

KEY WORDS:

Little Rann of Kutch, Agariyas, Seasonal Wetland Ecosystem, Salt, Salt Farming

Cultivating Landscape: Salt Farming in the Little Rann of Kutch

Gunali Ajgaonkar

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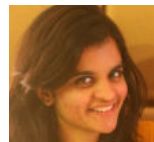
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ABSTRACT

The question of density occupies a lot of discourse on architecture and planning. However, submerged in questions surrounding critically high densities of metropolitan cities, we seemed to have grossly neglected the other extreme of the density scale. The imminent mass-urbanization of the Indian landscape omits the role of the marginalized areas that have been ignored as elements of a 'un-developed' past.

In this paper, I explore a landscape that is untouched by the questions of density, crowding and suffocation. The essay questions, documents and re-interprets the relevance of architecture in the Little Rann of Kutch, a landscape with a sparse, spread out 'migrant' population, comprising primarily of the salt workers who form the Agariya community. To bring to light the current apathy towards the community, a deep understanding of the activity of salt cultivation has been carried out and a framework of stakeholders and policies are identified. Change, as is prevalent in such an environment places the landscape at the heart and intervenes with architecture as a tool to visualize the sheer magnitude of barren emptiness.



Gunali Ajgaonkar is a recent graduate of Architecture from Sir J J College of Architecture, Mumbai. A sensitisation towards the issues of communities, environments and ecologies over the course of her education, urges her to contribute to architecture that is socially responsible and oriented towards upliftment in the country. She is currently further researching on designing community spaces for the Agariya salt pan farmers of Little Rann of Kutch.

✉ gunali.17@gmail.com

Introduction

Every map of Gujarat illustrates an area with dotted lines, labelled as the Rann of Kutch – the Greater and the Little. For those who have not been to the Ranns, it is often an image of a desert – a landscape with sand and dunes. For those who have, it is a vast flat land mass in the winters and summers and a big lake in the monsoon. Most people may imagine it to be an

The study area included the Little Rann as well as peripheral villages that surround the Rann from three sides. A prominent peripheral town studied was Kharaghoda-Patadi which is at the south-eastern juncture of the Rann.

area devoid of life and activity. But, the reality beyond these dotted lines has an interesting history and a complex present with communities and their habitat, animals and birds having a strong relation with this landmass.

This paper stems from a study carried out two years ago with a purpose to document and re-interpret the relevance of architecture in the Little Rann of Kutch (LRK), a landscape with a sparse, spread out 'migrant' population, comprising primarily of the salt workers who form the Agariya community.

I visited the Little Rann of Kutch at three different times throughout the year to document and study the various layers of activities and influences on the land, ecological changes under conditions of extreme temperatures, and adaptations done by animals, birds and humans were observed in detail. The study area included the Little Rann as well as peripheral villages that surround the Rann from three sides. A prominent peripheral town

studied was Kharaghoda-Patadi which is at the south-eastern juncture of the Rann. It is an old town with a colonial historic relevance having the practice of salt-farming dating back to more than 400 years (Vinay, 2008). Kharaghoda was the entrance point into the Little Rann and this south-eastern fringe formed the study site under consideration. It was surveyed with the help of local expertise and information provided by local organizations and NGOs. Tools such as a tape, GIS portal in the cell phone and shading device were used to measure and document various aspects of the site from sun angles, to nearness of local landmarks, to soil texture.

The findings helped generate a deeper understanding of the landscape; revealing the adaptability of the animal and plant species in the varying seasons of the year as well as the life of the Agariya community. The findings also helped identify key architectural concerns of the area, the scope of the architecture and limitations of the site.

Rann of Kutch

The Rann of Kutch was an inland gulf whose bed was raised due to seismic disturbances and by deposits from the rivers and shores. The deposits were rich in minerals and salts and the soil is therefore highly saline. Its terrain and nearness to the Arabian Sea make it a seasonally flooded wetland ecosystem. Rivers like Banas, Saraswati and Rupen, besides innumerable seasonal streams and surface water runoffs are the main sources of freshwater that run into the Rann to eventually get absorbed into its saline sands. Whenever the Rann gets flooded due to the rains and inflowing rivers and their sub-tributaries, the coarser fluvial sands and silts get deposited at the mouths of the rivers and the finer sediments are carried further



Figure 1: Location of Little Rann of Kutch with peripheral villages

to merge with the marine sediments of inter-tidal flats. During the monsoon months of June to September, water from the Gulf of Kutch heaps up, rising slowly over the Little Rann of Kutch, and along with the rains inundates the Rann with water ranging from a few inches to a few feet in depth. The wetlands in different sites assume varying seasonal characteristics, creating cracked barren plains during the hot summer months, shallow pools during the monsoons and grounds for migratory birds (Figure 1).

Salt Farming in the Little Rann

India is the third largest salt producing country in the world, next to the United States and China. In India, the major salt producing states are Gujarat, Tamil Nadu and Rajasthan. Gujarat alone contributes around 70% of the total salt production in the country. Though India has long history of salt production, the industry has really developed in post-independence period. Salt farming is one of the key economic activities in the Little Rann. It is a seasonal activity that spans about six to eight months of the year, supporting close to a hundred thousand people in the region. It is pertinent to point out here that this salt meets about 30% of

India's needs (Vinay, 2008, p.8).

The Rann is home to a community of salt cultivators known as the Agariyas, agar meaning salt. The community has a unique livelihood relationship with the Rann. They migrate from surrounding villages of the Rann from the month of October to April every year for duration of 6 to 8 months into the Rann for salt farming. Cultivation of salt is done through sub-soil brine extraction, an almost extinct indigenous practice, which is ecologically sustainable and its cyclic nature maintains the salinity levels of the region.

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From observations during field visit, it was inferred that salt is not made all over the Rann but in the places where good quality sub-soil brine is available and where sea brine can be drawn into pans. According to Gupta (2015), as per the geographical spread of current salt making areas in LRK, there are six salt zones in the Rann. All the salt production in the LRK is done manually. Salt making in the Rann requires highly skilled techniques, knowledge about the terrain, local expertise and most importantly intuition. Therefore only those, with experience gained through generations, get involved in it.

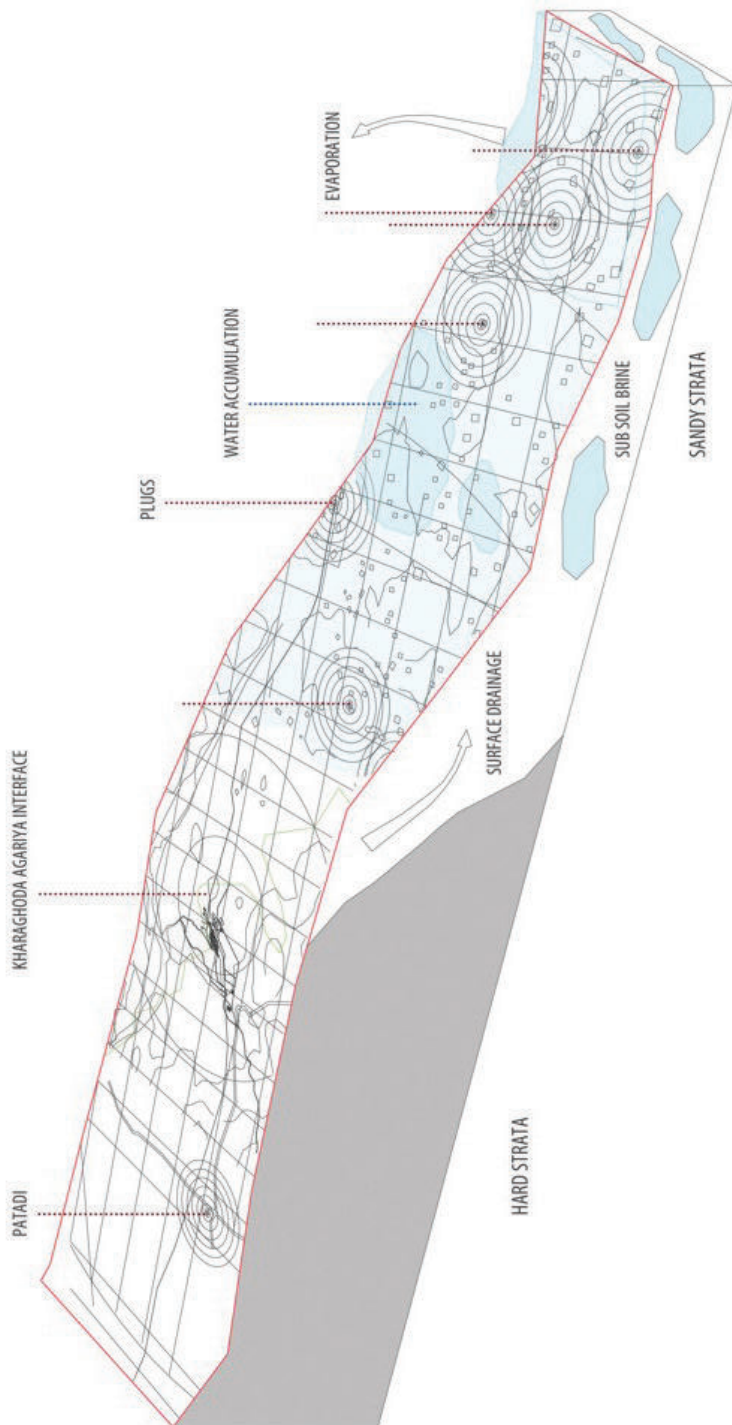


Figure 2: Geomorphology of the Rann, Drawn by the author based on field studies



Figure 3: Warped texture of the Rann soil

Geography of the Little Rann

Geologically, the Little Rann of Kutch belongs to one of the most complex regions of India and the world. It is characterized by large desiccated mudflats constituting dark silt folding in salts. The silts though rich in minerals are not soft and slimy except in a few isolated patches. The LRK has 74 elevated plateaus or islands called 'bets' (SAVE, 2005). These *bets* are highlands in an otherwise seemingly flatland. The lower lands are encrusted with salts forming salt *playas* (the texture the salt makes when deposited on the surface of a landscape due to evaporation of water) during rains. The deeper portions are made up of fertile clay with traces of mica (Babbar, 1994). The total area of the LRK landscape is about 7000 sq. km., spread over 5 districts and 10 talukas. The Wild Ass Sanctuary (WAS) lies in the center of this landscape, and most habitations are spread all around the sanctuary. The landscape offers limited livelihood opportunities upon which the communities have to depend. This is one of the hottest areas of India - with summer temperatures peaking upto 49.5 °C. Winter temperatures reduce dramatically and can go below 0 °C.

This region was once connected to the Arabian Sea. Geological forces within the Earth forced the land to rise, which turned this area into a lake. Silt gradually filled it, and the area became a seasonal salt marsh. For most of the year, the Eco-region appears dry. But when the monsoon rains fall from July to September they turn the area into a vast, shallow marsh. **Figure 2** illustrates a sliver cut through the Little Rann, which shows the difference in strata between peripheral villages and the Rann. The mapping has the "Rann Shala" or school locations identified as plugs, or local landmarks known to the Agariyas. The illustration also shows the terrain of the site and depicts how the water accumulates in the Rann in the monsoons. This diagram was drawn from observations on site and readings taken by using GIS portal in the cell phone.

The Rann exhibits a dark brown semi clayey -semi sandy texture, with deep wide cracks due to the spongy nature of absorbing and evaporating water (**Figure 3**). In these cracks appear white salty playas. This high content of salt is highly corrosive in nature, preventing vegetation growth.

The seasonally altering ecosystem of the Little Rann is because of its physiographical diversity and the seasonal flooding of the area by the sea and rivers during monsoon and its subsequent transformation into a muddy desert during the rest of the year. The Bets have the richest biodiversity among the all five physiographic divisions which include the bets, the Rann, the fringe, the revenue wastelands, and tidal creeks in the Gulf of Kutch. Since these bets are not inundated during the monsoon season and



Figure 4: The Lucas Library built by the British in Kharaghoda and the salt factory in Kharaghoda.

have a better foliage cover, they provide critical breeding habitat to several species during the monsoon. The fringe areas in LRK form the transitional zone between the slightly elevated mainland and the saline desert area of Rann. The

Agariyas working on the salt works governed by the British and later Hindustan Salt Limited (H.S.L.), live in Kharaghoda, comprising 50% of the total population in the town. According to the census report, the town has a very poor sex ratio of 866, which is a trend noted in other Agariya villages too. Literacy rate too is lower than 50%.

diverse vegetation cover of these areas which provide shelter to many species of animals can be attributed to the edge effect. The fringe areas function like a 'buffer' for the wild ass sanctuary, contain several seasonal water bodies and are also a part of the macro watershed areas of ephemeral rivers flowing into the Rann. The draining of water from rivers into the Rann is important for maintaining hydrological and nutrient dynamics of the Rann.

Kharaghoda and the Agariya

Kharaghoda is a pre-colonial salt manufacturing town which was made into a census town in 1977 (Gupta, 2015). Today the colonial town set up by the British, known as the *junagaam* and *navagaam* combine to form the town of Kharaghoda, and the nearest town is Patadi. Agariyas working on the salt works governed by the British and later Hindustan Salt Limited (H.S.L.), live in Kharaghoda, comprising 50% of the total population in the town. According to the census report, the town has a very poor sex ratio of 866, which is a trend noted in other Agariya villages too. Literacy rate is lower than 50%. The Agariyas of LRK constitute mainly of salt pan workers who collect sub-soil brine for the manufacture of salt, locating themselves in peripheral pockets of LRK and migrating just after the monsoon to begin a 'season' of salt farming.

Culture of the Agariya- the Salt Worker

The harsh living conditions for more than eight months and uncertainty about the success of salt production activity has created strong superstitions and customs, as well as addictions among salt-pan workers. The activities related to salt production are guided by ritual rather than any scientific method. For an Agaria, digging a well is a divine process. They do



Figure 5: An Agariya woman in Patadi

not follow any scientific method to identify the source of water but instinctively select a place. Many times they fail to strike water and are forced to move to another location leading to a repetition of the exercise. According to SAVE (2005), “Women are blamed if the well turned to be barren”.

The Agariya Women

The Agaria woman has an important place in the Agaria family (figure 5). A typical salt-pan is taken care of by a couple, with responsibilities allotted to the man and the woman, each contributing to the functioning of the salt-pans at different times of the season. The Agaria women belonging to Maliya, Halvad and Dhrangadhra region do not work in the salt-pans on regular basis as the salt-pans are situated close to the villages, while those Agaria women living in Dasada, Santalpur and Kutch region live most of their life in remote salt-pans. They are largely illiterate and hardly exposed to the outer world. The Agarias are largely dependent on the women for ensuring time-lines and responsibilities relating to the salt-pan as well as home are fulfilled. To justify their position



Figure 6: Children in Patadi

women have to work for more than 10-12 hours every day, give birth to more number of children and at the same time also face domestic violence.

Children of the Agariya

Most Agarias have more than four children. Some have as many as seven to eight children. The children are favored due to high labour requirement in the work, insecurity about ability to work in old age and high rate of mortality.

Child labour and poverty go hand-in-hand. Migrant life and poverty not only deprive them of their basic child rights of protection and development, but also push them into becoming free labour for the family to exploit.

Economic Status

The poor economic status of Agarias has degraded further due to exploitation by moneylenders and traders. Although Agarias are primary salt producers, the indebtedness and



Figure 7: Salt Pan of 10 acres with the dwelling and salt collected in heaps

other market practices have converted them into wage labourers. They receive only 1% of market price for all the physical labour and skill they put in salt making, while the traders and others share nearly 99% of market price (SAVE, 2005). Under economically bonded situation, labour rights of salt workers are violated. The condition of resource poorness along with low access to information prevents their growth and upliftment. It is also quite common that many Agariyas enter the Rann with debt and leave it at the end of the season with added debt, thus continuing the vicious cycle.

The Agariyas are extremely hegemonized people, been subjected to extremely poor treatment by political and social powers that they depend upon. They have been completely ignored when the Little Rann was declared a

sanctuary, in spite of the community being prevalent in the Rann for over a century. Their lack of education, poor living conditions and economic backwardness has kept them unaware and ignorant about the proceedings and regulations.

An Agariya Dwelling

One Agariya family typically occupies a 10 acre salt pan which is their home for eight months of the year. The salt-pan is nurtured by the family through the season. The elements of the salt-pan include the dwelling and a series of shallow pools that slowly separate water from the brine to form salt (**Figure 7 & 8**). The Agariyas carry necessary belongings and supplies to the Rann and build temporary houses using scraps of tarpaulin sheets, GI sheets and jute bags with bamboo framework. The homes upgrade from a

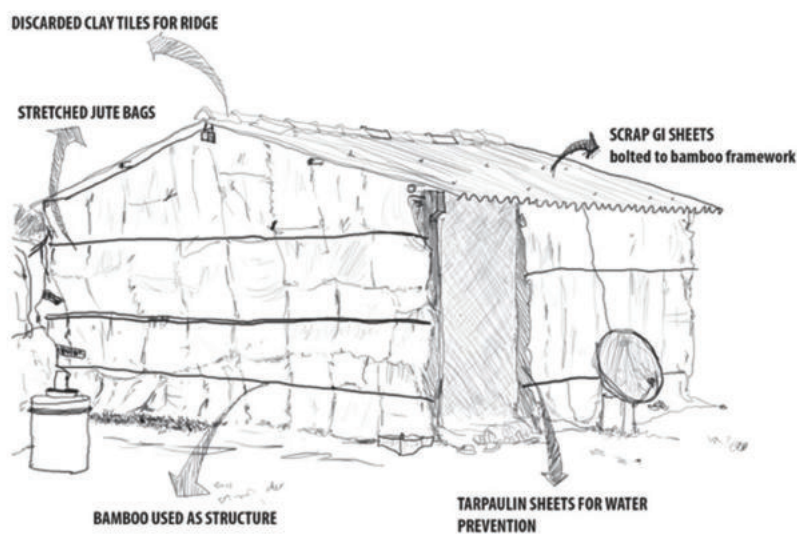


Figure 8: A typical dwelling in the Rann

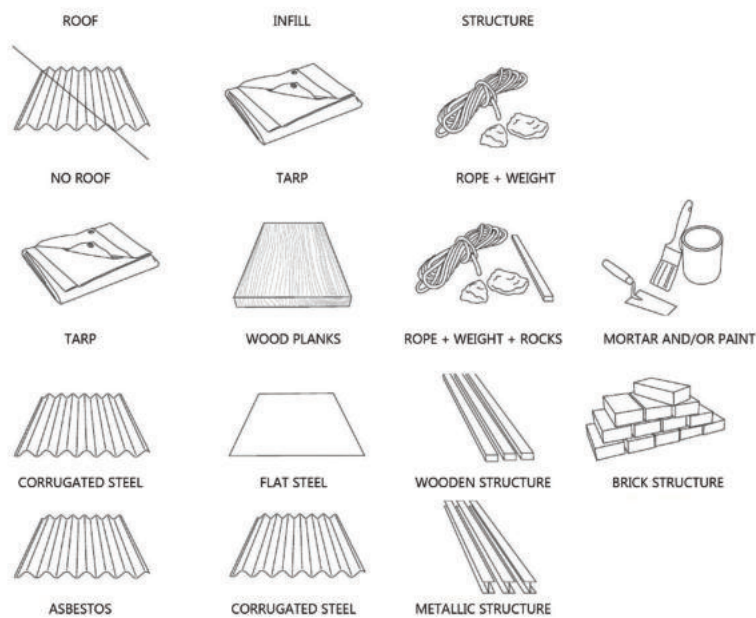


Figure 9: Dwelling Matrix



Figure 10: Agariya dwellings and toilets



Figure 11: The Rann Shalas- desert schools



simple plinth and roof into insulated jute walls depending on the season and economic capacity of the family (figure 9 & 10).

Schools

The Rann shalas are the schools for the children of the Agariyas. These are usually discarded tents given by a well-wisher or contributed by an NGO (figure 11). The conditions of the schools are extremely uninhabitable and therefore children prefer not to attend school, and instead work on the salt-pan, continuing the vicious cycle of illiteracy among the Agariyas. Presently there are 19 schools in the south-eastern Kharaghoda fringe of the Rann which are local landmarks for the Agariyas to travel through the Rann and

Geo-locate their dwellings in relation to distance from the Rann Shala.

The Architecture of Landscape

Each season the Agariyas migrate and select a piece of land from their past experience and intuition to set up their homes and build their salt-pans. They then proceed to cultivate salt and after the season ends, they abandon the salt pans, pack their belongings and go back to their villages. The monsoon then washes off the tamped pans, leaving traces and patterns throughout the Rann. And thus continues the cyclic process of recreating and dismantling the salt-pans. This reveals the intimate relationship between the Agariyas and the landmass.

“Landscape tells - or rather is - a story...To perceive the landscape is therefore to carry out an act of remembrance, and remembering is not so much a matter of calling up an internal image, stored in the mind, as of engaging perceptually with an environment that is itself pregnant with the past.”

- Tim Ingold, *The Temporality of Landscape*, 1993.

Land and Landscape differ. Land is quantitative – it can be measured, counted and analyzed for materials. Landscape is qualitative - it's the culmination of the contours, textures, objects - living and non-living, natural and artificial. But it's more than just these tangibles; it's the atmosphere and the perspective relationship between the visual and the observer. And amongst the wilderness being observed, we set up territories, spatially differentiating the landscape. Spatial differentiation implies spatial segmentation. This segmentation shouldn't be confused for division. The landscape itself embodies the whole at a particular nexus within it, and in this respect is different from every other. A place owes its character to the experiences it affords to those who spend time there - to the sights, sounds and indeed smells that constitute its specific ambiance. And these, in turn, depend on the kinds of activities in which its inhabitants engage. It is from this relational context of people's engagement with the world, in the business of dwelling, that each place draws its unique significance. Thus whereas with space, meanings are attached to the world, with the landscape they are gathered from it. And places have centers - indeed it would be more appropriate to say that they are centers - they have no boundaries. Like an

organism and environment, body and landscape are complementary terms: each implies the other, just as figure and ground. The forms of the landscape are not, however, prepared in advance for creatures to occupy, nor are the bodily forms of those creatures independently specified in their genetic makeup. Both sets of forms are generated and sustained in and through the processional unfolding of a total field of relations that cuts across the emergent interface between organism and environment. Is it possible to identify a corresponding cycle, or rather a series of interlocking cycles, which build themselves into the forms of the landscape, and of which the landscape may accordingly be regarded as an embodiment? Perhaps it is through the very architecture created by the landscape, forming the textural patterns, man-made or natural, intertwining to constitute the sublime surroundings of distinctive landscapes such as the Little Rann.

Inferences

An in-depth study of the Agariyas unearths several layers that overlap to constitute this unique ecology of the environment, of the economy and the social ecology of the Little Rann of Kutch. These have been discussed under the following structural categories.

User Condition:

Physical and Emotional State of the Agariyas- economically poor, lack of knowledge, age old habits and practices in most living activities such as the Farming techniques, the lack of hygiene and the belief in omens and rituals.

Sensory Perception- degraded health due to lack of nutrition, bone and muscle depletion, weak eyes, early mortality.

Aesthetic Sensibilities- extremely well organized, honed in traditional arts and crafts such as bead making, weaving and embroidery.

Function:

Living Model- Basic homes with jute and bamboo.

Medical Aid- Weekly health check-up vans visit the Rann.

Nursing and Privacy of Women- Unhygienic practices and unaware of healthy habits of sanitation and healthcare.

Context:

Safety and Town Planning regulations of forest land: therefore the Agariyas remain unregistered and are considered “illegal seasonal immigrants”.

Transport System- The vans and trucks that tread into the Rann have no set route of travel and the network is unplanned and haphazard.

There is a serious lack of community spaces for interaction and social gathering, keeping Agariyas further away from knowledge and discourse to improve their way of living and keep in touch with the world.

Legislation- The local Agariya representatives of each zone meet once in two months, they are often influenced by or are under the pressure of money lenders and political pressures.

Education:

Rann shalas (schools)- located in the Rann, their inhuman condition, lack of protection from the extreme climates and winds creating a negative impact on the children instead of encouraging them to study.

Technological and Monetary Aids:

Government grants are only given to registered and aware Agariyas, which are few in number. Most depend on money lenders who have entangled them in a vicious cycle of ever increasing burden of loans. The little amount of money that they may save is wasted on alcohol.

Ethical Beliefs and Views:

The Agariyas are salt farmers who in spite of having independent family farming practice, have a sense of community and are extremely close knit. Their methods of communication in the Rann are through mirrors and pigeons. The children are encouraged and often forced to participate in the salt farms from a young age and therefore quit school and remain backward and uneducated generation after generation.

Summing up, the Little Rann of Kutch is a seasonal salt marsh which for eight months a year is home to more than 1,00,000 Agariyas who fan out over the delta and toil in the brutal sun to extract one million tonnes of salt a year. The documentation carried out is therefore synonymous to the LRK's palimpsest, tracing evidence of former pans as they eventually dry out and leave fading scars. This unique ancient method of salt farming today is a heritage, providing one of the most basic elements of our diet- Salt.

In the following section is presented an analysis of the existing processes in salt farming and suggested improvements.

Salt Production Process




ACTIVITY AND DURATION	PROCESS	SUGGESTIONS TO IMPROVE
Scouting (End September to Mid October)	The Agariya husband and wife leave the children in search of land suitable for salt cultivation. An area of around 10 acres is found.	This process can be greatly enhanced and efficiency can be improved by involving GIS systems and partnering with local research institutions.
Re-Locating (Mid to end of October)	The family then moves to the site packing along a month supply of ration. Erection of temporary shelters and dwellings occur.	
Digging Of Well (End October- 1 Week)	A well, 3m in diameter and upto 9m in depth is dug to extract brine. Due to lack of scientific methods employed in site selection, a lot of times this results in failure and loss for agariyas.	The traditional method of employing poles as markers in land can be undertaken by the Govt. After necessary research, partnership which will yield better results as well as a landscape with marginal impact to the environment.
Installation Of Pump (End October- 1 Week)	A diesel or crude oil pump is generally used by the Agariyas for pumping brine in to the salt pans. This is one of the most expensive tasks for the Agariyas.	Solar pumps can be installed under the Govt. initiatives already taken up in Gujarat to install them for agricultural processes. These will be placed close to the well markers and would greatly reduce the exploitation of Agariyas by the diesel vendors (for which they take loans).
Preparing Salt Pans and Condensors October End (1 Week, 150 People)	<ul style="list-style-type: none">- Clearing plots- Loosening soil- Bunding land to form Gamdus (reservoirs)- Forming Paatas (crystallizers)- Channels made to connect pump to Gamdus to paatas	

Table 1: Production Process of sub-soil inland Salt

ACTIVITY AND DURATION	PROCESS	SUGGESTIONS TO IMPROVE
Pumping Brine And Tamping (45 Days From Start)	Now, brine is slowly let into the first Gamdu with gravity and flows to the others. Paglee (the activity of tamping with bare feet) to harden the soil is carried out meanwhile by women.	Gumboots should be provided for this process. Along with this, if salt worker villages are brought together, mechanized resources can be shared by them thereby making it more economical and accessible for them.
Filling Paatas (60 Days From Start)	<ul style="list-style-type: none"> - Paatas filled to a depth of 4-6 inches with brine maintained at 24-26 BC - Immerse Zipta grass stems for crystallization - 10 days for first crystals - After 15 days, raking to prevent flaking is done every alternate day - after 45 days, supply of brine stopped and water increased to 30 BC 	
Draining Mother Liquor or Britten (10-15 Days)	The birtten is drained out in the open grounds. Following this, salt-pans are sometimes again recharged to procure more salt.	Propose of creating temporary storage tanks for britten which can then be transported to village where small labs shall be set up to extract by-products which will add to the economy of Agariyas.
Harvesting And Transporting	The final step is for the harvesting of salt created very labour intensive process. Salt is loaded and carried on pans by the villagers. This salt is then transported by trucks to processing units owned by traders or sent by railways to other areas. Each salt-pan yields about 500-800 tons of salt.	Processing units can be located in the village itself. This will ensure the control of salt remains with the Agariya. These processing units can be shared with neighbouring villages thus removing the need for middlemen who exploit Agariyas.

Way Forward

The study of the Agariyas and the Rann reveals a unique relationship between man and land and utilization of resources. It also gives an understanding of migration and the need for movement and year after year return to the Rann. Any change in LRK to improve the living conditions of the Agariyas will have to be a phase-wise and slow process. The key to community upliftment is through the promotion of education and its importance. Then locals can be involved in frameworks and policies of functioning of the Agariyas, eliminating middlemen and allowing the Agariyas to sustain themselves through community aids and regulated government funding. Architecturally, creation of spaces for community gathering, which become landmarks in the Rann even for the health vans and trucks to reach, which could turn into education hubs and also platforms to communicate policies and spread awareness will bring the community closer and help them emerge out of the poor state of life they currently lead. These spaces can be multi-layered with infrastructural systems of ephemeral micro-architectures- furniture and minimal landscape interventions that support a cyclical system of events, which are nomadic. They can be disassembled, moved elsewhere and reprogrammed into community centers, neighbourhood labs and farms, rural and urban centers which become the plugs to replenish and bear the harsh yet pristine lands of the Little Rann. ■

Image Credits

All photographs and drawings by the author

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References:

- Gupta, V. (2015). *Natural and Human Dimensions of Semi-arid Ecology; A Case of Little Rann of Kutch*.6:311. doi:10.4172/2157-7617.1000311. Baroda: J Earth Sci Clim Change.
- SAVE. (2005). *A Pinch of Salt*. Ahmedabad.
- Vinay, C. (2008). *Yet to be Freed*. Ahmedabad.
- Phukan, D. (2013). *Livelihood and Conservation: A Study of Agariya Community of Gujarat*. Delhi.
- Sathyapalan, J., Bhatt, A., Esa, P. E., Srinivasan, J. T., Shukla, N., & Jog, P. (2014). *Livelihoods of Agariyas and Biodiversity Conservation in the Little Rann of Kutch, Gujarat*. Hyderabad: Centre for Economic and Social Studies.
- Ingold, Tim. (1993). *The Temporality of Landscape*. Retrieved 05 October, 2016, from <http://sed.ucsd.edu/files/2014/09/Ingold-Temporality-of-the-Landscape.pdf>
- My Name is Salt*- Film by Farida Pacha
- Singh, H. S. et. al. (1999). *Ecological Study of Wild Ass Sanctuary: Little Rann of Kutch - A comprehensive study on biodiversity and management issues*. Gandhinagar: GEER Foundation

