PERSPECTIVE

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AID, TECHNOLOGY AND PROJECT DEPENDENCE: A Case of Institutional Weakening of Water Sector from Sri Lanka

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Abstract

The deteriorating financial health of public sector water service providers attract large amounts of foreign funds (mostly as loans) to developing countries and could lead to dependence, deterioration of governance and weakening of institutions. The case study is primarily a whistle-blower to the proposed large-scale Water Supply and Sanitation project to be implemented in Kandy municipality in Sri Lanka funded by the Japan International Cooperation Agency (JICA).The bloated expenditure andhigh tariff rates to recover the operation and maintenance costs of treating wastewater, could be a huge burden particularly to lower and middle income households that raises questions on the larger acceptance of the proposed project. The technological appropriateness, economic viability, social acceptance, political feasibility and thus the sustainability of the project are questioned. The study also explores the related governance questions in the background of the water sector reforms currently underway in most of the countries including Sri Lanka.

Keywords: Water, sanitation, aid dependence, technology, institutional weakening, Sri Lanka.

1. INTRODUCTION

Water Supply and Sanitation (WSS) is of growing importance in the current discussions on MGDs which in turn attracts foreign aid as loans and grants to developing countries with international financial institutions perceiving huge potentials to increase their lending business. In the recent decades, WSS policies and programs of most developing countries have been influenced by donor assistance reflecting strategies of the donor countries and organizations rather than indigenous strategies of the recipients (Pradhan, 1996). An oft-repeated criticism is that such fund transfers create dependence with respect to both finances and technology and might turn up to be inappropriate to the existing institutional structure.Since the debate about the efficacy and implications of aid are not yet resolved, context specific studies are needed to ascertain the different dimensions of this complex issue.
This study focuses on the wastewater disposal issues in Kandy, a place of world heritage in Sri Lanka because of its cultural, historical and aesthetic values attached to it. The city has a population of around 160 thousand with a water consumption of about 25 thousand cubic meters per day. Since there is no proper system of waste water disposal, about 80% of this gets released to Kandy Lake and toMahaweli River. Over the years, Mahaweliriver, the main source of water in the region is threatened with increasing pollutant loads due to contamination from agricultural and domestic wastes,sewage and industrial effluents. Many institutions in different sectors with own mandates are collectively responsible for this situation.

The National Water Supply and Drainage Board (hereafter NWSDB) is the principal institution providing safe drinking water and facilitating the provision of sanitation in Sri Lanka, which began as a sub department under the Public Works Department until it became a division under Ministry of Local Government in 1965.

Since 1970, this division functioned as a separate department under the Ministry of Irrigation, Power and Highway until NWSDB was established in 1975. Presently NWSDB functions under the Ministry of Water Supply and Drainage. Several urban water supply schemes operated by local authorities were taken over by the board with intention of providing better coverage and improved service. NWSDBhas proposed the Kandy City Water Supply Augmentation and Environmental Improvement Project (KCWSAEIP) with financial support from JICA, which is supposed to provide safe sanitation by treating the effluents coming to the drinking water sources and ensuring clean drinking water within the city. The twin purposes of this study is: (a) to examinethe financial problems that led NWSDB to go for the loan and (b) to assess the implications of the proposed foreign aided project in terms of dependency on technology/expertise and institutional weakening of public systems responsible for the provision of WSS services in the country.

The study banks mostly on secondary data from local agencies and governmentinstitutions. The financial position of the NWSDB was analyzed using some indicators drawn from the data available for the last two decades. The proposed project invited differential responses from various sections of the society. Key informant interviews were conducted with the professionals at NWSDB, Kandy Municipal Council (KMC), University of Peradeniya, concerned government departments, religious organizations and civil society/research organizations that opposed the project. Since some of the project documents are not available in the public realm and thus many of the information confidential, the data was collected through interviews with different officials (thus information triangulated) and with the university faculty who were involved with an Environmental Impact Assessment (EIA) exercise.

The next section discusses the experience and possible implications of foreign aid projects globally and in Sri Lanka and reviews the debate on foreign aid, aid dependency and development. The third section analyses the process that led to the financial crisis of the NWSDB that forced the organization to go for the proposed project with foreign assistance. The fourth section describes the problem of pollution and the suggested solution. The fifth section analyses the implications of the project and the larger questions of water governance.

1. FOREIGN AID, DEPENDENCY AND GOVERNANCE CHANGES

Aid dependence defines as a situation in which a government is unable to perform many of the core functions of government, such as the maintenance of existing infrastructure or the delivery of basic public services, without foreign aid funding and expertise (Brautgamand Knack, (2004). Aid also leads to problems such as volatility and uncertainty of overseas development assistance flows, fragmentation of donor efforts, project proliferation, conflicting or dominant donor agendas, competition for staff, and high administration and oversight costs (Brautigam and Knack, 2004; Knack and Rahaman, 2004; Birdsall, 2004; van de Walle, 2005). Aid practices may cause substantial burden on qualified public officials who spend all their time attending to donor concerns and managing aid activities rather than promoting the development of the country. The capable staff is pulled out to the parallel structures weakening institutions by creating resentment and lowering the morale for those left behind (Cohen, 1992). In African countries state capacity has little improved during the last four decades of aid flow and even point to specific cases of clear decline (Van de Walle, 2005). Thus it limits the government's ability in aid dependent countries to learn the skills for effective management and administration with donor conditionality undermining genuine policy learning (Brautigam and Knack, 2004). Heller and Gupta (2002) argue that the fiscal uncertainty of dependence of external assistance makes long-term planning extremely difficult.We will examine how these arguments could be relevant in the Sri Lankan case explained later. Before that let us look to the macro scenario of foreign aid in Sri Lanka.

As of 1999 the total commitments of grants and loans that were made to Sri Lanka was US$ 706 million out of which the share of loans was 90%. The three major donors; Japan, ADB, and the World Bank accounted for 77% of all aid commitments. Of the total loan commitment 8% was taken up for the development of water supply and sanitation sector in 1999 (Foreign Aid Review, Sri Lanka, 1999). The government outstanding debt is 3,432.4 billion rupees as at end of 2008 which is a 14% increase compared to 2007 figures. As a share of GDP, thegovernment debt reduced from 105.4% in 2002 to 81.1% in 2008 (Table 1). Then it increased in 2009 by 2.2%. The share of government revenue of GDP increased from 2004 to 2006 and then it started decreasing. More or less the same trend can be observed in tax share to GDP and share of government expenditure.

Table 1: Government Debt Indicators in Sri Lanka

Government finance (percent of GDP)	2002	2003	2004	2005	2006	2007	2008	2009
Government Debt	105.4	105.8	102.3	90.6	87.8	85.0	81.1	83.3
Domestic Debt	45.6	47.9	47.6	39.0	37.5	37.1	32.8	36.5
Foreign Dept	59.8	57.9	57.7	57.6	57.3	47.9	48.3	46.8
Government Revenue	16.5	15.7	14.9	15.5	16.3	15.8	14.9	14.6
Tax revenue	14.0	13.2	13.5	13.7	14.6	14.2	13.3	12.8
Government Expenditure	20.9	19.0	22.8	23.8	24.3	23.5	22.6	24.9

Source: Central Bank of Sri Lanka Annual Report 2009

1. FINANCIAL CRISIS OF NWSDB AND FOREIGN ASSISTANCE

The NWSDB and local authorities like municipal councils are the two major institutions involved in WSS services and management throughout the island with the support of the provincial councils, lending institutions, external supporting agencies, CBOs and NGOs.

Water supply and sanitation services were provided by the respective municipal councils until the NWSDB was established as a statutory board enacted by the parliament under the National Water Supply and Drainage Law No. 2 of 1974.Since then the water services were gradually taken over by the NWSDB and in 1982 consumer metering and billing were commenced. However, WSS services of some of the cities are still provided by their respective local authorities while development activities are under taken by the NWSDB. Likewise, WSS services within the city limits in Kandy are provided by the Kandy Municipal Council (KMC) while the piped water supply to the periphery of the city is provided by the NWSDB. Rural water supply and sanitation including deep well programs are also being implemented by the board (NWSDB, Annual Report 2006).

The following analysis attempts to assess the financial problems of NWSDB and consequences like increasing dependence on foreign funding.

3.1. Costs and Revenue

Table 2 depicts the annual cost of production of water that more than doubled from 2001 to 2007. The cost of production mainly consists of direct operational cost, administrative overheads and other operating expenditure contributing 56%, 16% and 19% respectively with 8% financial cost and 1% taxation (NWSDB, 2006). The operational expenditure is increasing over the years with increasing cost of each item of the operational cost. However, percentage of each cost item from the total is either decreasing or not changing over time except the personnel cost. Personnel cost as a percentage from total operational cost is increasing over time despite a drop in 2006. Being an autonomous institution the NWSDB has the power to change (increase) the water tariff from time to time. In 2009 tariff rate increased by more than 100 percent. Thus one could argue that NWSDB is transferring the burden of increased personnel expenditure to the consumers through increased tariff. This situation in fact highlights the necessity of an independent regulatory authority that could control the tariff reforms etc. of the water board.

Table 2: Operational expenditure of drinking water over the years

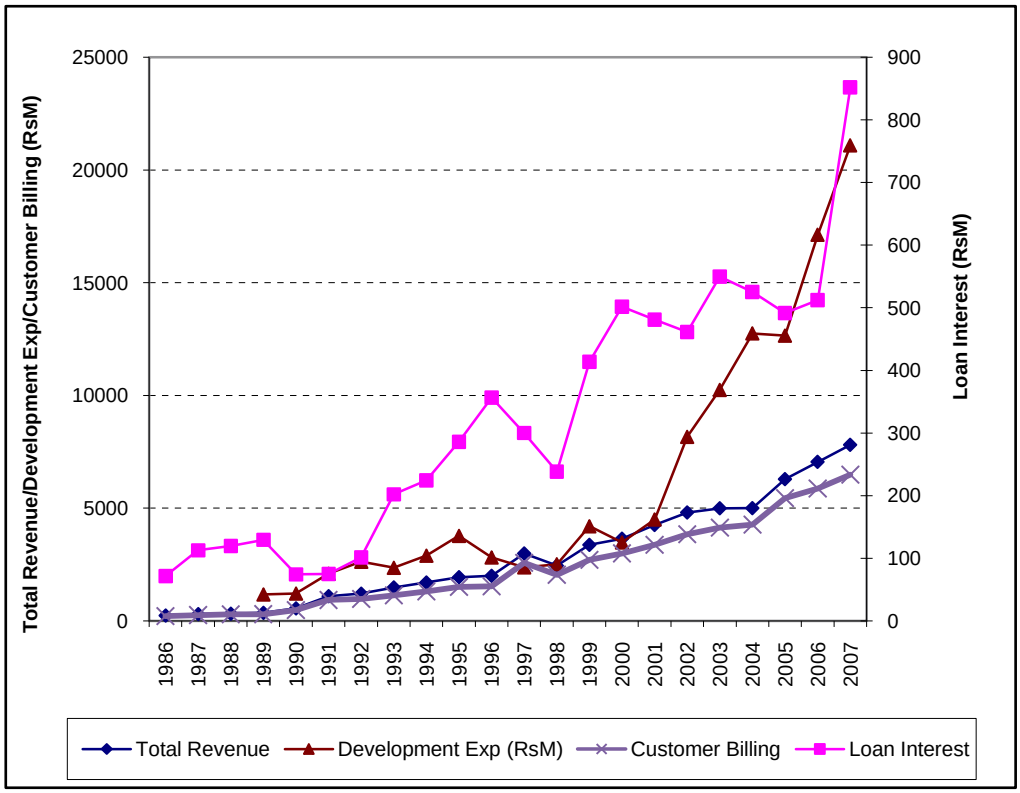
	2001	2002	2004	2005	2006	2007
Personnel	878.24 (39.09)*	1012.23 (35.39)	1919 (45.61)	2541 (48.19)	1829.35 (44.83)	2335.09 (47.63)
Pumping	904.8 (40.27)	1135.42 (39.69)	1126 (26.76)	1245 (23.61)	1360.67 (33.35)	1587.87 (32.39)
Chemical	170.33 (7.58)	182.24 (6.37)	171 (4.06)	214 (4.06)	319.57 (7.83)	349.49 (7.13)
Repair & Main	130.07 (5.79)	152.94 (5.35)	224 (5.32)	308 (5.84)	256.86 (6.29)	287.03 (5.85)
Establishment	68.28 (3.04)	272.57 (9.53)	451 (10.72)	610 (11.57)	137.64 (3.37)	152.01 (3.10)
Other	95.15 (4.23)	104.98 (3.67)	316 (7.51)	355 (6.73)	176.44 (4.32)	191.04 (3.90)
Total	2246.87	2860.38	4207	5273	4080.53	4902.53

Source: NWSDB Annual Reports, various issues.

*Values in the parenthesis are the percentage of each cost item from the total

Figure 1 shows that the development expenditure, revenue generation, customer billing and the interest payment are increasing over time. However, development expenditure has taken over the revenue as well as the customer billing except in few occasions. The interest payments are also increasing rapidly after 2001.

Figure 1: Total revenue, development expenditure and loan interest over the years



3.2. Non-revenue Water (NRW)

Over the years the production of pipe water is continuously increasing. However, the non revenue water (mostly leakage from the delivery point to the meters of the consumers[3]) continues to be around 30-40% range, though there is a slight decline (Table 3).

Table 3: Pipe water production and non-revenue water over time

Year	Piped water production(Mm3)	Non-revenue water (%)	
		Greater Colombo	Other Area
1990	219	36	40
2000	332	39	31
2001	343	39	30
2002	350	37	30
2003	357	38	31
2004	367	36	29
2005	383	35.9	33.8
2006	398	37.5	34.4
2007	424	37.8	33.1

Source: NWSDB Annual Reports, various issues (1987 to 2006)

Thus NWSDB was unable to account for 140 million cubic meters of treated water costing more than 2300 million rupees during year 2007 (Table 4). NRW in 2007 was sufficient to supply water for approximately 585,000 (140491*1000/(12*20)) new households, assuming an average consumption of 20 m3 per month, per household. The O&M cost also can be substantially reduced by cutting down the NRW. This shows the discrepancy between production and distribution and widening gap between water billing receipts and the total revenue indicating lowering of institutional capacity over the years.

Table 4: NRW and incurred cost over the years

	2003	2004	2005	2006	2007
NRW (000'm3)	124,442	123,959	96,690	136,630	140,491
Direct cost (million rupees)	1406.5	1648.4	1290.1	2040.4	2377.9
Additional cost born by consumers for every unit of consumption (Rs.)	6.04	6.76	6.76	7.82	8.37

Source: NWSDB Annual Report 2007.

[4] *Tortajada (2006) estimated that for the year 2001 the O&M cost/m3 of drinking water could have been reduced to Rs. 13.00 from Rs. 20.20 if the NRW was eliminated.*

3.3. Water Treatment Costs

Pollution by sewage, fertilizers, pesticides, and toxic metals degrade the quality of water available for human consumption with NWSDB incurring progressivelyhigher cost in treating water(see Table 4). In Sri Lanka the water is treated at the full treatment level where processes of screening, coagulation, flocculation, sedimentation, filtration anddisinfection are involved which costs Rs. 60,000 per connection with O&M cost of Rs 10-25 per cubic meter (Attanayake and Athukorale, 2007). This is a huge social cost incurred by the society due to the irresponsible use and pollution of water bodies.

Table 5: Water treatment costs

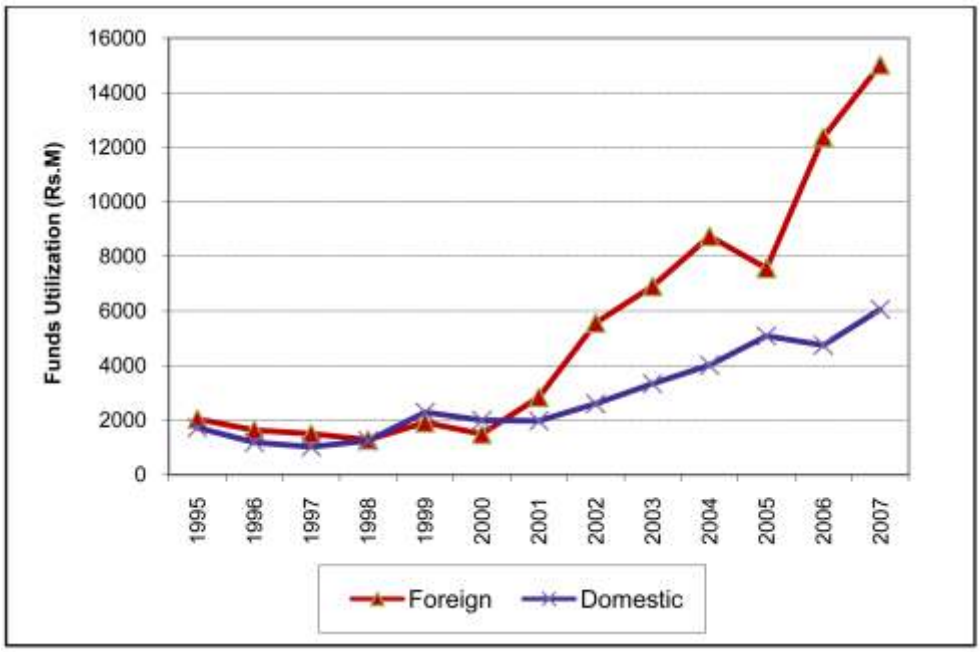
Treatment	Unit Involvement	Cost of treatment per connection (Rs)	O&M cost per cum (Rs)
Only disinfection	Screening & disinfection	1,500	0.5-1.5
Minimum treatment	Screening, filtration & disinfection	8000	1-3
Partial treatment	Screening, roughing filtration, filtration & disinfection	16,000	3-10
Full treatment	Screening, coagulation, flocculation, sedimentation, filtration & disinfection	60,000	10-25
Advanced treatment	Screening, coagulation, flocculation, sedimentation,filtration & adaptation, and disinfection	150,000	75-100

Source: Attanayake and Athukorala (2007)

3.4. Foreign Aid to the NWSDB

In 2007 NWSDB obtained 14,166 million rupees as foreign funds and the government of Sri Lanka provided 4,587 million rupees as counterpart funds (NWSDB, Annual Report 2007). NWSDB is handling 15 foreign funded projects with funding mostly from ADB, JICA and GTZ. Figure 2 shows a sharp increase in foreign funds coming as grants and loans during the period of 2000 to 2007. In 2005 the Board has obtained 36,338 and 12,841 million rupees as foreign grants and loans respectively (Annual Report 2006). Even though the revenue income is increasing along with the increasing service connections by 2004, the board had a deficit of over 800 million rupees that came down to Rs. 22 million due to the improved revenue and reduced interest paid in 2005. The level of high interest on loans along with high level of foreign grants and loans indicate dependency of the water board on foreign funds. Further except few occasions development expenditure exceeded total revenue indicating the dependency on external funds. In 2007 the foreign fund allocations was much more than double of the local fund allocation. The provision of water services is increasingly dependent upon foreign support evident through ever increasing development expenditure and the widening gap of foreign funds to local funds.

Figure 2: Utilization of the funds by NWSDB over the years



Source: NWSDB Annual Reports, various issues (1987 to 2007)

The following are the major observations on the dire financial crisis of NWSDB:

- *The development expenditure has exceeded revenue as well as the customer billing except in few occasions. The interest payments are also increasing rapidly after 2001 indicating the deteriorating financial health of NWSDB.*
- *The discrepancy between production and distribution (30-40% of non-revenue water)and widening gap between customer billing and revenue shows the lowering of institutional capacity over the years.*
- *Pollution of water leads to huge costs for treatment of water.*
- *Increasing development expenditure with huge proportion of loans and grants indicates enhancing dependency of NWSDB on foreign funds.*

1. WASTE WATER IN KANDY: PROBLEM AND PROPOSED SOLUTION (KCWSAEIP)

Mahaweli is the most important river for Sri Lankans as it provides water for multiple purposes such as domestic and industrial use, hydropower and irrigation. Over the years, Mahaweli river, is threatened with increasing pollutant loads due to contamination from agricultural, industrial and domestic wastes and sewerage. Urbanization and increased population in the Kandy city coupled with inefficient sewage systems contribute heavily to the pollution of Mahaweli river. The sewage in the downtown area flows directly into the drainage system causing heavy pollution to Mahaweli river. Further, sewage—mainly gray water from hotels, offices and residences around Kandy Lake flow into the Kandy lake causing heavy contamination (like algae bloom). Kandy has a long history of indigenous design and management of drinking water. The current problem in Kandy cityand the expected benefits and estimated costs of the Kandy City Water Supply Augmentation and Environmental Improvement Project (KCWSAEIP) are discussed in this section. The technology/expertise involved, impacts on the institution and the sustainability of the proposed project are then discussed under the implications.

The NWSDB is planning to operate a Sewage Treatment Plant (STP) in two phases with equal capacities of 8500cum/day. The project is planning to collect the waste water of the Kandy city area through a system of pipe lines, to pump to a treatment plant, to treat and to dispose the treated effluent to the Mahaweli River.

The expected benefits are

- Reduction in public nuisance, because of increased safe water sources and reduction of open-air sewers in urban area
- Improvement in public health resulting from the reduction of water-born vector diseases
- Improved surface and ground water quality
- Elimination or minimization of the pollution in Kandy lake
- Improvement of the aesthetic value of Kandy lake and the surroundings
- Reduction of the odor problems in the city
- Improving the raw water quality at the Gohagoda intake in Mahaweli river.

The project is estimated at almost 14 billion rupees, in which 82.9% is coming as a soft loan through treasury by JICA (see Table 5) and the estimated O&M cost is going be Rs. 11 million per month to dispose 17,000m3of wastewater per day for55,000 people in the Kandy city. This works out to be Rs. 210 per month per household for waste water treatment alone.

Table 6: Estimated costs of STP

Cost Item	Foreign Million Yen	Local Million Rs	Amount (Million Rs)
Construction contracts	4,352.2	3,450.9	7,407.4
Provisional sums			
Road reinstatement	0	334.0	334.0
Power supply	0	10.0	10.0
Equipment procurement	133.1	0	121.0
Sub total	133.1	344.0	465.0
Contingencies	224.3	2,515.1	2,729.0
Engineering services			
Detailed design	318.7	145.6	435.4
Construction management/supervision	255.9	152.5	385.1
Price contingency on Engineering services	129.6	0	117.8
Sub total	704.2	298.1	938.3
JICA loan portion	5,413.8	6,609.1	11,539.7 (82.90%)
Project administration	0	111.1	111.1
Land acquisition	0	0	0.0
Custom duties	0	539.4	539.4
Value added tax	0	1729.4	1,729.9
GOSL portion	0	2379.9	2,379.9 (17.10%)
Total	5,413.8	8989.0	13,910.6*

[5] This is the current intake of water from the Mahaweliriver for city water supply. This intake is 500m downstream of the proposed STP outlet to the river.
[6] URL www.jica.go.jp/srilanka/english/office/topics/press17_01.html accessed on September 22, 2010.

Source:SAPROF Report (2005).

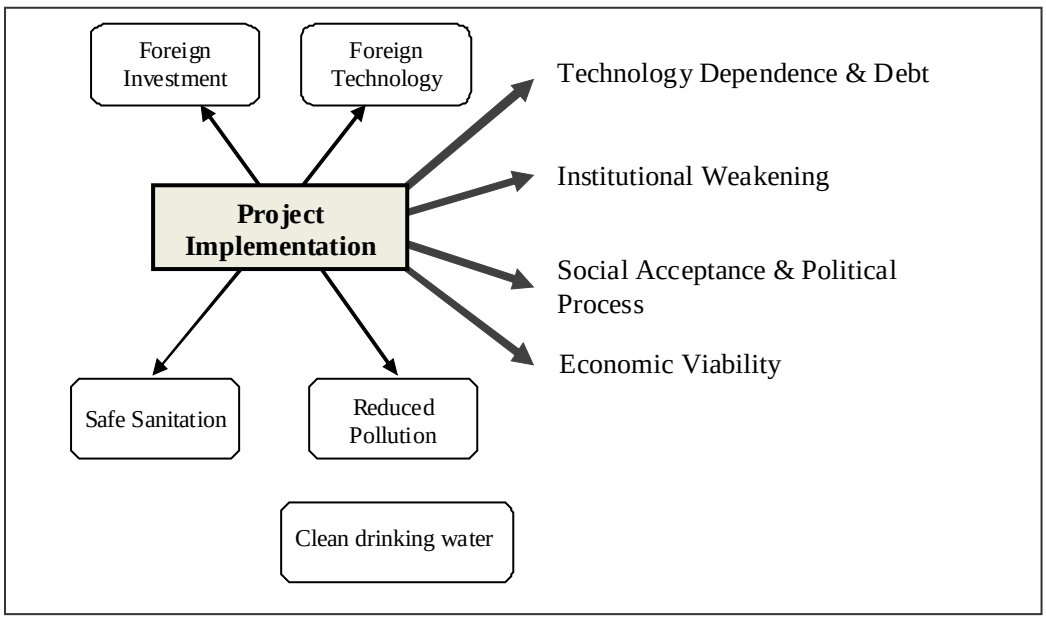
Note: * The latest figure is Rs. 18.11 billion (Yen 14.09 billion)

From the foreign portion of the loan, which includes construction contracts, provisional sums, contingencies and engineering services, almost 50% is going back to the lenders. The sustainability and even the initiation of the system after completion depend on the Sri Lankan government exclusively spending huge sums on house connections and ensuring power supplies. The responsibility of inclusion of low-income settlements and public sanitation also rests exclusively with the government with no donor spending on that. The road reinstatement after the disarray of putting the pipes also is government responsibility. The price tag for the engineering services and expertise that come from Japan and the huge benefits of selling the (black box of) technology for the plant and pumping station seen in the table clarifies the unequal benefits and costs accrued by the 'donor' and 'receiver'. The provisional sums of equipment procurement and engineering services consist of detailed designing, construction management supervision and price contingency on engineering services. Thus from the Rs.11.5 billion rupees that comes as the loan,a major share will be accrued by the donors with questions of sustainability at various levels (will be discussed in following sections). With hind sight of the delays in such projects, the escalation of costs could be a huge burden to the exchequer. An important observation here is the cost escalation of the total project cost from Rs 3billion in 1998to the current estimated project cost of Rs.18.11 billion (Yen 14.09 billion) as per the agreement signed between JICA and Government of Sri Lanka on March 21, 2010. With the ongoing delays, we can easily anticipate further escalation of costs.

5. IMPLICATIONS OF THE PROJECT

The implication of the project can be conceptualized as given in Figure 3. The project is expected to source funds from a foreign donor and needs exotic technology to be imported creating dependency. Bringing in new technology along with policy changes has to be suitable to the existing institutional setup, especially qualified staff to handle the new technology. Either the existing institution has to increase the technical capacity or affiliate with other institutions. This will have an impact on project cost and hence the sustainability. New skills and the funds will have an impact on the organizational culture. Developing new culture may be detrimental to the existing setup. When the new project is implemented it has to recover at least the O&M expenditure. The project expects to recover O&M expenditure through increased water tariffs. If unaffordable will lead to exclusion. It is also important to look whether there is a political will to implement the project and a scenario without the project being implemented. The discussion so far justifies the exploration for alternative lower cost technologies through mobilizing indigenous resources.

Figure 3: KCWSAEIP Project and its Implications



[7] (http://www.kandynews.net/august_2007/news.shtml)
[8] http://www.jica.go.jp/english/operations/evaluation/oda_loan/economic_cooperation/pdf/sri100326_02.pdf accessed on September 20,2010.

5.1 Technology Appropriateness

Centralised System Needed? The technology for waste water treatment has come as a package with the loan from the donors. The nature of technology, appropriateness of it for local circumstances, cost of alternative technologies etc. still remains to be tested. The proposed treatment technology—Oxidation Ditch—is highly sophisticated and complicated. An EIA done by a private firm has given green signal to the technology claiming that under prevailing conditions(continuous increase in population, limited land availability, soil type and high water table in the area) a centralized wastewater treatment method is needed to avoid contamination of Mahaweli water by sewage (NRMS, 2005). However, the report does not analyze any alternate technologies. Further a restructuring of the Kandy City is already approved with several big polluters like the prison, bus station etc. to be relocated outside the city.In that case the space problem highlighted as justification to the centralized system become insignificant.

Organic Pollution load and uncertainty? According to the comments submitted by the Environmental Foundation Ltd to the CEA, the effluents from the proposed plant is going to increase the organic pollution load by up to 700% though it is supposed to reduce the pollution level. However, according to CEA standards if BOD level can be maintained below 20mg/l, increase of organic pollutant loading does not harm the water quality since the self oxidation ability of the moving water. The Environmental Foundation Ltd (EFL) also argues that during periods of plant failure (which is quite unavoidable according to the past experience of small scale STPs in local context) it would increase the organic pollution load up to 4.2 tons of BOD per day(NRMS, 2005).The heterogeneous composition and unpredictable inflows of waste water is difficult to handle and hence the only reasonably successful plants in Sri Lanka are the common STPs of industries in which volume and composition of the load from each industry is predictable and constant.

Dependency, Lifespan, Operations and Maintenance? After such large investments if this is unavoidable, the donors may be giving huge bills for maintenance in the future (elaborated later). The expected lifespan of the project is 30-40 years (NRMS, 2005). However, this is possible only if appropriate operation and maintenance activities at sewage collection and treatment plant are maintained. The sustainability of the system rests on a set of sequential activities that demand experts, technicians and skilled labor. The shortfall in any activity could cause the collapse of the whole system evidenced from similar (but smaller scale) plants. The major problem in the existing smaller systems in Kandy (Narayanan and Thrikawala, 2007) is mostly the poor maintenance. The operation of the STP entirely depend on the electric power for running pumps at various locations on inflow systems and pumps of the STP and effluent system . Power failure at any location could cause shut down of the entire system. The risk of blocking the sewerage inflow transmission or power failure at the STP could cause spills and overflow of tanks leading to sanitation and health hazards and odor problems. Since the power failures are very common, the subsequent chaotic situations can be frequent with the implementation of the project. This implies that the proposed technology might increase the risks and health hazards that it is supposed to curb. Further, the pipe system has to be laid on a very systematic manner to collect and pump the sewerage. However, Kandy is not a planed city as such and all the roads, buildingsand other structures are established in an ad hoc manner. Thus, setting up a systematic pipe system for sewerage is very challenging.

5.2. Economic Viability

Enhanced debt: The project is estimated at almost 18.11billion rupees of which 82% is funded by JICA with the estimated O&M cost going to be at Rs. 11 million per month to dispose 17,000m3 per day to serve 55,000 people in the Kandy district. The money is coming as a soft loan from JICA to the treasury and grant from treasury to NWSDB. It is 0.56% of the GDP (GDP=Rs. 2500 billion1) and the current debt of each individual will go up by 0.12% to serve a very small fraction (0.3%) of the total population of Sri Lanka. This is in fact dependency on money from foreign donors.

[9](http://www.sundayobserver.lk/2010/01/24/new41.asp. accessed on January 24, 2010.
[10]Personal Communication with Mr. M. Sivakumar, Former Deputy Director of Northern and Eastern Province of Central Environment Authority on September 27, 2007.
[11]The sewerage treatment plants at PeradeniyaHospital, Hantana housing scheme, Raddoluwa housing scheme all failed.

Huge O&M Costs and Increased Tariffs: NWSDB is planning to hand over the plant to the Kandy Municipal Council (KMC) once the constructions are done. KMC will be the local authority responsible for cost recovery and maintenance. The EIA report (NRMS, 2005) as well as Table 5 indicates most of the construction and materials have to be imported with foreign expertise. The sustenance of the system needs continuous import of materials during repairs and replacements. Thus NWSDB and the KMC will be continuously dependent on the donor technology.

Even though KMC is planning to recover the full O&M cost for proper maintenance of the project. This is in addition to the asset management costs that work out to be 10% of the capital costs for repairs and replacement. The water board has understood that adding this to the water bill is going to be a huge financial burden for the users and a major reason to depend on the external sources leading to a perpetual dependence on technology and funding.

Operation and maintenance consist of personnel, electricity, chemicals, repairs and maintenance, and establishment costs as given in Table 6. The total O&M cost is 101.3 million rupees per annum. Per capita sewerage flow has been estimated at 86 L/day which is equivalent to 0.086m3/day (NRMS, 2005). If we assume a five member family there will be 0.43 m3/day of sewerage discharge per household per day. The total O&M cost to dispose 17,000 m3/day works out to be Rs. 16.33/m3. Then each household will have to pay Rs. 210/month for the service. However water board is proposing a differential tariff system based on household income and type of uses. Tariff rates are discriminated on the type of users and further for domestic users according to their income categories. On average thus a household within the medium income group will have to pay Rs. 200/month.In addition, a connection charge which depends particularly on the distance from household to the main sewage pipeis another financial burden for the consumers with very few people willing to get the connection even if a fully reliable service is guaranteed. Morethan 40% of the total cost is taken up by chemicals repair and maintenance by which at least 90% go back to the donors annually with water board and the KMC dependent on replacement of parts and chemicals for ever. The EIA report indicates that most of the equipmentshave to be imported (NRMS, 2005)

Table 7: Direct O&M costs of KCWSAEIP

Item	O&M Costs (Million Rupees/annum)
Personnel	8.8
Electricity	38.8
Chemicals	16.7
Repairs and Maintenance	34.6
Establishment	2.4
Total	2.4

Source:Feasibility Report of KCWSAEIP

5.3 Institutional Weakening and Dependence

The construction of the plant, operation and maintenance, and repairs needs experts and skilled workers for which there is a plan for allocating 27 personnel for O&M for various tasks such as inspection, sewer pumping, sewer treatment, water analysis etc.NWSDB and KMC will have to depend on external expertise during constructions, operation and maintenance and in emergency breakdowns as well (NRMS, 2005). The project has no budget allocation for capacity development of NWSDB personnel and hence the technology and processes remainsa black box for the institution, leading hiring to over-priced foreign and local consultancy expertise that results in over-spending. The lack of institutionalization of expertise by NWSDB will lead to deskilling and enhancement of costs. The opaqueness of the project office regarding sharing of many vital information does not allow us to assess this aspect in all its detail.

[12]Personal communication with Mr. J.C. Jayalath, Acting project Director.
[13]Mr. Jayalath, Project Director, personal communication

5.4. Social Acceptance and Political Process

The EIA study (NRMS, 2005) has conducted two surveys to determine the opinion of the people around the proposed STP site and the general public of Kandy city. The survey around the plant site was conducted with 165 respondents. 68% of the respondents were supporting the project since they believe that project will ensure cleanliness of the Kandy city, reduce environmental pollution, meet the needs of the increasing population, keep water quality in the Mahaweli River and scope of recycling waste for agricultural production. 40%opposed the project with reasons of uncertainty in maintenanceresulting in bad odour, adverse impact on the botanical garden due to gas emissions, proximity to the Buddhist temple, treating/reusing water with human excreta and thenegative impacts on the experimental fields of the Department of Agriculture.

There were protestsagainst the project with participation of over 5000 people. The protestscentered around the selection of STP site was organized by the Gatambe Buddhist Temple with participation of monks, religious leaders, officials of Department of Agriculture and general public. The protest questioned the survey findings with its "manufactured consent". It was argued that there is no social acceptance for this project even with the current lack of transparency that hides the implications of the project. If a genuine public debate is triggered with sharing transparent information about the technological, economic and institutional implications, it is doubtful whether it will pass the test of democratic consensus to take the project forward.

1. CONCLUSIONS

In the larger background of Sri Lanka's NWSDB's financial crisis, this study attempted to investigate the donor influence and institutional changes in the proposed foreign aided project in Kandy. The techno-economic analysis brought out the implications for dependency and debt. The insights from the literature about the need for strong policies and institutions to have aid-effectiveness were proved valid

in the case study. The unequal terms of aid, with weak bargaining power would breed technological, knowledge and economic dependency on donors. The price tag for the engineering services and expertise that come from Japan and the huge benefits of selling the (black box of) technology for the plant clarifies the unequal benefits and costs accrued by the 'donor' and 'receiver'. The proposed technology might not be the most appropriate one with very high capital cost, O&M cost and asset management cost where latter two are recurring and essential for the sustainability of the plant.

The financial crisis of NWSDB in Sri Lanka is reflective of the similar problems of public utilities in WSS sector in developing countries. The internationally available technology solutions are capital/technology intensive. The public utilities are faced with problems of resource mobilisation, work culture and populist policies against tariff hikes. The privitisation of public utilities has faced resistance and it is almost clear that developing countries could not support the rate of returns required by international equity capital (Hall and Lobina, 2007). All these point to the need of contextual solutions that are technologically appropriate, institutionally viable and economically feasible.

Decentralized technological alternatives like (a combination of) individual septic tanks and constructed wetlands could be integrated at the mini/micro watershed level to be managed by community-based institutions seem to be promising (Narayanan and Thrikawala, 2007). Paradoxically, the alternatives projected also are foreign-funded. However, they have built-in resilience mechanisms of simple locally appropriate technology banking on local labor and pooling of local resources (both financial and human). It has institutional mechanisms of a demand-driven approach that builds on consensus and ownership with participation of local NGOs and CBOs. All these might throw up other questions, which we have raised elsewhere (Irshad and Narayanan, 2007).

14The figure does not add up to 100% because some people had mixed opinions (NRMS, 2005: 103-104).
15 A larger survey was done covering the benefiting areas in Kandy city with a sample of 100 households. There were 78%, 3% and 19% supporting, opposing and with mixed opinions. Apart from the reasons given above, improved health conditions of the public, creation of job opportunities and efficient usage of small plots of land were reasons given by those supporting the project (NRMS, 2005:103-106).

But, in comparison, the alternatives offer scope for less dependent (technologically and financially) solutions for WSS problems in Sri Lanka and elsewhere. Future studies have to streamline the technological alternatives to suit diverse biophysical and socio-economic contexts with appropriate institutional arrangements. Further a thorough economic analysis should be done to investigate the possibility of establishing decentralized individual systems of sewerage management.

The increasing quantity and quality of waste water pouring into the water bodies with the increasing costs of purification raises the issue of addressing the problem at source than treating the symptom with technological solutions like STPs. The alternatives suggested seem to address the core issue of treating the pollution at its source, whereas techno-energy intensive models as assessed in this study raises sustainability issues at different levels.

A striking governance observation of this study is the lack of transparency about the project details like the high costs and implications like huge tariff hikes to the citizen. Ensuring accountability of officials to opt for appropriate technological choices depend on the transparency of information availability to trigger societal debates for more democratic decision-making. The near-absence of any civic involvement to facilitate such processes will ensure the repetition of similar projects in South Asia.

REFERENCES

ADB (2007). Sri Lanka assistance program evaluation:Water supply and sanitation sector assistance evaluation. Evaluation Working Paper, Operation Evaluation Department, Asian Development Bank.

ADB (2006). Country Water Action: Sri Lanka, 3rd Water Supply and Sanitation Project—Participatory, Consultative and Empowering
http://www.adb.org/water/printer-friendly.asp?url=/water/actions/SRI/third-water-supply.asp

Annual Report (2006).National Water Supply and Drainage Board, Sri Lanka.

Attanayake, M.A.M.S.L. andK. Athukorala, (2007). An experience of an epidemic-highlighting the need for collective decision-making through IWRM based strategy. Paper presented at the Second South Asian Research Workshop on Water Supply Sanitation and Wastewater Management. 24-26th September, Kandy Sri Lanka.

Bandara, K.R.N (2005). A national water policy for Sri Lanka. Paper presented at the Water Professional Day Symposium, 2005.

Bell, D.E. (1965). The Quality of aid. Foreign Affaires, Vol. 43; 601-607.

Brautigam, N and S. Knack (2004). Foreign aid, institutions and governance in Sub-Saharan Africa. Economic Development and Cultural Change. Vol. 52(2), 255-285.

Birdsall, N. (2004). Seven Deadly Sins: Reflection on Donor Failings. CGD Working Paper no. 50. WashingtonDC: The Center for Gobal Development

Central Bank of Sri Lanka. Annual Report 2006.

Ciria, M.P., M.L. Solano and P. Sariano (2005). Role of MacrophyteTyphalatifolia in a constructed wetlnd for wastewater treatment and assessment of its potential as a biomass fuel. Biosystem Engineering. Vol. 92:535-544.

Cohen, J. M. (1992). Foreign advisors and capacity building: The case of Kenya. Public Administration and Development. Vol. 12(5):493-510

Dayawansa, N.D.K. (2007). Need for coherent approach for sanitation, wastewater management and water supply: A case from Sri Lanka. Paper presented at the Second South Asian Research Workshop on Water Supply Sanitation and Wastewater Management. 24-26th September, Kandy Sri Lanka.

Devarajan, S., D.R. Dollar, and T. Holmgren eds., Aid and Reform in Africa: Lessons from ten case studies, World Bank 2001, WashingtonDC.

Dubreuil, C. (2006). Synthesis on the right to water; Fourth World Water Council, Mexico. World Water Council.

Durrbarry, R., N. Gemmel, and D. Greenway (1998). New evidence on the impact of foreign aid on economic growth. Research Paper No. 98/8. Center for Research in Economic Development and International Trade, Nottingham.

Farley, M. and S. Kilbey (1999). Environmentally-friendly hygienic dry sanitation technology. Paper presented at the 25th WEDC conference on integrated development for water supply and sanitation, Addis Ababa, Ethiopia.

Friedmen, M. (1957). Foreign economic aid: Means and objectives. Yale Review, Vol. 47(4); 500-516.

Foreign Aid Review, Sri Lanka. (1999). External Resources Department, Ministry of Finance and Planning, Sri Lanka.

Gupta, S., B. Clements, A. Pivovarsky, and E. Tiongson (2004). Foreign aid and revenue response: Does the composition of foreign aid matter?. In Helping Countries Develop. The Role of Fiscal Policy, eds. S. Gupta, B. Clements and G. Inchauste. WashingtonDC:IMF

Hall David and Lobina Emmanuel (2007). Water as a Public Service. www.psiru.orgAccessed on September 22, 2010.

Heller, P. and S.Gupta (2002). Challenges in expanding developmental assistance. IMF Policy Discussion Paper. PDP/02/5.

Herron, A.H. Low-cost Sanitation: An overview of available methods
. http://www.wilsoncenter.org/topics/pubs/WaterStoriesSanitation.pdf. Accessed on August 10, 2008.

Knack, S. and A. Rahaman (2004). Aid dependence and the quality of governance: A cross-country empirical analysis. Background Paper, World Development Report.

McGillvray and Morrissey (2000). A review of evidence on fiscal effects of aid. CREDIT Research Paper No. 01/13.

Morton, K. (1975). Aid and dependence: British aid to Malawi. London: Croom Helm in Association with the Overseas Development Institute.

Moss T., G. Pettersson and N. van de Walle (2005). The aid institution paradox: Long-term cost of high aid dependency.

Web: http://www.cgdev.org/content/publications/detail/5646.Accessed on July 30, 2007.

Mowjood, M.I.M, K.B.S.N. Jinadasa, N. Tanaka and D.R.I.B. Werellagama (2007). Applicability of constructed wetlands for wastewater treatments in tropical countries: A case study from Sri Lanka. Paper presented at the Second South Asian Research Workshop on Water Supply Sanitation and Wastewater Management. 24-26th September, Kandy Sri Lanka.

Narayanan. N.C and Irshad Mohammed, 2007, Foreign Assistance and Institutional Weakening: Experience of provision of drinking Water in Kerala, India. Paper presented at the Workshop on 'Civil Society in Water Governance' at Mulshi, Pune, India from October 10-12, 2007.

Narayanan. N.C and Sunil Thrikawala, (2007), Beyond the Big and Familiar: Technological and Institutional Alternativesin Water and Sanitation Sector in Sri Lanka. Paper presented at the Workshop on 'Civil Society in Water Governance' at Mulshi, Pune, India from October 10-12, 2007.

NRMS (Natural Resources Management Services (Pvt) Ltd.), 2005, EIA Report of KandyCity Waste Water Disposal Project-The Environmental Impact Assessment Submitted to the Central Environmental Authority., Sri Lanka.

Remmer, K. (2004). Does foreign aid promote the expansion of government? American Journal of Political Science. Vol. 48(1);77-99.

Payer, C. (1974). The debt trap: The International Monitory Fund and the Third World. New York: Monthly Review Press, pp 212-213.

Pradhan, S., 1996, "Evaluating Public Spending: A Framework for Public Expenditure Reviews," World Bank Discussion Paper No. 323, World Bank, Washington D.C.

Sachs, Jeffry D. (2005). The End of Poverty; Economic Possibilities for Our Time. Penguin Books Ltd. 80, Strand London WC2R) ORI, England.

Sudasinghe, M.I., L.W. Galagedara, and E.R.N. Gunawardena. Performance Evaluation of Selected Sewerage Treatment Plants in Sri Lanka. Paper accepted for publication in the Journal of Tropical Agricultural Research.

UNDP 2005. MillenniumDevelopmentGoalsCounty Report: Sri Lanka.

van de Walle, N. (2005). Overcoming Stagnation in Aid-Dependent Countries. Washington DC: Center for Global Development.

Windberg, C. and P. Barraggne-Bigot (2006). Ecological sanitation compost toilets in Sri Lanka: An Appropriate solution? Paper presented at 32nd WEDC international Conference on Sustainable development of water resources, water supply and environmental sanitation, Colombo, Sri Lanka.

AbbreviationDescription

ADB	Asian Development Bank
CBOs	Community Based Organizations
CEA	Central Environmental Authority
CWLs	Constructed Wetlands
DOA	Department of Agriculture
EFL	Environmental Foundation Ltd.
GNDs	GramaNiladari Divisions
GTZ	German Agency for Technical Cooperation
JICA	Japan International Cooperation Agency
KMC	Kandy Municipal Council
MDG	Millennium Development Goal
NWSDB	National Water Supply and Drainage Board
O & M	Operation and Management
OECD	Organization for Economic Co-operation and Development
PAP	Participatory Action PlanK
CWSAEIP	City Water Supply Augmentation and Environmental Improvement Project
STP	Sewage Treatment Plant
UDAUrban	Development Authority
USAID	United States Agency for International Development
WSS	Water Supply and Sanitation