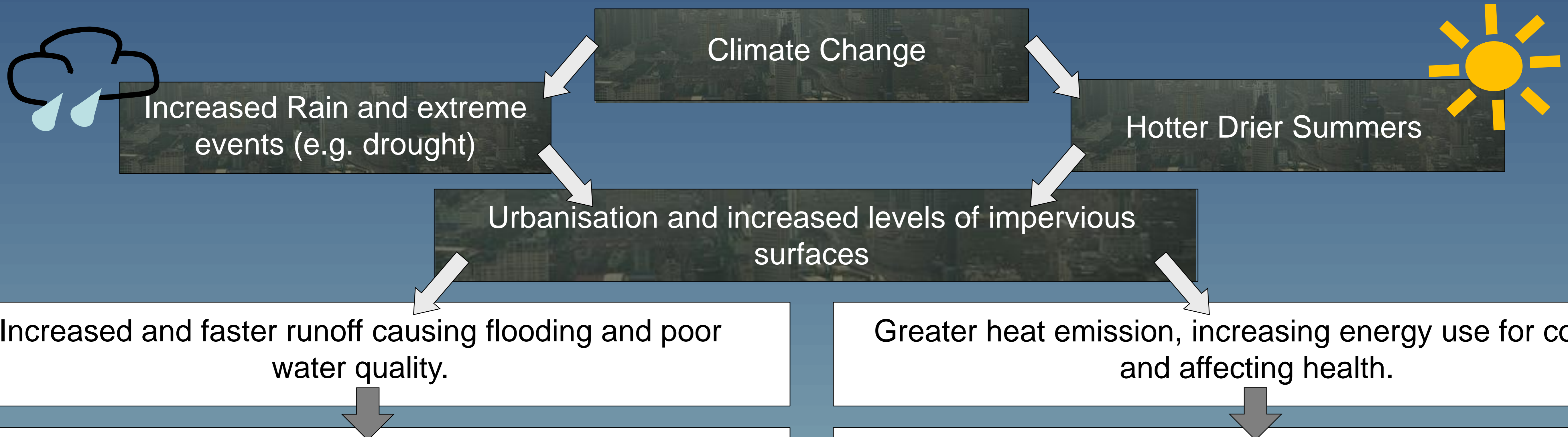




The Ursula project hypothesis is that *there are significant social, economic and environmental gains to be made by integrated and innovative interventions in urban river corridors.*

The following outlines two **interventions** in **urban river corridors** and methods to research their **environmental** gains. Both interventions are design responses to pressures from climate change on the urban environment .

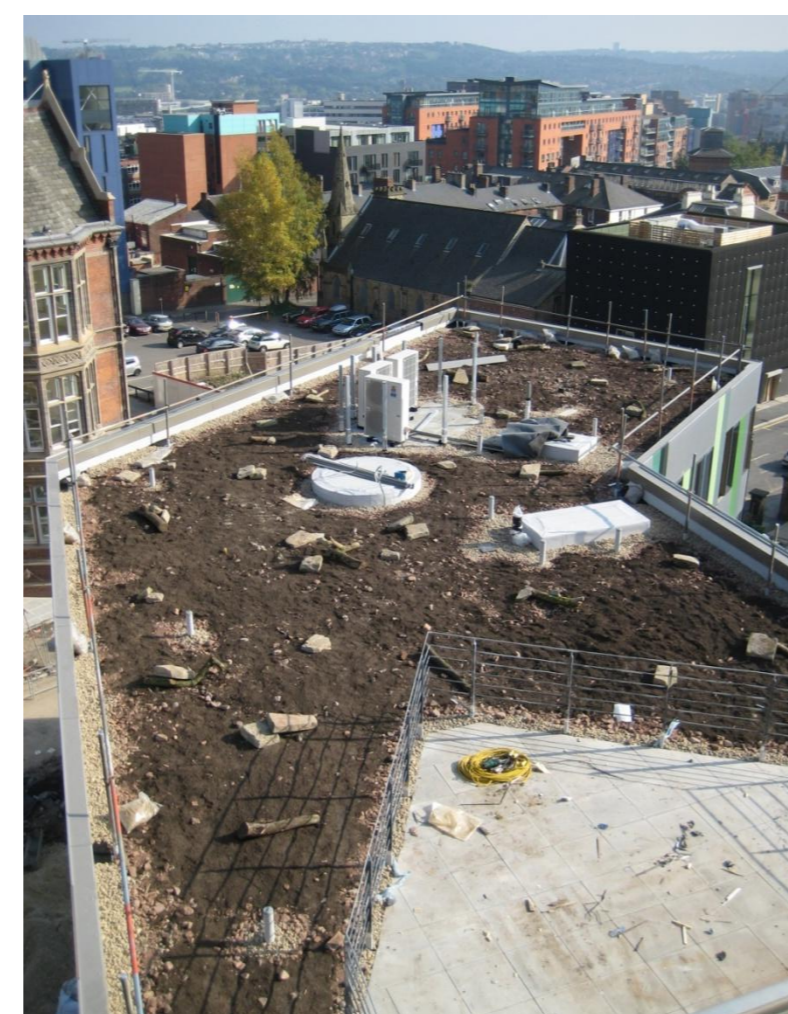


1. Sustainable Drainage

Sustainable drainage systems intend to mimic nature by creating more natural run off. Through a series of steps beginning as soon as the rain lands flow can be attenuated reducing the quantity and improving the quality of water reaching urban rivers.

Monitoring Methods:

A green roof will be monitored over the long term from its construction. Rain measurements using an on site rain gauge will be compared to run off from the roof into the sewer system. This will be measured in onsite manholes specifically installed for the purpose.



Jessop West's roof whose runoff will be monitored



Final 'polishing' wetland in a series of three storm water ponds in Deep Pits park, Sheffield.

Flow and quality (e.g. nutrient, metals, hydrocarbons) monitoring will be carried out on a series of three ponds to quantify the performance of the ponds in terms of flow attenuation and quality improvements

Outputs

These studies will provide parameters for process simulation models of ponds and green roofs in urban drainage models. The models will then be applied at plot and sub-catchment scale to compare the quality and quantity of run off with a sustainable drainage approach and a traditional piped approach.

2. Microclimate Modification

Traditionally water has been used to cool courtyards and buildings. By appropriate design of buildings and opening waterways the requirements for building cooling may be minimised and comfort in external spaces maximised. However there is very little published research on the magnitude of cooling provided by water.



The Alhambra, Granada. A traditional use of water in Architecture



Plan of an urban river showing expected measuring locations

Monitoring Methods:

Weather stations and temperature humidity recorders will be used to assess the local changes in temperature and humidity at incremental locations moving away from the river by securing the loggers to street furniture. Temperatures will be monitored in different seasons over periods of 2-4 weeks at a time.

The temperature loggers will be used to gather the spatial variation in temperature (x), where are the weather stations (x) will be used to provide additional information on wind speed and solar radiation.

Outputs

Information on the magnitude of change to the local micro climate provided by water will be generated. This will provide inputs for energy models of buildings in river corridors and enable calibration of simulations of external comfort conditions at the plot scale in urban river corridors.

Comparison of sites using traditional piped drainage solutions and sustainable drainage solutions will be evaluated for their microclimate benefits using information gathered on the effect of water as well as quality and quantity of urban run off

Finally through integration with other tasks within the URSULA project these interventions will be combined with others appropriate for urban river corridors at case study locations. The case study designs will then be evaluated using social, economic and environmental indicators.