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## **Danger “Downstream”!**

### **Collecting and treating wastewater to protect humans, the economy and the environment from the pollution of others**

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#### **Downstream waters**

Since the beginning of human existence, people have used streams and rivers to get rid of their wastes, both liquid and solid. Flowing water carries away, and out of sight, and out of mind, almost everything that is “chucked” into it. Once it’s gone it is forgotten and not a thought is given to who or what is round the next bend or what the rubbish will do to them. The trash, pollution and poisons that come down from upstream bring all kinds of unpleasantness, illness, inconvenience and costs to the people and places downstream that suffer from it.

When the population was small and settlements sparse, the self-purifying capacities of flowing water prevented these problems from becoming too serious, the practical problem was usually limited. Today this is no longer the case. Now, with an increasingly urban population and a much wider range of polluting substances in daily use, using the environment as a dump is not safe, nor is it acceptable. Many natural watercourses can no longer cope with the volumes of pollution. Rivers, estuaries, lakes and even the seas are dying or dead as a result. At the cheapest this means huge financial losses and the ultimate cost is death: death for individuals; death for the vital ecosystems that support all life.

#### **Downstream Politics**

The “downstream” problem has another dimension. Political decision-making is a process responding to the issues and pressures that concern the community or society that empowers the political leaders. These issues and pressures are the things that concern the people immediately. A “downstream” issue that is out of sight and out of mind does not have much chance of featuring highly in such a situation. The management of wastewater is an essential matter, but is badly placed to receive the attention it needs. It is downstream of the community and its political preoccupations. It is off the politicians radar screen and a blindspot in society.

#### **Water Pollution and water Quality – Vital matters**

Water pollution, the resulting loss of water quality and the negative impacts that this has on the (re)usability of water resources has become a very serious issue, but it is not recognised by enough people and has rarely become a political issue with the force it should have.

Simplifying greatly, two common situations can be identified in a world of increasing urbanisation and socio-economic development.

- Settlements where growth is occurring and where the need to manage wastewater has not been given enough priority and so has been left behind, now characterise much of the developing world.
- In many of the places where in the past, this phase was overcome and problems were solved, the need has been forgotten. The effort to keep the solutions provided by infrastructure, regulation and service operation has been neglected. Here systems are failing from lack of attention.

Both these situations place serious threats on water quality and everything that depends on it. In both cases, there is a real crisis. On the planet, more than 80% of wastewater is still not treated to remove pollution and make it safe. Many rivers, lakes, estuaries and inshore



waters are dying or are dead. The health, livelihoods and wellbeing of millions of people is impaired and the ecosystems they are part of, and that sustain them, are failing.

Action is needed urgently because it is almost too late!

There are three kinds of action that can be considered in solving the pollution and wastewater problem: prevention - collection and treatment - water re-use. The three are linked and overlap. There is little doubt that prevention is better than cure, but in many cases it is not possible or not practicable. Nevertheless even partial prevention makes operating the “cure” of collection and treatment more effective. If the most difficult or dangerous pollutants can be eliminated before they enter the water or mix with other flows of wastewater, the other matters can be dealt with more easily. They can be taken out of the used water flows to make water usable again.

The quality of the water available is very important for all users, but the quality required is not the same for all uses. In the urban context, naturally occurring water of drinking quality is rare, so it is important to preserve good sources and minimise the burden of treatment in other resources.

### **Wastewater collection and treatment**

The vast majority of uses of water change the state and quality of the water once it has been used. If users need water to be conveyed to the place where they need to use it, they also need to have it conveyed away from them once they have finished with it. This means that collection has to be built-in to all settlements that have a supply. The collection of domestic, commercial and industrial water once it has been used is therefore a necessity.

At the same time the water that falls as rain also needs to be collected and conveyed through the settlement safely. It is easy to forget that rainwater is often highly polluted with chemicals as it falls through polluted air. Storm water accumulates all kinds of dirt, chemicals and rubbish as it flows across roofs, yards and streets and often mixes with other water flows.

Collecting and managing all these different kinds of water flows and the different and varying volumes of water and concentrations of pollutions that can change very quickly is no simple matter, even in a small town, let alone a megacity. Nevertheless, it must be done if the town or city is to function and to be a satisfactory place for people to live. It requires policies, infrastructure, rules and regulations, physical operation and responsible user behaviour. Everyone should be involved, because everyone is affected, especially when things go wrong and a crisis hits.

Many people are conversant with the “big” water cycle that describes how water evaporates from the seas and eventually returns by way of rivers. This cycle of water is the basic resource that needs to be managed increasingly carefully as water stress grows in many river basins. Fewer people think in terms of the “little” water cycle. The little cycle consists of abstracting water from the resources of the big cycle, using it and returning it to nature. There can be many little cycles occurring within one big one, and this means that the original natural resource can be used many times over if sensible precautions are taken. One of the most important of these precautions is to treat the used water to remove pollution from it and to restore it to a usable state and with good quality, before it is returned to the big cycle. In this treatment process, polluting substances like nitrogen, phosphorous and organic matter can also be recovered and reused for useful purposes.

As water scarcity and water stress increase, it becomes more and more important to maximise the number of little cycles that can occur and the efficiency with which they operate. In many cases it is now possible to connect one little cycle to the next and thus truly



maximise the potential of limited natural resources by reusing used water. In this way used water is no longer a waste, but a valuable resource.

For this to happen, collection has to be built-in to any system. This is because if used water is not collected, it can't be treated. In many cases, there are strong arguments for collecting different kinds of water in different systems, because this enables different kinds of pollution to be kept separate and treatment to be adapted to each type of wastewater.

Unfortunately, practical constraints and limitations do not always make this possible. These practical constraints include the urban morphology and the amount of space available for pipelines and treatment installations, the differences between peak and normal flows that can vary greatly during a single day, day of the week, or season and between dry weather and wet weather. System planning has to take all this into account, which is becoming increasingly difficult as climate and other factors are changing more and more rapidly.

There is little point in collecting used water if once it has been collected it is still dumped into the natural environment without the pollution being removed. If polluted wastewater, including stormwater, is collected but not treated, it simply moves the pollution downstream further away from the people who cause the pollution and therefore further off the political radar.

### **Wastewater and Poverty**

The dangers and difficulties presented by wastewater and water pollution have a tendency to have greater impact on poor people than on rich ones. In slums and informal settlements if there is no wastewater collection system, all forms of waste and used water are mixed together and flow down the footpaths, alleyways and streets or in open ditches. This polluted water is in itself a significant vector of disease. Worse still, it often penetrates into the shallow wells and other sources of water making them unusable or dangerous to health. While the better-off districts may have drains and other collection systems, if they lack the ability to treat wastewater once it has been collected, this untreated water often ends up polluting or flooding poorer districts and the informal water supplies that they use. This means that the poor not only suffer from their own wastewater but from the wastewater of others as well.

### **Beyond economics**

Today, the economic benefits of treating wastewater are only partially demonstrated by economic research. This is because it is very difficult to measure all the benefits and impacts on people, the economy and the environment. Recent studies have shown that there are positive health benefits that are delivered by the collection of wastewater through proper sewers. However, there are no statistics that show the number of people whose wells are contaminated due to the lack of wastewater treatment, or those whose dwellings are occasionally flooded by polluted water coming from neighbours or sewer overflows. Similarly, there are no statistics that show the cost to society of people being obliged to fetch water from remote water sources because the local ones are too polluted to be used for safe drinking water. This means that the economic benefits of pollution removal are almost certainly under-estimated by decision-makers.

All humans are dependent on a healthy environment, healthy ecosystems and the life-giving services that these provide to everyone. Because of this, the value of protecting and preserving the ecosystems is very high.

The decision to collect and treat wastewater must be backed by an understanding of the urgent and vital necessity to act before it is too late. The management of wastewater and protection of water quality is essential for all dimensions of sustainable development. Collection and treatment of wastewater is not a luxury, it is a real necessity.



When the cities of the “Global North” took the decisions to collect and treat their wastewater for the first time, they did so facing urgent crises of public health, great discomfort and unpleasantness. These systems were built in response to recognition of a real crisis and strong public pressure. Writing about the development of the London sewers in a recent article in the Financial Times, John Kay points out that: “*The salient fact is that London could never have become a great business and financial capital if its residents felt an urge to vomit every time they went outdoors. ....Yet if the scheme had been subjected to current appraisal procedures, it is hard to imagine that it would have been built*”<sup>1</sup>. This lesson is important in the context of the world today.

Numerous towns and cities around the world are facing the wastewater and water quality crisis today, but failing to take sufficient action. For some, this is still because wastewater management is off the political radar and is still a blindspot in society, but there is really no excuse for this anymore. For others, they are struggling to find the economic justification to allocate money to the investments needed. Their decision-makers are tempted to call for more data to justify a decision to act. This is misguided, because the situation really is urgent. In many expanding cities, delaying investment in wastewater management will make it far more expensive and difficult to realise in the future. Planning and installing the systems needed to collect and treat wastewater in any city takes time. Time is running out. The time to take action is now before it is too late.

The success of Chile shows that ambitious policies deliver effective results. Having taken a policy decision to treat all of its urban wastewater, Chile has succeeded, in a period of less than 15 years, in moving from a situation where only 16% was treated to one where today nearly 100% of urban wastewater is de-polluted.

### **Concluding messages**

For a variety of reasons, the failure to manage wastewater adequately and the consequences this has on water quality is a very serious problem that threatens many of the world’s peoples today. Societies and their political leaders have a dangerous blindspot concerning the importance and urgency of solving this problem before it is too late.

Today, countries have very different policies. Some are aiming at treating all their wastewater flows, while others are far less ambitious.

This paper has argued that wastewater must be collected and treated more effectively across the world. The main reasons for this are that:

1. Collection and treatment of wastewater protects people and the environment and stimulates the economy.
2. Collection and treatment of wastewater is feasible and is increasing in those countries which have prioritised this to take advantage of its benefits.
3. Wastewater management protects and restores aquatic ecosystems effectively so that they can provide the services that society and the economy depend on.
4. In an increasingly urbanised world, with increasing water scarcity all wastewater must be managed comprehensively to ensure water security into the future.

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<sup>1</sup> London’s rise from sewer to spectacle: John Kay, The Financial Times, January 15, 2013