

Hydro-Justice in Farming: Smart Solutions to Prevent Water Waste and Territorial Disputes

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Introduction

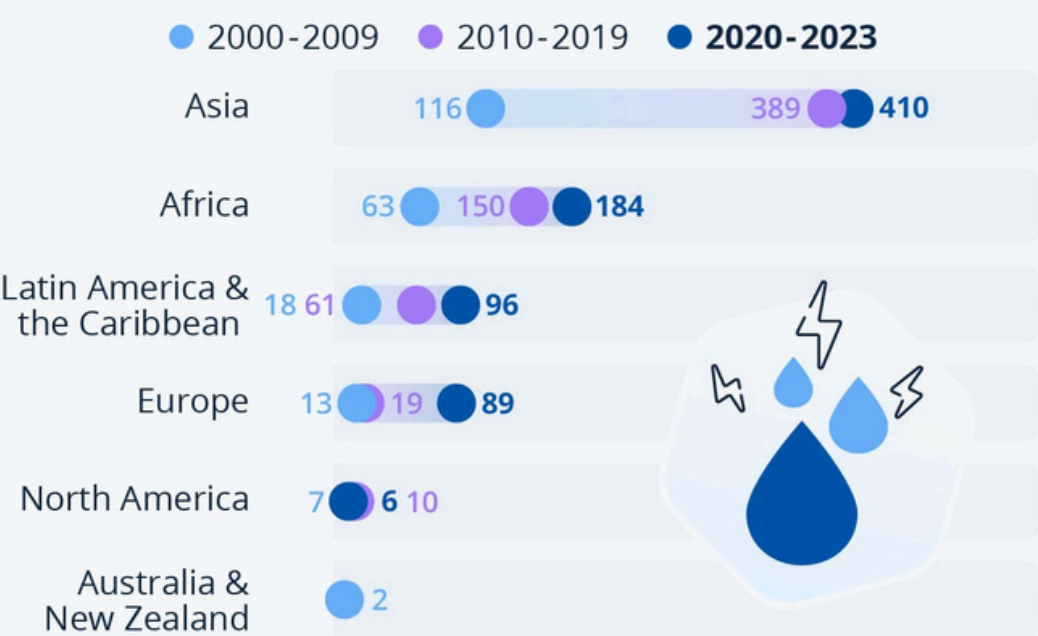
Water, the lifeblood of agriculture, is becoming an increasingly scarce and contentious resource. As global populations grow and climate change intensifies, the challenges of water waste and territorial disputes over water rights are threatening food security and sustainable farming practices worldwide. This poster explores the critical concept of "Hydro-Justice" in agriculture – ensuring equitable access to water, minimizing waste, and fostering peaceful coexistence among farming communities. We will delve into innovative smart solutions that empower farmers to optimize water usage, resolve conflicts, and build a more resilient and just agricultural future.



The Farakka Barrage severely impacts Bangladesh's downstream agriculture by causing dry-season water scarcity, increasing salinity, depleting groundwater, and exacerbating flooding, which collectively devastates crop yields and livelihoods.

More Than Half of the World's Water Conflicts Are in Asia

Number of water conflicts worldwide, by region*

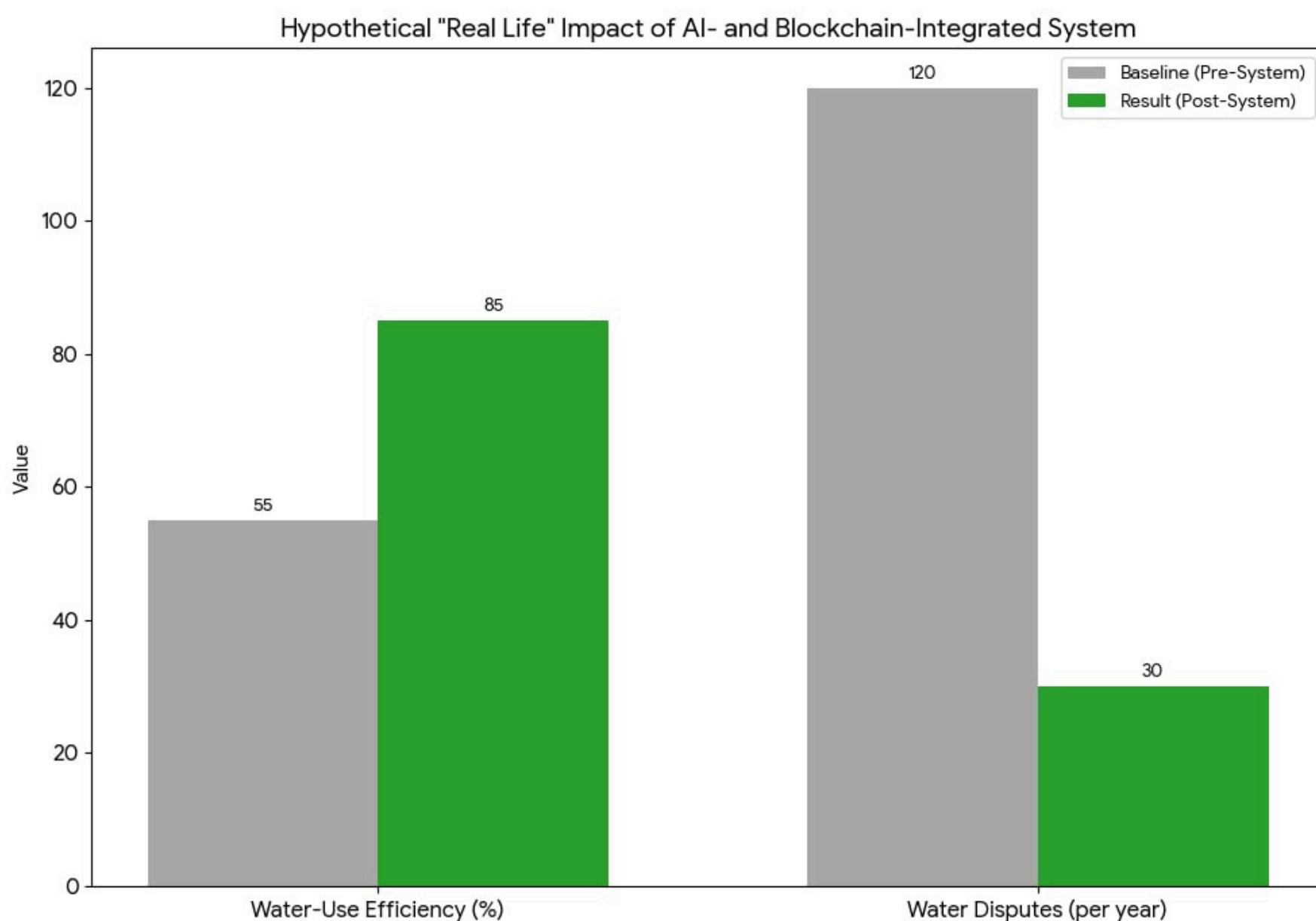


* Loss of water resources or systems through conflicts, the use of water as a weapon in conflicts and water as the trigger/cause of a conflict
Source: Pacific Institute



statista

Result



For Water-Use Efficiency (%), the system led to an increase from 55 to 85. In contrast, the number of Water Disputes (per year) decreased significantly from 120 to 30 after implementation. The system appears highly effective in improving efficiency and reducing disputes.

Conclusion

the pursuit of Hydro-Justice demands a paradigm shift towards smart, data-driven agricultural practices. The integration of AI and Machine Learning through systems like the Smart Irrigation and Dispute Resolution model provides a robust, dual-purpose solution. By enabling precise water optimization and conservation, we directly address the environmental challenge of water depletion. Simultaneously, by generating transparent, objective data on water availability and allocation, the system offers an unbiased foundation to mediate and resolve the growing social crisis of territorial disputes. Ultimately, these smart solutions are essential for building a more resilient, peaceful, and equitable future for farming communities worldwide, ensuring water is managed not as a source of conflict, but as a shared, vital resource. Further implementation and policy integration are recommended to scale these benefits across international and regional water basins.

References

- Causes and Consequences of the Conflict among Agricultural Water Beneficiaries in Iran by Masoud Bijani 1,*ORCID,Dariush Hayati 2ORCID,Hossein Azadi 3,4ORCID,Vjekoslav Tanaskovik 5 andFrank Witlox reference
- Big Questions, Global Reach – Dr. Sandra Guzmán
- IrrigationMonitor Visuals
- Statista. (Implied Source). Frequency of Water Conflicts Worldwide, by Region.
- Government of Bangladesh/India (Implied Source). The Farakka Barrage severely impacts Bangladesh's downstream agriculture.

Method

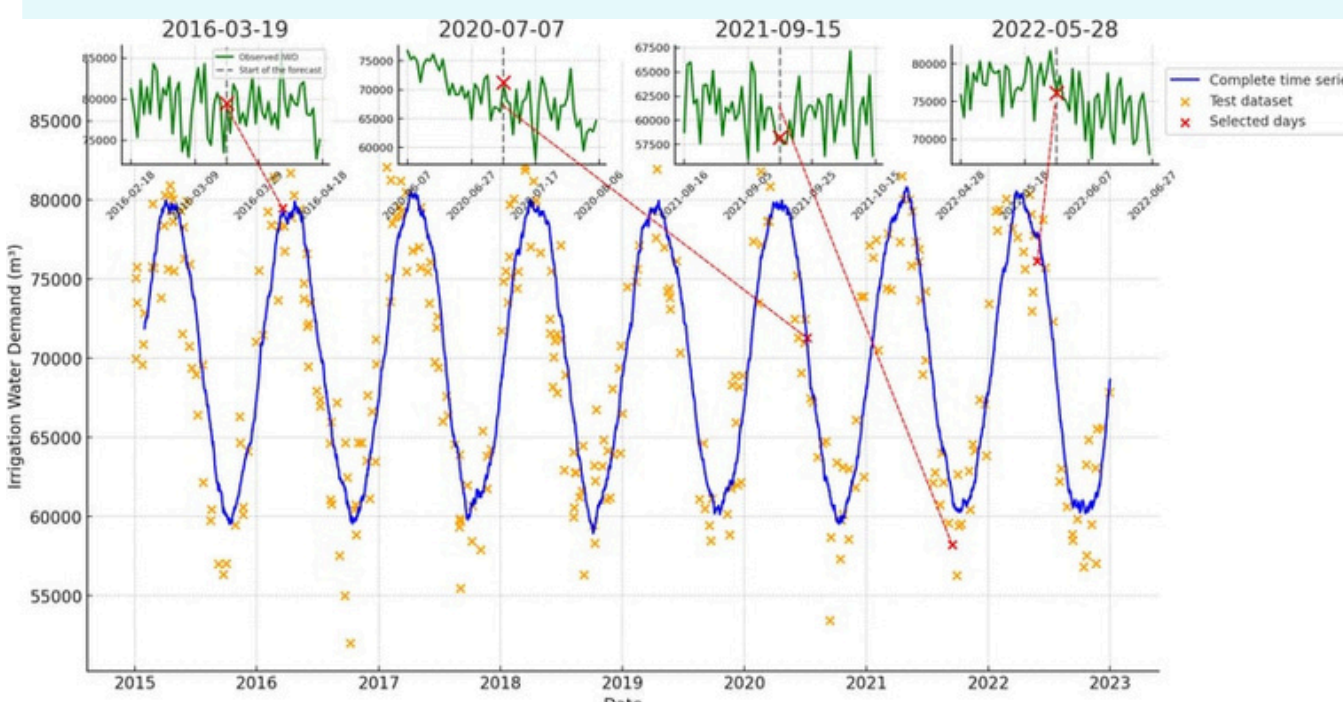
Applying AI and Machine Learning to Irrigation

- Smart irrigation systems built on irrigation apps and soil moisture sensors
- Combines data from different types and brands of in-field sensors, including soil moisture and weather sensors for the assessment of the water status of the orchard.



- IrrigMonitor's visual displays also advise growers about excess water applied, nutrients being lost, or water table rise.

AI and Machine Learning for Resolve Water Dispute



- Providing real-time monitoring, predictive modeling, and data-driven optimization for equitable water allocation.
- Use satellite imagery, sensor data, and historical information to transparently track water flow, predict scarcity scenarios, and simulate the effects of different management decisions.