

A WEBINAR SERIES ON:

# CHANGING POLITICAL ECONOMY IN LARGE RIVER BASINS: ENVIRONMENT, VALUES AND SYSTEMIC PRESSURES

## WEBINAR 3: STRUGGLES TO VALUE WATER: INSIGHTS FROM SOUTH AMERICA

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9 JUNE 2021

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*CONVEYED BY KING'S WATER AND INTERNATIONAL WATER MANAGEMENT INSTITUTE, COLOMBO*



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## SPEAKERS:

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**Pilar Carolina Villar** (Sea Institute of the Federal University of São Paulo, UNIFESP) : Lawyer with a master and a PhD in environmental sciences, as well as a post- doctoral in geology at University of São Paulo (USP). She teaches environmental law and water resources management at UNIFESP and participates in the Graduate Interdisciplinary Program in Marine Science and Technology. Her career has focused on the multiple dimensions of water governance, especially in the case of Guarani aquifer and the La Plata Basin.

**Jeroen Vos** (Wageningen University) : Jeroen Vos is Associate Professor Water Governance at the department of Water Resources Management at Wageningen University, the Netherlands. As a water policy advisor he worked a decade in Peru and Bolivia with different international development organisations. He was editor of two Spanish language books on water management in Latin America. His current research interests are the dynamics and discourses of water use by agribusinesses and its effect on local water users' communities in Latin America. He has published several articles on water governance, irrigation, mining and water stewardship certification in South America and Spain, and co-edited the Water Justice book published in 2018 with Cambridge University Press.

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## ESSENTIAL TAKEAWAYS :

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This webinar episode seeks to **highlight the struggles (local to regional) to revalue water** within the Guarani Aquifer in Brazil and the Yanacocha mine in Peru. Through the application of key narratives and experiences, this episode intends to **shed light on socio-political alliances and how such relationships are influenced with the way knowledge is gained**: monodisciplinary vs. interdisciplinary approaches.

The key takeaways from the webinar are:

1. The invisibility and lack of social comprehension about groundwater processes make it difficult to effectively implement the charging for groundwater use and to develop a broader analysis of its value
2. The need to increase the amount of social learning processes on aquifers is necessary for seeking reflection on the importance and value for society and ecosystems
3. There is great difficulty in translating local water and waterscape value to scientific arguments to prevent environmental degradation, such as open pit gold mining
4. The prevention of environmental exploitation is possible through the strategic linking of local values to hydrological, chemical, legal, economic and human rights aspects

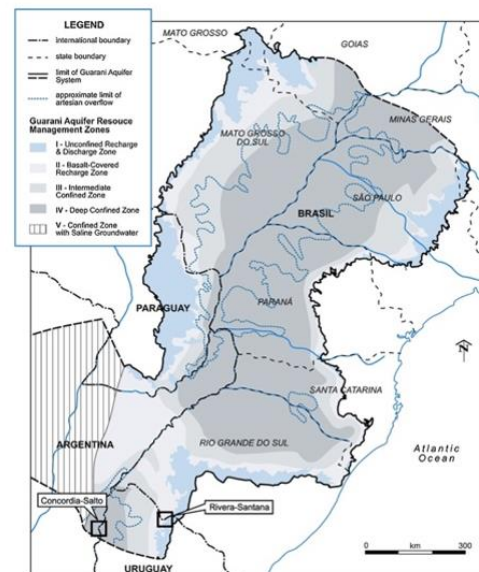
## SUMMARY OF WEBINAR 3 : STRUGGLES TO VALUE WATER: INSIGHTS FROM SOUTH AMERICA

Let's start this summary with a 'fun' fact: There are 592 identified transboundary aquifers worldwide (including 226 transboundary 'groundwater bodies') according to the European Union Water Framework Directive. 29 of these bodies of water are found in Latin America & South America (Villar, 2016), the focus area for Webinar 3. Each one of these aquifer's construes to being one of the nation's most important natural resources, delivering country, city water departments, households and business with their needed waters supply. However, such beneficial purposes are derailed due to changing political economies, systemic pressures placed on both society and the environment, and the overall value and meaning placed on these large river basins. As Dr. Naho Mirumachi reminded us, the complexity of such a relationship was explored in our previous webinar, where we inquired into issues pertaining to the Mekong dam. This episode instead centers on issues of groundwater management & irrigation within the Guarani Aquifer in Brazil and the Yanacocha mine in Peru. Through the insights and experiences provided by our two speakers, Pilar & Jeroen, an enriching discussion was provoked around the **intersection between the role of state and non-state actors in relation to the valuation of such contested waterscapes.**

Pillar, a lawyer & professor at the UNIFSEP, started us off by presenting the challenges for valuing the Guarani Aquifer. Her intention was to **go beyond the legal perspective when examining groundwater use charges within the Brazilian water management sector.** The Guarani Aquifer, known as the diva of aquifers

(in relation to the other 108 aquifers in Brazil) is shared by Argentina, Brazil, Paraguay, and Uruguay and stands to be one of the largest reservoirs of freshwater worldwide (**Figure 1**), with Brazil, being the biggest user of the aquifer (with 90% extraction). Due to its geology of being protected by basaltic rocks, the Guarani is a confined aquifer and is therefore not over-exploited with contamination problems. **With environmental degradation not being a key focus in the process of valuing this great giant, Pillar examined the social aspects, specially issues around ownership and accountability that challenged the valuation of the Guarani and groundwater in general.** The key experiences she provided to explain these challenges is illustrated below in **Figure 2:**

**Figure 1:** Map of the Guarani Aquifer System



**Figure 2 :** Key experiences in Pillar’s career that enhanced her knowledge on the valuation of the Guarani

<p style="text-align: center;"><b>1. A resource that is socially invisible</b></p> <ul style="list-style-type: none"> <li>• Ground users commonly claim that they have ‘lost their well’ and insist on perforating a deeper well with a better pump             <ul style="list-style-type: none"> <li>○ <b>Actual problem = the aquifer’s incapacity to provide water on the surface level</b></li> <li>○ Users don’t understand how groundwater works nor its value</li> <li>○ Resort to unnecessarily spending on better pumps</li> </ul> </li> </ul>	<p style="text-align: center;"><b>2. Uninformed of the necessary knowledge</b></p> <ul style="list-style-type: none"> <li>• Water managers and society are not well briefed of other aquifers around Brazil, nor are they aware of groundwater basics             <ul style="list-style-type: none"> <li>○ They only recognize Guarani to be relevant enough</li> <li>○ <b>This lack of knowledge impedes the representation of groundwater + water supply across Brazil</b></li> </ul> </li> </ul>
<p style="text-align: center;"><b>3. Nobody Cares</b></p> <ul style="list-style-type: none"> <li>• Property owners don’t register their wells due to the assumptions: That the well came with the property so why <u>bother?</u>; Minimum water withdrawal, so why bother?; and low chance of well inspection, so why bother?             <ul style="list-style-type: none"> <li>○ <b>With such a mentality, nobody takes the extra step to ensure the ‘proper’ valuation of groundwater</b></li> </ul> </li> </ul>	

To counteract the above ‘unknowingness,’ certain Brazilian laws are present to stimulate the discussion of the value of water. For example, the Civil Code of 2002 allows the public administration to charge for the use of public goods, i.e. water. Additionally, the national policy on payment for environmental services was approved this year, providing a more comprehensive approach to ‘filing’ water. Yet, while such legal action is a step forward, the value of water is still restricted to charging of water only, a limited aspect that doesn’t capture the full capability, usage or value of water.

Pillar expanded this notion by stating: firstly, many bases have not implemented the necessary instruments to surface or groundwater; secondly, the **price of using water is symbolic** in nature and doesn’t take into account the rational/economic usage of water or the environmental damage that is incurred on the water; thirdly, most groundwater users are deceptive when it comes to paying for their groundwater extraction. These collusive narratives were clearly demonstrated by the below two tables that Pillar presented.

Table 1 :

## Prices of groundwater

Type of charging water in the Pardo Watershed Committee (city of Ribeirão Preto)	Value in Real and Dollar	A point of comparisson
for collection, extraction and derivation (water companies, industries and agriculture)	R\$ 0.01 per m3 US\$0.002 per m3)	Bottle of mineral water 500 ml in the supermarket R\$ 1,69 (US 0.33)
for consumption (water companies, industries and agriculture)	R\$ 0.02 per m3 US\$0.004 per m3)	Value of tapped water R\$ 3,36/m3 (US 0.67)

Table 1 scanned the prices of groundwater: comparing the prices of extracting water (in the basin located in Ribeirão Preto) vs. the price of a bottle of mineral water. As shown, there is a significant contrast between the value of water by the charging system (Ribeirão Preto water company) and the value of water as a consumer product. This suggests that certain opportunity costs (i.e. losses in the water net by the water company) have not been accounted for.

Table 2 studies the number of wells in Brazil: with there being differing estimates and aesthetics of groundwater wells from public organizations. In short, there is 'no clue' on the number of wells in Brazil and therefore 'no one knows how much water is being tracked.' It is clear that Brazil has difficulty in valuing their aquifers and cost of constant use, especially when scholars and water managers choose to put in no special effort into learning about the aquifers value. As her concluding point, Pillar expressed that it is important to estimate the value of the Guarani aquifer (and aquifers in general) as it can help users, government and society to understand how an aquifer works, how to manage such bodies of water, and how

Table 2 :

## Number of wells in Brazil

Public entity	Number of wells
National Water Agency	estimates 1.2 million wells
Geological services	Has a cadastre of 338307 wells
Water states agencies (responsibles to charge groundwater)	36.308 permit wells (this are the ones which are charged for the use)
Agriculture census	1.03 million properties declares that they have at least one tubular well

to make better resource allocations and investment among users in restoration, conservation, preservation and development of alternatives of water supply system.

A smart transition was made into Jeroen's work through a question raised by Naho: **How do you ensure that the appropriate economic as well as the socio-cultural values are attached to water?** While it is easier to encrypt a valuation of water through an economic criterion, filled with numbers and signs, the end result produces more harm than good. Excluding to consider the social dimensions interconnected with water is a deliberate choice taken to ignore the well-being of a human; a concept that refers to one's ability to live a valued life comprised of cultural heritage, health, access to land and natural resources, etc.

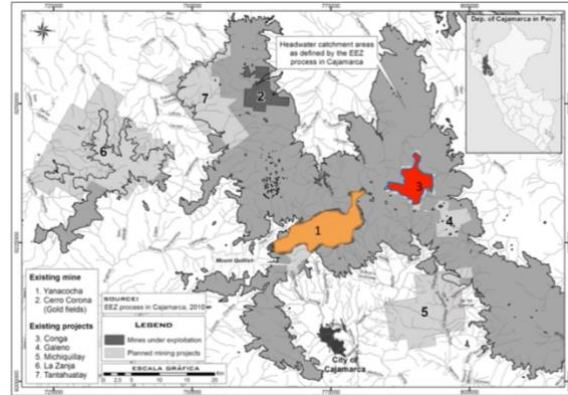
Jeroen, an associate professor of water governance at Wageningen University, introduced his insights on: **the challenges of translating local water and waterscape values to scientific arguments** against large open pit gold mining in Peru. His story encircles around the Yanacocha mine, the second largest open pit gold mine in the world (a production of 62,000

kg of gold/year since 1993, worth \$5million/day). Situated at the headwater of four different rivers, the mine distresses local communities i.e. the city of Cajamarca and its 230,000 inhabitants, that heavily depend on these water ways for their livelihoods strategies. As exhibited in Figure 3, livelihood, environment & health problems arise due to mining exploitation.

**Figure 3:** Mining Effects on Local Communities

- Reduction of grazing land
- Reduction of seasonal water storage
- Death of animals
- Lead and arsenic in drinking water & mercury in blood of mine workers
- Rivers for irrigation diverted (need pumping)
- River water pollution due to runoff and acid mine drainage

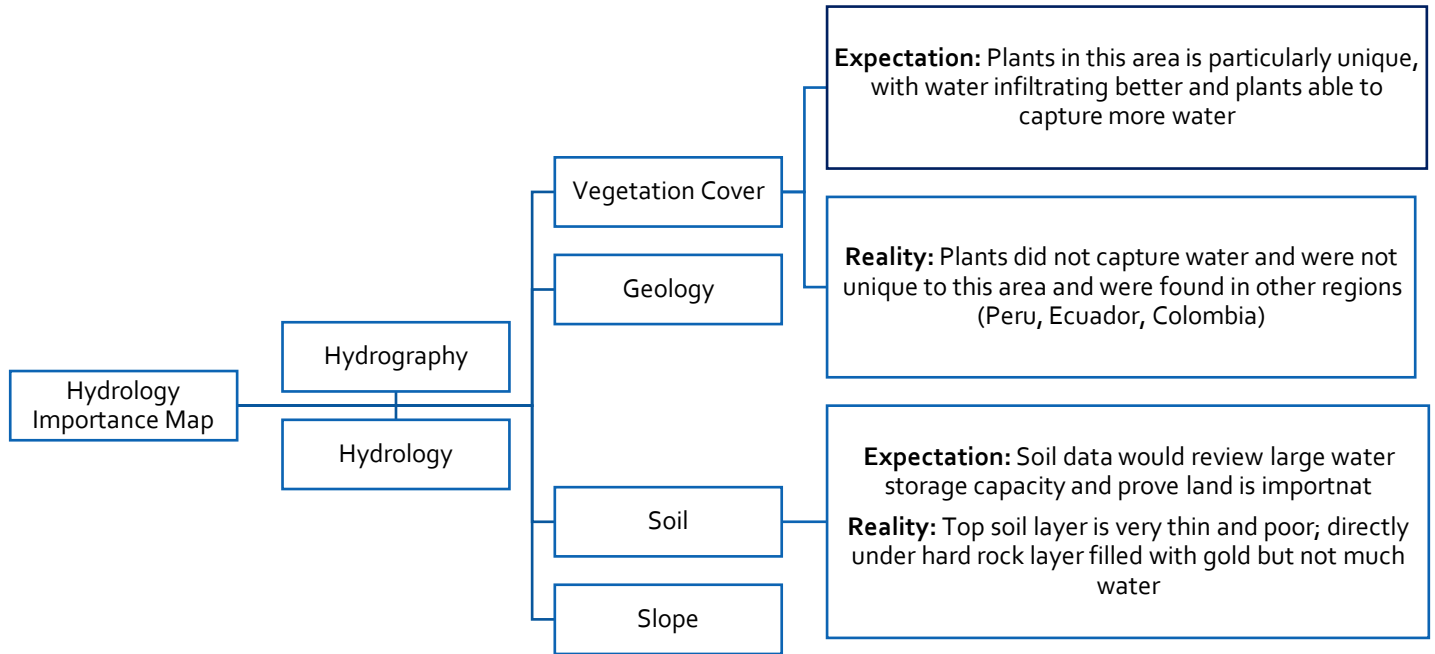
Additionally, communities lack a stage to voice their concerns as the mine has become extremely politicized. In Jeroen's words, the region is a military zone with no participation or decision making allowed from the affected communities. It is also important to note that the impacts, placed on these communities, go beyond livelihood disruptions. Instilled within cultural morals, spiritual and religious links are made to water; communities see the lakes & rivers as living beings and therefore make a deep attachment to water, through worshiping and paying tribute to the rivers. This detail was the driving force of Jeroen's presentation; **how does one translate these social values and beliefs to illustrate the mine beyond it's economic uses?** In other words, how can we create a compelling anti-mining narrative to compete against the pro-mining narrative (headed by the national government)?



**Map 1:** Typography Map

To try and illustrate the uniqueness of headwaters, in terms of its capturing and storing capacity of drinking and irrigation water, the communities collaborated with the Regional Land Use Planning Government (RLUPG) to come up some maps. The first map, didn't draw the exact lines of the area in which to delimit the headwaters. **There was no specification on what characterizes the headwaters**, or what makes them 'special enough' that they should be protected. That intrinsic, **spiritual attachment to the area was missing**. To fill in the gap, the RLUPG were in the process of creating a hydrology importance map (Map 2, below) that would look at the vegetation cover, geology, soil and slope of the area. Such data would prove the uniqueness of the area through scientific proof.

**Map 2 : Hydrology Map**



But as shown in **Map 2**, due to inaccessibility to necessary data and incorrect assumptions regarding data hypotheses, the map failed to provide adequate scientific proof.

To overcome this lack of scientific proof, Jeroen recommended, as his closing statement, that an **interdisciplinary approach** (rather than a mono disciplinary approach) should be applied. In such a method, various disciplines can be combined, such as: linking hydrology, water quality analyses, with actual water use (quality needed for human consumption and animal husbandry) and essentially, human rights.

To start of the discussion Alan dug into the topic of **data ambiguity and how it can be politically facilitating**, especially in contested resource environments. Within the Brazilian context, he noted how the lack of data has provided a sense of comfort to those in higher power positions as without concrete data, there is less chance for complexity or obstruction to arise against them. Pillar provided a name for that political comfort

zone: *the organizing of responsibility phenomenon*. She stated, while there are so many beautiful laws that regulate 'everything,' none of these laws actually get applied. This is a tactic that government exercise to maintain legitimacy; **the more water laws there are, the more oversight is required for such water sources, which can create further complexity and 'work,' for the government.** It is of no surprise that the Brazilian authorities puts most of their focus on handling the Guarani Aquifer only; that's their comfort zone.

In Jeroen's case, there lies a data-science gap that exists with and without data. Firstly, when nationally governed managed data is not shared and is untransparent to society, it's difficult to conduct thorough research or obtain reliable data. Secondly, even if the data was presented, it would not prove to be advantageous due to the data having been collected through a monotonous disciplinary approach. Such a one-sided, constricted perspective doesn't demonstrate uniqueness. As Naho put it,

science is leveraged as a battle between paper tigers. There are beautiful pieces of legislation that can manage every aspect of our lives but

the extent to which they're used is a political decision.

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## DISCUSSION WITH PARTICIPANTS

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The discussion then evolved to taking a more legal direction when Miranda, a PhD student from King's College, was curious to know more about the new project of law, environmental licensing, and its impact on the fight to make groundwater consumption more sustainable. According to Pillar, the project won't create an impact on contestation perse, but might have an negatively shape on groundwater protection. "The flexibilizations that the project brings are very concerning as it removes license requirements for many activities that have the potential to contaminate groundwater."

Moving to a discussion revolved around digital systems, Fiaz, from IWMI, was interested in the use of smart technologies and techniques for aquifer management. He was curious to know if "technology can take forward the boundaries of management, improve the strength of governance tools, at the disposal of government and other management hierarchies?" Pillar answered first by asserting that the current

water management systems in Brazil, specifically in Sao Palo, are not very modern; and there is much struggle in implementing modern, well networks, i.e. adequate supply of piezometers/100km. The same line of thinking was directed toward Jeroen, in terms of wondering if crowdsourced data could be collected in the Peruvian basin to help understand the relationship between water mining and local indigenous communities. Jeroen answered by providing a compelling example on the application of citizen science. Communities would determine the water quality in streams or irrigation canals by collecting micro invertebrates as small insects can be indicators of certain water quality standards. Such an interdisciplinary method involves greater participation between communities while raising awareness about issues of water quality.

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## CONCLUSION

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To wrap the webinar up, the last segment revolved around power and control, with Naho enlightening us on the broader picture **in which those who have undisputed access to land and water are able to extend their influence, and hegemonize over those who don't have full control**. To expand on such political conflicts, Mariela, from the University of Valle, Colombia was curious to know from Jeroen if local communities received any support from Peruvian universities? Sticking to the narrative that there is a comfort zone within the institutional hierarchy of power, private universities choose to have nothing to do with anti-mining, social mobilization or data

gathering; and state universities focus on the teaching aspect rather than the 'out of norm' investigation aspects. Overall, the statement, 'The less we know, the better,' is proclaimed loudly within the political and institutional arena.

Again, like last time, everyone agreed that an hour was simply not enough time to chew over all the stories and narratives connected to the discourse on values of river basins and development; especially narratives that looks at how human rights can be interpreted to serve the most powerful



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