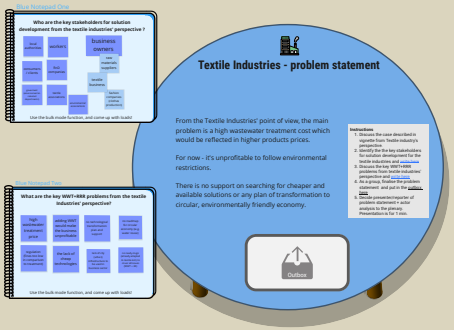
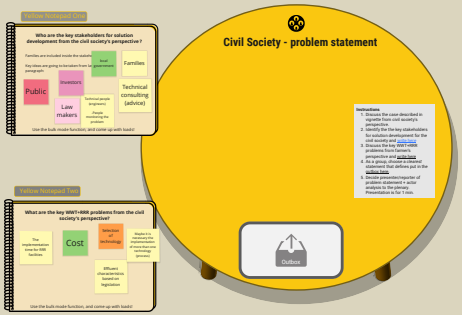
Problem and Actor Analysis





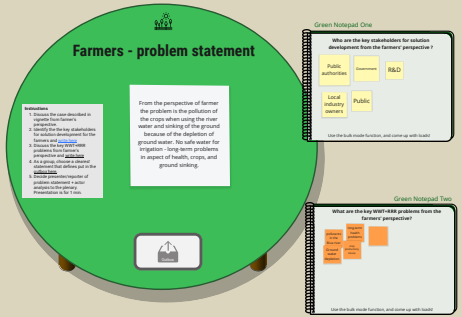
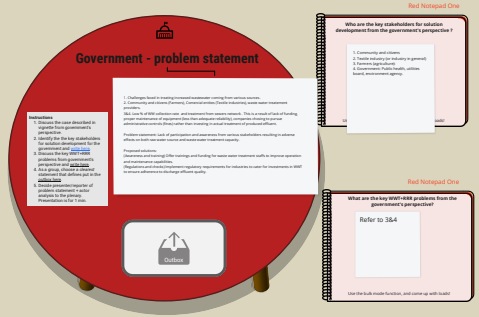
IWA WWRR 2022 Conference – Workshop vignette

WATER, WASTEWATER TREATMENT AND REUSE IN PAVIPOLIS

The city of Pavipolis in Beautiful country is rapidly urbanizing. As major political and socio-economic centre, Pavipolis attracts all types of people who move to the city for education, work and related opportunities. This has led to a steep increase in demand for water supply, exceeding supplies by Blue river, the main river running through the city. Blue river used to carry water in abundance; nowadays it runs dry for most of the year. The local public water utility as well as many private industries and businesses in Pavipolis continue expanding groundwater extraction beyond the natural recharge of the aquifers.

The urban drainage situation is similarly gloomy. The traditional 'storm drains', a system of open canals built hundreds of years ago that criss-cross the city to safely collect and discharge water into Blue river during the heavy rainy season is dysfunctional. The storm drains have been partially built-over, suffer clogging form solid waste and have factually become open sewers that carry untreated wastewater year-round, as urban sanitation infrastructure is not keeping up with the developments. There are also large disparities in water-related service and risk exposure between Pavipolian which increase political pressure on public authorities. Whereas the better off demand visible improvements in return for their taxes rather than filthy surroundings and lack of amenity, the more precarious demand equal rights and services like any Pavipolian instead of the high risk flooding and health issues they are currently facing. The latter rely on the drains as their main water source and their dwellings are often located in flood-prone areas.

Pavipolis also serves as an industrial hub for textile production and related businesses, providing employment to tens of thousands of workers. Despite strict laws and regulations, industry and business often illegally discharge their wastewater. On the one hand, polluters are rarely discovered and the fines (or the bribes needed not to pay them) are usually cheaper than the cost of treatment. On the other hand, many businesses would become unprofitable on the global markets they are embedded into if they were to implement advanced treatment that allows to meet the ambitious standards the government has set.

At the same time, the public authorities are struggling to adapt and scale city-wide wastewater treatment, too. Only 40% of wastewater produced in the city is collected and reaching treatment, but treatment plans are often dated and running at under- or overcapacity. Moreover, lack of funding and personnel for operation and maintenance, as well as unreliable electricity supply all add up to result in substandard treatment results. Hence, most of the wastewater produced reaches the Blue river either untreated via the storm water drains or only partially treated from the wastewater treatment works. This has led to significant levels of pollution, contributing to widespread ecosystem degradation, public health issues and failing harvests downstream, with farmers being most affected.

Surrounding the city are farmlands where for generations subsistence agriculture has been the primary employment activity. Most of the farmers around Pavipolis use polluted river water or treatment plant effluents for irrigation, thereby saving cost by replacing fertilizers with treated wastewater but also facing long-term health problems and crop productivity losses. Climate change has additionally impacted the intensity and frequency of rainfall in the region. Those who can afford pumping equipment thus often prefer to use groundwater instead of the unreliable and heavily polluted traditional sources. In combination with over-extraction of groundwater within the Pavipolis, the groundwater table is dropping at unprecedented rates. Along with it, the city itself is sinking. Could wastewater reuse and resource recovery provide a viable solution to the abovementioned issues?