**Semi-structured interviews during field visits Bhuj and Kozhikode, India**

**February - March 2023**

Bhuj 24 February 2023 - 1 March 2023

Kozhikode 1 March 2023 - 10 March 2023

Field visit locations:

Bhuj, Gujarat, India

- Hamirsar catchment traditional water drainage system

- following the stream up from Hamirsar lake to Umasar lake

- following the stream up from Umasar lake to the Southern Hills

- following the Badami Chelo stream up from Hamirsar lake to Kachchh University canalization

- Rann of Kutch downstream site visit

Kozhikode, Kerala, India

- pond site visits

- Thiruvachira Sree Krishna Temple

- Kannanchery Temple

- Nadakkal Temple

- Thiruvannur chira

- Sree Kirshnapuram Temple

- Panniyankara Sree Durga Bhagavathi Temple

- Hare Krishna Satsanga

- more to be identified

- reclaimed pond site visits

- Kandamkulam Jubilee Hall

- Anakkulam Cultural Centre

- Bilathikulam Shiva Temple

- more to be identified

- paddy field site visits

- Koozhakkode Wetlands

- more to be identified

- sacred groves

- Koozhambra Kaavu

- more to be identified

- Conolly Canal

**Semi-structured interview preparations**

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| Themes | Key words | Questions | Interviewee |
| Development process | Development  Decision  Process  Planning  Ownership  Influence  Considerations  Task  Role  Job | - How does built-up space or maintained public or green space come to be? For example, an apartment building, a road with drain, a square, a park. Can you describe the process chronologically and who is involved? | M/A |
| - Who decides for (road, building, or park) constructions and maintenance to be allowed or done and how? And what is taken into consideration (besides the masterplan)? | M/A/N |
| - How can ground by bought? | M/A/R |
| - Once a project is assigned or sold, what is the influence and possibility for municipality or neighbors to constrain the design and development? | M/A/N |
| Design and construction process | Design  Construction  Development  Process  Considerations  Regulations  Permissions | - How can (additional) constructions be built on grounds? Are permissions necessary? | M/A/R |
| - Who generally designs developments? | M/A/N/R |
| - What aspects and regulations are taken into considerations when a project gets designed or constructed? And which are not? | A/R |
| Management and maintenance process | Maintenance  Management  Control  Regulations  Permissions | - Once a project is constructed, how is the maintenance organized? For example, a secondary road. | M/A/N/R |
| - If, for example, a local resident makes an alteration to the road, drain, garden, how is this controlled or regulated? | M/A/N/R |
| Use and residence | Satisfaction  Neighborhood  House  Home  Inconveniences  Problems  Quality | - Why is an area chosen for construction, development, or residence? Why and when did you move here? | A/R |
| Any water inconveniences? Cause? | A/R |
| - Are you satisfied with the surroundings or neighborhood? | R |

Interviewees

- M – municipal worker responsible for or related to urban design, urban planning, public space, maintenance

- A – private architect, urban designer, urban planner, or landscape architect or student in the field

- N – critical view on constructions or development, NGO

- R – local resident, owning land, having constructed a building, or having altered a garden, road, or drain

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| --- | --- |
| Questions | Answer notes |
| - How does built-up space or maintained public or green space come to be? For example, an apartment building, a road with drain, a square, a park. Can you describe the process chronologically and who is involved? |  |
| - Who decides for (road, building, or park) constructions and maintenance to be allowed or done and how? And what is taken into consideration (besides the masterplan)? |  |
| - How can ground by bought? |  |
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| - Once a project is constructed, how is the maintenance organized? For example, a secondary road. |  |
| - If, for example, a local resident makes an alteration to the road, drain, garden, how is this controlled or regulated? |  |
| - Why is an area chosen for construction, development, or residence? Why and when did you move here? |  |
| Any water inconveniences? Cause? |  |
| - Are you satisfied with the surroundings or neighborhood? |  |

**Take-outs semi-structured interviews**

Interviewees are anonymized

Interview 1

Employee NGO, social worker, and resident in Bhuj (N/R)

* Bhuj municipality and BHADA (Bhuj Development Authority) get 2 crore assigned for beautification of which only 1 crore gets spend on Ahmedabad-like encroachment of Hamirsar lake with 15-20 ft wide lakefront promenades. It should be known to them that one cannot develop in 30 (check in recordings) ft proximity to (such) a waterbody yet they decide to ignore that fact. Visibility and tourism is prioritised over local inhabitants.
* The NGO collective aims at addressing the victims of climate change rather than climate change, such as through addressing thermal heat comfort which includes green and water.
* Buying land for construction is affordable in Bhuj. BHADA checks the square meters
* The NGO hopes to be included in the establishment of Bhuj’ first masterplan but expectations are low.
* Checkdams at the Smritivan Earthquake Memorial & Museum are functionless, mostly used by picknickers, yet disturb flow patterns for the downstream part of the city.

Interview 2

Director NGO, engineer, and resident in Bhuj (M/N/R)

* The recognition of lakes is failing for a number of reasons:
  + Bhuj lies in an arid region, which implies water bodies and streams are dry most of the time and therefor really not visible and forgotten. They may fill up only once in a few years.
  + In 1971 the rule passed on from the royal family and panchayats to the municipality and knowledge that was embedded in the rule was no longer central or lost. Attention shifted to expansion and development.
  + A (national) land record survey in the 70s assigned many of the dry water bodies with the legal status of wasteland, facilitating development on them.
  + With urban expansion, came decentralization with borewells, tubewells, and amplified groundwater extraction.
  + With this shift in planning and development style the water system of Bhuj shifted from direct household livelihood provision to simply recreational and aesthetic.
* Groundwater levels were high until 1985-1990 but quickly declined after, introducing the request for Narmada connection.
* BHADA (Bhuj Development Authority) was established after the 2001 earthquake which assigned four relocation sites. These emergency relocation sites and infrastructure (e.g., roads) did not recognize local drainage and cut through water catchments, disturbing the traditional infrastructure and knowledge.
* Kutch University encroached a major 4km2 wetland which provided gradual release of its water due to its flat slope. Upon encroachment a 700m drain of 7-8m wide was advised. A 700m drain of 0.45m was placed. After a 2011 flood of the entire campus (ruining entire computer and electricity systems) the drain was upscaled to only 2m width. The neighboring army area should have a drain with a width of 13-14m. Money should not be a problem for the university. An urban planner was involved in all of this. The university has borewells which could be recharged with the passage of the water discharge.
* The Haripar and Hamidrai canals are clean and functioning.
* The catchment in between Haripar/Hamidrai and Umasar is blocked due to sale and development of the land.
* Umasar catchment therefor decreased from 16km2 to 10km2, the other water now is deviated to Haripar/Hamidrai.
* The 24 wells should be clean and functioning. Around them a green belt is secured from any development (check recording for exact dimensions). The bottleneck is its connection to the resurfacing underneath the ring road. Such encroachment is often allowed when placing a tube. The tube(s), however, is too high, blocking full flow downstream.
* The intervention in a blockage like underneath the ring road is hampered due to the many compartmentalized department at municipal (maintenance)/district/state level.
* The route from the 24 wells to Hamirsar lake is the original one. After a flood in 1959 an additional drain was created and an additional overflow from Hamirsar was dug around Sharad Baug Palace grounds to Romania tank. Romania tank/talav and the new channel are now encroached. The latter by an orchard in Ravalvadi. Encroachments of such scale are impossible to remove. Encroachment of the original drain is not as heavy disturbing (yet).

Interview 3

Founding partner NGO and resident in Bhuj (N/R)

* There is a multiscalar land use issue. Land (Gujarat state level) is government owned and used for development and investments, Kutch and Gujarat being the most invested-in state and district of India. On the other hand it is heavily encroached upon. At larger scales in the form of agriculture. Similar practices can be seen on the smaller scale in Bhuj.
* This links to water as Narmada water is sold to industries, increasing dependency, and Kutch is very sensitive to alterations of it land cover in relation to hydrological processes.
* The close collaboration of NGO’s in Bhuj started after a cyclone in 1998. NGO’s are listened to because of and only after disasters.
* There is some national attention to reviving Indian practices when it strengthens a identity for Hinduism (Indian design idiom, e.g., round mud houses).
* The foundation support self-built. However, the state doesn’t want to give land, they prefer giving a house. If you give 50-65m2 of land it would reduce slum size and the informal heightening of slum dwellings. A same approach can apply to tax cuts or repay with self management of waste and water.

Interview 4

Employer BNP, engineer, and Bhuj resident (M/A/R)

* BNP or BHADA has no control on single project constructions and developments. Sale of land often happens informally and verbally, without writing. Only from a state level control could be executed.
* If constructions and developments on water bodies are to be controlled, records and mappings are needed. DLR does have records.
* Collaborations between BNP and NGO’s are not happening as he had not heard of them before. The interviewee works at BNP for 1,5 years.
* The BNP sanitary inspector is responsible for the cleaning of the drains which happens by excavator once a year before the rains.
* The state enforced focus of BNP is on one solution: the Narmada supply
* BNP has only one engineer for drainage and supply, one engineer for drainage, one sanitary inspector. In the event of flood each colleague is responsible for one of 11 parts of Bhuj to resolve flood issues, besides doing their usual tasks.

Interview 5

Director NGO, architect, and resident in Bhuj (M/A/N/R)

* The network of NGOs are mostly disaster-born which triggered big money flows to the region. In order to grow the local economy while rebuilding, the use of local material and traditional knowledge was stressed. Only due to good connections with Gujarat state level engineers and the state disaster relief office - where the state places the good officers - and a scientific approaches proving the likelihood of success, such an approach succeeded. The knowledge was there and scientific capacity was created with the aid of IT Bangalore.
* In certain ongoing cases and practices, the suggestions are not listened to but the foundation keeps raising their voice while building knowledge and date by education others and creating examples.
* Struggles are experienced with ever-changing policies and land ownership administrative formalities between state-district-BNP-BHADA.
* Other kinds of urban development of Bhuj happens via developers-BNP-BHADA. Developers get assigned or sell a plot and do not prioritise (the additional costs of) water sensitivity or do not even know water sensitivity. BNP and BHADA has short term (contract) staff which encourages their short-sightedness, lack of vision, and lack of awareness.
* Ward level development plans (below the existing municipal development plan), with each its own funds, would be a solution but currently formally there are no wards. It shows the need for a municipal corporation reconfiguration with a proper senior head at IAS (Indian Administration Service - exam passed to get high government positions) level. Wards could do cleaning for instance. But now there is municipality dependence which focus on centralisation and refuses decentralisation. Yet does not do the maintenance they are responsible for (e.g., the STP alongside a drain to fill the streams going to Hamirsar which deteriorated after maintenance was passed on to the municipality).
* The water body south of the earthquake memorial park and museum no longer fills up. NGO’s offered help to develop proper connections between the park and the lake but the deputy collector (heading BHADA) is too occupied with VIPs, elections, and BHADA.

Interview 6

Employer BHADA, architect, urban planner, and resident of Bhuj (M/A/R)

* BHADA controls development at 9m distance of the streams which are documented in any government document (e.g., village map, measurement sheet, magistral order). Along non-documented secondary streams BHADA conducts site visits to constructions but struggles to quantify the amounts of water passing through and the passages to be created for it.
* BHADA notifies, documents, digitalizes, and compares the masterplan water bodies with village maps and Google Maps. The aim is to hire external remote sensing but currently BHADA has no GIS (training) capacity. In government documents the ownership of the water bodies is stated. The major ones belong to Bhuj municipality but many secondary ones are state property and can only be secured by state intervention.
* Pragsar Lake was a depression but has been filled with earthquake rubble as it was dry at that time and nearest. Many of the water unsensitive interventions should be seen in light of its emergency context.
* Subsequent years of drought also facilitate encroachment.
* BHADA was founded after the 2001 earthquake. Before such control was the responsibility of BNP.
* The Bhuj 2025 masterplan is likely to be updated in 2029.

Interview 7

Academic, architect, urban planner, landscape architect, and entrepreneur in Kerala (M/A)

* Constructions or natural conservation (e.g., Akkulam lake) are assigned by a department of the Government (of Kerala) (e.g., tourism department but could also be Smart City program or infrastructure department) in collaboration/contact with assigned party (e.g., TPLC (Translation research and Professional Leadership Centre) or non-government institutions such as churches, schools, universities (IIT Bombay + CDD (Consortium of DEWATS dissemination society)). They co-develop a DPR (Detailed Project Report) (such as the one on Kottooli wetlands). This report then goes to WAPCOS (Water and Power Consultancy Services Limited, an Indian consultancy service provider under the ownership of Government of India and administrative control of Ministry of Jal Shakti, providing consultancy services in the fields of water resources, power and infrastructure) who assigns a consortium of contractors who implement.
* Smaller scale constructions go via local government bodies, i.e., local panchayat, which provide permits for small scale development and control (illegal) developments. Coastal Regulation Zones are a main constraint for permits for (additional) development. Permits usually additionally follow economic and touristic considerations, many loopholes are possible (e.g., constructing something for tourism but also your own residence). Small scale adjustments and constructions are disregarded, only when they are of a remarkable scale or require electricity connections they will not go unnoticed and permits will be requested.
* Informal settlement is allowed (occurs on a piece of someone’s land in return for rent or in no-development zones) as long as foundations are temporal. Locations are chosen mostly for proximity to the city and work (mostly North Indian immigrants for construction work)
* Communal and cultural ties to a locations of residence are stronger than flood inconvenience
* Constructions are designed by a licensed civil engineer and the client, mostly with the attention to economic and functional priorities and focus on the constructions, not green space. Architects are more costly due to additional consideration of aesthetics.
* National and state government have increasing attention for wetland (conservation act) which increasingly secures conservation funds and programs at larger scales.

Interview 8

Director architecture office, architect, landscape architect, and resident in Kozhikode (A/R)

* Developers and architects don’t have the luxury to prioritise ecology, water, etc
* As land values are going up, ponds are considered a waste of land and a value not recognised
* Government support is needed but not in the form of “you cannot” as that is where corruption starts. Incentives are the solution. To reduce tax when ponds are constructed and maintained as they should.
* In a state with the highest densities, how to balance preservation realistically? If we preserve all Kerala wetlands there would be no place left to live. Absolute preservation is impossible. Accept densities when assigning what to preserve. (Kerala is fortunate not to be receptive to industries)
* CRZ may assign where not to construct without exception. But additionally needs to guide in how to develop in places it cannot fully protect. Making the balance realistic.

Interview 9

Employee Kozhikode Municipal Corporation, urban planner, and resident in Kozhikode (M/A/R)

* Awareness is increasing. Ponds are no longer filled for constructions and concrete is no longer used for its sides.
* Wetlands convert to dry land due to land scarcity through which it loses its water holding capacity. The revenue district collector allowed such conversions up to approximately ten years ago. This no longer is the case due to increasing awareness causing opposition and news coverage.
* No buffer zone is required.

Interview 10

Employee Kozhikode Municipal Corporation, urban planner, and resident in Kozhikode (M/A/R)

* Not all ponds belong to the municipal corporation. They may either be private or temple property. Sixteen are now being rejuvenated and protected by the municipality. In order to do the same with all hundreds of ponds they first need to be announced and secondly committees of neighbouring residents need to be formed to take care.
* New ponds are most likely to be constructed in the private sector. As swimming pools…
* The edges of the ponds follow an ecofriendly green protocol, leaving its bottom open and natural, using porous local rock for its sides and gaps between the rocks (Bilathikulam pond). The engineers of the municipal corporation supervise these protection and rejuvenation projects.

Interview 11

Academic, architect, urban planner, landscape architect, and resident in Kozhikode (A/N/R)

* Only 12% of the Kotooli wetlands has wetland status. The location of KPM Tripenta, Kerala Water Authority, exhibition grounds, all were wetland not long ago. With assigning wetland status to 12%, dangerously assumed is that all other area is not wetland.
* Stick to the survey of India names of wetlands whose names keep changing.
* The Conolly Canal has an ongoing legacy of extraction. Eight meters deep on average and shallower near the Kotooli wetlands.
* Kozhikode had commercial area along the coast and in the hinterland was lots of wetland. With the creation of the Conolly Canal, only its eastside remained its status as wetland whereas the west was converted actively. The canal reduced the water table significantly enhancing fragmentation. Regarding the fresh water turning brackish, there used to be a barrier in the canal to limit this but it didn’t work. Local communities who used the wetland for paddies complained but as the original status of the wetland was not agriculture it was decided nothing will be done to stop it. During the monsoons the wetlands still turn fresher which local fishermen will acknowledge.
* The embankments of the canal were developed as roads, further encroaching on neighboring wetlands, magnifying developments again encroaching wetlands. As of the 90s all wetland west of the canal was gone (except for one small patch, now quite polluted, saved by a female Indian poet). Similarly the introduction of the NH66 (national highway) and its ongoing widening encroaches the wetlands. The NH66 is now 15m above the wetlands on a huge dike-shaped mount with only a pipe going underneath. The NH66 triggered a network of roads crisscrossing across the wetland. They are discussing deepening of the canal and Kallai river, a mobility hub, and even an additional canal from mobility hub to Conolly canal, which would remove the wetlands for good.
* A sacred grove every one km. They used to be fully natural as the gods worshipped are associated with nature and should get wet in the rain for instance. Nowadays, pavilions and pavements are being added as the religious ideology became more popular than the natural conservation mechanism. Sacred groves exist in different castes. In her study area 42 were documented but she found 392 and knew there would be even more.
* In summer they say the earth is menstruating, she needs rest.
* In April there is a festival with a procession around the sacred grove where someone of the community will impersonate god during the festival, his face is painted, he wears a tall headdress, and songs (totum) are sang.
* What may protect sacred groves a little longer is the strong believe that if you do something to them, something bad will happen. Mostly due to the snake god.

Interview 12

Academic, architect, urban planner, landscape architect and resident in Kozhikode (A/R)

* Request his study on land use along the Canolly Canal
* Documentation is poor, which is at cause of small ponds missing in the masterplans
* There is a masterplan for the Kozhikode municipal cooperation but there is not mandate to have one for the surrounding panchayats nor a mandate to align the neigbouring masterplans. Furthermore such masterplans do not recuire ecological planning for which the boundary would be the watershed.
* No documentation of open wells and regardless of building regulations people simply dig it.

Interview 13

Academic, engineer, and resident in Kozhikode (M/A/R)

* The water issue and it’s situatedness in Kozhikode is two-fold:
* On the one hand there is the coastal area (up to 7m above sea level) which has an alluvial soil and ground water 2m below ground. This is also Kozhikode’s most densely populated area with 5000p/km2. Kozhikode’s attitude of self-sufficiency is at cause for its inhabitants digging wells. With increasing awareness of sewerage, sceptic tanks became the standard, which causes health and quality problems when in proximity of open wells (CWRDM study showed 80% of the wells to be contaminated with harmful bacteria). Building rules have been introduced to keep 7m distance between well and sceptic tank. This however is insufficient with alluvial soils and is only enforced per plot. A neighbour can place its tank or well right next to the well or tank of its neighbour.
* Then there is the midland (7-17m high) with hard rock at a depth of approximately 3-10-20m with the aquifer above. This area was populated with Kozhikode’s urbanisation and plots are larger here with 830p/km2. Due to the larger plots groundwater quality is not the issue. The hard rock causes the aquifer to be small which causes scarcity. Since the top soil is so thin stormwater quickly discharges as surface flows and in general the catchment is so short with insufficient storage of the water to prevent flooding and outflow into the sea. Artificial well recharge by connection roof surfaces to a filter and the well is incentivised. Providing water by lorry in times of scarcity is costly so some panchayats provide 60-80% discount on the 4000-6000INR costs of installation. Rainwater harvesting in tanks is not popular as the rain quantities or so high that tanks are full so quickly. Well recharge is a preferred option.
* Large ponds are protected and conserved but many more small ponds aren’t. It’s especially nearby households and wells that profit as ponds don’t dry out in summer and maintain high groundwater levels, especially large ponds. But even small ponds have an effect. Many of the small ponds are property of neighbouring temples, the large ponds are municipality property. Protection often requires fencing to prevent waste dumping. Ponds are mostly located in the coastal area but do exist in the midland in the depressions of the undulating plain or next to rivers or paddy fields. Money is lacking to protect smaller ponds but willingness is there. Infrastructure, however, has the priority when developing the city. Educating neighbouring beneficiaries of the ponds to protect it could work but also required funds and time. For the conservation of Neelichira ponds a group of neighbours was involved.
* A national Gandhi related project to daily employ people, mostly women, was used to dig new ponds near Ponnani in a panchayat in between Edappal, Alancalo, and the wetlands. Promotion of additional ponds in Kozhikode is limited by (public) land availability and value.
* Downtown Kozhikode used to be rich in paddy fields, most of which have now been encroached by Kozhikode’s high rise, starting in 2010. High rise depend on piped water  but often do have a large pond (5-6m diameter) for calamity to water supply.
* Increasing quality and scarcity issues triggered the request for piped supply. Its arrival (provided by Kerala Water Authority KWA) in the 1980s added water security, especially in summer. Water used to come from two nearby rivers (Challaya and Pudupura) but in 2015 a connection to a reservoir 40km away was made possible by Japan to provide water to both Kozhikode and nearby panchayats.
* Kozhikode wetlands are protected by the government. Law and regulations are there and encroachment is decreasing. But in the past there were no roads and even KWA encroached the wetland. It is too costly to protect its boundaries and money can always be given to get permits to construct on the wetland.