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Paper "Forfeiting - an Output-Based Component for Sustainable Water Finance"

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Forfeiting - an Output-Based Component for Sustainable Water Finance

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Abstract: The way of financing water infrastructure is of strong influence on how facilities are designed, built and operated. Investment-only-financing basing on a state guarantee does not set incentives for sustainable operations and maintenance. Output-based elements in financing are needed to avoid mal-functioning facilities and improve the performance levels in water and sanitation. Forfeiting is one method which has been experienced with good results in industrialized countries and could be introduced for developing countries, as well, in a pragmatic way as one component of hybrid finance, to establish a driver for sustainable water management and operations.

Keywords: water infrastructure; operations and maintenance; donor, public, private financing.

Introduction

Financing mechanisms are of great influence on the way, how water and wastewater facilities are designed, built and operated. Especially in developing or emerging countries with poor enforcement of legal and technical standards, the "bottleneck of success" is often O&M (operations and maintenance) [Harbach, 2011]. The "investment-only-finance" basing on a sovereign state guarantee does not set incentives for O&M. Output-based elements in financing are needed to avoid mal-functioning facilities and improve the performance levels in water and sanitation [OECD, 2010]. Furthermore, there is a lack of financing concepts to cover the growing investment need for SMP (small and medium-sized project), LTP (long term investment programmes) and RCI (risk capital investments with innovative technologies, solutions) [Rudolph, 2015/1]. Typical SMP are for rehabilitation works, for decentralised (waste), water purification systems, and for "non-point-investments". Typical LTP are for water-loss reduction with network improvements [UNW, 2011]. Typical RCI are for high-tech water re-use plants, IT-based remote process control and operations [Mueller-Czygan, 2016] - just to give some examples.

The photos below show successful/non-successful investments under different kinds of finance, with/without contractual O&M-incentives. **Figure 1a** shows the mechanical unit of a WWTP (wastewater treatment plant) in South-East-Asia, three years after commissioning. Inappropriate design, cheap installations and poor O&M are the reasons that this plant must be considered as "sunk investment". **Figure 1b** shows a SWPP (supply water production plant) in Latin America with operators throwing chemicals by hand into a reactor basin, just because there is no budget for replacement of a broken dosing station. The photo is taken from one of too many cases (not only) in the developing world, where "investment-only-finance" has come along with poor budgets for maintenance and repairs, which has caused significant surplus costs and insufficient technical efficiency. **Figure 1c** is from Africa, showing a WWTP properly designed and built. However, the plant is not in compliance with wastewater discharge standards simply because of neglected O&M.

Sources of financing

Simplified, there are three different sources of financing available in the water sector. These are

- (1) Public (national, provincial, municipal) loans and grants,
- (2) DFI loans (from development financing institutions), mostly from national (like AFD, JICA, KfW, USAID), regional (like ADB, AfDB, AIIB, EIB..) or multilateral donor banks (like World Bank)
- (3) Commercial, private loans.

All these financing sources will fail if O&M is not duly secured through the overall project development and implementation scheme. Vice versa, all three financing sources can be implemented successfully, provided a professional and reliable O&M solution is secured.

Figure 1d (www.gkw-bitterfeld-wolfen.de) shows a WWTP subsidised through public loans and grants (which were necessary after the German re-unification to clean up the heavily contaminated industrial sites in the former communist East). The plant is operating successfully (in spite of "dangerous subsidies") since 1994 because O&M is executed in a professional way (in this case) under a PPP company (Public Priate Partnership) [Singh, 2008]. **Figure 1e** (mail@professor-rudolph.de) shows the WWTP in Managua, financed through DFI-loans under a DBO (design, build, operate contract), wherein the WWTP construction company is made responsible for operations under performance based contract. **Figure 1f** (www.wabag.com) shows a WWRP (waste water reclamation plant) in Windhoek, for which the investments had been financed with a commercial loan under a BOOT (build, own, operate and transfer contract). Even though the interest rates were comparably expensive, the City Council had understood that sunk investments or a malfunctioning WWRP (producing no or bad non-potable re-use water) would have been much more costly.

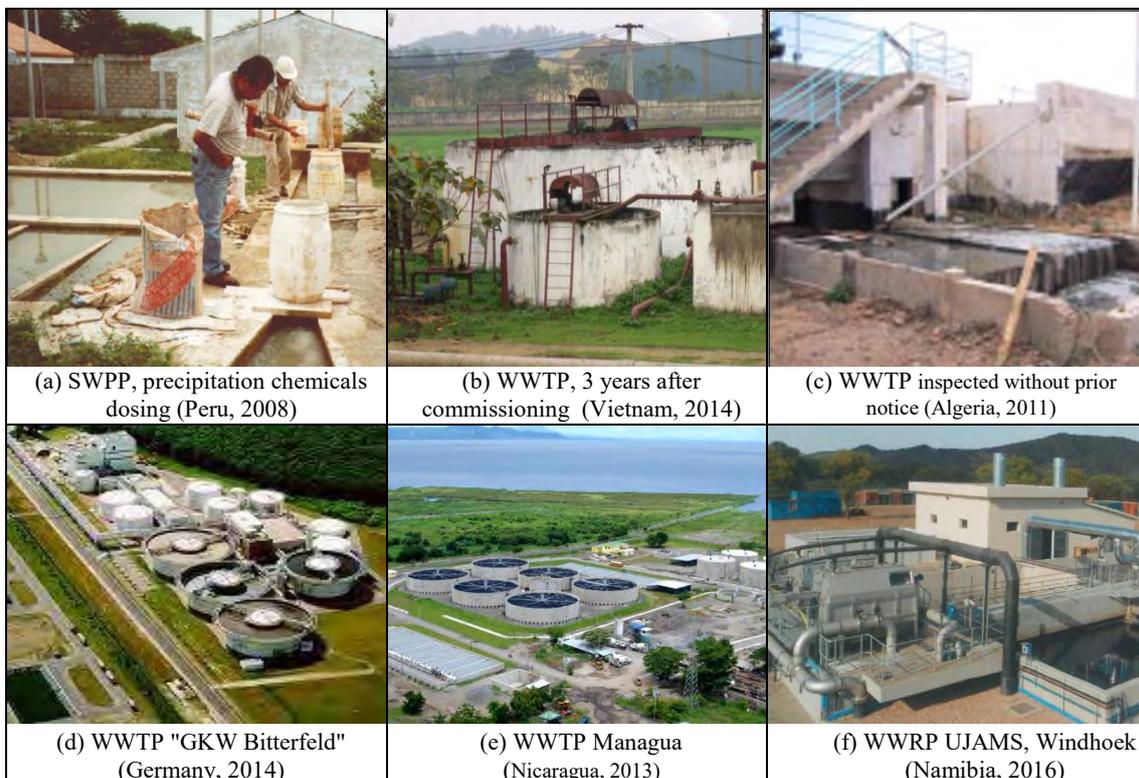


Figure 1: Mal- and well-functioning (waste)water plants invested without/with output based finance

The sector-specific challenges for all three sources of financing are described in the following chapters:

Public loans and grants

Few countries in the world have sufficient budget to pay for all water infrastructure required under the SDG (Sustainable Development Goals). Therefore, public funds (loans, soft-loans and grants) have to be accomplished with other financing sources, including private investment [Michel, 2016].

One specific solution has been decided by the Indian Government for the huge Ganga Rejuvenation Plan, a national programme based on a financing concept entitled "Hybrid Annuity Finance" (HAF) [MoW, 2015]. In principle, the investments are tendered under holistic competition (integrated optimisation for design, construction and operations). The tender concept is a mixture ("hybrid") of a DBO (contractor shall design, build and operate the plant, wherein financing is provided by the employer) and a BOT (contractor shall build, operate and transfer the plant to the employer after contract expiry with the employer paying a base fee per month and a working fee per m³ of orderly purified wastewater for the contractors services, but he does not provide capital). Practically, the contractor shall receive a limited down payment plus annual base fees from public sources, with part of these to be paid by the employer (municipality). Under HAF, the contractor must finance part of the investments and all of the working capital.

Soft-loans and grants from donor banks

Funds from donor banks (soft-loans and grants), available for developing and transition countries, are usually based on a sovereign state guarantee and disbursed exclusively to a public entity ("intermediate").

Figure 2 visualises the contractual relations and guarantees from a typical example under ODA (Official Development Assistance). Unlike with commercial loans, the donor banks bear no (or very little) commercial risk in case of project failure (which is the reason why ODA is cheaper in interest rates than commercial loans). Of course, DFI banks are aware that this is a critical point and may provide TA (technical assistance) to pay for consultants, for O&M training and guidance. Unfortunately, this is not leading to successful results very often, because consultants in the water sector are seldom experienced in practical O&M; they are more focused on design, management advisory services etc. Even more important: Independent Consultants (if free of conflicts-of-interest) must not be equipped with executive powers, unlike contracted O&M service providers. There may be cases, where consultancy helps to achieve O&M success - but in no way this is guaranteed like under a competitive, integrated scheme with professional O&M, as under a BOT, DBO, PPP, Water-Franchise or similar.

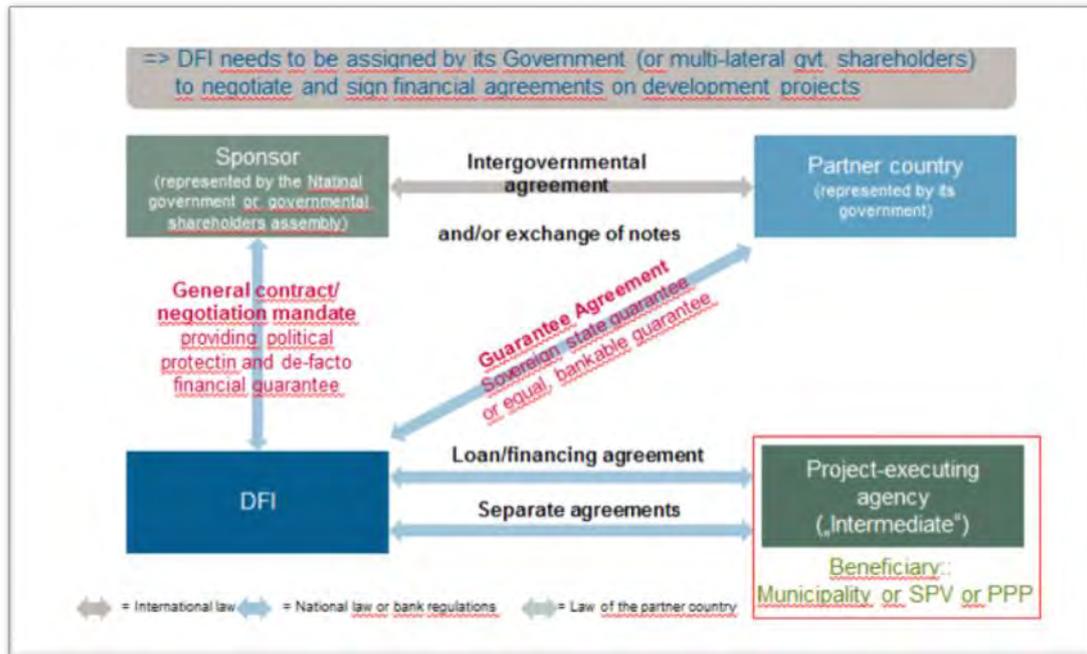


Figure 2: Contractual relations under ODA financing [MOSA, 2016]

Commercial loans and financial investments from private sponsors

Private investors and banks have to calculate specific risks. Besides technical and legal risks, they must consider the political environment with all its uncertainties. Risks for debt re-pay and the difficulty to manage (mitigate) such risks over long repay-periods are typical for investments in water infrastructure [Gmeinbauer, 2007].

A very important issue in that context is the enforcement of technical and environmental standards. If supply-water services (which may rely on re-use water from wastewater-reclamation plants) fail, because quality and continuity of services are insufficient, the consumers will complain and generate political pressure sooner or later. This is not often the case with WWTP and therefore an independent monitoring of wastewater-discharge into the environment is inevitable to make sure that O&M is in compliance with the legal requirements.

Unfortunately, this fundamental pre-condition cannot be taken for granted in many countries. In the contrary: Very often the local EPAs (Environmental Protection Agencies) are governed by the same political bodies as wastewater utilities which is a conflict of interest. Corruption is another obstacle for independent monitoring and control. Poor technical equipment and training do generate additional shortcomings, of course. (By the way: Real time, online monitoring instrumentation with reliable and manipulation-proof data-transfer to "leapfrog the local level" and is a strong tool to create transparency and consequently improve enforcement [Rudolph, 2015/2]).

It would be easy for donor-banks to insist and introduce independent effluent monitoring as part of technical auditing. Commercial banks do not have such power, just a procedure to detect and handle technical, operational risks, which must be assessed beforehand under a financial due diligence.

Figure 3a is the photo of a WWTP in Russia (www.wte.de). The plant had been developed under a balanced mix of commercial financing sources and public export guarantees. Even though the political relations between Russia and the Western world have been deteriorated dramatically since this WWTP investment has been done under a BOT-scheme, the Government and City have fulfilled all contractual obligations and paid their fees onto the bank account of the BOT contractor. The WWTP is functioning in compliance with all technical standards due to the fact that there are incentives, financial bonuses and penalties contained in the contract.

Financing options for SMP and innovative solutions

Banks prefer large project investments. Especially project finance needs a volume of (let's say) million 30 EUR or more to cover the expenses for the bank's project development and administration, including the technical, commercial/financial and legal due diligence. SMP coming along with million 0.1 to 10 EUR are too small.

There are special programmes from DFI-Banks and special financing solutions from commercial players for SMP - but not enough to come true under "normal" conditions. (Financial arrangement for SMP is hardly possible without having a very enthusiastic individual to drive project-development and investment and succeed under adverse, difficult circumstances.)

The same is true for financing innovative solutions (RCI, see chapter 1): For good reason, donor banks want to see practicable, well established solutions and fear the risks related to innovations. Commercial banks can hedge specific innovation risks - if the lender is able and willing to pay the risk premium. Fortunately, there are special programmes from the Governments (Ministries of Research, Science, Technology) as well as private foundations and commercial investors specialised in water innovations. However, compared to the needs taking the yardstick "SDG" (sustainable development goals) this is not more than a "drop in the ocean".

One positive example is visualised in **Figure 3b** below, showing a modular water disinfection unit (www.redowater.com) for which a special investment fund has been created (www.grasshopper-investments.com). This unit has been implemented in more than a dozen countries. The customer can buy or lease the unit and will receive support for installation and operations. The unit is remote controlled and can be switched off from the manufacturers headquarter if the customer does not pay (which has not happened very often - not even with customers in North Korea!).

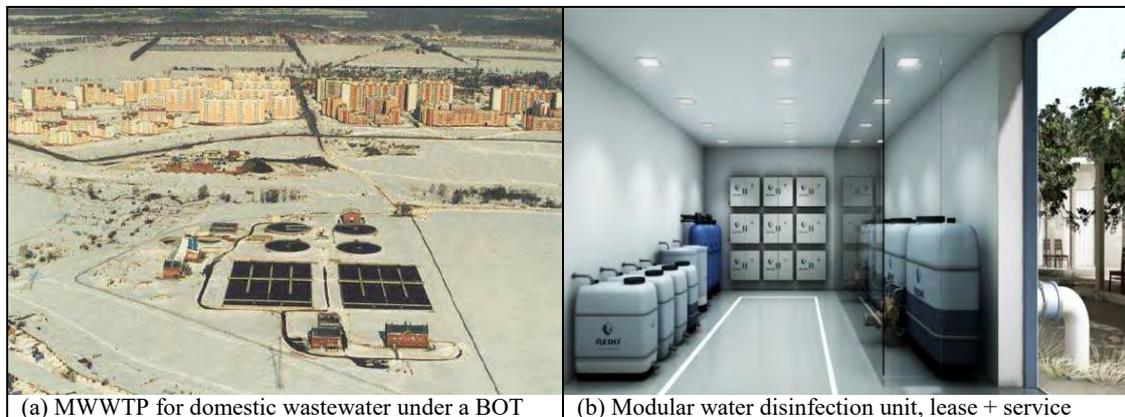


Figure 3: WWTP financed by commercial banks

Forfeiting to finance water project investments

The basic idea of forfeiting is that the borrower "sells" future revenues from water tariffs to the lending bank. If the borrower is a private service contractor under a PPP (Public Private Partnership), the employing public water management authority (in most countries a municipality or municipal association) is involved as third party under the forfeiting finance contract. **Figure 4a** gives an overview on the contractual relations and data from selected WWTP investments realised under forfeiting finance.

After the reunification of Germany 1989, when money was scarce in public pockets, more than billion 2.5 EUR (!) have been financed through private investors under the forfeiting mechanism (Herman, 2015). It must be emphasised that forfeiting is not limited like "investment-only-finance". Forfeiting may include (on lenders request) re-investments and working capital for operations to cover the scheduled cash deficits in the first years until the "day of break-even" under the PPP contract is reached. **Figure 4b** indicates the asset values of 17 WWTP investments (the author of this article has been involved as advisor in 8 of these cases).

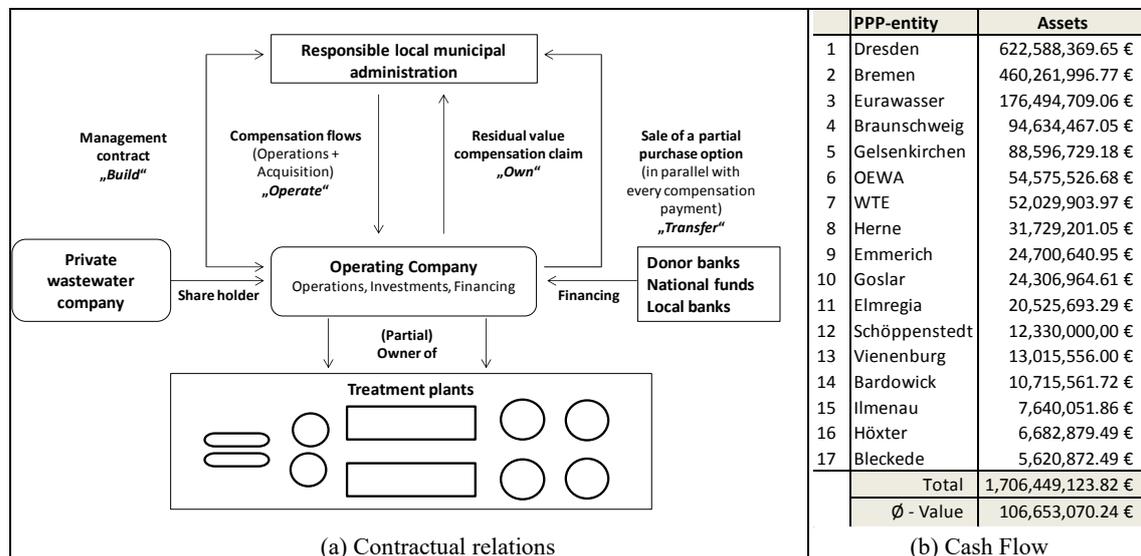


Figure 4: Scheme and data of PPP forfeiting financed WWTP [Hermann, 2015]

Whether or not forfeiting makes sense to be implemented in different countries depends (as always) on the institutional framework, namely on the taxation and on the legal status of municipalities. In Germany, municipalities (respectively municipal associations or similar public entities) can not go bankrupt since they are protected under a constitutional de-facto financing guarantee (municipalities protected under their provincial Government, provinces protected under their State Government, states protected under the German Federal Government). This is different from the status of municipalities in other developed countries (like US or Australia) and developing countries.

However, since in most countries (especially in developing countries) the water sector is subsidised through public funding and ODA, this subsidy can be used to minimise the risk of the lender under a forfeiting scheme. The financial agreement with the bank would need a clause, wherein the lender guarantees to deviate a pre-determined cash flow (taken from the water-tariff revenues) as payment for the BOT-contract fee.

In case the municipality wants to do it without PPP this payment is due as compensation for the work of a ring-fenced municipal SPV (special purpose vehicle) which is to be made responsible for investments and operations of the facility under discussion. Furthermore, the National Government might have to issue an irrevocable promise to compensate deficits in case the lending municipality does not comply with the contract.

Pragmatic approach towards sustainable water finance

To implement sustainable water finance will take time and needs different working principles for donor banks and bank-regulators. A number of donor banks is not allowed to finance without 100% risk coverage through a sovereign state guarantee; others need permission from their board or even the from the ministry of their home-country. Several donor banks own affiliated banks registered as commercial banks, which provide project finance and other sorts of commercial loans, building on the financial capacity and political protection of their state-owned proprietary bank. In so far, the development of sustainable water finance is a matter of change-management in the financing-sector.

Private commercial banks have to seek for other ways to minimise and cover the financing risks - which is of course reflected in the financing conditions (higher interest rates).

There are two cases under research respectively under implementation which both led to the conclusion that (for the current state of development and working conditions) a *hybrid-finance appears to be the most appropriate solution*, consisting (i) of traditional, subsidised investment-only-finance from public sources and ODA and (ii) a component of output-based finance.

Case 1: IWRM Africa: Water-re-use investments in Windhoek, Namibia

More than 80 % of Windhoek's raw-water is collected in dams, which are running empty because of a long draught and climate-change - simultaneously with increasing demand due to growth of population and tourism. The city-government has launched a draught-response plan on December 1, 2015. Since then, it is expected from ordinary households to save up to 50 % of their water-consumption or not to use more than 90 l/cap/d. Other institutional consumers, such as schools, hospitals, prisons, military bases etc. were simply given quotas they have to meet. Windhoek has developed additional bore-holes and is pushing up water-reclamation. Operating the eldest potable water-reuse scheme worldwide since 1968 (!), Windhoek must now extend raw-water-production from domestic and industrial waste-waters (the latter limited to non-potable reuse).

One of the investment-projects under preparation is the extension of the Gammams WWRP (waste-water reclamation plant), producing raw-water to be further purified in the Goreangab supply-water production plant. Gammams needs to be rehabilitated, extended and modernised with an investment of roughly million 40 EUR. Initially, the project was planned to be realised turn-key under an EPC (engineering procurement construction) with financing through the municipality.

For better "incentive engineering" (as described above), pragmatic solutions for hybrid financing have been developed under a research project funded by the BMBF (German Ministry for Education and Research, www.iwrm-southafrica.de), meanwhile adopted by the City Council.

The author has organised a road-show to collect indicative financing offers from a number of donor banks. The result was that some of the donor-banks were indeed ready to abstain from the usual sovereign bank guarantee. However, it was found that the grant component and price-condition of a "conventional" ODA loan from the best bidding donor bank were so attractive that the idea of hybrid-finance under the Gammams-project, itself, was abandoned.

Therefore, the following financing strategy shall be applied:

- Establish a "ring fenced" SPV (special purpose vehicle) under the municipality, which is acting like an autonomous enterprise with its own financial, technical responsibilities (tariff collection, expenses for construction works, repairs, operations, staff management etc.) for all currently 8 plants;
- The Gammams WWRP shall be financed under ODA and tendered under a DBO (because this allows for holistic competition and "open-technology-tender" incorporating construction and operational costs);
- Existing assets invested under output-based finance shall be transferred to the SPV, like the BOT for the WWRP UJAMS (see Figure 1f) [Rudolph, 2013];
- A professional (commercialised) operational company shall be made responsible for the consolidated operation of all water and wastewaters plants and receive output based payment for successful O&M.
- Future investments shall be prepared with an output based financing component (like forfeiting) as far as needed protected with a payment guarantee from the City.

Forfeiting could not be realised as portion of hybrid financing in this case, yet, but it is recognised as the strongest driver towards sustainable O&M and towards transparency in re-financing with ttt (tariffs, taxes, transfers). Council members and stakeholders shall make their opinion case-wise and take their decision for each single investment being aware of financial figures which indicate the consequence of higher/lower tariff decisions on the amount to be compensated through the municipal budget. The discussion and decision making which has developed with the municipalities under the IWRM research project is quite different from those cities, which are not aware of sustainable financing options and decide for lower water tariffs before election and are trapped to subsidize more (and/or accept degradation and devaluation of assets) after election.

Case 2: WaLuE - Water-loss reduction programme in Tiruvannamalai

Tiruvannamalai is a city with 150,000 inhabitants suffering from similar water-supply deficits like many other cities in India. Without reducing WaLUE (Water-Losses in Urban Environment) it will not be possible to serve the growing population continuously under the target "24/7" of the Indian Government. In 2013, the German Ministry of Education and Research (BMBF), in cooperation with KfW-bank, has decided to support a research and pilot-project (www.walue-india.de) in order to

- adapt technologies and tools to local requirements (dynamic pressure-management, active leakage control, immediate repairs, GIS-based asset-management - all this in absence of continuous water-supply and low water-pressure zones);

- develop a viable business-model aimed to be considered as bankable for ODA including an output-based (blended) financing component to intensify the long-term success of WaLUE activities;
- provide training and know-how transfer with local operators and leaders to ensure the sustainable implementation of WaLUE.

As presented at the ADB Annual Meeting [Rudolph, 2016] the project has achieved the following [intermediate] results

- TECHNICAL: Within the pilot zone, 10 bulk-water meters, 150 house-water meters in 75 households, data loggers, low-pressure monitoring and control devices have been installed and test-operated. The IWA-definition of NRW (non-revenue water) has been adapted to incorporate in-house-installations (roof-tank-overflows). So far, the technical targets have been achieved by 85 %.
- FINANCIAL: A complete set of economic data has been researched and collected, and a tool to calculate capex and opex has been applied. Cost-transparency has been established. However, to increase the utility water service-performance and to motivate the water consumers to stop wasting supply water was impossible, since cost-coverage and financial incentives could not be institutionalised due to the political decision to keep water-tariffs low (partly flat rates). Therefore, the financial targets have been achieved by just 25 %, so far.

Assuming that water-tariffs would increase to cover at least OPEX (still excluding CAPEX), and that local capacities and local water-business would develop (with involvement of international professional service-providers as partners of local companies "on equal level" like under a franchise concept (www.waterfranchise.com), then the following financing model could be envisaged:

- Hybrid Financing of a ten years WaLUE-program under a performance-based service-contract,
- wherein investments are covered through ODA, refinancing the regional bank (TNUDF, Tamil Nadu Urban Development Fund in Chennai, India),
- wherein re-payment is delivered from the municipality (in its role as employer of the WaLUE-service-contract).
- The working capital (to cover the initial OPEX-deficit and to pay for structural maintenance, repairs and small investments for network modernisation) is provided under a commercial loan and has to be repaid by the WaLUE service-provider from the expected success-fees.

Matters of reconciling are contract clauses to protect the parties from unfair interpretation of performance indicators (starting with the so-called base-line data) as well as from payment delay and political interventions.

Conclusion

Based on all these lessons learned, a "vision" for Sustainable Water Finance had been discussed with experts from water industry, researchers and banks (**table 1**):

Table 1: Sustainable Water Finance - Needs and Model in Key-Words

To become sustainable, Water Finance should

- * include SMP (small and medium-sized projects)
- * be accessible for novel technologies, innovative solutions, like elimination of micro-pollutants, water-reuse systems, advanced IT-controlled facilities etc.
- * include long-term investment programmes, like water-efficiency measures, water loss reduction, network management etc.
- * incentivise appropriate O&M, incorporating regular maintenance (repairs) and structural maintenance (non-activated reinvestments)
- * strengthen local water business development („job per drop“)
- * attract professional technology and service providers
- * be built on stable (financial) commitment; impose risks and chances to the project owner.

The vision of a Sustainable Water Finance approach is a concept, which

- * is ready to bundle SMP under a standardised (lean, affordable) process of project development, due-diligence and administration during the overlapping disbursement and pay-back periods ("Programme finance", "Bundled Finance"),
- * can go for a loan disbursement period of up to 15 years, bundling all core investments needed to achieve the programme targets, with a pay-back period, accordingly
- * will be implemented through a ring-fenced municipal SPV or PPP or concession enterprise
- * is supported by a professional performance O&M-warranty from a professional service provider (like under a Water Franchise contract [Rudolph, 2008])
- * may well include a grant component for Technical Assistance, Project Development and „viability-gap-finance“ under valid development goals
- * but does include a significant output-based loan component (may be forfeiting) re-financed through tariff revenues and land-value increase ("Hybrid-Finance", Blended Finance").

From the view of sustainable water finance, the road to a better world would

- ring-fence business-administration and technical operations of water and wastewater entities (a pre-condition for transparency and rational political decisions as well as optimal utility operations).
- not enter investment-only-finance, insist to incorporate > 30 % of output-based loans in financing scheme (and if the DFI-sponsor is not able to grant/lend less than 100 %, then his grant/loan is combined with output based loans from another sponsor for other projects to make sure that the water utility is not left without O&M incentives, not exposed to failure due to non-sustainable water-finance).
- Preferably not subsidise the tariffs, but subsidise the poor (mis-pricing leads to mis-spending [OWEN, 2016], and with low water tariffs, there is little incentive for water-utilities to deliver good water service, and weak power for good water demand-management).
- mitigate negative side-effects of subsidies and verify why and to what extent these are necessary (subsidies are like a drug, needed for babies to grow and ill people to be cured, but all drugs should be medicated in awareness of negative side-effects, especially if consumed over a long period).

Final remark

The water sector, especially in the donors market and subsidised public part (less in the industrial sub-sector) is characterised by discussion based on arguments which do not reflect the true motivations, with statements which are not transferred into actions, and sometimes with project reports which look brilliant, but are not reflecting the reality in the field. In most of the countries (including Germany, by the way), there is no clean separation of powers between the political function (decision making under the principle of democratic consent), administrative function (sector-regulation, enforcement of law and standards, treating all subjects in the same way with no privileges for whoever, like a good referee under the principle of neutrality) and executive function (design, finance, build and operate water systems, the task of water entities obliged to act under the principle of competitive efficiency).

There will always be disputes. It is the right for public institutions defend their privileges, for development institutions to preserve their comfortable life, for scientific institutions to maintain their freedom in "clean" science, and for commercial companies to make profit, refuse to commit financial suicide, as well as for politicians to hunt for majorities, votes. Sustainable Water Finance can help to improve the water sector in spite of all this, because it sets incentives for success, especially O&M, the bottleneck of success.

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