

Using a socio-hydrology stance to address the paradox between global decarbonisation, lithium fever, and sustainability in the Atacama Salt Deposit

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INTRODUCTION

In the remote Atacama Salt Flat basin, infrequent rains and the highest solar radiation on the planet allows miners to produce high-quality lithium at a low cost. However, hyper-saline brines are being pumped at increasing rates from underneath the salty plains. These pressure raise concerns about the long-term **environmental** (e.g., fragile wetlands and lagoons), **ecological** (e.g., Andean flamingo populations that depend on water resources), **economic** (e.g., lithium production and local labour), and **social** (e.g., drinking water sources that sustain indigenous communities) viability of this system, and the potential (negative) effects on the **technology development** and **global decarbonization** pathways that could unfold from its collapse (i.e., telecoupled connections).

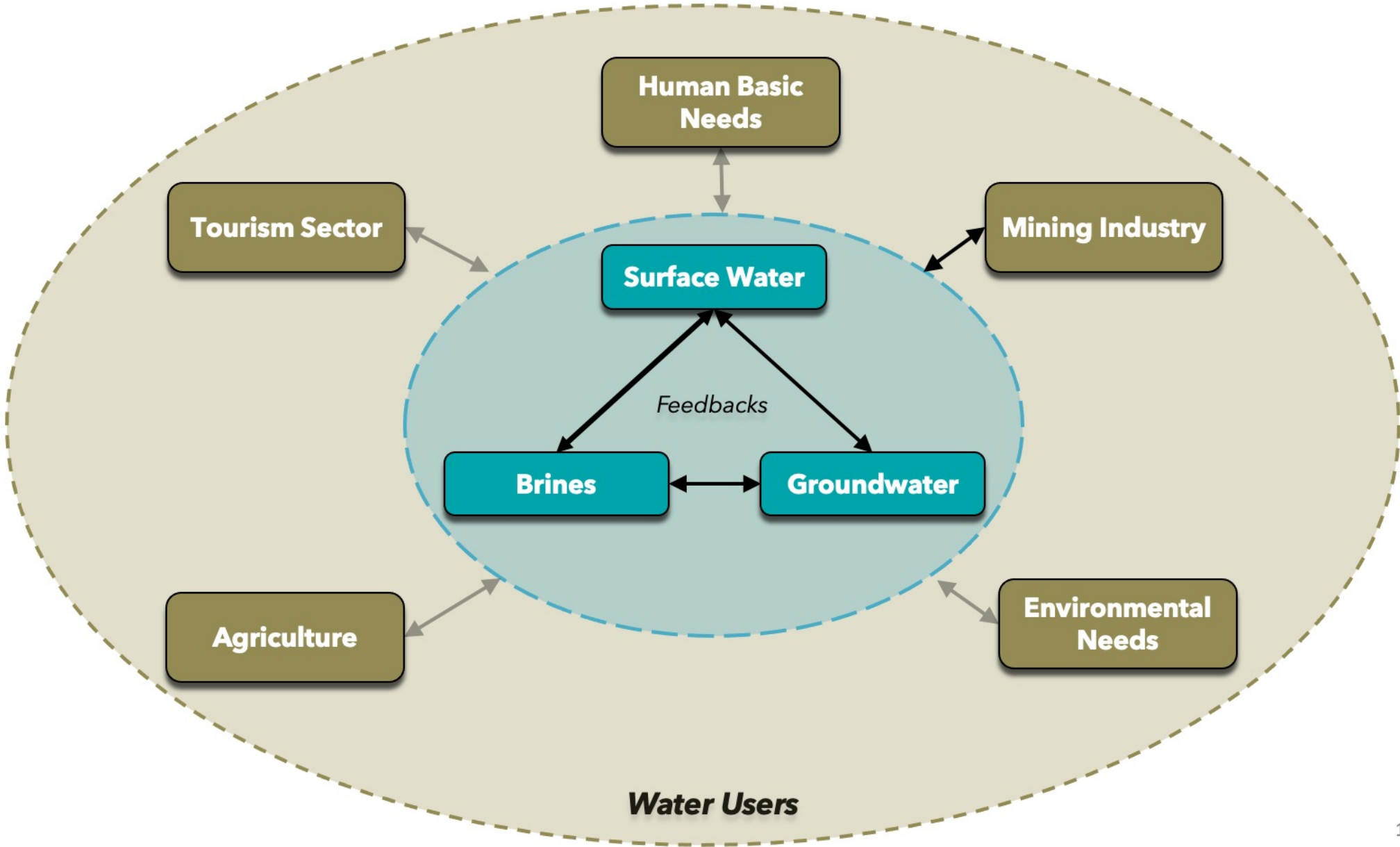


Figure 1. Relevant water users and resources for the Atacama Salt Flat basin. Source: Prepared by the author.

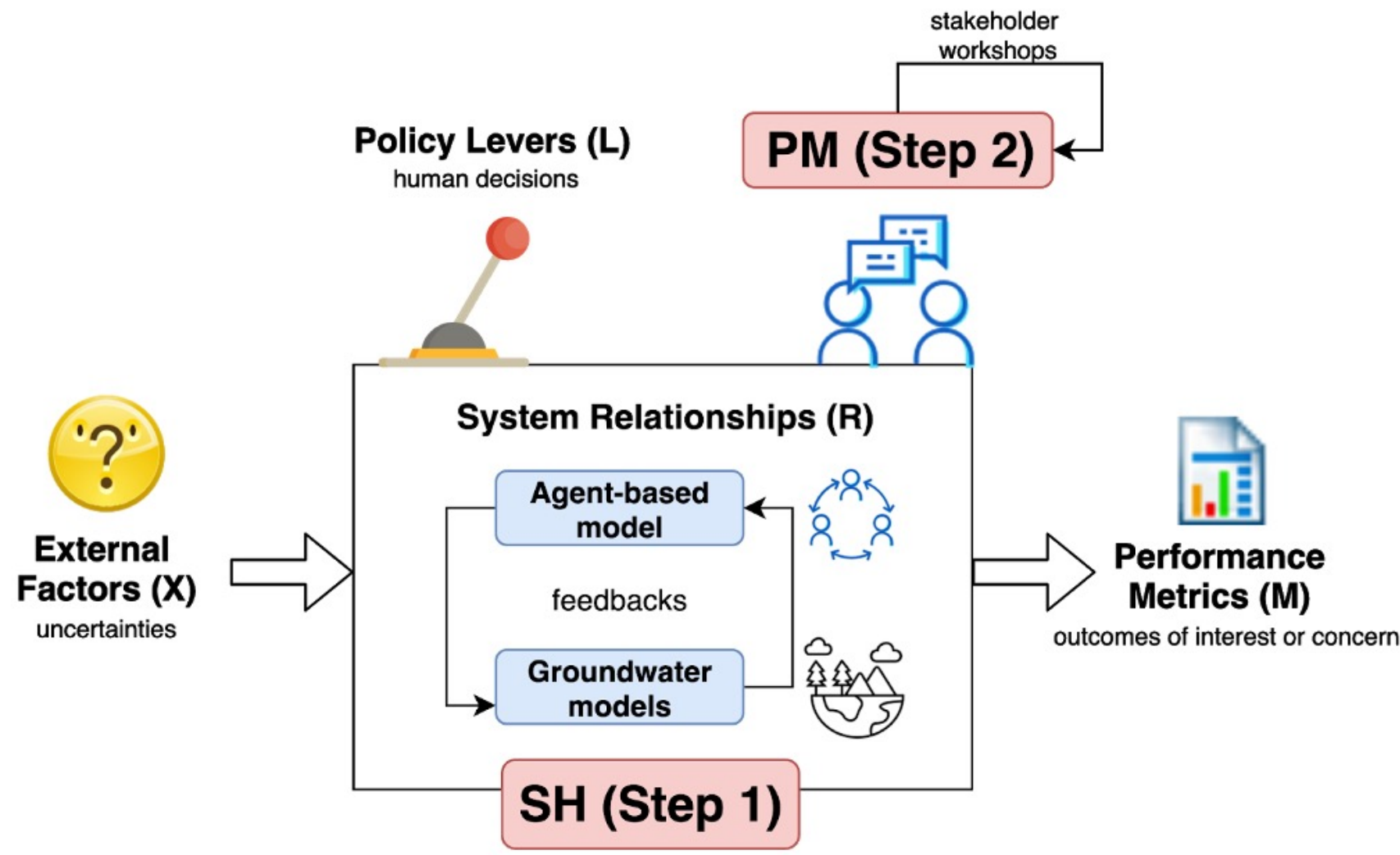


Figure 2. Participatory construction of the Socio-hydrological Model. The methodology used is a hybrid Cognitive Mapping with XLRM. Source: Prepared by the author.

A SOCIO-HYDROLOGICAL STANCE

This research aims to provide an instrument for participatory basin-wide water resources management, by explicitly including the “Social System”, through an Agent-based Model that operates in synchrony with an existing surface water-groundwater model.

PARTICIPATORY MODELLING IN THE MIDST OF THE PANDEMIC

This research project operates under the principles of Participatory Modelling (PM): The co-production of knowledge with stakeholders via facilitated modelling workshops. Although the COVID-19 global pandemic has disrupted our planned stakeholder and community engagement programmes and undermined many of our tactical options, it has also given us the opportunity to transform our workflows and adapt our methods to deliver virtual PM under lockdowns and social distancing constraints. With web applications being widely used and accepted, plus the recent advances in videoconferencing and team collaboration platforms (many of which can be used free of charge), we believe our results highlight a pathway for digital engagement that is utmost necessary for sustainability researchers and practitioners presently engaged (or wishing to engage) in collaborative processes.

