

# Key long-term strategic decisions in water and sanitation services management in Finland, 1860–2003

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This paper describes the key long-term strategic decisions related to the evolution of water and sanitation services in Finland from the 1860s to 2003. The study was conducted in two phases: the first one based on a literature survey identified 40 key decisions while the second ranked those decisions by 13 senior national experts. According to the experts, the most important decisions concerned legislation, particularly water pollution control. There is a wide variety of options for organising services in relation to the size and scope of the systems. Although future options may seem abundant, the development paths are largely restricted by historical strategic decisions. Such path dependencies may be positive or negative.

## Introduction

In international discussions on water policy development and the principles of sustainable water and sanitation services it has often been argued that most of the problems are largely of institutional nature — even though they often lead to technological failures. Already at the dawn of the International Drinking Water Supply and Sanitation Decade (1981–1990), Pacey (1977) pointed out that “technology alone is not enough” but that we also need a variety of criteria for technical, social and economic appropriateness.

In 2005 another International Water Decade was launched which concentrates on wider water governance issues. How to organise and develop water and sanitation services for about 1.5 billion people lacking safe water and 2.5 billion people lacking safe sanitation is still the biggest

challenge. Besides, a recent study showed that worldwide, even in nations and societies where irrigation may take up some 85% of the amount of water used, community water supply was identified as the most important water use purpose (Katko & Rajala 2005). Thus, the question of providing and producing water and sanitation services is of vital importance.

In Finnish boreal conditions the demand for improved and organised water supply in urban areas was created particularly by the need for fire fighting water but health concerns and other public infrastructure needs also played a role (Juuti 2001, Hietala 2002). In rural areas demand was created primarily by the need to water cattle (Katko 1992a, 1997).

In many European countries where the development of water and sewerage services started earlier than in Finland, water supply systems were typically constructed earlier than the actual

sewerage systems (Juuti & Katko 2005). In Finland urban water supply and sewage systems were often established simultaneously while in rural areas water-borne sewerage was mainly introduced much later than water supply (Suomen kaupunkilaitoksen historia 1983).

The evolution of Finnish water supply and sanitation services from the mid-1800s till 2000 can be divided into the following key phases (Katko 1997):

1. First initiatives,
2. Rise of the first works,
3. Diffusion of innovations,
4. Second World War,
5. Reconstruction,
6. Rapid growth,
7. Balanced growth,
8. Present and future.

In this context the evolution of water supply and sewerage systems is dealt with, while on-site systems, increasingly important in the early 2000s (Mattila 2005), are excluded. In the early phase, water supply and sewerage were typically taken care of by different bodies within the municipal administration, while since the mid-1970s most of the utilities became integrated particularly in urban areas and larger communities.

Figure 1 shows the interrelationship between the past, present, and future that form the theoretical background for this paper. This framework combines the views of water history, water management and future research experts. According to their nature, past decisions can be classified as postponing, limiting or binding regarding the alternatives available. Path dependence shows how in practise especially in water supply and sewerage systems we are largely bound with the past decisions. These decisions also limit the available options in the future (Kaivo-oja *et al.* 2004). Thus, those seriously interested in the future must also know the past at least to some extent.

It is obvious that in the past various types of decisions affected, and still continue to affect, the available options for our present and future. It also seems that there is a lack of convergence between history and future research. While historian researchers are typically interested only

in the past, and in most cases not the recent past, researchers of the future are not always interested in history and past decisions. Yet, if we want to have a serious impact on the potential and desirable future development paths, we should be more active in our strategic and visionary thinking rather than just working within a short-term operational or opportunistic framework. Kaivo-oja *et al.* (2004) pointed out the plurality of our futures on purpose since instead of one past, present and future only, there are several alternatives depending on our interpretation and understanding of the pasts and our views on the most desirable future paths.

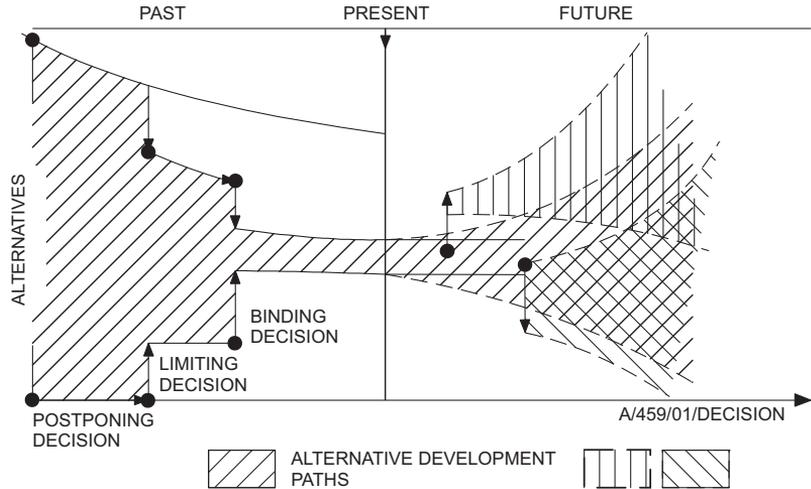
## Objectives and methods

This paper aims at finding out and analysing the key long-term strategic decisions in relation to the evolution of water and sewerage services in Finland from the 1860s to 2003. Evolution of the services is seen in a wider institutional context based on the definition of North (1990) that covers organisations, management, legislation and policy including formal and informal institutions.

This study was conducted in two phases. The first phase was to identify the key long-term strategic decisions on Finnish water services. It was based on a literature survey done by the authors focussing on several water history related studies, particularly those of Herranen (2001), Juuti (2001), Juuti and Katko (1998, 2004, 2005), Juuti *et al.* (2000, 2003), and Katko (1992a, 1997). These results were presented at the national seminar on 100 years of water legislation in Finland, held in Helsinki, Finland 17 Oct. 2002, and published in Finnish (Katko 2002).

After the first phase, 13 well-known senior national experts, familiar with the long-term development of the sector, were each asked to rank the decisions and select the ten most important ones. These ten decisions were also ranked according to their importance from 10 to 1. The 13 experts included four historians, five mainly engineering oriented researchers and four other experts. While some of them were obviously better able to comment on the earlier development phases, others were more familiar with

**Fig. 1.** Interrelationships between the present, past and future, and the ways in which path dependence affects available future options (Kaivo-oja *et al.* 2004: 536).



the later phases after the Second World War. Although the selection of experts was not fully balanced, it is still probably the best group of experts readily available for such reviews.

## Key decisions on water services over time

The evolution of water and sanitation services in Finland is explained and analysed first based on these identified decisions (Table 1). The analysis also covered some of the key written and oral arguments raised by the interviewed experts in the second phase. Thereafter, we discuss the key findings of the second phase on the most important decisions and present implications.

### First initiatives

In Finland, the earliest wells, wooden-piped water systems and latrines were constructed for fortresses and manors. Modern water and sanitation services did not start to develop in the country until the 1870s. The first piped water system for community use was constructed in Ilmajoki in 1872 (Turunen 1985). The first rural piped systems were quite small but were expanded later (Katko 1997).

Several cities or townships in Finland considered and discussed establishing and constructing piped water systems in the mid-19th century.

In Tampere the industrialist von Nottbeck suggested in 1865 that he would establish private waterworks. He had a list of ten exact requirements which were based on the idea that the city should assume the risks which would guarantee a more or less stable money-flow to his company. After negotiations the city abandoned this option (Juuti & Katko 1998, Katko *et al.* 2002).

In 1875 the first Finnish Local Government Act, largely based on Swedish experiences, was enacted. It meant the beginning of independent local governments and infrastructure services based on municipal ownership.

Finnish urban water and sewerage systems started to develop primarily based on demand for the following key needs: fire fighting water, drinking water, and hygienic and health requirements.

### Rise of the first works

The first urban water system in the country was established in 1876 in Helsinki. In fact, in 1871 the city had made a concession with a private entrepreneur W. A. Abegg. After a while he sold the concession to a Berlin-based company called Neptun, making a good profit on the sale. He appeared never to have attempted to start building a system. Some time later the Neptun company had to give up the concession due to financial problems, and after long negotiations the city finally bought the concession back

**Table 1.** Key long-term strategic decisions on Finnish water supply and sanitation 1866–2002, with major reasons and outcomes, based on literature and identified by the author (modified from Katko 2002). wss = water supply and sanitation, www = water and wastewater; wwt = wastewater treatment; ws = water supply; wpc = water pollution control; FIWA = Finnish Water and Waste Water Works Association.

Phase	Year	Strategic episode/decision	Reason	Outcome
1	1866	private water supply rejected in Tampere	to prevent private profiteering	city assumed responsibility
2	1871	concession for Helsinki water works	wish to get private funding	difficulties faced
	1872	1st rural piped water system	demand	start of water cooperatives
	1875	Local Government Act	development of local administration	start of local democracy
3	1876	1st urban water works in Helsinki	demand for fire fighting and health	start of service
	1877	water meters into use in Helsinki	controlling consumption	soon expanded
	1879	Health Decree	improvement of sanitation	levelling, start of sewers
	1879	Oy Huber Ab, pipelaying company	replacing the concessioner	major pipelaying contractor
	1882	Helsinki water works bought back by the city	concessionaire in financial crisis	others cities followed
	1890	metering based billing only, Helsinki	controlling consumption	others cities followed
	1890	use of lead pipes forbidden, Helsinki	excess lead dissolution found	far-reaching decision
	1892	1st urban ground water system, Vyborg	good quality ground water fairly close	promotion of interest
	1900	water closets commonly accepted	flushing of human wastes	R&D of dry toilet forgotten
4	1902	Water Rights Act	economic use of water	pollution control enforced
	1906	universal and equal suffrage	democracy for state level	start of democratic society
	1907	Cooperative Act	rural development	rural water cooperatives
	1910	1st biological wastewater treatment plants	concentrated water pollution	1st ww treatment in Nordic countries
	1912	1st contractor (YIT), subs. of Swedish AIB	wish to go to Russian market	major wss contractor
	1917	independent republic		
	1920	Tampere rejected ground water	doubts about safe yield	other cities followed
	1938	1st separate sewers	separation of wastewaters	made wwt possible
5	1939–1945	World War II		stagnation of development
6	1949	1st consulting companies (2)	demand for expertise expected	planning of wss systems
	1951	1st Governmental Financing Act	rationalisation of households	financial support to rural centres
	1954	start of domestic plastic pipe manufacturing	need for better pipes	technology jump in rural areas
	1956	FIWA's (1993) predecessor established	interests of small systems	expansion of know-how
	1958	1st overseas export project	expansion of markets	internationalisation started
7	1962	Water Act	need for water pollution control	construction of wwt plants
	1967	1st professor in ws and sanitation	need for sectoral experts	creating sector knowledge
	1967	1st wholesale company	supra-municipal water	companies to river basins
	1968	regional planning for the whole country	planning of societal change	water sometimes recognised
	1968	start of development cooperation in wss	needs of the developing world	building also national capacity
	1970	water administration	multipurpose water planning	forerunner of env. administration
	1974	Wastewater Surcharge Act	fees instead of taxation funds	biological-chemical wwt
	1977	Act on Public Water and Sewerage Systems	modernisation of legislation	integrating www works
8	1982	120-km Päijänne rock tunnel	assumed increasing demand	promoted modern forest industry wpc
	1995	Local Government Act	modernisation of local administration	increase of utility autonomy
	1995	Finland joined EU	security	adoptability of directives?
	2000	Environmental Protection Act	modernisation of legislation	non-point wpc
	2001	Water Services Act	modernisation of legislation	full cost recovery, development plans

(Lillja 1938, Herranen 2001, Juuti *et al.* 2006). Interestingly enough, an engineer of Neptun, Robert Huber, established a pipe-laying company in Helsinki and later on also in other major cities of the country. This company became one of the earliest private water service companies in Finland. In 2005, older people still remember the phrase “Huber’s beer” used earlier to refer to tap water, particularly in the dozen or so towns which had Huber branch offices.

In 1879 the Health Decree came into force. It was based largely on Swedish legislation. As for water and sewerage services, this decree required that the elevations of city areas should be levelled (Juuti 2001, Nygård 2004). In practice this made it possible to plan gravity-based sewerage systems.

As early as in 1877–1878 the use of lead pipes was tested in Helsinki, and it was found that excess amounts of lead was dissolved in water. Around 1890 the use of lead pipes in house connections was completely abandoned there and other cities followed soon (Lillja 1938: 301–302). Now, at the beginning of the 21st century, several of the European countries that were first to introduce water services have a lot of difficulties due to the lead pipes used in house connections whose replacement at once would require huge investments.

In 1890 the City of Helsinki established a metering-based billing system, which can be considered another far-reaching strategic decision. It was largely based on German experiences. The city waterworks produced their own meters as well as having a repair shop for them (Lillja 1938, Herranen 2001).

In Tampere and Oulu, the first piped water systems had relatively low pressure, but later on better materials allowed building higher pressure systems. The first city waterworks using ground water in Finland was completed in Vyborg in 1892, followed by Turku in 1903, Hanko in 1909, Hämeenlinna in 1910 and Lahti in 1910 (Juuti *et al.* 2000).

Around 1900, after several years of public debate, water-based toilets became gradually accepted in Finland. This was a dramatic decision in terms of increasing water demand as well as pollution of waterbodies, the effects of which became apparent fairly soon.

## Diffusion of innovations

In 1902 the Water Rights Act was enacted. This act emphasised the utilisation of waterbodies, particularly for economic purposes, but paid hardly any attention to water pollution control requirements. This was the case despite the fact that several cities had identified water pollution control as a problem already during the first decade of the 20th century. Besides, the problems caused by pulp and paper wastewaters were officially recognised by the Sulphite-cellulose committee (Sulfatisellulosakomitea 1909) as early as 1909.

In 1907 the Cooperative Act was enacted, and in the same year the first official water cooperative was established in Pispala, a working-class peri-urban settlement close to Tampere. Similar informal water cooperatives or partnerships had been established since the 1870s particularly in Ostrobothnia, on the western coast of the country. The tradition of water cooperatives is a special feature of Finland’s water management, and it is still argued to have several advantages: being able to utilise local resources and being largely created by demand, particularly by water for cattle (Katko 1992a, 1992b, 1994).

One interesting tradition in building elevated water reservoirs — most often called water towers — was the tailor-made principle rather than using the same design in several locations. Steel, for instance, was used in only a few cases while various types of concrete structures have evolved. The first elevated reservoirs, such as the oldest one still in use in Tampere since 1898, were buried in the ground. The oldest actual water tower was completed in Hanko in 1910 (Asola 2003).

In 1910 the country’s first wastewater treatment plants were constructed in Lahti and Helsinki. These treatment plants had septic tanks and trickling filters. In 1913 the City of Lahti was awarded a special certificate of honour at the Russian Public Health Fair held in St. Petersburg, Finland being an autonomous Grand Duchy of Russia from 1809 to 1917. The award was given particularly for utilising ground water as well as the introduction of wastewater treatment to the entire area covered by the town plan of that time. Helsinki treated just eight percent of its waste-

waters that time. The know-how for the earliest water and wastewater services was largely, if not solely, acquired from central and western Europe (Torikka 1994, Laakkonen 2001).

The first actual contractor specialising in the water and sewerage sector started its operation in Finland in 1912 when *Allmänna Ingenieursbyrå*, based in Sweden, established its subsidiary in Helsinki. Later this company became the biggest water sector contractor in the country under the name Yleinen Insinööritoimisto (YIT). In 1916 due to lack of slow sand filters — despite them being proposed in the original plan for the water works — a typhus epidemic killed almost 300 people and made some 3000 people sick in Tampere. The major reason for that was that some sewers discharged their contents into Tammerkoski Rapids upstream i.e. too close to the water intake (Koskinen 1995).

From the very beginning one of the strategic questions in community water supply has been whether to use ground or surface water. In Tampere, the city finally decided in 1920 not to use ground water and obviously many other cities followed the example. That decision was probably not considered strategic, but it had obviously a big impact in the country. Artificial recharge was also experimented with in Vaasa as early as 1901 by the Swedish expert Richter based on experiences from Gothenburg, Sweden (Vaasan kaupunginvaltuusto 1901–1903). However, the use of artificial recharge did not gain ground in Finland and was not used in Finland until the 1960s.

As for wastewater treatment, one of the key decisions was the introduction of separate sewers that started in Helsinki in 1938 followed by other cities after WWII (Katko 1997). This made it possible in practice to start treating wastewaters although a few cities had treated theirs already earlier.

### Post-war reconstruction

In 1949 the country's first consulting companies were established, namely Soil and Water and Plancenter Limited, then called the Central Construction Bureau of the Countryside (Lehtonen & Katko 1995).

The establishment of consulting companies was in fact promoted by the first governmental Financing Act that was enacted in 1951. One of the wisest strategic political decisions was perhaps that this act was preceded by the establishment of a parliamentary committee for rationalisation of households.

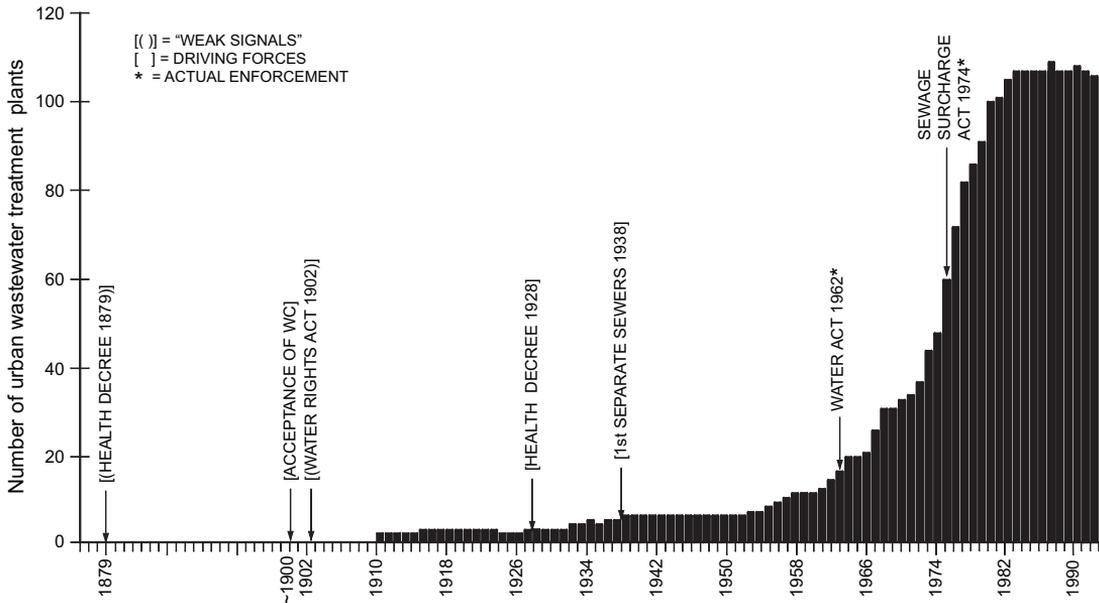
As for technology, since the early 1950s plastic pipes have been used and manufactured in Finland. Domestic plastic pipe manufacturing started in 1954. At first the pipes were used for rural pipelines, gradually in larger communities, and finally in the biggest cities (I. Masar pers. comm.). Nowadays Finland uses proportionately more plastic pipes in water and sewage systems than any other country (Katko 1997).

In connection with the establishment of water systems for rural communities, an association for promoting their interests — the forerunner of the current Finnish Water and Waste Water Works Association — was established. In 1958 the first export projects in water services were launched including the planning of a sewerage system in Reykjavik, Iceland as well as planning and constructing of water works for Karbala, Iraq (Katko 1997).

### Rapid and balanced growth

The Water Act that was enacted in 1962 meant the start of modern water pollution control in Finland. The act forced communities and industries to apply for a permit allowing for discharging their wastewaters, and these permits became stricter along with the development of technology and time (Fig. 2). In the 1960s and 1970s, the construction of wastewater treatment plants was very rapid, and thus, within two decades the country had established modern wastewater treatment including in most cases biological and chemical methods.

Treatment of wastewaters was further promoted by the introduction of a special Wastewater Surcharge Act in 1974. This act allowed water and sewage works to cover the costs of providing sewerage services which were earlier largely covered by municipal taxes. From the mid-1980s the total number of wastewater treatment plants in cities started to decline,



**Fig. 2.** Construction of wastewater treatment plants in 102 so-called old cities in Finland, 1910 to 1993, and an introduction to key related legislation. (Modified from Lehtonen 1994: p. 53.)

when larger wastewater treatment plants were constructed and smaller ones were taken out of use or converted into pumping stations. Interestingly enough, smaller communities and townships introduced wastewater treatment first and the biggest cities often last. Besides, the pulp and paper industries, the largest polluters in terms of biological oxygen demand (BOD), did not start modern wastewater treatment before the mid-1980s (Katko *et al.* 2005). From the nature conservation point of view this was illogical, but it rather shows the reality of decision-making: water pollution control started from the socially “easiest” cases and expanded to the more difficult ones. It also shows the relatively high power that forest industries have had in the country over the years.

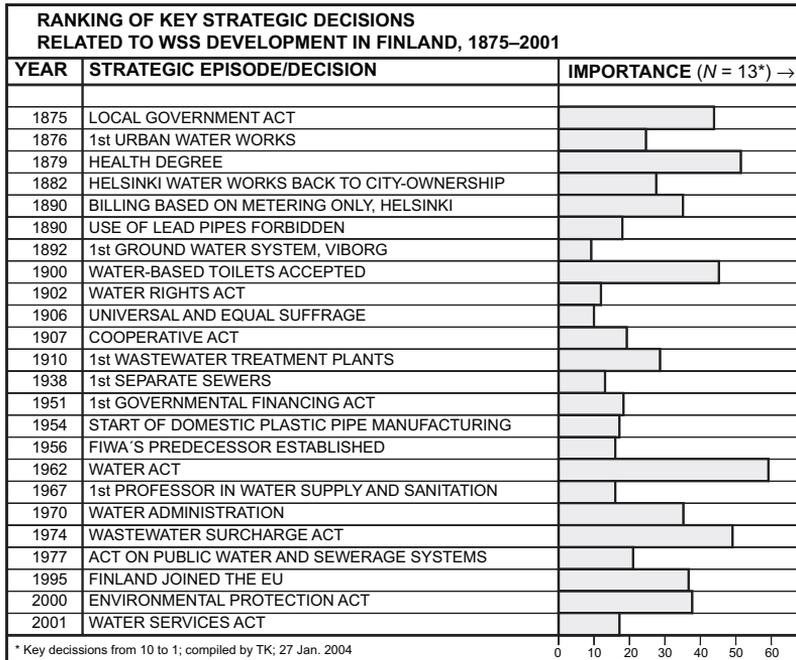
The Wastewater Surcharge Act of 1974 together with the energy crisis of 1973 caused specific water consumption to decline. In the 1960s it was still estimated that total water consumption would increase heavily and that even specific water consumption would increase as in North America (M. Murto pers. comm.).

In the late 1960s the first professor’s chair in water sanitation was established, and the same year the first intermunicipal bulk water company was established on the western coast.

In 1977 the Act on Public Water and Sewerage Systems was enacted whereafter many urban water and sewage utilities were gradually combined into a single utility. This is similar to what happened in Sweden and can be considered as the first practical step towards Integrated Water Resources management (IWRM) that is commonly stressed in the early 21st century.

One of the largest water supply investments was the construction of the 120-kilometre Päijänne rock tunnel. At first the main goal of the project was to supply the expected ever increasing water demand but later on other reasons have superseded that. By the mid-1980s the Helsinki Metropolitan Water Company had become one of the key lobbyists demanding the introduction of modern wastewater treatment also for the pulp and paper industries (Konttinen 1999). One of the first pulp and paper companies that introduced modern waste water treatment was located in Äänekoski upstream of Lake Päijänne from which Helsinki Metropolitan Water Company takes its raw water.

Some more recent key decisions concerned the reform of the Local Government Act, Finland’s joining the European Union in 1995, the Environmental Protection Act of 2000, and the entry into force of the Water Services Act in



**Fig. 3.** Ranking of 24 most important long-term strategic issues in Finnish water services, 1875 to 2001, assessed by 13 national experts. The length of the bar to the right of each decision indicates the total points given to it. (from Juuti & Katko 2005: p. 63.)

2001. The Water Services Act requires that utilities become autonomous and use netbudgeting. The Act also put municipalities in charge of the development of water and sanitation services within their territories (Ministry of Agriculture and Forestry 2001).

## Discussion on the most important decisions

Figure 3 presents a summary of the most important decisions ranked by 13 invited experts in the second phase of the study as explained earlier. The invited experts were requested to select the ten most important strategic decisions/episodes (Table 1), and further rank them using a scale where ten points referred to the most important one and one point as the least important one. In addition, most of the experts were interviewed regarding their views, priorities and arguments. There were altogether 24 decisions that received 10 or more total points.

The Water Act of 1962 was ranked by the experts as the most important decision. The Water Surcharge Act of 1974 and the Health Decree of 1879 were ranked the next most important decisions, followed by the decision to

accept water-based toilets around 1900 and the Local Government Act of 1875. Thus, according to the experts the most important decisions concerned sanitation or water pollution control rather than water supply.

The first finding related to the ranking of the key decisions is thus the obvious importance of legislation. However, it can be argued that certain acts or decrees enacted in a certain year were not necessarily one-off strategic decisions, but rather culmination points of a longer-term process that had preceded the preparation of certain legislation. From that point of view, the enacted legislation reflects the actual social and political needs felt by society at certain times. Legislation and requirements on improving sanitation and non-point pollution control in rural areas in the early 21st century are more recent examples of strategic emphasis although not included in the original list of decisions (Table 1 and Fig. 3). This policy was created after pollution from point-sources in communities and industries was properly developed (Mattila 2005).

The key decisions did cover widely the basic framework: political or policy, economic, social, technological, ecological/environmental, and legislative dimensions in addition to the identified key strategic decisions (Fig. 3). This will

become apparent over the long-term although the finding was not identified as an individual strategic decision.

The above-mentioned principles include the different approaches to developing urban and rural services. Thus, we have a variety of options for organising services in relation to the size and scope of the systems. The very smallest ones are on-site systems both in water supply and sanitation. Rural villages have a long tradition of consumer-managed water cooperatives, and cooperatives have recently been increasingly introduced also into sewerage and small-scale wastewater treatment.

In larger communities and cities, integrated municipal utilities typically provide these services. In the European context such integration of water supply and sewerage under one utility is not very common. It seems that many member states of the European Union still have separate water and sewerage utilities (Vehmaskoski *et al.* 2002, Juuti and Katko 2005). However, cooperation between these services can also be practiced as separate organisations, though it might require extra efforts. Various types of supra-municipal systems have also been created since the 1960s both for water supply and sewerage.

The government policy of supporting the evolution and development of sector services has been quite consistent. This is particularly evident if we compare it with the policy on solid waste management where quite dramatic changes have occurred over time (Nygård 2004). Yet, more recent cases make one wonder how long such a paradigm on continuously expanding systems can be justified in a country which still has a remarkable number of permanent rural as well as an increasing number of leisure housing. The theory of large technical systems (LTS) as presented by Hughes (1987) is hardly applicable to water services which are highly dependent on local conditions.

The central government's financial support was smaller than 10% of total investments (Katko 1997). Municipal funding started through The General Fire Assistance Company of the Grand Duchy of Finland, established in 1832 (Nikula 1972, Nuoreva 1980). The taxes paid by spirits distilleries were also of significance. Besides, in the early stages utilities also took loans from

local banks. More recently, central government support has been channelled to various types of technical assistance, planning activities, ground water inventories and advice and help for municipal cooperation. Yet, compared with several other western countries, the share of government funding in Finland is remarkably low, particularly as concerns water pollution control.

The services have from the very beginning been covered by direct consumer charges, particularly water supply, and after 1974 also sewerage services instead of using local tax revenue. While smaller utilities have for long been subsidized through local taxation funding, more currently particularly the bigger utilities are making profit. The latter is based on the Water Services Act of 2001 which allows "reasonable rate of return" for public utilities. The overall rate of cost recovery of 290 water works in the country was found to be clearly over 100% (Vehmaskoski *et al.* 2005).

Since the early 1880s all the water supply and sanitation utilities in the country have been owned by municipalities, excluding small rural cooperative systems. However, from the very beginning the private sector has been providing various types of services, equipment and goods. Most of the investments in sector services have benefited private sector enterprises. This has also been the case with many operational services over the years (Hukka and Katko 2003, Juuti *et al.* 2005, Juuti and Katko 2005).

Certain decisions indicate remarkable path dependence. In contrast to the often presented negative cases, positive path dependence has also occurred in water services such as the selection of ground water instead of surface water, meter-based billing, and the introduction of separate instead of combined sewers. A negative dependence was the introduction of flush toilets which discharge nutrients to water bodies instead of agricultural use.

In terms of environmental protection, the introduction of water and particularly wastewater services can be seen as the biggest environmental investments in communities. Development and introduction of these services has dramatically improved the safety and environmental state of communities — whether urban or rural. In 2002 Finland was ranked number one in

the international comparison on Water Poverty Index, considering the key elements of water resources, access, capacity, use and environment (Lawrence *et al.* 2002). Yet, the high ranking is not explained by the relatively high amount of water resources available per person but particularly by management related criteria.

Since the 1980s the emphasis in water and wastewater networks has shifted increasingly towards rehabilitation. The demands of the beneficiaries and customers have also increased continuously. Therefore, one of the future challenges will be to improve further the level of services and reduce any environmental risks or major vulnerabilities.

One of the most current policies is the trend of centralising and thus promoting the expansion of water supply and sewerage systems. This may be justified in several cases but obviously such systems will also have limits — it should be now studied how large systems will be feasible in relation to their political, economic, social, technological and environmental aspects. Even these are obviously dependent on local conditions.

## Conclusions

1. According to the experts, the most important decisions concern legislation, particularly on sanitation or water pollution control rather than water supply.
2. In any development, the wider institutional framework including various political, economic, social, technological, environmental and legislative requirements must be taken into account.
3. There are a wide variety of options for organising services in relation to the size and scope of the systems.
4. Integration of water supply and sewerage could be one of the first practical steps in Integrated Water Resources Management.
5. The central government policy of supporting the evolution and development of sector services has been quite consistent.
6. The share of central governmental financial support has always been quite small. The support has been channelled to areas deemed the most important ones. Municipalities'

funding was initially based on fire insurance loans and taxes on spirits. Utilities have since the early days taken loans from private local banks.

7. From the very beginning the costs of services have been covered by direct consumer charges, particularly in water supply, and after 1974 also in sewerage instead of using local tax revenue.
8. Since the early 1880s all water supply and sanitation utilities in the country have been owned by municipalities, excluding small, non-profit rural cooperatives.
9. The private sector has always provided various types of services, equipment and goods. Most of the investments in the sector have benefited private sector enterprises. This has also been true in the case of many operational services.
10. Although future options may seem open, the development paths are largely restricted by historical strategic decisions. Such path dependencies may be positive or negative.

All in all, management of water services should include adequate consideration of strategic and visionary issues. At the same time, utilities and the water sector should be prepared for pro-active actions, particularly pressures that seem to come from outside the water sector. The paper also implies the need for further respective comparative studies in other countries.

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