

Spatial Dimensions of Land Administration and User Rights over Groundwater – Case study of Kerala, India vs. Coca Cola

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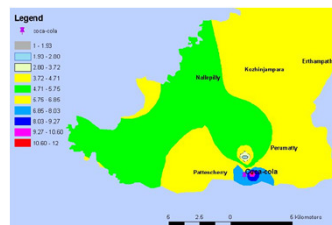
FIG International Congress Bridging the Gap Between Cultures,
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Challenge the future



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- **Case study:** conflicts over user rights in Kerala, India between community and Coca Cola
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- **Conclusions and Recommendations.**



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Groundwater Resources

- Benefits from the use of groundwater:
 - A revolution in irrigation, positively impacting the lives of millions of rural farmers
 - Allowed farming in semi-arid regions, increasing the gross cultivated area
- Threats from the overexploitation of a scarce resource:
 - Land Use changes affect aquifer recharge areas
 - Lack of an integrated land – groundwater management
 - Climate changes are negatively impacting recharge



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Two main legal traditions on land and (ground) water rights

1. Civil Law Tradition
 - Groundwater is the property of the owner of the land above it
 - There are dispositions on the flow of surface waters, but not on groundwater
2. Common Law Tradition
 - Landowner is entitled to sink a borehole or well on his land to intercept groundwater
 - There are no dispositions enabling a landowner to maintain an action against another interfering with the supply of groundwater

→ Effect largely the same: land owner has water rights



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Changing economies of developing countries

- Liberal approach in trade:
 - Developing countries open to concept of free trade
 - Multinational companies can access the resources of these countries
- Issues with liberal approach in trade:
 - Issues of property rights, over-exploitation (with modern drilling techniques) of resources and capital mobilization coming up
 - Insufficient laws or insufficient implementation of laws to protect the rights of community

→ Many (developing) nations struggle unsuccessfully to enact groundwater regulations



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Rights to Groundwater: Inadequacies

- Groundwater usage for commercial purposes by multinational companies
- Recent **change from a case law** example in India (Kerala State vs. Coca Cola):
 - The right to use groundwater remains with the ownership of land above it
 - Extraction rights should be curbed by the State if the use is considered excessive
- Note: Despite being a 'rain shadow' region of Kerala state, the area is traditionally called 'rice bowl' of the state



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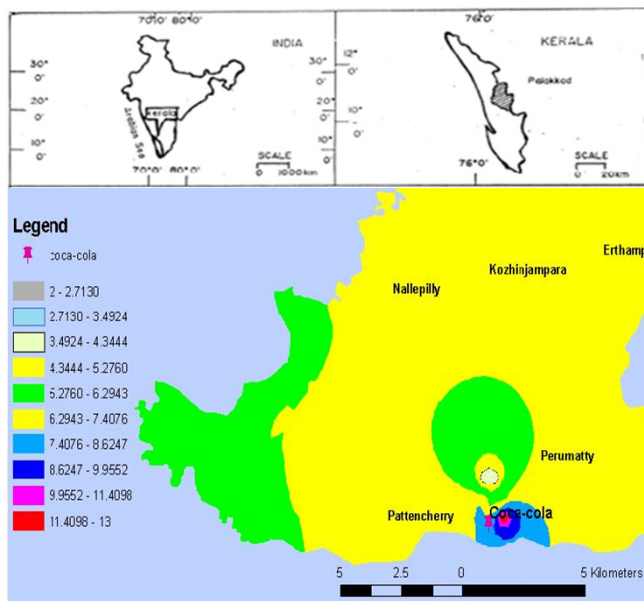
Conflicts over user rights in Kerala, India between community and Coca Cola

- March 2000, Coca-Cola factory established
- Villagers are predominantly landless agricultural laborers
- Farmers are mainly dependent on groundwater irrigation
- In 2002, community accused Coca-Cola of over-extraction of the groundwater than the permissible limit
- Groundwater level reduced and quality of groundwater deteriorated (dissolved salts/waste) → health problems
- In 2003, local Village Council cancelled the permit for Coca-Cola bottling plant operation
- State government confirmed the council decision
- March 2004 Coca-Cola 'suspended' production
- Legal battle begins in Kerala High Court and then continued in Supreme Court of India
- Today plant is still closed

Groundwater level in Kerala, India

Water level depth during pre-monsoon periods immediately after Coca-Cola suspended the Production (2004)
→ 8-13 m

2 years later (2006)
→ 5-7 m
natural recharge



Hydrologic and Land Administration Perspectives

- GIS techniques are used to analyze water level data collected by groundwater department of Kerala state
- Groundwater models exist considering the spatial and temporal dimensions of groundwater datasets
- Land Administration perspective originates from LADM
- Two LADM based options are considered:
 1. **Private law** based alternative:
Private shared use (ownership) of a collective resource
 2. **Public Law** based alternative:
Public Trust resource with (regulated) private use



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Options for Legal Groundwater Model

- Both Private and Public Law based scenarios are derived from the LADM Legal Profile
- Legal principals concerning the Civil Code or the Common Law traditions do not foreseen an intensive use of groundwater, as exists today
- The two following scenarios seek to demonstrate the usefulness of LADM in developing groundwater rights which can address the case at hand



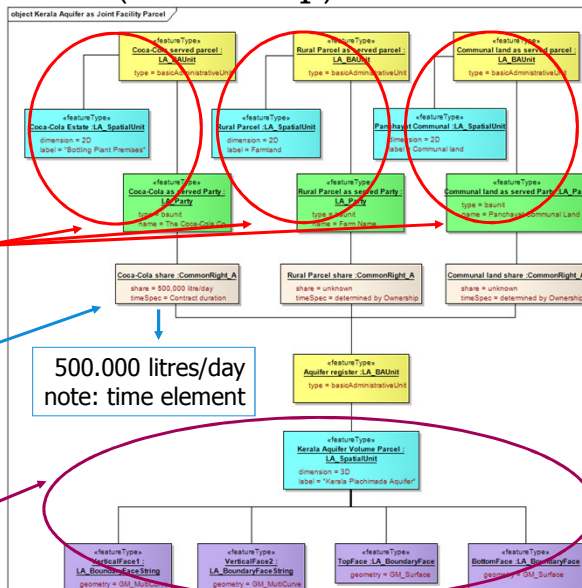
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1. Private shared use (ownership) of collective resource

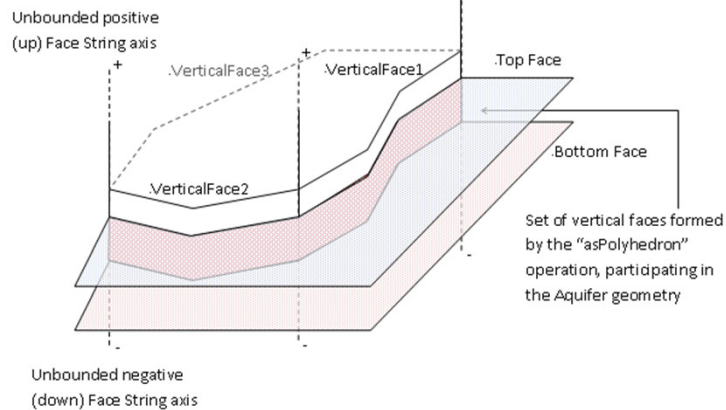
- Instance Level for the Kerala-Plachimada Aquifer as a Joint Facility Parcel
- Ownership is shared amongst related land (surface) Parcels
- New Common Rights appurtenant, have to be defined
- Legal space Aquifer: Volume Parcel using a mixed 2D/3D profile



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Aquifer Volume Parcel



Note: the "VerticalFace" objects are implemented as GM_MultiCurve (2D), while the Top, Bottom and the set formed by the "asPolyhedron" operation are implemented as GM_Surface (3D). Only the 3D objects are shaded.

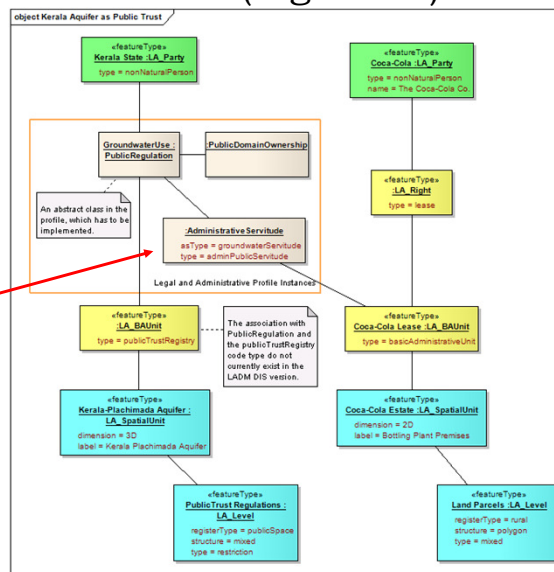


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2. Public Trust resource with (regulated) private use

- Instance Level of Kerala-Plachimada Aquifer as a Public Groundwater Resource
- Use of groundwater regulated by a new form of **Administrative Servitude**
- Aquifer Volume Parcel registered in a Public Registry
- Association to the surface Parcel links both registry types



Conclusions and Recommendations

1. Changing economic scenarios in the developing countries require the new perspectives to define appropriately the ownership of resources
2. Development of spatial science based approaches in recent times can contribute significantly to the better decision making in context of Land Administration
3. The integrated modeling approach using LADM key elements can contribute to water rights representation
4. Instead of absolute values (X litres/day) also possible to specify relative shares (depending on monitored recharge)
5. Future researches should be focused on True 4D approach (integrated 3D space and time)