Finland

The European Commission and the OECD jointly review investment needs and financing capacities for water supply, sanitation and flood protection in each of the European Union's 28 member countries[1]. A fact sheet was developed for each country. Each fact sheet: (i) highlights the main drivers of future expenditure and quantifies projected investment needs; and (ii) analyses past sources of financing as well as capacities to finance future needs.

The analysis reflected in the fact sheets aims to support cross-country comparisons. For some indicators, trade-offs had to be made between reporting the most up-to-date and accurate data for each individual country and using data available for all countries in order to support such cross-country comparisons. The fact sheets were reviewed by country authorities and have been revised to reflect comments as much as possible. Inaccuracies on selected items may remain, which reflect discrepancies between national and international data sources.

A full methodological document will be published to explain in detail the sources, categories and methods used to produce estimates. In a nutshell:

- Current levels of expenditure (baseline) on water supply and sanitation are based on a range of data sets from Eurostat, which combine water-related public and household expenditures.
- Projections on future expenditures for water supply and sanitation are driven by the growth in urban population. Additional scenarios for water supply and sanitation were developed to factor in such drivers such as compliance with Drinking Water Directive (DWD), Urban Wastewater Treatment Directive (UWWTD) and emerging EU water directives.
- The paucity of data on current levels of flood protection expenditures did not allow for monetisation of projected future investment needs. Projections of growth rates of future expenditures for flood protection combine estimates of exposure of population, assets and GDP to risks of coastal or river floods.
- The characterisation of past sources of financing in each country is derived from baseline data on current levels of public and household expenditures, debt finance and EU transfers.
- Countries' future financing capacities are approximated by analysing room for manoeuvre in 3 areas: i) the ability to raise the price of water services (taking into account affordability concerns); ii) the ability to increase public spending; and iii) the ability to tap into private finance. Affordability analysis is based on water-related household baseline expenditures, not on average tariffs (which are highly uncertain, inaccurate and not comparable across countries).

[1] Further information and project outputs can be found on the websites of the European Commission and the OECD.

The future costs of diffuse pollution, compliance with the Water Framework Directive, adaptation to climate change, contaminants of emerging concern, urban floods from heavy rains, as well as the potential of innovation to minimise future financing needs are explored qualitatively and will be reflected separately. Costs related to water storage and bulk water supply are not considered.

Key messages

- Very high compliance with DWD and UWWTD.
- Widening financing gap to rehabilitate, renew and replace WSS pipelines.
- Current price levels demonstrate the ability to recover costs of WSS services. Healthy fiscal conditions would make it possible recourse to public spending, should need be.

Context

Finland is a relatively wealthy country, though with below median future economic growth forecasts and moderate expected urban population growth over coming decades. Finland is particularly rich in surface waters, with a total of 187,888 lakes and large ponds, as well as rivers totalling 25,000km in length. As a result, more than 10% of the country is covered by water, and water resources are abundant (21,000 m^3 per capita) (WWF, 2017[6]).

Table 1 presents a number of key indicators characterising the country context and features relevant to future expenditures for WSS and flood protection. These indicators are further discussed in the next sections, including those that underpin the projections of future investment needs.

Table 1. Key features relevant to future expenditures for WSS and flood protection

	Indicator	Value (rank if applicable)	Data Source	Year
Economy and Demographics	GDP per capita	EUR 39 300 (7/28)	Eurostat	2016
	Projected GDP growth	1.6% (23/28)	IMF	2016-2022
	Projected urban population variation by 2050	1.09x (16/28)	UN	2017-2050
Water Supply and Sanitation	Estimated annual average expenditure per capita	EUR 70	Authors based on Eurostat	2011-2015
	Population not connected	8.5%	EC	2015
	Annual household consumption per capita	75 m3	Eurostat	2017
	Leakage rate for public water supply	22%	EC	2017
	Non-revenue water	c20%	EurEau	2017
	Compliance with UWWTD Art.3, 4 and 5 (Index)	96% (13/28)	EC	2014
Flood Protection	Estimated annual average expenditure per capita	N/A	EC survey	2013-15
	Pop. potentially affected in flood risk areas	4%	EC report	2015
	Value of assets at risk (rise 2015-30):	1.4x (11/28)	WRI	2015-2030

Note: Rank 1 implies best in class among the EU member countries for which data is available for each indicator.

Main drivers and projections of future investment needs

Water supply and sanitation

Finland performs around the EU median on network performance and connection measures for WSS. The country already reaches very high rates of compliance with the DWD (99-100%) (European Commission, 2017[1]). All urban areas are well-served by sewage treatment. Where population density is very low, some rural areas have little or no collective treatment, but the resulting pollution and health risks are assessed as very low (OECD, 2018[1]). However, the gap in investment needed for rehabilitation, renewal and replacement is assessed as continuously widening, especially in WSS pipelines (SYKE, 2015[3]).

Table 2 projects future investment needs in water supply and sanitation for a business as usual and a compliance scenario. The compliance scenario consists of two dimensions (1) investments needed to comply with the revised DWD, extend access to vulnerable populations and improve network efficiency (reduce leakage); and (2) investments needed to comply with the UWWTD.

Table 2. Water supply and sanitation: projected investment needs to 2050 (million EUR)

FINLAND		Baseline 2015	2020	2030	*Total by 2030*	2040	2050
BAU water supply and sanitation	**CAPEX**	**142**	**153**	**175**	-	**193**	**210**
	TOTEX	**319**	**327**	**340**		**347**	**350**
Scenario Compliance + for water supply and sanitation	**ADD. CAPEX**	-	**115**	**125**	*1309*	-	-
	ADD. TOTEX		**254**	**254**	*2770*		
Compliance with DWD, access and efficiency (water supply)	ADD. CAPEX	-	7	7	*73*	-	-
	ADD. TOTEX		25	25	*246*		
Compliance with UWWTD (sanitation)	ADD. CAPEX		108	118	1235		
	ADD. TOTEX		229	230	2524		

Note: BAU projections on future expenditures for water supply and sanitation are estimated based on the growth in urban population. Additional scenarios for water supply and sanitation are based on drivers relating to compliance the DWD and UWWTD as well as (for water supply) the cost of connecting vulnerable groups and of reduced leakage. The projections do not take into account the age and pace of renewal of water supply and sanitation assets due to the lack of comprehensive and comparable data across EU member countries.
Source: OECD analysis based on Eurostat (water-related public and household expenditure data) for the baseline; United Nations and Eurostat (total and urban population statistics and projections); European Commission (estimates of costs of compliance with revised DWD and of connecting vulnerable groups, leakage rates, and distance to compliance with UWWTD).

Further, new contaminants are likely to increase the costs of wastewater treatment. In particular, as one of the Baltic Coastal Countries, Finland has agreed to develop measures to address micro-plastics and urban and storm water discharges to rivers, and to consider cost-effective mitigation measures to reduce legacy pollutants and contaminants of emerging concern, including pharmaceuticals (HELCOM, 2018[3]).

Flood risk management

In 2010, a national-level preliminary assessment identified 21 areas of potential significant flood risk in Finland: 17 related to river flooding and 4 related to coastal flooding. Flood mapping and risk management plans were established on that basis. Examples of significant flood risk include the city of Pori, where avoiding direct potential damages of EUR 200 to 300 million implies protecting the city centre and industrial sites. In the city of Huittinen, avoiding potential damages of EUR 5 to 10 million requires protecting residential buildings and the wastewater treatment plant (SYKE, 2015[10]).

Table 3 highlights growth factors in future investment needs for protection against (riverine and coastal) flood risks. The increase in the value of assets at risk from future river flood events is slightly above the member state median.

Table 3. Protection against coastal and river flood risks: projected growth rates of investment needs to 2030

	Expenditures to protect against river flood risk			Expenditures to protect against coastal flood risk
	Total growth factors, by 2030			Categories (0-4), by 2030
	Expected urban damage	Expected affected population	Expected affected GDP	
Finland	0,91	0,89	1,16	0

Note: It was not possible to establish a robust baseline of current expenditures for flood protection due to the absence of comprehensive and comparable data across EU member countries. As a result, this table presents projected growth rates in future expenditures.
Source: OECD analysis based on the Aqueduct Global Flood Analyzer of the World Resources Institute (river flood impacts by urban damage, affected GDP, and affected population), the global database of FLOod PROtection Standards (for countries river flood-related protection level), the European Commission Joint Research Centre (change of build-up in areas vulnerable for coastal flooding), a study 2010 by Hinkel et al, (number of people exposed to coastal flooding, and damage costs in the case of a coastal flood event).

In terms of climate change-related vulnerability, according to estimates by the Finnish Meteorological Institute, by 2080, the average temperature in Finland could rise by 4 to 6°C and the average precipitation grow by 15 to 25%. As a result, extreme weather events, such as storms, droughts and heavy rains, are likely to increase, having an impact on a wide range of sectors: agriculture and food production, forestry, fisheries, reindeer husbandry, game management, water resources, biodiversity, industry, energy, traffic, land use and communities, building, health, tourism and recreation, as well as insurance (Ministry of Agriculture and Forestry, 2015[7]).

Other pressures affecting compliance with WFD

Finland's first generation reporting against the WFD River Basin Management Plans highlighted that 30% of natural surface water bodies achieve good or high ecological status (the status of 53% is unknown) and that 35% of heavily modified or artificial water bodies achieve good or high ecological potential. 63% of surface water bodies (37% unknown), 90% of heavily modified and artificial water bodies, and 92% of groundwater bodies achieve good chemical status. 98% of groundwater bodies are in good quantitative status. The frequent "unknown" status highlights deficiencies in River Basin Management Plans (European Commission, 2017[2]).

The main pressure on Finnish waters is diffuse pollution that affects 20% of surface water bodies. Eutrophication remains a major problem as some surface waters and coastal areas suffer from excessive nutrients, due in particular to run-off from agriculture. For instance, the Baltic Marine Environment Protection Commission estimated that Finland increased its nitrogen inputs to the Bothnian Bay (European Commission, 2017[1]). In contrast, point sources of pollution and hydromorphological changes only affect 5% and 3% of water bodies. This average, however, hides regional differences (European Commission, 2017[2]).

Past financing strategies and room for manoeuvre to finance future needs

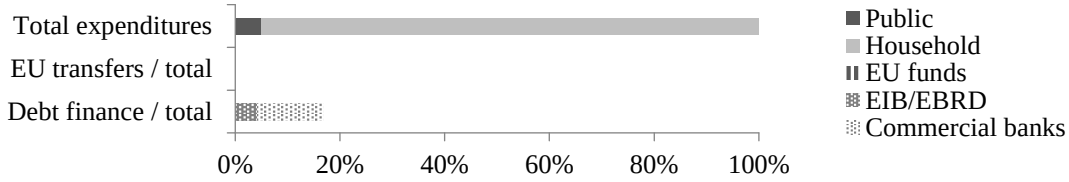
Water supply and sanitation

Finland's regional environment centres supervise the water supply and sewerage systems in their respective regions, while also controlling the planning of improvements and allocating

financial subsidies for such purposes (WWF, 2017[7]). Local authorities, typically via publicly-owned utilities, are responsible for the provision, maintenance and improvement of the water supply and sewerage systems. The municipal water utilities invoice combined drinking water and wastewater fees, which are designed to cover all costs, including investment costs. However, in rural areas (about 10% of the population), households pay directly their investment and operation costs (SYKE, 2015[3]).

As a result, as highlighted in Figure 1, Finland relies almost exclusively on pricing to finance WSS-related capital and operational expenses (noting, however, that government expenditures are underestimated due to data issues). Notably, water pricing enables to tap into commercial debt, which plays a significant - well above EU average - role. Further, the country has not benefited from nor would have been in need of EU transfers.

Figure 1. Share of annual average expenditure on WSS, by source (2011-15 average, %)



Source: Eurostat (for public and household expenditures), European Commission (for EU transfers), European Investment Bank, IJ Global, Thomson Reuters, Dealogic (for debt finance).

Based on criteria in Table 4, Finland does not face any core issue in terms of financing capacity. Current price levels demonstrate the ability to raise and maintain tariffs towards full cost recovery of WSS services. Should higher levels of public spending be needed at some point, the authorities would likely be in a position to rely on borrowing.

Table 4. Indicators of future financing capacities

	Indicator	Value (rank)	Year	Data Source	Assessment
Ability to price water	Water expenditures in lowest household income decile	N/A	2011-15	Authors based on Eurostat	High
	Full cost recovery equivalent in lowest household income decile	1.12% (2/28)	2011-15	Authors based on Eurostat	
	At-risk-of-poverty rate	16.2% (13/28)	2016	Eurostat	
Ability to raise public spending	Tax revenue / GDP	44.6% (25/28)	2016	Eurostat	High
	Government consolidated debt / GDP	42.2% (9/28)	2016	Eurostat	
	Sovereign rating	AAA	2017	Standard & Poor's	
Ability to use debt finance	Domestic credit to private sector / GDP	129% (4/28)	2015	World Bank	High

Flood risk management

The regional environment centres are responsible for river and coastal flood risk management (SYKE, 2015[5]). Municipalities are responsible for rain-related flood risk management. However, Finland does not currently compile figures on flood protection expenditures. (European Commission, 2017[4]).

References

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