WATER INTEGRITY IN ACTION

Curbing Illegal Sand Mining in Sri Lanka
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Water Integrity in Action

CURBING ILLEGAL SAND MINING IN SRI LANKA

2013

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Water Integrity In Action:
Curbing Illegal Sand Mining in Sri Lanka
2013

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Acknowledgements
The authors would like to extend our sincere thanks to many people who have graciously accepted their requests for interviews and who have shared their experiences with us generously – Kusum Athukorala (Chair of SLWP), Niyangodu (Former Chair of SLWP), Anil Peiris (Director General, GSMB), Chief Inspector Ernest Perera (STF RSM Programme Coordinator for STF), Dr. Ranjana Piyadasa from the University of Colombo and AWP Chair Ven Malgane Aththadassi. Thanks also go out to Binayak Das and Alexandra Malmqvist from WIN for spearheading the initiative to document this campaign and to Thakshila Premaratne from SLWP who was helpful in organising logistics for meetings with key stakeholders and the field visit to river sites.

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Citation: Pereira, K., & Ratnayake, R. (2013). Water Integrity in Action: Curbing Illegal Sand Mining in Sri Lanka, Berlin, Germany: Water Integrity Network.

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<th>Full Form</th>
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<tr>
<td>AWP</td>
<td>Area Water Partnership</td>
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<tr>
<td>CEJ</td>
<td>Center for Environmental Justice</td>
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<tr>
<td>EFL</td>
<td>Environmental Foundation Ltd.</td>
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<tr>
<td>GDP</td>
<td>Gross Domestic Product</td>
</tr>
<tr>
<td>GSMB</td>
<td>Geological Survey and Mines Bureau</td>
</tr>
<tr>
<td>GWP</td>
<td>Global Water Partnership</td>
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<tr>
<td>IWRM</td>
<td>Integrated Water Resources Management</td>
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<tr>
<td>NetWwater</td>
<td>Network for Women Water Professionals</td>
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<td>NGO</td>
<td>Non-Governmental Organisation</td>
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<td>PIL</td>
<td>Public Interest Litigation</td>
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<td>RSM</td>
<td>River Sand Mining</td>
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<td>SLWP</td>
<td>Sri Lanka Water Partnership</td>
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<tr>
<td>STF</td>
<td>Special Task Force (police)</td>
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<td>WIN</td>
<td>Water Integrity Network</td>
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Foreword

Globally, the construction industry is booming as cities are growing, buildings are mushrooming. There is a boundless demand for resources and sand is one of the core resources required by the construction industry. This demand has led to the incessant and many times illegal mining of sand, from various sources which include river beds. This illegal and unregulated mining of sand has a major detrimental impact on the ecology of rivers. This is compounded further by the fact that the construction industry is known to be one of the most corrupt sectors, according to Transparency International’s Bribe Payer’s Index. In this situation, illegal mining of sand is taking its toll on the rivers and also affecting people’s livelihoods and crime is spiralling upwards.

To curb illegal sand mining, efforts are underway across countries and at various levels. This publication documents the efforts made in Sri Lanka to counter illegal river sand mining. In 2005, a campaign was initiated against river sand mining (RSM) by the Sri Lanka Water Partnership, the Network for Women Water Professionals (NetWwater) and their partners. The RSM campaign was supported by the Global Water Partnership (GWP) and WIN. Currently, GWP is continuing support to RSM till date.

The impacts of the RSM campaign have been positive; illegal sand mining has been banned in two river basins – Deduru Oya and the Maha Oya. One of the interesting highlights of this process was the involvement and role of the police department as law enforcers in curbing illegal sand mining. This case highlights the role that law enforcers needs to play in protecting natural resources and the environment. The sustained campaign and engagement with different stakeholders produced the successes. This example shows that a tenacious process to curb corruption and improve integrity is possible.

This is the first of a series of good practices that WIN will be documenting and sharing from the water sector.

Water Integrity Network
By 2025, the global construction industry is set to grow by more than 70 per cent to $15 trillion worldwide

—Global Construction Perspectives, 2013
1. Introduction

Sand is an inalienable part of the construction industry supply-chain. This industry is a very important indicator of the growth of any economy. Moreover, the global construction industry will outpace world GDP over the next ten years. A report released in July 2013 forecasts that the volume of construction output will grow by more than 70 per cent to $15 trillion worldwide by 2025. A mega-trend that underlies this growth is that developing countries will overtake developed countries in market share (Global Construction Perspectives, 2013). While there appears to be no dearth of sand on earth, it is time we took a closer look at the issue. Much like water, there are different kinds of sand. Some are suitable for human use as they are, some need to be treated before they can be used and others are not suitable for use in construction (e.g. desert sand). The reason such sand is unsuitable is that the grains in desert sand are too rounded and smoothed by the wind, and hence do not offer any cohesion and structural strength to concrete (Welland, 2009). Consequently, much of today’s sand supply comes from relatively limited sources.

On a global scale, sand mining is an issue that has not been recognised as a threat for a very long time. However, it is a threat that is rapidly growing in significance across the world, and it has direct bearing on local water security. This threat is compounded by the fact that the construction sector is known to be one of the most corrupt, according to Transparency International’s Bribe Payer’s Index (Transparency International, 2012). Sand is extracted in massive quantities, primarily for use in construction and land reclamation, and in relatively smaller quantities for extraction of strategic minerals. However, as mentioned above, not all kinds of sand are considered suitable for all uses. In the construction industry in developing economies, the most sought-after kind of sand is river sand, followed by coastal sand. With rapid urbanisation and changing landscapes, this increased rate of extraction from rivers and beaches has had severe socio-environmental consequences. Examples of this can be found in several countries across the globe (See Figure 1). The rapid construction and urbanisation forged in the neo-liberal model of development rarely takes into account
social and environmental costs of such growth. Especially because they are more isolated than their inland counterparts, island states are particularly sensitive to the acute tension between such a neo-liberal form of development and the need to minimise socio-environmental impacts. This is more so if the island happens to be a developing economy.

In many of the cases shown above, sand mining has often been ignored and little action has been taken to stem the issue. In addition, surprisingly little academic literature is available connecting such trends. Since sand is officially classified as a ‘low-value resource’, we believe that many governments and economies are yet to recognise the linkages between the question of sand mining and larger issues such as water security of the region.

As seen in Figure 1, sand mining is a common practice in Sri Lanka too, where the construction industry recorded annual growth of 9.3 per cent in 2010. The share of construction in Sri Lanka’s GDP consistently increased from 6.1 per cent in 2002 to 7.6 per cent in 2010. This growth was mainly driven by large-scale development projects in the country. Growth at such a frantic pace has had tremendous impacts on sand sources. However, over the last few years, there have been active campaigns against sand mining. Although beach sand mining is a very serious issue in light of climate change and rising sea levels, this document focuses on the issue of river sand mining (RSM) alone and excludes mining along beaches in Sri Lanka. However, it also includes the issue of clay mining, as this has similar socio-environmental

Figure 1: Sample list of countries where sand mining has been reported to cause problems

Source: See Appendix 1 for the various sources
impacts. One of the most recognised and successful campaigns against RSM has been led by the Sri Lanka Water Partnership (SLWP), the Network for Women Water Professionals (NetWwater), and their partners, with key support from organisations such as the Water Integrity Network (WIN) and Global Water Partnership (GWP). The campaign began with the aim to create awareness of the downsides of the practice, and the alternatives that are available. It has engaged multiple stakeholders across various levels, from high-level government ministries to local people impacted by sand mining along major rivers. The evolution of campaign is described in the paragraphs below.
2. The historical background of the problem and its impact

The Indian Ocean tsunami in December 2004 caused widespread destruction of property. After Indonesia, Sri Lanka was the country hardest hit. However, science has found that sand mining could have further exacerbated the problem. Removal of sand dunes and extensive illegal dredging appear to have increased inundation in the first place (Richmond et al., 2006). In addition, sand mining in rivers not only resulted in a lower river bed and increased bank erosion, but also drastically reduced the sediment supply to the coast. Indiscriminate and extensive sand mining in rivers, beaches and dunes thus reduced the amount of sand available to replenish what was lost during storm events such as the tsunami in 2004 (Samaranayake, 2005). Ironically, an extra 10 million cubic metres of sand was required for restoration and rehabilitation efforts, in addition to the annual requirement of 7 million cubic metres (Senaratne and Dissanayake, 2006).

Such huge demand led the Sri Lankan government to consider the option of offshore dredging (Dredging News Online, 2009). However this has met with limited success, as will be
explained later. In short, while sand mining has always been prevalent in Sri Lanka, it has seen an exponential increase over the last two and a half decades. Data from the Coast Conservation Department (CCD) depicted in Figure 2a below shows this sharp increase. The first peak can be attributed to the construction boom in the post-tsunami reconstruction and rehabilitation phase. The current upward trajectory of the graph is due to the growth of the economy and investments in several sectors following the end of the country’s civil war. Much of the extraction is channelled towards the western regions around the capital, where the rate of urbanisation is most rapid. It is estimated that nearly 40 per cent of the extraction is used only in western Sri Lanka (see Figure 2b).

Historically, much of this sand extraction was unregulated and illegal. It was also largely mechanised, which greatly exaggerated its negative consequences. Incessant sand mining in specific areas over decades began to cause serious problems, especially in zones such as the south-west coast of Sri Lanka that were naturally prone to erosion. Illegal sand mining was carried out extensively at places such as the Kelani River outfall, the Kalutara inlet and the southern region of the Panadura outfall on the west coast, all situated in close proximity to the national capital (Gerritsen and Amarasinghe, 1976). It was estimated that the mining of sand from rivers in the south had also increased by three times in 2009 compared to 1997 levels (Piyadasa, 2009).
3. SLWP’s campaign against sand and clay mining in Sri Lanka

The campaign against RSM led by SLWP, NetWwater and partners, with key support from WIN and GWP, was successful, although it was far from being a cut-and-dried solution to a specific problem. Rather, it was a series of actions carried out by several actors across various timescales. For the purpose of simplicity, it can be depicted as follows. (See Figure 3 and the following explanation)

Before the tsunami struck in 2004, the economy had been on an upward trend and had registered 5 per cent growth in 2004. As a result, there was robust growth in the construction of infrastructure and housing. Sand mining operations continued to become larger and larger. In the reconstruction phase following the tsunami, when sand mining became most visible, the two rivers most affected were the

**Figure 3: Timeline of the campaign process against River Sand Mining**

<table>
<thead>
<tr>
<th>Historically</th>
<th>Artisanal sand mining on a very small scale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre and Post-tsunami</td>
<td>Increased and incessant sand mining (especially mechanised)</td>
</tr>
<tr>
<td>2004</td>
<td>Community Mobilisation by SLWP, Public Interest Litigation filed</td>
</tr>
<tr>
<td>2005</td>
<td>Launch of SLWP campaign</td>
</tr>
<tr>
<td>2006</td>
<td>National Dialogue on River Sand and Clay Mining and Special programs for the Police</td>
</tr>
<tr>
<td>2008</td>
<td>Campaign increased by five-fold by support from WIN</td>
</tr>
<tr>
<td>2013</td>
<td>Campaign extended to formerly war-torn North-East regions</td>
</tr>
</tbody>
</table>
Figure 4: Map of rivers of Sri Lanka affected by River Sand Mining – particularly Deduru Oya and Maha Oya

Source: Ratnayake (2008)
Deduru Oya and the Maha Oya along the west coast.

In-depth interviews with experts and key stakeholders reveal that traditional artisanal sand mining was replaced by mechanised dredging in order to meet the demand for additional sand required for reconstruction activities.

Indiscriminate mining to feed the construction boom caused several undesirable consequences. In the areas around the Deduru Oya, the groundwater table fell by 12-15 metres in some places, and up to 30 metres in others. Sand mining led to degradation of the river bed, erosion of the banks, encroachment of the river buffer zone and deterioration of water quality.

Removal of the sand layer also had a direct impact on groundwater availability, with the water level in many dug wells falling by several metres. This impact was immediately felt by people, and it had knock-on effects. Many agricultural crops usually cultivated along the river banks failed. There were drastic declines in productivity of crops such as coconut – an important part of the staple diet in Sri Lanka. The poor were especially adversely affected. Not only did they lose employment in plantations, but because coconut is an important smallholder and home garden crop, they also suffered when their trees were a major casualty of lowered water tables. Comparable problems occurred in tea and rubber plantations in sensitive areas.

The greatest impact was seen on many small-holder farms and households which depended on vegetable cultivation. They were forced to abandon their livelihoods, move to areas with accessible water or incur heavy costs in order to invest in deeper pumping and water supply systems (Ratnayake, 2008). Similar problems were reported in the case of Maha Oya. Not only were livelihoods affected, but highly productive land was also lost when river banks became unstable and collapsed. Furthermore, when the riverbed became deeper than the sea level, it

The campaign was multi-faceted and included various stakeholders, such as:

- Government officials, e.g. district / divisional secretaries
- Geological Survey and Mines Bureau (GSMB) – the main regulatory authority
- Law enforcement agencies – the police and the Special Task Force (STF)
- Local authorities
- Religious heads
- Community organisations and other NGOs
- Press and media units
- Youth communities
caused saline intrusion into the freshwater stream and affected the drinking water supply of the region. This was extremely damaging to the entire ecosystem, and had a pervasive impact on people’s quality of life. RSM badly affected groundwater, livelihoods, infrastructure (such as bridges, culverts and roads), and all buildings on the river banks. It created environmental refugees out of people who used to have a reasonably good standard of living.

Tension within communities mounted as the benefits of RSM were passed on to private players engaging in the sand mining business and to urban communities who enjoyed the benefit of better infrastructure. Local communities rarely derived any benefit from it, barring opportunities for strenuous labour. The consequences of such extraction were left for the local communities to deal with, and they were not compensated in any way for the deterioration of their living standards. This led communities along Deduru Oya and Maha Oya to file Public Interest Litigation (PIL) cases in the court when they felt that their grievances were not being resolved by the existing law enforcement mechanism. The Deduru Oya PIL was supported by the Centre for Environmental Justice (CEJ) and the Maha Oya by the Environmental Foundation Ltd. (EFL), an SLWP partner. SLWP helped in mobilising the community in both instances. As a result of the PIL, sand mining was completely banned along these two rivers in 2004. The court also demanded periodic reports from the police to ensure progress was made. However, communities still felt unsure as to how to handle the situation. Recognising that these conditions posed a major threat to water security, further magnified by rises in sea-level and climate change, SLWP and NetWwater launched a campaign against illegal sand mining in 2005. Thus legal efforts to confront the practice of indiscriminate sand mining were supplemented by SLWP creating awareness and further mobilising communities to take concerted action. As a result, the Ministry of Environment and Natural Resources issued a ‘Draft National Policy on Sand as a Resource for the Construction Industry’ in 2005.

SLWP also realised that the country already had several rules and regulations to protect the ecosystem and the people dependent on it, but that the problem lay in law enforcement. It therefore offered an RSM awareness-raising programme to various stakeholders, such as government officials, divisional secretaries, media, youth communities, local authorities and NGOs. The police were brought in for the awareness-raising programmes and went on to play a major role in the increased action to curb illegal sand mining. (See Special Focus section below, on the role of the police.) The
Initially there was not much involvement from the police in curbing illegal sand mining activities. They were primarily involved in monitoring criminal activities and their main area of focus was the penal code. Environmental crimes were considered secondary, and some even believed this to be outside their remit. As a result, the issue of RSM was not taken seriously. There were many instances where tractors that were seized were released when a minor bribe was paid. This made the public perceive the police as a corrupt force, creating resentment among communities. SLWP and NetWwater tackled this situation by deciding to engage with the force. Thanks to key support from GWP, training courses for police personnel were launched in 2006. These produced positive results, and with support from WIN in 2008, SLWP and NetWwater were able to expand the scope of the programme by five times and target more of this extremely important but hitherto neglected audience. The organisations worked from a premise that the police merely represented a cross-section of society as a whole. There was as much corruption within these forces as there was in society at large, therefore they could not be singled out as a corrupt influence.

The training programme was found to be particularly effective because the police were given a voice to express their concerns. They pointed out many loopholes in the law, such as permits being issued for extended periods when the amount of sand that could be mined was very small. They also highlighted that such licences could be misused by unscrupulous parties, as there was no mechanism to maintain records of overall extraction and the only time the license could be checked was during the transportation of sand. Therefore corrupt parties could re-use the same license to extract much more sand than was allocated to them. Similar suggestions from the police created a positive feedback loop between the regulatory body and the law enforcement units.

Earlier, the police were unsure of the law governing RSM. Gazette notifications were usually sent to higher officers and information rarely trickled down to officers on the ground, or if it did, it was significantly diluted. The police also didn’t know they could seize machinery. Thanks to the awareness-raising programmes, the police department and other forces gained a good understanding of the Mines and Minerals Act and Regulations. The programme also helped them become aware of the various problems associated with RSM, and the alternatives available. As a result, they felt empowered to act with authority.
campaign also targeted the media, which became more vigilant over the question of sand mining. This was invaluable to winning support and lobbying for changes.

In 2009, a Special Task Force (STF), of the police, was put in charge of protecting natural resources. This had several benefits. It drastically reduced the scope for corruption, as officers were not answerable to local politicians and were directly supervised by the Defence Ministry in Colombo. The STF officers always acted as a team – again an advantage in comparison to individual police personnel, who were vulnerable to attacks and intimidation. Specialised training programmes for STF personnel were provided with assistance from GWP. This awareness-raising programme on RSM and natural resource management was launched in 2010 at the request of the STF, covering specific north-western and south-western provinces. It was expanded to cover southern provinces in February 2012 and an eastern province in June the same year. The first programme in the northern province was held in June 2013. The programme was a collaborative effort between SLWP and the Geological Survey and Mines Bureau (GSMB – the regulator), the Central Environmental Authority and the Universities of Ruhuna and Colombo. It offered a comprehensive view of the policies, laws and practices related to RSM and natural resource management, which facilitated a greater appreciation of the problems involved and the responses required (SLWP, 2012).

Falling water tables affected women the most, because the burden of fetching water for the family fell directly on them. NetWwater therefore worked especially with women on the issue of RSM. This concern came to the forefront during one of NetWwater’s gender and water dialogues conducted with communities in a north-western province where women participants complained of loss of water security due to damage to drinking and irrigation water sources. Women who previously had access to drinking water literally at their doorstep were now forced to travel 3-4 km in search of water, due to the impacts of RSM. This led NetWwater to work with the affected communities in raising awareness and building linkages with other Community Service Organisations and activist groups. It also worked
with related state agencies and catalysed the formation of an awareness and advocacy network through intensive national media coverage, which had been intermittent till then. This helped to build critical mass among activists and develop a national profile for the issue, in order to enhance awareness of the need for alternatives (NetWwater, n.d.; Athukorala and Navaratne, 2007). A key example of this success comes from the work of NetWwater’s partner organisation EFL. In an effort to protect the river, an alternative livelihoods programme was offered to a community of artisanal sand miners and their wives in the Maha Oya basin. The men chose to farm fish, while the women launched an enterprise called ‘Lucky Ladies’ which made and sold women’s shoes. This has become an extremely successful business enterprise and has provided a strong alternative to people who would otherwise have been instrumental in the destruction of the ecosystem in order to make ends meet. The key success of the multi-faceted approach was also the enrolment of local leaders as champions of the cause. One shining example was a much respected priest from a prominent Buddhist temple. Given that more than 70 per cent of the population in Sri Lanka is Buddhist, this was a very significant move. For many years now, the Ven. Malagane Attadassi (Chief Incumbent Bingiriya Raja Maha Viharaya and Sanganayake of Sathkoralaya) has been mobilising communities to protect the rivers and the ecosystem services they provide. Along with other community leaders, he was instrumental in the filing of the PIL. He has also been very vocal in calling for the environment ministry to change its focus from mere supply of sand for construction to one based on a consideration of ecosystem needs and issues such as land degradation and damage to river systems. He has suggested that until an effective monitoring mechanism is put in place, contractors should be asked to compensate communities for their losses. In Buddhist philosophy, water is the most important natural resource on earth. Any change either in quality or quantity of water affects the circle of life. When asked about his role in the campaign, he said he felt compelled to act when he saw not just the community being affected by the decrease in the water quality and quantity, but also vegetation and animals being seriously harmed.
4. The policy and legal implications involved

Sri Lanka’s Water Vision 2025 reads as follows:

‘A society that values the sustainable use of its water to achieve the goal of an environment conducive to balanced social and economic development’.

Some of the important components of this vision are:

- An enabling environment for Integrated Water Resource Management (IWRM)
- Optimum use of water resources for a dynamic and diversified economic system, and for food security through efficient and sustainable water use, both in terms of quantity and quality
- Well-maintained watersheds and clean water bodies, rivers, lakes and ponds
- Access to adequate, safe and affordable drinking water for all (LIFE-WRU, 2000).

RSM undermines all efforts to achieve these components of the Water Vision. The SLWP-NetWater campaign has therefore been instrumental in putting this important topic onto the national agenda.

Although not all sand mining is illegal, the ease with which this resource can be exploited for economic gain has led to the formation of a ‘sand mafia’ in Sri Lanka, as in many other countries. Unlike civil society, the mafia is usually very well organised and wields strong influence due to political connivance and corruption in the system. This corruption makes it even tougher to tackle the urgent issue of RSM.

‘Delayed decision-making is also corruption’
— Ranjith Ratnayake

Thanks to this campaign, SLWP also worked closely with the GSMB (the regulatory authority) and was instrumental in influencing a number of positive policy and legal changes. Previously, the GSMB had operated through an excessively centralised model. While this system had advantages, it also had many drawbacks. The centralised position of the GSMB helped it establish a national overview and exclude vulnerable areas from coming under...
licence. However, the lack of adequate staff and the failure to use the district administration system for operations management meant that the centralised system was not as effective as it should have been. In addition, it was found that authority and power were concentrated in the hands of a few officers, making conditions ripe for corruption as officers in remote locations were in a vulnerable position. They often felt pressurised by the sand mafia to give in to their demands or face consequences otherwise. The downside of such a centralised model is illustrated by the situation where at one point, people needed a permit even if they required just minor quantities of sand for small-scale construction purposes. They could not simply dredge it from their own private lands or adjacent streams. Instead, they needed to buy it from hardware stores. As a result, many middlemen profited while the common man suffered. SLWP and NetWwater worked in partnership with the GSMB to bring about policy changes. According to the Director General of GSMB, Mr. Anil Peiris, key approaches included:

- Based on feedback from SLWP, GSMB increased the number of personnel posted to remote locations from two to 10, in order to better manage resources. GSMB currently operates 14 District Offices.
- The earlier law did not allow police officers to arrest guilty parties without a pre-issued magistrate’s order. However, after SLWP and WIN’s intervention, GSMB amended the
act and made illicit RSM a cognisable offense instead of a non-cognisable offense. This empowered police officers to detain people without requiring a magistrate’s warrant, resulting in many arrests.

• Earlier permits did not mention specific details. They have now been changed to include details such as the exact area they cover and the length of their validity.

Many government bodies were happy to work with SLWP, NetWwater and their partners as these organisations worked in a partnership mode, rather than an antagonistic and fault-finding mode. An important element of this success was their creation of a platform to bring together the views and collective wisdom of many stakeholders, such as researchers, environmentalists, agencies, community organisations, the construction industry, law makers, the police and law enforcement agencies, and the media. In 2006, they organised a National Dialogue on River Sand and Clay Mining, and have continued engaging with all stakeholders to maintain momentum. The country’s Minister of Science and Technology participated, agreeing to create a task force to examine the outcomes of the Dialogue and to keep the national cabinet informed. A similar dialogue was also held in 2007 (NetWwater [n.d.]). Such concerted and sustained action has made Sri Lanka stand out among the many countries that face similar sand mining problems.
5. The learning so far

Water Integrity can only be achieved by transparency, accountability and participation. The establishment of a central command and control management model diminished both transparency and accountability at the local level. The governance of RSM has also had a chequered past, especially since governance of water resources fell under the remit of a land-focused regime. More than 50 legal enactments and 40 agencies are involved in Sri Lanka’s water resource management activities. This has at times led to inaction, confusion and even duplication of efforts, providing fertile ground for corruption and political patronage. While the earlier licensing process was localised, this did not offer the government a national overview, so it felt governance had to be centralised to manage the issue better. In 1992, the Mines and Minerals Act No.33 established the GSMB to oversee and regulate the exploration, mining, transport, processing, trading and export of minerals. While this enabled a nationally integrated holistic view of resource management and removed undue political influence at the local level, the centralised decision-making process reduced the accountability of local administrations. The question of sand and its management was located in the GSMB headquarters, far removed from the people closest to the issue. Established in 1993 with a small core staff and insufficient provision to delegate or use the district/divisional administrations, the GSMB system allowed rampant illegal mining to occur in the regulatory and monitoring lacuna (Ratnayake, 2008).

The transparency, accountability and participation necessary for integrity require an effective monitoring system, which is sorely missing in Sri Lanka and many other countries where sand mining occurs. Although in Sri Lanka the process seems to be off to a promising start with the PIL and the subsequent multi-stakeholder campaign, it is far from complete or effective. To use an analogy, both have merely been the turning on of a light in a messy room. How large the room is and the scope of work that awaits are yet to be determined. At the present moment, neither the GSMB, the law enforcement agencies, the communities affected, nor even NGOs such as SLWP and its partners know the exact quantity of sand currently being mined. Furthermore, it is extremely difficult to pinpoint the precise demand for sand in Sri Lanka.
and the quantity that may be safely extracted from the rivers, although various numbers float around in different contexts. As a result, the government cannot plan for and promote suitable alternatives. Studies have found that most sand mining in Sri Lanka occurred illegally (Gerritsen and Amarasinghe, 1976). Since transportation costs account for a large portion of a sand miner’s expenses, in-stream sand mining is a common practice, as the mining locations are either near the markets or along the transportation route. In-stream sand mining refers to mining of sand directly from stream and river beds. Much of this activity is not only illegal, but is also carried out without any scientific input and is very damaging. Yet with construction activities booming and there being little alternative to river sand it is difficult to impose a complete ban (Piyadasa, 2012). Although alternatives do exist in theory, they do not have great public acceptance as will be explained in the following sections.

Alternatives to River Sand in Sri Lanka:
- Off-shore sand
- M-Sand or manufactured sand
- Quarry dust
- Imported sand

However, actions from local stakeholders led by SLWP, NetWwater and other organisations helped bring in local participation. This in-turn changed the dynamics of the situation and forced the issue into the public awareness. Although the problem is far from resolved across
all river basins, but there is an active debate about alternatives to river sand. River sand mining has become an increasingly contentious issue in recent years, due to popular participation, integration of research findings across various studies, imposition of legal regulatory frameworks, and the networking of community-based organisations [Piyadasa, 2009].

Although local communities were the first to notice the issue, they did not really understand the consequences. SLWP’s campaign helped them articulate what they were seeing on the ground. The involvement of multiple stakeholders increased the effectiveness of the campaign tremendously. It filled a void and provided a platform for these stakeholders to communicate with each other. For example, the feedback loop created between the regulatory authority and the law enforcement agency helped to tighten the monitoring mechanism that is slowly being put in place. Provision of platforms for discussion and interaction provided opportunities for the regulator, other line agencies, local authorities and community interests to work together. Better integration and consultative decision-making processes were thus institutionalised. The feedback enabled the GSMB to fast-track practical changes to administrative and clearance processes in line with emerging local requirements.
6. The current status and plans to take the campaign forward

Despite these successes, the problem is far from having been solved. Detailed examination of the construction sector shows how entrenched this issue is and how much effort is required to tackle it.

**Overview of the construction sector in Sri Lanka:**

In the coming decade, the Sri Lankan Government aims to sustain the economic growth rate at over 8 per cent. As in any developing economy, the construction industry plays a very important role, ranking seventh among the 13 major sectors contributing to the country’s GDP.

Sri Lanka’s construction industry has grown since 2002 and it currently contributes about 70 per cent of the Gross Domestic Fixed Capital Formation and about 8 per cent of the country’s GDP and Figure 5 shows that the industry is on an upward trend, especially in the post-conflict context since 2009. In 2010, disbursement of loans increased 39.6 per cent for the construction of houses, business premises, other buildings and property developments. Several plans and strategies announced by the government indicate that the country’s construction industry is poised for significant growth. Major reconstruction activities are expected to be undertaken not just in the north and east of the country where the worst effects of the war were seen, but also in other regions. The government expects to make significant investments in sectors such as power, road development (including expressways and national highways), ports, transportation, water supply, sanitation, housing, tourism and reconstruction of post-conflict and tsunami-affected regions.

- The construction sector is expected to grow faster than the broader economy over the next 5.5% 6.6% 8.9% 9.2% 9.0% 9.3% 2001 2002 2003 2004 2005 2006 2007 2008 2009 2010 2011 Years Percentage (%) 

![Figure 5: Growth of Construction Industry in Sri Lanka](source: ICRA Lanka and IMaCs (2011))
five years. This is especially significant because the industry is the largest consumer of sand and the trajectory it follows will determine the future of Sri Lanka’s development. Already, higher construction activity has resulted in 12 per cent growth in domestic production of building materials such as sand, clay and limestone (ICRA Lanka and IMaCs [2011]). But such growth has come at a significant environmental and social cost. [See below]

Thanks to the campaign, the issue is now very much in the public eye and there are periodic media reports across various locations. Despite this, alternatives to river sand have not become popular, for several reasons:

- River sand is still culturally perceived to be a better choice than other alternatives, creating market resistance to those alternatives.
- The supply of river sand often continues unabated because permits are misused by contractors. They may be issued for 2-3 weeks, but as there is no monitoring mechanism on the ground, a miner with a permit for e.g. for 500 cubic metres is free

### SOCIO-ECONOMIC IMPACTS

- Livelihood impacts for those dependent on agriculture. Depleted water tables have necessitated constant changes to sites of pumping units or their depth, increasing costs of infrastructure, equipment replacement and production.
- Domestic wells and water supply pumping stations have been adversely affected. Excessive mining in lower river reaches and estuaries has led to severe saltwater intrusion. As a result, pumping intakes and associated filtering and purification plants have been relocated at enormous cost to the public purse, while private sector sand mining outfits continue to flourish.
- Damage to infrastructure such as rural roads and culverts, national highways, bridges and piers by heavy sand-laden trucks.
- Increase in health issues arising from dust and heavy traffic, and increase in vector-borne diseases where heavy RSM occurs. An. Culicifacies, the main vector for Malaria in Sri Lanka usually thrives in clear water pools formed in river and stream beds. Sand mining activities often lead to creation of such breeding sites. (Briet et al., 2005).
to take 1,000 cubic metres. This can only be checked if the loads are intercepted during transportation. In addition, as no GPS facilities or maps are used to delineate permit areas clearly, mining is sometimes conducted in adjacent areas, while the local community is led to believe that miners have the relevant permits. Nearly 35 rivers are severely impacted due to RSM. The Supreme Court has intervened in the case of mining in just two: Maha Oya and Deduru Oya. However, while sand mining has largely been stopped in the main rivers, it often goes unchecked in their tributaries, as in the case of the Kolamunu Oya in Bingiriya.

- Communities will often admit to the problem when interviewed, but will rarely take the trouble to organise and actively stop RSM unless they are directly and immediately affected by it.
- As sand is not hidden away like other resources such as petroleum or gems, it is easy for pilfering of this resource to give way to looting.
- Powerful vested interests would like to maintain the status quo, because profits do not need to be accounted for and are relatively

ENVIRONMENTAL IMPACTS

- River sand mining disrupts sediment deposits along the coast, reduces the ability of the ecosystem to achieve equilibrium and increases coastal and river bank erosion.
- Constant interference changes the shape of the rivers due to deepening of the water and collapsing river banks. This has immense negative impacts not just on emblematic species in Sri Lanka such as the elephant and rare endemic birds, but also on micro flora and fauna. Many of these impacts are yet to be assessed and discussed.
- Sand mining is especially counter-intuitive because of the inescapable issues of rising sea levels and climate change.
- Saline intrusion changes the nature of the river itself, causes loss of ecosystems and directly threatens the survival of most species that are particularly adapted to their habitats.
- Reduced groundwater tables, compounded by increased extraction levels due to changing lifestyles, increase the vulnerability of rivers. It is important to realise that many societies were built along rivers and vulnerable rivers can magnify the vulnerability of such societies.
easy to make. Most sand mining contractors are said to enjoy political patronage of some sort.

• Once communities start protesting, mining activities are moved upstream where there are fewer people.
• In the immediate future, dredging offshore sand or importing sand can provide temporary relief. Although offshore dredging causes significant environmental damage too, it is still a viable option in the short term. Sea sand is also a cheaper option due to scale, costing two thirds of river sand in Sri Lanka. The government started exploring this approach 3-4 years ago. However it is still a minor contributor, and only 5-6 per cent of demand is met from such sand. The government has issued few permits, meaning a small group of people have monopolised the industry. As a result, there is no room for new players. The initial investment required is also extremely high, and sea sand cannot be used in its natural state. It needs to be washed thoroughly before use, otherwise it is very corrosive. Since in Sri Lanka such dredged sand is piled up at a specific place and allowed to remain there for several consecutive monsoons so that the sand gets washed by the rains, the general public perception is that there is no defined quality control mechanism in place. There are also legitimate fears that the salt thus washed away on land might in turn affect the quality of land.
and water. The Sri Lanka Land Reclamation Board has carried out some offshore dredging projects, but thanks to such public perception, the construction industry is wary of using bad quality raw materials, as this could lead to serious damage in large-scale projects, or even loss of life. Another drawback concerned with offshore sand is that there are immense costs involved in hiring a barge and conducting bathometric surveys (Bathometric surveys measure the depth of the water and determine the shape of the seabed). Private players are not interested in spending the millions required for these surveys, because they fear they will lose money if they are not awarded a contract.

- The government is the largest consumer of sand, with immense quantities used in the construction of roads, dams, bridges and similar infrastructure. Overall, the alternatives to river sand have not taken off as expected, because of a lack of recognition and support from the government. For instance, while sea sand is touted as an alternative, little has been done to enforce standards and build confidence in the industry. Much needs to be done in terms of training artisans, masons, engineers, architects and other professionals in the construction industry in how to use sea sand in construction projects. Vocational training programmes for engineers also need to be carried out, and quality control authorities need to specify ratios and minimum standards. Only such action can encourage large-scale commercial use of sea sand.

- Alternatives such as M-Sand or manufactured sand have not become popular due to a lack of indigenously designed and manufactured machinery and higher power costs in Sri Lanka. Furthermore, it is difficult to find isolated places to locate such plants in Sri Lanka because of the high population density, except in forests and wildlife reserves. The country’s population density is also a drawback for inland mining, where sand is separated from sand-based soil by washing the gravel.
7. Conclusion

Although the construction industry is growing at break-neck speed, it is unlikely to have reservations over which type of sand is used as long as it is cost-effective and meets minimum commercial standards. Experience has shown that learning can be drawn from success stories in the management of other aggregate sources, such as quarry dust. Commercial standards for the use of quarry dust are well established in Sri Lanka. Thanks to this, the country’s road industry today primarily uses quarry dust and has employed technologies that do not require much sand. Road-builders now use a premixed bitumen mixture and an epoxy resin material that hardens with water. As a result, they don’t need to use sand to prevent vehicle tyres from sticking to the road. Even the Victoria Dam was built using quarry dust. But such examples are more the exception than the norm.

Another immediate, short-term solution is to import sand. Similar regulations for timber are enforced very strictly. There are very tight rules about how large-scale construction projects are required to use imported timber instead of that felled locally.
The Ven. Malagane Attadassi also advocates that instead of the modern fixation on concrete and glass structures, traditional building practices must be re-examined and adopted, as they were more in-tune with nature and did not cause such damage.

There are plenty of alternatives but none is likely to be a silver bullet on its own. Sri Lanka will probably need to find the right mix of options to ensure that development is truly sustainable in the long run. What is most needed is concerted action and strong leadership. This has clearly been demonstrated by SLWP, NetWWater and their partners, with support from WIN and GWP through their campaign. The GSMB too is keen on demonstrating leadership in this matter. It has plans to limit river sand and introduce offshore sand, but to do so methodically. It is also working closely with SLWP on rehabilitation, tree planting and river restoration projects. For World Environment Day in June 2013, a special pilot program was planned for riverbank restoration with concrete planks instead of timber planks, which might be a technique employed for particularly sensitive areas.

The STF has also expressed ambitious plans to tackle the issue. It has identified several places where illicit sand mining is occurring, and intends to target them in a sustained manner. In addition, there are also plans to educate large numbers of personnel in its forces. So far, a train-the-trainer model has worked well here. This model will be
supplemented by awareness-raising training for all the students at the STF training wing in Katukurunda, Kalutara. Having conducted nearly 20 training programmes in all, SLWP conducted the most recent session for the STF at Kilinochchi, for officers serving in the northern province.

In the immediate future, SLWP and NetWwater have further plans to communicate the seriousness of RSM through the Strategic use of media. They believe this can be a very powerful force for change and help to keep the campaign momentum alive. Although funding is yet to be found, there are proposals to target specific audiences such as farmers who are likely to be affected by RSM, using radio programmes and other media. There are also plans to host another National Dialogue to steer the discussion forward and consolidate the progress made so far.

Considered in the context of global sand mining, Sri Lanka seems much better placed to tackle the issue than many other countries facing this problem. The campaign by SLWP, NetWwater and their partners, with support from WIN and GWP, has proven successful, even if it is only a start. At present, there are few other examples where a National Policy on Sand as a resource for the Construction Industry has been drafted, or where there is interaction at a national level between the regulatory authority, the law enforcement authority, NGOs, the media and the public at large. This campaign clearly places Sri Lanka at the vanguard of the RSM issue.
References


APPENDIX 1: Reference list for countries where problems with sand mining have been reported


The Water Integrity Network (WIN) series Water Integrity in Action aims to look into detail at specific themes or areas of the water sector that have been affected by corruption. The purpose of the series is to share good practices so that evidence is documented to benefit the water sector and to help strengthen the fight against corruption.

Without sand, there can be no construction of buildings, roads, airports, parking lots, bridges, ports or many of the other things that we take for granted in modern life. River sand mining has become a very controversial practice today and illegal sand mining is often becoming the norm. Very often however, despite such controversy, the practice continues unabated. This first publication in the WIN series “Water Integrity in Action” explores how the island nation of Sri Lanka has managed to curb illegal sand mining along two of its major rivers – Maha Oya and Deduru Oya. Such action was largely due to the campaign efforts of the Sri Lanka Water Partnership and NetWater, supported by Global Water Partnership and Water Integrity Network. Although the campaign is far from over, the aim in this publication is to take stock of the situation, to document the progress made so far as well as the challenges that lie ahead.

The Water Integrity Network (WIN) is an action-oriented coalition of organisations and individuals promoting water integrity to reduce and prevent corruption in the water sector. Its membership includes the public sector, the private sector and civil society, as well as leading knowledge-based organisations and networks in the water sector. WIN works through knowledge sharing, advocacy, capacity building and the development and promotion of tools to improve integrity in the water sector. As of 2013, WIN is funded by grants from the governments of Germany (BMZ), The Netherlands (DGIS), Sweden (Sida) and Switzerland (SDC).