Enabling the Transition to Resilient, Long-term Continuous Water Supply

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WATER INFRASTRUCTURE AND RESILIENCE WIRe

EPSRC Centre for Doctoral Training

BACKGROUND

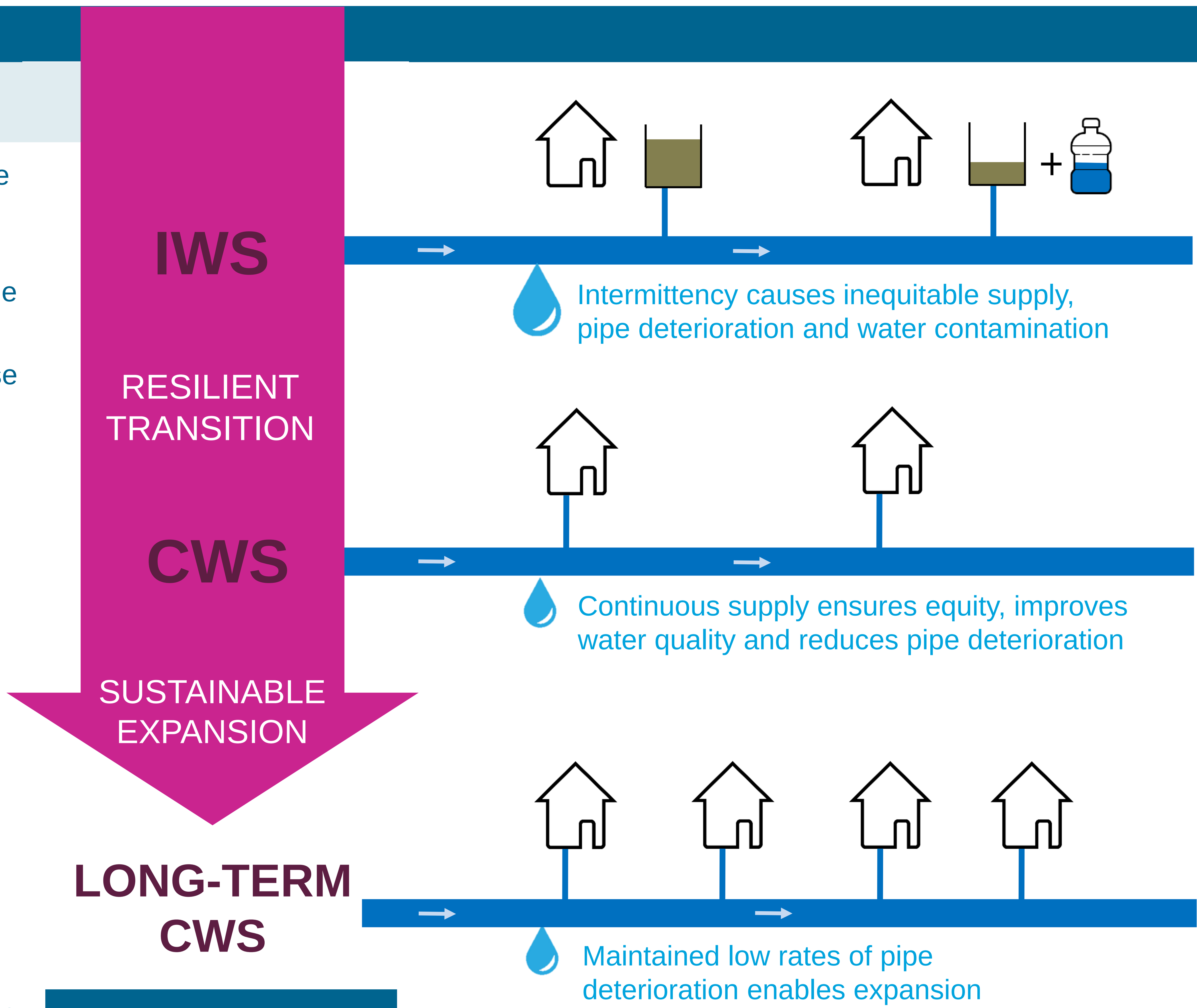
Continuous, clean water supply through piped networks is not the global norm:

- Approximately 41% of networks in lower and middle income countries operate intermittent water supply (IWS), affecting one billion people[1];
- IWS is thought to be the cause of 4.5 million diarrhoeal disease cases per year and 1560 deaths[2].

IWS is therefore a major hurdle to achieving SDG 6.1: 'Universal and equitable access to safe and affordable drinking water'.

This project aims to investigate the technical requirements for transitioning systems from IWS to continuous water supply (CWS), using Lahan, Nepal as a case study.

Figure 1: Water tower in Lahan, Nepal



OBJECTIVES

1. Develop a method of **estimating the water requirements during the transition** from IWS to CWS
2. Evaluate the optimal **monitoring/data management strategy** to enable a transition to resilient CWS
3. Develop a **network expansion strategy** to satisfy growing demand whilst minimising the risk of a return to intermittency

METHODOLOGY & HYPOTHESIS

The research is using a case study of Lahan, a town in Southern Nepal. The water network currently serves 40,000 customers IWS, with a view to transition to CWS. Figure 2 illustrates the hypothesised change in water requirements for a network during key stages of the transition. A hydraulic model of the Lahan network as well as supply and consumption data are being used to assess this prediction.

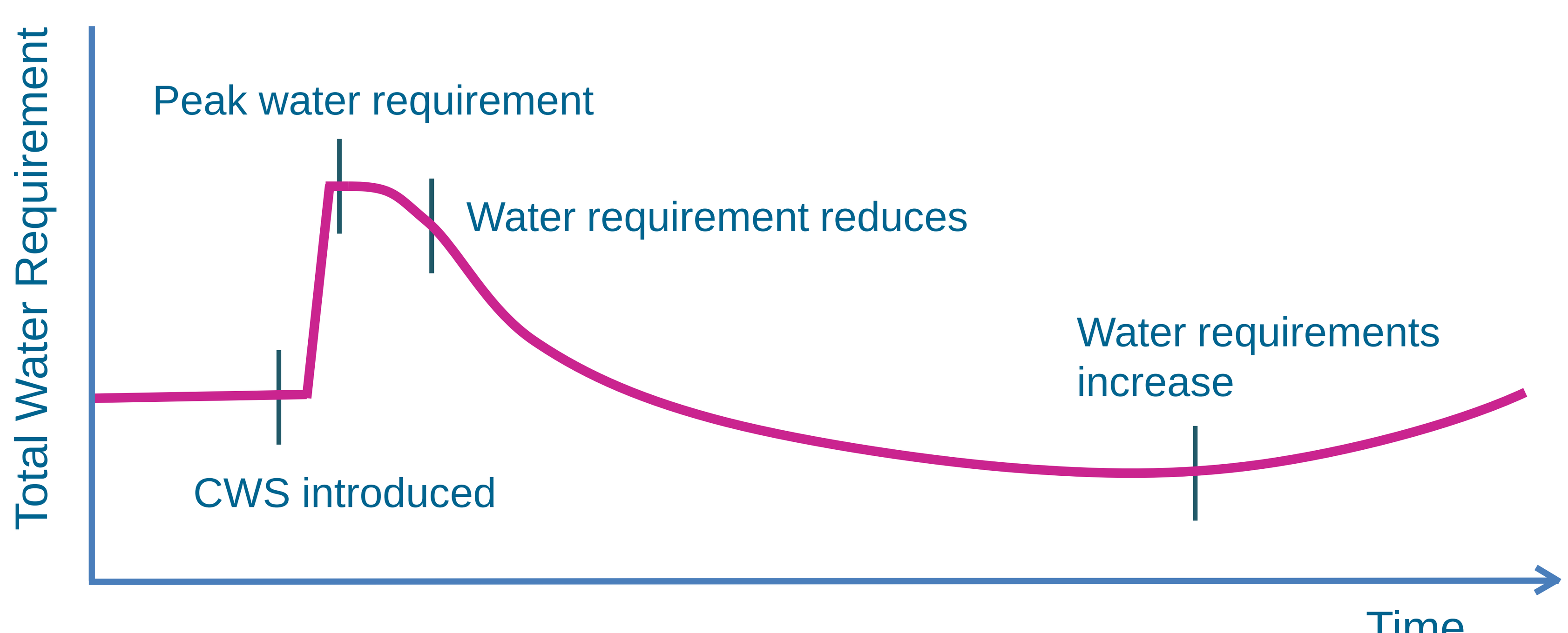


Figure 2: Predicted change in water requirements during IWS → CWS transition

FINDINGS & FUTURE DIRECTION

- Water scarcity is the cause of IWS in only the minority of circumstances, technical and economic scarcity are more often the restrictive barrier as is the case in Lahan;
- Expansion of a network threatens the operation of continuous supply and must be planned in order to maintain the supply-demand balance.

The key next steps:

1. Construct a model to forecast demand changes during the transition;
2. Apply the model to Lahan, and compare output with field data to validate the proposed relationships;
3. Evaluate what network data must be collected to enable useful output from the model.

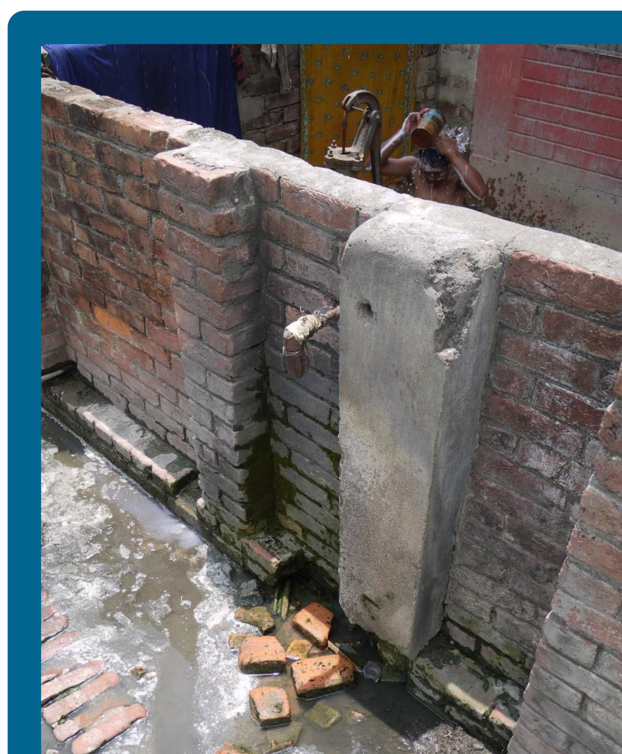


Figure 3: Typical community tap in Lahan, Nepal

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