

**Managing rivers with climate change and expanding population
Brisbane, Australia , 4 -7 September 2006**

Session: Natural disasters – how to restore rivers after tsunamis and hurricanes and protect them from future events

Title: Natural disasters / tsunamis in view of the climate change and expanding populations

Sub- title : Restoration and protection of water resources in Sri Lanka and Maldives after the tsunami

**Mr Tadeusz Malkiewicz, Department of Water Affairs and Forestry,
Pretoria, South Africa**

Co-presenter : Mr Sibusiso Mthembu, Department of Water Affairs and Forestry, South Africa

Climate change and associated higher prevalence of natural disasters dictate that water resource managers have to focus their efforts more than in the past.

This paper deals with the restorative effort to water resources and services in Sri Lanka and the Maldives, after the earthquake below the Indian Ocean on 26 December 2004, that triggered a tsunami which severely affected twelve countries.

In both Sri Lanka and the Maldives, for different reasons, rivers are not the primary domestic water source. Whether the water source is surface water or subterranean water, the principles that promote sustainable water supply are not significantly different from a water management point of view. South Africa as a water-scarce country is well aware of the crisis that would be precipitated by widespread disturbance of water supplies. South Africa has also successfully administered the largest ever sector wide Programme funded by amongst others the European Commission.

South Africa was therefore in a position to offer its experience and expertise to supplement the capacity in other countries in the aftermath of the tsunami. The original intention was to assist with accelerated and more efficient roll-out of donor funds in tsunami-stricken countries for the obvious benefit of communities which have lost so much.

Very soon after South Africa became involved in technical assistance, the focus changed from mere tsunami assistance, to assistance with setting meaningful goals and holistic planning of donor activities in the water sector and its interface with (re)development, to align with priorities expressed by the water sector roleplayers in both countries.

Sri Lanka

Sri Lanka was, after Indonesia, the country hardest hit by the tsunami, despite its distance from the quake. More than 30 000 people were and almost three quarters of its coastline scoured on the day. Some 12 000 dug wells which are the primary domestic water source were contaminated by sea water. Nature will according to experts take about three years to reverse this salination of the coastal aquifers.

After the trauma, generous international donations were received in the form of emergency water supply and treatment plants, as well as pre-fabricated houses in large numbers. The fact that people could not resettle on their previous sites which were now declared a flood zone, dictated that new bulk infrastructure for housing estates had to be developed in a short period.

The medium term re-establishment of ruined water and sanitation infrastructure is not merely a question of re-instatement of the lost infrastructure. The high rainfall of more than 2m per annum, in conjunction with the high water table meant that river storage to serve coastal regions was a low priority in the past. After destruction of the dug wells, water has to now be transported over long distances, where such infrastructure did not exist before.

There was suddenly a dire need for integrated planning and coordination of the various initiatives. A unique situation existed in the sense that there were no budget or resource constraints, which is unheard of on most projects. The biggest need was for coordination and orchestration of the reconstruction efforts, a task for which the water sector in both countries could not possibly be expected to have the required capacity.

A South African delegation, led by ministers of Health and DWAF, attended the conference held in Jakarta on 6 January 2005 to discuss the aftermath of the tsunami disaster. Upon her return the Minister of Water Affairs and Forestry called a meeting of the water sector and requested that South Africa co-ordinates with its counterparts and assists with water and sanitation challenges in tsunami stricken countries. In response to this request, the water sector managed to mobilise alum donations to replace a 38t shipment of alum destined for water treatment in Sri Lanka that sunk near Chennai. A team of South African water sector experts visited Sri Lanka and The Maldives in April 2005 with a view to assessing where synergy between the needs of the countries and the resources in South Africa could be achieved. The end result was two national programmes in Sri Lanka and one multi-disciplinary project on three islands in The Maldives, as follows:

- **Sector Wide Approach Project (SWAP)**

This project was modelled on the EC funded water sector donor coordination programme in South Africa called Masibambane (Zulu word for 'We work together'). The outcome of the process, which must be seen as a long-term initiative, should be better communication, efficiency and cooperation amongst all high-ranking government officials and key functionaries in many role-players organisations including donors and civil society.

As a direct spin-off of the progress of this sector wide coordination initiative, Unicef is in the process of appointing two experts to support implementation in a sector wide fashion: a full-time local change management and communications specialist and a part-time international monitoring and evaluation expert.

The success of this initiative lies in the gradual transfer of ownership of the South African sector programme structures and positions to senior Sri Lanka government officials.

○ **Water for Growth and Development Project (WGD)**

This project is planned to impact on holistic planning and coordination approaches within the water sector and related development sectors both nationally and at district level. The name Water for Growth and Development was derived from the theme of the 4th World Water Forum in Mexico earlier this year.

In essence this is a focus on Integrated Water Resource Management, that commenced with several presentations made to the Sri Lanka Institution of Engineers and staff of the drainage board, culminating in an informal Think Tank on the topic of integrated management.

Several workshops were held where integration was achieved of planning initiatives in the Sri Lanka water sector.

A desk study by a Sri Lankan consulting firm was commissioned in order to establish the availability, nature and quality of information on water resource management in four tsunami affected districts, namely Matara, Hambantota, Ampara and Trincomalee. The South African team followed up on the study findings with various meetings with key officials at national level and in the districts, in order to facilitate the establishment of local water resource management initiatives and processes. The focus has subsequently been narrowed down to the district of Hambantota., which is proposed as pilot project for Water for Growth and Development. An earlier pre-feasibility study on potential water resources for development in Hambantota district will now be revisited with a view to implementation, at request of His Excellency, Mahinda Rajapaksa, President of Sri Lanka.

The Maldives

The death toll from the tsunami in the Maldives was not very high. The country which comprises some 2000 islands, less than 200 of which are inhabited, was overtopped by sea water for most of a day, and the already limited fresh water reserves all but destroyed. The fresh water lens under each island is rarely deeper than an average of 2-3 m and most islands have a diameter of less than 1 km. It stands to reason the there is a finite amount of water under each island and that the amount available per capita would be reduced in direct relation to the population growth. This fresh water lens has been contaminated by sea water and in many instances overexploited, because adjacent wells are collapsed, with the result that it will take years to reverse the damage by the tsunami. Ground water is only suitable for washing and sewerage. Rain water harvesting is the sole source of water for drinking and cooking. All fresh water originates as rainfall, some of which is captured in rainwater tanks or percolates into the ground and some simply

runs off into the sea. Domestic toilets are generally pour flush in combination with individual or communal septic tanks and lagoon or sea outfall. The potential for contamination of the ground water is therefore obvious. Ground water is generally brackish as a result of sea water intrusion – exacerbated by the tsunami. Public buildings mostly have flush toilet systems. The Maldives people are Muslims and aquifer recharge from even treated waste water is not desirable.

Desalination of seawater was an important and vital solution to provide drinking water to the worst hit islands after the tsunami. This was however met with opposition from the local people as a permanent solution.

The Maldives is an interesting economy where there are three distinct sub-sectors, also from a water and sanitation perspective, ie. Malé and its neighbouring islands, the tourist resorts and the remaining inhabited islands. The resort islands are the main foreign exchange earner and autonomous and completely separate from the country's other infrastructure. The water, sewerage and waste water infrastructure on resort islands is largely self-regulating and abuse in terms of ocean waste dumping does occur.

In absence of formalised water law, each water use segment developed its own water service practices. In the capital city/island Malé, services are efficiently provided by a private utility company, to the densely settled population, but due to the use of desalinated water, the unit costs are high in comparison to similarly sized organisations in other parts of the world. This high operating cost raises the question of sustainability of these services in relation to the income levels of the served population and consequently the government of Maldives subsidises the cost of water.

International donations to the extent of one rain water tank per family and several reverse osmosis desalination plants per island were received. There is a capacity constraint to transporting all the tanks to their destination and in Malé, the main island and capital city, which is also one of the most densely populated area in the world, there is not sufficient space to mount so many rain water harvest tanks.

The large scale introduction by donors after the tsunami of reverse osmosis plants and package or conventional plants for sanitation treatment has fundamentally changed the service delivery environment on the inhabited islands in the Maldives. The country needs to now train people to operate and maintain the hi-tech plants. Spare parts have to be kept in inventory and costs of operation have to be covered, since the original donor does not indefinitely take responsibility for the equipment.

The Maldives ministry responsible for water supply and sanitation also faced the dilemma that control and management of donor interventions were difficult in the absence of supporting legislation, regulation and guidelines, that the country did not need prior to intense activity following the tsunami. Donors also want the assurances of legal and regulative measures.

It is therefore imperative that new policies, responsibilities and guidelines and standards be developed around the current infrastructure mix and roleplayers in the water sector in the Maldives.

The water authorities welcomed inputs from South Africa at a time when the permanent staff was overwhelmed by service interruption and supply issues and not able to focus on the longer term integration and master planning around the new infrastructure, or on regulatory framework matters.

Summary on the nature of assistance needed during the restoration phase

Much of the work done by the technical experts from South Africa has been done on a volunteer basis, as part of their contribution to the relief effort in the wake of the tsunami. Their efforts are recognised and applauded and due to their contribution South Africa has, with a budget of less than US\$1million, been able to make a significant contribution to the redevelopment of the water and sanitation sectors in Sri Lanka and the Maldives.

Assistance with operational planning on how a government body will structure and fund itself to cope with their normal work load as well as the pressures brought about by the disaster. Numerous meetings and presentations with donor delegations are just one of many time consuming aspects.

It is very important to bear in mind that officials dealing with the aftermath of a disaster as well as agencies on the ground, are under pressure to produce short term results, which in turn places a similar pressure on those assisting them. To be able to navigate between the short term requirements and a holistic longer term approach, requires a delicate balance.

The South African initiative was structured in a way which encourages personal interaction and building of relationships between South Africa and Sri Lanka or the Maldives respectively, as well as companies and individuals from these countries. South African consultants were actively involved in sharing ideas with staff from the ministries, both at a formal and informal level. This type of open discussion proved useful to the officials, who used the opportunity to benefit from the learning curve on service delivery experienced by water professionals in South Africa since 1994.

Flexibility was one of the requirements working in the disaster stricken territories. At the on-set eight South African projects were envisaged to support the drainage board in Sri Lanka. Extending the scope of certain projects, while scaling down others, was the natural conclusion once it was clear what other parties on the ground were contributing. For example, two experts from Rand Water in plant operation and maintenance and related water quality management, visited Hambantota and Ampara in early 2006 with a view to staff training which was requested. The experts concluded that knowledge and skills of the local staff was of a high calibre but identified structural policy and management problems that would need attention in order to ensure sufficient supplies of adequate quality on a sustainable basis. The training was abandoned and new policy is being developed as part of a long-term thrust to establish good governance.

Each country has its own unique environment (physical, social, cultural, policy, etc.) and although much can be learned from each other, solutions must accommodate local realities, even down to the area near Trincomalee where violent clashes between factions take place in Sri Lanka. The overall approach of the project was to be sensitive to local

conditions and not make assumptions which did not apply in the disaster struck region. Working with agencies familiar with local conditions is vital.

Donations of goods and trauma assistance were plentiful in the aftermath of the tsunami, but there was a gap where it was necessary to familiarise local people with some technical or user aspects. Short lectures done to familiarise staff on how to improve the efficiency of borehole testing, as well as a training course in the use of modern electromagnetic instruments donated by Unicef to the Sri Lanka, were much appreciated.

Sri Lanka has a very old, unique and strong history and tradition of irrigation for mainly rice production and a related strong lobby with vested interests, which must be accommodated in any new initiatives, policies and approaches for growth and development.

The water and sanitation sector, especially in the Maldives, has changed permanently with the introduction of more sophisticated technologies after the tsunami and will be more reliant on having sufficient skilled personnel to operate the new reverse osmosis and secondary wastewater treatment plants.

Where different parties were involved in adjacent projects, it was difficult to align the requirements of the parties involved in the projects.

Conclusions

Capacity building support is one of the biggest needs experienced by tsunami hit countries and the South African water sector was and is able to make some unique contributions in this field. This is in many respects unique as a truly South-South support initiative.

The original intention was to assist with accelerated and more efficient roll-out of donor funds in tsunami-stricken countries for the obvious benefit of communities which have lost so much. Gradually the emphasis of the South African water sector support however shifted towards strengthening water management structures in those countries where we were involved to be more effective and efficient in terms of integrated governance principles.

The lack of clarity over roles and responsibilities, the need for new strategic direction and the overwhelming pressure from the urgent problems raised by the tsunami and the donors' response all contributed to officials feeling overwhelmed and unable to see a clear road ahead. Part of the contribution South Africa made, was to assist with prioritisation and synthesis of the water and sanitation management topics and their relationships to each other in order to provide simple and more manageable solutions and add structure for purposes of decision making.

The post-tsunami reconstruction programmes should not be seen in isolation but as triggers for reform and development of policies, approaches and procedures that impact nationally and internationally.

Good governance from a water management perspective involves more than the usual monitor, plan and design, build, operate and maintain principles. In cases of constrained resources it becomes progressively more important that water managers liaise very well

with users who are dependent on or influence the water supply, such as agriculture, health and tourism.

To illustrate the point, South Africa's emphasis on integration and coordination of the Sri Lanka water sector culminated in buy-in at the Presidential level and support by Unicef for specific medium term restoration and upgrade projects in the water sector. Likewise, in the Maldives, the South African team, subsequent to the technical assistance, was commissioned to jointly develop a legal framework towards the enabling legislation necessary before the Maldives water sector can take a more proactive regulatory role in future.

The water and sanitation sector in the Maldives has changed with the introduction of sophisticated technologies. This has an impact on both the price and availability of purified water and is reliant on having sufficient skilled personnel to operate the plants. There is currently not a sustainable programme for the operation and maintenance of such plants, or any form of cost recovery that can sustain the more expensive technologies.

The lack of suitably qualified and experienced local staff for the new technology means that alternative plans must be put in place to deal with the shortages. In the short term these people can be sourced from overseas and for the long term a programme to boost the number of engineers and technical specialists should be commenced as a matter of urgency.

In monetary value the South African support programmes were the smallest of tsunami related donor programmes in the water sector of Sri Lanka and the Maldives (+US\$0.6 and US\$0.3 million respectively). The impact was disproportionately large, as assistance focused on a spectrum of key technical and institutional capacity building issues instead of merely on specific design and/or construction projects. South African assistance extended beyond purely tsunami related issues and can be of sustainable value to the relevant individuals, organisations, sector and both Sri Lanka and the Maldives as countries.

In order to be pre-emptive for future natural hazards, water sector managers will have to cooperate closely with disaster initiatives to focus on the prevention and mitigation of water-related disasters, while at the same time, improving efficiency and effectiveness in providing relief, and spearheading sustainable reconstruction, rehabilitation and development.

Acknowledgements

The author wish to thank the following persons for help with input data and support : Mr K. Pelpola, Mr C. Swiegers, Mr T. Louw and specially Ms Y . Burger.