget of DWASA, but in practice the final approval is given by the Ministry of Finance and the budget is then finalized in a tripartite meeting among the Ministry of Finance, the Administrative Ministry and DWASA.

***Budget Process follows Incremental Approach:***

The budget process in DWASA follows an incremental approach3, it is not led by the definition of strategic targets, both physical and financial, to be achieved by the organization. There is no midterm review of the budget execution nor monitoring mechanisms of the revenues and expenditures. Similarly, at the end of the fiscal year there is no comparison of  the budgeted and actual figures, and no explanation is provided in case of significant discrepancies between the two figures. Finally, in spite of the Act requiring the Board to publish the Annual Report within six months from the end of the fiscal year, this document has been overdue since 2002. This points to lack of accountability of DWASA management for the utility performance.

***Revenue Income – expenditure disparity:***

Over the last few years DWASA has been able to finance its operating expenditures out of own revenues, while capital expenditures are partly financed out of DWASA own revenues and partly out of the Annual Development Plan (ADP) allocations. The current budget and the capital expenditure from revenues accounts are held by the Administration and Finance Division (A&F) of DWASA, while the development budget is maintained by the Planning and Monitoring unit under the Resource Planning and Development Division (RPD). The development budget is entirely financed out of ADP funds which usually consist of both Government funds and foreign borrowing in the form of multilateral and bilateral financing4. Government funds officially take the form of loans, but they are hardly repaid thus representing *de facto*a grant to the utility. Nonetheless, it is difficult to gauge the extent of Government support to DWASA development budget as domestic and foreign financing are consolidated and DWASA accounting division does not provide separate records for the central government share on ADP funds. This information would be relevant in order to assess DWASA’s financial autonomy also because the utility apparently does not benefit from any other Central Government subsidy.

***No association from Govt. in case of Supplementary Budget:***

During the fiscal year DWASA may resort to the supplementary budget procedure in the event expenditures exceed the amount estimated in the budget. When this is the case, the additional expenditures are usually financed out of DWASA revenues, unless the corresponding outlays are financed out of ADP funds, in which case is GOB to provide the corresponding resources. In any case the supplementary budget is to be approved by the Government.

***Delayed Audit Report:***

DWASA financial statements are subject to independent audit. According to the DWASA Act the audit report should be submitted within two months from the end of the fiscal year, but usually the submission is delayed. Comments from the auditor point out to weak capacity within DWASA as far as accounting of assets and liabilities is concerned as well as management of foreign exchange risk in case of foreign borrowing. Apparently there is no obligation for DWASA to incorporate the auditor’s comments and to publish the adjusted financial statements; this affects negatively the transparency of the budget process and financial performance of the utility.

***Foreign Borrowing & Debt Management:***

Another serious concern about DWASA financial management is related to its foreign borrowing and debt management procedures. As of 30 June 2005 DWASA foreign borrowing consisted of the following: four IDA credits on account of water supply loans (i.e. 1st, 2nd, 3rd and 4th credit); two ADB loans on account of Dhaka Urban Infrastructure Improvement Project (DUIIP) and Integrated Flood Protection Project (IFPP) and SIDA Generator Loan. These funds are usually re-lent by the Central Government to DWASA at higher interest rates and shorter maturity than those for the original loan. Auditing of DWASA’s financial statements reports significant delays in repayment of these loans5 as well as irregular booking of payments on account of interests in some cases6. As a result, arrears in principal repayment lead to a buildup in interest liabilities with subsequent increase in debt service, while incorrect recording of loan repayments provides a misleading picture of the actual liabilities of DWASA.

***Lack of Computerization:***

Finally, the lack of computerization of the financial management system is another serious impediment to the efficient budget process. Budget data are still recorded in the manual ledger in the accounting and finance department, while at the zonal level information on billing and collection is kept in the consumer ledger which is not reconciled with the general ledger. Financial reports are prepared by spreadsheet which is a lengthy procedure.

***Recommendations***

***Use Participatory Approach:***

Since the main constraints on the institutional asset of DWASA are political in nature, any reform path to overcome these limitations has to be built on a participatory approach to promote ownership of reform and to generate the necessary support from the part of the Government.

***Consensus*** ***Building:***

The milestones detailed above are quite ambitious, their achievement has to be based on consensus building at different levels:

(i)                 DWASA staff be actively involved in the elaboration of the reform program. Consultation with the MD and DMDs is crucial to identify an agreed path of reform;

(ii)               Trade Unions play an important role in DWASA management and they can be powerful allies in the implementation of reforms. Consultation with their representatives is a key factor especially on issues concerning the new recruitment policy and remuneration mechanisms.

(iii)             Raising civil society’s awareness about the right to safe water supply and cost effective management of the utility which benefits consumers’ welfare.

***Adoption of new Organization Chart:***

Amendment of the DWASA Act along the lines suggested by the institutional development specialist1 especially in what concerns elimination of the clause requiring government approval of the first DWASA organization chart. This would allow DWASA to adopt a new organization chart which is more suited to the needs of a commercial organization.

***Allow Participation of Stake Holders:***

Adoption of the new organization chart inevitably leads to a redefinition of the current articulation of DWASA in zonal offices. Specific options for reform will be based on inputs from consultations with the stakeholders, but one of the main objectives of reform should be the creation of fully accountable zones from a financial and operational point of view. This implies unification of the zones management under only one manager which is responsible for the zone’s performance vis-à-vis the DWASA central office. The number of zones may be increased as well as their competencies though the central DWASA office should keep overall responsibility for DWASA strategic investments, financial performance and quality of service delivery.

***Rearrangement of Staff Competencies:***

Rearrangement of staff competencies with the organization’s requirements also in light of the new organization chart. This requires provision of technical assistance to DWASA for the actual implementation of the new chart, design of curricula, job description and matching of the human resource needs of DWASA with the existing staff.

***Merit-based Recruitment and Promotion:***

Adoption of a merit-based recruitment and promotion system that provides employees with the right incentives and introduction of a performance-based salary scale.

***Code of good Conduct:***

Adoption of a code of good conduct for DWASA staff and of a system of penalties/incentives for zones performance in collection of bills.

***Setup Human Resource Development Unit:***

Elaboration of a human resources development policy is an integral part of the institutional reform of DWASA. In this respect technical assistance can be provided to the authority to setup a human resource development unit in charge of: assessing DWASA’s recruitment needs; conducting a training needs assessment and identifying training courses to be provided on a regular basis.

***Strengthening Training Center:***

The most important requisite for sustainability is to enable DWASA to attract and retain qualified trainers and to ensure availability of financial resources to fund training activities. In order to retain qualified trainers a specific career path should be developed which includes financial incentives. Nonetheless, as it may be difficult for DWASA to develop a separate remuneration package for trainers, an alternative option might be to develop partnership agreements with local and/or foreign institutions and universities by means of which training can be provided to DWASA staff either in-house or through study tours. The advantage of this solution is that it would reduce to a minimum the burden on DWASA from running its own training center as this would also raise some concerns with respect to its funding. In fact, though during project implementation the training center can be funded out of the project loan proceeds, once the project is completed, DWASA should take over the financial burden of the center.

***Recruit Qualified Staff and Ensure Accountability:***

Therefore, implementation of the reform initiatives suggested in the previous section represents an enabling condition for improvement of the budget process and financial management of DWASA. Ability of the DWASA management to recruit qualified staff from the open market would certainly benefit the accounting and finance division, which at present is lacking any qualified accountant. Moreover, increased accountability of DWASA management for the financial results of the utility would provide additional incentives thus improving the quality of financial reporting.

***Introduce Result Oriented Budget:***

Reforming the budget process to introduce results-oriented budget mechanism by which planned current and capital expenditures are functional to the achievement of the management’s long term vision of DWASA. This requires dismissal of the current incremental budget approach and building in the accounting division the necessary capacity to produce reliable budget estimates;

***Reforming the Accounting System:***

Reforming the accounting system in order to unify the capital budget (i.e. capital expenditures from revenue and development budget) and to provide separate information about the extent of Government budget support to DWASA;

***Capacity*** ***Building*** ***in Debt Management:***

Capacity building in debt management especially in what concerns monitoring debt service payments and reliable projection of future debt service liabilities to be incorporated into the budget document. DWASA management should play an active in role in the elaboration of the utility borrowing strategy also with respect to the renegotiation with the central government of the re-lending terms as well as rescheduling/write off of the most expensive loans which absorb an excessive share of financial resources.

***Regular Training:***

Providing regular (refreshing) training to both the existing and new staff in the new accounting practices and the computerized management information system;

***Computerization of Financial Management:***

Computerization of the financial management and budget system in order to expedite to process of budget reporting and to link the different WASA zone offices to the central office. This step is even more important in light of the likely increased decentralization of the DWASA duties to its zonal offices;

***Be Accountable to Ministry of Finance:***

Making the DWASA management accountable to the Ministry of Finance for the financial results of the authority by making compulsory publication of the Annual Report;

***Conclusion:***

From the overall discussion it can be said that, Dhaka Water Supply and Sewerage Authority (DWASA) as an autonomous institution providing water supply, sewerage and drainage service to almost 12 million people of the Dhaka mega city. Its activities are not faultless because of financial, technical and technological inability. Even though, there is a regular increase of Dhaka WASA geographical are, water supply network, drainage network and other activities. Various initiatives including strong monitoring have been taken to ensure rapid completion of its functions. Dhaka WASA is increasing number of water refinery station, surface water collection from city side Rivers, operating regular mobile court against bill defaulters and illegal connections etc. Dhaka WASA also achieved success in water production and supply through good administrative structure and e3fficient management system. Less intervention of government and active participation of skilled employees may provide Dhaka WASA with the capability to fulfill total water demand as well as creating safe environment in Dhaka by near future.

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