Annual rainfall totals have been increasing worldwide in recent years, given the growing frequency of localized torrential rain, typhoons, hurricanes, and other extreme weather phenomena. Not only does the inundation of buildings and underground structures represent a danger to people living in highly developed urban areas in particular, but it also poses a grave threat to urban functions in general. Therefore, developing measures against flood damage is a pressing issue. The Japanese government considers national resilience—including disaster prevention and mitigation, such as flood control—a central element of its policy, and is moving ahead with both public and private initiatives.

Tokyo, one of the world’s foremost metropolitan areas, is making use of underground spaces in the fight against flooding. One example is the underground regulating reservoir being constructed to prevent overflow from small and medium-sized rivers. When heavy rain causes a river’s water level to rise, water flows from a weir built into a revetment down into the reservoir, thus reducing the amount of water flowing downstream. So far, 28 such facilities have been constructed, collectively holding a total of 2.56 million m$^3$ of water.

One massive reservoir has been built under a major ring road that runs around central Tokyo. When a typhoon dropped record rainfall of up to 32 mm per hour on Tokyo in 2019, the reservoir retained about 490,000 m$^3$ of water, or 90% of its total capacity. Estimates indicate that it lowered water levels downstream by up to 1.5 m. “We have systematically developed river facilities such as this reservoir, which have helped to prevent massive flood damage,” says Director ODAKAMA, from the Tokyo Metropolitan Government (TMG)’s Bureau of Construction, with conviction. The reservoir is currently undergoing expansion. Eventually, it will be able to compensate for localized heavy rainfall coming down at up to 100 mm per hour.

Many other efforts to save lives from flooding are also being made across Japan, including the construction of levees and detention basins, as well as the refinement of heavy rain forecasts. A further example of Japan’s inundation prevention measures is the use of dams for hydropower and irrigation to control flooding. To prepare for this year’s Olympic and Paralympic Games Tokyo 2020 and beyond, Japan is advancing the development of national land infrastructure that is resilient to natural disasters.