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**Ways of Monsoon Air: Entanglements and Stories of Matter,
Space, and Time
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Ways of Monsoon Air:
Entanglements and Stories
of Matter, Space, and Time.

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Abstract

The air of the monsoon is a powerful force of matter that makes, co-constitutes and is made by its many worlds. Having emerged from the context of the Monsoon Assemblages project, this doctoral thesis asks how the air of the monsoon re-orientes, informs, animates and confronts the way we view Delhi and how the city animates, opens up and assists in the distribution of its matter and politics through the monsoon. Through the process of the work, the thesis travels to a variety of locations, temporalities, matters and times to engage with the sticky complexity of the liveliness of (and living because of) monsoonal atmosphere. I develop something that I call A Monsoon Air Methodology which I propose is a way of meandering with and because of monsoonal capacities and forms – in inviting generosity of the way different knowledges view the monsoon, and letting monsoonal sway mediate those stories – in concluding that the monsoon is a knowledge system too.

Enveloped between an introduction with notes for a methodology and a conclusion are three chapters. They are about the winter haze, an invasive plant species and the question of the death of monsoonal time – amidst a range of linkages and materials. The work is very interdisciplinary and gathers a variety of methods and approaches in engaging and deepening an understanding of the role of the monsoon and anthropogenic materiality as they agentially mingle in the co-production of narrative, writing, worlds, possibilities, pasts and the broader implication of monsoonal thought – investing in its opacity, survivability, uncertainty, multispecies ecology and permeation. Through this work, I ask how thinking and sensing through the monsoon and its ways – can open up, share, distribute and make insights of matters, places and times, for liveability, in these precarious troubles of the Anthropocene.

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Introduction and Notes for a Monsoon Air Methodology

Introduction

This thesis begins with the New Delhi National Capital Region. A city, a material, a time. It's a beginning to the making of monsoon stories for this thesis – that cities in the spacetime of urbanisation and anthropogenic knitting are making a difference to the wind – that winds and the urban co-produce weathers and their assemblages can offer stories. At the same time, the movement of the wind – its making and becoming – the monsoon can also change the way we understand cities. The commission for that starting point to probe from Delhi came from the Monsoon Assemblages project. In this work, I begin with Delhi but soon realise that it distributes with air's materiality – that the monsoon animates urban form far beyond the imaginary boundedness of what is often perceived to be a seasonal circulation. In doing so, a variety of different sites emerge – from the aerosol of the winter haze, the high plateaus of the Himalayas, southern Karnataka and so on, being drawn into the speculative story making capacities of monsoonal methodology. Assemblages are material, just as much as they are conceptual. So through the smog, emergent plants, dust and the death of time, in these stories, the work of the monsoon, airs through, in assembling knowledges, materials and times in this work.



Figure 1: Monsoon clouds over Delhi. Photograph by author.

Post-disciplinary, but also atmospherically anti-disciplinary/The-monsoon-as-living-intraactive-knowledge/the-monsoon-as-a-temporality-of-this-earth¹

This project from the very outset was designed to be an interdisciplinary exercise which would not necessarily emerge from an acknowledgement to genealogy, in the sense that the guiding intuition suggested that the monsoon did something to the way things were structured under its shadow. So unlike monsoon history which traces the work of colonial scientists or cultural anthropology which explores local notions of seasonality or science studies which attempts to study the way science knows what it knows, this experiment in writing had to emerge out of the friction that the monsoon itself produced in ways that it undermined discipline and these stories attempting to define and hone an institutionalisation of life-giving-making-taking wind. There was something about heeding to the sensibility that monsoonal work is not just more-than what those histories and methods said of it but was also something that enlivened “its” own history, time, mattering and living-work. At the same time, the science of the air and the science of relations in its gathering of rich information constantly seemed to overflow into monsoonal interpretation – that even at the rubric of being converted to data, the monsoon was both opaque and unclear requiring constant interactions between disciplinary expectations and circumstantial states. It organised knowledge.

Taking inspiration from Donna Haraway’s work in being kind to my own language, the “it” here is a process of figuration that is not just attuned to a particular dimension of monsoonal matter such as the wetness of seasonality but is a figuring struggle of wording observation, knowing and ambiguity into text that is able to expand the “it” into some form of methodological happening. This “it” which is appropriated by meteorology as an instance of volume, a cosmological telling of one version of atmospheric typecasting is expanded to a broader proportion of “its.” I must also highlight that the “it” here is for the sake of words, and when the force of the argument is observed, conceptualised or even realised: the “it” loses part of its meaning as it becomes

¹ My invitation is to wonder in seriousness the opportunity of taking the monsoon as an account of livingness in air’s world – that the containment of what constitutes life’s wetness (as Da Cunha might suggest) or air’s enlivenment in its encounter with density, when suddenly colour to the senses is heightened by the empirics of what happens in this air – life. It is the kind of methodological debt that can never be paid back. To bend, in order to fall into monsoonal water and therefore drown in its methodological condition is not a choice but an entanglement which is pre-defined and figured by the many ecologies that compose air, ocean and earth by being present in its story and working with it. So a monsoon air methodology is largely about making sense of living inside monsoon air – drawing on that livingness to sustain time for many beings. The work against is colonisation. The rationale for the title is not an antagonistic one but one that acknowledges the post-disciplinary space of the monsoon that has historically and ongoing destabilised colonial method, and hence is an air, a temporality, a way within which methods are made sense of because-of-it and not applied to it.

undiscernible to language – you can hopefully feel the air melt, sense the air weathering, permeating into multiplicity. I mean that also in the concern that the ways of validating “it” as the air we breathe, the water we drink, the food we eat, the way multispecies assemblages air with “it,” the relations and patterns of time, the violence of the definition of the monsoon is something I work with and through. So, the monsoon despite holding a particular imaginary, monsoons in many ways in this work – and my research shows how its meaning materially and temporally expands. I draw from a variety of perspectives and disciplines in how they see the monsoon and implicate their knowledges in the story of being swayed by monsoonal drift. A critical task in this enquiry has been the project of resisting gaslighting – confronting the fire hosed by the disciplinary exercise enabling the license of who, what and in which ways can the measure and subject of monsoon-air be discussed. Who can tell us that “it” exists? What methods can tell us what rain is real? Whose evidence of air’s work is to be made legible?

Akin to interactions in the joy of academia where conference colleagues have asked “What are you?” in the context of monsoonal research – which discipline is it that organises your sense of air is perhaps what they ask. I have often in good humour found the answer Monsoon Studies to be quite suitable, one that Lindsay Bremner has also attested to – that the monsoon changes the way the study of things is organised and imagined. I ask you to think and feel the study with me akin to the idea of study, Moten and Harney (2013) speak of – as revolt, gathering, love, continuity – or as perhaps something that suspends and is in suspensions, drenched or otherwise as Tim Choy (2011) might suggest or endear into the way the monsoon brutally and playfully changes the politics of meteorology, like the sand storms in Jerry Zee’s (2015) work (that confront the engineers of his research context who try to tame dust storms). They are all from very different contexts but I bring them up to simply say that the monsoon is not a lonely weather but is one in exchange and conversations with many, despite my role in centring its story in this work. My task is to amplify the monsoon as a way of knowing that seems to be ontoepistemological (Barad 2007) for the academic register, and so be it but to pay attention to the way monsoonal description in and of itself offers knowledge in reanimating anything that is inside it. Such as the death of ancestors who have taken by the river’s current. Such as the smell of rice that has grown on monsoonal lands. Such as the landing of an airplane inside monsoonal turbulence. Such as the smell of concrete dust (in a monsoonal moment) that still smells like petrichor, because life (outside its othered/fetishized odour) is exploding in atmosphere. Such as the multispecies cry for rain, when photosynthetic relations get exhausted. It generates an opacity and repetition to writing (Glissant, 2020), and in this work I sequence and interact with different methods constantly – from the environmental humanities, be it - poetics, urban studies,

atmospheric science, science and technology studies, feminist and decolonial studies, ethnographic reflection and observation, speculative theory, political studies and so on. There are a range of methods implicated in this study: from the scientific archive, extensive reading of politics and history, photography, observation, embodiment, autoethnographic current, positional narrative, poetics, speculation, interviews and conversations, walking and sensing among others that contribute towards these stories in the ebbs and flows of a monsoon air methodology.

The monsoon and its conversations swirl the praxis of observation or even paying attention to the method of its way. That “it” again is not a linear line and is neither represented by the animation of weather reporting on television. As I will express in much of this work, the monsoon re-writes theories that are projected on to it by colouring its own results of entanglement – moisture, drought, song, science – whatever they may be. The season becomes more-than-a-season. Its rain sometimes is dry. Its force sometimes is still. Its dark but it does not rain. Sometimes, it breaks worlds. The stories in this thesis of including the instances of the aerosols produced in agricultural fire (as in the first chapter), the re-thinking of monsoonal forest categories through the emergence of an invasive vegetal species (as in the second chapter) and the death of time (or seasonality or *kala*, as in the third chapter) are all contexts that wouldn’t be usually entertained as part of monsoon stories. The regimenting of what kinds of stories are those of the monsoon, when much of my own world (and those of that I know growing up) is fed because of monsoonal life is an interesting reflection for departure – that the demand of discipline is asking for life to be appropriated for extraction, and a particular theory of the world to survive.

Instead, through aerosols, the vegetal species *Prosopis juliflora* and conversations about time – I invest in Delhi (and my own and its distribution) and show how the monsoon is implicated in a range of life altering movements, forms and capacities. Eventually, through the processes of the Anthropocene, as these stories suggest the monsoon itself is obscured from normative assumptions made about it. Disciplines get re-arranged and the monsoon is a way of knowledge in and of its entangled “its.”

I pull a long sip of water, filtered but pumped from the ground, collected by harvesting pits – and I rub the back of my neck of the moisture of monsoon-ness. There are moths of the wet season waiting for the sun to go down to meet the lights of anthropogenic night.²

There are three stories that follow this chapter. I begin with the Delhi winter which is part of global pollution folklore for its smog. I link this temporality with agriculture, monsoonal science and its futures. This was an obvious story to start with for me as writing a thesis about the air of the monsoon and Delhi seemed impossible without addressing how the smog intersects and interconnects times, landscapes, practices and ecologies with monsoon air and method. The second story on the emergence of a plant called *Prosopis juliflora* taps into the environmental history of a species in noting the complicated relationship it has had in a variety of social, political and ecological contexts but most importantly that of monsoonal categorisation – that the plant is in conversation with monsoon air, just as any vegetal ecology of monsoonal lands are. The plant was also an atmospheric calling to be spoken in this work, as it's found in so many parts of Delhi – thick, thicket, expansive – enveloping the capitals many city forests. It also storied in with nuance in the way it interacted with governance imaginaries of dust storms and air pollution. The third story is a travelling query that emerged from a repetitive ask – a question that so many people seemed to ask in interactions and beyond – of monsoonal death, its future, its time, its weather, its air. I refused to categorise it as climate or ecological anxiety as it was specific to the space-time-life-entanglement of the monsoon as a practice of staying alive, and the turbulence of that feeling about the future is a shared question that I explore to some degree.

A note on locations and movement

Much of this work was researched and written in London as part of my studentship of the Monsoon Assemblages project at the University of Westminster. While I drew from libraries, archives, technoscience portals, internet resources, an important component for this work has also been the “field.” In many ways, the field is the air of the monsoon. Its material logics can be found in a variety of places. However the fieldwork for this project began with Delhi in line with the commission. The location of the New Delhi National Capital Region as a conceptual and material site for this work is unique in a monsoonal context. Historically, inland cities have ignored, privileging coastal and oceanic sites by the Indian ocean, the Arabian sea, the Bay of Bengal and so on. Picking up Delhi as a starting point allowed my project to expose how the

² I use this technique of poetic pause in an attempt to deepen the relation of circumstance and condition to the point being made in the broader neighbourhood text, that it has literal implication in a variety of forms despite its academic texture.

ocean is upon “us,” across monsoon-ness as a literal field that wraps up everything that breathes and more. Positioned geographically in north central India, south of the Himalayas, the region offered this experiment a generous positionality to think of the monsoon in new and creative ways. Fieldwork was distributed from 2017 till 2019, spanning extensive walks, observations, conversations, sensing(s) and registering.

In 2018, I also spent time in the Ladakh region following curiosities that emerged from aerosol stories (and their entanglements) from the Delhi region, expanding this study to a broader definition of the field. Retreating during brief moments when I was back in southern India, I spent time at my grandmothers place – a village by the Western Ghats near Puttur towards the west coast of Karnataka, re-visiting space and the idea of creative and troubled inheritances – and how they informed my way of knowing the monsoon. It is also worthwhile to add Bengaluru and Kochi as extended field sites as I had so many conversations, experiences, interviews, and realised observations here during my time in these spaces that they sprinkled renewed understanding and interventions when necessary.³ Finally, London as a temporary residential field site that has hosted me on my Tier 4 visa kept me intensely busy with its generous offerings, friendships, archives, racism, relativism, comparison, collegiality, cuisines, natureculture, history and placement. Note that what I situated as the field was not a zone of “discovery” but re-learning, reconceptualization and research writing as I had spent time and owed time to all of these places previously in my short period of life – from Delhi, Ladakh, Bengaluru, Kochi and London.

I now move on to this section on Stickiness in a Monsoon Air Methodology that opens up a key methodological sensibility offered by the monsoon, its air, its knowledge. Stickiness here as a trope is somewhat banal in the sense that it is often found in the way so many people theorise (unconsciously or attentively) the monsoon (and its field) as humid harbouring the potential for a thunderstorm. Now, while this fetishism might seem valid to the worldview of some, I would clarify that it is not that what I deploy here. Instead, I use stickiness as the conceptual and material force of relation (or of relation itself) which is the monsoon, and the way it interconnects, blends, permeates and so on into the way sense is made inside its air. My notes are an offering against colonial method and is a letter to the science of the monsoon in how it leaks, oozes and fumes into the opacity of monsoonal knowledges – how they confront the lack of an empirical conclusion, how they gaslight forecasts, and how they re-animate wonder in science of

³ My entry for the Monsoonal Multiplicities online exhibition by the Monsoon Assemblages project speaks to some of this. Find my entry under Air (catalogued under Matters) at <http://exhibition.monass.org/>.

what the wind is doing in the first place. It is important for me to mention that parts of this section are implicated in chapter 1 (on the agricultural industrialisation of the sky) and chapter 3 (on the death of time). While I develop stickiness in the second chapter on the monsoon forest as well, I place these observations here as they fell into a methodological opening, a story that enabled me to present stickiness in a monsoon air methodology as a sense making exercise in the process of this scholarship. I want to place monsoonal matter as the basis of methodological generosity instead of applying new materialist theories into the monsoonal apparatus. Monsoonal people and life have theorised in and with the monsoon since the wind aired life. So, I think with interlocutors, colleagues, scholars and friends when I can and bring them in conversation but I try to insist that the monsoon is the primary site of the story – and it is because of that air that theories can be produced and some understanding can take place.

Stickiness in a Monsoon Air Methodology⁴

The monsoon is so much more-than-rain and is much-more-than-a-season. The South Asian monsoon as an air permeates through every aspect of life and death, livingness and form, in the Indian subcontinent and beyond. Its forms and patterns shape methodologies, and our ways constantly confront its form. As a recurring form of predominantly aqueous matter, monsoon-like experiences can be thought of as planetary. Wind reversals, convections, precipitative processes are felt around the world, but the subcontinent is the only place where inter-tropical convergence happens over land (Gadgil, 2018; Francis and Gadgil, 2013; Gadgil, Joseph and Joshi 1984; Sikka and Gadgil 1980) conspiring a powerful lively conversation of the air bringing energy, matter, ocean, landscapes, life-forms and activities together inside this magnificent holding of aerial aqueous matter.⁵ So, when we theorise the monsoon as just-rain or as a volumetric outcome as resource, we are participating in a crucial essentialising trope inherited from colonial research and fetishism that cultivated extensive methodologies on inferring difference between the lively matter of the air and volumetric water for plantation economies.

⁴ This section titled *Stickiness in a Monsoon Air Methodology* has been accepted (at the time of submission) in a slightly altered version as a chapter in a collection edited by Nils Bubandt, Astrid Oberborbeck Andersen and Rachel Antoinette Cypher. The collection is titled *Rubber Boots Methods for the Anthropocene: Curiosity, Collaboration, and Critical Description in the Study of Multispecies Worlds*. The collection has been accepted by the University of Minnesota Press for publication at the time of this submission. A special thanks to Anna Tsing who asked me tough questions post the namesake AURA (Aarhus University Research on the Anthropocene) workshop, that helped me rethink certain aspects of this analysis.

⁵ The scientists cited here are contemporary Indian meteorologists (and the late DR Sikka) in the wake of tropical meteorology and the science of the monsoon. They all play a critical role in the development of a monsoon science from south Asia that is relevant to the world.

These processes having written the basis of modern monsoonal description haunt our understandings of what the air is actually doing. I argue that monsoon descriptions are so much more-than-wet, and brood the dynamics of life-worlds it is intertwined with. One must always remember that the convergence of monsoon air has wide ranging temporalities even inside the expansive hopeful grey that blankets the sky of south Asia. Inside this perceived blanket are many-many-many worlds, co-constituting and co-theorising its flow.⁶

Through the stories in this section, I suggest a methodology of *àntu* which is a very rough verbal transliteration of stickiness (a sensing of something that qualifies as sticky) from a southern Karnataka dialect of Kannada.⁷ It's a sensibility of description that often begins with the body, contemplating the felt *àntu* of summer, where perspiration is felt across lively forms, anticipating the gathering of the monsoon which expands that sensibility of life to matters across scales, atmospheres and strata. In the passing of the monsoon, the sensibility calls for a holding, a stickiness of living through till the next monsoon, as post-monsoon breeze completes the theorising of one version of matter, cycle and time. It's an organising of working against forms of knowledge that tell us to invest in monsoonal alienation and is instead a call to dive deeper into curiosities of this stickiness that holds some of our worlds together. The monsoon drenches claims into the world beyond its seasonal temporality and as the monsoon breathes itself into the living, it gives agency to its claims which also trouble attempts to structure it, such as interests that attempt to forecast it or organise it for extractive planning. The use of this term of *àntu* (henceforth as stickiness) implies many possible things. Stickiness refers to a kind of clinginess, a dependency, a fondness of sorts, an undetachable form of trouble and something that is also sensed between different beings, processes and materials. It is an embodied connection with monsoonal atmosphere and is a relational descriptor that can be used to also deploy ambiguities

⁶ I would like to acknowledge an idea – a quote rather that I got to think quite deeply with thanks to its usage by Marisol de la Cadena and Maria puig de la Bellacasa in their lectures and scholarship. It is by and from the Ejercito Zapatista De Liberacion Nacional “Fourth Declaration of the Lacandon Jungle” – “Many worlds are walked in the world. Many worlds are made. Many worlds make us. There are words and worlds that are lies and injustices. There are words and worlds that truthful and true. In the world we want, everybody fits. The world we want is a world in which many worlds fit” For this version of the quote, See Cadena, de la and Blaser (eds.). (2018). *A World of Many Worlds*. Although used in a different context, one of the spirits of sticking to the monsoon as an idea is that there are many worlds in the world system of weather – that there are many worlds and ways that animate life literally within the atmosphere of the world – that climate change is more than a universal applied metric but can also be understood through the mattering of monsoonal life.

⁷ Pronounce the “t” in *àntu* the way you say “t” in “top.” This is a very rough transliteration, meant to express my own perception of it, as through the English language. It represents a dialect understanding.

and uncertainties opened up by the monsoon: its weather, climates, waters, relations and so on. I find that different forms of monsoon research and sensing rely on this methodological quality to figure with the monsoon.

Using and celebrating stickiness is also a way of operating against the invention and fetishization of so-called tropical nature and atmosphere. By recognising this methodological quality of the monsoon-air we are inside, I am interested in how different approaches get latched on to monsoonal sway.⁸ The word monsoon itself which may be an inheritance from the Arabic word *mausim*, implying season, seems to have cajoled its way as an oceanic wind to broader seasonal description.⁹ Histories of the state and science have also positioned the monsoon as a geopolitical and economic weather construct (Dash, 2020; Coen, 2018; Gadgil and Gadgil 2006, Cullen and Geros 2020, Bhat, 2021). In general, I do not have a problem with the idea of the monsoon, as it is after-all an ocean that moves to the sky through the change in the direction of the wind. However, from my audit of several South Asian languages, of which there are hundreds, I have not found a general “monsoon,” as a hegemonic weather formation anywhere. There are many-many words (and worlds) for rains, winds, airs and relations. One of the things that this section and broader work exposes is how different cosmologies, approaches, materials and processes are swayed by monsoonal stickiness. The monsoon too can meet its many *kalas* (times). Linking two stories from Delhi and southern Karnataka and navigating through conversations with atmospheric science, meteorology, fluid dynamics and monsoon history, I show how the monsoon stickily intertwines itself into these stories exposing collaborations, realisations and methodological breakdowns. I hope this offering, places to the reader a sensibility (to the opacity, air and breath through the rest of this work).

⁸ “We” opens up ethical trouble but in the interest of this section, “we,” is anyone who would want to read the monsoon as something that they are inside, and are some of the storytellers this piece is in conversation with.

⁹ In my understanding, there is an alternative theory of the monsoon (word) as an inheritance from Malay but the Arabic inheritance is more widely accepted.

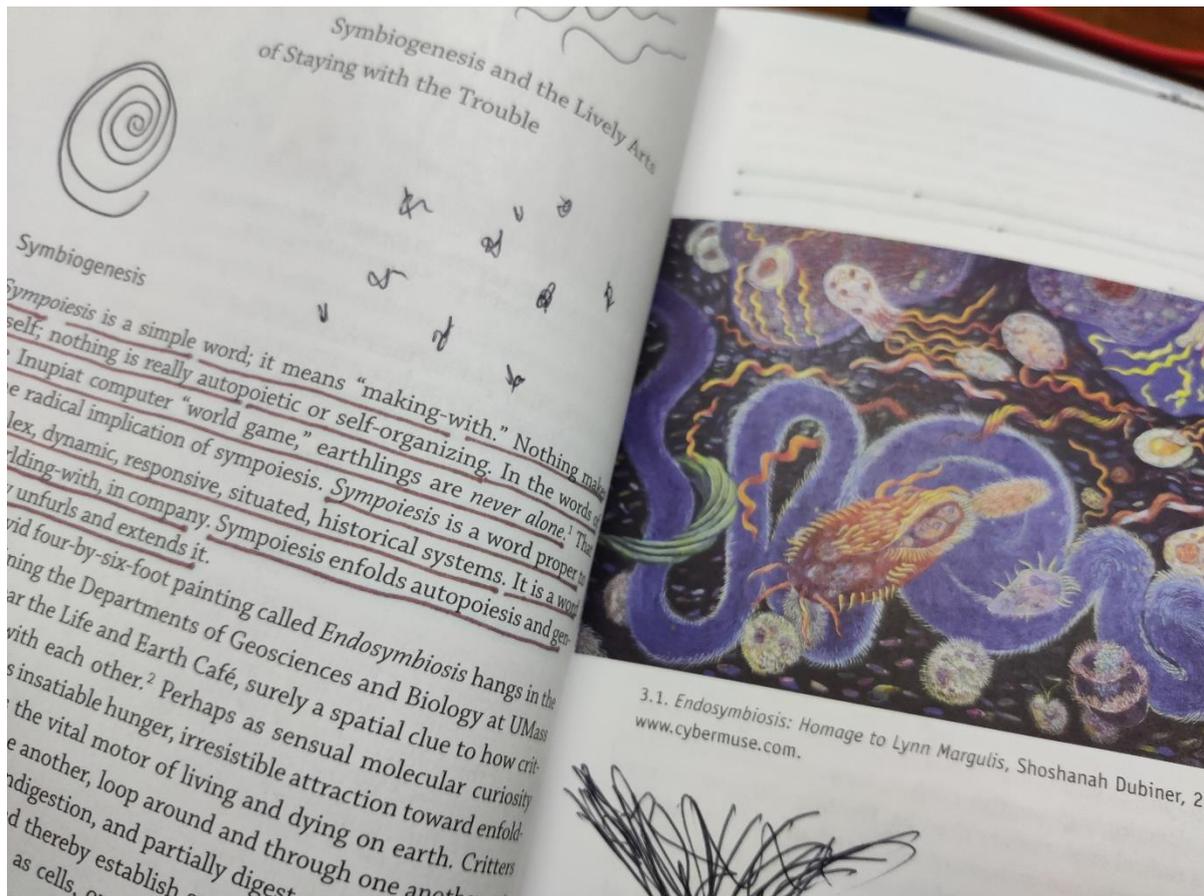


Figure 2: Thank you Donna Haraway. Partial photograph by author of doodles and of page 58 and 59 of *Staying with the Trouble: Making Kin in the Chthulucene* by Donna Haraway, published by Duke University Press in 2016. On the right is an image by Shoshanah Dublin

Inspired by Donna Haraway, I am particularly influenced by the idea of figuring – to think “figuratively.” This helps me connect specific moments in my research story with the broader conceptual, material, life-altering field called the monsoon. The work of figuring (Haraway, 2008) here is also linked to this realisation of stickiness which is gradually pulled out of monsoonal forms for conceptual, socio-economic, political interests but at the same time has already permeated through the many ways it does ambiguously, unclearly, often undiscernibly, as it holds things together as *antū*.¹⁰ Take for instance the idea of figuring that precedes the description of Jim’s Dog “a redwood stump covered with redwood needles, mosses, ferns, lichens” in Donna Haraway’s work (2008, 5) where she insists that “figures are not representations or didactic

¹⁰ Thinking through figurations, I’ve also found Haraway’s development of the term “attachment sites” at the 2018 Rubber Boots Methods in the Anthropocene workshop in Aarhus, to be very helpful. The monsoon already seems to distribute attachment sites vice versa, that the monsoon can be understood through attachments of different kinds. In monsoonal contexts, the monsoon can often also be perceived as the cause of the attachment site.

illustrations, but rather material-semiotic nodes or knots in which diverse bodies and meanings coshape one another. For me, figures have always been where the biological and literary or artistic come together with all of the force of lived reality. My body itself is just such a figure, literally.” (Ibid, 4) she says. I find the trope and sensibility of figuring to be an ally for monsoonal work. One has to always figure within monsoonal worlds, and I need friends in the scholarship spacetime to share that recognition of the sticky, textured, vibrant form of sensing and figuring. Haraway’s solidarity to this figuring within the atmospheric texture of life’s density is clear to me in the way she describes tentacular thinking, following the methods of the *Pimoi Cthulhu* in tangling and opening up string figures (Haraway 2016). “The tentacular ones make attachments and detachments; they ake cuts and knots; they make a difference; they weave paths and consequences but not determinisms; they are both open and knotted in some ways and not others” (ibid 31). SF as in science fiction, speculative fabulation and string figures are ways of figuring and it cannot be done alone but is always in relation, insists Haraway.

String figures says Haraway can be used as a “theoretical trope, a way to think-with a host of companions in sympoietic threading, felting, tangling, tracking and sorting. I work with and in SF as a material-semiotic composting, as theory in the mid, as muddle” (ibid). If the monsoon was a cosmological spider that seasonably woke up and shadowed, excreted and blew interconnections into life – perhaps this would be one toolkit to refer to in figuring the speculative ways of the monsoonal spider – which life under its shadow could not perhaps see. I thread such a speculative line of fiction for just a brief moment of the prior sentence to say this – that the relations between knowledges that feel monsoonal worlds can be understood by this intuition of complex description within wet worlds – that the gut of monsoonal life knows – it just does. “It” knows where breath comes from. “It” knows how waters mingle in the magical compost of the underground where the air falls as rain. That word, “sympoiesis” which Haraway (2016, 58) extends and explains as necessary in the act of staying alive, as “making with” – that “nothing makes itself; nothing is really autopoietic or self-organising” captures a key monsoonal premise – that monsoonal time and futures are made-with-this-air, made-within-this-air. Haraway’s work enables me to take seriously that language serves description and a politics of survivability and not the other way around. Most importantly, figuring is not dogmatic to the application of the disciplinary exercise but of taking the puddle seriously, into which research dives, appreciating the muddle as Haraway might suggest.

I also sense the commonplace of figuring in how I myself have heard of it growing up, when my grandmother for instance would say – transliterating a memory in this instance – that you just have to figure with what the monsoon (or the *time of the rain* as it is in her language) does to the earth. The way the monsoon mixes the times of the many with the times of this place is something outside our/her control, but to figure with this time, this place, this monsoon is something we have to do. I expand on this in later parts of this work but I evoke it here to simply suggest that figuring is not allied to the specificity of authorship but that conceptual worlds of survivability is and are always shared.

This section trails off into three parts. First an Anthropocene-ology of aerosols that links with the next chapter but used here to introduce key points. Second a section called Reading Collaborative Convection which expands an interpretive reading of the science, and extends the premise further – that the science of monsoon leaks and oozes into opacity and that the need for collaboration in the monsoonal breakdown of assemblages is crucial in these times of the Anthropocene. And finally, a section which draws on positionality and autoethnographic currents of inheritance that animate certain concerns in the writing of a monsoon air methodology.

An Anthropocene-ology of aerosols



Figure 3: Intense haze at Delhi airport. Photography by author.

Delhi, the Monsoon Assemblages case city where my enquiry on monsoon-urban relations began, had many stories about the air to offer. Having lived in Delhi for a few years prior to my PhD, I had a relationship with this air, and was familiar with its capacities that had become part of global pollution folklore. Every winter the conditions for a thick soft smoggy misty air came together over this vast urban landscape. The megacity emitted, and the air held. The region emitted, and the air gathered. During the two years I spent in the region, I developed an acute sensitivity to what can only be ambiguously described as a respiratory allergy, allergic to nothing in particular but to everything, as the air oscillated materials, making it indiscernible to expanding its temporality within bodies.¹¹ I have yet to meet a person who does not have some form of

¹¹ I don't use the word toxins or pollutants in this instance as I really don't know what exactly it was/is that was causing the allergic reaction. The Ear Nose Throat (ENT) and allergy specialists I've met through the years have acknowledged that this is increasingly a common problem and that people are developing reactions to airborne aerosols, dust particles and materials (such as construction dust) at an ever fast pace

respiratory symptom living in the region. It constitutes situated breath. Some days are much worse than others.

And sometimes your eyes burn.

Skin flakes.

Nose leaks.

Respiration becomes known.

Breath becomes a relentless project.

*Everybody and everything.*¹²

The opportunity to work back in the city was a welcome one, as through 2017 when I started my PhD, I had come to grips in managing breath to some degree. Furthermore, the Schedule H third generation hybrid antihistamine that required a prescription was something that my local pharmacist would just hand out, telling me each week how lucky he was to still have these packs as the city constantly runs out of supply. The work of breath and the atmospheric assault on living in Delhi has been well studied in recent years (Srigyan 2016; Negi 2020; Sharan 2020; Ghertner 2020; Narain 2017). Every winter, episodes of agricultural burning would spike pollution levels in the region. Typical post-harvest rice stubble residue would be burnt in neighbouring states including Punjab, Haryana and Uttar Pradesh among many others in the region. Much of over 13.5 million hectares of the Indo Gangetic plain (Mahajan and Gupta 2009), the region in and around Delhi, follow a wheat-rice bi-cropping system. The green revolution through the 90's which instrumentalised the use of chemical fertilisers, commercial seed and machines was forced and absorbed considerably well in the region. The Combine Harvester, which is a machine that integrates reaping, threshing and winnowing, leaves stubble behind, and this is burnt to accelerate the time from one agricultural cycle to the next (ibid). This burning not limited to but persistent during October through November and even December through the years of my study (due to delayed harvests) nurtured a broader blanket of smog and density throughout the sub Himalayan Indo Gangetic central Indian region. As one farmer I spoke to in 2018 told me "*karna padta hai*," that they had to do it, indicating precarious socio-economic and circumstantial predicaments that required so, despite alternative machines and

that they're unable to track the specific material registers to develop or suggest control policies. Instead, there are general respiratory health suggestions and a growing techno-fix culture to air in places like Delhi that speak of addressing this problem – from antihistamines to air purifiers.

¹² I use poetics in continuity and without distinction as monsoon stories have often been gaslighted into categories of culture and/or science. Poetics helps me think through things.

processes that have been available in recent years.¹³ Interestingly, much of the stubble that is burnt is that of rice. The industrial varieties of rice grown here tend to be water intensive and monsoon waters are channelled, re-routed, drilled from the ground, engineered from river and glacial systems. The engineering of water manipulates monsoonal form. I expand on this issue in the next chapter.

Atmospheric science experiments since the 1990's have offered glimpses into how anthropogenic atmospheres in the subcontinent speculatively transform monsoon metabolism and becoming. The 1990's International Indian Ocean Experiment (INDOEX) for instance led by Veerabhadran Ramanathan was one such key moment, where they came to the conclusion that what they identified as 'atmospheric brown clouds,' essentially anthropogenic clouds consisting of several different carbons, sulphates, nitrates, ash and dust, that they distinguished separate from what they called natural clouds created a dimming effect that impacted precipitation and hence rain (Sharma, Nunez and Ramanathan, 2016). They linked the haze with reduced solar radiation absorbed by the ocean. Following this discourse, aerosols have extended spatial linkages bringing together the Himalayas, the oceans and the monsoon (Ganguly et al, 2012; Gautam et al, 2007; Ramanathan et al, 2007; Ramanathan et al, 2001; Ramanathan et al, 2007; Luthi et al, 2015). By digging through the volumetric archives of meteorology and the speculative expanse of atmospheric science experiments, the haze of these anthropogenic clouds participates in disrupting what the monsoon becomes, both as concept and as a lived reality.

Aerosols as matters in/of the air seemed to have atmospheric temporalities, and I was curious about how the monsoon swayed in multiple temporalities, collecting, remaking and being remade by them. Gauging the aerosol from New Delhi for instance was an attempt at seeing how aerosols manipulate monsoon stories. While listening to my conceptual monsoon-air hypothesis, K, an atmospheric scientist from IIT Delhi pulled out a graph sheet and drew representational images of clouds, cyclones, tornadoes and typhoons to tell me that scale exists.¹⁴ The scribble connected representational conditions but he insisted that the grid enables the discipline to produce forms of certainty, to the extent science allows. The sway of aerosols seemed to be also methodologically in tune to spatial and altitudinal attunements. K explained that the science

¹³ Transliteration from Hindi.

¹⁴ K has been anonymised.

requires the grid as a scaling methodology in order to assess phenomena.¹⁵ This was a basic fact for his method and methodology. More importantly, winds at different scales seemed to pick up some matter and not others, in these imaginaries. Yet, the air constantly materialised transformation. Facts change in it, just as fast as they are created and sustained. From what I understand, it is air's own methodology in sustaining its materialisation. The monsoon made it particularly visible. However, the questions I had received from friends, interlocutors, and people passing by in conversation was one of transformation and insane change: a monsoon that is unrecognisable, a monsoon that is dying, a monsoon that does not rain, a monsoon that sheds mountains, a monsoon that unexpectedly drenches, and so on. There was a crisis of monsoon perception. So, as I listened to K, the question I had was of methodological transformation: how is the monsoon transforming what we know of it? And what forms of transformation such as that of the agricultural aerosol find their entanglements creeping into the production of a different kind of monsoon future?

The grid clearly seemed to remain static as aerosols mixed. The grid as an important scientific device seemed to have a fascinating and troubled history that shares its lineage with the deployment of the colonial line. As architect Dilip Da Cunha (2019) argues, the invention of the river i.e., the deployment of the line on a map – the drawing of separation between water and land and air – attempting to capture the landbound side of the hydrological cycle is a colonial praxis with a deep history, attempting to colonise wetness (Da Cunha's term) in its lifework earthbound. The development of a colonial meteorology in India was closely choreographed with the "great trigonometrical survey" which was completed by a man whose last name was Everest - a member of the Royal Geographical Society, who deployed through the 1820's and 1830's a survey to triage the geography of India (Keay, 2010; Amrith, 2018). It was with this geological triage and an attempted although unsuccessful triage of the weather that the grid of colonial meteorology scales as a geography of the corporate framework.

¹⁵ While the idea of attunements has been developed over the years by scholars such as Donna Haraway and Nick Shapiro, I use it rather simply here, in the sense that aerosols probably have preferences to altitudes based on conditions.

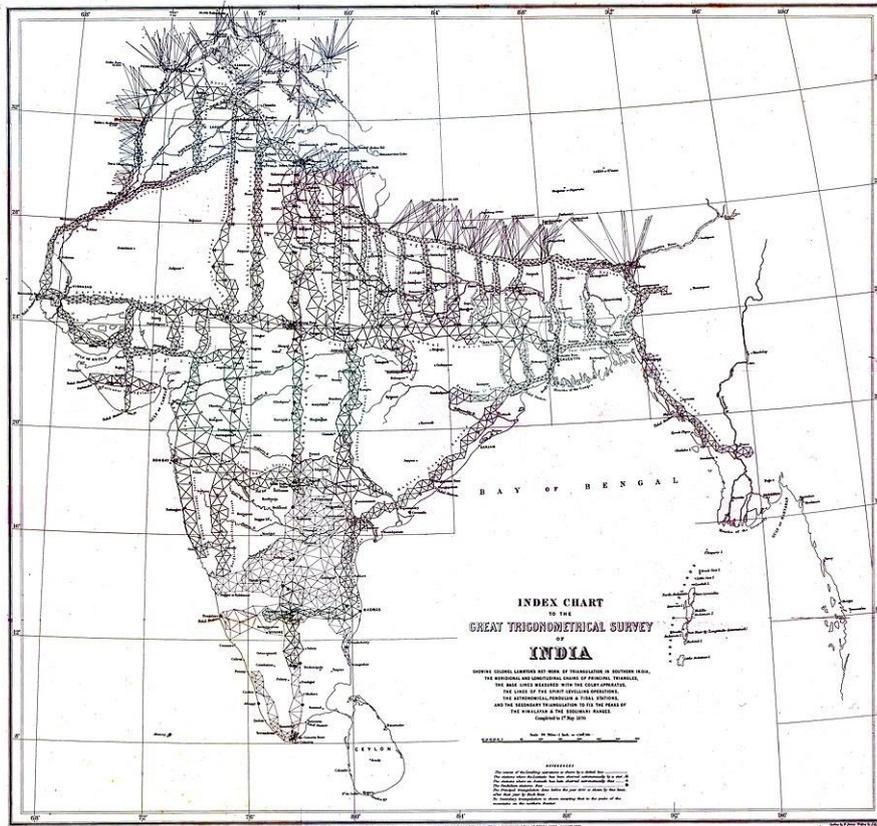


Figure 4: 1870 Index Chart of the Great Trigonometric Survey of India by the Survey of India, accessed from Wikipedia: Uploaded to Wikipedia Commons, accessible here: https://commons.wikimedia.org/wiki/File:1870_Index_Chart_to_GTS_India-1.jpg



Figure 5: July 10th 2018. Photographs of historical IMD leadership in the ground floor of Mausam Bhavan, India Meteorological Department HQ. A sign “Man at work” placed next to the lift undergoing maintenance. Photograph taken by author



Figure 6: July 10th 2018, rooftop of Mausam Bhavan, HQ of the India Meteorological Department in Lodhi Road, Delhi. Photograph by author

Getting back to the subject of the aerosol, and following it through the winter, and into the summer where pre-monsoon dust storms breeze into Delhi, I noticed how all of these material timelines shifted and made themselves noticeable through a variety of agencies such as that of pollination, oviparity, cultivation, urban forestry and so on. I was reminded of Choy and Zee (2015) who insist that the air is always occupied, and suspended in multiplicities (Choy, 2011; Zee, 2017). By the end of June in 2018, the monsoon had already onset over the region a few weeks prior to what the Met Department had predicted. The city was also witnessing a mixture of timelines where the seasonality of dust infused with the seasonality of rain. It was the 10th of

July 2018 and as I followed reports of these so called “pre-monsoon” dust storms through May and June, and subsequent failed forecasts, I had an opportunity to pop by the India Meteorological Department (IMD). The IMD which was set up in 1875 following the meteorological legacy of the British East India Company and the Raj currently is the apex meteorological agency in India which infamously also declares what it calls the annual onset of the monsoon. The IMD also inherited a knowledge practice of colonial weather connections that spanned the history of Company observatories set up in the subcontinent and other observatories set up by Empire in other parts of the world such as the Caribbean, East Africa, the South Pacific and South East Asia. In recent years, the agency under its role as part of the Ministry of Earth Sciences has also broadened its portfolio developing meteorological communications for agriculture, heat plans for cities and other experiments on urban adaptation in a changing climate.

Many of the popular reports about the dust storm in the media drew from NASA dispatches, highlighting the role of satellite spectral visibility in “seeing” materialities unfurl. Friends who were around for dust storms then and past, spoke of it as a dirty monsoon; something that rained water and mud; something that tore away the house plants in balconies; that torrented through the gaps under the door; something that disturbed visibility; almost like that perpetual winter smog, that hits breath. The dust merged with the monsoon in different ways. I was curious of how these aerosols and dust registered with the IMD. I spent some time with Dr V.K. Soni who works on aerosols, dust and air pollution among other things. He generously took me through some of their recent studies on aerosol radiative forcing, that took to the air from “ground,” drawing on a range of “sensors” and data collection methods that fed into mathematical translational analytics and modelling. At the terrace of Mausam Bhavan (the name of the IMD building which translates to “Weather House”), one was confronted by the compelling view of structured gardens and government buildings from their positionality in Lodhi Road. Among the several technical objects around, he points out to an instrument he’s been working with recently for his dust and air pollution study. I see it moving on its circular rotor, and he tells me, “This is the sky radiometer used for the measure of aerosol optical properties. It looks at the sun and measures the direct radiation, and takes measurements from the sky. So from the sky it measures the diffused radiation or sky irradiance and using both these measurements we calculate aerosol optical properties like aerosol optical depth, single-scattering albedo, asymmetric parameters, size distribution of aerosols, and refractive indices, and use these things to calculate aerosol radiative forcing.” He raises his finger and points out to the sun on

what was a fairly clear skied day despite the monsoon, and says “it’s right now pointing to the sun... and moves like that” indicating its path, and boundary of its data sampling path. It was a sample reference to the point he was trying to make about the range of instrumental and technological ecologies that are scattered on landscapes in order to derive a science of the air. These objects happened to be methodological interlocutors for data: for the more that can be modelled, the more they can test and validate. Multiple technical, mathematical and chemical translations and inferences figure in the values and properties of, in developing units, theories and notions of matter and force in atmosphere.

Aerosol radiative forcing is the effect aerosols (particularly anthropogenic aerosols) have on climates; aerosols absorb and distribute radiation and radiative forcing implies its process in different parts of the atmosphere. Aerosols constitute some of the biggest mysteries for scientists, because it is unclear to them as to what they do to the monsoon. While aerosols can be isolated to infer their chemical properties, the way they operate in the atmosphere opens up ambiguity and speculation for their models. Some aerosols have heating effects, others cool, but in ever evolving complex mixtures, attunements and monsoonal sway, they drift into their own stories. While there is agreement that they do impact the monsoon, there is little understanding of the precise ways in which they do, because aerosol mixtures suspend certainties. Furthermore, akin to clouds which simultaneously warm and cool climates, aerosols too are speculative and sticky in that they tend to draw us into ambiguities about how they change the world, despite their constant, relentless force in doing so. They complicate the relationship between fields and knowledges, calling for a variety of convergences, experiments and speculations.

Continuing our conversation, Soni takes me downstairs by an air-conditioned room with buzzing servers. On a desk sat two black rectangular boxes: a Magee Scientific Aethalometer and an Ecotech Nephelometer. Pointing at the Magee, he explains “Basically, air passes through this filter paper, and then relative accumulation of aerosol on this filter paper is measured using this relative attenuation of radiation and then absorption is calculated and from that absorption, black carbon aerosol concentration is estimated. Because it is measuring the absorption in seven different wavelengths, we can also measure the biomass concentration of aerosol using some model, and that way we can estimate how much is coming from fossil fuel burning and how much is coming from biomass burning.” Moving to the Ecotech, which measures a “scattering coefficient,” he explains, “We are interested in monitoring the extinction by aerosols – extinction is scattering plus absorption by aerosols. So, the scattering is basically the redistribution of

energy, when radiation falls on any particle, then it redistributes the energy – *that is the scattering.*” And then pointing to the Magee, he explains “and in case of absorption, the radiation is absorbed by the particle and re-emitted by another form” hinting at a difference between the two objects. Absorption takes place with aerosols like soot and other carbons, and scattering takes place with sulfates and dust aerosols that cool. The differences between aerosols matter, he insisted. They influence worldmaking within models and hence expanding technoscientific materials webs such as these data collecting objects assist in the ways models can speculate the way aerosols potentially meet winds. Modelling aerosols are intensely hard, as each speck is inherently unique. So, aerosol stories tend to attenuate the gathering of collaboration, as they have already changed the nature of relations by the time the gathering has taken place. And thus, my argument here is that aerosols are sticky matters. Perhaps they show us how the monsoon and winter were closer airs, much more intimate and wound up. Perhaps monsoonal agencies played into matter, indiscriminate of their timeline. Perhaps the specificity of aerosols dissolved in the anthropogenic soup of living atmosphere, remaking it. I strengthen these points in the next chapter.



Figure 7: July 10th 2018, The insides of an Aethalometer, IMD. Photograph by author

In 2016, a collective of global atmospheric scientists proposed for the first time the need to integrate the category of natural aerosols as an integral part of the monsoon “system” to eventually develop methods to get closer to how aerosols complicate air (Li et al, 2016). Unlike the speculations offered by thermodynamics and theoretical modelling of warming futures, aerosols complicate how, why, when, with-what, and in-relation with what atmospheric thermals behave – from the scale of the gene, the microbe, to the scale of cities, atmospheres and the planetary. Furthermore, in contrast to popular discourse which considers the monsoon as a sway of rain which brings down pollution, aerosols are found to be in complex and intensely intimate relationships with the manipulation of flow, precipitation and variability and journeying (Ding et al, 2015; Avantika et al, 2021). Matter in the air, changes what the air does. The aerosols gather the methodological apparatus through their very dissolution.

The empirics heat up.

Aerosols here with aerosols there.

Cough. Boom. Shadow.

The cloud bursts, and drops their toolkits to the floor.

The intensities of those 2018 pre-monsoon dust storms were aligned with the heatwave, and the increased warming in the north western expanse and Tibetan plateau that also drew the monsoon into being. As K.J. Ramesh at the IMD in 2018 told me “We will have to be ready to re-organize our time schedules for the day, from school timings to office hours and congestion on the road and so on.” If the upper Himalayas pulled the ocean into the sky, these stories of heat prior and disturbed patterns through and after spoke of multiple different monsoonal airs in the making. Delays, erraticism, strangeness, intensity and silences have been some of the few registers of description attempting to speak to the changing qualities of the monsoon. As atmospheric science description asks us to think in planetary terms, the monsoon spoke back of the many multiples that it occupied in the same place.

Reading collaborative convection

Andrew Turner, a leading monsoon scientist from the University of Reading has been an important advisor and interlocutor to the Monsoon Assemblages project.¹⁶ In 2016, Dr Turner, Dr GS Bhat (from the Indian Institute of Science, Bangalore) with a series of collaborators set out on a project called INCOMPASS which among other things was a campaign to develop better linkages between atmospheric fluxes just above ground, and on higher altitudes taking diverse measurements from an air-borne flight facility called FAAM.¹⁷ The reason why this project spoke to my work was because Turner suggests that the Indo Gangetic Plain and its subregion (which surround the National Capital Region) as some of the most irrigated spaces on the planet, potentially have an impact on the regional becoming of the monsoon. It was an important moment for atmospheric science as it connected the matters of ground with the matters of the wind as entangled forms in a methodological practice that has for the longest time relied on volumetric speculations and statistical repetition, implying a narrative of a phenomenological clock. Turner's thesis spoke to me of the possibility of stickiness between methodological worlds, that the monsoon troughed up north because of a careful choreography with the attached quality of monsoonal landscapes. They observe that, the monsoon "Despite its importance, currently there is no accepted physical explanation for the advance of the monsoon onset across India" (Parker et al 2016, 2256). One of their key proposals was that pre-monsoon forms of oceanic organization encourage the moistening of mid and low-level airs which prepare soils for encouraging monsoonal possibilities. They suggest that monsoonal onsets are driven to certain extents by the moisture premised just before (and even after) their onsets, hinting at a synoptic relationship between temporalities; a stickiness if you will which sociologically displaces the thesis of an externalized weather. Consider the bonds and "figuring" of monsoon air with the convective capacities of landscapes: moist, dry, grassy, agricultural, urbanized, industrialized, of forests, microbes and multiple others. Stickiness permeates in enabling what we even conceptualize as the monsoon, which deepens stickiness, as moisture and rain.

¹⁶ See Turner (2017) in the conference proceedings of Monsoon [+other] Airs organised by the Monsoon Assemblages project. Talks are archived in the Monsoon Assemblages YouTube channel.

¹⁷ INCOMPASS stands for Interaction of Convective Organisation with Monsoon Precipitation, Atmosphere, Surface and Sea and was the name of Turner and Bhat's teams field campaign. FAAM stands for the Facility for Airborne Atmospheric Measurements and is a flight laboratory based in Cranfield University.

At an Indian Monsoon workshop at the University of Leeds in February 2018, Turner generously took me through one of their posters showing the path of one of their 2016 FAAM flights from Lucknow to the edge of Rajasthan (on a higher altitude) and back to Lucknow hovering on a lower altitude of around 191 meters above ground. It was a unique exercise for them which allowed for observations of lower airs and the ground. In recently published work, they disclose that soil moisture impacts deep convection.¹⁸ As they write “The impact of irrigation on temperature and wind patterns implies that historical changes in irrigation are likely to have influenced mesoscale processes within the Indian summer monsoon and, perhaps more importantly, future changes are likely to do the same.” (Barton 2020, 2901) The intuition that also seemed to be guiding them, via what I understood from Turner is that waters transformed on ground, below ground, and brought out of the ground develop conversations with waters above ground. Despite the monsoon being the air which brings waters to the earth, the manipulation of systems in bringing waters out into the air transforms the monsoon by converging multiple times of water. Water had time, and anthropogenic forces manipulating/encouraging their convergence in air influenced what the monsoon became. Among other conclusions, they note “Patterns of shallow cloud correspond well to regions of low soil moisture, indicating an important role of land surface state in the development of shallow convection. Deep convection developed either in association with topography or on the dry side of soil moisture gradients.” (ibid, 2902) This meant that dryness played a role in monsoon convection and that ecologies of aridity were just as important as the imaginary and entrenchment of wetness. Stickiness then in this instance can be viewed as an expanding zone of visibility where variables attach formations of air, not perceived to be attached before. *Antu*.

It can also be thought of a formation that holds things together, like the way Dr. Rama Govindarajan (at ICTS, Bangalore) who speaks from the field of fluid mechanics who thinks of the monsoon as an “underlying current,” an air that is a liquid.¹⁹ Referring to the scientific mystery of monsoonal variability within this current, she argues that “we have the fundamental belief that all this is being driven by an underlying dynamics and the randomness we see is due to other factors sitting on top of this underlying dynamics. So, if you’re going to try and capture the underlying dynamics, we have to look at the rainfall as a probabilistic manifestation of this

¹⁸ Thanks to Lindsay Bremner who alerted me about this workshop, and with whom I attended the programme.

¹⁹ Notes from conversation with Dr Rama Govindarajan at ICTS (International Centre for Theoretical Sciences) in Bangalore on the 9th of January 2018 about their work on the monsoon.

underlying dynamics.”²⁰ She represents this through what she defines as a “sticky family” displaying an image of the subcontinent with a patchwork of colors, some of rain and others in absence. She was the first person from the natural sciences who reminded me that the monsoon is a multidisciplinary and transdisciplinary investigation. Speaking of the monsoon, she said, “Its possibly one of the biggest problems there is to solve,” and that everybody was needed and had something to offer.

The monsoon cannot be contained. And it escapes. It dismantles discipline. Constantly. It becomes the world of its own stories, and how one imagines the air therefore matters to how they encounter its stickiness, despite already being entangled in it. I learnt two other things from Govindarajan at ICTS that day. One, that the foundational equations for liquid dynamics (such as the Navier Stokes) that are used to model and forecast weathers, don’t operate well just yet with monsoonal dimensions and despite vast parallel supercomputing capacities pose huge mathematical challenges that might never be resolved. The other thing I learnt that day was that clouds form the largest uncertainties for climate scientists, and that it is not entirely understood if clouds amplify global warming or soften it. As S Ravichandran and Govindarajan (2017, 271) write “The reigning dogma is that low clouds reflect more and therefore cool the Earth’s surface, whereas high clouds act like blankets to keep the heat in. Monsoon clouds are thin and tall, and do both.” It is in-fact one of the reasons (among many others) as to why the “we” may not fully understand as to how climate change impacts the monsoon. As speculations in atmospheric science compete with one another to claim results of the possible death or deepening erratic intensity of the monsoon, what is clear is that the Anthropocene in/of the subcontinent and its many places play with the monsoon: its past, present and futures. We need better constructs and ways of figuring inside monsoonal worlds.

Furthermore, the monsoon for many has also been a way to construct a relational colonial weather map: a geography within a tropical idea. One can tell through monsoon history that the monsoon is also a conceptual invention of sorts (Cullen and Geros 2020; Davis 2000; Sivasundaram 2020; Amrith 2018; Sikka 2010). It collaborates with the production of states, society and culture and colonial processes theorize in order to extract from monsoonal life – human and more-than. As a state construct, colonial observatories expanded the scale of the

²⁰ Talk on “Raindrops, Buoyancy, the Indian Monsoon” at the International Centre for Theoretical Sciences in Bangalore (published on the ICTS YouTube page).

monsoon to the Himalayas and provided early teleconnection speculations such as the *El Niño* with observatories elsewhere. This was a leap from climatological boundaries drawn by kingdoms and principalities prior. The observatories that the British East India Company set up through the late 1700s and the imperial enterprise that went on to develop them on a larger scale drew upon the monsoon to enhance extraction and profitability. Following history writing for instance, one can see the politics of developing monsoonal data as a process of accumulation, amalgamation and appropriation of monsoonal knowledge systems to the view of the colonial apparatus and its simplification. Geology, climatology and meteorology evolve under monsoonal surveillance because they try to figure it as it constantly undermines them with alternative stories of reality as they fail to forecast monsoons to extract life from it. The obsession for forecast precision might have developed scientific technologies and practices but they also relied on planetary colonization to figure the clinical between world-making teleconnections such as the *El Niño* and Southern Oscillations which were theories developed from a small web of stations in the south pacific, northern Australia and the *El Niño* by Peru and Ecuador. As contemporary wisdom in atmospheric science often indicates, while it seems easier to understand the macro (the planetary), it is extremely hard to understand the granular, where issues such as monsoonal “variability” are enacted. Meteorologists often say that not all drought years are *El Niño* years, but all *El Niño* years are drought years. Although one can also argue that droughts are co-produced, cultivated and deepened by enterprise and extraction that also rely on meteorological description to validate precarity (Davis 2000). I invite the possibility of the monsoon enabling us to ask different questions of connections, that are not dictated by the methodology of correlation and extractive mapping but of survival and joy in changing airs. Probing monsoon studies and searching beyond it, I realized that monsoonal descriptions can always be found when there is attention being paid to the monsoon as something-more; as something that constitutes the living; in viscerally real and sticky ways. There are deep investments in monsoonal description that have historically emerged from modelling planetary nature-man relations to objectify, fetishize, and extract (Sivasundaram 2020; Chakrabarti 2020; Davis 2000) a theory of air, out of life-webs.

One of those life-webs for instance in this work has been the city forests of the Delhi region where I attune to the stories of a particular plant called *Prosopis juliflora*. It was in the research and writing of that story that I realized the importance of what scholars Natasha Myers and Shiv Visvanathan have in the past called detuning, or more specifically the way Myers terms it as – colonial detuning. There’s a sense of familiarity to its sound from the context of south India where to “un” tune or tune-out-of were calls often made by friends and relatives in a variety of

communicative contexts: like the situation where you are crossing a large but shallow monsoon stream with a current, calling to detune one's fear and trust elders to cross the stream with them; or to tune against a broadcast for violence. Or more so, to detune as Natasha Myers suggests one's own perception of plant ecologies; or to intertwine one's tuning of monsoonal worlds through cosmological diversity and material multiplicities; like un-tuning against that American geographers at a workshop, who insisted that the monsoon is a "just a shit load of rain."; like detuning the weight of sweat of pre-monsoon heat as an indicator for a monsoon to come; like tuning against binaries of disasters and flourishing but asking how all of them cohabit the same air; and most importantly detuning investments against *àntu*, and exploring ways through which this attachment keeps many of the things "we" know alive. Let us tune instead for ancestors that repeat themselves as something much more than "just a shit load of rain."²¹ Like the "shimmer" that Bird Rose (2017, 0G54) speaks of in the Arts of Living on a Damaged Planet. The darkest skies through the year entrench us with shimmer, even when they're silent, even when they're broken, even when they wash over and stay. A monsoon air methodology is an investment in keeping that story.

An investment in holding on to air.

A methodological oscillation of investments.

Currents that are cultivated.

Stories that are told.

A broken circulation

I pivot to a story here to end on a slightly personal note. It situates a parallel yet connected enquiry that has permeated through the process of my research project since 2017. I perceive this note to be somewhat of an opening to *stickiness* and *why* monsoonal methodologies; or how the construct of the methodology is in-fact constantly being re-written by the monsoon itself. I argue that this *àntu* (stickiness) is a methodology that is accessible to people and living forms trying to live within a changing monsoon. Collaborations, slippages and experiments are already being made. Our monsoonal contexts have some useful stories.

²¹ The reference to the ancestor is simply an acknowledgement to how my grandmother referred to it as, implying an air of origins. Just that. It wasn't a reference to deities or gods here, although nature-cultures in the subcontinent will surely have multiple ways of perceiving ancestors and monsoons.

So, this requires me to take to you a moment of positionality, a place of opening to these different conversational curiosities. A site that has been important for me in coming to terms with the meaning of the monsoon has been my grandmother's place in southern Karnataka, a village at the feet of the western *ghats* (rainforest hills) towards the coastal town of Mangalore. At the outset it is a mosaic space with dense *tota* (cultivated agricultural forest), *gadde* (fields), *todu* (streams), *gudde* (hills) and some *kadu* (forest).²² From coconut trees, areca palm, mangoes, jackfruit, cashew, rice, pumpkins, gourds, pepper, coffee, tubers, roots, stems, leaves, flowers, flourishing grass, ferns, medicinal plants, wild berries and fruits, and even some violent rubber, to the hundreds of other forms of monsoonal collaborations that inhabit the geoforations of the *tota*: the changing monsoon impacts all of them in different ways. My grandmother was probably 85 when she passed away in 2017. It was an unspeakably incredible loss. Among the vastness of the loss was a very late realization in me that a lot of what I knew about the monsoon as natureculture was thanks to her. This led me to an exercise of writing a tiny little archive and validating some of the stories in it through some of my family members who were also very close to her. *Ajji* (grandmother) was the one who made me understand that the monsoon was not a singular season but in-fact a vast temporality of multiple different winds and rains.²³ While she never used the word "monsoon," as it doesn't exist in old Kannada as most other south Asian languages, the attributional term here is *male kala* (time of the rains) which conceptually holds both time-and-matter. There are multiple forms of *kala* and *rain* within *male kala* but *male kala* is the general term for what I can best translate as the monsoon. She insisted that it carried the influences of many different places (and worlds) and constantly remade her world, and carried matters further. She insisted that monsoons (or just *male kala* / time of the rains) were in conversations with other *male kalas* before and yet to come. For every monsoon that did not deliver the rain expected, and as each got worse, one could register a kind of intense breakdown of sadness she would exhibit about the change in the wind.

We would on occasional years when I was younger search for a particular flower that comes out just after monsoon rains. In our dialect of Kannada this flower is called the *Ammange badade kai* which is a translation of what they call in Tulu as *Appege nothina kai* which means the hand that

²² These are very rough transliterations from my dialect of Kannada. They're the way I imagine and use them and are not meant to be "scientific" linguistic representations of the language.

²³ Her name was Honnamma but she claimed to never like it, and hence I don't use it.

beats the mother.²⁴ It is a flower in deep yellow and red, a green brown stem with leaves close to the ones of a ginger plant, but slightly slender. It resembles a broken hand of sorts from its stalk, and is really an intricate find when you spot one in the land. I never went searching for these myself as they usually tended to pop up in corners of dense wet vegetation by a stream or a corner which promised the richness of crawling life. The common story about the flower was that it blossomed as a broken hand because of having beaten its mother, presuming a previous life as a human or more-than. *Ajji's* version was slightly different. She suggested to me that the flower emerged with its broken hand, because the world needed ways to circulate the violence being released onto it. It was a gesture, of peace, of some kind of reconciliation that can possibly take place. It was also something that literally emerged from the ground, was not cultivated and was hard to find in their land. The earth had its own way of circulating these flowers back into visibility to hold the pain, which would eventually scatter or transform. They were very post-monsoon flowers in the sense that there was a very brief time when they would blossom, and they were never found in clusters, so you had to really look for them or simply encounter one which was usually what happened. In recent years, they've disappeared, and one of the last stories I heard from her of the flower was a story of disappearance: that the capacity to hold the violence, the capacity to break the hand and be re-born was being broken.

My mother Vijayasaraswathy recently told me that the last time she spotted the flower was a few years ago by a native jackfruit tree I had recently written about (Bhat, 2019). I hear that the jackfruit tree too has not been producing its bloom, the flower that breaks from its stem bark during the *phala gaali* (flowering winds in Tulu) that usually come right after the monsoon, just into September and deeper in October had not arrived this year (2020). The bark remains unbroken. The wind is missing. Here is a lesson about stickiness: its materiality cross cuts time, and cross-pollinates. It holds violence and possibilities, and as *ajji* often used to suggest, one doesn't know what the wind carries but all we can do is gather for it and do everything to let it carry from us better things. This is meant both literally and conceptually. At my grandmothers' home, *ajja*, my grandfather, lately has been paying less attention to the rain stars and

²⁴ I believe it's a local type of wild *Gloriosa*. However, I don't use the formal nomenclature here, to let the story be. I also want to recognize that *Gloriosa* is said to have medical use and there are variants of it that are commercially grown. While it seems to be largely endangered in the region, it is still the state plant of Tamil Nadu where it is called *Karthigaipoo*. The flower has apparently also been the state flower of Rhodesia, although I'm not sure if there are deeper colonial and caste interconnections and implications to this story in time.

constellations of the *panchanga* (the local cosmological calendar) and instead follows the weather forecasts on TV and science-reporting that he reads from newspapers. In a conversation with Sharada *ajji* in 2019, who is a family member who consults on matters of the monsoon via the local *panchanga* calendar, she acknowledged that her reading of the pattern of the *panchanga* has been changing with the weather: that she too had to consider the purpose of the consult in order to make judgements of whether her reading of the *panchanga* would deliver the right advice for the particular plant/crop being considered. She finds herself negotiating the fixities of the calendar system with the changing materialities of place and weather. When I last met her in 2019, she carefully took me through some of her historical records of wet seasons: moments she got wrong, and moments she got correct. She said, I'm still doing better than they are, referring to state predictions. In a conversation that transpired a few hours, she says "didn't they after-all learn that from us?" suggesting that the cosmologies of power that held weather knowledges were perhaps collected to develop a colonial science.²⁵ While I have not yet been able to completely explore the implications of that claim, I sense that Sharada *ajji* is also asking me if cosmologies don't play and draw from each other. I think that they do. Monsoon histories often speak of the role of upper caste assistants and data collectors in the assembling of colonial science (Sivasundaram, 2020; Amrith, 2018). Sivasundaram's (2020) essay on modelling empire for instance, asks us to consider the fact that disciplinary practices and collaboration cross-pollinated intensively through the late 1700's and beyond, citing the Madras Observatory. My sense is that the monsoon confronted discipline then and it continues to do so now. The opportunity here is to refuse objectification, racialisation, applied caste and anthropocentrism as a working methodology of monsoon study – that the material condition of life does not exist for the sake of mass murder and extraction.²⁶ It breaks with mountains and it breaks with cities. It dries up expectations and surprises speculation. Yet, life forms including people make sense of monsoonal worlds with it, not against it. I wonder if and how the winds that futures become, translate these cosmologies and matters to circulate blooms, in some way if not the other. I

²⁵ Quote is a rough transliteration from what was said in a local dialect of Kannada.

²⁶ It is an extremely common argument made by so many members of the academy that colonisation took place because of monsoonal winds – that wind current allowed for sailors to sail around the world, trade, conquer and so on. You can find this argument across scholarship to do with history, economics, cosmology and international politics. This is an absurd argument, one that I refuse to engage with because centring it is to naturalise colonialism. I have received this question from members of the audience at least for every one in two workshops or public conversations I have participated in through the tenure of my PhD. This argument pretends as if world communities did not interact prior to European movement. It pretends as if the wind exists to serve colonial adventure, risk and theft. All I have to say is this – just because I feel good because of the breeze this morning, does not mean I will commit an act of violence. The breeze is not connected to the psychosis of whiteness. If anything, the breeze is asking us all to live.

wonder of the possibility of better conversations inside and with, despite the brokenness of changing monsoon winds. That spirit of figuring despite troubled worlds is something that sustains much of this work – that disciplines and methods thanks to occasionally kind interlocutors and friends enables one to alter language in knowledge in some form. This work is influenced by scholars such as Donna Haraway, Karen Barad, Natasha Myers, Shiv Visvanathan, Edouard Glissant among others, and I draw them into the conversation and process of development when the story allows me to do so.²⁷ The development of this methodological premise so far has been to demonstrate the prefix, that you will find sits within many of the stories that follow. Stickiness and permeation are neither static or stationary concepts – they are migratory alignments that expose interactions and intraactions of methodological deepening, in the language of the monsoon.

²⁷ But also, so many others: Maria Puig de la Bellacasa, Astrida Neimanis, Linda Tuhiwai Smith, Michael Taussig, Mike Davis, Helena Norberg Hodge, Christina Shapre, Catherine Odora Hoppers, Anna Tsing, Elizabeth Povinelli, Fred Moten, Stefano Harney, and others mentioned, and some perhaps not, in intellectually unpaid/meandering debt.



Figure 8: a view of the *tota* from the house. A call when I was following up on post-monsoon flowering in January 2021. Photograph by Niranjana Bhat, used with permission.



Figure 9: a small stream in the *tota*. Photograph by Niranjana Bhat, used with permission.



Figure 10: Another picture of the *tota*, this time centering pepper vines climbing areca palms. Consider then the pepper that animates your food from the coast of Kerala and southern Karnataka, where monsoon winds nourished vines clinging on to trees, distributed into flavor around the world.

Of the agricultural industrialisation of the skies

“Growth, jobs, opportunities; these are just flimsy excuses

For one who sold the waterbodies, the lake is mere *poromboke*

You and I, then; what are we to him?

We are *poromboke* too

I certainly am *poromboke*!

How about you? Are you *poromboke* too?

I certainly am *poromboke*!”

- Translated excerpt from Chennai Poromboke Paadal sung by TM Krishna²⁸

I begin with the end of the story, at-least to the brief tenure of project writing. I begin with the political-atmospheric circumstance that emerged through the final stages of my thesis writing through the pandemic in 2020. This is a chapter about Delhi, the fire of post-harvest residue and aerosols but it is also a story that begins with the end, as a gesture to circularity, a hint of a circulation – the argument being made already having been enacted through these several monsoons and seasons of fire. This chapter continues aspects introduced in earlier sections on exploring aerosols and convection. It begins however with the evocation of the end – a strike which signifies the relentless material demand of cultivators for justice against the deployment of extractive power. It then moves on to the story of the machines of the green revolution, tracing the role of the harvester and the method of fire. I do so by paying attention to the concept of *prakriti* (the word for nature in certain parts of south Asia) which implicates caste theory and a circumstantial expanse of entanglements. Sensing and thinking with the aerosols of the Delhi winter smog which in this work help us think of the monsoon in post-seasonal and cross-circulatory ways, I speculate with the monsoon in the ways it dismantles concepts, offers hope, cuts through divisions and airs into forms. Aerosols in many ways complicated the monsoon to such a degree, in my thinking, that they assisted me to theorise the end of particular seasons. One of the reasons why I evoke the farmers protest right here below in A Gathering in Winter is

²⁸ Listen to Chennai Poromboke Paadal here: <https://www.youtube.com/watch?v=82jFyeV5AHM>. This song that was published in 2017 as part of a campaign to raise awareness about Ennore creek near Chennai has captured the imagination of many including mine. Krishna uses Carnatic music to deploy protest rather quite unusually thanks to the history of its medium, but as one can see in the video is a process through which key questions are asked in an atmosphere that is being taken away from the communities that live in its vicinity.

to begin at an end – the dreaming of possible ends to structural violence, drawing from Karen Barad, the thinker who has influenced this chapter to a great degree.

As in her 2019 paper, opening an invitation to what she calls *radical hospitality* – that “if only for the time-being” (Barad, 2019, p544) drawing from the novelist Ruth Ozeki who wrote the 2013 book *A Tale for the Time Being* “in the aftermath of the downfall of hegemonic ways of thinking founded on the binarism of us/them, when instead of drawing lines in the sand..” (ibid) as I sense in this work too, where aerosols disorient seasonal lines, so far too late in the story of anthropogenic excess that the air had to force us to stare at the collapse of seasonal affectivities – continuing on, Barad having heeded to the story of the Marshallese (in the wake of nuclear colonialisms) “the practice will have been/is one of looking to the wind, like the Marshallese indigenous practice of wave-piloting, riding the diffraction patterns of difference/differencing/différencing guiding us along alternative” (ibid). If I was to for one brief moment think with radical hospitality, in the context of this story – perhaps the circulation of the monsoon is that space of radical hospitality – where violence are inherited, transformed and circulated into something so wildly different that we are unable to recognise it, because it is despite “our” way of injustice, even as it rains and oxygenates dead rivers and some green to emerge out of what just seemed to be dust – that the work of airing life has always been a monsoonal way, giving us just some more time to air a better conversation ourselves. Each section in this chapter, marked in the interest of structural convenience, airs and escalates the narrative further in showing how agriculture, fire, Delhi, technoscience and aerosols are entangled with the monsoon.

A gathering in winter

In the December of 2020 as I was writing up parts of my thesis in North London, the largest protest in Indian history was being organised in the highways towards Delhi. Farmers largely from the states of Punjab, Haryana and Uttar Pradesh had organised to protest against the recent farm bills the government had unanimously passed. They had called on a range of national, regional and agricultural unions and associations to join the protests garnering large scale support in the process. The Delhi police which are managed by the union government cordoned off Delhi’s borders for days, triggering a large-scale settlement of protesting farmers to set camp on the highways. Weathering the winter, and the pandemic, the farmers had come prepared. It’s the 26th of December 2020 as I type these words and the headlines this morning also features several hundred farmers from Maharashtra who are also walking towards Delhi making a 1000 km

journey. The farmers who are mostly small landholders fear that the new laws privilege corporate acquisition of farm produce cutting out the middle men and the state organised marketplace which follows the guaranteed minimum support price of crop. They also observe that the laws hold potential to strengthen the power the corporate sector has on rural India, enabling deeper privatisation of food production in coming years. The new “black” laws as they call them, also enshrine a policy measure which restricts farmers from approaching the courts upon contractual disputes relating to agricultural produce and instead deems local sub magistrate offices as ultimate arbitrators of disputes. I must confess that this moment in itself is at a bit of an impasse. We don’t know what will happen. However, I found that it was important for me to begin this chapter evoking this protest as it eerily brings together the range of issues being discussed here. It presents to me in many ways the deep ambiguities and relentless fight for justice in a climate that is both politically and ecologically changing in violent ways. It highlights the dependency on modernity for agriculture in much of the subcontinent. It also brings together the crisis of atmospheres; in the gathering of the thousands in the dusty highways of Delhi, blanketed under its dense winter haze, and confronted by the state which chooses to use tear gas and water cannons to keep them out of the city. While there are several atmospheres in operation in this story, the monsoon is the silent assemblage, or rather the unspoken material-time at the heart of this transformation.

The bi-cropping system which is prevalent in these states relies on water intensive, chemical input intensive, and market intensive mechanisms which are interlocked as a matter of anthropogenic force despite pressures being put into each of these systems. As debt, co-produced drought and socio-economic changes deepen the stress on the farmers, environments of productivity begin to rupture. Therefore, what does it mean to consider a strike worth over 250 million farm workers, some assembling in Delhi, for a thesis exploring the nuances and complexities of a possible monsoon air methodology? The monsoon permeates through the creaks and cracks of this opening. It leaks into the language even though without its waters we can’t breathe. From the modification of seed, water, soil, earth, continual plantation form and the financialisation of cultivated life, this strike among other things comes to represent a crisis with these monsoonal relationships. What has industrialisation done to water? What has colonialism done to land? What has capitalism done to life? What has infrastructure written time with? The protest claims resentment and resists servitude to ongoing forms of coloniality. It asks for support from the state but also I sense, to be left alone to cultivate life. A lot seems to be at stake. The dignity of people. The work of people who cultivate life for life. The strike comes to

Delhi because the city represents the political power of the union government and the site gives visibility to protest. Like the pollution discourse in India that is rendered visible almost exclusively through cities thanks to their economic privilege, the cultivators of food walk to the city in order to be heard amidst democratic and ecological collapse. Monsoonal stories are always recurring, compounding and breaking through. As I review this section one final time on the 19th of May 2021, the protest continues. Thousands of the farmers remain, and they have over the past several months borne the state, the winter, the summer, the pandemic and now, a monsoon to come.

The chapter centres the work of aerosols and the monsoon via the large scale burning of post agriculture residue in the Indo Gangetic plains and beyond. It begins with the green revolution, stories through Delhi's pollution and ends with theoretical reflection. The farmers protest in Delhi that I now closely follow from a distance speak of these monsoon assemblages that have recurred, folded, breathed in and ploughed in presence multiple. What I seek to position at the outset is that there are always multiple conclusions, always multiple methodologies and most importantly very high stakes for peoples and life forms linked with monsoon air and monsoonal breakdown. The story here offers one way to ponder into these assemblages and rather than treating the monsoon bio-politically, I thread through breakdown in monsoonal sway – that the air of the monsoon is co-authoring and re-orienting perception and discipline as methodology itself.

Machines of the green revolution

Several million hectares of the northern Indo-Gangetic plains and their expanse follow a bi-cropping system. Comprising of the states around the National Capital Region but not exclusive to them, including Madhya Pradesh, Himachal Pradesh, Punjab, Haryana and West Bengal, this method of replenishing the soil for the suitability of repetition has often been considered highly industrially efficient. The system is based on the idea that rice is water intensive and wheat requires well balanced temperature and humidity. It's a relational theory of how two specific genotypes of grasses grow in comparative aerial wetness. It's also a relational theory about valuing and measuring wetness and moisture to grass genotype in order of extracting economic value from that relational theory.²⁹ It aligns the selection of the grass in order for it to be scaled as landscape calling for the reconceptualization of its air. So, when analysts observe the water

²⁹ Rice and wheat are grasses.

intensity of rice and the temperateness of wheat, they are pre-selecting species and scale as a relational form of enquiry. As Mahajan and Gupta (2009) note, this cropping system incorporates a transfer between aerobic to anaerobic soil: water puddled to non-puddled soil (ibid). It positions an industrial theory of nourishment and extraction from soil, attempting to optimise wetness from one part of the year to another at scale.

The Green Revolution through the 1960's and the following decades led to the mechanisation of agriculture in several Indian states. Particularly and initially so in Punjab, Haryana and Uttar Pradesh – in and around the Delhi region. Backed by the US government, the World Bank and other enterprises, it also marked the encouragement of the state-led selection of seeds which were considered to be high yielding. The period featured the broad use of chemical fertilisers, irrigation technologies and in particular the use of a device called the Combined Harvester. The Harvester is typically a machine that integrates three functions as mentioned before: reaping, threshing and winnowing. From the first tractor introduced in 1941 and the first pump-sets in 1930, through the 1990's - 2000's, the Combined Harvester emerged as a key mechanical artefact that facilitated the idea of the modern agricultural process (Singh, 2015). It was a machine that amplified an imaginary of a productive nature. Furthermore, as energy costs went down and access to energy increased, the incentive to use energy intensive systems increased (Singh, 2015). Singh (2015) also argues that modernisation and state incentives for the use of mechanization in agricultural processes played a key role in the reduced use of human labour in the bi-cropping system. Whole water systems were re-engineered to be aligned with modern irrigation designs. This being among the inheritances of a post-colonial society that was using a modernised knowledge imaginary of hydrology, dams and water infrastructure cultivating what will be one of the most geoengineered water systems in the world (Acciavatti, 2015). States like Punjab and Haryana experienced the wholesale intervention of water systems through their diversion and canalisation. As political geographies that exist in the wake of the Indo Gangetic Plain at the foot of the Himalayas, they profited from the flowing blessings of the mountains through rivers such as the Indus, the Ganges, the Yamuna among a myriad other entangled and flowing water streams – permeating on and below ground. The Green Revolution was also a project about controlling and harnessing hydrological power. It generously inherited the colonial dream of transforming water holding earths, for optimal short-term extraction. As historians of nature, canals and geo-histories such as Pratik Chakrabarti (2020) and Adithya Ramesh (2019; 2020) have written, colonial theories constantly drew upon water to theorise past and futurity in South Asia. Through post-independence modernity, the region witnesses deeper and extensive geo-

engineering of water systems. Borewells, canals, river diversions, dams, barrages, embankments among other interventions populated the landscape. The Green Revolution as a transformative material project of earth systems impacted life-world experiences far beyond the imaginary of economised agriculture. Scholars such as Vandana Shiva (1991) have pointed out to the revolution's role in ongoing social violence and systematic debt. She has also spoken of its role in diseasing soils and cultivating water-logged desert ecologies.³⁰

Shiva's scholarship asks us to reconsider the categorisation of state agricultural metaphors such as the "breadbasket" of which Punjab and Haryana are often addressed. She argues that while states like Punjab statistically perform well in line with the numeric of irrigation and production, their technopolitical modes of development had unleashed transformative social violence and cost human life (Shiva, 1991).³¹ She identified that the conflicts in Punjab stemmed from tensions between the "demands of diversity, decentralisation and democracy on the one hand and demands of uniformity, centralization and militarization on the other" (1991, p15). Shiva argues that sociological relations are not separate from agri-neoliberal-developmental assemblages. Shiva identifies this as a shift in *Prakriti*, the "nature of nature" and it was a shift towards violence she says (Shiva, 2016, p39). *Prakriti* indicates the inseparability of nature and culture.³² Positioned as an integrative concept, *prakriti* is a note on the sustenance of life through ontological continuities that are shared with various more-than-humans, forms and processes (ibid). In her reading, it offers a particular kind of ecofeminist entry. However, as a term, its Vedic inheritance makes it politically murky as *prakriti* in Vedic forms calls on social hierarchies and theories of the body and its cosmos that are designed as theoretical technologies of caste and segregation. However, in recent decades ecologists and eco-feminists have revived the use of the term through its relational capacity, as Shiva herself implements a feminist relational

³¹ 80% of Punjab's agricultural land was irrigated at that time of Shiva's study. Shiva's analytics is one that asks us to reconsider what the generousities of industrial irrigation actually mean and how they entangle with troubled processes over time. She asks us to reconsider what this alternation of life process comes to be and mean.

³² I must clarify here that my use of the term *prakriti* is not loyal to its history in Vedic cosmology. Such a usage would determine a very different political use and direction of the term as its archive is immense. Its usage spans caste theory, the body and even Ayurveda. I instead follow Indian ecologists, eco-feminists and particularly everyday parlance in its integrative use of the term and draw upon its potential to collapse distinctions of insides and outsides, nature and culture, anthropogenic and natural. Its relational capacity holds value. Furthermore, *prakriti* in contemporary usage is also invested in the empirical mode of observation, experience and evidence as prerequisites to theory and production. Unlike notes on consciousness and phenomenology that are co-inherited from the Vedic register, *prakriti* is one of those renegade terms that acquires a different life of its own thanks to its use by people interested in more-than-human life and processes.

understanding of what forms natures of natures. However, I'm interested in how the everydayness of the use of *prakriti* in language perhaps comes to mean something quite different, where interiorities and exteriorities blur. It's a relational universe implied by people, the same people who have the everyday agency to break *prakriti's* meaning from its caste-logic. The work of operationalising against caste and its annihilation surely requires one to scrutinise assumptions made in *prakriti* and break, re-imagine and re-make an otherwise.

When people ordinarily tell me that "*prakriti* itself has changed," they aren't in my limited listening so far, saying that certain actors and processes are not responsible and neither are they saying that they are not complicit. In my reading, *prakriti* is always said and sung in multiplicity. Like farmers attempting to maintain an industrial landscape, are also attempting to maintain a certain kind of *prakriti*, even as other relational forces within *prakriti* are perhaps demanding other forms of engagement. As with the harvester and geoengineered hydrology, fantasies of industry have also amalgamated into *prakriti*. *Prakriti* evokes the predicament of temporality with the impasse of constraints brought forth. That *prakriti* is coproduced to be sold and marketed, for survival, for flourishing in contemporary capitalism and socio-economic worlds. There is no clarity in this understanding of *prakriti*, as all that one has known has been a transformed and transforming *prakriti*; where insides and outsides co-collapse in the production of effects. What is glorified as *prakriti* is often found to be what works for one version of flourishing or one version of ecological relations. It is inherently an atmospheric concept, which also makes it potent for caste theory as caste is often practiced, theorised and understood through atmospheres – that living breath is theorised violently. At the same time *prakriti's* elasticity to be something more-than "Nature," as a material space that is acknowledged to be influenced by people opens it up as an idea that can be moulded thanks to its atmospheric quality – that there is work to be done. This is also what makes industrialised agriculture *prakriti* – a form of atmospheric kinship to place in acknowledgement that the earth feeds those processes and people – that the work is from the ground-up, a theory of atmospheric undoing and/or making.

The industrialisation of agriculture and therefore life itself shifts continuity into deeper relations of disturbance. *Prakriti* is not just in disturbance but *prakriti* is being made to disturb and hold disturbance. Bhattacharya's (2019) work on agrarian conquest speaks to the entanglement of colonial processes in agriculture in northern India, particularly in Punjab. He traces the work of "conquest" in its reimagining and redesigning of agriculture. He writes of how colonial processes displace earlier life-worlds and use human labour in systematically sustaining that displacement

through multiple cycles of life. It creates the conditions and systems for multiple cycles of methodological replication and deepening. The relational forms of *prakriti* are made to change to be held as inherited certainties of *prakriti*. *Prakriti* can and is violent but what Shiva asks us to consider is the role of the colonial, developmentalist and industrial work in making it worse for ecology and more-than others – that the naturalisation of inequality between people and life forms cannot go on. In other words, there are other relational states of *prakriti* that can be nurtured and imagined. We require reattuning conceptions in the deep iteration of *prakriti*- its catalogue of nature-culture in conspiring better relations. Shiva would insist that *prakriti* performs an ontological role of living-ness but *prakriti*'s capacity to hold its own temporalities and distribute forms of collapse indicates to me that its atmospheres are playful and is violent disproportionately. I expand on *prakriti* despite its murkiness to make a simple point: that the machines of the green revolution are more than singular objects in agrotechnical transitions. It involves the terraforming of territory over time to the design of it being the machine of agricultural extraction. The Combined Harvester is one artefact albeit a technical departure for this story, provoking one possibility for stubble burning. The assembly of a *prakriti* through the terraforming of water systems and life systems offers the burn for seasonal acceleration its framework and context, which is also why a solution to the mass burning does not exist in the replacement of the Combined Harvester but in something much more foundational itself – the cause of industry in contemporary colonialism and capitalism – that has been naturalised as nature and/or *prakriti*. The terraforming of life for agricultural extraction as and through machines of the green revolution encompasses outcomes and conditioning capacities of monsoonal presents and monsoonal pasts. The story of the applied burning of wheat and rice stubble, takes that further.



Figure 11: Image of a combined harvester. Sourced from Wikipedia Commons, posted by user Sixtybolts on 16 April 2008, 08:36, accessible here: https://commons.wikimedia.org/wiki/File:Punjab_930_combine_in_India.jpg.

As the grass burns

I want to extend the thesis of *prakriti* from its imaginary in soil and earth-bound narratives to its transfer, movement, distribution and expansiveness – explore its atmosphere-ness, as agro-form is burnt. The burning of crop residue is one such moment where the scale of applied fire helps me think about the distribution of a transformed *prakriti*. There is this particular moment in the use of the Combined Harvester in which it leaves behind a stubble/stalk. This humble stalk of grass is cleared away for the next cycle of agricultural harvest. The fastest and cheapest way to get rid of it is through applied fire, as claimed by thousands of farmers in northern India and the Indo Gangetic plain.³³ As scholars have pointed out, the burning of crop residue in Punjab is linked to the use of the Combined Harvester which is a machine that typically combines the three functions of reaping (to cut), threshing (separating) and winnowing (blowing to remove the chaff) into one (Kumar, Kumar and Joshi, 2015).³⁴ Zooming in on Punjab for instance, Kumar,

³³ I first learnt of the term “applied fire,” in an academic context from Timothy Neale’s presentation at the Knowledge/Cultures/Ecologies 2018 conference in Santiago, Chile.

³⁴ I draw a considerable amount of literature from Punjab because of the relatively larger amount of detail available compared to other states. The use of the practice of-course is across the region.

Kumar and Joshi (2015) estimate that the burning of rice paddy straw results in the nutrient losses of “3.85 million tonnes of organic carbon, 59000 t of nitrogen, 20000 t of phosphorus and 34000 t of potassium” in that single state alone (2015, p13). Kumar, Kumar and Joshi have also pointed out that the pressures of the rice-wheat system in the state was one of the reasons for the excess exploitation of water. Water after-all is an antidote to applied dryness. Irrigation systems supply the possibility of that speculative optimisation. So, to talk about applied fire brings together a confluence of stories: from mechanisation, chemicals, grass, soil, air, water, politics, life and so on. It teaches us that a change in the soil is also always a change in the air.³⁵

Drawing fire out of its historical elemental material theorisation, Neale, Zahara and Smith have collectively theorised that fire can be understood as a dialectician; a process if one may prefer, that subsumes and acts as an interlocutor between times, states, forms and so on. They say: “Rather, fire is a conjunctural, durational and transformative biochemical reaction. It is a point of exchange conditioned by its specific time and space, a deterministic process of inputs and outputs that can feed new life but cannot be reversed to revive what it has consumed. Fire is a process of contingency’s determination” (Neale, Zahara and Smith 2019, p126). Fire biochemically lifts water and all sorts of matter and dissolves their constitutions into aerial carbons and more. If one does consider the role of agricultural anxiety in nurturing acceleration, then fire is being used to accelerate a political economic trajectory of the field, literally. Scaling the dialectics (Neale, Zahara and Smith, 2019) of fire into central Indian plains, allows it to feature as a choreographer of anthropogenic aerosol density often described as: smog, fogs, pollution, soot. Substantiation takes over.³⁶

Using remote sensing data, a study by Punia et al (2008), which is also cited by Kumar, Kumar and Joshi (2015) estimates... about 4315 square kilometers of burnt area, as of 2005. In the year 2000, Gupta et al (2004) observe that of the 78 million tonnes of rice and 85 million tonnes of wheat straw generated in the country, about 17 to 18 million tonnes were burnt in the field and that for every tonne of burnt straw, released 3 kilograms of particulate matter, 60 kilograms of CO, 1460 kilograms of CO₂, 199 kilograms of ash and 2 kilograms of SO₂. Venketraman and others note that on an all-India basis, 30-40% of the crop waste in the Gangetic plain is burnt and most of these fires reach their peak in May and October, which is the harvest season for

³⁵ I also want to acknowledge a chat I had with Maria Puig de la Bellacasa at the annual Royal Geographical Society conference in 2019 where Maria insisted this fact – that the soil is always in the air, she said.

³⁶ Substantiation is a word I have learnt to take seriously, thanks to the work of Timothy Choy.

kharif (such as paddy) which is sown during the monsoons and the rabi (spring crop including wheat) which is sown in winter (Venketaramanan et al, 2006 ; Kumar, Kumar and Joshi, 2015).



Figure 12: Image of stubble burning. Credited to a story titled “A farmer burns the stubble in a rice field in Zirakpur in Punjab,” photograph by REUTERS/Adnan Abidi, accessible here: <https://www.cnbc18.com/economy/delhi-braces-for-choking-smog-as-farmers-set-f>

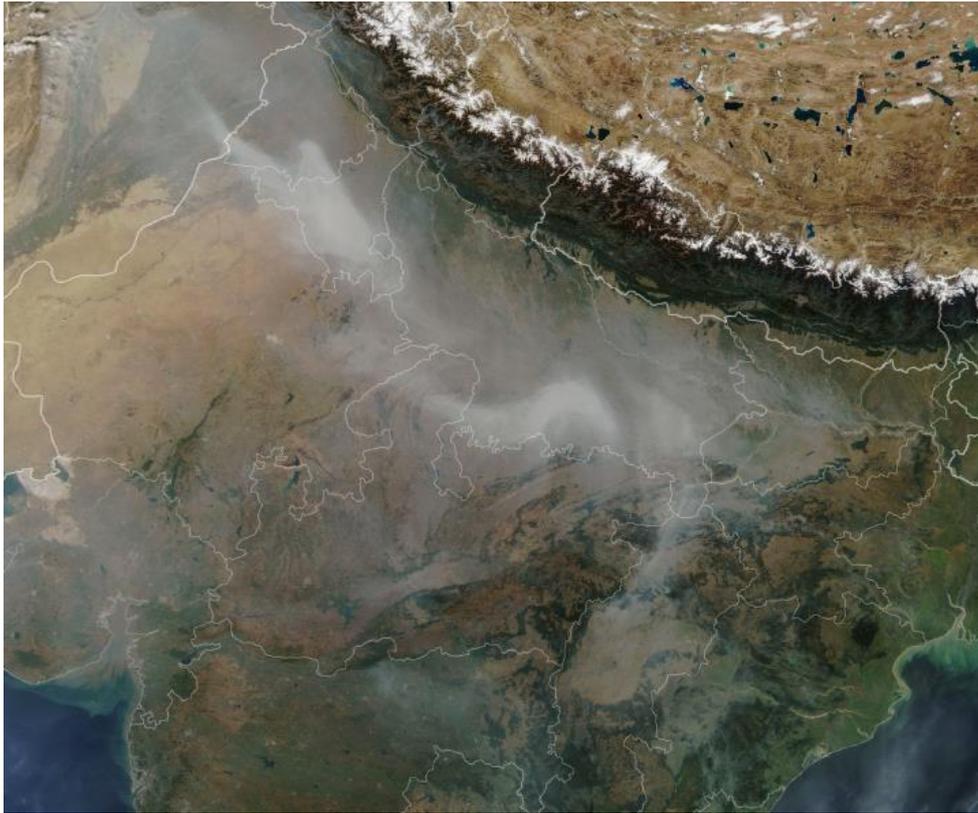


Figure 13: Image from NASA Earth Observatory dated November 9 2020, webpage story titled “A Busy Season for Crop Fires in Northwestern India”. Accessible here: <https://earthobservatory.nasa.gov/images/147547/a-busy-season-for-crop-fires-in-northwestern-india?src=>.

The work of the monsoon and the work of grass lives in the air, through this process of harvest and fire. As Choy (2011) reminds me through his work, substantiation involves the writing of materialisation, affect and effect in ongoing processes. Substantiation is constant, and it involves ‘becoming atmospheric’ drawing one’s attention to the inherited volumes of matter and investment into the air (Choy and Zee, 2015, p215-p217). Scholars have shown how this large-scale enactment of fire loses and emits a portion of the soil’s nutrients to the air (Kumar, Kumar and Joshi, 2015). The soil becomes the air, materially and transformed. For what is typically theorised within a logic of political-economy and agriculture, nutrition makes its way to the air (as ash), as nitrogen is converted to nitrate and human and other lives elsewhere breathe the result of this combustion. While crop burning is not only one of the many factors for New Delhi’s dense winter smog, it is however among the key reasons why the air’s density darkens and thickens. As Delhi’s expansive surrounds burn through this spatio-temporal adjustment of grass clearing, this thick smog of atmosphere permeates, ebbs and holds its form to the ground. In what can only be theorised as a meteorological predicament of time and space, the winter

stillness of the region lets the smog be. It lets it meander into the ground and knits its way into how viewing and sensing beings see the sky.

In recent years, this has become a very political issue for the city. Annual complaints and demands from the Chief Minister of Delhi to the neighbouring states have become rituals of repetition. The fires seemed to compound Delhi's already intensely relentless anthropogenic air. Somehow in these cosmological mix-ups between the post-monsoon flourishing of rice and the dense meteorological air of winter, the smog ties different times and processes together as a material form that centres attention through the chocking multiplicities. People for one, begin to complain. In recent months I've been thinking about Elaine Gan's provocation of the intensities of knowledges a grain of rice gives us (Gan, 2018). Through Gan, I am able to approach this grass as a cultivated form that is enmeshed in monsoonal rhythms and civilizational inheritance. To grow rice *Oryza sativa* in the Indo Gangetic plains attunes the labour of wet entrenchment with civilizational scale and applied burning. It's a living story that gives way to the stub left behind by the machines of industry to leak it as dark aerosols. While industrialised irrigation systems are used to inundate rice fields before, during and after harvest, it is the monsoon that enlivens the types of *oryza* that are grown in the region. The monsoon is the ultimate form of inundation and is also the source of water that supplies the rivers with flow. The myth of eternal glaciers and rich monsoonal repetition is being challenged through climate change and the darkening of Himalayan glaciers. The grass needs the monsoon, and so does industrial cultivation. Particularly the rice that is selected, bred, cultivated for industrialisation tends to be water intensive. Demands for acceleration call for a manipulated theory of seed. Demands of acceleration tie in fire to breath, meteorology, and glacial darkness. While unlike Gan, I don't write this story from the point of departure of rice, I'm interested in the monsoon's implication of/to life processes that are also participating in the transformation of its air. To be implicated by the monsoon is to be written into and with its story. This is also how one is constantly forced to update and relearn the force of what *prakriti* means and comes to mean. *Prakriti* is never static and people are always implicated in *prakriti*. Its common everyday use implicates an onto-epistemological simultaneity of things where its evocation by a speaker projects a sense of awareness, a sense of living theory where particularity and expansiveness are acknowledged, despite the uncertainty and opacity involved in atmospheric speculations. It's also interesting to me that uses of *prakriti* in the everyday don't regiment time through the routes of measurement and calendar. Time as framed by a modern understanding is somewhat lost in *prakriti's* wake as matter and the work of matter ignores it altogether. There is no clarity as to whether other forms

in *prakriti*'s form of relations share the “human” perception of time and if it matters at all to a theory of *prakriti*.

As someone who has grown up eating rice, I recognize its centrality in South-Asian human food systems. As someone whose relatives grow rice in villages in southern Karnataka, I recognize its implication as a monsoon story. At my grandparent's farm in southern Karnataka, the family used to intermittently stop the cultivation of rice forecasting ‘bad monsoons’ from ‘good ones’. In-fact through 2007 to 2010, I recollect that they decided not to grow rice for a while in order to mitigate the grief and disappointment of drier monsoons. Instead, they grew vegetables: local varieties of gourds, green beans, cucumbers and papaya trees bordering the paddy patch. The site of rice and its entanglement with the monsoon registers deep emotional and sensorial bonds. Rice is a form of knowledge and what enlivens most of it is a really wet monsoon. In recent years, my uncle has been trying to revive a traditional variety of rice that might grow with a much thinner volume of water in the field, compared to varieties in the past. The *kanjisale* as they call it is a local variety of red rice which is immensely flavourful. The work of local meteorological and seasonal cosmological calendars play a role in the decisions they make about what to grow and speculations they make about what type of monsoon it will be that year, as mentioned in earlier sections. They are ultimately at the mercy of the monsoon, in the sense that the air felt is not always what the air delivers. It's an encounter they have to prepare for, attempting to story a particular kind of monsoon between the soils and the wind. It's an enormous amount of intellectual, sensorial, cosmological and physical work. My grandmother, *Honnaamma* used to proudly tell me that they've never sold a bag of rice. While their economic privilege allows them to retain a sense of refusal from growing and selling to the market, that is not the case with the majority of farmers in the Indo Gangetic plain and State spaces around Delhi. While they can both be conceptualised as modern agricultural economies in some sense, different forms of acceleration are inherited and applied to facilitate cultivation and extraction.³⁷ In other words, different forms of debt ensue in landscape. Fire for instance is a way to reduce short term economic risk. Acceleration is sought to displace risk. Accelerative modes are also often the only ways viewed feasible to get households out of debt.

³⁷ While the term plantation here can be linked with the plantationocene, it is important to invoke *difference* in how these plantations are understood. In South India, large farms and gardens like the one I'm referring to are addressed as estates or plantations in English for lack of a better translation. In Kannada, the word *tota* captures a very particular visual ecological imaginary. *Totas* however are also often extractive economies. On the other hand, the use of the term plantation for the wheat-rice bi-cropping system is a posture of applied theory : i.e. the fields as plantations where extraction of value takes place.

While I have not walked past the literal burning landscapes of agricultural fire during fieldwork (i.e., I have not witnessed farmers in the act in and around Delhi during fieldwork), I used to live in some proximity to fields where applied burning was practiced. This was in 2013 during my research associateship at the Jindal School of International Affairs which was located in Sonapat, Haryana which is part of the National Capital Region. It was here that my colleague Dr Rajdeep Pakanati first described the practice as ‘something industrial’ to me. Living in a flat in the area, dust and soot would regularly make its way through the tiny gaps of doors and windows, even if the burning was taking place several miles away. The soot would almost creep in unnoticed, seemingly mysteriously, being swept in by the air. Before the monsoon, gusts of wind would slip layers of dust into the flat. Pre-monsoon winds and cajoled summer dust would layer in. In conversations with locals, folks would often invoke the idea of *prakriti* - to articulate how it has changed. As mentioned earlier, *prakriti*'s invocation as a concept in conversation takes for granted the integration of natureculture that western theory typically does not. So, when fire as natureculture is thought through these terms, one understands it not just through the register of harm and violence but also through the consciousness of practicing changed relations. Its toxicity is not limited to human bodies and neither is it privileging human suffering. It is an opening to the changed condition which is matter itself where various forms, conditionalities and dependencies re-orient. The characterisation of dusty pre-monsoon winds is often enveloped within those everyday letters of air – that the air has changed and is being changed.

As a linguistic gesture *prakriti* allows people to simplify stories and express political predicaments. It has conceptual space for imbalance, instability and temporal collapse and is not an autopoietic imaginary of recursive balance. The burn and the breath of smog that follows are analytics embodied by *prakriti*. It is simultaneously media, relations, pluriversal and yet situated. The extrapolation of *prakriti* helps me express the burning of grass stubble as a story that moves and mingles. Fire lends a transformation to a different kind of story where the modernist autopoietic expectation of annual agricultural cycles around the monsoon are somewhat in eerie and speculative ways broken.³⁸ Grass mediates the monsoon, fire, economy and politics and suddenly the autopoietic myths of finance and the recurring monsoon are disturbed. Most

³⁸ I want to heed to Gan's call that the 'cycle' as a theory and form is also a method of strategic exclusion. Gan (ibid, pp 94) writes: "The cycle describes an autopoietic rice plant. It excludes how, where, and with whom rice lives and flourishes as it cycles through the various stages. The cycle embodies processes of human selection that have increasingly favoured a predictable schedule and a determinate life cycle that can be tracked and managed on a calendar for supply chains that synchronise food commodities"

importantly, in this chapter, it lends itself to express a different story about the air: of aerosols and their speculative entanglements with the monsoon.

Delhi as political interlocutor

One way through which burnt rice (the stubble of rice grass) like burnt fossil fuels, construction dust, industrial effluents in a world of many other anthropogenic aerosols gets understood is through breath. It manipulates and impacts respiratory systems and thus the human quality of life or anything that breathes. Magdalena Gorska (2016) in her thesis *Breathing Matters* describes it as a process that opens up relationalities and scales. Breath brings things together and it is also the spatio-temporal site of life-work where pauses, ruptures, textures, and so on are felt with much ease. It is political to breathe because it is political to stay alive (Braun, 2014; Ghertner, 2015). Delhi in this instance is an interlocutor of political use. As the national capital of the Union of India, it gets a socio-politically visible hearing as a city that holds influence and power to some degree. The historian Awadhendra Sharan has written extensively on the history of pollution in Delhi through the historical subjectivity of water and air. Sharan's work (2014; 2020) is to me an archival placeholder in how air comes into being treated as a metric. Sharan traces jurisdictional, aesthetic, medical and governmental histories of how colonial systems and methodologies in Delhi framed air and water. He discusses the creation of 'Smoke Nuisances Commissions' and the invention of expertise to liaise with atmospheric pollution in colonial cities. Colonial science and its auxiliary practices of engineering and policy regulation play a key role and atmospheric modernity is framed through its processes. In Sharan's work, these legacies of atmospheric modernity can be understood as a history inherited, developed and further distributed by the Indian state. Delhi in particular is a city with a rich environmental jurisdictional history under this legacy. Yet, as I understand from Braun (2014) and Ghertner (2015), the metric of racialised lungs continues to be haunted by the register of colonial science which designs a technology of respiration based on the racialisation of breath – that black bodies and othered bodies inhale to speculative scales of subjected dehumanisation.³⁹

³⁹ Braun's work is something that Ghertner also engages in his work in dealing with the political-medical subject of Indian lung capacity. Braun's work on the history and development of the spirometer exposes how the capacity to breathe was measured and racialised to naturalise *difference* between white bodies and others. The perceived capacity of Indian breathers for instance in breathing dusty air or "dirty" air has been a subject of white fetishization in tropical medical history for a very long time, and these legacies unfortunately seem to continually impact scientific practices and developments even today.

I happened to be in Delhi the winter of 2016 when the Supreme Court of India declared New Delhi's air as a public health emergency (Chandra, 2017). One of the most memorable mornings I had was the morning after Diwali. Fireworks reigned through the city the previous night. Children and adults in my block were out into the early hours of dawn setting on fire every type of firework available, expressing and articulating joy and excitement. For an air that was already smoggy and hospitable to anthropogenic toxicity, the fireworks had escalated the severity of the crisis the next morning. The air was rancid: a chemical cocktail of undersecretable distinction which made it very hard to describe. Having boarded a taxi that morning I wondered how the taxi driver got me to the destination as there was very low visibility. We had rolled up our windows as the dense air teared our eyes up. It was painful. The Supreme Court anticipating the winter haze that year in November demanded the city government to improve air quality, proclaiming that it only had 48 hours to do so. The bench demanded restrictions on the mobility of trucks, compliance of pre-existing standards, emission control from thermal power plants, the reduction of fly ash, restrictions on garbage burning, regulation of biomass burning in Punjab and Haryana, the use of clean technologies, and policy implementation by the various state pollution control boards (ibid). Scholars Shah and Narayan (2016) comment that the bench's demands were "destined to fail" (p NA) largely due to the lack of investment in clean infrastructure, research, communication and implementation across agencies. Note that through the research and writing of my thesis from 2017 to 2020, this has been a recurring feature of every winter in Delhi. In Delhi today, the subject of air quality is deeply political and pervasive in a variety of normative ways. Air quality surveillance is at an all time high and so is the tracking of this annual increase of anthropogenic form being released into suspension. Large swaths of trucks coming into and leaving the city are regulated with time slots and corridor permissions. Construction companies are often advised to pause. The courts have succeeded in moving out industries into the periphery over decades. Environmental regulation has been attempting to improve energy production and distribution systems. Odd-even policies have been implemented for weekly vehicle use. Many other policies continue to shape discourse in the city.



Figure 14: Image of India Gate in New Delhi on a smoggy day. Source: Image from a PBS story as of October 31, 2016. Photo by Adnan Abidi/Reuters, accessible here: <http://www.pbs.org/newshour/rundown/delhi-air-pollution-smog/>.

So has heavy region-wide stubble burning continued despite its outlaw, discouragement and the availability of alternative solutions for stubble residue. The predicament of visceral dense winter smog continues in the New Delhi National Capital Region. This viscosity to me is not just material but is also a conceptual one where the lively matter of the air (within which much knowable life exists) is retained as a technoscientific, jurisdictional and governmental axiom. It centres the human, by registering it as measurable life – a figure of respiration which inhales and exhales the subjectivity of value. I must confess that I don't intend on placing viscosity here as an anthropological concept but rather as an imaginary, as a trope of temporal de-containment where a methodology operationalised by various technological forms loses the conceptual hold of the material it was meant to theorise. This projection of this anthropocentric sociology as an analytic of the air is fascinating and has been interrogated by researchers in critical air studies and chemo-ethnography.⁴⁰ As jurisdictional, governmental and technoscientific registers fail to comprehend the work, material and relational complexities of the air: they produce viscosity as an excess of their comprehension (or their inability to contain conceptual order of form). Because, to comprehend the air is to no less attempt to comprehend the literal material condition-form within which life premises. So, when I talk about the smog in the city, the

⁴⁰ I really like this Cultural Anthropology issue assembled by Shapiro and Kirskey on chemo-ethnography. See: Shapiro, Nicholas, and Eben Kirksey. 2017. "Chemo-Ethnography: An Introduction". *Cultural Anthropology* 32 (4):481-93. <https://doi.org/10.14506/ca32.4.01>.

burning of grass stubble and the analytics of toxicity: I am also talking about expansive anthropogenic form (the Anthropocene), and the monsoon in the broadest of its understanding. Letting go of vicerality and listening to the haze instead offers me a productive way to place Delhi as a meaningful interlocutor to the politics of air. This is also why I am less invested in theorising an end to the haze and writing a speculative politics of hope. I use the haze instead to initiate and continue monsoon stories that take the haze into directions and performances that are completely out of human control, although influenced by it. So, this politics of air that I allude to is a method of bringing together a variety of temporalities into the brief form of description such as a sentence. It pays tribute to the ontological characteristics of the air. It acknowledges monsoonal intertwinement. It allows me to propose that the monsoon ebbs out of the text, even when it's not supposed to.

I rely on that leakage or rather I take leakage as granted to allow for the aerosol to complicate monsoon stories. Let me get back to the case of stubble burning to elucidate. Now, despite the practice of stubble burning being deemed illegal, a variety of loopholes, socio-economic and circumstantial issues ensure the continuation of the practice (Nandi, 2017). Seasonal patterns have been changing and so has stubble burning. As of 2017, while October and November were typically known for being the months when rice stubble was excessively burnt, April and May are now also included as months where a spike in stubble burning is being noticed, in clearing secondary wheat crop residue. The National Green Tribunal prohibits crop residue burning and this rule also covers the states of Punjab, Haryana, Uttar Pradesh and Rajasthan (Bhatnagar, 2016). Despite reminders from the central government and political promises on a state level, this practice continues to spread (Jitendra et al, 2017). The practice is punishable under the Air (Prevention and Control of Pollution) Act 1981. However, reports indicate that the practice has been expanding to other states due to changes in the labour market, increasing access to irrigation infrastructure and cheap access to the combined harvester among a myriad of other socio-political issues (Jitendra et al, 2017).

In this viral human orchestration injecting aerosols to the air in brief and dense periods of time, these landscapes of agriculture partake a unique form of anthropogenic solidarity with the infrastructural condition of the urban site blurring distinctions between exhaust pipes and fields of exhaust. It destroys the deployment and sustenance of governmental difference – in space, time, site, urban, rural, peri(-), in making air a form of writing in which state form finds absence to air's own making and unmaking with matter. The stress to compete in the market, reduce the

time between crops, the ability to dispose off excess into the air combined with the precarious socio-economy of labour and migration (between cities and agricultural land) generates a texture of sharing where anthropogenic(s) of place is shared and exercised. Breathing becomes the normative site of that sharing where neoliberalism, agricultural biochemical logistics and post-colonial state enterprise terraform as toxic meaning as their dust pollinates and bounces of the surface of agricultural and urban industry. I am reminded of Gregg Mitman's (2007) work on *Breathing Space* where he describes how "an inhaler in every pocket" manifests with folks in North America. He researches and curates what he calls allergy landscapes in exploring breathing through pollen, hay, pollution, industrial smoke, the sinus and air-conditioning in its everyday (ibid). Inhalers in their broad and logistical multiplicities are increasingly becoming part of breathing imaginaries in and of Delhi too.

There has been a 43% increase in the sale of Asthma related medication in the past 4 years, as of a May 2017 report (Sharma, 2017). The report cites that a whole new generation of people with no history of asthma are being diagnosed for it in New Delhi (ibid). In some cases, doctors have asked patients to leave New Delhi, as the only solution against the air problem (Chatterjee, 2015). The demand for drug sales to do with antibiotics, eye drops, anti-allergens, inhalers and steroids according to reports increases in Delhi as pollution increases, so much so that pharmacies often run short (Raghavan, 2016). Further, I want to suggest that the notion of quality and cleanliness of air as prescribed by the Air Quality Index for example is destabilized by the complexities of highly mobile and articulate aerosols. Equations that privilege toxicities from sulphur dioxide and carbon monoxide miss the complexities posed by the-aerosols-many in sinking into the breathing condition. Shapiro (2015) for instance in his work on domestic formaldehyde shows how formaldehyde is consumed by bodies through the air. Through his chemo-ethnography, he exposes toxic atmospheres as part of their "complex give-and-take" (p372) relationship. He summarises that "such attunements to encounters between airs and bodies constitute the openings through which to grapple with the composition of our world and with the untold caustic ecologies that remain largely insensible to the human" (ibid, p388). This complexity of the air is seen for example in Punjab's air quality equation which is " $\frac{1}{3} \times \frac{(so_2)}{(ssO_2)} + \frac{(no_2)}{(sno_2)} + \frac{(spm)}{(sspm)}$ " which is the total of the ratios of three major pollutant concentration to their air quality benchmarks (Kumar, Kumar and Joshi). For Shapiro (2015), there is a sublimity in the productions and consumptions of the chemosphere, which is a result of the "toxicity of industrial human progress" (p381) that finds ways to distribute "vaporous displeasures" (p381) and thereby "being deeply moved by" (ibid) it. What we will also

see in subsequent sections is that this give-and-take relationship is acutely felt with the products of the air - its clouds, its water, its movement. As the-many-aerosols leak into the vocalisation of more stories, it leaks into the fabric of seasonal time where its materiality obscures the meaning and becoming of so called futures. The monsoon perceived to occupy amidst that fabric of seasonality is scattered by the politics of aerosols. Aerosols diffuse monsoonal becoming. I express this in upcoming sections.

Note that these episodes of heavy statewide crop residue burning while extremely significant to the aerosol mixtures discussed in the subsequent section, are by no means atmospherically isolated causalities of density. They enable me to speak of accentuation in air that allows for a particular kind of registration relevant to my monsoon air story. The exhausts from the motor vehicles in Delhi for instance can take us to ecologies of fossil fuel capitalism. The burning of waste can take us to discard study ecologies. The sway of dust can take us deeper into the study of winds, urbanisation and seasonal transformation. I stay with the stubble to centre monsoonal connectivity as agriculture and the meteorology of winter interlace the potential for story-work to expose the fraudulent logistics of seasonality and the colonial-capitalist impulse to medicalise, isolate and diagnose air in measurable terms. Air releases regulatory capture. Perhaps, the monsoon allows us to acknowledge the collapse from measurement, into life-space where liveliness is the premise for orientation, breath and even decay. Residue burning connects across time and space not just as an agricultural praxis but a circumstance where a monsoon air is co-produced as a complicit unknown - where the perceptual quality of knowing what something does seems to occupy conservative limits but a reality governed by several other lively actors that translate and transform interconnectivities.⁴¹ I want to say that aerosols akin to the monsoon does often sound like a hyperobject (Morton 2013). In the vast scales of perceivable work and movement, scales of the environment blend in enabling concepts of complexity. I am sympathetic to Morton's note that hyperobjects are entities that challenge our ideas of what things are. I also acknowledge that aerosols and the monsoon sound like hyperobjects, and that clearly the whole is less than the sum of its parts in these instances as Morton suggests. I am sympathetic to the note on scale where Morton (2013) identifies that "Because they so massively outscale us, hyperobjects have magnified this weirdness of things for our inspection: things are themselves, but we can't point to them directly" (p12). However, I refuse to scale the monsoon as an object or subject it to a framework of values theorized for a term in abstraction and

⁴¹ I spoke of "Complicit Unknowns" at the 2017 Monsoon [+ other] Airs conference organised by Monsoon Assemblages. Playlist of the conference is accessible via the project's YouTube page: <https://www.youtube.com/channel/UCamcCWHWwYL74xacO2f7nnQ>.

abstracting for something that is called a hyperobject. I refuse to subject monsoonal work to systems despite its inheritance and leaky cosmology. The monsoon is simply not a mere aesthetic device for cultural articulation. The monsoon is more, and I have expressed why earlier and will continue to do so. The monsoon is co-authoring methodology, and I have expressed why earlier. The refusal to centre colonial storytelling in the production of the conceptual monsoon is shared in the refusal of object-oriented western abstraction. The violence of anthropogenic becoming is not novel to monsoonal worlds. The monsoon if read through the choreography of colonial history offers us an Anthropocene that is already enacted in the gesture of regionalised weather production and politicisation. To speak of the monsoon is already speaking of an Anthropocene in process, in repetition, in layering, in sedimenting futures. Aerosols draw anthropogenic becoming to closer immediacies where socio-political-economic-technological landscapes and bio-chemical-industrial performances are roped into a closer movement of transformations.

What can be easily addressed as Anthropocene air offers also an immediacy to its causal production in fossil fuel, plantational, colonial and modernist stories (Moore 2015; Visvanathan 1988). People and science, as figuring knowledges open up this crisis of producing a memory of modernist auto-subscription that Visvanathan identifies as something that is disembodied and disembodyed. Modern scientific knowledge objectifies and splits the observer and the observed argues Visvanathan (1988), operationalising science to constantly other. He (Visvanathan 2011) identifies for instance processes of “monoculturalism,” “reductionism,” “appropriating through patenting, dismissal and virtualisation” that expand the force of othering in the making of colonial and (post) colonial science which draws more lines and nurtures knowledge based linearity, gaslighting biodiversity, myth, plural vocabulary, imaginations, music and the many networks in and of worlds. Shiv’s thesis and opposition to this developmentalist mode of movement and world making asks one to open up epistemologies to wander, listen and enable the collapse of knowledges pre-determined in cartography. I must insist that this cannot be understood or essentialized as an anti-science position but rather an invitation to bring knowledges together in how they understand the monsoon and how they are swayed by it, rather than using uncritical empiricism to serve state and enterprise.

The agricultural industrialisation of the skies is complicit to this modernity. Consider for instance the annual recurrence of satellite imagery in the cultivation of agri-logistical post-harvest fire. Consider these images below. As these air-objects are simultaneously choreographed, what do these several kilotonnes of particulate worlds suspended in the air do? As the Himalayas cajoles

smoke in nurturing a pathway and temporality, is it not then that we see the line? Before it dissolves for one version of *spectroradio* visuality to another. Here, the subsequent section might show that there is a need to think of the methods of a particle and its construction of its own socialisation. This is a socialisation with perception but it also a socialisation with the multiple becomings of air. What some scientists might show us is that when particles socialise in particular arrangements, they radicalise the atmosphere and the air. What scientists like Ramanathan and Crutzen will tell us is that they still don't completely understand the absolute allegiances of particles (Ramanathan et al, 2011). The impact of aerosols on the air and the climate, including the monsoons is an ongoing scientific project across several research communities, that have gone far beyond initial understandings of how it produced a "dimming effect." The challenge of discerning a politics of the aerosols is not unlike the challenge in studying them - that aerosols occupy complexity both at the nano level and the planetary – that the variables figured through the outcomes of studying particles under a microscope or within a lab change or radically tend to improvise their own stories upon broader worlding. So, in the glimpse below; we record two things. Firstly, that there are some technologies to see them and secondly, that there are then some technologies to hopefully think about them too. The spectroradiometer and its science offers one an architectural glimpse of aerosol-presence through agricultural industrialization, but also one that is processed through global conferences and discourses of photography and the mathematics of radio visuality.

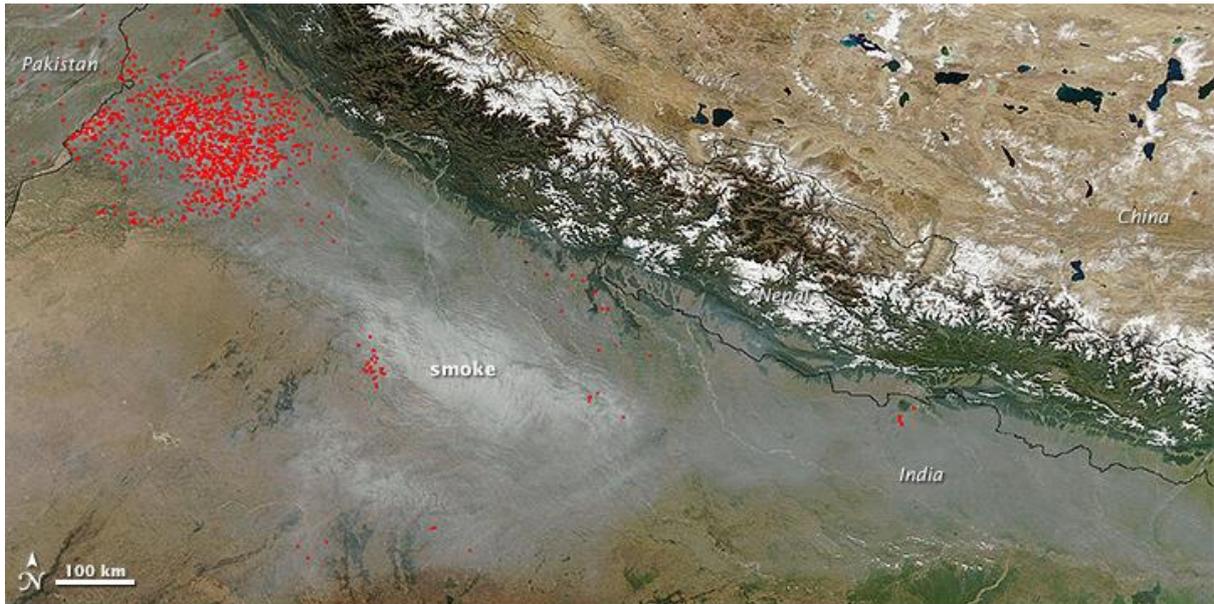


Figure 15: Image from NASA's MODIS, with depicted red dots to indicate active fires inferred on that particular day as of November 4, 2010 by NASA, Source: <https://earthobservatory.nasa.gov/IOTD/view.php?id=84731>

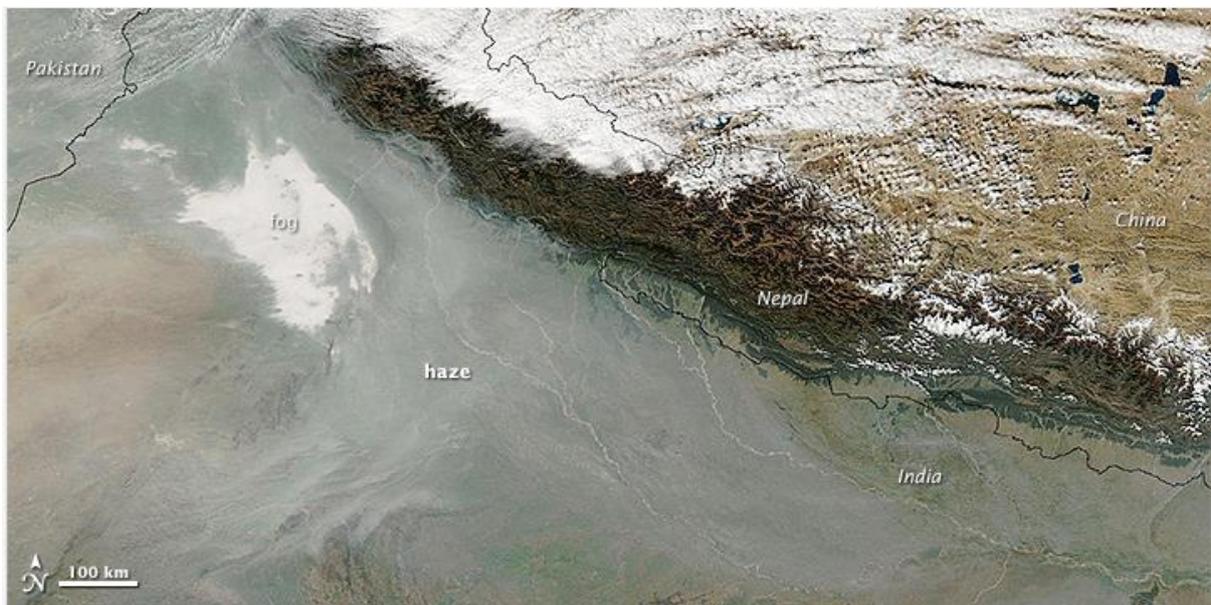


Figure 16: Image from NASA's MODIS showing mixing compositions of fog and haze hovering and circulating by the Himalayas. Report titled "Haze skies over the Indo Gangetic plain" as of December 26, 2010 by NASA, Source: <https://earthobservatory.nasa.gov/IOTD/view.php?id=84731>.

The above two images, taken from NASA's MODIS instrument shows two sample moments in time in the evolution of the haze over the Indo Gangetic plain which arrives at Delhi periodically. The fires as observed by NASA, play an important role in the production of the technoscientific visibility of this haze. MODIS, the Moderate Resolution Imaging Spectroradiometer, a NASA programme visualises every part of the world one to two days in 36 discrete spectral bands, as a Terra sensor and is a crucial technology in the study of clouds and aerosols (NASA, NA). Using MODIS data, Vadrevu et al characterise in a study, in two observations which are placed below, the nature of variational seasonal fires. The below two graphs from their scientific study drawing from MODIS data shows that the fire count over irrigated croplands is exceedingly high and the second graph by Vadrevu et al (2011) shows that these observed fire spikes seen from MODIS are periodically right around the two crop residue burning seasonal episodes in the north of India. This metric-capture of the assemblage of fire spikes in sync with the seasonality of crops that comes through the technoscientific is interesting for a variety of reasons. Firstly, it shows how the assessments of carbon enable reverse speculation of where is it that ash comes from. Secondly, it amplifies the political role of the applied season in industrial agriculture. And third, based on where sensing devices are placed and how satellite visibility is mathematically understood, the space-time of distribution can be speculatively connected with the subject of aerosol origin. It gives "science" an opportunity to figure aerosols in monsoonal intimacy before they get globally distributed and dissolved into the climate imaginary.

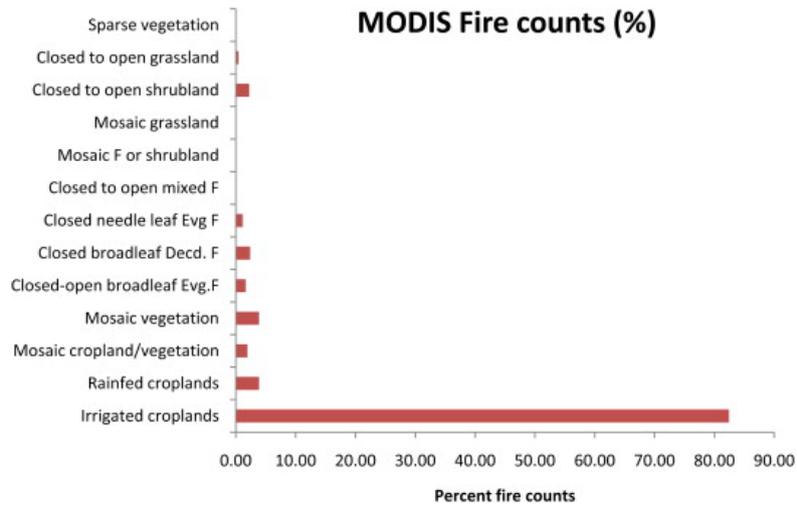


Figure 17: From Vadrevu et al, 2011: MODIS fire counts aggregated based on Land use /cover types (2003–2008). More than 80% of fires occurred in Irrigated Croplands mainly due to agricultural residue burning. Available here: <http://www.sciencedirect.com/science/a>

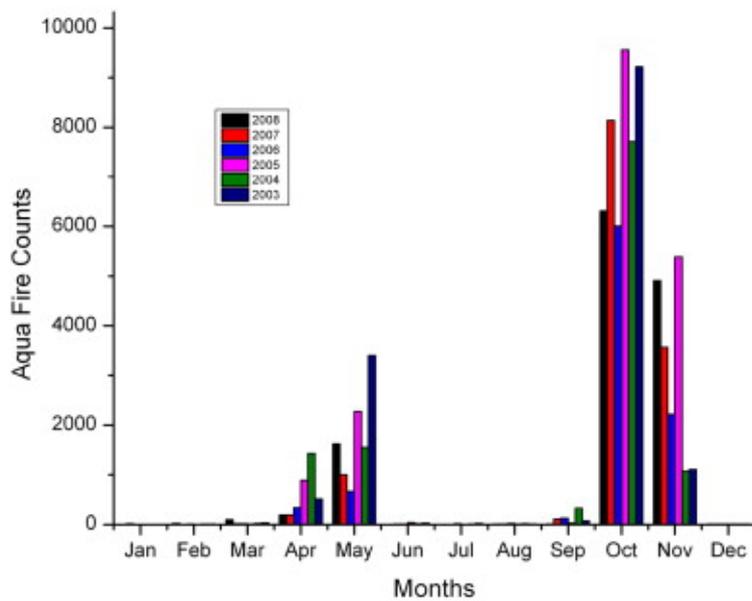


Figure 18: From Vadrevu et al, 2011: Temporal trends in AQUA MODIS fire counts. The peaks correspond to agricultural residue burning season.” Available here: <http://www.sciencedirect.com/science/article/pii/S0269749111001254?via%3Dihub>

A pause to cough, to sneeze and to breathe⁴²

Consider the settlement of dense air in breathing life. Consider the elongation of times within which breath exists, where aerosol-densities curate the only air known, for days, weeks and months. Consider how the air stays, lingers and figures. Consider the many painful lives of digesting air. People. Living forms. Consider for a moment, the stickiness of breath. Consider for a moment, that there is method in suffering to breathe. Aerosols write stories in our worlds even before we begin to theorise them.

Places stay with you, even after you depart. You stay in places. You move to places. And places find ways to move with you. My research fieldwork in Delhi has taught me many things. One of those things is that certain matters stick with you (literally) and change (materially) as you leave – clinging on, evolving, changing, mixing and becoming. The winter airs of Delhi, in their toxic form, both for breathing people and living forms, offer through the sensorial-forceful-painful-amplifying metabolism of mucus, an analytic of transdisciplinary transformation. The air, read through the mucus of my body's metabolism and histamine interactivity, clings on to the field (the city of Delhi – a form of circumstantial love, a relationship perhaps) as a material that is inherently vital, living and fluidly cellular. Leaving Delhi, I enter a series of stages, typically travelling through cough, wet cough, and a gradual exit of phlegm through my nose and mouth, as I hear it through the ear canal. In transit to Delhi, air travel makes me conscious of the power that this thick liquidity has over the region around my eyes and nose, as pain ruptures in synchronisation with changes in cabin pressure as the aircraft descends to land – pressure vitalises fluidity and asks me to forget the distance between one time and another. Everything is focussed on breath.

Like Delhi's air, which changes texture, density and colour (amongst other things) through the year and during the day, phlegm makes a journey, as it plays its part, in my bodily system and gradually changes characteristics too. As part of this process, I have learnt to cough with care, wipe with care, sneeze with care and interact with wash basins with care. I observe the airs of

⁴² This section titled “A pause to cough, to sneeze and to breathe” can be found as a slightly different version as “Mucus as some kind of methodology” as part of my paper “As I sit down to write a monsoon story without cloud bands – some mucus, confrontation and sadness” published as part of Issue 1 of Hyphen Journal. See: Bhat, H. (2019). ‘As I sit down to write a monsoon story without cloud bands – some mucus, confrontation and sadness.’ Hyphen Journal 1. http://www.hyphen.space/journal/issue_1/.

Delhi (but also rice, but also fossils, but also dust, but also industry, but also capitalism, but also so much more unknown) and their particular becomings, slowly leave in parts out into the water supply network. As the inner tunnels of my wind system become sensitive to the dances of new-aerosols, ruptures perform a solitary event – as repetition. Respiration is solidarity.

Researching and writing about a city in/with the airs of the monsoon demands a conscious un-othering of the air. This means that the airs of the monsoon are not just seasonal forms that change an experience of time but airs that form ‘us’ and every possible composition that forms the living. As some spoken theories of *Kali Yuga* (time of the demon, *Kali*) inform me, time itself has changed – and therefore the air. While I expand on this idea later on in this thesis, I mention this yuga here as it kept recurring as a speech act across so many conversations in Delhi. The problems of time interlaced with the problem of *this* time and *these* times interlaced with air and condition and material presence. Distinction is lost to time, as time is air. It isn’t necessarily a choice, because life lives within, together with and because of the air. It’s a becoming-with (Haraway, 2003; Wright, 2014) in some sense, becoming-inside-of, becoming-because-of-the-air. As Neimanis and Walker (2013) observe, “we are thick with climatic intra-actions” (p.558) and the weather etches bodies and bodies make and carry the weather too. The air as the grand living site of all disposability is the active interpretation of most methodologies and methods of development (i.e., the discipline and what follows). For example, most air pollution policies require that the city comprehend air as a jurisdictional space with boundaries. Of course, boundaries politically drawn in the air allow for the performance of power, control and regulation. However, I wonder if methodologies for the study of the air were not subject to the framework of territorial maps, then what kind of airs would we see – inhabiting a world of their own transformation? If Delhi manages to escape in a million other ways outside the bounds of Delhi as we know it, where and how does Delhi crawl, swirl and become entangled as matter that is constantly alive? Stories of the air help us recognise that the site is a transdisciplinary figure, offering for the widest range of analytic possibilities.



Figure 19: The floors of an airport, while in transit in 2019. Searching for a restroom to clear my nose and wash my face. Photograph by author.

Back in London, as the Piccadilly line from Heathrow terminal 4 rattled to Finsbury Park, I felt the airs of Delhi doing their bidding again as my sinus took my hearing through the stages of breath and fold. Mucus methodologies and the management of mucus interacting worlds teaches me that toxicity privileges some more than others. Othering the air as the waste site of growth and economic-life in India in the twenty-first century, forces breath-life to become sinus aware. Srigyan (2016) points out that everybody does not get to breathe the same air in Delhi. For humans, architectures determined by capitalism, class, caste, gender and other socio-political-economic energies determine materials and technologies that envelop some and exclude others. As different forms of expertise propose cuts in how, why and where air should be identified and managed, I find that the airs of the monsoon, for example, find themselves flourishing and exchanging far beyond the perceived season of the monsoon. Storying with the monsoon, allows for atmosphere and air to enter a very kind of storytelling. The airs of the monsoon materialise methodology.

Even if that meant, that the same airs were airs within which people cry, within which people tear, within which people die. Akin to Shotwell's (2016) thesis of a materially compromised

world where living ethnically becomes increasingly more precarious and simultaneously urgent, purity neither exists in imagination nor does it exist as material. Cosmologies of purity in the inheritances and continuing legacies of several belief systems in south Asia continue to perpetuate caste and oppression. The monsoon problematises meteorological purity, as explained earlier in my section on methodology and stickiness. The contamination and perpetual widening of toxicity in/of air confront monsoonal becomings and futures. The airs of the monsoon materialise methodology because the air is un-otherable. Forms of atmospheric assault that are industrially generated and sustained as urbanisation and development nurture the time of the elements and their choreographies inside us. Even as it hurts, as some of the boys biking in my neighbourhood one evening told me – that the vibe of riding wheelies on smoggy evenings was “something else only,” – that joy could premise amidst the cough and the crying – that life goes on. Akin to aunty V, who hosted me that month who used to tell me, just let me know when you get back – I’ll feed you, “there’s nothing that our meals made of love cannot solve,”... “look at how healthy my sons are.” Stories of living with the changing methodological airs of the monsoon and our increasingly contaminated winters, continue, and persist.



Figure 20: December 21st 2018, North Delhi. Intense allergic reactions to dense smog. In a car. Going somewhere. Staring at the lights, as the neuromuscular network hurts with every breath. I wish I could write how the aerosols weigh – how it dances between suspension and soil – the speck of matter in a theory of weather and a theory of weather in all these breathing bodies of “us.” Photograph by author.



Figure 21: December 18th 2018. Running to my host's residence from Shastri Nagar metre station in north Delhi. Pondering a stop for food but terrified by the extra hour in open air. Perhaps I should surrender to the process of breathing. Well, it's the only thing that one can go. Photograph by author.

As particles huddle as brown clouds

The 1990's International Indian Ocean Experiment (INDOEX) team led by Veerabhadran Ramanathan as a collaboration between the Centre for Clouds, Chemistry and Climate (C4), the National Science Foundation and the Scripps Institute of Oceanography (UC San Diego) came to the conclusion that atmospheric brown clouds, essentially anthropogenic clouds consisting of several different carbons, sulphates, nitrates, ash and dust, that they distinguished separate from what they called natural clouds created a dimming effect that impacted precipitation and hence rain (Sharma, Nunez, Ramanathan, 2016). Investigating aerosols through what these scientists called the haze layer in the INDOEX region concluded that these particles scattered solar radiation and reduced solar radiation absorbed on the surfaces of the ocean by as much as 10% (INODEX, 1999). Aerosols they realized were pointing towards a much more complicated climate change narrative, with broader connections and impacts.

Atmospheric brown clouds, consisting of soot, dust, sulfates and organic matter among others, due to the burning of fuels and organic matter have amongst other consequences caused the retreat of the Hind-Kush Himalayan-Tibetan glaciers (Carmichael, 2009). This has affected the monsoon pattern in different ways in its becoming (Ramanathan, 2007). 70 to 90% of surface black-carbons in India come from biofuels according to Carmichael et al (2009). In what develops as aerosol interactivity, shows that air unlike a two dimensional surface is not a flat space. Air occupies space and material occupies air. Air therefore is not a void but an ocean that is able to fluidly change - just as aerosols travel across people made boundaries and zones, air expands its agency. Aerosols as agents of the air don't care for the functional "human" world. Air makes worlds possible. What in the 1990's the INDOEX experiment categorically described as natural and anthropogenic in scientific distinctions - subsequent literature slowly begins to indicate of how air blends, blurs and collapses these distinctions and categories, in lieu of phenomena and transformation.

Cohen and Boos (2014) write that in the years 2002, 2010 and 2012 no summer monsoon depressions were formed and this was the first of its kind as an event in over a century. They further add that because of the "the number of extreme synoptic events occurring each summer over the Bay of Bengal... exhibits no statistically significant trend over the last three decades"... raising the question about the "validity of previously claimed large trends in monsoon depression activity in the Indian summer monsoon" (2014, p7846). For them, a 30 year long satellite data set revealed no "statistically significant" (ibid) trend in the scale of monsoon depression storms over the ocean surfaces of the Bay of Bengal. This letter problematizes the notion of a trend and its description, but alas raises more problems in the process. Is a monsoon wind a unit of static natural technology or an interactive/intra-active life form? The study of the monsoon depression shows that causality of phenomena in the Anthropocene, expresses different units of measurement based on the technology used – that often scarcity experienced is not scarcity produced. In the emergence of extreme rain events and otherwise general low intensity/scarce rain; bipolarity is often claimed as the norm (Venkatesh, 2017). As aerosol-worlds are registered with wind-worlds, new scenes for knowledge are produced. Heavy pollution weakens monsoon depression, others say (Krishnamurti et al, 2013). In the Atlantic Ocean, researchers observed that polluted environments tend to have numerically more but smaller droplets of water in clouds which increases the lifetime of a cloud and suppresses precipitation (Kaufman et al, 2005). The co-productive distribution of clouds in the Anthropocene happens across air time(s)

and space(s). The haze is an interesting example of an anthropogenic moment translating to conventional natural categories like the cloud. Such as in the study of atmospheric brown clouds, wherein Ramanathan and Crutzen later note that a “haze will become a cloud if the relative humidity reaches saturation” (Ramanathan and Crutzen, 2003, p4033). Distinctions then start to fail and fall apart. Ramanathan and Crutzen (2003) actually do ask the question “Can increases in absorbing aerosols in the future create different modes of operation, regionally or globally” (p4035) and this was back in 2003. In-fact in their 2005 paper on the “Absorbing Haze over the Himalayan Foothills and Indo-Gangetic Plains”, Ramanathan and Ramana (2005) point out that many of the aerosol induced changes in the atmosphere potentially help aerosols in increasing their own lifetimes in the air making them even more persistent.

Aerosols change the atmosphere. Aerosols become the air. Aerosols seem to have their own sense of community. Aerosols as NASA calls them are “ubiquitous specks of matter” in the air (Voiland/NASA 2010). The story of the aerosol, is the story of matter in the air. Aerosols scatter and absorb radiation from the sun and the land and the oceans and are constantly modifying the micro and macro properties of clouds (Srivastava, Dey and Tripathi, 2012). Some absorb heat. Some deflect heat. In an air of the Anthropocene, human activity resulted aerosols generate new interactions and new consequences. Atmospheric aerosols like black carbon absorb sunlight and heat the air (Menon, Hansen, Nazarenko and Luo; 2002). One of the sources for these black carbons is the burning of biofuels and open air biomass, which includes crop residue. The warming caused by black carbon aerosols in China and India according to the above scientists causes significant warming in the Sahara Desert region and in west and central Canada (ibid). Using climate models, Menon et al speculate that an increase in aerosols that are dark-carbon-rich in India could lead to “increased droughts in northern areas, such as Afghanistan, as well as to climate changes in India” (Menon, Hansen, Nazarenko and Luo 2002, p2252). Satheesh and Srinivasan (2002) argue that there are still large gaps in the scientific understanding of natural aerosols but there also seems to be complications in distinguishing natural from anthropogenic. The pre-monsoonal drift of aerosols during the pre-monsoon period over the Arabian sea is of a mixed origin - both natural and anthropogenic and have a great impact on the weather (ibid). Dilip Ganguly and others point out that the “response of the South Asian monsoon system to anthropogenic aerosols is multi-scale in nature” (Ganguly et al 2012, pL18804) and that different aerosols play different roles. Amongst the array of complex movements noted here, Ganguly et al (2012) write that while precipitation is collected on the southern slopes of the Himalayas, they don’t convert to significant rain because of an “increased cloud lifetime effect” (Ganguly et al,

2012, pL18804), which is caused due to the exposure to anthropogenic aerosols and reduces the efficiency of rain. These simulated models only but show a portion of the entire picture. Most cartographies of aerosols are made from data viewed from space and above ground (Voiland/NASA 2010) but only through models, do they apparently manifest as experiments. Atmospheric brown clouds make many stories.⁴³

As rain transforms

So what explains extreme rain events? How does the industrialization of the air distribute complexity? Earlier noted bi-polar ruptures in rain as observed in 2017 for example are connected to the nature of a changing monsoon air. 1000's dead and thousands more displaced in the monsoonal ruptures of 2017 in what has been an enactment of aerial and cloudy bipolarity (Suhasini and Gettleman, 2017). As I update this line on the 10th of September 2017, this year's monsoon has shown both drought and crisis level floods in North India. For Narain who heads the Centre for Science and Environment in New Delhi, the only way for India to deal with this is

⁴³ There was this question that the anthropologist Anna Tsing asked me after a workshop in Aarhus in 2019 that stayed with me in reference to this section. Anna asked if the atmospheric brown cloud had a racist connotation. Why is it she asked that "science" decided to call it the ABC – the atmospheric brown cloud? – did its brown form have a reference to brown in as a racialised subcontinent? Brown in the ABC solicits a developmentalist imaginary – that *chulas* – rudimentary stoves used across India that effect the respiratory systems of largely women and children – produce atmospheric claims of brown-ness into the expanse of air. Ramanathan's viewing of this affectivity informs us of a moment of colour but also a predicamental quality of what it is that constitutes atmospheric justice or atmospheric form that links back to the politics of energy and commodity form – that the very particles found in the air represents particular struggles and the methodology for energy transfers within socio-economic-political contexts. A developmentalist anthropogenic politics therefore is never either this or that, in the sense that what constitutes the anthropogenic is intensely unequal, intensely unjust, intensely violent and of a broad range of occupations and inhabited frequencies. The stories of people and their many relations that are presented in these forms of the brown – held by their formulation as clouds could be gestured as poetics or representation but one does so at the risk of ambiguity and dignity – that somehow a lot is at stake in those tracings – to figure and be with the voices those tracings feed-back to. Instead, as a letter to science, the atmospheric brown cloud is drawn into a performance of weather systems and planetary space. Somehow a politics of race, colour and the specific poetics of the everyday sneaks into this planetary cosmology that pretends to write technocratically superior stories. Brown dissolves, in our time, in living-ness.

for India to engage in “obsessive attention to building millions and millions of connected and living water structures that will capture rain and be a sponge for flood and storehouse for drought” (Narain, 2017, no page number). While rain gauge data apparently indicates that the south Asian monsoon has remained stable over the past 100 years, Goswami et al (2006) point out that there has been a stable trend where there are more heavy rainfall events alongside broader episodes of scarce rainfall. Often, typologies of measuring volume assert volumetric knowledges but what if the knowledge of moisture in the air had something vastly different to say. As Da Cunha and Mathur (2019) argue, we are always experiencing parts of the hydrological cycle - in what they describe as the ocean of rain.

In Bollasina, Nigam and Lau (2008) on aerosols and the evolution of the summer monsoon over South Asia, the authors analyze the impact of the haze build up from December to May which absorbs solar radiation. They propose through their observational analysis that “excessive aerosols in May lead to reduced cloud amount and precipitation, increased surface shortwave radiation and land surface warming” (p3221). While the monsoons strengthen in June and other patterns may exist further south, their observations show that rapid urbanization and growth has a direct impact on aerosol interactivity with the airs of the monsoon (ibid). This through Ramanathan and his team’s fieldwork and experiments to do with atmospheric brown clouds further elucidates that biomass burning and fossil fuel consumption contribute immensely to regional lower atmospheric warming trends that not just impacts the monsoonal system but also the large scale retreat of the glaciers in the Himalayas (Ramanathan et al, 2007). These interconnections are not moment specific but evolutionary i.e., to say that unlike digital cause and effect where binary responses are clearly distinguishable, the bipolarity of monsoon air is deeply indistinguishable because there are no cause-and-effect switch buttons that occupy the comfort of distinction. It is monsoon air. While the planetary scale of this consumption is in operation here, what is also clear in much of this work is that temporality matters. Decisions made on a regional scale do have temporal impacts on the becoming of the air. Air makes air. Air shares.

William Lau’s research and computer simulations in 2006 on the Asian monsoons at NASA’s Goddard Space Flight Center indicate that the carbons generated from these agricultural fires play an important role in triggering rain earlier than expected (NASA, 2006). Lau rejects a particular temporality of aerosols in conceptualising this mechanism that he calls the “elevated heat pump” where “aerosols blowing in from western China, Afghanistan, Pakistan and the

Middle East coupled with black carbon... from Northern India accumulate before the monsoon in late spring against the northern and southern slopes of the Tibetan Plateau” (no page number) absorb heat and draw in moist air from the Indian ocean “prematurely” in causing rainfall and changing expected patterns (ibid). Lau, Kim and Kim in a 2005 experiment discuss that while global dimming (a term that they use) due to the haze effect might weaken the tropical monsoon as suggested by Ramanathan, they illustrate that the same aerosols at elevated land levels might produce radically different reactions which involves rapid intensification of rain (Lau, Kim, and Kim, 2006). The heat pump effect according to Lau is one of the reasons for the glacial retreat in the Himalayas (NASA, 2009). This effect express a temporality of acceleration where global warming as a universal analytic enacts temporal accelerations that accentuates some spatio-temporalities over others. As Lau further explains "Over areas of the Himalayas, the rate of warming is more than five times faster than warming globally” (ibid).



Figure 22: NASA report on “Space Shuttle view of haze and pollution over Northern India swept in from Tibet” Available here:https://www.nasa.gov/vision/earth/environment/asian_rain.html, accessed 6th September 2017.

The heat draws clouds and accelerates a scattering of scattered rain. As Baskin (1995) notes “Floating overhead are mysterious arbiters of our climate” (no page number). Clouds are actors of the air. Clouds, based on Ramanathan and his team’s work are complicated interlocutors, that scientists only in recent years have discovered the enormous value of and the challenge it poses in understanding air and climate change (ibid). Much remains a mystery. In recent experiments,

Pistone et al (2015) reveal that the increased emissions from Southeast Asia in recent decades having combined with the monsoon cycle caused heavy air pollution in the northern part of the Indian Ocean during the winter monsoons in turn diversifying the kind of collaborations black and brown carbons can have. This complicates further the plain assumption in the simplistic characterisation of winter fires as winter pollution over Delhi. An act of choking links the body, the neighbourhood, the region with the infrastructural and circumstantial condition of the politics of aerosols. Affectivities circulate.

Particles seek clouds just as the air seeks particles to move. Each category of particulates generates a consequence and then further exchanges reactions as other chemicals of the air-world are introduced. Now, Sharma, Nunez and Ramanathan as part of their discussion on brown clouds do discuss how certain aerosols such as nitrogen dioxide, sulphur dioxide, carbon monoxide, organic carbon, black carbon, PM2.5 particulates, PM10 particulates, benzene, butadiene, alcohol, misc. acids, ozone amongst other metals and dusts can be controlled by measures. They write that places such as California have brought down pollutants by over 90% since the 1980's through mitigation and regulation. However, one does wonder how this narrative sustains within a complex material geopolitical neoliberal energy-reliant Anthropocene. Does the cloud as a form dissolve nature/culture distinctions through their speculative arbitration of science? Because if anything, Ramanathan's teams' work only shows us that "probability is not prediction" and that the surface of what is discovered and known about climate change and the clouds increases in time - only to be speculated in between, where the future of the cloud is just is at stake as it was before (Ramanathan, 2017). Surfaces are never singular but always plural and in/of spatio-temporal exchange. So how then is an idea of control meaningful at all when imagined at scale when air cloud-form and wind-form into movements and occupations? Clouds trouble planetary models because science is unable to imagine computation in a world of clouds. As discussed in reference to Rama's work in my section on methodology, clouds gaslight meteorology – and calls for the revisitation of extractive science to a science that is invested in wonder and curiosity of air's lively form.

Larry Di Girolamo from the University of Illinois using NASA's data from its Multi-angle Imaging Spectro-Radiometer (MISR) satellite instrument, in 2010 concluded that in the shift to an inland wind blow from the oceans before the monsoons, bringing in dust from Africa and the Arabian Peninsula combining with dust and anthropogenic aerosols from the Indian subcontinent impact the nature of air in north India and might also trigger early rain. Loaded

onto NASA's Terra satellite program in 1999 it allows researchers to "differentiate surface variability from the atmosphere so they can observe and quantitatively measure particles in the air" (Ahlberg, 2010, no page number). Contrary to popular belief, that while dust settles with the monsoons, Girolamo's analysis shows that anthropogenic build ups continue and that anthropogenic particles are active before, with and after the monsoons (NASA, 2010). Girolamo says "Just before the rains come, the air gets really polluted, and for a long time everyone blamed the dust but MISR has shown that not only is there an influx of dust, there's also a massive buildup of man-made pollutants that's hidden within the dust." (Girolamo as quoted by NASA, 2010).

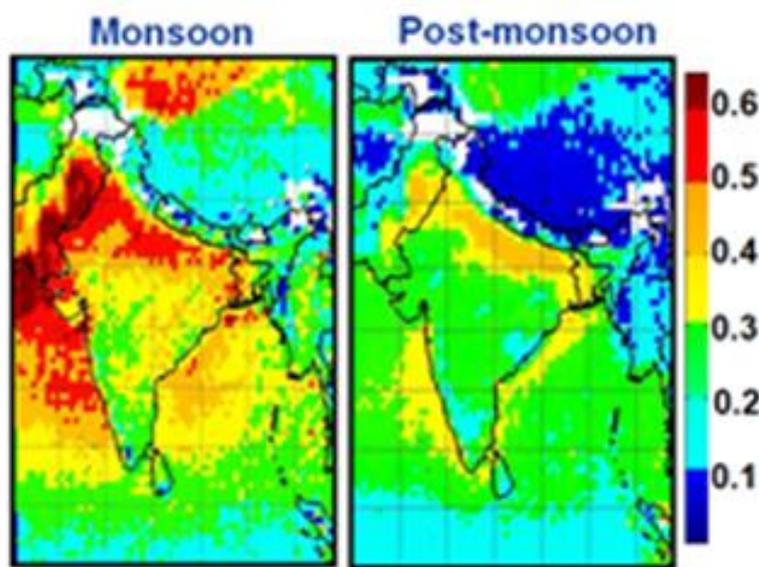


Figure 23: Quote from page: "MISR data were used to measure the concentration of aerosol pollutants over the Indian subcontinent and how it varies by season. The most polluted areas are depicted in red. Image credit: NASA/JPL-Caltech/University of Illinois" source: <https://www.nasa.gov/topics/earth/features/misr20100915.html>.

Lau takes special note of desert dust in which he says that the Spring dust winds from the Thar desert in North West India "mash with industrial pollutants to create a massive brown cloud visible from space" (Voiland/NASA, 2009, no page number) which blocks sunlight and cools the surface but gradually heats up because of its high carbon content around the Himalayan foothills enhancing the "seasonal northward flow of humid monsoon winds, forcing moisture and hot air up the slopes of the Himalayas" (ibid). Adding to Lau's heat pump effect as mentioned earlier, it triggers not just early reactions from the monsoon but also disrupts glacial activity and enables melting - which means if the Himalayan glaciers play a role in monsoonal

production, this impacts everything. This makes sense when juxtaposed with ISRO's (Indian Space Research Organisation) 2016 report about large scale desertification in India, predominantly in the north, where the union state of Delhi sits on top of the list (DS, 2016). Based on ISRO's IRS Advanced Wide Field Sensor (AWiFS) instrument data from 2003 - 2005 and 2011 - 2013, ISRO claims in its Desertification and Land Degradation Atlas of India that Delhi has experienced an unprecedented expansion in settlements and has undergone up to 60.60% desertification and land degradation (ISRO, 2016). The Thar Desert for example is an important source for atmospheric dust that has capacities to influence environment and aerosol complexity greatly and has in many cases been read to close proximity to desertification in India (Hegde et al, 2007).

To slip into envelopes

On the crisis of incomprehensibility because of the scale of the Anthropocene, Latour (2017) argues that we need to slip into envelopes - "envelope ourselves within, a large number of loops, so that, gradually, step by step, knowledge of a place in which we live and of the requirements of our atmospheric condition can gain greater pertinence and be experienced as urgent" (p139). If there is anything that people of monsoonal spaces do tend to know and/or inherently recognise, it is that the monsoon is urgent and pertinent. It not just loops but life is looped in with it. It is just as urgent as breath, and it is pretty much as pertinent as things can get. Monsoonal breakdown is not just a meteorological "phenomenon" but is also a breakdown of bodies, lives and ecologies. Even if I was to borrow the metaphor of an envelope, it is an atmospheric envelop that monsoon lives (people and more-than-people) are very familiar with. It is textured in the earth even after the density of the enveloped blanket lightens or seems to escape. Naturecultures in monsoonal worlds are inheritors of monsoonal loops, if the imaginary of the loop is even suitable for their description: perhaps as a wind-time loop that constantly materialises with material and becomes the future, again and again. This form of knowledge building, knowing and relearning needs to be kept anew constantly, and monsoonal people have always done so. It perhaps confronts institutions of their conventional ways of knowing and learning, suggests Latour, addressing his European context (ibid). However, institutions within monsoonal worlds were also historically built through modernity for colonial projection and extractive economic planning. Imagining institutions that do monsoonal work for survival and monsoons to come calls for a large effort of dismantlement and nurturing. The work of this imagination, I do not know the structure of and neither do I know the premise of. However, I

sense that the aerosol opens up a monsoon story that helps me be aligned to New Delhi as a starting point for this story. Aerosols clearly scale and perform scaling, expanding their ability to be part of monsoon stories in several other spatial worlds – so perhaps the monsoon offers some researchers loops within their atmospheres.

Consider, the scientist K who I spoke about earlier who tried to convince me that scale exists – that monsoon stories from Delhi albeit offering a potential localised perspective is too minute a scale to imagine macro processes that require scales and grids. He uses the graph sheet to represent different types of atmospheric processes that tend to enact in certain parts of the air. Science with the capital S, requires processes to be in and of the grid. When you expand the grid, pretend for it to have elasticity, perhaps there are loops that can be drawn. It produces one type of scale. Aerosols, I argue re-orient those scales by doing what specks-of-the-air do in air – they're air, and they air the air, dance with it in and out of the grid. For the knowledge practices that seek to understand it – the air is the material assemblage of constant transformation and distribution, where the figure of distribution re-orientes based on air's methods of movements that ally with the sun, energy, life and process. Facts change in it, just as fast as they are created and sustained. It is air's own methodology in sustaining its materialisation. The monsoon makes that particularly sensible.

From the mode of the satellite which views the aerosol in its social clustered mode, to the view of the aerosol in its micro independence, the aerosol initiates a whole new political sequence. Air textures the temporalities of aerosols, despite the sense of holding it through visual capture. Such as of the crisis Ritesh Gautam at IIT Bombay enters in asking if the fog or the anthropogenic urban haze can be predicted with satellite only data to which he argues is a very hard task (Gautam, 2014). A logical reason perhaps for this distinct urban air is that the urban does tend to produce its own rhythmmed aerial materiality. You sense the city when you're in it. For example, the coal powered power plants in New Delhi as Prasad, Singh and Kafatos write in their Geophysical Research Letter in 2006 are major protagonists in amplifying the effects of the winter smog in New Delhi. Yet as one shuts down, another burning yet other materials opens up elsewhere in the city.⁴⁴ So much of energy it seems generates some form of ash or the other in Delhi or for Delhi. So where did all the fly ash go? “Logically and intrinsically” as Dipesh Chakrabarty argues about climate change that, “it is blind to the question of justice between

⁴⁴ Delhi has had a particular problem with this trope – where energy transistions switching from coal-to-power to waste-to-power and linkages with power projects across the region retain Delhi as a major consumer of energy calling for a variety of materials to be used in the production of it.

humans” (2013). Air complicates this further by posturing possibilities with living communities – who chokes, who is more vulnerable and who purchases filtration and ventilation. What forms of life are open to air’s affordances in a politically unequal world? While climate change is simply representative to a certain globality of terms, akin to the Anthropocene - spatio-temporal proximities to ash generating coal powered power plants compose particular textures and densities to the space-time of that particular experience. The world can be positioned as a theory but the situatedness allows for research practice to start telling the story from matter in and of place in the broader ecology of the monsoon’s dance. So perhaps then there is a need to articulate the many Anthropocenes of place, here and this, instead of one, acknowledging that as aerosols dance with monsoonal futures, there are many-many-*many* of them, making many futures and airs. Aerosols collectively perform global stories but with the monsoon, they reopen a foundational methodology of monsoonal storytelling – that anthropogenic form produced *here* can tell a story about something that *here* is implicated in. They reopen fundamental questions that monsoon studies had always taken for granted – that the monsoon is a recurring weather, comes as force no matter what. They open up the lived reality of monsoonal uncertainty that the speculation of what monsoons are said to become are also held by materials such as aerosols – that the walk you take in your neighbourhood where an energy plant burns waste for power, has some impact albeit speculative on the type of rain you get tomorrow.

“The single largest uncertainty in climate change is how do aerosols effect clouds and climate” says Kimberly Prather, who is a scientist at the Scripps Institution. Her group’s work demonstrates that sea spray and the composition of sea spray effects clouds, their formation and behaviour (DeMott et al, 2016). What makes clouds even more complicated to work with is the fact that clouds are very hard to be captured within mathematical formulas (Lougheed, 2017). Different particulates do different things to different flows and thereby are at dynamic odds with measurement, as clouds constantly form into future forms, of their selves and becoming, in the air. As quoted from Lougheed’s piece, “Sea spray aerosol was thought for a long time to be just salt — sodium chloride — and that’s not true,” says Grassian. “There’s a lot more that comes out of the water — viruses, bacteria, organic compounds, parts of cell walls — little ‘bio bits,’ if you will.” (ibid.). There is so much more to be understood about the constitution of clouds and aerosols in the air. Seshan (2017) in her field notes from the Western Ghats in southern India vocalises a perspective that the elimination of our forests would impact the monsoon as we know it. Antonio Donato Nobre (2014) in the Future Climate of Amazonia Report reports on how the forest orchestrates the waters of the air and its role in hydrating the atmosphere.

Aerosol cloud materialities are in keen air relations with ground matters too, and forests have the capacity to sway and make monsoon stories.

In their study developing a theory of atmospheric moisture called the biotic pump, Anastassia Mararieva and Victor Gorshkov (2007) argue that the active biotic pumps like tropical rainforests transport atmospheric moisture inland from the ocean. As these forests maintain a high evaporation flux, they suck in moisture to compensate water losses in the soil (ibid). The biotic pump they say does not work well in scarcely vegetated ecosystems as precipitation in this model weakens with the distance from the ocean, which is accounted in their reasoning of how the biotic pump may play a role in certain monsoon systems (ibid). Moisture as a composition of an aerosol in itself, fluctuates, evaporates, fluxes, morphs, soars, ascends, descends, dissipates, etc. playing with temperature and wind flow. In a brief note on infrastructure Mararieva and Gorshkov (2007) write “We also note that when the forest cover is (partially) replaced by an artificial water body, like the water storage reservoirs of hydropower plants, the controlling function of forest transpiration and the biotic pump weaken causing reduction of runoff and precipitation in the corresponding river basin” (p1030). Desertification weakens the possibility of a wet monsoon air and weakens rain. Such speculative analysis also makes one wonder what the effect of landscapes of garbage, concrete, metal and tar would mean for these airs of life.⁴⁵ At the same time, as I learn from Davis’s (2016) work on aridity - the linking of desertification as barren, worthless and as waste is an inheritance from Anglo-European political interests. To call something as dead when its vitally living and relational comes from the political desire of premediated death. The lack of a colonial knowledge system to recognise life does not mean the absence of the many knowledge systems that do. The complexity of dryness in an otherwise wet monsoonal world begets such questions at times of urbanisation and transformation.

Furthermore, as described in the methodology section earlier, it animates the very foundation of meteorology where they explore the question of why the monsoon moves. In appreciating the complexity of moisture and water in the air, in writing about environmental chemistry, Vicki Grassian (2015) argues that atmospheric particles are typically heterogeneous. Grassian takes a step further from the mode of analysis used in many other studies and highlights the importance of single particle analysis under ambient conditions which in some way comprehends an integration of the particle in a sense of current surface conditions (ibid). It turns out that brown

⁴⁵ The word speculative used in this instance considering the multiple sites of studies mentioned in these contexts.

carbons do not dissolve well with water molecules unlike other types of carbons. This development read through Tang and team's analysis shows that there might be implications for certain carbon aerosols in the troposphere that behave differently with solar radiation, that the scientific community did not have an understanding of prior (Tang et al, 2016). So, all carbons for example cannot be deemed equal and behave differently with different actors in different conditions. The popular brown carbon (from Ramanathan's atmospheric brown cloud) for example, is set free in air through the burning of organic material like biomass and crops (Mok et al, 2016). The carbon of the coal power plant and the carbon of crop residue amongst other carbons have unique atmospheric agendas that politically are independent and collaborative at the same time. Different aerosols apparently have different lifespans in the air (Tang, Cziczo & Grassian, 2016). As the above authors note "after being lifted into the troposphere, mineral dust particles have lifetimes of up to several days and can be transported over thousands of kilometers" (p4206). A popular understanding of carbon dioxide articulates for example that it takes anywhere between twenty to two hundred years for carbon to dissolve in the oceans (Clark, 2012). Meteorological linkages between oceanic acidification and thermodynamics reveal new connections in how the air of the monsoon is changing. We are stuck it seems with the affluence of complexity where a perceptual temporality inside the air of the monsoon is entangled with deeply non-stationary, translational, transnational and mobile forces.



Figure 24: Image 1 of 3, Badarpur Thermal Power Station. Photograph by author.



Figure 25: Image 2 of 3, Badarpur Thermal Power Station. Photograph by author.



Figure 26: Image 3 of 3, Badarpur Thermal Power Station. This is a coal power plant in Delhi that has been closed. With Russian designed turbines and eerie cooling chimneys that you see from the highway, this large power production unit used to be a distributor of fly ash and energy-atmospherics I recollect passing by the station on dense, rainy monsoon nights, and the glow above the large cooling tower would glimmer in eeriness. It distributed a mimetic viscosity: volcanoes, boiling water and the work of wholesale steam surrounded by the partial darkness of the highway. Fly ash conspiracies are both atmospheric and terrifying. Photographs by author.⁴⁶

One is confronted by the vastness of these infrastructures of the air. One is also confronted by the anthropogenic transformation of earths – in airs, waters, grounds and below. A fracture in conventional aerial insight it seems occurs in the retreat to the corridor, to the indoor or the object confines where air is conceptualized. Yet, I wonder if monsoon air helps us ask better questions? The force of monsoon air makes sense to lived reality not just because it offers the material for life but also because it is the confluence of conditionalities where things begin to make sense. Aerosols are more than categories of pollution science because the monsoon kindles them into renewed confluences where monsoonal life-work is altered. In the Anthropocene, it seems therefore that these material infrastructures are constantly morphing, into modes that we don't identify with and understand clearly. They deepen precarity. They deepen pluralities. They are becoming. Coming back to Delhi, Anirban Gupta-Nigam (2013) argues that “air is community” (p73) and that we are in air's world and we share air in its community. Drawing

⁴⁶ This note has been used in my contribution for the Monsoonal Multiplicities online exhibition at <http://exhibition.monass.org/>, under the section Air in the part “Fly Ash Conspiracies.”

from Sloterdijk, he writes that the “Humanists never realized that people are naked, constantly on life support, propped by the envelopes that surround them. Modernists assumed nature - the atmosphere - would always be there. It is only with gas war - and then the Holocaust - that the atmosphere was explicated 3: the fragility of human life was exposed once and for all.” (p73). In the design turn to protect ourselves from the pollution of the air, Gupta-Nigam (2017) says that malls for example are sites as “atmospheric enclaves” (p76) that simulate some sort of social condition to keep people indoors in air-conditioned environments (ibid). So, the Consumerists never realized that “people are naked” (p73) either. The environmentalists never realized that non-human life is naked and governmentality never realized that air is bare open. In this crisis, where every form of viewing the air, which is the home of the monsoons (in this context) is fractured by its very way of viewing. In generating methods of air conditioning, one escapes how the air is itself conditioning in/with the world - past, present, future. This is particularly resonant while thinking with the New Delhi National Capital Region which is one of the fastest urbanising regions in the world. The subject of air conditioning has been extensively discussed and debated in a variety of academic and political forums. Inundated with the experience of air conditioning, I am reminded of the “cry” (albeit from a different context) that Philippopoulos-Mihalopoulos (2014) talks of – that “the cry is spatialised, legalised, rarefied, embodied, ruptured, dissimulated, but underneath all this, it remains a cry.” – that “there is no outside!” but it seems to have been something we have forgotten, as he suggests (p1). The financial and technical landscape of that inside has been well cultivated in New Delhi in recent decades but insides and outsides of air conditioning are constantly brought into question by the smallest of movements a person or life form can make spatially – that inequality is plentiful, that the cry for many insides – insulated or chilled – dusted or filtered – bathed or fed – wept or celebrated remain a question of socio-political circumstance, the increasing stresses of the economy and the ever increasing weight on multispecies assemblages to fly free in an air without the matter of death.



Figure 27: The exhaust sections of air conditioners at the back of a building in an affluent market neighbourhood in south Delhi. Photograph from July 2018, taken by author

Even as I theorise some of these expanses of air from studies that view the air from the outside orbit such as - satellite instruments that “see” aerosols for example through particular technological eyes (metaphorically and mathematically) that capture through special spectral ranges, wavelengths, angles and spectral signatures that humans cannot see (Kaufman, Tanre and Boucher, 2002) – they hold stories of plenty in how they have already re-organised life in their production and sustenance. These aerosol registrations often require complex “translations” and “retrievals” in which Kalashnikova and Sokolik (2002) argue that newer “aerosol algorithms” are required to truly appreciate and account for the diversity in their shapes and compositions while

studying them at large satellite scales with emerging new instruments (like MISR and MODIS). Aerosol algorithms enable the possibility of sight in a world of mobile and aerial aerosol composition. A mathematics of the material dimensions of tiny particles sets the parameters for the visual gaze. A technoscientific understanding of air's complexity thrives as modes of translations to understand what's going on in the air. The question therefore is, how do life forms more-than-(us) view these political articulations in/of the air? A question perhaps for the future is that of machine learning that animates contemporary political myth making through the subjugation of life as data – although the monsoon as I have alluded to and been informed by interlocutors is something that machine learning does not so far compute. It opens up the gap between myth and empiricism.

A note on myth and foam

In many South Asian belief systems, the term *Vayu* means Air. *Vayu* conceptually is connected both to Zoroastrianism and Hinduism where *he* (in masculine) plays a central role for all life. In Zoroastrianism Barr observes that “in all living beings Vayu is the life-breath, in the cosmos he is the breath of life. But Vayu is also the wind that we the living breathe out of death. So he is both the god of life and death... It could not be ignored [by the Zoroastrians] that he hunts, attains and vanquishes both creations, that of the good spirit and that of evil. All life is in his power” [Barr as quoted by Boyce, 1975, p80). These lines reflect a similarity in how *Vayu* is seen in Hinduism as well, as noted by Boyce (ibid). Air through *Vayu* knows violence just as it knows life. In the Hindu version of *Vayu*, it enacts multiple roles as *Mukhya Prana* or the centre of life. He is known as breath (*Prana*), as the purifier (*Vata*) which culminates as *Vatavarana* i.e., translating to an idea of the atmosphere and/or environment (Granvil, 2017). Without entering the discourse of *Vayu* in mythology, it's perhaps worthwhile to note that the epistemology of an air through the likes of *Vayu*, enacts a politics of divine orchestration in the everyday. *Vayu* is integrated with the creator of life in Hinduism i.e., *Vishnu* and even in the *Vishnu Sahasranama* which is the central meditation serving *Vishnu*, *Vayu* shares the title of *Mukhya Prana* with the preserver of life (i.e., *Vishnu*) as being the power responsible for the force of life behind the force of life (Tapasyananda, 2013) (interpreting the *Vishnu Sahasranama*). The two spiritual sons of *Vayu* in Hinduism emerge through the *Mahabharata* and the *Ramayana* respectively, as *Bhima* and *Hanuman* and while their narratives are uniquely different, they're both in these stories associated as forces of power and strength restoring *Dharma* (justice and balance). *Vayu* enacts disruption just as it enacts life. While this research of a politics of the air is not associated with

regional spiritual historicity or its belief systems, perhaps a note can be made between the abstractness of this epistemology of the Holocene with the current quantitative particulate-sensing air-partitioning density-measuring system in the Anthropocene where air is constantly expanded as a knowledge commodity by communities to only participate in its transformation. A world after the ontology of *Vayu* is not the death of *Vayu* but the rearticulation of its composed being. *Vayu* teaches me that while the conceptual apparatus of pollution is based on anthropogenic emissions based on anthropocentric activity - the air takes it and becomes it. *Vayu* assists the imagination to realize that an ontological openness in the reading of matters, is to actively observe organics through death and life.

“We” it seems are constantly submerging ourselves into myths of earth and atmosphere. The river Yamuna that Delhi is built around is one such example, where the literal desired submersion of people in its polluted waters takes place, waking fascination as to the entanglement of imagination and matter that are enacted, in its deeply polluted waters where anthropogenic contamination has ended several types of life in its water. Images such as the one below (taken from a newspaper file) can always be found in the media around times of festivals where members of Hindu communities attend their bodies into the water of the river in reverence, despite the river’s transformed state.



Figure 28: Photograph published in the New Indian Express from a Press Trust of India file for a story on 1st November 2020, accessible here:

<https://www.newindianexpress.com/cities/delhi/2020/nov/01/frothing-in-yamuna-detergents-in-untapped-sewage-major-reason-2>

Discussing the Yamuna river in the Yamuna Manifesto on a similar note, juxtaposed next to Sheba Chhachhi's 2011 Black Waters Will Burn installation art piece floating on the Yamuna are the following words, that "the feminine theology of water and nature works paradoxically. In itself, the act of sacralizing nature can both generate the desire to protect and nurture as well as obscure the need to protect. Needless to say, many of these ideations have in recent times been ripe for ethno-nationalist belief systems and oppression."⁴⁷

The materialisation of divinity is never out of its trouble but it opens interesting questions into the troubles of anthropogenic matter, its work and forcings into the monsoon. As Chhachhi notes "The divinity gets dematerialized - separated from the embodied material body, perceived as all powerful and meta human, meta physical, therefore not needing to be cared for by ordinary mortals" (Yamuna Manifesto, 2011, p59). This is noted in the context where the Yamuna River is seen as holy and as a female deity, with the characteristics of a mother who cleans up after her children, the human expectation that anything that's thrown into the Yamuna is cleaned by it (ibid). While *Vayu* is masculine, much of water in Hindu systems is feminine but these reliances and cosmic assurances of nature expose a political problem to their use and translation in the Anthropocene. To consider *Vayu* as an ontological force is to also acknowledge that while we live in the world of the *Vayu*, *Vayu* exists in the water too, where humans cannot breathe. Thus, *Vayu* is not a facilitator of the medium but is the force of materialisation that interconnects, interrelates and makes things what they are – for "us" to exist. It is known these days that the section of the Yamuna passing by Delhi consists of little or no oxygen (in some seasons) and thus very little river life (Nandi, 2018). Thanks to the barrages and high influx of industrial contamination, the Yamuna is a river that tends to have little air in its water. The monsoon we are told temporally rejuvenates the levels of oxygen in the river. It brings back life. It revitalises the possibility of animacy, literally. Consider then the stickiness of the aerosol with oxygen. Consider the stickiness between different states of hard and soft matter, material and gas.

⁴⁷ For instance, the state opened the Kumbh Mela in 2021 despite being enveloped within the condition of a pandemic, triggering a second wave of infections in the region. The Kumbh which happens around 12 year cycles is a major site of human and river confluence, bringing together large gatherings in their millions at what some argue to be the perceived confluence of three rivers – the Ganga, Yamuna and Saraswathi. Politicians from right wing Hindutva movements often use the analogy of motherhood, rivers and land in galvanizing communal sentiment. So while it is interesting and useful that rivers are sacred, one must also note that the sacred-ness of the river is also what makes it ripe for the politics of injustice.

Consider how they are convection and that they are also *fall* and in their falling, oxygenate the possibility of breath to lives that live underwater.



Figure 29: Sheba Chhahhi's river installation titled *Black Waters Will Burn* (2011) at the Yamuna River.

Image by the artist accessed here:

<http://artasiapacific.com/Magazine/77/ARiverOfMemoriesShebaChhachhi>



Figure 30: Picture of monsoon clouds/airs suspended over/on/into the Yamuna, as photographed from the Noida side of the Okhla Bird Sanctuary in Delhi NCR. 4th August 2019. Photograph by author.

Accepting the materiality of air

The particle calls for a re-simulation of how a researcher understands the air of the monsoon. Aerosols in the Anthropocene assist an ontological breakdown between distinctions of the anthropogenic and the natural. This calls for a reassessment of how one understands the air of the monsoon. These particles help me in writing monsoon stories across the micro, meso, marco scales onto an imagination of monsoonal acceptance and becoming. While particular assemblages make aerosols in the context of Delhi readable, I'm interested in drawing out their work that transverses time and space - extends material situatedness onto monsoonal futures. This trouble that monsoon air creates is a rich spatio-temporal opportunity for this project. Drawing from New Delhi and the review of aerosols, enables unique registration opportunities in how monsoon airs can be read and understood. Writing a monsoon air methodology after-all is to assume the instability of nature-culture where the monsoon washes up categories drenching and opening up knowledge. In-fact the very language of *understanding*, possibly limits one's ability to hold on to the apparatus of monsoonal becoming. Does understanding hold the capacity to hug the knowledge of the monsoon? What form of understanding could that possibly be? Understanding can only be a mere opening, a perspective, a little something within air's world.

Let me clarify. A technology of visibility only reproduces a methodological conclusion of sighting matter in the assemblage of cartography. However, if we consider the air of the monsoon as vital, living agency - in/of itself - what kind of methodological apparatus could thus be developed? Let me take Barad's (2019) assistance in describing this (routing to her point on hospitality) - "The fact that *this structure of hospitality* is not limited to the human but rather is in the very nature of nature is vitally important. For it means that the self—or should we say "itself," which is not "itself"—*is not merely interrupted by human others but also by a host of other others, including the hauntological relationalities of inheritance and the hauntological wanderings/ wonderings of nothingness*" (Barad, 2019, p543).

The language of aerosols and the air are bound just as the monsoon binds air and matter to geography and geology. The air 'itself' here, is an attempt at awakening description to help theorise the force, that is of the monsoon. In the paper cited above, Barad (2019) argues that matter inherently has in itself, a response to the theorisation of the void. If the invention of meteorology was a response to the white curiosity (from the 1700s and 1800s) of what-is-it-that-this-weather-is-doing in addressing it as a meteorological phenomena of a single monsoon – pushing the ontological world of everything that lives under "monsoonal" shadow into the pit of phenomena – isn't it writing a void in its premise? That phenomena as an authorship of making void legible, bringing up the obvious question – who is it that writes the void? If anything, I have insisted that the monsoon(s) in its aerial multiplicity is not a void – and neither is it this medium like outer space. It is the matter within which everything that seems to matter exists or can exist. My imagination like a billion others can dream of the stars but it's very unlikely we can breathe there, or even afford a sense of love, a sense of life if we escalate ourselves into a higher altitude seeking breathing – forget the actual arrival to a star, before which one could conceptually and materially burn. Doesn't even the mere presence of pressure at higher altitudes teach us that the air is the material within which *this* is – that it is a medium only because we take it for granted – it is a medium only because communities wanted to extract imaginary value out of it for economic and political systems. It is a medium only because its matter allows for waves (in all its diversity) to move and communicate between artefacts. The air therefore, at-least in this offering of the monsoon is not a medium. I view the medium to be that void, in researching, writing and thinking within the air. The least I can do is keep that theory out of colonial grasp – because why after-all should a methodology of extraction and subjugation be interested in the liveliness of air when all it needs to do is essentialise it as measurable phenomena for the games it wants to play.

For Barad (2019), a notion of radical hospitality needs to be developed where matter's potential of interrupting hegemony or the force of colonial reading is settled and inscribed. Aerosols compose certain stories of violence but so is the industrial, agricultural, capitalist, state sanctioned lock-in between nature-culture webs of nurturing and distributing matter. Barad writes - "After the end of the world—the world of capitalism, militarism, racism, the ending of these structures of violence even if realized only locally and momentarily, if only for the time-being—in the aftermath of the downfall of hegemonic ways of thinking founded on the binarism of us/them, when instead of drawing lines in the sand, the practice will have been/is one of looking to the wind, like the Marshallese indigenous practice of wave-piloting, riding the diffraction patterns of difference/differencing/différencing guiding us along alternative paths, transformative alchemical wanderings/wonderings." (Barad, 2019, p544) I have quoted this line before but I evoke it again to say this – that the monsoon offers us the opportunity of those ends so many times over and over and over again. Even as aerosols enable me to argue that the monsoon is more than a season and is effected by temporalities across scales and times drawing the season out of its box – it is that wind of density where the possibility of the ocean being in the sky, post its saltiness where the freshness of water absorbs everything that is in the air, as it sways the possibility of life for every construct of year that people (and life forms) of these lands have known and will come to know – isn't every year an opportunity to write with the monsoon – to offer it different kinds of aerosols – moving from ones that kill to instead ones that nourish more multispecies assemblages? I don't know if this can happen but the reason I say so is because it can be a theoretical possibility and it seems to me that the carers of cities and forests have a role in the production of those stories. I take a cue from Barad (2007) that the project of truth hunting does calm technoscience down from its assertions of what is it that is supposed to be real about the air of many worlds. For a monsoon one, monsoonal airs amplify the biodiversity of truths, and sometimes even wipe it all out, laying the earth bare as if the monsoon was a lie – although the sky was blanketed grey the whole time.

A monsoon air methodology is therefore also a way of telling monsoonal stories. The monsoon is the methodology and this writing is an experiment in enacting research, participating in the highly entangled flows of monsoon studies. An attempt is made therefore, when feasible to explore spatio-temporalities of aerial registration. Such as, of the dioxins in Okhla's power plants, the ridge's monsoon forests, the city's waste dump, the pre monsoonal dust storm and the physical stickiness of the monsoon - all found partially, during fieldwork - stories of which then interact with works from other disciplines and geographies. Particulates in the

Anthropocene transform clouds and relations in/of the air. In upcoming work, I explore linkages between desertification, pre-monsoonal dust storms, Delhi's city forests and the monsoon. Following ISRO's (Indian Space Research Organisation) desertification reports in the New Delhi National Capital Region, I initially found stories of how monsoon currents and airs are symbiotically linked with dust and other matters. It contributes to the monsoon air methodology, discussing Delhi's entanglement and materialisation.

For Latour (2017) "Gaia is an injunction to rematerialize our belonging to the world" (p217) but if anything aerosols and a transformed monsoon air only show us that the materialisation has already begun and we're inside the re-materialisation of air. It is perhaps here that a narrative of production and dissipation exists, where time and space collaborate through sites in the city, where the mesh (Rodriguez-Giralt, Tirado and Tironi, 2014) of monsoon air integrates the anxieties of agricultural carbon, bio-political infrastructures and the highways of modernity with the glacial melt, schizophrenic rain and particulate simulations constantly flow, as viscous hyperobjects (Morton, 2013) or *something-more-specific-like-the-monsoon-itself* and are actualised in/of the Anthropocene. Through glimmers and a few captured moments of this, within emergent realities of monsoon air, this research through New Delhi intends to question some of the assumptions we might have as social beings/kin of the air.

Conclusions with shimmer and swirl as aerosol continuity⁴⁸

Consider the moment of shimmer that I evoked from Bird's (2017) work earlier. That time when things came back to life. That time of "brilliance" (pG54) she talks about in north western Australia, which kisses parts of the global monsoon system as theorised through the inter tropical convergence zone. Shimmer as an idea of absorption that retains wet livingness till more shimmer bursts into time is such a monsoonal sense of place and description. What if shimmer could be the argument? That the work of writing – the work of imagining – the work of figuring in a world of aerosols and toxicity is to figure shimmer – that it is the work to create the absence of its absence – that shimmer cannot be afforded to be lost. Monsoon stories are often always intergenerational. *This* time of the air is spatiotemporally entangled with the times and airs that

⁴⁸ A version of this section can be found in my article for Hyphen Journal under the section "The Ghat will accept your depression." See: Bhat, H. (2019). 'As I sit down to write a monsoon story without cloud bands – some mucus, confrontation and sadness.' Hyphen Journal 1. http://www.hyphen.space/journal/issue_1/.

have been made and are yet to come. Even when the shimmer of the monsoon is a violent one, it is arguably never hated and/or rejected. Not because one can't but people usually don't - because to accept the monsoon is to accept monsoonal life. The work of modernity is a process of monsoonal management, and sometimes, expulsion. A monsoon air methodology teaches me that monsoonal detachment is impossible and is an inheritance of colonial fantasy. This is why writing a monsoon air methodology is a political process of writing an air of acceptance and attachment. Aerosols teach us that the fabrication of their work on human bodies (as pollution) is only a very small aspect of the overall worlding of aerosols. To bring anthropogenic aerosols in conversation with the shimmer is to bring the future of life-worlds in conversation with anthropogenic materiality. Delhi is fertile ground for this conversation, as the commissioned entry point for this project. In the next chapter, I explore monsoonal interlinkages between pre-monsoon dust storms, desertification, an emergent shrub species and Delhi's city forests.

Unlike the western ghats mentioned earlier, the ghat of Delhi is a space by the river waters of the Yamuna where steps or some slant in mud, lets you step into the water or stay for a while in its breeze. It is also a site where cremations take place. "The ghats will accept your worries," "the ghats will accept your offerings," "the ghats will accept our suffering" is what a local resident of the ghats in a seemingly theological current told me.⁴⁹ I overheard a conversation she was having with a man, complaining about a court case to do with their housing settlement. Acknowledging my presence having spent some time there, staring at the river that evening – she lets me in to her speech. "What are you doing here?" she was interested to know. What was I doing there? I told her that I had just come for a visit and I study the weather (in the interest of simplicity), and wanted to see the river. "Please be comfortable" she told me, "nobody will come to disturb you." "People come and go," – "whatever they do to us, this is where we will come to die," she said, pointing at the direction where the cremations took place. The "they" was a reference to the courts, to political power, to financial and legal subjugation. The "this" was a reference to premise, circumstance, condition, life, death, air, water, earth, shelter, departure. I think. Perhaps.

Writing about the airs of the monsoons is a very peculiar kind of privilege. With regard to Delhi, it pushed me in developing a heightened sense of love for a city that I did not like very much. It encouraged me to look again, ask again, and think again about matters that I would otherwise have ignored. As the temperature, carbon and toxic condition of life worlds across spaces accentuate and change, the monsoon as a thermodynamic, physical, biochemical and ecological

⁴⁹ All said in Hindi but transliterated here to English.

being also changes in the way it relates to the life world it has sustained. In describing airs literally, such as the air you are in by the Ghats of the Yamuna in New Delhi where open cremations take place, everything comes together. A boy clears the sludge for boats to park. College students with DSLR cameras, accompanied by a local boatman, throw crumbs into the water to attract migratory seagulls to circulate around them. Bodies' burn at the Ghats. Ash rises in the air. Every few minutes you can see the Delhi metro pass by on the bridge. The river, like oil, reflects the evening sun through the Delhi haze. Some plastics float.

The lifting away of life by the monsoon through its changing behaviour – sometimes extreme dryness, and at other times extreme wetness – confronts us (Narain et al, 2017). The disappearance of water from our mountains and the killing of our rivers confronts non-human and human communities across the subcontinent to negotiate ways of finding water and re-dealing with it, as dry air takes it away. Breathing in the Ghats, one is keenly reintroduced to the fact that the air is material and as bodies' burn, other bodies breathe those matters. A monsoon air methodology, amongst other things, gives the researcher an insight into how the air is writing its own stories. Following those disciplines invested in the matter of these airs takes the research to different places where we get to see how monsoon airs mingle with, and create, new conditions and circumstances. Navigating the hazy air, Siberian seagulls circle in celebration of being fed industrial crumbs by the Ghats of the Yamuna – they take us through a different story of a winter air mingling with a monsoon air. The richness of keeping analysis slightly suspended above the ground exposes the work to possibilities of a politics of monsoon air: a methodological reframing of air matters by the monsoon. The monsoon read through this political figuration is more-than-cloud, more-than-water and is definitely more-than-a-fluid-measure. The air enacts its politics for 'us' to see. Methodology in some sense, is indeed inherited. The monsoon becomes more than a volumetric measure. By thinking with its aerial entangled complexity, it becomes more-than-a-season. The aerosols of winter allows us a way into that cross-seasonal storying of monsoonal pasts and monsoonal becoming. It becomes a force that ends up doing so much more than what we give it credit for. Like the "seven-hundred-year-old rain" that swirls through the "bottomless chasm..." saving "the village from a terrible flood" in the Nagaland inspired novel *Son of the Thundercloud* (Kire, 2016), the air, older than all of us, has been in a long conversation with the ocean and the earth and is thus older than methodology itself – "its" ways animate the city and aerosols into and onto broader swirls of circulation. I visit Kire's story in the final chapter on time.



Figure 31: Delhi Ghats. Winter 2018. Picture taken by author.



Figure 32: Siberian seagulls feeding crumbs offered by visitors at the Delhi Ghats. Winter 2018. Picture taken by author.

Monsoonal entanglements of the *kikar* and the dust storm ⁵⁰

Introduction

Continuing from the story of aerosols, and the way aerosols story with the monsoon, in this chapter I attach with ideas and matters of ‘forest(s)’ linked with the New Delhi National Capital Region in analysing and articulating a politics of a transformed monsoon air. I think of this as a continuation from the aerosol-story, where the forest (or what is thought to be the forest) participates in the metaphorical and literal breathing of the air, arguably filtering and making it, and playing with the multiplicities of winds. I think of these forests as bodies that are perceived to have certain capacities of regulating dust (aerosols) and the interacting natures of air, waters and grounds. Forests (a term that gets problematised in the flow of this chapter) is used in this chapter to both indicate the conceptual category offered to certain zones by the state and the contextual spacetime of ecological emergence of certain multispecies stories. In this chapter, the monsoon forest receives conceptual, material and metaphorical treatment (as forests linked with the monsoon). As this living being of the monsoon forest changes: detracts, shifts and ruptures to become something of a different kind of relational form - I try and think with the anthropogenic forces that attune to this kind of forming and becoming.

In Delhi, I do this by thinking with the Delhi ridge on which many of Delhi’s city forests are located. My material interlocutor for this story of a transforming monsoon air is a small tree species called *Prosopis juliflora* which is locally known as *vilayati kikar*. Scientifically known as *Prosopis juliflora*, it was introduced by the British in the Delhi ridge in the 1900’s and over the past several decades has become the dominant invasive species of the ridge and the Aravalli range.

While this chapter briefly explores and analyses certain details about the anthropogenic history, biology and ecology of the plant, I must clarify that the plant is only a facilitator in the development of an argument to expand a monsoon air methodology. In telling plant history and story, I aim at diving deeper into vegetal possibilities of understanding the monsoon and its aerial relations differently. Observations on the story of the *vilayati kikar* assists in the drawing of the *kikar* as an analytical tool in thinking about the transformation of monsoonal life and monsoon air relations. The *kikar* assists in conceptually intercepting several important movements without

⁵⁰ A shortened version of this chapter has been accepted by the journal *Geohumanities: Space, Place, and the Humanities* published by the American Geographers Association and Routledge/Taylor and Francis, as of the time of this submission. The paper version of this work is titled *Becoming the Monsoon Forest: Emergence in the Breakdown of Categories*.

necessarily forcing distinctions from one against the other. For example, in the section titled *Foresting the Air*, I argue that entangled changes in the monsoon forest and afforestation fail to address the emerging *aandhi* (summer dust storm). The dust storm grows regardless of theories of barriers implemented to control it. The air draws out an intrinsically different methodology from assumptions that are often enforced on it. As the air is not the medium but the becoming of matter itself, materials (or wholes) of trees and forests are not just submerged in it but are also in and of the air itself – they make air. The dust storm through its growing intensities clocking into monsoonal timelines also opens up a conversation with the next chapter on a theory of change (of time) with the air of the monsoon. Therefore, as a facilitator, I assess that the *kikar* is informative for an interesting sequence of intra-action in understanding the matters of anthropogenic change and a transforming monsoon air: its materials, concepts and discourse.

There are two concepts that run through this chapter that work towards a monsoon air methodology and contribute to the current of the project. They start out as terms offering the reader a basic meaning or a sensibility of what the term can address. I intend, through this chapter to flesh out how these concepts, so as to be made visible through the story and development of the argument. The two concepts are “emergence” and “stickiness”. While we’ve seen the emergence of aerosols in the previous chapter and the development of stickiness in a monsoon air methodology, in earlier sections, I aim at expanding those forces into the storying of the *kikar*, the ridge, and the monsoon.

This chapter consists of two parts, following the introduction. These two parts are titled *Vilayati Winds* and *Foresting the Air*.

The first part titled *Vilayati Winds* is divided into four short sections.

- > Introduction to the *vilayati kikar*
- > A perspective from Delhi
- > These two siblings of *Prosopis*
- > Enzymes, Seasonal Light and Becoming Monsoonal

In the introduction, I briefly introduce *Prosopis juliflora* and its anthropogenic entry in India. In ‘A perspective from Delhi’, I discuss the politics of the associations between the shrub and the Delhi ridge. In ‘These two siblings of *Prosopis*’, I compare two kinds of *Prosopis*, one invasive and the other indigenous in discussing human nature-culture relations. Here I also discuss the

presence of a certain kind of colonial stickiness in both the reading of emergence and difference. Stickiness as a feature of several monsoon related conversations requires careful treatment with specific alliances. Stickiness also continues in the imaginary of the enzyme which is discussed in the next section. Finally, in ‘Enzymes, Seasonal Light and Becoming Monsoonal’, I zoom-in with studies examining the adaptation of the *kikar* and its protein responses to sunlight and air - extrapolating from it a speculative argument of a form of becoming-with monsoon air. An enzymatic relation can be viewed to be something of a plant-scene (thinking here with Natasha Myer’s (2017) provocative invitation to think with the planthroposcene) which allows for the *kikar* as a sample amongst other sticky figures expanding air-work through ongoing and continuing processes. Enzymatic relations, as a conceptual act used to scratch out from a process invisible to the human eye, a certain kind of living materiality between leaves and the air pushes for a monsoon air methodology to work both as an ethical project of monsoonal figuring where aspects of empirical understanding meet conceptual speculation as a theory of monsoonal change.

Each section explores particular nuances of the air entangled with the subject and attempts at furthering a thick description of the invasive species, the anthropogenic monsoon grounds of Delhi and an ongoing monsoon air methodology. Note that the last section of both parts explores a particular kind of speculative becoming-with. They both speak to the argument I make, that a monsoon air methodology opens up ways to think of emergence in both more-than-human and monsoonal ways interlocking a certain kind of speculative intra-activity in the forming of worlds.

The second part titled ‘Foresting the Air’ is divided into two sections.

- > Afforestation and the monsoon forest
- > The emergent pollination of dust

The first section engages with the ridge and the *kikar* by drawing from the analytical toolbox of the state, hence titled ‘City Forests’. Here I open a discussion on legislative stickiness, thinking with Kohn (2013) on a semiotics of language and processes of forming and making-with (Haraway, 2016) situating it in the context of ongoing stories of environmental degradation in the Aravalli range, citing literatures on the ecologies of the Delhi ridge and analysing the *kikar* in its emergence (Kirskey, 2015). Emergence and its use in this chapter, drawing from Kirskey’s

conceptualisation of emergent ecologies helps me develop an analysis that is more-than-human in two ways. Firstly, the *kikar* as a sample can be viewed to perform a certain kind of emergence. The emergence that I am more interested in clarifying is of emergent monsoon air collaborations. Enzymatic relations speak to this kind of speculative possibility. In this part, afforestation, its politics and function in the churning of landscape is questioned as an act in the development process of a monsoon air methodology. Some of the questions the second section answers involve questions on the uprooting of monsoonal life and an inability to escape monsoonal figuring.

The second section titled 'Afforestation and the Monsoon Forest' furthers section one by entering the discourse of afforestation and thinks about its implications to a monsoon air methodology with monsoon forest stories from Delhi. An emergence here involves disappearances and appearances (forms of replacements and displacements) of species, materials and forms but is eventually united as emergent by the air of the monsoon. As Kirsky (2015) notes, "When a forest is clear-cut by loggers or destroyed by volcanic eruption, emergent plants are the first to sprout. Nascent associations are able to exploit faults and fissures within established assemblages. They contain the promise of supplanting deeply rooted structures" (p1). The third section titled 'the emergent pollination of dust' concludes this part by offering a speculative becoming-with (Haraway 2003; Wright, 2014) between forms of pollination and dust emergence - asking if affordances against monsoonal becomings are even possible in the Anthropocene? I answer and argue here that a monsoon air methodology offers an opportunity to perceive attachments between matters, as processes of time-mattering (Barad, 2007) extend parameters of experience and time not just as forms of feedback loops - but an active intra-active forming based on monsoonal currents and atmospheres that carries matters in constructing times of speculative dust. This marks an important argument for this chapter that also facilitates on to the next which discusses time in reference to monsoon air in detail. I finally end with a discussion on afforestation and the fantasy of controlling the dust storm.

A note on method

As an exercise in transdisciplinary inquiry in the project, I use a variety of methods in gathering information, analysing and developing an argument in this chapter. Methodologically, the attempt in using methods creatively is to engage in the task of developing monsoon stories in the crafting of a monsoon air methodology. As Tsing (2012) articulates in paying tribute to Donna Haraway, the task indeed is "to refuse the boundaries that cordon nature from culture—and

besides, to dare tell the history of the world in a single sentence” (p141). Philosophically and literally, being enclosed in monsoon air as a human subject requires me to gather not just different points of view but knowledge from disciplines that operate research with methods and methodologies different from those that I’m normatively familiar with. Following the spirit of transdisciplinarity from my previous chapter, I continue to draw from scientific, cultural, socio-economic-political registers of knowledge production. This chapter has also profited from field work in summer 2018 and winter 2019 which allowed me to deepen my visual, sensorial and socio-cultural understanding of some of the actors in this story. Most importantly, data is acquired as much in perceptual and observational ways as it is embodied. In writing a sense of air in which one is enclosed, the air is often performative, literal and conceptual at the same time. However, it’s never treated as a medium and the non-human interlocutors such as the *kikar*, allow for a story of monsoon air matters to be researched, written and argued. What this means for the fieldwork preceding the writing is that fieldwork was a process of continuous information gathering - intentional, unintentional, conscious, unconscious - embodied and otherwise. Fieldwork was a way by which information gathered through literature were made sense of through a process of observation and conversation - of materials, intensities and monsoonal possibilities with/of the air - which participate in the furthering of the project. The key difference between the previous chapter and this one in terms of method is that I spent tremendous amounts of time – over days and weeks at different parts of the Delhi ridge – hanging out and experiencing its space-time.

> The viewing of the expansiveness of *juliflora* forests is met by the data produced by scientists who have studied similar sites. Different informational intersections are generatively produced in assisting the development of the methodology itself. A sense of patchy (Tsing, 2015) dryness is met with local meteorological data; extinction studies is met with the loss of local stories; a political air is felt as a conversational anthropological project.

> Here, intensities of information gather not just as constructive empirical nodes but acknowledge that a monsoon air methodology is exposed to a variety of flows in the informing of what could be a political argument. In the development of my argument, I intend for methods to speak to the project of assisting in the dismantling of nature-culture divisions. So, stories of science are treated in conversation with human and non-human stories. Some of these primary observations are brought together with analysis from secondary and tertiary sources in drawing out a monsoon air methodology. Walking, photography, conversation and other modes of

paying attention help me develop descriptions associated with the broader project of air literature, analysis and writing.

> During the fieldwork session of July-August 2018, I spent a considerable amount of time walking and exploring parts of the Delhi ridge and its forest areas that are accessible to the public. Observational notes taken during this time inform some of the descriptions used in this chapter. Conversations, interactions and more-than-human nuances during these movements inform a certain kind of representation that develops. While I did have conversations with a range of people including academics and officers of the state, it is actually the conversations on the move or during pauses with people passing by that seem to inform a situated sensibility, to the task of fieldwork, particularly on matters of the ridge.

The two concepts I work on in this chapter are of emergence and stickiness.

Thinking with emergence

In the development of a theory of emergence, I think with *Prosopis juliflora*, the invasive species, as an attachment site (Haraway, 2018), that is part of the story of emergence being described. Emergence is a powerful word and its use in this chapter begins with a vegetal emergence but is conceptually expanded to think with the emergence of dust and emergent formations offered by the air of the monsoon. I draw from Eben Kirsky's (2015) work on Emergent Ecologies where he discusses symbiotic associations between species in some of their emergent contexts where they disable pre-existing ecological formats of knowing and being. Stories of invasive species and extinction thread together but Kirsky theorises these ecologies to be something of an emergent yet flourishing form of trouble. However, an emergence here cannot be read as a linear emergence such as of an upward line in a graph (although some disciplines might choose to quantify emergence in a numerical way). This is because emergence can be read in diversity in reference to spatio-temporal time scales and most importantly offer an opportunity for political ontoepistemological ethical (Barad, 2017) considerations. For example, in the development of my argument, *Prosopis juliflora* exposes stories of colonial history, land regulation, ecological devastation, animal pollination, an inability to weed it out and an adaptation process that attunes with monsoonal change. *Prosopis juliflora* does not hold an ethical or moral task in this work but is an agent of anthropogenic threading - the life of anthropogenic forms, taking on intentional and unintentional (Tsing, 2018) formats and becomings. The process of anthropogenic threading

exposes not just relationality (i.e., how does a certain plant relate with the air) but how a species can participate in the elimination and replacement of indigenous forests - and thus be generative in thinking with a transformation of the air itself. Therefore, an emergent form needs to be read with political onto-epistemological ethical considerations so that it speaks to time - past, present and future, as the air of the monsoon sequences its own change and becoming. This becomes particularly clear with my argument on afforestation and the dust storm - that a monsoonal emergence tied with the monsoon forest and Delhi requires a collaborative monsoonal reading of plant matters and infrastructural matters as a project of air.

Thinking with stickiness

Stickiness in this chapter, which seems to begin as a metaphorical colonial stickiness is to be in fact read as a material-conceptual stickiness, that the argument intends on developing. It helps elaborate a certain inability to break away from concepts and matters but also seeks to think about how the inherent stickiness of monsoon forest's life becomes a site of manipulation. The *Vilayati kikar* and its history in Delhi and the Aravalli Range is rich with an environmental history of violence and economic landscaping. Akin to modernity in the subcontinent, colonial experiments reshape matter and time (Bhattacharya, 2018; Visvanathan, 2006; Nandy, 2009). This is where stickiness begins to story as a methodology, in this chapter. Afforestation claims managed for the practice of extraction and erosion management are sticky with contemporary afforestation claims seeking to manage the land and the air, in order to absorb carbon and beautify space. The *kikar* as a colonial experiment in afforestation is tied with a phantasy of the ground and the air detached from the monsoon. Yet, for Delhi and the Aravalli Range, the *kikar* as I will argue in subsequent sections sticks past, present and future onto-epistemologically and also raises ethical concerns of air, ground and time as a methodological monsoonal issue. This is why I call the plant, a facilitator in the development of a monsoon air methodology. While the plant itself can be seen as being influenced by the monsoon, it is not the research of the plant by itself that satisfies this inquiry. It is the political, ethical, onto-epistemological (Barad, 2007) entwining of the plant with its anthropogenic formation in the Indian subcontinent and the condition it speculates with the monsoon, transforming categories of forest lives called monsoon forests. This therefore also means that the potential for other more-than-humans to facilitate a discourse with the monsoon exists beyond this case study for a monsoon air methodology.

Stickiness informs me of a sensibility that coloniality is not cause enough for monsoonal complexity. Stickiness, also read with Kohn's (2015) idea of semiosis thinks with post-nature-culture understandings of legal forms entwined with plant forms. Coloniality here incorporates aspects that are more-than-causation and more-than-human. It speaks to the stickiness of the assemblage not just because it is literally sticky (like the gum from the bark of a tree or humid air in relation to human bodies) but because it historically, ecologically, politically and philosophically does something important. It marks the event in time. It marks time. At the end of ethical time, as Bird Rose (2012) argues, one needs new ways of making sense of transformation. Stickiness brings the body of the trees, the arid forest (both as a living and metaphorical figure) into the world of the air of the monsoon. It conceptually advances a theory of emergence to be understood as a sticky airy figure. Here, time is bodied and embodied in and with the air. This stickiness incorporates a certain kind of corporeality (Groz 2017; Alaimo 2010) and forms associations between formations within the air (Alaimo 2010; Tuana 2008) that include roots, leaves, aerosols, sands etc. Stickiness therefore conceptually becomes a project of fleshing out a monsoon air methodology by the generosity offered by monsoonal beings and becomings. Processes of deforestation, afforestation and otherwise urban transformation speak to certain anthropocentric desires of manipulating stickiness. Stickiness in a monsoon air methodology begs to differ – that the retainment of water-air ecologies from their smallest of scales is also oriented by the “desires” of multispecies assemblages entwined in monsoonal ways.⁵¹

Vilayati winds

An introduction to the *Vilayati kikar*

The term *Vilayati* in Hindi is said to have come from the English word ‘blighty’. The use of the word ‘blighty’ in the subcontinent is argued to have transformed locally as ‘*vilayati*’, indicating something foreign, the English, the ‘whitey’ and the outsider. In Delhi, the term *vilayati* is prefixed to a plant species that is scientifically called *Prosopis juliflora* and locally called the *vilayati kikar*. It is today extensively found in the Delhi ridge and several other forested parts of the city and by its extension the Aravalli range itself. It was introduced by the British in the 1900’s in north India and has found home in the biologies and ecologies of many of India’s arid and semi-arid landscapes. It’s strong influence on the biome and on local communities where it has made

⁵¹ The word desire here used as a metaphor – akin to asking what it is that the plant wants or does with the world.

home with has brought about the classification of the plant as an invasive species. The Invasive Species Compendium (cabi.org) catalogues the plant as an “invasive species, pest and host plant” (CABI, no page number). Its preferred international name is the mesquite but, in this chapter, I will be using the Hindi word *vilayati kikar* to address the plant, as its the term that is most common in Delhi.

Native to South America, this small shrub tree species was internationally used in colonial processes as a wood-fuel and fodder species highly adaptable to arid grounds and hence used in the project of afforestation. This *Prosopis* has multiplied over the past few decades to become a hegemonic cover over several of Delhi’s landscapes and the Aravalli range. The toxic alkaloids in its root system and its thorny branches deter the growth of other plants in its surroundings.

Hinting at a certain kind of emergence in the name itself, CABI cites Perry (1998) in the explanation of what *Prosopis juliflora* means “The origin of *Prosopis* given by Perry (1998) was ‘towards abundance’, from the Greek word ‘*pros*’, meaning ‘towards’, and ‘*Opis*’, after the wife of Saturn, the Greek goddess of abundance and agriculture. The name *juliflora* comes from *julus*, meaning ‘whip-like’, referring to the long inflorescences and flora being the flower” (CABI Invasive Species Compendium, 2018, no page number). Reddy (1978) observes in a letter from Lt. Col. RH Bedome (Conservator of Forests, Madras) to the Secretary of the Revenue Department of Madras in 1876; they correspond, “The *prosopis dulcis*, the *Prosopis pubescens* and *P. glandulosa* – are stated to grow best on dry arid soil. They yield hard and valuable timber and also an abundance of sweet succulent pods which are used for cattle feeding and also ground into meal. It is very desirable to introduce these trees into the fuel plantations in our dry districts; and I have the honour to suggest that the British Consuls at Galveston and San Francisco should be applied to for the seed. The *Prosopis Juliflora* is a species growing in Jamaica which I should be very glad to get seed of” (CABI Invasive Species Compendium, 2018). This letter marks an important moment as it solicits an act of movement of the seed from one world to another.

From the Imperial Kew Gardens in the following decades, the seeds of the *Prosopis* made their way to India where they found a new home. The movement of the seed as an anthropogenic formation and forming of worlds to come, offers an interesting case for short analysis. *Prosopis juliflora* travelled with the colonial hold guided by Caribbean currents and monsoonal energies in reforming grounds and airs in places to come. It is said that *Prosopis* pods protect its seed from the water (Solbrig and Cantino, 1975), during heavy rains. Oceanic dispersal is known to have been the mechanism for the distribution of *Prosopis* in regions such as the Caribbean. Thanks to

the layer of protection the seed gets, it is able to move and find ground, floating and moving in water. While the future of the fertility of the seed is uncertain in a turbulence created by water, the air that protect the seed inside the pod, gives it time to float and hope for a little longer, to meet soils where it can live and grow. The pod and the seed are hardy beings. In the Indian subcontinent, they are known to travel through the digestive tracts of animals in the process of them travelling and finding new grounds to live and grow. This movement allows me to initiate the framing of an analytic distribution and movement of seeds. The seed as something enclosed and pushed into the ground to break open to fuller life helps us think about the air of the monsoon in a different way. The seed through its temporal breakthrough with roots, stem, branch and leaves speaks to seemingly different worlds of moisture that are held by the air in the ground and the open air itself. The seed finds the monsoon in the Indian subcontinent.

The title of this section '*Vilayati* winds' is an opportunity to analyse airs through different membranes, flows and becomings. While much analysis is based on fieldwork, secondary data and literature, my attempt in this chapter is to write a monsoon air methodology with the assistance of the *vilayati kikar*. The *kikar* I argue helps me make a three-point argument in this first section.

> That (post)colonial afforestation and landscape practices to control the relationship between the ground and the air attempt human exceptionalism in an otherwise monsoonal world. The monsoon extends vegetal life as a sticky collaboration despite an anthropocentric desire to use afforestation as a methodology of aesthetic segregation and management. The *kikar* opens up an opportunity to understand how that story begins with Delhi and offers me a chance to draw speculations for a conceptual argument to be furthered in the next part.

> Comparisons between the *vilayati kikar* and an indigenous *kikar* open this chapter to stories of difference - how communities (human and non-human, literal and imagined) relate to the *kikar* differently.

> By finding home in monsoonal grounds, the *kikar* seems to have found ways to attune with monsoonal ways. This is articulated by an extrapolation of the *vilayati kikar*'s speculative protein rhythms that scientists inform us is adapting with the monsoon air of northern India. This I argue is a form of becoming-with (Haraway, 2008). It calls for a rethinking of what a monsoon forest is in the Anthropocene.

Each part of this section intends to speak to some kind of *kikar* and air arrangement that gathers and builds up, in how a monsoon air methodology operates with matters of the ground reaching out to the air and becoming the air. After developing these three arguments in this section, I continue on to the next section titled ‘Foresting the Air’ where I explore afforestation, the Delhi ridge, the monsoon forest and pre-monsoon dust storms in their speculative attunements with the idea of the *kikar* and the conceptual monsoon forest.



Figure 33: *Prosopis juliflora*. Image by R.L. Hensel, hosted by the USDA-NRCS PLANTS Database. US Forest Service 1919



Figure 34: *Prosopis juliflora* seeds. Image by Steve Hurst, hosted by the USDA-NRCS PLANTS Database

A perspective from Delhi

In her work titled *The First Garden of the Republic*, Amita Bhaviskar (2016) writes about the history of the presidential gardens on Raisina Hill in the Delhi Ridge. On a barren ridge laid dreams of a new colonial capital. For the two decades from 1917, she notes how the colonial caretakers of that land tried and failed to introduce several species in the greening of the Ridge. They desired the production of a habitat that was representative of power and a colonial future. The Ridge's arid and rocky condition did not make that easy. Furthermore, Delhi's extreme weather swings made it a challenging task for them to curate a botanical plan that would survive in its air. Annual extremes of 47.2°C and minimums of -0.6°C (Daily Normal Maximum & Minimum Temperatures and Rainfall, IMD, <http://amssdelhi.gov.in/forecast/Climate.pdf>) meant that plants had to survive through a wide range of temperature change through the year. The British failed several attempts at introducing and sustaining species from the Himalayas and beyond, to green the Ridge. To seek to green the Ridge, is to seek a certain kind of emergent process. Bhaviskar notes, "Though some native trees such as *ronjh*, *dhak* and *siris* managed to survive, it was the Central American Mesquite (*Prosopis juliflora* or *vilayati kikar*) that proved to be the most tenacious" (p.14). The imperial gardener, William Mostoe she notes had a real passion for this exotic functional tree. He would occasionally seed the plant himself, in tracts (ibid). This is where one form of vegetal emergence begins to operate. Raisina Hill draws *Prosopis juliflora* from other lands to levy the possibility of vegetal life that the British could see, at the Delhi Ridge. The hill after all through the guidance of Lutyens was engineered to meet a phantasy of opulence in remembering their home and articulating power. The image below is of the presidential estate on the right and the Central Reserve Ridge Forest on the left. Note that much of the green represented on the left is the *vilayati kikar*. The task of greening the Ridge changes not just the image of the Ridge from the air but also the air itself. This is why this first part is titled *Vilayati Winds* as this formation of coloniality with the ground begins to change the air.

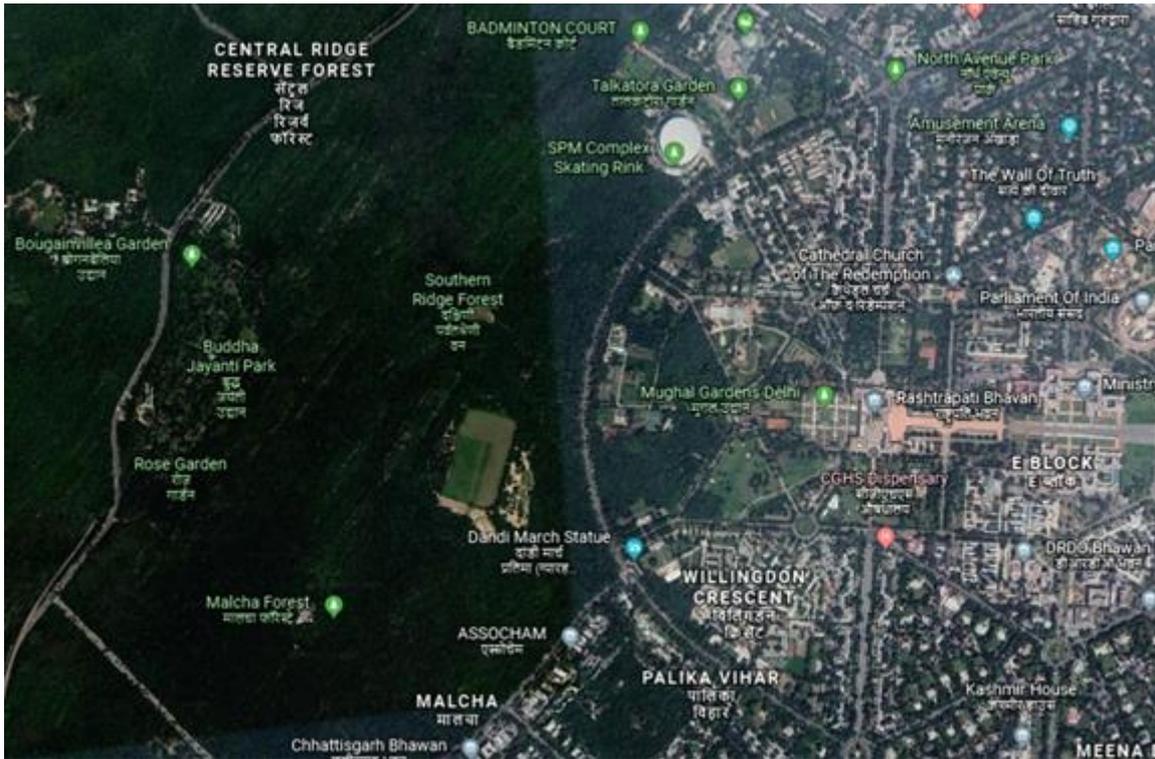


Figure 35: Google Earth image from 14/02/19. Presidential Estate on the right and Central Ridge Reserve Forest on the left.

Westward of Delhi, in Rajasthan, the British allegedly encouraged the South American import to be planted extensively, by the then king of Jodhpur – after successful trials in Gujarat. It was said that the king of Jodhpur himself participated in aerial seed drops, to plant *Prosopis juliflora* across the desert (Burrows, 2012). It was given the designation of a royal plant. Rumour has it that the king believed the wood from the species could be used in the production of aircraft wheels (Burrows, 2012). Maharaja Umaidh Singh was a passionate flyer and the founder of the Jodhpur Flying Club. During the Battle of Britain of World War II, he commanded the Jodhpur base (Parmar, 2016). Other explanations indicate a much more humble possibility of its use: firewood. This attempt of an anthropogenic emergence through the *vilayati kikar* is clearly visible in the airborne distribution of *juliflora* seeds. Reports from the CSE indicate that the Government of India continued the practice of aerial seed drops (from helicopters) of the *vilayati kikar* right after independence in 1947 over many of India's north western arid landscapes, including the Banni grasslands.

Through this collective choreography of planting between Delhi and Jodhpur, one begins to notice how the plant develops a conversation between the ground and the air. In time *Prosopis juliflora* in both Delhi, Jodhpur and much of the Aravalli Range came to be known as an invasive species. It came to be known as *vilayati kikar*, the *Prosopis* from foreign lands. The airs and

grounds of the Aravalli bind Jodhpur and Delhi through a *juliflora* story. These foreign winds influenced the Aravalli Range, the mountain range that linked the western edge of Gujarat and Rajasthan with Delhi. The lines of peaks, the Aravalli connecting Gujarat, Rajasthan and Delhi have been agential as quartzite matter in enabling the geological continuation of this vegetal life. The resilient root system was able to cut through to access aquifers and portions of the soil that were rich in moisture. The alkaloids in its roots, poisoned and deterred the growth of other species. It emerged as the *vilayati kikar*.

It is worthwhile to note that Reddy (1978) claims that the first *juliflora* introduction in India was in Andhra Pradesh in 1877. What is clear however is the navigational current that brought these seeds to the subcontinent transited via the imperial Kew Gardens where Mostoe, the gardener also worked before his assignment in India (Bhaviskar, 2016). *Juliflora* in Bhaviskar's account tells us how a colonial reading of land involves a separation in the treatment of an inside and an outside. The inside, as a space of curated gardening and the outside as a wilderness that needs to be managed. In the case of the latter, the tool of afforestation is used as a methodology of controlling land and the flow of air. For the seeds of *juliflora* and the journeys they make, they become part of the stories colonial power structures have told and retold on the profits of afforestation. Yet, they seem to offer us a certain kind of stickiness, an uncertainty if you will, on how the vegetation relates to the environment and the future. This stickiness unlike plantation legacies that are designed and implemented in the interest of capitalist extraction is a form of stickiness that is perpetually diuturnal but one that is of its own relational making. The seeds of *juliflora* journeyed through the Atlantic and Indian Ocean to get to the subcontinent and seeking assistance from the imperial project in its pollination, yet offer us an analytic of its own multiplication through its practice of living.

Bhaviskar's reading of power and the gaze from Raisina Hill informs us of an anthropogenic production of green worlds that transgress urban, rural, exotic, native and managerial boundaries. The *vilayati kikar* plots a story with the monsoon, its soil, air and animals in making new stories. As a plant versatile to life in dry, arid, hot and water scarce conditions, it adapted well to the grounds and the airs of North-West India. As a plant that could root deep into the earth, its soil and rocks, it found a way to manipulate the waters below to new streams of movement. By binding what lies underneath the ground, the surfaces that we see and the airs above the ground, *juliflora* exposes relationalities that are both intended and unintended. We learn from *juliflora*'s activity that humans are not separate from ecology but are constantly writing stories with several other non-humans as protagonists in their own versions of the story. It also exposes us to the

issues in reading a linear pathway of its monsoonal relations, in what Deborah Bird Rose (2012) calls the “embodied knots of multispecies time” (p136).

For a monsoon air project, the *vilayati kikar* helps get into a conversation on time knots between the monsoon, the monsoon forest and the trouble of species in the Anthropocene. This colonially sticky anthropocene, performed with the *vilayati kikar* opens up a conversation on air that troubles time-scales, the categories of forests and the enzymatic relations of a leaf with the air. This process involves the consumption of empirical truth with speculative becomings. Like the winds that brought the seeds of *Prosopis juliflora* from the Kew Gardens to India, *vilayati kikar* holds potential to creep into how the air argues in articulating monsoon stories. Especially when the story it speaks to is of a simple categorical shift – of native monsoon forests disappearing in the place of a different kind of forest, which slowly arguably becomes monsoonal. A comparative conversation between an indigenous *kikar* and the *vilayati kikar* can assist.

These two siblings of *Prosopis*

In the Aravalli range, two kinds of *Prosopis* intersect, scheming a conversation between Delhi and Jodhpur: *Prosopis cineraria* and *Prosopis juliflora*. The *cineraria* variant is called *Khejri* and is also the state tree of Rajasthan. *Juliflora*, because of its invasive influence is popularly called *Baanlio* in Marwari i.e. the mad one (Rahman, 2014). These two siblings of *Prosopis* signal different meanings and possibilities based on the stories entwined with them. By bringing some of these different meanings to the fore, I think with these two variants on how change can hold political difference not just between the ground and the air but also between humans and plants.



Figure 2a. Leaf shape of common Prosopis species (x 0.6).

Figure 36: Representations of Juliflora and Cineraria leaves from page 32 of The Prosopis juliflora - Prosopis pallida complex: a monograph. Henry Doubleday Research Association (HDRA), Coventry, UK.

There were quite a few people in Delhi who metaphorically told me the same thing – i.e. the project of weeding out the *vilayati kikar* was akin to the project of throwing the white coloniser out. Ironically, I wish we could build walls around them and force them to stay there, said one of them. The idea of a constructed material boundary to control the spread of *juliflora* is an interesting one, as an analogy that offers us a glimpse to the politics of its life. While the wind carries the pollen of the *kikar*, it only reproduces through the seeds in its hard shelled pod. Consumed by donkeys and other animals, the seed finds its way to the earth through the waters and digestive juices of these non-humans. So the *vilayati kikar* has many allies in its fold in the process of finding air and water. The siblings of *Prosopis* intersect at the scales produced also by their allies, in finding their movement.

For example, in Gujarat, satellite analysis by Pasha et al (2014) indicates that 42.9% of the Great Rann of Kutch is now under the cover of *vilayati kikar*. In appreciating the aggressive speed and

volume in which it spreads, Pasha et al observe that “the largest patch of *Prosopis* cover increased from 144 km² in 1977 to 430 km² in 2011” (p1481). The Rann in Katch, literally translated as the ‘cleft in the ground’ from Vedic Sanskrit is a salt marsh in the Thar Desert of Gujarat. From the Rann, the shrub is now also found in the indigenous grasslands of Banni in Gujarat. Like quartzite grounds that *juliflora* cracks open, the salty grounds of the Kutch open up to *juliflora*, its roots and air. In Gujarat, Bhutia and Singh (2018) read that *Prosopis juliflora* travels thanks to dung of wild asses “which is damp and nutrient rich and filled with seeds (the endocarp layer that surrounds the seed having been separated in the digestive process), provides the perfect conditions for the trees’ seeds to germinate and grow in the desert” (no page number in online edition). So *juliflora* out-scales the *Khejri*, in several places.

Imagine therefore the dusts and aerosols picked up in the Great Rann of Kutch and the range westwards of Delhi in an *Aandhi* of the summer before the rain. The *vilayati kikar* and the *khejri* speak to different rhythms and cultural ideas of the monsoon. The leaves of *cineraria*, also called as *Shami* in parts of India is used to denote a time of prosperity. The resilience of *Shami* through extremely dry periods feeds cattle and other herbivorous animals. It keeps animals fed till the rains arrive and far after they depart. While it shares the characteristic of being evergreen with *vilayati kikar*, it seems to occupy a different emotional and political register. One can argue that this is because of the ecologies that have been historically formed with the *Shami*. These are affective airs of difference. Furthermore, the medicinal use of *Shami* is archived in Ayurveda and is used in a variety of medicines (Garg and Mittal, 2013). During the period of Vijaya Dashami, also known as Dusshera, signifying the victory of the tenth day of the Ashvin calendar entangled with different mythical stories discussing the end of evil – the leaves of *Shami* (*cineraria*) are used to signify wealth and resilience. The period of Dusshera is also a post-monsoon time of harvest for some crops. The wood of *khejri* trees have also historically been used by some communities for sacred *yagnas* (vedic rituals centred around a burning fire). *Shami* leaves keep peace when wet airs are yet to come and also when they have far gone. The leaves of *Prosopis cineraria* signal hope in a post monsoon time. The environmental history of these leaves hints at how an *Aandhi* affectively inscribes different meanings in forms of nature culture collaboration. The difference between the airs of these two siblings of *Prosopis* speculate at two different ways of writing specific nature cultures.



Figure 37: Popular painting on a wall describing the massacre. The author's unknown but the image has been extensively reproduced. This copy is from Bharadwaj, 2018 for Newslandry.

In 1730, Maharaja Abhai Singh of Marwar commissioned the cutting of a *Khejri* forest for the construction of a palace. The Bishnoi community who saw the trees as sacred living beings, dissented to the proposal. 363 Bishnoi people laid down their lives protecting those trees from the Maharaja's soldiers. For each tree, a human life. In mythological Hindu storytelling, the *Khejri* is underneath what the deity of fire, Agni hides (Hans, 2016). It is interwoven into parts of the Mahabarata and Ramayana where the tree participates as an ally with positive human forces. These entanglements represent a difference in the situated bonds, these two forms of *Prosopis* have with the human. Recent reports indicate that the *Khejri* is in decline in Rajasthan due to climate change (Krishnan and Jindal, 2015). A reduced water table in an already arid landscape and increasing fungal infections have impacted *Khejri*. For an indigenous tree that survives even through the periodic sand burials of the arid west, climate change has even impacted its flowering, fruiting and possibility of survival (ibid). Yet, the spirit of the *Khejri* persists in human imaginaries, even as it finds itself in trouble. As Kohn (2013) purposefully claims "Spirits are real (see also Chakrabarty, 2000; de la Cadena, 2010; Singh, 2012). How we treat this reality is as important as recognizing it as such; otherwise we risk taking spirits to be a kind of real – the kind that is socially or culturally constructed – that is "all too human" and all too familiar" (p216).

The emergence of the *vilayati kikar* indicates the production of a different experience of time. The *Khejri* as the carrier of mythological stories and alliances is in semiotic disturbance with the

vilayati kikar. Anthropogenic formations in this context are affectively *Vilayati*, asking for spirit worlds to retreat in the arrangement of new mad ones (drawing from the word, *Baavlio*). Like the wind that seems to come from other places, to situated points of experience, the *Vilayati* affectively carries a force of rearranging context through its emergence. The *vilayati kikar* at the other end of the *Prosopis* family attracts a different kind of cultural attention. Having competed with the *Khejri* in some places, it inspires a sense of disturbance. Its toxicity to some animals and its reach into the deep water table of arid landscapes inspires resistance against it in some rural communities.

At the same time, the *vilayati* is also a technology of discourse for the post-colonial state. The Madras High Court in an ongoing battle in 2017 to weed *juliflora* out of public lands, stated that there was “no scientific basis” for its indiscriminate removal. The petitioner of this case highlighted its uses as “fuel, fodder, tree shade, soil stabilization, wind breaker and construction material in villages” (TNN, 2017).⁵² This particular case in the Madras High Court was upgraded to a larger bench which in summer 2017 ordered for the phased removal of *juliflora* by the administration (TNN, 2017).⁵³ In reference to the Madras High Court ruling, the forest department in Rajasthan set out to consider the NREGA program to clear *juliflora*, the very same species they had facilitated the planting of in earlier times (Government of Rajasthan Forest Department, date unknown). Entwined with ecology, economics and industry, the species is now nothing short of an active political participant in everyday human and non-human life in several regions. Its pods are processed in the production of fodder and its wood is burnt to make charcoal. What I will argue in the subsequent part of this chapter on afforestation is that colonial analytical figures are active throughout anthropocentric treatments of the *kikar* and the ground.

The *vilayati kikar* attunes to human activity in what Tsing (2015) calls “salvage accumulation” (p63). It is not a tree that is commercially harvested but an invasive species that communities and the state are making do with by transforming it to a commodity. This process managed by the state and its capacities generates an atmosphere of industrial sustenance where accumulation is practiced through means of industry based on a commodity that cannot be controlled. While historically, *juliflora* was seeded to tame the land as an act of colonial practice, it nurtures its own assemblage by collaboration and flourishing with the monsoon. Tsing (2015, p160) calls for paying attention to the kind of disturbance that reforms assemblages. Assemblages entwined and

⁵² Story from April 29th.

⁵³ Story from July 19th.

formed with and within the condition in/of the airs of the monsoon hold political form. By lacing the life of the two *Prosopis*, I argue that the atmospheres and stories of atmospheres inherited with the two *kikars* differ and offer different speculative possibilities.

From the sacred figures of the post-monsoon *Khejri* to the *vilayati kikar* that persists in conversations about the disappearing forest, the two *Prosopis* of these lands expose us to the complexity of inheritance and how different beings generate affective and political atmosphere. These lived relationships are not symbols but bonds that generate conceptual meaning. As Kohn (2013) invites us to think about a metaphysics of conversation, between the concepts of forests and the concepts of humans – I argue here that as *Khejri* stories travel to places such as Delhi where *Shami* rituals are practiced even with the absence of the *Khejri* in several landscapes - the *vilayati kikar* in contrast offers stories of uncertainty. The *kikar* is not just an uncertain actor in the landscape but is also an agent of generating an air of anxiety. As I follow up in the coming section, these categories can be contentious as even forms of anxiety catch up with monsoonal currents. The *Khejri* is a sample from the monsoon forest. The *vilayati kikar* as an invasive species I argue learns to become monsoonal, in its own way - offering a story of emergence generating a different kind of monsoon air - which is also an uncertain one.

The image taken below on a monsoon day in July 2018, prefixes an analysis of becoming monsoonal. This a photograph taken from Tughlaqabad fort where the Delhi sultanate was founded in the 1320's. A skyline otherwise known to be of largely arid patches of native species in widely exposed quartzite ground is now covered green with *vilayati kikar* edging the horizon. This is both a change in the state of meaning and matter. Through the next section, I elaborate how a closer analysis of the leaves of the *kikar*, drawing from scientific studies of the shrub offers interesting openings to the micro-political enzymatic workings of plant proteins in figuring the monsoon, and thus the monsoon figuring it. For a monsoon air methodology, the implication of this gesture is significant. Through enzymatic relations, the methodology takes on a granular approach. This acts as a precedent to the part on afforestation and monsoon forest change where the vocabulary of a monsoon forest is lost and rearticulated through political means. The granular informs the possibility of a political air and that very much is a methodological one.



Figure 38: July 2018, Tughlaqabad, southern Delhi ridge. Photograph by author.

Enzymes, Seasonal Light and Becoming Monsoonal

Through the brief observations offered in this section, I intend on showing how processes from the study of monsoonal adaptation of the *kikar* might shed light on what is considered invasive becomes-with the monsoon. As I learn from Wright's (2014) reading of Donna Haraway's term becoming-with - "a form of worlding which opens up the frames of what registers to us and so what matters to us (in part by recognising what matters to others)" (p279). Akin to the analysis in the next section where emergence is ontologically characterised as a collaboration across matters and materials, enzymes assist in the reading of becoming-with because they literally perform it. What matters to the monsoon and the dust storm may also matter to the *kikar* and the many other beings enveloped within the air. Becoming-with, Wright (2014, no date) observes, involves "a metaphysics that is grounded in connection, challenging delusions of separation." Essentially, there is no "becoming" in independence but always a becoming-with, some easier to observe than others. Enzymes, through their microbial work assist in the development of a monsoon air methodology by releasing some of these temporalities to be open for analysis. Through this analysis, one gets closer in seeing an intraactive politics of the living, the leaf in this instance that

speaks to the project of a metaphysical and literal attachment of an ongoing transformation in/with the air. So while some invasive life might be viewed as precarious and/or dispensable and/or necessary by some humans - it may have its own metabolic way of becoming-with the monsoon.

For this part, I draw conceptually from Natasha Myers's (2015) work on excitable matter to think with literatures on the monsoonal adaptation of the *vilayati kikar* and speculatively draw out temporalities of meaning deeply linked with a theory of monsoonal becoming. This section delving into the micro-cosmologies of a monsoonal becoming seeks to speak to an affective-but-real emergence; that empirical connections from the natural sciences don't need to stay within the technoscientific project of linear description but can and do have implications to the way an emergence is thought of, with and about. Critiquing the normative and simplistic representations of photosynthesis, Myers (2016, no page number) observes "Textbook diagrams familiar from high-school biology class are simplistic renderings of that utterly magical, totally cosmic alchemical process that tethers earthly plant life in reverent, rhythmic attention to the earth's solar source." Myers continues, "The photosynthetic ones - those green beings we have come to know as cyanobacteria, algae, and plants - are sun worshippers and worldly conjurers" (ibid). This act of photosynthetic observation precedes the story of contemporary afforestation in this chapter - which in some ways attempts to nurture an enchantment of photosynthetic possibility as a codified contract between the soil and the air. The *kikar* as a facilitator between colonial afforestation and (post)colonial afforestation marks an important transitional flow in the direction of this chapter.

For a monsoon air methodology, the implication of a photosynthetic methodology is huge as the living forest is attached with the monsoon - which means it is photosynthetically bound with the air. The monsoon not taken as an externalised weather system speaks to/with the forest (and what is left of it). The monsoon forest and the conceptualisation of the monsoon forest seeks to push back against presumptions of the possibility of detachment from the monsoon, even within an experience of its transformation. One of the ways through which a monsoonal attachment can be articulated is through the life of a protein enzyme called Rubisco. Ribulose biphosphate carboxylase/oxygenase otherwise known by its scientific name Rubisco is the most abundant protein on the planet and is an enzyme found in plants that facilitates the photosynthesis of carbon dioxide with chloroplast (Karcher, 1995; Sciencedirect).

As the RCSB Protein Data Bank describes it, this enzyme “forms the bridge between life and the lifeless, creating organic carbon from the inorganic carbon dioxide in the air” (Goodsell, 2000, no page number). Rubisco situates the process of carbon fixation in leaves. It is a protein that makes what Myers refers to as the “photosynthetic ones”: “Photosynthesis circumscribes a complex suite of electrochemical processes that spark energy gradients across densely folded membranes inside the symbiotic chloroplast of green beings” (Myers, 2016, p3). Natural scientists interested in studying the way leaves adapt in different airs and conditions are interested in factors such as the amount of photosynthetic energy that is available to a plant which is also called PPFD or Photosynthetic Photon Flux Density. They’re also interested in understanding what they term as Vapor Pressure Deficit or VPD which is the difference between the amount of moisture in the air and the amount of moisture the air can hold.

Shirke, Pathre and Sane (2018) in their study of the adaptive nature of the leaves of the *vilayati kikar* note the following: that the first cycle of leaves through spring “exhibit maximum carbon fixation under moderate temperatures and a wide range of PPFD. However these leaves are sensitive to high leaf-to-air-vapor pressure deficit (VPD) occurring at high temperatures in summer resulting in senescence”. Senescence is the aging of a leaf and its gradual inability to hold energy in its cells. In the monsoon, the second cycle of leaves “showed maximum carbon fixation at high irradiance and temperature with low VPD, it is sensitive to low temperatures causing senescence in winter” (p468) write the authors. In comparison with the behaviour of the *vilayati kikar* in other parts of the world, the authors note that the leaves of this *kikar* have well adapted with north India and its climate. The monsoon lets the leaves of the *kikar* relax. It gives it the ability to actually remain evergreen, reducing the brackets of time between leaf cycles. It attunes with monsoonal breath, if one was to consider a speculative form of breath that combines anthropocentric senses - of sight, breath, smell, sound into one - where the leaves of the shrub - adapt and become-with light and moisture during monsoonal times. This photosynthetic breathing that the *vilayati kikar* performs is a form of breath that is in-sync with the amount of moisture in the air and the light that makes its way through the airs of north India. This is enzymatic work. Shirke and Pathre (2004) in their study of Rubisco in the *vilayati kikar* argue that the plant “did not show significant changes even under extreme conditions of temperature” in tropical conditions (p137). They suggest that it has found a way to regulate and govern its protein metabolism through the seasons. Through the summer and the monsoon, the *kikar* attunes its enzymatic relationship with the air as a metabolism that draws from the air to stay alive.

These nuances offer complexity to the reading of the *vilayati kikar* as a drought-tolerant species (Vanthof and Kelly, 2017) and an evergreen species (Shirke, 2001). Shirke (2001) argues that the “high degree of reversible photoinhibition” seen in the leaves of this *kikar* at all their stress stages between seasons “represents a dynamic regulatory process protecting them from major photodamage” (p310). Photoinhibition is the reduction of photosynthetic activity caused by light (Baker, 1996) helping the *kikar*’s leaves from photodamage (being damaged by high exposure to the sun). Shirke and Pathre (2004) also observe that the reason the plant seems evergreen is because “unlike typical deciduous plants the shedding of leaves is also accompanied by the emergence of new leaves, thus the period of senescence and growth of new leaves is very short and the plants appear evergreen” (p131 – p132). This means that it figures the difference between perceived death and life in very short cycles - generating a sticky temporality.

A sticky temporality here is a perceptual temporality underlined to elucidate the closeness between perceived times of regeneration. For the *kikar*, this is an enzymatic process and I imagine this to be a sticky process. Stickiness here is a way of describing inherently attached materials and processes. The *kikar* is alive not just as a constituent plant body but is alive within and among other attached forms. Stickiness as an imaginary, analytic and mode of description helps me push against binaries and descriptions based on simplified assumptions of biological matters that are often conveyed through linear design. The plant as a complex ecological enzymatic more-than-human when thought through stickiness addresses an insufficiency in hegemonic aesthetic regimes that simplify the plant into human exceptionalist modes of understanding. Unlike the spiderweb in Alberto Corsin Jemenez’s (2018) writing on sticky entanglements which is a mode of capture - stickiness here is not understood that way. Stickiness here refers to the inseparable bonds that are predetermined by the air and the forms of life that exist within it. Recognising sticky temporalities helps one register more-than-human beings as formations that are immensely complex and driven through monsoonal relationships. Stickiness as a mode of description inspires a monsoonal hegemony is writing life and its ways. This is particularly important in this context because the arid monsoon forest is a breather of monsoonal life. Temporalities of aesthetic regeneration in plants that facilitate descriptions of the so called evergreen are stuck with the photosynthetic metabolism of the air. As Pathre et al (2014) write... that the second flush of leaves produced annually by the *vilayati kikar* during the monsoon display a higher rate of photosynthesis than those of that from spring, summer and winter. Times of the air are stuck with the way life forms become.

The *kikar* scales as a landscape because of its stickiness with the monsoon. Monsoon air nurtures stickiness and facilitates sticky temporalities as condensed forms of absorption (of light and water), as the shrub unfolds its living potential into time-frames outside the monsoon. This brings the *kikar* closer to the analytic of the monsoon forest, where an enzymatic led observation suggests that these *kikars* are also in some sense working with the monsoon. Therefore - between the cool and foggy winter where direct sunlight reduces and a scorching summer where moisture is lifted from the ground, the monsoon and the *kikar* hold an elemental conversation that helps the *kikar* live throughout the year. This form of stickiness can be thought of as 'becoming with' in a world of stickiness, offered through a wind reversal called the monsoon. Analytically, the reading of sticky temporalities helps one understand how things become-with in monsoonal atmospheres and landscapes. However, I want to push further, the analytical possibilities of thinking through monsoonal stickiness and the complex layers of description it can speak to, in the writing to come.

To study stickiness is to study monsoonal liveliness. In what I read from Myers's insistence on liveliness; is a different way of articulating an intra-action that recognizes that the literal and representational are interwoven and as Myers (2015) insists is a way to "refuse to make clean distinctions between organisms and machines, or between vitalism and mechanism" (p). The stakes of liveliness are high in a world largely ordered by neo-colonialism, capitalism and scientific communities that partake in the legitimitising of those projects. The appropriation of the forest to the frame of contemporary carbon capture has some interesting implications, in this discussion. As a political discourse responding to the emerging ways of monsoonal life such as forests and cities are described, I am interested in thinking with the "invasive" monsoon forest in asking questions that trouble normative descriptions of complex monsoonal ecologies. An enzymatic relation opens up a way of reading stickiness as an ontological state. It helps me go beyond linear descriptions of ecology such as the feedback loop which is used commonly in discussions to do with afforestation. The loop between death and life, the loop between air and leaf, the loop figuring elements and states in the performative gaze of a control system is problematic for a monsoon air methodology. Stickiness deters the imaginative function of the feedback loop by generating what I'd like to describe as the consistent inconsistency of stickiness. Epistemologically, an interpretation of stickiness is always partial because stickiness affectively and/or effectively doesn't assert a function of absolute truth but facilitates the description of phenomena being sticky. The tree is not a service to the air and enzymes are not services to the tree. They are ontologically sticky matters in the thickness of world making.

Writing about protein science, Myers (2015) in her ethnography of protein modelling writes “that rendering molecules as machines is a craft practice, one that makes it possible for practitioners to visualize and intervene in molecular worlds in particularly effective ways” (p161). A feedback loop as an environmental loop or a methodological loop of understanding within the environment does something similar in the natural sciences. Stickiness here, is a way out of the imagined loop into a membraned form of aqueous and aerial consistency/inconsistency. Like the slimy gum from the bark of a tree between two fingers - inconsistent and consistently sticky as you feel its material presence. Between ideas of death and life of the leaf, is the sticky living - just as the *kikar* enzymatically makes sense of light, moisture, bacteria and aerosols in monsoon air - in stickiness.

As Povinelli asserts in the Karabing manifesto “In turning away from each other, entities withdraw care for each other. Thus the earth is not dying. But the earth may be turning away from certain forms of existence. In this way of thinking the Desert is not that in which life does not exist. A Desert is where a series of entities have withdrawn care for the kinds of entities humans are and thus has made humans into another form of existence: bone, mummy, ash, soil.” (Povinelli, 2016, p28). What I argue in the subsequent section is that the *kikar* participates as a sign in the process of emergence, which is a consequence of a series of attempted detachments. Situated afforestation practices at the crux of sticky narratives bring to light some of the multi-material-scalar complexities of the changing (literal) matters of the monsoon. Incorporating entanglements of pollen with sand and the summer with monsoonal time, I will hyphenate my argument with the emerging dust storm that meets other forms of emergent beings and becomings - becoming-with the monsoon.

In conclusion, I will argue that the cellular life of the *vilayati kikar*, through its roots, bark, enzymes, alkaloids and proteins offer speculation to an otherwise normative political reading of this species in/with the monsoon. Its alkaloids clear out other vegetal life from growing around it but its adaptive photosynthetic metabolism brings it close to a monsoonal cycle and its air. It survives through drought and it prospers with rain. It's attunement with moisture might seem violent to biodiversity and that's why it is colonially sticky. However, the *kikar* holds its own form of stickiness that makes sense of the air. It represents the trouble that does not leave but teaches us to see the city's forest in metabolic and aerial terms. It shows us that enzymatic

relations are embodied in monsoon air. Yet, life figures with the air of the monsoon. Even invasive life, becomes monsoonal.

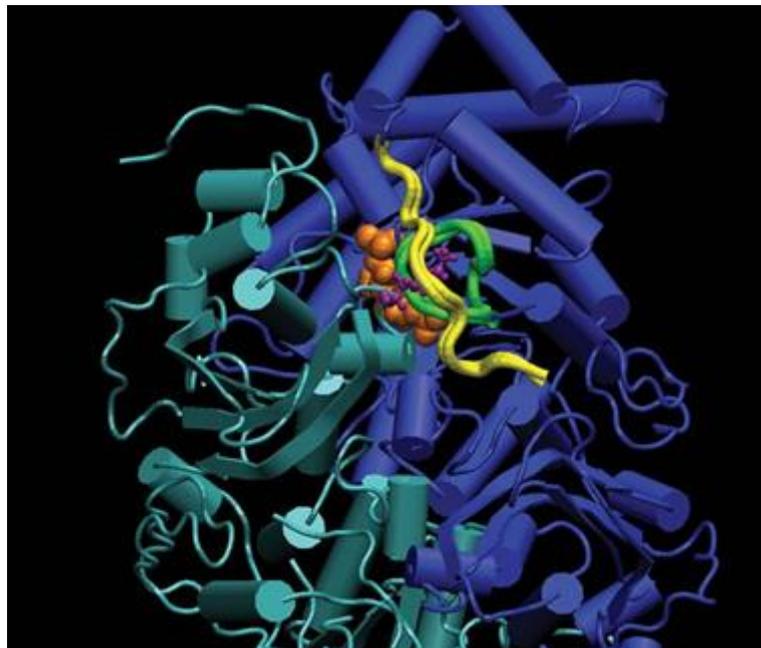


Figure 39: Sample Rubisco visualisation from the U.S. Department of Energy Office of Biological and Environmental Research

Foresting the Air

Delhi's city forests are some of the largest of any city in India. They largely live in sections of the Delhi ridge, as mentioned previously. Forming the north-eastern edge of the 1.5-billion-year-old Aravalli, the Delhi ridge is a significant geological body primarily consisting of quartzite rock. Its vast tracts of land and the forests they hold have been cited as protecting Delhi from air pollution and dust. The Ridge is administratively cut into 4 sections – the north, central ridge, south-central ridge and southern ridge. These sections are highlighted on the map below, drawn from the Delhi NGO Toxic Links. While the city is on the ridge, the ridge is separate from the imaginary of the city itself. Each geological cut on the map holds a certain atmospheric telling of what Delhi is. The ridge is both an imagined construct of separation and a zone of ecological exception because of the way it is governed the way it is. The forests of the ridge are governed by the Delhi Forest Department and the Ministry of Forests. The second image from the 2017 State of the Forests report highlights forest density areas in Delhi.

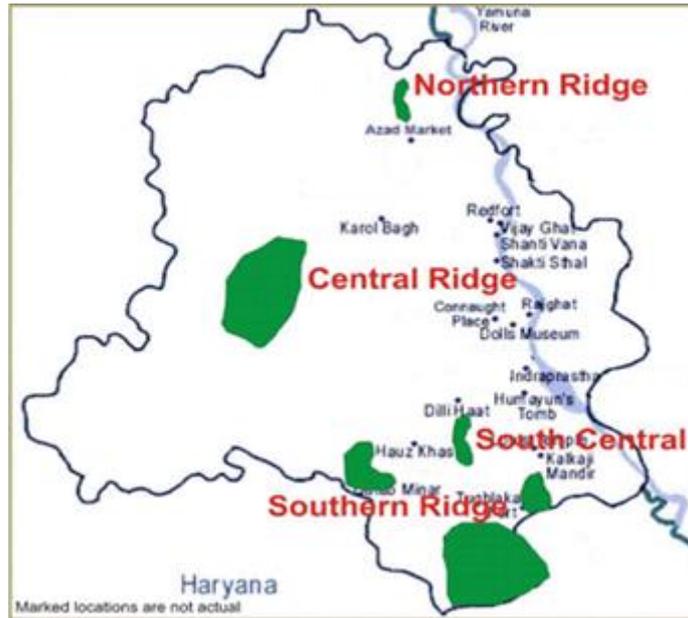


Figure 40: Basic map of Delhi ridge forest area by Toxic Links <http://toxicslink.org/delhiridge/map>

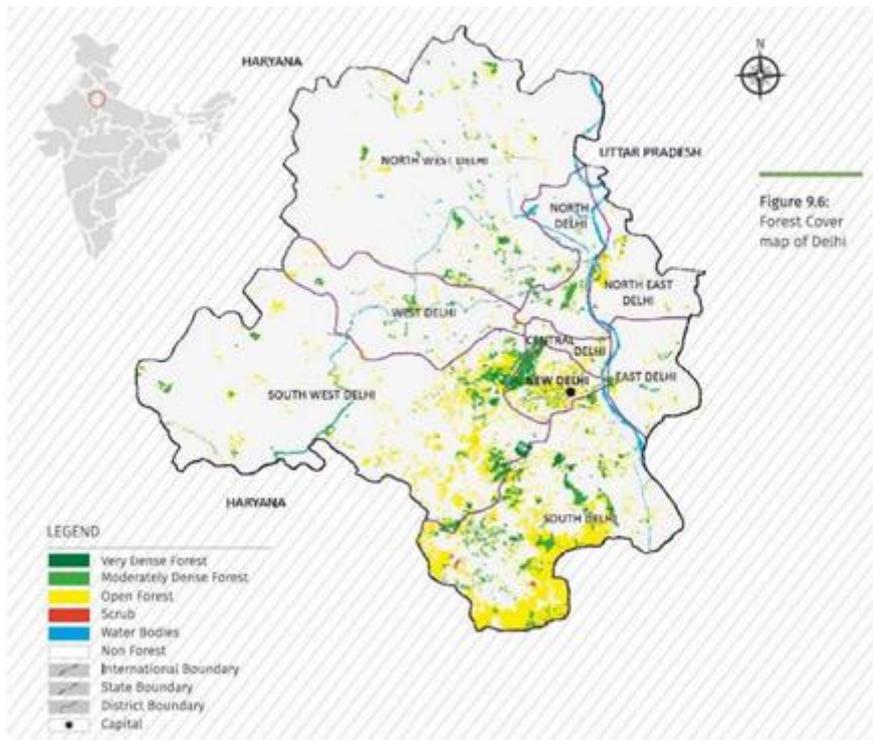


Figure 41: Forest cover map of Delhi, State of the Forests Report 2017, Government of India, Pg. 175

I use the monsoon forest as a site to think with, in finding a different way of understanding and discussing monsoon air. The monsoon forest albeit a damaged environmental category is used to pin and mediate a particular conversation on transformation. This is particularly relevant if one acknowledges that the air of the monsoon as not an uncommunicative figure, disembodied from other life forms. Hence this section engages with changes in the forests of the Delhi Ridge, from

a monsoon forest breathing with the monsoon to an anthropogenically transformed formation, that treats the monsoon differently.

Here I argue that unlike the “resurgence” Tsing (2015) speaks of while discussing the resilience of forests, I instead attune my analysis to try and work with a certain kind of emergence (Kirskey, 2015) which is more-than-just a monoculture of the *vilayati kikar*. This emergence is not the property of the *kikar* alone but the ecologies that play together to perform an emergence, including that of the air. Like the dust storm which is also emergent, the *kikar* anchored in Delhi’s ridge is emerging with other beings. It is not emergent in isolation (Kirskey, 2015). As Kirskey argues, even landscapes of capitalism find emergent flourishings. These emergent flourishings can sometimes be read as threats, calling for the resilience of bodies affected by these threats but yet at the same time, these emergent flourishings show little sign of resistance to modes of defense. Instead, they remind dominant forms of practice and knowledge that worlds collaborate within worlds in producing new worlds. The Ridge is not just the Ridge. The dust is not just the dust. The *kikar* is more-than-*kikar*. Similarly, through various forms of collaborations between the material forming of this monsoonal world, I argue that nothing escapes monsoonal figuring. Within this framework, afforestation and the maintenance of city forests as anthropogenic sites of creative more-than-human collaboration can be reread and re-interpreted as places where one can observe the complexity of attachments (Haraway, 2018) and the frequent inability to find attachments in a world where emergent complexities change the matters of what can constitute an attachment.

Afforestation and the monsoon forest

The *vilayati kikar* as the thorny shrub that forms a dense canopy of slate green cover over significant parts of the Ridge is simply unavoidable these days. Even in the heart of New Delhi, driving by *vandemataram marg* and some of the other *margs* west of *rashtrapati bhawan* (the presidential estate), in the green zone, the motorist moving on tarmac is surrounded by a walled assemblage, which the occasional crack and horizontal zone presents as a thicket of arid thorny green *kikar*. From the southern end of the ridge, at Asola Bhatti for example, the *vilayati kikar* is the dominant vegetal species (Dwivedi et al, 2018). Dwivedi et al (2018) document 82 genera and 100 species in Asola Bhatti Wildlife Sanctuary between 2012 and 2016 (ibid). The sanctuary is often called the green lungs and carbon sink of the city (Government of Delhi NCT). Slightly up north from the sanctuary, south of centre of the city at Tughlaqabad Fort, the *kikar* reigns the skyline (refer to next figure).

The Delhi Ridge is critical for the “ecological security” of the city, argues G.N. Sinha (2014, pvii). The 1991 Kalpavrikh report discussing ecological matters of the Delhi Ridge notes that “Cool oceanic air is able to penetrate the area only during the months of July, August and September i.e., during the monsoons” (Kalpavriksh, 1991, no page number). They observe that this arrival of the monsoons, initiates a “sea change” in the vegetation of the Ridge (ibid). It takes note of the diverse life and interspecies gains that are made during the monsoon. From fungi to frogs, the wetness of the monsoon enables for a range of bodies and sounds to build their presence in and beyond the Ridge. Species like the Indian common toad and bullfrog are known to come out with several other species of snakes. Past studies and observations also observe the burst in the visible population of insects and other critters – butterflies, beetles, ants, bees, wasps, spiders, millipedes, snakes, frogs, toads among several others, during the monsoons. The trees of the Ridge form an important constituent of these life worlds, sustaining the biome and movement of life through these spaces.

Viewed as a deterrent to the indigenous biome, there has been an active movement against the *vilayati kikar* in Delhi for decades. As Babu, the infamous Delhi professor at the Centre for Environmental Management of Degraded Ecosystems who set up campaigns to weed out the plant from the city noted - the *kikar* skyline has also negatively influenced the local migration pattern of birds and has sucked out groundwater from large tracts of the Ridge and the city (Bhutia and Singh, 2018). Scientists are now experimenting with other competing indigenous vines and creepers to see if they can be grown to curb the *kikar* of its sunlight and gradually bring down their numbers (Thakur, 2018). These contestations in conservation and environment practices that place the *vilayati kikar* in a binary, signify an anthropo-technics that’s webbed as a political mechanism that articulates itself through the vegetal. In arguing for the presence and meaning of a monsoon forest, I attempt in this section to show how a monsoon air methodology layers new meaning with the *kikar* skyline. This *kikar* facilitates in this section, an opening for an Anthropocene that’s not just a product of colonial interest and stickiness but is the active practice of labour and the politicking of vegetal ecologies participating in the nurturing of atmosphere. The process of becoming monsoonal in this part of the story is not just articulated through the enzymes of the shrub but the political anthropocentric experience of the shrub in the city.



Figure 42: Juliflora skyline on the Delhi ridge as viewed from Tughlaqabad Fort

The *vilayati kikar* is omnipresent in several parts of Delhi that it is often hard to spot in isolation. At the fort ruins of Tughlaqabad, where the Delhi Sultanate was founded in the 1200's, one can truly sample the vastness of green *Prosopis juliflora*. The fort as a site of strategic viewing speaks to a particularly interesting telling of history where the atmospherics of its ruins speaks alongside the breath of the evergreen invasive. The ridge is in this tiny gesture of deep time and monsoonal time, a space of anthropogenic textures, as Mayank Vikas (2017) highlights on the complexity of ecological transformation in Delhi; "Delhi's forests are admittedly a result of centuries of manipulations, geo-climatic vicissitudes and anthropogenic influences. The changes include not only deforestation, but also significant afforestation measures since British colonisation" (p73). For the assemblages of the air, sensed from a site like the Ridge in Tughlaqabad, the Anthropocene is conceptually sensed as a series of breaks, cuts and cycles. As Vikas (2017) writes, the ridge near Mehrauli in the south of Delhi might have had "Mughal built summer homes"... to exploit "the microclimatic coolness that dense foliage offered to escape the heat" (p75). The British too, found a comfortable site for their gaze in Raisina Hill (currently part of the central Ridge), as observed in the previous section. The *kikar* through the affectivity of its skyline helps me think about an Anthropocene that's spoken with and through the shrub. In the previous chapter, the fields of rice and wheat perform a similar role in the production of atmospheric brown clouds generating and impacting variable monsoonal experience. The *kikar* furthers that thinking through an intra-active understanding of how landscapes co-produce an experience of the air. The question that bothers environmentalists is - how do they limit the extent of its growth?

In recent studies of the impact of the *kikar* on native biodiversity in Delhi, Naudiyal, Joachim and Stefanie (2017) argued that the species "was much more positive than is currently perceived"

(p41) in its impact on native ecosystems in Delhi. Their work expresses that anthropogenic influences and species that have prospered under the shade of the *kikar* have been ignored in past studies. Their work speaks to other research elsewhere that argues that invasive species can often nurse and cohabit with native flora, implying a certain kind of “nurse effect” (p40). They observe that the seeds of the *kikar* are often not successful in their own shade but require transport in the process of finding suitable ground, which is provided by animals and insects. Most importantly, they stress that anthropogenic influences had the most powerful impact on “ground vegetation composition” (p39).

Walking into *Sanjay Van* (which simply means Sanjay’s forest, which is a section of the southern Ridge) by one of the entrances near Qutub Institutional Area, I could feel the radical drop in temperature just a few minutes into the space on what was otherwise a very sunny day. The air is cooler, denser and wetter. On walking attentively in damaged forests, Tsing (2015) expresses the need to story beyond the human protagonist. I’d like to argue that monsoonal figuring opens up stories that are bound with stickiness - of and with non-human others. Stickiness as a form of description is attentive to the air as a mattering in/of the drenched assemblage of the city forest. Entangled between stories of ghosts, the smell of compost and dark green pools of water, the *Van* is a highly effective collaborator in the making of urban stories. There are several graves in *Sanjay Van* and in the northern edge of the *Van* is a Hindu cremation ground. One of the more popular stories is of the wandering spirit of a 14th century sufi saint, Hazrat Sheikh Shahabuddin Ashiqallah (Jeelani, 2017). The trees gather the potential for these stories as lived forms of atmospheric articulation. In addition, *Sanjay Van* has also been a site for the experimentation of the *vilayati kikar*. Here, the *kikar* has grown generously, transcending its figure as a shrub to fully grown, entangled trees. The affective experience in the *Van* is one that is supported by the cover of fully grown *kikars*.

The image below is from *Sanjay Van*. I asked the security guard at *Sanjay Van* who was apparently around when the dust storms earlier that summer arrived, if he felt much of the storm in the forest. He said he didn't thanks to the tree cover. Wearing the badge of a contractor, he told me he’s been working there for several years, and then he went off to tell the teenagers to stop provoking the monkey drinking the water leaking from the large plastic water tank. Sohail Hashmi, the historian, credits the destruction of the forest to policies adopted by the Delhi Development Authority, which is responsible for many of these city forest zones. Through this process of policy, he writes “A guard post appeared at the gate opposite ICSSR on *Aruna Asif Ali Marg*. Sign boards appeared at every turn, everything began to be painted. The entry opposite

ICSSR, favoured by the residents of *Vasant Kunj*, came in for special attention, it got sandstone steps and a sandstone landing” (Hashmi, 2019, no page number). In *Sanjay Van*, parts of the zone have been converted to herbal gardens addressing the growing economic interest in medicinal plants. A 50 ft road cuts through the heart of the zone and encroachments are taking place from every direction, inward to the *Van*.



Figure 43: Sanjay Van, Delhi. Photograph by author.

Sanjay Van like the other forest zones in the Ridge are conceptual spaces of nature-culture collapse. Following from Vikas (2017), the forest is fractured in anthropogenic becoming – and reveals the complex stickiness not just of concepts but of a variety of human and more-than-human worlds interacting and intra-acting. Hashmi (2019) laments the end of the distinction between a garden and a forest. He writes “The reason is rather simple. Efforts are afoot, even as we write these words, to surreptitiously convert a reserved forest into a park. This systematic act of vandalism is being performed by the Delhi Development Authority (DDA), the very agency tasked with the responsibility to protect them” (no page number). For Hashmi, who takes visitors on extensive historical walks of the city, the distinction between the garden and the forest holds an important function. It’s a difference between ecological complexity and anthropogenic control. It’s a difference between biodiversity and biological control. As the pathways of *Sanjay Van* and the other publicly accessible forest areas in Delhi are aestheticized for social function, he views this to be a problem for biodiversity and non-human life. In contrast to a political view of the *Van* as expressed by Hashmi, a sticky reading of monsoonal worlds opens up a unique view of rearrangements and flourishings that don’t meet the

expectation of a human exceptionalist gaze. I want to take Kohn's (2013) argument that "It is because thought extends beyond the human that we can think beyond the human" (p.22) into consideration. Kohn here is challenging a particular relational way of thinking but is also in the spirit of matter and meaning, speaking to the fact that matters do think. For the nature-culture distinctions between the garden and the forest, between the ridge and the city, between this air and that air – a monsoon air methodology conveys new meaning by mattering-with instead of mattering against. The forest, the ground, the city... matter-with the air.

For the methodology of a feedback loop, enacting the causality of carbon cycles – a monsoon air methodology with emergent allies like the *kikar* speaks to a different kind of cycle(s), where a semiotics (Kohn, 2013) of the forest is constantly interlacing between states of figuring and becoming. Here, the cycle is always plural as the trope of observation is submerged in the process of movement. Air, as the attachment-within which a monsoon air methodology exists – pulls actors into a state of mellifluous semiotics, where the web of relations is thought through with the forming of the air. This is also what makes monsoon air sticky, or rather why stickiness is often found within monsoon air. Afforestation as discussed in the next section is a good example of a fractured attachment – humans transferring meaning into form, attempting to enact a different kind of monsoonal attachment. The use of the word stickiness between these two states of knowing and being – of colonial stickiness and a monsoonal stickiness is to invite the reader to think in sticky ways. It is to signal the trouble and meaning between metaphor and evidence, policy and process, power and becoming. In describing a monsoon air methodology, the unfolding world (of matter, life, meaning) figures as the performance itself. The unfolding is not the event but the temporality of understanding. Figures, as Donna Haraway (2008) grapples with are "not representations or didactic illustrations, but rather material-semiotic nodes or knots in which diverse bodies and meanings coshape one another" (p4).

The aesthetic project as a colonially sticky gesture of meaning that shapes a world, is a form of cultivation that locks labour into a relationship with an economy of maintaining the air as an aesthetic medium. In discussing the maintenance of the gardens in the presidential estate, Bhaviskar (2015) writes "A keen eye and constant practice hone the skills required to nurture plants: to know which seeds require what ideal conditions to germinate; to gently tamp down the soil around a seedling with the exact amount of pressure that removes air pockets without hurting its tender roots and stem; how to optimise the changing calculus of space and sun and shade; when to feed and water, when to prune and harvest; how to diagnose what's afflicting a sickly plant and to nurse it back to health" (Baviskar, 2016, no page number). The *malis* (local

word for gardeners) through their hard work and attentive care maintain the aesthetic project of the presidential estate in its contemporary form, carrying species through to perform as the garden. The *malis* are knotted into a relationship in the precarious maintenance of aesthetic life. Bhaviskar remarks how climate change has forced the estates office to annually import flowers, in maintaining its aesthetic regime.

Foresting the Air is speculation that begins with what I call anthropocentric groundwork. By this I mean, the work of labor, the work of power, the work of human centred and often human exceptionalist relations. Talking to one of the labourers servicing a pathway in *Sanjay Van*, he told me about how they've been planting native saplings in recent times and the hard work it takes to maintain the area. Speaking to an ecologist about *Sanjay Van*, he remarked "it's just everywhere there!" citing the *vilayati kikar* but even within the 'farce' of what the city had done to the forest, he claimed that there was hope, that it was about learning how plants can sort it out amongst themselves and working towards giving them a chance. As a practice of attention is written and financed by the state, pathways of functional use begin to be made visible. Just as in the case of afforestation, as I will argue in the subsequent section – practices of maintenance and anthropocentric accentuation locked in with logics of 'foresting the air' attempt an attachment with colonially sticky methodologies. Walling forest zones as properties of breath and species control converts "the entire forest into a jail" as Hashmi (2013, no page number) remarks on the mobility of animals in the Ridge. Foresting the air therefore is a commentary on the anthropocentric groundwork of speculative emergence.

Anthropocentric groundwork as a premise offered by the stickiness of coloniality unfolds onto practices of afforestation, the displacement of human and more-than-human indigenous life and locks several more-than-human social relationships as economic practices. For a monsoon air methodology, this becomes an important moment of clarification. I intend to clarify in the subsequent sections that a methodology of emergence is pollinated by more-than-human becoming(s) that don't necessarily feed back into a methodology of anthropocentric groundwork. Afforestation in this story does not necessarily succeed in preventing the dust storm. They form more-than-human kinships across material, spatial, temporal and topographic categories. It fosters emergent associations. So does the dust storm in its wake.

*

In discussing the *vilayati kikar*, Jennifer Baka (2014) argues that "*Prosopis* was originally spread throughout India as part of a wasteland development program of the 1970s underscores the deeply political nature of the concept of wasteland" (p315). As noted in the earlier sections of

this chapter, the introduction of the *vilayati kikar*, was linked to the intentionality of colonial use – of making land usable to the interests of government. Mann and Sehrawat (2017) argue that the “project of colonial forestry prioritized the needs of the white colonizers living in Delhi, while coming into conflict repeatedly with indigenous peasants” (p543). They observe that the decision to move to Delhi in 1911 was linked to the afforestation programme that was widely experienced in the region during that time. They argue that the project of afforestation was linked to an imagination of an economy based on timber but was also very much about transforming territory to something that can be governed. This alongside the notion of a planned Delhi, leveraged afforestation as a policy instrument for government. They quote the Scheme for the Afforestation of the Ridge - “[f]rom an aesthetic point of view the ridge is not a pleasant sight.... As it forms the most conspicuous object on the horizon when seen from the site proposed for New Delhi it is desirable that it should be made more attractive in appearance by covering its slopes with a green mantle of vegetation, and at the same time it is desirable that there should be a wild park in the neighbourhood of the new city for the recreation of its inhabitants. Apart from the aesthetic point of view it is very necessary to afforest the ridge in order to stop the run-off of rain water and prevent thereby the erosion of the nalas in the plains.⁵’ The afforestation of the ridge may also be beneficial in framing a screen to stop much of the dust which blows from the ridge over the site proposed for the new city” (Superintendent Government Printing, 1913, p1; *ibid*).

The ridge as part of the green zone accounts for 8422 hectares of the 44777 hectares of the Delhi Master Plan Document of 2011, note Mann and Sehrawat (*ibid*). The British perhaps did not find an aesthetics that interested them in the arid monsoon forest. Krishen argues that a monsoon forest is in-fact a complex metabolic being that lives in harmony with the monsoon. He writes (Krishen, 2006, p16) “It must be hard, being a tree, particularly so in Delhi”. “Unlike a natural forest, no nutrient rich litter of dead leaves revitalizes the soil each season. The earth is either covered or packed so tight that nothing penetrates beyond the first few centimeters” (p.16). He argues that a monsoon forest unlike a rainforest is a much drier forest. He fears that they are being endangered in north India. For a monsoon air methodology, this is a matter of kinship – of the worlds the monsoon shapes and the worlds attempting detachment, in colonial stickiness. This form of colonial stickiness as a conceptual formation of earth relations is retained by the state and the corporation (Visvanathan, 1985; Visvanathan, 1997). In thinking with the Anthropocene, as a human practice that transforms earth relations, one begins to recognize that ground-work is air-work, although the way the ground makes, becomes, becomes-with the air is highly complex. This is further elaborated by the analytical openings offered by the ridge in

nurturing a particular idea of the air - able to be part of an environmental project, protecting the city from the dust storm.

In February of 2019, the Government of Haryana tabled an amendment to the Punjab Land Preservation Act of 1900 (Punjab Act II of 1900). The legislation as described by the State Forest Department to this day cites the purpose of the act “to save the soil from erosion” (State website, no page number) in Punjab and Haryana part of the Aravalli “which are prone to soil erosion due to water and air flow”. The amendment proposed the lifting of particular rules in the Act that forbid the commercial development of areas under its care. Ironically, the Act in the legacy of colonial legislation, was a law that was enacted to clarify processes of grazing, deforestation, forestation, conservation – and draw out a situated definition of terms such as a stream and a forest. If one was to consider for a moment that colonial stickiness is a web of extractive semiotics, drawing from Kohn’s (2013) thinking of semiotic relations – what webs of mattering/ meaning emerge as a result through these rewriting of streams and forests? For a monsoon air methodology, I argue that they offer a pause in material analysis - asking for one to situate a process of anthropogenic threading as a detachment from the monsoon - which helps clarify the necessary detachment a project of afforestation needs to perform to gain propriety as an ethical response to the air. What this political assumption misses in the process is that afforestation figures from the ground to/with the air. The air composes the monsoon forest.

One can also associate policies of afforestation in Punjab, Rajasthan and Haryana (such as the Punjab Act II of 1900) to have facilitated the ontological emergence of *kikar* and other vegetation. These policies seem to have been written against indigenous forms of human and more-than-human life in these regions. By codifying and categorising practices such as agriculture, cultivation, grazing, tree cutting, occupancy, these laws were profitable instruments for the control of territory, guised in the form of conservation. The *vilayati kikar* prospered as a result of these processes. Interestingly, there seems to be a perception that laws like these protect Delhi from complete desertification. If the amendment was successful, critics argue that by opening the Haryana Aravalli to real estate development and mining, it would wreck Delhi’s air that was already dusty and polluted. The speculative conservation of the city now rests on the speculative instruments of control produced by colonial stickiness. These policies while deeply problematic hold some functional use, in (post)colonial states.

This speculative knot between afforestation, conservation and dust is an interesting one - especially at this time where Indian cities like Delhi are experiencing rapid desertification. The Aravalli Afforestation Project initiated in 1992 which later was supported by the Japan

International Cooperation Agency used species like *Prosopis juliflora* in extensively foresting against what they considered as desertification (JICA, date unknown). The Rajasthan Forest Department among its objectives for the Aravalli Afforestation Project claimed that they were interested “to check desertification and to restore the ecological status of the Aravallis by intensive reforestation” (Rajasthan Forest Department website, no page number). Investment from central government and foreign agencies like the JICA have been important for afforestation and livelihood programmes linked with the *vilayati kikar*. The pod from the *kikar* is now being industrially processed for the production of cattle fodder and low-cost meal fibre in Rajasthan. In 2013, a World Bank funded project came up with a processing method to produce a coffee like substitute/additive called Juli Coffee, from the pods of the plant (Tewari et al, 2013).

In Rajasthan, there has been an attempt at designing an economy around the species by the use of its wood and pod harvested for cattle meal. *Prosopis juliflora*, Kumar et al (no specific date) note “can be profitably cultivated in different types of waste lands” and has apparently been known as a “miracle tree” for a vegetal species that survives in arid, dry, saline grounds where other plants do not. The inability to weed out the species has in recent years forced local governments in coming up with economic rationales and solutions in pacifying local low income rural communities. In Tamil Nadu, there is now a charcoal and biomass industry based on *Prosopis juliflora*. Some even argue that the income gained by the plant has compensated some financially for what has otherwise been lost by its consumption of groundwater. (Sato, 2013; Saraswathi and Chandrasekaran, 2016).

These bewildering and perceptive forms of ecological-economic compensation might be seen as one simplistic way of how nature is culture and culture is nature. A culture of economics, peddled in making sense of an invasive species, in return the invasive species making its way through culture. An economist in Delhi informed me that ‘there is function’ for the shrub in our culture and we can learn to live with it. I find Tsing’s (2015) note on collaboration helpful. She argues that in the interest of staying alive “collaboration means working across difference, which leads to contamination. Without collaboration, we all die” (p28). Citing these fractures is important for a monsoon air methodology because a monsoon-air perspective is to really take nature-culture and culture-nature as knotted figures, as one might speculate from Haraway. Economic rationales inform afforestation practices and the anthropogenic influence of monsoon forests.

The monsoon forest as the holding of a monsoon as an annual clock of breath and metabolism situates the monsoon as a hydrological holding practiced by trees. While a tree might just seem to be a tree – some trees do different things compared to others, as we know from the story of the *kikars*. Commenting on the project of afforestation, Krishen has rightly argued that “afforestation is a sham. The forest department knows nothing about forests” (Nandi for Times of India, 2018, no page number). Krishen in this report was commenting on the State Government’s decision to fell 16000 trees in Delhi earlier this summer of 2018. The Forest (Conservation) Act of 1980 (with its following amendments) allows for the compensated sanctioned cutting of trees i.e. trees that will be cut here with saplings grown elsewhere. The decision to fell 16000 trees was received with significant public backlash at a time where the discourse on air pollution had really taken on the political public imagination.



Figure 44:Image by Yogendra Kumar/HT PHOTO for Hindusthan Times from the November 15, 2018 report “Students take out march against expressway through Aravalli Biodiversity Park”

Projects like the Aravalli Biodiversity Park have been sites for recent middle class and upper class environmental movements in Delhi. The Aravalli Biodiversity Park in Gurgaon shepherded by a group of local environmental activists (called iamgurgaon) opened formally in 2010 after a campaign to weed out invasive species and replant native species. The group claimed that “this project will not only reinforce the local ecology by reclaiming the native Aravalli forest but also change the landscape of the entire Range in the area” (iamgurgaon website, no date). In 2018, *Prosopis juliflora* seems to have crept back in at the edges of the park. Placed by the busy Delhi Gurgaon main road, you can hear the sound of the city in the park: the Metro passing by every few minutes, the honks and sounds of motorists buzzing through, the party someone is having

on their roof, and just everyday life in general. You can also feel the highway dust drift as a translucent plume over the park. The air finds its way for things, through things, with things. I learn from the sensation of the park that the park is not separate from the city. Observing the *kikar* edging into the park, a local caretaker told me that they won't let it grow here. With its elaborate walkway and even space marked for an open air theatre, it promised a sense of upper middle class environmentalist success that had managed to draw specific labour relations in the careful management of species. The project seems to have stemmed out of a small group of upper middle class residents seeking out space for recreation, however also recognising anxieties on pollution and loss of local diversity. The use of labor here therefore akin to an anthropocentric groundwork is to manage that aesthetic imagination, of laboring for and against species - watering, digging, gardening within the imaginary of the zone. Surrounded by an ever growing and busy Gurgaon where trees have been rampantly cut in generating a neoliberal metropolis, the park offers an ecology of some difference albeit damaged.

I am reminded of Kirskey's argument about emergent ecologies here, that "When a forest is clear-cut by loggers or destroyed by a volcanic eruption, emergent plants are the first to sprout. Nascent associations are able to exploit faults and fissures within established assemblages. They contain the promise of supplanting deeply rooted structures" (Kirskey, 2015, p1). An emergence that I want cite here is of the dust plume – surfacing above the park. I expand in the next section, why this form of emergence is relevant to a monsoon air methodology. In continuing afforestation as an active figuring of land in speculatively cultivating the air (the term cultivation here, drawn from Hulme, 2015), one is required to consider here the implication of a monsoon air methodology on the claim of its cultivation. Just as the *kikar* becomes-with the monsoon, I argue that the dust does too.

In a government publication on the Delhi ridge, the authors write that the ridge is "protecting Delhi from westerly winds loaded with sand from the desert areas of Rajasthan, lowering ambient temperature, pollution absorption, cleaning the air, sheltering flora and fauna, and perhaps most importantly – filtering and preserving groundwater in a parched city..." (Sinha ed, 2014, p55). The ridge clearly does play a role in filtering the air and retaining biodiversity in a complex changing ecology. However with emergent associations in a monsoon air methodology, the business of figuring the air is not unidirectional or linear but of composition. As I will argue in the subsequent section, emergent associations of monsoonal dust and the forest (monsoon, invasive and urban) are speculative and collaborative compositions with monsoon air. The forest is not an instrument to deter dust but is of the composition itself, when its produced by the

monsoon. Emergent figurations between the enzyme and the dust of the air hold an important consensus as associations within the condition of air - they are all attempting to nurture a monsoonal relationship: a becoming-with of sorts, from the enzymatic to the dense airs of rich monsoon air.

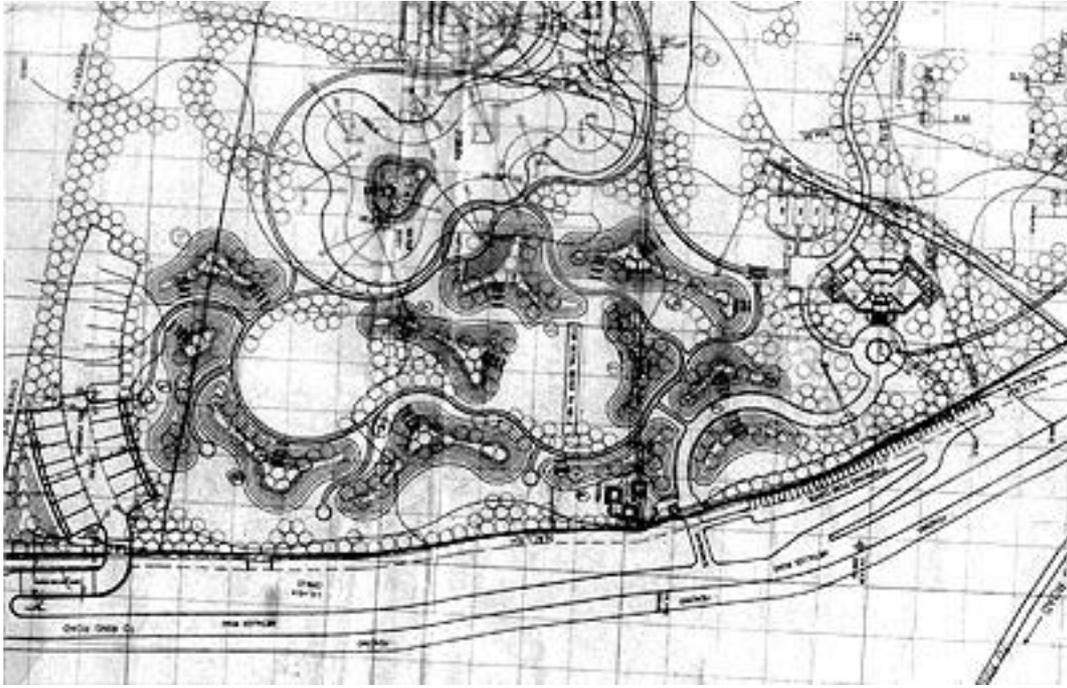


Figure 45: Mounds in Yamuna Biodiversity Park meant to “illustrate the different forest ecosystems in its miniature form found all along the Yamuna River Basin” - Delhi Development Authority webpage on Yamuna Biodiversity Park (<https://dda.org.in/greens/biodiv/yamuna-biodiversity-park.html>).

Jyethi et al’s (2014) research of the ambient (polluted) atmosphere in and around Yamuna Biodiversity Park indicates that pollution greatly impacts vegetation. They exhibit concern that the city’s emissions “potentially pose threats to the protected plant species, migratory avifauna, aquatic and terrestrial biota through water and soil contamination” (p859) parceled by the air. Some literatures of toxic impacts to more-than-human worlds are the inverse of a presumption afforestation practices make – that the air is not a medium that simply carries material to be filtered through the subjects of afforestation. Just like the analytic the *kikar* offers me through its emergence with its alkaloidal work below the ground and its enzymatic becoming with the air - aerosols compose monsoonal life as an attachment. Jyethi et al (2014) indicate that registering air pollution data during the monsoon is challenging because the rain washes some of these compounds to the ground. As these compounds are washed to the ground - questions of other emergent possibilities begin. As monsoon air dips into the ground as the air and evaporates into

the air as water, compounds, formations and sequences matter. They story in different ways as their materialities materialise in, through, with a range of bodies and spatio-temporal matters.



Figure 46: Aravalli Biodiversity Park, Gurgaon, July 2018. Photograph by author.



Figure 47: Watering the plants during the monsoon, Aravalli Biodiversity Park, Gurgaon, July 2018.
Photograph by author.



Figure 48: Residential area at the edge of the park, Aravalli Biodiversity Park, Gurgaon, July 2018.
Photograph by author.

The emergent pollination of dust

Earlier this May of 2018, winds of up-to 132 km/hr accompanied by hail, dust, rain, thunder and lightning raided the north-west of the Indian subcontinent (BBC, 2018). Reports of casualties, severe damage to infrastructures in Rajasthan, Uttar Pradesh, Punjab and the New Delhi National Capital Region was sustained by the news cycle for several days. For a city experiencing fast desertification, dust storms are events of concern. Narratives in the media suggested that the monsoon would help settle the dust down. It is true that heavy rain calms the dust. It is a regular practice for local communities and the government to wet the ground on especially dry and dusty days. In Delhi, the State Government spends several million rupees every year on water tankers to spray water on dusty roads (Press Trust of India, 2018).



Figure 49: Divya Soundararajan for Scroll.in (April 06, 2018) “Dust storm and rain bring relief in Delhi-NCR from sweltering heat”

These “pre-monsoon” dust storms are not unique events. In parts of western India, they are called *Andhi* (kali andhi or black storm) - a dark storm in the form of dust. It’s common in arid and semi-arid parts of the Indo Gangetic Plain, the Thar Desert, and Punjab westward of the Delhi region. I was interested in how this so called pre monsoon dust storm was felt in Delhi. As a wind moving from the west to the east, it seemed counterintuitive to a monsoonal logic as the monsoon seems to come from the south-west, moving upwards and eventually merging in central India as it troughs by the North East and the Himalayas. When the air moves in force, it carries a multitude of things, becoming-with it. Yadav, Chauhan and Sharma (2007) point out that the pollen of *Prosopis juliflora* and *Prosopis cinearia* are heavily present in the bio-aerosol samples taken during (pre-monsoon) dust storms in North and North-West India. An interesting observation from their 2007 study is that all of their samples had traces – of Himalayan gymnosperm pollen and Himalayan dust. Air conceptualises time and movement differently to how we conceptualise the time and movement of the air. While some may place distinctions between the energies of the pre-monsoon and the monsoon, the air of the monsoon occupies an energetic entanglement of forms that occupy it. It ties time and matter together. As a news report on the storm penned it “the same ingredients that fuel the widespread floods also play a role in the widespread pre-monsoon showers” (Martungudde, 2018, no page number). The report was referring to the high 50’ pre monsoon summer heat in north India which had taken away several human lives and was also the reason for the strengthening of the dust storm. Low pressure troughs in north India galvanise moisture laden airs and in what is called the ‘pre-

monsoon' the wetness of the air brings down the temperature but activates dust in forceful movement. As the *aandbi* transitions from its tradition to a seasonal time which ends before the showers, the emergent dust storm encapsulates the *aandbi* and wraps it as an initiation of the monsoon.

In writing the Chutulucene, Donna Haraway emphasises the importance of other storytellers in describing change in the Anthropocene. She says “we need another figure, a thousand names of something else, to erupt out of the Anthropocene into another, big-enough story” (2016, no page number) and “names, not faces, not morphs of the same, something else, a thousand somethings else, still telling of linked ongoing generative and destructive worlding and reworlding in this age of the Earth” (ibid). In writing with the figures of monsoonal change, the *aandbi* occurs into disappearance, into this reworlding where its capacities are tied up with anthropogenic change. This speculative figure of the dust at the same time is a literal furthering of a dusty time into a monsoonal time, where anthropogenic threading as one observes with the *vilayati kikar* and the colonially sticky project of afforestation - produce a range of effects. A monsoon forest and air discourse as cacophonous (Tsing, 2015) in these temporalities of simultaneously mattering expose the dust storm as something more-than-an-event. From the *aandbi's* place in environmental history as an informant of a coming monsoon, it entwines in the anthropocene as a monsoonal project fostering and nurturing at the same time.

The Aravalli range holds *Prosopis* not just because of the human attention it has received in the region but also because the monsoon gives it the air to do so. While human attention on the ground can help observe the presence of the *kikar*, so does satellite soil moisture analysis (Muturi, 2012; Hoshino et al, 2012). Even though we are told that the dust storm travels from the west to the east and the wet monsoon travels through a circulatory south west, attention to the kinships that species hold with the monsoon exposes new trails. Anumita Roychowdhury (Down To Earth, 2018) in a 15th July commentary, remarked that this ‘dust fall event’ is so much more than what Delhi has ordinarily experienced in the past as a localised event. Observing satellite images she remarks that “it is across the region and the vast expanse of it... the spiral that you see... is a brown dust that has engulfed an entire region... is phenomenal and scary” (0:25). She highlights the importance of a green barrier. The importance of green barriers and vegetation in the Aravalli are constantly highlighted as important solutions to the problem of dust. At a time when the city’s toxic air had become a deeply political subject, the tension between trees and the air had also taken on a public discourse. In the same summer, the proposal for the mass cutting of trees and compensatory afforestation by the Delhi Forest Department

was met with significant public protest. There was also public attention on the subject of encouraging the planting and growth of native species. In the same month, the Forest Department announced funding for an initiative that would crop out the *vilayati kikar* replacing it with native species. They had announced that a phase to phase process would be undertaken to strategically plant native species to complete with the *kikar*. Reports indicate that Delhi has the second largest green cover to any state in India, followed by Goa (TNN, 2018; Forest Survey of India, 2017). It has 13% of its area covered by urban forests. Most of these urban forests are on the Delhi ridge. So to the question of managing the dust with the forest - a monsoon air methodology, analytically responds by taking into account the dust as part of the monsoon - an emergence within the condition, as part of change. The Anthropocene here is not hidden under the guise of a geological formation, under the ground - it is constantly unfolding in the air.

Images like the one below signal to us the ecological scales that the air can manufacture. How did the forest and the dust converse in the knots between chemical species and biological species? As the dust “trapped between mountain ranges” (EarthObservatory, 2018, no page number), I wondered how anthropogenic forests converse in/with the dust. How does the air of the monsoon underwrite that very conversation? The condition of monsoon air and its force matters dust with forest. Its intersectional energy between the heat of the northern subcontinent and the drawing of wetness from the south, forces the drawing of materialities to the mattering of form that relates with it as a condition. At the speculative scale of the macro image analytically constructed by satellite and computational technology, the Aravalli cradles the dust with the Himalayas exposing to the reader a pattern of movement.

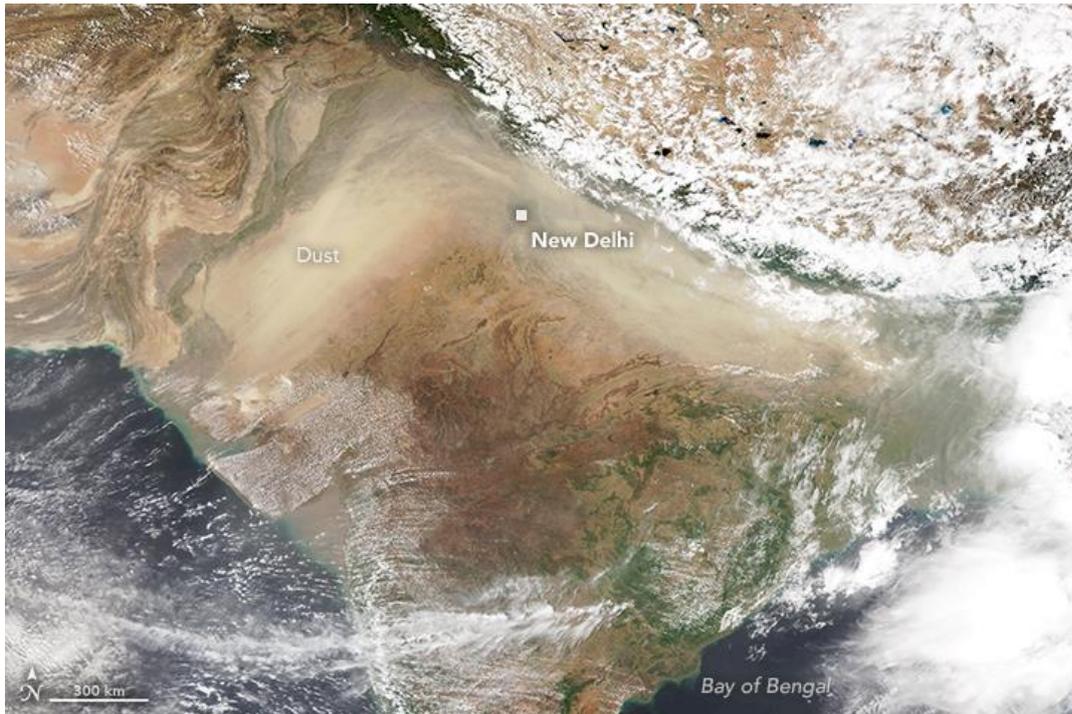


Figure 50: NASA image from June 14, 2018 from the “visible infrared imaging radiometer suite (VIIRS) on the Suomi NPP satellite” of dust “trapped between mountain ranges”



Figure 51: NASA image based on data from the US Embassy from June 2 – 17, 2018, sourced from NASA Earth Observatory Report

Signing in at my host’s family residence in July 2018, I was saddened to see the disappearance of the many plants that occupied his terrace. He told me that the dust storm had killed them. As the terrace had a partial opening, curtained by a light bamboo mesh, allowing for the wind to come in, they were unable to protect the plants when the winds were not kind. The heating that draws a monsoonal circulation into becoming, forces the world to notice its presence. In the gradual “onset” of the monsoon in July and/or August in Delhi, humidity lingers – like the transference

from the metabolic sweat of the body to an air that's sweating with life. In Delhi, this July of 2018, I felt a patchy humidity. It didn't rain much but the bands of dark clouds were up there, moving and gifting us with the presence of its air.

The body is a temporal register just like the sensors on the US Embassy that helped produced the graph above. The dust, like most hyperobjects (Morton, 2013) befores causal assumptions from being situated as movements between rigid points, also pointing to the fact that temporality informs the speculative possibility of a registration. This is particularly relevant while thinking with plants because unlike a pollution sensor in a building which produces a form of causal data, plant ecologies webbed within conditional material relations are far more complex. In a monsoon air methodology - monsoon forests and speculative monsoon forests are subjects of intraaction, where time (or a notion of *kala* which I will expand in the next chapter) is knotted as a monsoonal analytic for the possibilities life can take. To stay with the trouble (Haraway, 2016) in the uncertainty of monsoon air and hence of its methodology, is to take on an ethics of connectivity that the monsoon offers to any reading under its care. As Bird Rose (2011) writes “ecological existentialism enjoins us to live within the dynamics, and to pour our love into this unstable and uncertain Earth” (p51). At the end of what she calls ‘ethical time’ is a premise not for judgement but for writing with the monsoon, for what it has to say or what one can possibly learn from it. This is therefore not just a time that offers disaster and/or prosperity, where the air of monsoon is roped into binary narratives. This is an invitation to think outside the problem of bracketing (Kohn, 2013, p90) where the more-than-human world is bracketed to particular ends, treating it as a machine. A monsoon air methodology studied with emergence, forms its own condition of brackets outside brackets - where the monsoon forest, replaced by a vegetation becoming-with the air, overcome by dust, entangling with aerosols - extending the bracket as a carrier of imagination, monsoonal emperics, matter and mattering.

On the question of the monsoon forest, I would like to speculatively argue that the end of the native forest or its struggle to stay alive in the Anthropocene is akin to the murder of multispecies arrangements, that Bird Rose (2011) marks as the end of ethical time. This simply means that the ability to respond to irreversible, speculative and unpredictable change is very much in trouble – or rather the perceived condition of being able to do so at scalability. While cases such as afforestation show that response can engage as an analytic connection between inferences such as that of carbon and vegetation - they don't comprehend the stickiness of the air's world - and the way the air remakes and remodels connections that are often inferred as static. If we take Bird Rose's invitation to think with a “sequential and synchronous” (ibid, p128)

time, in what she calls as an “embodied” (ibid) state - one begins to see that afforestation does not reproduce the time of the monsoon forest but the time of the Anthropocene, just as the highway and dust plumes over the forest, indicates for it to be.

As dust storms become more severe in the broader region, the subject of anthropogenic control becomes more politically persistent. It is not increasingly being recognised that the green revolution led wheat rice bi-cropping system has encouraged the process of desertification across several regions practicing this type of agriculture (Singh, 2021). There is some sign that the state has been responding through a variety of schemes (Press Trust of India, 2019) although it's difficult to know at this time of the scale, feasibility and sustainability of their response.

The death of time, seasons and *kala*

Listening to monsoon stories from people involves me to tune to a constant trans-pollination of air and time. Do they even apply as different categories or does a monsoonal sensibility draw it as an atmospheric experience? If applying a western standpoint, I'd find it hard to translate back to the English register which takes seriously the distinction between measurable, scientific time and air as an element. As the monsoon tightens that bond between time and air's becoming, the specialized skill of segregating time and air as conceptual categories gets gaslit and confronted as the methodology of segregation and also fails in its ability to understand that monsoonal distributions have spacetimes – that what is often understood as time in one place, is perhaps a weather in another, is perhaps a sign of distancing to another, is perhaps an erosion elsewhere, is perhaps lightening a hundred miles away, is perhaps a sunny day a mile down the road. Monsoonal spacetimes have their interconnectivities and this chapter which takes a form of an extended essay is a meandering through different ideas, perceptions, experiences of those “times” and how they complicate, inform, and inspire a monsoon air methodology. Through the narrative in this work I also develop a troubling of time in monsoonal materialisation, particularly drawing from fieldwork and analysis from Ladakh – that sometimes the time of the monsoon is simply undesired, seeking for alternative alignments of time to weather as snow or glacier. The trouble therefore created by this distributive cross-pollination of difference in how time and air are perceived offers me an opportunity in rendering research and study as movement as it implicates itself to get a richer sense of how the fabric of monsoonal representation and claim-making outweighs normative elemental approaches.

I have touched on this in my section on methodology but I want to reiterate that the monsoon is a time for life, for its origins and continuity to repeat. Even as cosmologies of calendars and measure continue, they do so to largely orient life to that repetition which as I have discussed earlier is increasingly falling out of the spacetime of its perceived category. So let me trouble time, and let me listen to the question that people and life forms across sections seem to discuss – can, does, will the monsoon die (?). Akin to my grandmother traditionally pondering whether the rains will arrive on a certain year or not to the casual question of the possibility for future seasons, while I was in Delhi – this question of the death of monsoonal time haunted me. When I asked this question at a workshop in Sonipat in 2019 that a friend organised for me, the

anthropologist Shiv Visvanathan asked me if I was attempting to create a myth.⁵⁴ Somewhere in the opacity about the monsoon created between the claims of science and the belief systems (and or knowledge systems) that viewed the monsoon as a being, there withstood this potential for mythical animacy in how different approaches often shared claims based on their experience. A similar question also popped up in 2018 at a workshop with Astrida Neimanis in London where participants engaged with the subject of weathering that Neimanis had worked on. In response to something that I had said, Neimanis asked me if the monsoon could die. It is very common in my circulation being brought up by people who were caught in with annual expectations of monsoons, to say, speculate and probe the possibility of a time not occurring – and if that time of the rain or that *kala* of moist winds did not occur – things do die. On the level of the everyday from my positionality, I found that the question when asked by relatives for instance – about doing a PhD on the monsoon, and the possibility that I could answer back referring to the possibility of a monsoonal future – solicited to me a collection of things: sentiments, assertions, expectations, knowledges, uncertainty, desire. So on the one hand while I can argue that seasons can die as concepts, for those who live in and because of seasonality, it becomes a question of literal life and death. To think with my own late grandmother once again, it is a spacetime “we” simply don’t know about – its like asking, will i/we be around in the future to gather? Will relations see monsoons in time to come? Does drought take away our time? And so on. These forms of knowing that are catalogued as anxieties are simultaneously knowledge systems that are attempting to unpack and juice time into a fabric of living, recognising that some *times* are undesirable, some *times* are much needed but time in its interchangeability with air lets life breathe. The time of the monsoon centres time as air, in its many multiplicities – as even when you see summer clouds galvanise from the horizon into land, as you stand at a location gazing at the ocean – you can see on a good monsoon day that the air is of a similar hue as the ocean. Imagine therefore, dear reader, the implication of a methodology of oceanic air blanketing time for those that require soil to breathe in open air. Imagine the implication of that specific spacetime as a knowledge.

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The French-Caribbean scholar Edouard Glissant (2020, 73) writes “To write: is to say the world.” I’ve been reading Glissant to help me with writing, because like some of the few scholars cited here or otherwise, he implicated the ocean in the air as he wrote. He implicated its politics

⁵⁴ Thanks to Keerty Nakray for organising this conversation.

and the politics of society in writing it, at the same time. “We’ve” got to find ways to write time, the way the wind offers it to the many. Glissant also was someone who recognised the importance and persistence of opacity. Even as he stared into the vocabulary of uncertainty, the abyss he wrote about informed me of the possibility of writing opacity without it being the void – that what is opaque is also the world within which “we” existed. Being swayed by the current of the monsoon and by recognising that our knowledges of it had to be more-than-the-forecast, meant writing the monsoon in a way where its drench and pain can be felt and represented as a knowledge without implementing the urgency of modernity to standardise “our” feelings and realities of our many worlds. In my reading of Glissant, I sense an invitation to open up the idea of the measure. The construction of the contemporary season and its dependency on the volumetric as a time for plantation outcome could be viewed as a measure. It was what several post-colonial theorists had already routinely called as a colonial understanding of time. Somewhere its trouble interlaced and smashed the threshold of concept in making atmospheric hospitality (2019), a material to absorb its trouble, and circulate it. Barad brings this up beautifully – by thinking through troubling and placing the provocation that “There was a time when matter stood outside of time. But in the intervening years between the two world wars, physicists broke with a more than thousand year-old tradition, inherited from the Greeks, and placed matter in the hands of time.” (p527) From the atomic bomb to climate change, Barad uses this observation in developing notions of intra-activity and complexity in time. I find this provocation helpful because the time of the monsoon is also often categorised through a fundamental science approach of its time having a sequence, which provides itself as a format of phenomena meant to be forecasted and extracted upon. While I don’t dispute the role and value of those knowledges for their use case scenarios, I find that “time” has a much more complex role both in its diversity and performance in a monsoon air methodology.

One of the things that did was to externalise the responsibility of matter to the phenomena of time. By investing in the deep phenomenologising of the weather via its empirical construct as an experience of the subcontinent and the Asian tropics, it attempted to set free the cosmologies that were trying to make sense of the monsoon’s many winds and instances that harbored material hospitality. If the phenomena was just-volume as water, clearly a praxis of time was simply just there to deliver water at a particular time. Akin to the schedule of water tankers that are booked and arrive on particular days of the week at the building my parents stay at in Bangalore, the monsoon can be empirically studied as a schedule. So much of monsoon studies, geological, natural history, geography and the history of atmospheric science tells us stories of

how scientific approaches were developed in order to get a sense of a more granular view of monsoonal time – as arrival, movement, scheduling and eventual departure. Through the attempted writing of some of its permeated stickiness that opens up the monsoon to many more particularities, stories and ideas – I have said that the monsoon changes the way these fields orient, as the offering of methodology itself. As Glissant (2020, p73) accurately points out, “Writing, which leads us to unpredictable intuitions, allows us to discover the hidden constants of the world’s diversity, and we are happy to feel how these invariables also speak to us.” More on writing, he says, “No science can give us a truly global opinion of it, can enable us to appreciate its extraordinary hybridity, or can reveal to us how much living in it changes us.” Writing changes the way I hear *time*, and I pay attention to time because through writing, I have come to closer granularity of the sounds of the mechanical keyboard and my voice as it desperately aches to reach out to the moisture of place to tell its story. Through writing I have learnt that time in its clinical mode is not fertile as many claim for it to be – that the literal animacy that was being written was through the agency of the air, even though it mattered how it touched and impacted the time and *times* of many other beings. So I pay heed to Glissant in this chapter. I consult his writing to think with it when I needed consultation.

This chapter draws upon my fieldwork but also literary works, art, science studies, positional inheritances of monsoonal love, anti-caste theorists, poetry and music. The monsoon through its movement, speculated ends and stickiness in this narrative opens up unexpected encounters with concepts, assemblages and realizations that hold value to this thesis. I touch upon fieldwork temporalities from Ladakh, Bengaluru, Kochi and Delhi. Through this narrative, I hope to inspire doubt in the sequential register of the volumetric archive that calls itself time and instead inspire an ontologically diverse understanding of time of the monsoon – that the air travels in many ways and it creates and absorbs time.

I discuss how monsoonal presence in Ladakh exposes us to a different version of how the monsoon moves, as time, and what it comes to mean. Working through to the next section, citing local cosmologies and deities like *Kali Yuga* and the *Yamantaka*, I write to how time or notions of *kala* find conceptual force in matter as affect, and time as being. I find that they dictate the affective presence of forecasted futures in ways that encounter the technoscientific but also entangle with it in producing anxieties. I take assistance from Gail Omvedt’s work in addressing some of the ethical implications of the *Kali Yuga* cosmos and develop it as a parallel with modernist thinking, following notes from Amitav Ghosh. I end the second section with

Bharat Venkat's evocation of heat which premises the work of the story in the final section where I explore the possibility of different kinds of description in a sticky world. This chapter emerged thanks to questions of death, ends, drifts and monsoonal closures that I received during the duration of my study from a variety of sources (some of which have been addressed in the methodology). While the question of the death of weather for instance posed by Neimanis (in 2018) held vast ontological potential for exploration, I'm interested in how some of these questions operationalise a different kind of imagination, when the descriptive poetics of the monsoon are allowed to speak. Within the discourse of this work, the monsoon does not die within *Kali Yuga* but instead is textually furthered by exploring alternative forms of description to the performance of a monsoon air methodology. In working through observations and insights from the works of Rama Govindarajan (theoretical science professor), Karin Amimoto Ingersoll (Hawaiian scholar and surfer), Temsuyanger Longkumer (artist), Karen Barad (author of fiction), atmospheric scientists, my grandparents and the pollinating winds of the jackfruit tree (among others - I offer an alternative reading of time within a monsoon air methodology. One where the monsoon becomes a site of sticky, enzymatic, *mmcal* and airy in its speculative articulations about its presence and our future.

“I hope it won't rain today”⁵⁵

On 24th July 2018, I took a flight to Leh from Delhi as part of my summer fieldwork. As mentioned in the first chapter, the aerosols of the Indo Gangetic Plain seemed to have a particular meteorological conversation with the high passes and plateaus. Ladakh, at the northern point of India borders Tibet and Pakistan. Much of Ladakh is above 3000 meters above sea level and is often classified by geographers as a high-altitude desert. The Indus cuts through the region, flowing into the mainland. Glaciers glisten against the morning sun, as one gazes at the grey of disappearing melt, slowly transforming into a visual vastness of rocky sand brown, as the plane approaches Leh, the capital of the region. It's one of the most beautiful places I've ever breathed in. I've been here before. Well into the monsoon onset, on 24th July, as the plane cruised onwards to the upper Himalayas, you could see the tall monsoon clouds. Speculatively amplified by global warming and complex aerosol systems, the monsoons now periodically visit Ladakh every year. For a high-altitude dry region like Ladakh, the monsoon is often unwelcome as it disrupts and ruptures the grounds on which human settlements are built. Landslides following cloudbursts have lethal effects on human communities in the region. Even the slightest

⁵⁵ “I hope it rain today,” is an anecdotal generalisation of what has been heard in context.

amount of rain can have unexpected consequences in Ladakhi land. As a visitor, I recall how local drivers would take note of the weather while agreeing to make longer trips. While enquiring the cost of journeys, the taxi coordinator seemed to ask drivers what the weather was like on their way back from particular destinations. Their calls coordinated critical information and stories of pathways – of the possibility of movement and safety.



Figure 52: July 24th 2018. Monsoonal envelope. Upper Himalayas. Photograph by author.



Figure 53: July 24th 2018. Clouds that cut. Upper Himalayas. Photograph by author.



Figure 54: July 24th 2018. Drift texture. Upper Himalayas. Photograph by author.

Ladakh's modernisation has been well catalogued and studied by ecologists, anthropologists and social scientists. In recent years, Ladakh's modernity has been determined as a cause for glacial melting and microclimatic change.⁵⁶ Evoking Ladakh in this work was an opportunity to explore and articulate the movement of the monsoon, as a time of material presence, as a time to come and as a time of anxiety for people in the region. As climatic transformations force the monsoon onto higher altitudes, it reconfigures and changes the relationships of the air. If the movement of the air is an ongoing unfolding relationship with place, it can also be understood as time and hence often is. By appropriating time as a conceptual form of monsoon air, I am interested in integrating the time of the monsoon as a material figuration of description where time is not simply measurement-and-sequence but is conceptualised as a shared capacity between material worlds – such as the insisting of locals here who asked the monsoon “season” to go away. For example, the nurturing capacities of monsoon air are held to doubt in the reading of its presence in Ladakh. A speculative literacy of monsoon air entanglements in Ladakh would greatly differ

⁵⁶ This has simmered into popular discourse in India thanks to successful and charismatic projects in the region by local activists such as Sonam Wangchuk and the Ladakh Ecological Development Group.

from other places. Monsoonal anxiety in Ladakh does not constitute the desire for rain but rather for the desire of its absence. More importantly, it problematises the idea of the season as a recurring formation of relative stability. The monsoon in Ladakh is a monsoon in disorientation but also disorients the perception of seasonality in the region – and also breaks land.

While knowledge is often situated (Haraway, 2016; Strathern, 2018; Pandian, 2019) as often read in anthropology, cultural studies and ecology, so are monsoon air entanglements. What is made possible by the expanded distribution of monsoon air densities in a warming world, through this temporal placement is understood as a time to come - entangled effects of the air, that breeze through. We just don't know when the cloud will burst. And that knowledge around the density of air, its premise, conceptualization and the subjective clinging on to time is a project of making do – that around “these” times, sometimes clouds burst and terrains erode. How does one make do with description out-of-its-time when clouds burst and homes erode? “I hope it won't rain today” is that analogous description of monsoon time, asking the monsoon to be okay for another day, to perhaps even just go away. As I have already articulated in earlier chapters, the monsoon blurs effect and affect as descriptive categories in study. It taught me the meaning of what Erin Manning (2013) might describe as the movement of affect that prefigures displacement and becomes body (5). Every breath is made aware in constituting the movement of the body, considering the lower level of oxygen in this atmosphere – descriptions of wetness are transformed to a lighter configuration (although I cannot speak for winter, as my previous winter there was several years ago). Leh's particulate pollution because of its accelerated modernity adds to this crisis of breath. Stories of asthma and breathing problems circulate in conversations, despite the serenity of the sky, the mountains, the wind, newly forested trees and its waters. However unlike Delhi, where the winter smog drew attention to the desire for rain, in these regions the rain is still not welcome for the summer.

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A little over 200 kilometers southwards from Leh is *Tso Moriri* by the village Korzok in The Changtang – which is an example of a place that has a particular kind of situated monsoon air relationship. *Tso Moriri* or the lake of the mountain is one of the deepest and largest high-altitude lakes in the Indian subcontinent. *Tso Moriri* is often said to be wet, enclosed in moisture and

cloud, patterned by an air that is unique to its spatio-temporality in the plateau⁵⁷. Ladakhis in the region say that *Tso Moriri* witnesses rain when other places don't. In recently published model reconstruction studies (Mishra et al 2018), the Indian Summer Monsoon is being identified as an important force impacting the lake's microclimate which because of its inconsistent outflow, is thought to nurture its own wet microclimate, in its own time. Meanwhile, back in Leh my host, aunty S jokingly asked me to take the monsoon away with me when I left.⁵⁸ It might have been her also asking me to go away, that moment, when I was asking her questions about her garden and water supply. Nevertheless, it was a common response – to ask the monsoon to go away. Perhaps they meant multiple things, but they all seemed atmospheric and important. Having grown up in southern India, this was not an imaginary that someone would ask of another – for the monsoon as a time to go away. Despite its tremors, bursts and forceful phases, it's rare to ask the monsoon to leave. The lack of IMD data for the area and the intensities of the changing weather had garnered interest in local organizations such as the Ladakh Ecological Development Group to plant mini weather stations on rooftops.⁵⁹ Ladakhi nature-cultures are adorned with elemental knowledge(s).⁶⁰ Like the *lung ta* (wind horse), also popularly addressed as prayer flags are composed red, blue, white and green interpreted often to represent fire, air/wind, water and earth.⁶¹ The infinite knot, for example that is said to hold the world together, represents some say, knowledge and method. The messages of the *lung ta* are said to permeate the world, acting like moments of method in a monsoon air methodology. Ladakhi nature-cultures are deep and rooted yet in complex conversations with so many worlds - Tibetan, subcontinental, of cosmologies in/of the middle Himalayas and other places. I bring this observation into consideration here to ask for an imagination of conversation, permeated by the air as the material of inescapability. Ladakhi cosmology accounts for the monsoon in this knot of knowledge and method.

⁵⁷ Dr Nandini Rajamani who studies Marmots in the region had suggested Tso Moriri in the Tso Kar region. She's been studying the impact of climate change on marmot life-worlds and migration in the upper Himalayas. Dr Rajamani who relies on weather stations for certain aspects of her work was the first to inform me of some of the problems with meteorological infrastructures in the upper Himalayas.

⁵⁸ Anonymised by request. Aunty ran the Thonksup guesthouse with her husband and considered that all her knowledge was shared, inherited through ancestral wisdom and the Dalai Lama.

⁵⁹ Thanks to the Ladakh Ecological Development Group office in Delhi for having me and Nordan for enabling access to the project site and library resources

⁶⁰ I refuse to use the word culture alone as these forms and practices cannot be contained through either category.

⁶¹ They are not material mediums for prayer but messages that intermingle with wind and carry/become with the air

The anthropologist Helena Norberg-Hodge has warned readers of the romanticisation of Ladakhi naturecultures. Her work which carefully traces the work of Indian developmentalism, militarisation and modernity in overwhelming ecologies and disrupting local systems, addresses some of the lessons Ladakh could offer the world. Through these visual metaphors and materials that hold philosophical and poetic merit on their own terms, my objective is for them to make a geography of imagination visible through their textual presence. As anthropogenic aerosols and forms of warming transform materials and obfuscate the unit and scale of seasons - they change what we understand as forms and methods. The poetic and the material share the time and space of this change in the assemblage.⁶² The cloud bursts of Ladakh are speculative effects of these forces entangling in the plateau where the airs of agricultural industrialization meet an atmosphere of developmentalist militarisation. The increasing summer rain in Ladakh also seems to positively impact the commercial agriculture encouraged by the government and the military in the region. As part of developmental efforts in recent decades, the greening of this high-altitude desert has been on the agenda for the state. Norberg-Hodge's early observations about the impact of neoliberal development and large-scale infrastructural intervention in the region through the 80's and 90's has solidified and taken root.

On a broader scale, the impact of the monsoon on upper Himalayan rhythms has been deep, as Pandit (2017), Rajamani (in conversations with me) and Lal (2016) observe.⁶³ It has influenced multispecies extinctions and migrations in/and towards higher altitudes. The monsoon as an oceanic and subcontinental air, permeates upwards manipulating in/with the time of many others. So, to claim the movement of time is to also claim the change in the state of relations and hence to recognize the time those relations have taken to come into being. As Lal (2016) reminds his readers, the monsoon is born and intensified through the emergence of the Himalayas.

⁶² In offering a brief sample of the poetic, I'd like to cite Helena Norberg-Hodge's (1991, 22) translation of the Ladakhi winnowing song which is as follows:

“Oh, pure goddess of The Winds!
Oh, beautiful goddess of The Winds!
Carry away the chaff!
Ongsla skyot!
Separate the chaff from the grain!
Where there is no human help
May the gods help us!
Oh, beautiful goddess.
Ongsla skyot!”

⁶³ Nandini Rajamani tells me that the monsoon among a broader range of climate change effects has impacted species patterns and movements (in respect to the context of her work). Like the remarkable sciurid kin, she spoke of. I spotted a few marmots myself while around *Tso Moiriri*. It was nice to be aware of their company.

Forecasted to be as old as 16 million years, through the recent 8 million in which the accelerated geological time of rock intensifies the surge of the turn the monsoon makes in the Himalayas (in his reading). The time of the monsoon is made to move through the agential geologies of the earth. So, when aunty S, asks for us to take back the monsoon to Delhi, she is asking for temporality. She is asking for a temporal break. She is asking for calm amidst militarization. She is asking to be able to grow vegetables for years to come, that will grow thanks to glacial melt and not the rain. This is different from the Western hope of non-rain. This is different from the pedagogical trajectory of a Londoner desiring a sunny day and lamenting rain. This is because there is a difference in the lament for a walk under bright light or the desire for the public consumption of a park and the severity of land erosion. Literal life-relations are co-constituted by forces of air. The air is more than an aesthetic of cosmopolitan experience. This is also different because to hope for the rain to go away is not in this instance a projection of tropical fetishisation (that the “gloom” ruins one’s day) and the modernist fantasy of eternal private tap water (that there is always water despite the sky). Taps here are artefacts that only but play a gimmick for the last few meters of the glacier, of snow melt, of stream and water. As aunty S pointed me to the direction from which their water came from – and also to the direction where “our” waste was composted or temporarily disposed. The tap was the medium but the mountain was not. Forms of retainment weigh responsibility upon people to design logics for them to organically compost or find other ways to make sense, in these environments.

The ways in which air becomes monsoon and air melt matter. There are dark skies over Ladakh in winter, and when they snow, they feed the earth. Snow levels in winter have been reducing. The glaciers have been melting. The consumption of water has skyrocketed in Ladakh in recent years thanks to tourism and the military. In this context, and of-course that of climate change, Ladakh has been a frontier for experimentation on how air and water cosmologically interact for their temporalities to be extended. The local activist, engineer, educationalist Sonam Wangchuk popularized a methodology of diverting little downward glacial streams to sprinklers that are structurally placed to produce large ice cones in the winter, ice stupas as they are called that remain until early to mid-summer thanks to the low surface areas of cones absorbing less heat and retaining the cold thanks to its structure. I have never seen one of these structures myself but this has been a powerful media story from Ladakh in recent times. Glacial technologies are ancient ways of knowledge for many of the people who have lived there. The disappearance of glaciers implies a change in the wetness of winter – that the snow that falls is altered or is in an altered spacetime where mountains are not fed as they were before. How does

the mountain weep for the plains to sleep if the ocean does not make it to the mountains in winter? The change in the intensity and patterns of winter snow in Ladakh also impacts the monsoon, and we will only know in years to come how the death of winter times in the mountain speak to the death of other landscapes that have been under monsoonal care for many million generations.



Figure 55: Lung Ta. Photograph by author.



Figure 56: Among the weather tech on the rooftop of the LEDG campus. Photograph by author.

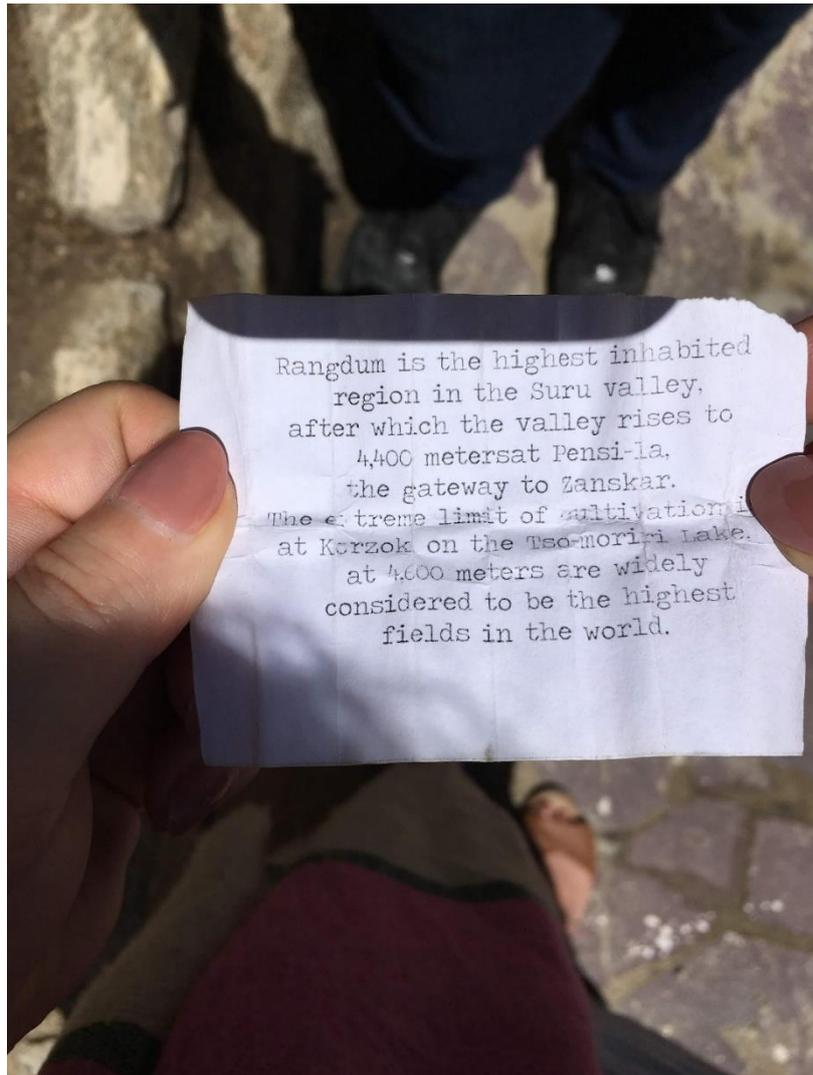


Figure 57: A chit about Tso Moiriri at LAMO, from a pot filled with info-bits about the land. Photograph by author.



Figure 58: Military logistics. Photograph by author.



Figure 59: Korzok village. Photograph by author.



Figure 60: Tso Moiriri. Photograph by author.



Figure 61: Shores of Tso Moriri. Heavy clouds. Photograph by author.



Figure 62: Clouds descending over Tso Moiriri. Photograph by author.

Imagined ends to some monsoons

In scientific experiments over the Indian Astronomical Observatory in Hanle in Ladakh, researchers have argued that anthropogenic aerosols and dust impact local atmospheric circulation (Shantikumar et al, 2015). Shantikumar et al (2014) have also argued that monsoon winds over Hanle are observed to differ from the winds from the rest of the year which are westerly. Following studies by Toledano et al (2009), Che et al. (2011) and McKendry et al. (2007), Shantikumar et al. (2014) ascertained in their analysis that desert-dust aerosols do travel with the pre-monsoon. They observe that anthropogenic aerosols and black carbons increase the aerosol optical depth in the station area during the pre-monsoon, when winds from the north-east and north-west permeate towards that space. In reading these studies, I have been interested in how the monsoon can be conceptually read with these energies of what are otherwise considered as ‘pre-monsoon’ materialities and forms. Its time is a bringing of circulation of entanglements, past-present-future and of different material states. Imagine with me for a moment how the aerosol-dusts of the previous two chapters meet in this story. As the black

carbons of advanced industrial capitalism hover over Ladakh, they transform the speculative presence and future of the monsoon at that site. As the loosening dust of colonial anthropocentric groundwork breeze with the wind, they add another dimension. Similar to observations made in the first chapter, a monsoon air methodology is premised by the realisation that the monsoon forces the world into increasingly sympoetic entanglements in a world increasingly also influenced by anthropogenic materiality.⁶⁴ Therefore if the monsoon is read as a time shifted by anthropogenic processes, doesn't that conceptually also ask us to reconsider the future of this time? In resisting medium-thinking, in much of this work, I have attempted to think through material form to the extent existing knowledge(s) and vocabularies have allowed. The movement of what is perceived to be the monsoon - from the oceans, the south, the Indo Gangetic plains splashing over Ladakh is a form of description that often attracts the thermodynamic gaze⁶⁵. In materialising description through the transformation of entanglements, thermodynamic energy (Schneider and Sagan 2005; Dagget 2019) while clocked with the planetary discourse of time, finds the monsoon as a disruption of expectation and premise. At the literal frontiers of the meteorological site, in Ladakh where the forecast glitches, and the monsoon is an unwelcome time, I wondered what forms of stories sprout as a result⁶⁶.

⁶⁴ Sympoesis is a term that I have come to learn thanks to Haraway's work.

⁶⁵ Scholarship that relies on thermodynamics to explain all phenomena and process.

⁶⁶ This is also ironic because the region is a crucial site for meteorological knowledge systems in their computational work on the monsoon but predicting cloud bursts in Ladakh is something that meteorological knowledge and infrastructure cannot currently do.



Figure 63: An atmospherics of the inside. Thiksey Monastery. Photograph by author.



Figure 64: A depiction of the Yamantaka holding the cycle of existence, Thiksey Monastery in Ladakh. Photograph by author.

In Ladakhi Mahayana storytelling, the *Yamantaka* as represented in the image above as the deity holding the circle of existence is the inescapable condition. *Yamantaka*, is different from *Yama* who is well known in mainland subcontinental cosmologies as a Rigveda deity who is addressed as the god of death. *Yamantaka*, on the other hand is slightly more complicated as *Yamanataka* is both deity of death but is also the force that interrupts it or terminates its possibility. In the image here taken at Thiksey Monastery, *Yamantaka* is represented to have a grip on the circle of existence in which a Gelug perspective of human and non-human transmigration is represented (Thiksey Monastery 2018). *Yamantaka* mediates not just the work of death but the speculative possibility of regeneration and time. Cosmologically, *Yamantaka* holds time, as a grasp over a certain world and a theory of the world. The representation of the world here is not done through linear statistical notions of time where theories of acceleration inundate violence. But is instead through the integration of time and matter as process or circulation. So in arguing with the monsoon as a force of the living, when viewed from a Ladakhi site, even the time of the monsoon is a circulation in the grips of this hold. I invoke the *Yamantaka* superficially to perform a particular kind of cut in the understanding of the work of the monsoon.⁶⁷ While the monsoon performs in other chapters the capacity for a collective embodiment of life within and because of its time, here we are introduced to a greater contrast between these seemingly disparate relations of landscape and wetness. The *Yamantaka* helps one appreciate that for cosmologies inherited and being produced at particular sites, the monsoon is within the grip of this larger cosmological time. *Yamantaka's* control of the circle reminds me of the time of *Kali* in mainland Vedic cosmos that is also found and evoked popularly in places like Delhi. Unlike spirits, jinns, ghosts and deities that are in their millions in Delhi and the subcontinent, the *Yuga* of *Kali* or *Kali Yuga* is a popularly understood construct of the contemporary condition of time. Similar to the *Yamantaka* in this distant interpretation, the concept of *Kali Yuga* is defined by inescapability. It is a force that becomes time through the inheritance of its capacity by matter and its human entanglements. *Kali Yuga* is centered on the demon *Kali* who is a character of initiation in the cosmology (who creates trouble and violence) but it is linguistically in the phasing of *Yuga* that pertains to all matter that *Kali* exists - living, human and more-than-human. *Kali*, the demon is choreographed in a variety of ways based on the school of thought *Kali Yuga*

⁶⁷ Let me for the sake of clarification mention that this view does not in any way signify the ends of worlds, such as the ones noted by Eduardo Viveiros de Castro and Deborah Danowski in their work on Amazonian worlds and the indigenous telling of their ends. While this could be in conversation with the concepts being addressed here, they don't necessarily mean the same thing.

is referenced and/or understood from. In some stories, *Kali* is the poison that escapes Shiva who is the destroyer of worlds when he churns the ocean into life.

The term *Yuga* meaning epoch, time and/or phase echoes ontologically although on a much vaster scale to a concept like the Anthropocene. Although this *Yuga* is technically vaster than the Anthropocene as it dates back thousands of years and a few hundred into the future, I was interested in its popular use in describing the contemporary condition and the monsoon. I myself came to understand it through my grandmother who would address it as the condition that makes relations (despite attempting resistance), in which there is little hope in how things will come to matter. She would commonly reference *Kali Yuga* during unfavorable monsoons. Narayanan and Bindumadhav (2019) describe *Kali Yuga* as a Hindu meta-narrative to the Anthropocene. Patton (2000) in their work following Mani (1998) explains how *Kali Yuga* participates in a colonial double bind and amplifies textual Brahmanical privilege and violence.

Gail Omvedt has argued that anticaste intellectuals have done a lot of work against the dystopian nature of *Kali Yuga*. The methodology of the time of *Kali* is held as the cosmology of the elite but the work of cosmology akin to the work of an emergence is methodological work. Part of this methodological work is the practice of imagining and telling the story of this *Kala* and operationalising the story in the world. In her work, *Seeking Begampura*, Ombedt (2018) traces and explores a utopia without sorrow drawing from anti-caste work from Ravidas, Periyar, Sakya Buddhists and followers of Ambedkar. The consciousness of the presence of lifeworld and the analytics of designing within that lifeworld, despite its humanist tendency is something that spills out of Ombedt's reading of *Begampura*. Reading the history of *Kali Yuga*, Ombedt notes that it was "for nearly two millennia the guiding metaphor of brahmanism for understanding the historical world" (p36). Theorisation has power in forming human natureculture imaginaries and relationships. In her development of this argument, she draws from the Vishnu Purana where water and earth are carefully placed in the framing of the *Yuga*: "Being dry of water will be the only definition of land" (p36) in *Kali Yuga*. The Purana which is a well revered document within the Hindu cosmos indeed perpetuates the telling of that time of *Kali*. Imagining the end of the world through the condition of the encounter of time itself, is a powerful imagination of the world. One cannot help but develop parallels with this conceptual encounter with what Amitav Ghosh calls omniscient thinking. The inherent value of the destruction of everything that is present in the deep human exceptionalism of post-enlightenment modernist thinking, Ghosh in an online seminar delivered in 2020 argued that this "is a conception of the world and of

historical time which conceives of the earth not as a nurturer or a life giver but a dead weight whose enveloping ties must be escaped if man is to rise to a higher stage of being.”⁶⁸ While this critique and engagement with Man with a capital M is not new for critical feminist studies and Anthropocene studies, I position this argument here to encounter *Kali Yuga* in a meeting of concepts - an ancient form of trouble meeting the modern form of ecocide. What happens to the monsoon in these times? While modernist thinking and *Kali Yuga* distribute agential capacities of engagement to different forms of material operation and distinctions, they both share the commonality that they are both narratives of power and world-making. What I have come to realise through a monsoon air methodology is that the monsoon is a force despite these articulations of power. The monsoon reinforces the possibility that forms of livingness continue, despite theories that forecast its demise. The anxieties represented by so many conversations about the monsoon asking if it would end one day, are speculations and imaginaries just as the forecast of what the monsoon will do - when and where. The lack of certainty of how climate change will change lives and the dwindling prospects of flourishing in the changing monsoon, are real fears.

What I found so fascinating in some of these conversational encounters of (largely elite) human anxiety with the future of the monsoon was the realisation that regardless of how ancient the monsoon was, in cultivating the very possibility of the human in the subcontinent, the future of the monsoon was something that fell into doubt in a rapidly changing world. Getting into the granular of the everyday, pre-monsoon heat was one such moment, where the possibility of monsoonal death was forgotten, and the expectation of its shower shimmered in anticipation. Descriptions of heat, for example cater to these forms of doubt. Take for example this note from Bharat Venkat’s post on an Anthropology of Heat: “The causes of heat are multifarious: predictable seasonal changes; natural idiosyncrasy; failed or delayed monsoons; humidity. Heat is also, as we know well in our time of heightened discourse around climate change, anthropogenic.” (no page number) In Venkat’s prose about heat in Chennai, the reader is transported to a reading of heat that runs through the monsoon, that heat is not merely a constituent of the summer but is felt, experienced and lived-in through various timelines. Most importantly, the social understanding that heat is anthropogenic, that *sakhe* (heat in Kannada) as I have come to learn is caused by the changing world is communicated as anthropological understanding of heat. *Sakhe* beyond its cultural connotations is a feature of description that runs through the year. Descriptions of heat do not have season even if they increase during certain

⁶⁸ Noted while in an online seminar that Ghosh was delivering in 2020.

periods of the year such as the summer pre-monsoon. *Sakbe* is an active articulation of the everyday. It demands an attunement to other forms of life that may also require attention because of this atmospheric transformation – that the capacity for convection is being made, and we feel it in our bodies. As forms of heat intermingle in a monsoon world, it is unclear sometimes if moisture metaphorically evaporates because of this experience of heat. An embodied reading of heat speaks to the coexistence of humidity and heat. The monsoon surprises as a condition where the empirical site of the body could conclude with radically different observations of what is taking place in the world of moisture and heat. Such an embodied experience of the material force of the air opens new ways of understanding what the time of the monsoon could mean from place to place.⁶⁹

In Huntington's (2018) beautiful book called *Creating the Universe* which explores the artscape of cosmos as depicted in Himalayan Buddhism, he points out at the interconnectivities of how for instance the sky is understood from one cosmology to another – that in their travelling they change and thus offer a different interpretation of the world and the universe. From the Rig Veda for instance that relies on a earth and sky bounded by a vertical axle enclosed by the two cups of a sphere where, that “For Indra,” the songs of the ocean have been raised to the shuddering magnitude of earth (ibid, p20) – that from these humble origins, intricate, detailed and extensive cosmologies of universe-making are written, drawn and theorised. To the wheel of time in Buddhism that “closely comports with the natural elements of space, wind, fire, water and earth” (ibid, p48) which are also among the features of the lung ta and/or prayer flags scattered across Ladakh that intentionally carry cosmological messages through the wind. Huntington's work is extensive and specific but I read his argument with interest, that the production of cosmology has space – and that the physical geography where cosmology is designed makes a difference in how the universe is depicted and comes to be. The intervention of the monsoon impacts cosmology and the possibility of sustaining cosmologies, in the time of climate change. They arguably change the affordances of what the theorised universe can carry, from one generation to another, from one relation to another, from one time to another. They seem to retain the circulations though, that the opacity between life and death and the ability to imagine living-ness in the different material mediums of the universe – from the sky to the ocean, seem to scratch open the imagination of somehow in the violence-of-it-all, that

⁶⁹ Increasingly, heat also seems to reorient the meteorological institution in some ways. Dr Ramesh (DG of the IMD, during my visit) in his conversation with me in July 2018 stressed at how important the heat mapping work at the IMD was to get state and city level heat response plans rolling.

circulations allow “us” to imagine some kind of world, even as “we” pass by, or organically compost. Akin to that difference the *Yamanatka* makes in breaking re-incarnation and rather sustaining circularity where the transfer of energy as a meditation practice attunes to a place in atmosphere that is simultaneously both – of the future and time to come, and the positionality of the then and there.⁷⁰



Figure 65: Forms of circularity. A Monastery, Ladakh. Photograph by author.

⁷⁰ I recognise that I am invoking a major difference of opinion between Hinduism and Himalayan Buddhism but the reason I do so is to display that an understanding of circulation changes not just over time but also through positionality, allowing people to participate in the wake of wind’s methodology – that the wind can be imagined for a different kind of future if living beings intended to do so.



Figure 66: The figure of the endless knot on the ground. Photograph by author.

Pulling and making time through sound ⁷¹

Consider the raga, *Malhar*. I had put down *Malhar* as a note to the Anthropogenic Table of Elements for a Cultural Anthropology website fieldsights section (Neale, Phan and Addison, 2019). In recognition with the fact that anthropogenic soundscapes span the earth and disturb ecologies, I was reminded in some ways through Delhi of how sonic forms of design could be represented as modes of anthropogenic desire. *Malhar* which calls on the rain could be a form of mythical insistence – that perhaps its agencies were not completely dead in the time of the Anthropocene and perhaps it could call the weather, to weather. Its what passionate listeners of

⁷¹ The section on Mahar has appeared in Fieldsights in the Cultural Anthropology website. See: Bhat, Harshavardhan. 2019. "Malhar." Theorizing the Contemporary, Fieldsights, June 27.

<https://culanth.org/fieldsights/malhar>.

the Hindustani raga insist, albeit sometimes humorously. In Delhi and the broader cultural region that follows these ragas, it begins with an invitation – to join, listen, encounter, submerge and yearn with the performance of *Malhar* – a seemingly anthropogenic negotiation with the clouds of the monsoon. It wasn't a raga I was used to. The slow, serious and grounded frequencies would put me at a lull, to be shimmered into wake by the sudden up-tones simmering through the register of the call of the vocalist, just enough to sustain the tremor of the call. *Malhar*, as a sonic anthropogenic element, brings to attention the complex transformation of materiality and time with the monsoon. In thinking with the transformation of the monsoon, *Malhar* helps us have a unique conversation on the anthropogenic entanglement of the shifting materialities of the monsoon: dust entangled with wetness, dense clouds that give no rain, bursts accompanied by silence, and toxicity that manipulates the future of aerosols that become clouds. The monsoon as a seasonal change in the direction of the wind that carries the ocean into the sky is the recurring alignment sought after by a performer of *Malhar* – that the performer's sound can be caught to pull the current – desire it – pull it – beg for it to – arrive as shadow, as lighting, thunder and rain. In thinking with the monsoon as more-than-rain and as a shifting figure in/of time, *Malhar* helps me think about anthropogenic sonic entanglements—i.e., what is desired, what the air conspired, and what eventually becomes of it.

It is said that the musician Tansen of Akbar's court fell ill due to a performance of raga Dipak, which is associated with fire and heat. The court had to find performers of the ancient raga *Megh* (raga of clouds and thunder) to bring down the temperature. According to stories, Tansen would go on to develop what is today known as *Miyan ki Malhar*, which is arguably the most popular raga known to call on the clouds of the monsoon. Stories of raga *Megh Malhar* and the many monsoon *Malhars*, of which there are said to be over thirty, are understood to produce atmospheres and call on the monsoon, if done properly. Typically performed before and during the rainy season, *Malhar* tunes in a monsoonal expectation and atmosphere (Leante 2018).

Recollecting that summer of 2018 when the dust storm “killed” the plants on my host's terrace, a summer where the India Meteorological Department declared the onset of the monsoon through the south Indian state of Kerala on May 29th 2018 as it exposed to meteorology a broken impasse and slow way up north. Dust pollinated through so much of that time, in between nurturing the impasse. I also thought about the potential of an anthropogenic sonic elementality, when the government in 2019 set out to cloud seed the winter skies to encourage rain and bring temporary relief from its dense pollution. Their plan was foiled as they soon realized that the clouds over

Delhi in winter were not suitable for a cloud seeding exercise. In a conversation about the changing weather, a passionate listener of the raga suggested to me that there might have been a time when the air did listen to *Megh Malbar*. Time seems to have changed and its clouds have too.

So how does an anthropogenic sound speculatively interact with a becoming in/of the air? You see, while some *Malbars* are a call from the human to the air, some are complex negotiations for the world to protect the human from the rage of the skies. *Megh Malbar*, for example, embodies a story of a deity called Krishna protecting a village from the wrath of Indra (deity of lightning and thunder) by lifting a mountain over them (Uberoi 2015), shielding them from the storm. *Malbar*, it seems to me, is a way of staying in tune with entangled disturbances, like the dust, the rain, the toxicity, and the storm. It's a sound that intensifies for emergence, while being enveloped within it. Like the dust storm that often takes over a monsoonal time—due to climate change, urbanization, atmospheric toxicity, and the deforestation of arid monsoon forests—categories of anthropogenic elements fall together in fostering new worlds of anthropogenic experience. As I've heard again and again from people in Delhi in discussions about the dust and toxic air: “What else can we do but breathe?”

Malbar, then, as an anthropogenic sonic element is an offering of a different kind in this time of trouble. *Malbar* holds decolonial potential not to undo anthropogenic trouble (because it can't) but to find ways to negotiate these times and reattach with air's materiality so essential to life. Figuring and producing *Malbar* as an anthropogenic element speaks to the trouble of changing times because we don't really know if it works or not within it. But it still offers an opportunity to elementally attune with the air, to gain sight of figures that complicate the present and the forms of materiality circling within it.

In the current of myth, and of Krishna too in this instance, I learn from the historian Sugata Ray that the Yamuna was considered as *adhibhautika rupa* which for Vallabha, a scholar from the 16th century Braj region not far from Delhi denoted an expansion of the “liquescence of water to seep into a multi-sensorial experience of the natural ecosystem that encompassed sand on the river banks that glistened” (p45) like the feet of Krishna, a key deity in the Hindu cosmos. The Yamuna he says in the 16th century was a river that was considered to be “the sensual drops of sweat that emerge during Krishna's love-making with his devotees” (p43) The Yamuna in this divine form of love can be found in a variety of artworks, texts and artefacts, says Ray. Krishna in some of these works blurs into the blues of the waters, the sky and their own body. Ray views

this as a form of hydroaesthetics. In his description though, one can also read monsoonal forms collaborate: skies collapsing into rivers and rivers emerging into skies. He reads this offering of Vallabha in their work titled *Isarda Bhāgavata* as a way of seeing nature and culture together, as non-anthropomorphic sociality which encompassed a particular “theriparian ecosystem to include plant life that rendered the river fragrant, cows that gathered by the water, and monsoon clouds as dark as the water itself” (ibid, p45). Ray follows that the Mughals meanwhile in the region, archived in their work that droughts during the 16th century created a shortage of grains and food. The connected reading of these texts produced around the same time of droughts around 1556 must be read with care as they’re entangled in different cosmologies he warns. He argues that however, they centre a way of looking at the world through water: its atmospheres, gravity, geophysical agency in the force of life. Ray is sensitive to the presence of his work in a context where mythical storywork is often being drawn into narratives of the majoritarian and “Hindutva” naturalisation being politically manufactured in India. However the reason that I bring it up is that Ray’s analysis of art history through which he reads these times of water argues that the way water was written and manifested in art articulated the becomings and transformations of the time that it occupied – the mini ice-age, in the period of his analysis which was 1550 – 1850. This is to say that ideas of reverence and conceptual-material attachments that animate relationships between people, more-than-humans and living materialities change over time despite the seeming force of the stories that are archived and told. The monsoon has changed and the monsoon will change. It offers us new ways of figuring within its changing times as the world changes itself.

Swimming between times ⁷²

Back in London, I had spent a lot of time at art spaces starting at works that often positioned water as a subject of knowledge or probed atmospheric concerns, There was one work through late 2019 and early 2020 that I visited repeatedly. Kara Walker’s *Fons Americanus* which was commissioned for the Tate Turbine Hall. Her piece, expansive and vast, yet subtle and forceful – present and insistent, quiet and of punch – was I believe “inspired” by the Victoria Memorial in

⁷² Some of the work in this section, particularly engaging with Kara Walker and Christina Sharpe has been represented in my chapter titled *The Weather is Always a Method* for edited book – *International Relations in the Anthropocene: New Agendas, New Agencies and New Approaches*. See: Bhat, H. (2021). ‘The Weather is Always a Method.’ In: Chandler, D., Muller, F. and Rothe, D. (eds.), *International Relations in the Anthropocene: New Agendas, New Agencies and New Approaches*, London: Palgrave Macmillan.

front of Buckingham Palace. Unlike the latter, it is not a celebration of empire and colonial ecocide-genocide, but is what I felt as a meandering placement of waters of play, grief and livingness, despite the white exterior, despite financialised shelter, making *black* known as the current. Walker's piece – remaining true to her project asks us to “regard the immaterial void of the abyss” in a “delightful family friendly setting” (Walker, 2019) – invokes slavery, quietly, loudly, saliently – in the affective state of a presence of knowledge and matter, situated and implicated with this time. I stood in front of the installation for quite some time and I remember reading the poetics of the poster on the wall by the piece, in some wonder and pain. An excerpt from the piece is as follows:

“Witness
the
FONS AMERICANUS
THE DAUGHTERS OF WATERS
An Allegorical Wonder
Behold! The Sworling Drama
Of the Mercliness Seas, Routes and Rivers,
upon which our dark fortunes were traded
and on whose frothy shores
lay prostrate Captain, Slave and Starfish, alike,” (Walker, 2019)

Walker's work made me ask questions about how times connect as a matter of bodies – how bodies were made to swim between times, forced between times, subjugated between times, in the production of a universal time of valuation, financialisation and extraction – that too as the work sits by The Thames, sits in the City of London – the spacetime where insurance, finance and the project of slavery was theorized as a cross-oceanic register of connections. As Christina Sharpe (2016) reminds me “Slavery is the ghost in the machine of kinship. Kinship relations structure the nation. Capitulation to their current configurations is the continued enfleshment of that ghost. Refuse reconciliation to ongoing brutality. Refuse to feast on the corpse of others. Rend the fabric of the kinship narrative. Imagine otherwise. Remake the world. Some of us have never had any other choice.” (p12) Sharpe and Walker help me think of kinship otherwise, in the sense that the fabric of kinship still needs work – that the rain of the monsoon is also for many a rain with which subjugation is enacted. If art and literature through this register of oceanic life, literally as I come to learn from Sharpe has anything to say about the work that needs to be done for the future of oceanic life that blankets the sky – it is that to swim across times is the work of

collaboration and love. The methodology to force violent social inundation (in this context) is despite the ocean (Neimanis, 2019; Sharpe, 2016), that the work of extractive institutions, whiteness, the castist formation, the relentlessness of injustice – values the skin, the breath, the measure of the body in a world of commodities. For many, surviving through that, and living in that theorisation of logistics where matter and life have no love, have no meaning is akin to the deathwork, Bird Rose talks about, akin to the *kala* or the painful becoming of *kala* that Honnamma talks about. The work therefore is to seize methodology to the concern of love and livability – that the ocean in one context and the monsoon in another is for all breathers – all things composting and fragrant under the forest of the sun. The kinship rendered to the disciplinary form that invests in the intuitional future of that extractive enterprise is not just the continuation of subjugated ends but is also the desired ends of many monsoons – who gets to decide “our” kinship with air, water, earth, life? Who gets to decide the features of that ontological current?



Figure 67: January 3rd 2020, Turbine Hall. Photograph by author.

Let me take assistance from Karin Amimoto Ingersoll's definition of an ontological time to expand on this. Ingersoll (2016) tells us that "Time is not merely a cyclical narrative, however; it is also the rhythms of this cycle" (p118). In the development of a seascape epistemology, Ingersoll tells the reader that Hawaiian time is never stagnant but is something that constantly moves through the narratives of various times. Her book on *A Seascape Epistemology* argues that there are oceanic ways of knowing and for Ingersoll, this is an indigenous methodology that she has come to understand through Kanaka identity and knowledge systems. She writes "For Kanaka, the cyclical rhythms of the days, nights, tides, winds, marine animal migrations, seasonal plant flowerings, and rain patterns function as ways of discerning time" (p118). Descriptions of seasonality and inundation like the one that Ingersoll offers us are not new. Yet, the concept of time in most descriptions of season and inundation are forms that are taken for granted in terms of their capacity to circulate, cycle, repeat and/or manifest.⁷³ What I found very powerful in a Kanaka understanding of time in reading Ingersoll's work is that time is created by the place and its materials which are also according to Ingersoll, places. "This dynamic flow of material, bodies, and memories in the seascape represents the evolution (deconstruction and reconstruction) of knowledge and identity through time. For Kanaka Maoli, time is created through place in such a way that place, in fact, creates time, and neither place nor time are void of Hawaiian bodies because the sand crabs and taro plants are genealogical manifestations of self, which are also place, and which create time" (p113 - p114). The reason I textually travel to Hawaii with Ingersoll's work is because it offers me a reference of a knowledge system and vocabulary in English that views time as something that is produced from the material of space. Time through this conceptual force can be understood to not just have rhythm but textures, complexities, interminglings of all sorts. Time therefore has agency but so does space have agency in producing time. Let me unpack this by stressing that the point I am trying to make with this expression of time is not to dispute the meaning of time disciplines like physics or horology might have to offer. The point is to recognize that time is experienced within matter and space and it is unevenly distributed. For the ocean (in Ingersoll's case) and the monsoon (in mine), time is offered in the myriad many ways these oceanic and monsoonal agencies have in the formation of things in the world. This thinking is valuable to understand time in a monsoon air methodology, especially as the story of the monsoon is so often read to be the story of time⁷⁴.

⁷³ Closer to home in reference to India, the anthropologist Nikhil Anand is has been also thinking about epistemology, waves, ocean pollution, through the fishers of Mumbai and seems to be hinting towards a more complex understanding of time that can be gathered through seascapes.

⁷⁴ Lindsay Bremner has insisted in conversations with me in 2017 that the ocean can never be ignored, despite the meta (and primary field) location of this study being Delhi. While viewed through the planetary and global atmospheric science technologies, monsoon theories tend to show oceanic origins.

As Ingersoll might suggest, the monsoon can be the ‘living classroom’ within which its ontological time circulates. To swim through these different times, can be that material spacetime for a conversation, an experiment in learning instead of the means of subjugation.

Connecting *times* in Science

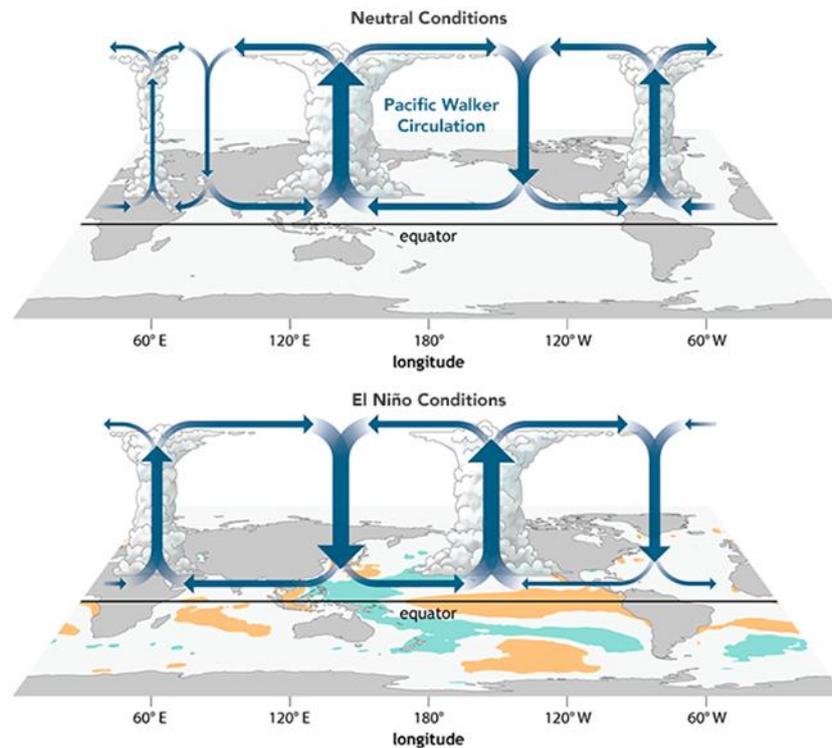


Figure 68: Atmospheric circulation over the equator—the Walker circulation—changes substantially with the arrival of El Niño. (Illustration by NOAA/Climate.gov)

It is worthwhile to mention that I do think that science and/or technoscience can offer ethical capacities (with the right work) despite its inheritance of being a logic of connections in the interest of plantational extraction. The *El Niño* effect is an interesting example. It animates Indian news every year. This year of 2021 is expected to be wetter because of an *El Niño* (which represents a cooling dynamic) in the south pacific instead of the latter *El Niño*. The El Niño as a planetary informat was developed thanks to colonial weather stations that were stretched around

Work from Monsoon Assemblages speaks to this. Some of the work of this thesis has been around expanding that imaginary to the complexities that land and its materials pose in changing what one considers the air of the monsoon. An oceanic imaginary therefore is not meant to disturb the thesis but empower it.

the world, including the south pacific, which relayed back archives that assembled as meteorological connections. It is now a popularly known fact that the tiniest of changes in the El Nino register, immensely transforms the kind of monsoon South Asia experiences. By the word register, I simply reference the accounting system used by atmospheric scientists to represent in numeric form the changes that perceive in oceanic atmospheres such as that of temperature. It has become a common meteorological dictum that not all drought years are *El Nino* years but all *El Nino* years are drought years. While there are many theories of how these two spatial and material logics are possibly connected to each other, the linkage between these two spatial temporalities of transformation – even though I can politically consider it as the swim between times - is still work in progress for the scientific community. For monsoonal observers, the *El Nino* – Southern Oscillation is essentially an irregular pattern of change in the air (its force and temperature, coupled sometimes with the ocean) over the South Pacific that influences tropical dynamics, which include that of the monsoon. Based on historical data, Jatin Singh (2014) who is the CEO of SkyMet Noida (a private meteorology firm) claims that Northern India is the most vulnerable for *El Nino* years. The *El Nino* tends to shock the region with scarce rainfall despite its foreshadow. In an important 1999 paper by Kumar, Rajagopalan and Cane (1999), they observe that through a 140-year historical analysis that “the inverse relationship between the El Nino-Southern Oscillation (ENSO) and the Indian summer monsoon (weak monsoon arising from warm ENSO event) has broken down in recent decades” (no page number). Among the speculations they offered in the paper, the authors suggest that the increasing warming of the Eurasian region might have helped sustain the monsoon despite stronger ENSO events (ibid). Interestingly still through recent years, the *El Nino* Southern Oscillation continues to be one of the key indicators for monsoonal foreshadows in the subcontinent or the lack of it. It registers a cosmological link for technoscience between two spatial-material-temporalities that have held a conversation for a very long time. Although the consensus in atmospheric science as to why and how these teleconnections perform is weak – they know that the connection exists.

The atmospheric scientist Philander (2004) reminds his readers that although the *El Nino* is popularly perceived as a global meteorological disruptor, its origins in its naming and observation simply refers to warm currents in the shores and waters of Peru and Ecuador around Christmas that were viewed as a blessing when they arrived late in the year. Cane and Zebiak developed at the Lamont-Doherty Earth Observatory at Columbia University what was the first ever model in the atmospheric sciences that coupled ocean and atmosphere to model El Nino forecasts in their irregular periodicity (Cane, Zebiak and Dolan 1986; Cane and Zebiak 1987). Cane’s work

specifically played a key role for the sciences to break the ocean into the earth, as an integrated system – it produced the idea of a planetary system from the perspective of atmospheric science. Cane and Zebiak’s model formed the basis of several earth systems models and atmospheric theories that relayed back to the monsoon as a crucial tropical moment in the zone’s dynamics. This inheritance had an interesting monsoonal drop, in the sense that it was an inheritance from a mathematician, Walker who was based in Pune during colonial times but Cane and Zebiak’s work renews a sense of technoscience in expanding analytics to a muddy register where broad teleconnections began to offer the possibility of an ethics of planetary movements – those oceans and airs are connected for a reason – and they are in entwined timescapes – that the time of the *El Nino* or the *El Nino* is always also a time that precedes the monsoon.

Making time and preparing for monsoonal times⁷⁵

I recently watched a beautiful short animated film entitled *Hum Chitra Banate Hain* (‘We Make Pictures’) which begins by posing the question, ‘Why do the Bhils paint?’ In it indigenous artists Sher Singh Bhil and Subhash Bhil along with filmmaker Nina Sabnani and others interpret an origin story of the Bhils, who come from Jabhua in Madhya Pradesh (Sabnani et al, 2016). The film begins from the perspective of a rooster and tells the story of how rain follows the drawings of the Bhils, as the reason why they come to learn to paint the world. It starts out with the message that “if you really want to teach someone a lesson, Bhuri amma says that they should become a rooster... but listen to how hard it is to become a rooster.”⁷⁶ Premised in a context of conflict among the Bhils who are fighting over water, this is a story about how making pictures (or drawing worlds with lively living forms) nurtures monsoonal relations. Under the advice of Bhuri amma, the rooster takes the Bhils on a journey of consultation to seek out the elder who knows the clouds and has strong bonds with the waters of the sky and the earth. The elder with these relational bonds advises them to draw relations into being – paint and cultivate locale and world in enticing the clouds to gather. The sky generously offers thunderstorms.

Bhuri amma points to the snakes and turtles swirling into the ground, showing people how to hold and store water. They show how to make volumes from the leaking airs of a thunderstorm.

⁷⁵ A version of this section will also be represented in an upcoming publication by Monsoon Assemblages titled *Monsoon as Method*. See: Bremner, L. et al. (2021). *Monsoon As Method: A Book by Monsoon Assemblages*. Actar D.

⁷⁶ The word ‘amma’ refers to mother, and is also usually used as a term for an elder or someone in maternal kinship or as commonplace gesture to someone who is viewed to occupy a socio-cultural-political relation where it is appropriate to call them amma.

This thus generates harmony, peace and prosperity. Thus the Bhils draw pictures and paint as ways for times to come. While I can't speak for the storywork (Archibald, 2008) of that particular inheritance and practice, I want to think with the story Sher Singh Bhil and Subhash Bhil offer through their narration. It is an important story, one that evokes the monsoon and its air both materially and relationally offering an insight into cultivation and the many living. If the drawings of the film are meant to tell us the story of painting relations into the world, I want to think of its colours as a visual poetics of monsoonal liveliness and possibility. Paying attention to the intricate condition of being alive in/with this air in monsoon worlds gives us an opportunity to clarify beyond doubt that we are need of better stories of cultivating inside this air. It reminds me that monsoon stories don't begin with meteorological history but the life of people and beings that have sung with the many airs before and after it became the monsoon. The work is to paint for worlds with better thunderstorms.

If we push this further into speculative iteration, thinking with Barad (2015) in imagining lightning from a dense monsoon day, one can ask how the poetics of the "desire to find a conductive path" (p397) "between earth and cloud" (p397) where "yearning" (p397) and how they were made to "discharge" (397) – perhaps are offered a spatiality of labor that is ready for its iteration. What if certain earths need thunder? Need lightning? Barad asks the reader to make way to this speculative possibility where the unpredictable and non unidirectional path of lightning is guided by the underlying condition of clouds and the earth. This "quantum form of communication- a process of iterative intra-activity" (Barad 2015, p398) interrupts the stability of seasonal time because only the relations in/of the air understand when its methodology of iterative lightning will perform. How can one describe the kind of circulation that cultivate these speculative encounters?⁷⁷ Tamsuyanger Longkumer's 'Catch a Rainbow II' installation at the 2018 - 2019 Kochi Biennale provided one such experimental encounter. At the courtyard at Pepper House (one of the Biennale sites) stood this almost anonymous straight metal pipe arch installation that generated rainbow producing mist, visible to you as you walked through it. Longkumer's project was an attentive choreography of fine tuning the closest speculative possibility of the sun, the wind and the droplets (from the installation) to cultivate rainbows when the subject was inside the mist produced by the installation. While I have only seen it

⁷⁷ The word 'circulation' used here despite its colonial history as understood from Davis (2000). Circulation, simply here references an imagination of atmospheric movement, as circular, in fluid ways, inspired by the shape of the earth. Circulations need not be abstractions despite their use in planetary meteorology. Circulations can be specific like the 1978 Delhi storm in Amitav Ghosh's book *The Great Derangement* or the invocation of the 400 year old storm in Eastrine Kire's *Son of The Thundercloud*

during the day, I have been told that it also works at night. The Biennale positioned the installation as a sign of hope following the devastating floods in Kerala earlier in 2018. Drawing from Nagaland knowledges, Longkumer also suggested that the rainbow represented myth but was also in conversation with the contemporary success in Indian courts who had decriminalised homosexuality by overturning Section 377. Having arrived at Pepper House for coffee with colleagues⁷⁸, I was in awe as the machine suddenly buzzed into action, flowering the open space with the air of water. As you walk into the water of the air, you see rainbows. Even when you closed your eyes on that sunny morning, under the installation, it was almost like the water went through you – that the memory of colour is a permeation that stays, that sticks. One could read Barad’s (2015) text of that “desire to find a conductive path” (p397) “between earth and cloud” perform through these rainbows, as they speculatively (to the human imaginary) intra-actively found ways to exist. Somehow in this yard where the archive of pepper trading, colonial trade and warehousing for goods to be carried in oceanic currents had become this site for a contemporary encounter of an imagination of colorful livability, under the conscious gaze of the air.

⁷⁸ Thanks to Matt Barlow for suggesting Pepper House that day and thanks to Ankit Bharadwaj for making this meeting happen.



Figure 69: Image from January 2nd 2019 of Longkumer's installation at Pepper House. Standing on the other side are friends, Matt Barlow and Ankit Bharadwaj. Photograph by author.

Pollinating winds and the time of gathering ⁷⁹

The *halasina hannu* (in Kannada) or the jackfruit is native to the Western Ghats and is found in southern India.⁸⁰ Growing up, I was told that *halasina* refers to the root, 'of the roots' - the bark that extends its fruits from the tree. The word *hannu* means fruit. In some Kannada dialects, *halasu/halasi* (pronounced with a deeper stress on the 'la') refers to the process of decay, rotting and/or fermentation. Before I go any further, I must acknowledge that there are different explanations to what and how the word *halasina* comes into being and what it means. The

⁷⁹ A version of this piece is represented in the conference publication for the Monsoon [+other] Earths Conference conducted in 2019, and a version of this will also be available in the upcoming publication titled Monsoon as Method by Monsoon Assemblages. See: Bhat, H. (2020). Stickiness of the Halasina Hannu. In: Bremner, L. and Cook, J. (eds.). (2020). Monsoon [+ other] Grounds. London: Monsoon Assemblages. And See: Bremner, L. et al. (2021). Monsoon As Method: A Book by Monsoon Assemblages. Actar D.

⁸⁰ Halasina Hanu along with all the other non-English words used in this piece are very rough transliterations from my Kannada dialect. The only exception is Phala Gaali which is a rough transliteration from Tulu.

speculative connections between concepts that are made in this piece are a result of situated narrative and description, hinting at one possibility of how one may perhaps understand sticky relations. It is an interpretation. At my grandmother's home in southern Karnataka, there are quite a few jackfruit trees. The oldest one, north east of the house still occasionally, after many generations produces some of the largest jackfruits I have ever seen. The tree is right by a stream. There tend to be anthills in its vicinity. Dense foliage. Wetness on the barks. Ferns. Moist air. In this corner of the land, the air is always sticky. Even in peak summer, a few minutes by the big *balasina mara* (jackfruit tree), will show you air that is cooler than the air you felt in the yard. The lifeworld around the *maru* (tree) like a membrane for winds that move through it, conditions it, thus changing it. In the briefest of moments, that change is felt by the breeze of decay - the *balasu*. It is amidst the orienting air of this deep rot, decaying its vibrant fragrance into the air, that an interesting encounter of concepts can be found. The *balasu* of the *maru* is not just the atmospheric condition that it spatio-temporally shares with those that find themselves in its company but is a matter of deep more-than-organic reasoning as to why they exist. I seek to articulate an enlivenment of the air that is specific to those grounds but is not because of what is in the ground alone but is entangled in the condition of *balasu* - suggesting a possible theory of stickiness, that airs hold life. In reading aliveness, Puig de la Bellacasa (2019) argues that descriptions and reinterpretations of aliveness need to address what is more than 'the soil' Soil is not simply the description of ground and affect but about figuring "a relational key to the aliveness of the more than human-soil community: it is not in 'the' soil" (:401). Puig de la Bellacasa views this attunement of reading soils not just because it could be an ethical practice but because the soil is already alive. It is not alive independently as Puig de la Bellacasa stresses but is part of dense material and multispecies communities. To think with the ground, therefore, is to bring into consideration how these grounds complicate the sticky affectivities of our understanding the *maru*, the *hannu* as tiny arbiters in an entrenchment of *balasu*.

The *balasu* is therefore in this context, not the rot in a conventional modern sense referring to binaries of good and bad, and the *balasu* is definitely not the decay or ferment of stagnation. It is not a process of something getting spoilt or losing its functional properties. The *balasu* is superficially a description of process but it is conceptually an ontological state. In-fact, the *balasu* has no productive function although its deep capacities can be cultivated. As an ontological state of lifeworld it does not conceptually fit in with life-death binaries. As Puig de la Bellacasa (2019) notes: "Thinking with soils, aliveness moves, transitions, circulates, revealing a common entangled fate that blurs human-soil ontological boundaries" (p401). It can be argued that my description of the jackfruit and the *balasu* are in-fact descriptions at the boundaries of exposure

and meaning. What the state of stickiness I otherwise like to think of as the *balasu* is the fragrance of possibility - of deep organics entangling a million worlds in the eventual attempt at writing the most mundane boundary description of something that does not constitute the object but is flesh that is afforded to become part of human community (and activity). The task here is still not to extend the force of description as a mere aesthetic but to invite the methodological possibility of the flow of *balasu* to guide thinking on the *balasina hannu* and the *balasina mara*.

Like the thud. Thud! As the fruit falls in all its might from the *balasina mara*. Often the fruit is already consumed by other critters. When we do find one for the house, its presence is felt in the placement on a gunny sack, in a corner by the lobby. That sense of air's density that the *balasina hannu* emanates is an aroma without pretense: it is social knowledge that an event will soon be enacted. My grandmother, uncle and aunt scout the room to sense the possibility of its consumption. Outside by the bay next to the kitchen, a *katti* (knife) affixed/soldered to a low stool sits next to utensils with water and some coconut oil. My grandmother takes her seat and lifts the jackfruit, in one deep breath, and drops it onto the *katti* (knife). And the process of the cut begins. It's a slow and attentive process. Having oiled her hands, she carefully plucks out the pods and separates them from the fabric of gums, sticking into everything that it comes in contact with. The texture of the *katti* has inscribed in it- the leftover stickiness of jackfruits of the past. It's impossible to completely scrape off the gum of the open jackfruit. In order to avoid a reaction with the human skin, the latex that drips on the exterior of its green body is carefully negotiated with. As the pods are carved out, plucked and, separated from the seeds inside - some into a bowl of water - you see the dance of viscosity and stickiness: one describing the other, letting one take form, slipping in interactions that are otherwise sticky, muddled in the most intricate of movements, fleshed out for ritual, culture and cuisine. An ontological boundary is sensed in its aroma and stickiness, as an atmospheric embodiment in the corridor entangles with the air.

My grandmother shares her excitement of how ripe the fruit was. She exclaims that this was indeed the right moment to cut the fruit open. Its affectivity of stickiness retains the force of the monsoon, akin to the maturity of the *maru* itself which uses that time to flourish. Despite being a *maru* of the monsoon, the jackfruit tree is known to be drought tolerant by local farmers. Opening up the *balasina hannu* and tasting the ripe pod: an explosion of sticky flavor - honey, pineapple, custard, caramel, mango oozing out as one chews through its fiber. This is not a speculative enchantment. It is the literal interactive temporality of stickiness conditioning the

nature of liveliness, parceled by one brief version of description. The jackfruit tree is a life of monsoon grounds but it is also a living theory that affords us the importance of thinking with/through ontological stickiness. The *halasu*, i.e. the material of stickiness is also a material of reading the condition of stickiness. Parceling the metaphoric and material meaning of wetness from the air, soils, multispecies communities and others, the *halasu* as the living organics of what makes the *mara* part of the local lifeworld, is one entry for theory to speak from monsoonal grounds. It is also a hint for a knowledge system of stickiness that inherits the monsoon as a figure of time that makes the world what it is. Sticky relations are therefore not just material causal links of more-than-organic connections but are attuned to conceptually sticky matters of the time of the monsoon.

In recent years, as mentioned earlier, the post-monsoon breeze locally called the *phala gaali* (flowering/fruit winds) has become erratic and is often absent, resulting in the barks of jackfruit trees not breaking open into their flowering.¹ As the monsoon changes, it effects the possibility and pattern of joy. The monsoon as a force that makes *halasina* possible is exactly what affords it the ontological capacity to be a possible theory of stickiness. Without the monsoon, there would be no or rather a very different speculation of *halasu* or *phala*. The monsoon makes the *mara* and the condition of *halasu* (the roots, the rot, the deep decay), affords us the sticky joys of *hannu*. The work for fruits for us and other critters continues, within shifting monsoon air methodologies.



Figure 70: *Halasina Hannu* seeds. Bengaluru 2021. Photograph by author.



Figure 71: *Halasina Hannu* pods. Bengaluru 2021. Photograph by author.



Figure 72: *Halasina Hannu*, ready to be eaten. Bengaluru 2021. Photograph by author.

Conclusion

In this work I have shown how time, season and air interlace under the blanket of monsoon air. I have shown how they mean different things to different people, lifeforms, temporalities and contexts. I have argued how time meanders with the monsoon, how it offers time and takes time, but also makes one aware of making time with-it, pulling and asking time to form-with. The air of the monsoon in its transformation can also feature the end of times, such as the end of the season, thanks to anthropogenic climate change and the archive of meteorological violence which still despite its trouble offers interesting insights thanks to the generosity of the ocean and the sky. I have further deepened how positionality matters and how the meeting with the times of what we perceive as others may after-all be a fact of intimacy, of hope, glued by oceanic sway, where communities of people and otherwise do the work to gather around the monsoon, as its many winds nurture the possibility of sticky, fruity, material, vibrant life.

Conclusion: some closure as the next monsoon begins

In this concluding section, I begin with key lessons from the research, represented in parts 1, 2 and 3 below. Through part 3 and 4, I briefly discuss challenges and contribution to knowledge. Finally in part 5, I write about emerging curiosities and research problems for the future. Continuing in the spirit of the previous chapter, I maintain a narrative style in this section to present an ongoing-ness to the way enquiry persists. I pay heed to the condition in which this conclusion is being made and process linkages acknowledging some of the space-times and political matters that inject vicerality to monsoonal research and life. Together, I hope they can stand as a statement of closing for the research written so far in the context of the conclusion, its contribution to knowledge and possible trajectories.

1

I term this section as Notes on a Conclusion as I'm uncertain about monsoonal conclusions as a knowledge that terminates, but instead repeats and instantiates change. That perhaps is one of the critical conclusions of study – that the suggested limit of what is said to be the monsoonal archive is challenged by identifying, existing and gathering air's stories – that they reanimate our understandings of what the monsoon is not just because of air's affinity to atmospheric aesthetics and language but because it gives us a way of seeing monsoonal ways more clearly, as they breathe us into their stories. Monsoons so far have led to new conclusions – with aerosols, the fire of industrial agriculture, city forests, vegetal species, distribution, notions of death and seasonality. So, I offer then notes on some possibilities of how things went and how things can perhaps come to be. I can say these are conclusions among many of study – of studying and being studied (by weather). Study almost in the sense Moten and Harney (2013) mean it – that study is disorganised, study is revolt, study is breathing because it has to go on. The monsoon studies “us,” and study is also a co-constituted process of being together – that the stickiness of the air is an air of love – that where else can monsoonal life be but here. I study and have attempted to study therefore in order to not extract but allow monsoonal speculation to haptically, academically, thoughtfully, knowingly mix with cosmologies and archives of future and past. I have been less interested in the debt produced by the claim of colonial method which asks us to stay under the canopy of the plantation and to theorise the monsoon in alignment with plantational scale – its visuality, scale and interest in resourcing measure. I have attempted to keep conversations with farmers in the same story as with aerosols and the poetic visuality of technoscientific assemblages. I have attempted to allow geological forms to air their ways into

monsoonal form and to expose their intimacy with the everydayness of field-sites. I have attempted to tell stories of air without ever blaming it for the politics of cosmology i.e. colonisation did not happen because monsoonal winds allowed for colonisers to sail but because extractive form and violence gives colonial life its rationale – and that is not the story of the monsoon – but among its myriad relations. Mike Davis teaches us that through the writing of the holocaust authored by empire in Bengal and the surrounding region, it is not the monsoon that produces debt, but it is racialised and caste driven oppression. While the letter from science authors the *El Nino* as the provider of drought, Davis asks us to ask again. Empire produces drought. And to do so requires one to produce monsoonal debt, where associated forms of life pay to be rained upon, pay to be sheltered, pay to exist. There can be conclusions about debt but there cannot conclusions about the monsoon, as the wind lives on – the wind is an invitation for time, to time, for us to air in time. So as the Anthropocene makes monsoonal times more severe, we still don't know what forms of extremities will nourish and trespass into methodological form.

These 4 years have been tremendously powerful. Towards the concluding waves of this work, I realised that the monsoon had to occupy a relentless anti/post-disciplinary approach not just because the project's work environment allowed it to do so but also because the stakes for monsoon research and monsoonal work is very *very* high. The forms of sense and sensemaking, monsoon research communicates needs to diversify and offer nurturing despite drought, despite contamination, despite whatever state and enterprise said the future would or should be. In many ways, monsoonal work is about making air-lifeform legible to the practice of staying alive. As I begin in the introduction, the word monsoon itself dispels the sense of a discipline, that the idea and its weather-world are the regimes of particular ways of knowing and not others. Ignoring, avoiding and going against that meteorological hubris has been critical throughout this enquiry. The uncentering of meteorology has undeniably been one way. The method is not the monsoon, but the monsoon as argued in much of this work is the methodology i.e. the monsoon is not an applied framework but is the way within which worlds make sense. The monsoon is not a utility for research but is what makes research tenable – stories begin with monsoon air, and they animate methodology. The monsoon teaches us that there is no single science of the air but a swirling and confused multiple. Scientific assemblages are swayed. The monsoon wanders, meanders, sinks, grows, decays, still, forces, breaks and sustains the broadest ecology of life and its knowing possible. While the monsoon as a geopolitical idea is undeniably part of global colonial history, in the wake of extractive enterprise's project of linking weathers between plantation and political-control ecologies, its meaning and lifework if seen for what it is, is much

more than colonial story. As I mentioned critically in the introduction and methodology sections, there is no south, south-east Asian word that I found for the monsoon but innumerable others, that seemed to air worlds of many different kinds and temporalities. One of the key learnings of this process has been that despite my own affinity to key the monsoon as permeation, it is in the dismantlement of abstractive specificity which pretends to know the wind as a technological object that stories even begin to make sense – because it is not the technological object that one signifies as breathing – and architecture does not doodle the air, despite its sense of material prowess. What I mean to say is that meteorological representation is not the monsoon, and the history of atmospheric science is not the history of the monsoon, despite its use value to tell stories about the wind. I have shown on aerosols, plants and ideas of time assist one in that critical trespass out of meteorological centrality.

Co-production, a key concept from Monsoon Assemblages has been helpful in this regard. Starting from the New Delhi National Capital Region, anthropogenic materiality and knowledge help me understand the monsoon in different ways, even as the monsoon changes those forms, and challenges foundational separations of conditioning, politics, infrastructure, seasonality and so on.⁸¹ The aerosols that helped me dive into their mist and start a monsoon enquiry pollinated through the struggles of farmers and other distributions, such as that the high plateaus and Himalayas that I later storied in the chapter on time and seasonality. Co-production allowed for sequencing the force of curiosity to migrate with the wind and its many dynamic ecologies. But it also takes me to southern Karnataka, where my own inheritances and lens-to-know inform so much of my movements and bathings in monsoon air through time. As we know, there is no objective knowledge. The subjectivity of inheritances and what air makes of me and us matters. The methodologies of places and the fragments that feed us inform what and how the monsoon is known. Furthermore, my point through this project has never been to extract knowledge despite the complex financial, positional and “research” ecologies I occupied, in the sense that the monsoon somehow spoke to the perspectives that we can have conversations about the weather between places both inside and outside the bounds of monsoon-ness. Monsoonal conversations seemed to tighten knots and expose the fragility of weather-thread. Monsoonal conversations taught me that the air is not a medium. It seemed to be for western academic theory and it ticked the boxes of a mathematical and thermodynamic medium but conversations in and of monsoonal lands teach me otherwise – that the air is not a medium. Monsoon air in

⁸¹ “The monsoon will be approached as an agent in the co-production of bio-physical and social space on multiple scales.” - Monsoon Assemblages 2017. See the executive summary of Monsoon Assemblages at <http://monass.org/project/executive-summary/>.

particular is a multigenerational time that repeats in multiple winds, over and over and over again, with emerging demands, responsibilities, multispecies sensitivities, chemical baggage and an archive of origin stories imagined, unintended, and cultivated despite.

2

I also learnt that figuring is always in the context of ongoing breakdown and turbulent circulation. The monsoon was not something I could write about by launching a balloon or theorising the history of atmospheric aesthetics. The monsoon is a lived reality, and figuring in and with “it” hurts, because the monsoon orients you to the cause of air. It exemplifies the geography of place. Be it a desert, or a rainforest, or a central Indian city, a rice plain or the lower Himalayas. It compounds the circumstance of place, its material forms with the offerings of air – be it through its silence, its dryness, its wetness, its dust, its lack of interest, its rage, or whatever they may be. The monsoon is a conversation across aspirations and *lifeforms* – what they want it to be, what it is and what is intra-actively fumes to be.⁸² Donna Haraway’s word “figuring” has animated much of my imagination in this work. Figuring worked so well with opacity, weather, teleconnections, and just being a being inside monsoon air. Figuring was always in the current of monsoonal ways. Figuring did not insist for a framework or a colonial structure to guide a path inside air’s world but instead take ethnical investments in living, seriously, playfully. To figure was to understand that the way words align were not often the ways the world aligned. Figuration was to worm in world’s stickiness, and that allowed monsoon stories to live in and through forms that were not often considered to be monsoonal. The second chapter on the thickets of *Prosopis juliflora*, arid monsoon forests and the Delhi ridge speaks to that spirit of enquiry. Researching with these thickets taught me that the colonial discipline of environmental history opens up in steroid animacy when dosed with ecological enzymes and monsoon air. The monsoon changed my way of approaching categories such as invasive-ness, emergence and native ecology. Or rather, I should say – it dint change it but opened my eyes to a way of seeing with the shrub as a weather form, that is breathing and inside of air like all of us readers of texts. While this wasn’t a key aspect of any of my chapters, I often wondered through the concluding waves of this work if readers of this text (if at all) would recognize the common dust storms/winds that connect the conclusions of the first story (chapter) to the second and the

⁸² Thanks to Karen Barad for this idea and term of intra-action that has been so important to me.

second to the third. Often inside pre-monsoon dust storms and usually dusty days in Delhi, one would wonder how dust changed the lives of its consumers. I'd have visceral allergic responses the evening later, so dust to me was intimate. A newspaper seller near Hauz Khas told me that he's lost relatives to dust storms in Rajasthan. I didn't ask much probing but it was a response to the query of how he was doing in the dust, and that too on what was supposed to be a wet day. Growing up, I had heard stories of my parents losing extended relatives during the monsoon: to strong currents in streams, mud erosion and the odd intersections of other materialities with heavy rain. Heavy rain and thunder conjured some fear in their imaginations, even though they recognised its importance. The transition to a chapter on the death of time and/or *kala* and/or the season was an opportunity for me to meditate on the persistent question of the death-of-the-monsoon through anecdote, the everyday and through the spirit of the climate emergency. It breached the typical nourishing-ness of monsoonal sway where the monsoon brings things to life. It extended breakdown (Puig de la Bellacasa 2021) to its many matters and ways, in how folks viewed the monsoon to be in times to come.⁸³

I write this at a time of mass death in India (May 2021) when so many people have died due to the shortage of oxygen supply in the medical system, in the context of this pandemic. As the disease of the pandemic spreads through the aerosols shared between people, more find themselves closer to breathlessness. I re-read my notes on the death of seasonality, the death of time, the death of *kala* and I hear of friends looking for oxygen for the ones they love – through black markets, contacts, political begging, social media networks, the neighbourhood, NGO's and other communities. The fight for air persevered as the regime responsible for feeding the structure didn't consider its responsibility to do so, and instead invested in the deeper privatisation of life systems, campaigning for its own violent and extractive political interests. I say this because oxygen compressors and industrial medical oxygen suppliers procure oxygen from the air. At times of crisis, the seizing away of that air is also the seizing away of monsoons to come.

⁸³ I cite Puig de la Bellacasa to acknowledge a recent paper "Embracing Breakdown -Soil Ecopoethics and the Ambivalences of Remediation" that I read that speaks to the multiplicity in breakdown form and knowing. Breakdown, I've often found to be an easy word to inherit meaning of several languages that are trying to communicate weather-related-pain and an-anxiety-about-the-future-of-the-monsoon. I recollect a question I got at a seminar I did at the Centre for Policy Research in Delhi (thanks to Ankit Bharadwaj) in 2018 where the participant asked (roughly) if the mapping of breakdown events could be helpful to understand monsoonal change. I sensed the meeting of the dense temporality of event-time-and-form meeting the wind: how are these transformations changing weather maps already? Is not the monsoon and its changing dynamics already a map of the Anthropocene of "our" monsoon time and Anthropocenes to come? The stories of the death of time are already meanderings in the changing maps of breakdown.

Who gets to see another monsoon? These are deeply political and forceful questions. It is important that monsoonal life survives the extractive theorisation of air – the monsoon – monsoon air.

Of the Himalayan monsoon waters that gravitated and sedimented into the plains of central India (that were discussed in my methodology and first chapter, through forms such as the Yamuna), over a thousand bodies were reported to be found by the banks of the Ganga, drifted, some buried in sand.⁸⁴ They were speculated to be the bodies of people who were perhaps affected by the “fever” of the pandemic and whose families perhaps could not afford or be accommodated by the infrastructures organising the final rites of people.⁸⁵ It is hard to say.

Meanwhile, in Delhi, as the India Meteorological Department and other private meteorologists put out speculations of when the monsoon would “arrive,” the farmer protests still persisted, still camped, still demanding the regime to allow them to make monsoon futures in peace. I write this at a time of mass death and what I know is that breakdown is also a political project for those who profit and extract from it, value for whatever world they consider themselves to live in. For those attempting to cultivate monsoon futures and desiring a world with monsoons to come, breakdowns can be lively, can be painful, can be sweaty, can be sticky, can be dry, can persist, but they ask for the space to make monsoonal futures with particular kinds of ecologies. And perhaps those ecologies desire and ask of monsoonal matter the same question – to be, to repeat, to breathe in whatever for air is air to those lifeforms. To figure in monsoonal form is always political. Recognising that inquiry and holding it close to the study of matter is and has been crucial for this project.

3

I learn therefore that it is important to put colonial methodologies at risk, as they measure “us” into the last geological minutes of life, attempting to examine the amount of air you consume to financialise life, air, ocean, earth. I deploy the term risk, in alignment to abolition but highlight risk as the inverse of how deathwork (as termed by Deborah Bird Rose) is instantiated as a cosmological offering to understand weather and lifeworlds. Akin to a 2019 report I read from

⁸⁴ Reports of this story can be found in the Indian and international media from May 2021. See a report here, from Mojo Story titled “Nameless: The Corpses of Ganga”: <https://www.youtube.com/watch?v=ZybcN-b0f1o>

⁸⁵ I refer to it as the fever and not COVID-19, because rare reports from rural India indicate that that’s what people call it. See, the People’s Archive of Rural India (<https://ruralindiaonline.org/en/>) and Gaon Connection (<https://www.gaonconnection.com/>) for some of the only rural reporting taking place in the English language in India today.

Down to Earth where the Rajasthani village of Lapodia thanks to its community led grassland revival and traditional rainwater harvesting methodologies has risen to be drought proof, despite its colonial categorisation as an arid and damaged ecology. Akin to Lapodia finding its story with air, and resisting the story of aridity's death (Davis 2016). The village forms part of the perceptual expanse where the dust in/of the dust in earlier chapter, pass by. Akin to the monsoon being a letter to science, where it disorients white computational form in the production of forecasts for extractive resourcing. As disciplinary praxis breaks down the monsoon into categories and bits of biological and computational form, they attempt to dive deeper into the formulae of what constitutes wind to speak its many ways. But if those speeches are codified for extraction, what of the speech is still alive? I am not saying science always does this but I am saying that anthropocentric and colonial methods deep into the way knowledge is framed and practiced have catalogued an economic rationale of monsoonal materiality that reorganises human and more-than-human life into violent relationships. The monsoon have instead shown how fire produces intergenerational aerosols, vegetal experiments produce “invasive” ecologies and how the season itself is gaslighted in the Anthropocene as disorientations continue. Disorientations continue. That ability for this zone of turbulence in method's ecology is I suggest a welcome one to assist us in putting colonial methodology at risk. I often think of the speculative question – how many more monsoons will it take for the pretend of colonial capture to truly disintegrate? I think of this in line to the question for how long as injustices go on? Following the findings of weathering (through geological and soil science), Ali, Hathorne and Franck (2021) argue that the monsoon has been monsoon-ing for 27 million years, and life in the subcontinent and the broader region is etched into that force of weathering. Life is and has been the methodology of monsoonal form. So as I make acts of speech and text at a time of mass extinction where plantational-colonial-industrial-anthropogenic forms conclude multi-general forms of multi-species life, how long can it be till the air itself dies? How long can it perhaps be, (albeit in a poetic and speculative sense) till the thermodynamics of heat collapse into their own methods? And that some kind of monsoonal time resists and insists on weathering more?⁸⁶

For the process of this work, I had to step out of particular disciplinary pathways of monsoonal examination. The monsoon is not a clinical body, and as one may observe neither have I treated as a tropical laboratory. Monsoonal life is not a test site for continental fantasy. Historians that I've cited in this thesis and elsewhere have often written the monsoon in very close proximity to

⁸⁶ I think of Astrida Neimani's work every time I use the word weathering.

the colonial archive, in some instances almost sounding exactly like the colonial archive – that “its” discovery marks knowledge. Geographers followed geologists in the naturalisation of the monsoon while anthropologists researched cultural curiosities of tropical peoples from the standpoint of the western gaze. The invention of meteorology, almost as a consequence of extractive colonial capitalism’s interest in the puzzling and unpredictable monsoon appropriated several weather disciplines in cultivating a singular science of the forecast. As disciplines became more specific to press and distil value from objects and objective contexts, monsoonal story and form became many things but the air itself. One of the significances of my study has been the relentless unionising of the air as a way through which the monsoon can be understood. Air is in of its many material, space-time and life assemblages. Instead of starting with water or the volumetrics of meteorology, I have stuck with the problems, complexities and opportunities of the air. Even as I wrote stickiness that leaked from the form of atmospheric science. Even as I story with city forests and *prosopis juliflora* in earlier chapters, I did so with a sensibility of the air – that the windy-ness of enzymes and the caress of the dust played along with what vegetal stories were doing already with the sun and the general weather. The other significance of this study has been the cross-pollinating poetics of technoscience and struggle, to work and sing alongside – that, disciplines do not privilege themselves in the force of lifework – that narrative is still possible. This is particularly visible in my chapter on industrial agriculturalization and aerosols where information from atmospheric science is just as poetic and problematic as the description of *prakriti*, stubble burning, national politics and so on. The power of empirics it seemed to me was shared by different ways of knowing monsoon air – and rice, agriculture, spectroradiometers, satellites, mathematical discourses, poetics and dust all had important contributions to make to moving paragraphs and sentences gathering in monsoonal circulation. The post-disciplinary (and or even anti-disciplinary ethos) commissioned by the project and its political direction helped me take those risks in reading things for what they were, allowing me to dive into curiosity driven research where my own haptic response to these different disciplines collapsed in an internal assemblage of meaning making.

Fieldwork validated and contributed to these processes even more. This process was significant in so many ways as it allowed me to re-examine, re-imagine, re-interpret spaces I’ve been to and known. Fieldwork informed theory and not the other way around, but at the same time the field was distributed. The archives of atmospheric science were just as much fields as the city forests of Delhi or meanderings around Himalayan lakes. Data points connecting these places informed pathways and journeys being made. Fieldwork also played a role in the production of contradiction and new dynamics, in the sense that – pollution was not just about toxicity,

infrastructure was not just about movement, waste was not just about disposal, music was not just about celebration – and so on. Being present inside monsoon air enabled me a second opportunity to listen to its sociality. It was an opportunity to write the city differently, so much so that it almost disappears in its re-distribution, but then some other method senses it and calls me to read on – the monsoon is never completely known. My study allowed for that opportunity where urban studies could be swayed by monsoonal happening and that the register of writing seasons/weather/phenomena was not just written off as an agricultural concern or a matter of volumetric inundation and drainage. The city was an offering to know the monsoon differently.

4

This brings me to the subject of contribution to knowledge. This work has communicated that the air of the city can open up new ways of understanding the monsoon. I have insisted that monsoonal stories and their knowledges integrate elementalities, concepts and assemblages. I have argued that the monsoon is more-than-rain, much-more-than-a-season, is a force that means different things to different spaces, and is an air of constant co-production.

I have over the past 4 years (and ongoing) participated, spoken at and engaged with a range of academic and intellectual communities in a variety of formats. From international relations conferences to workshops on multispecies assemblages to Anthropocene campuses to art-and-science programmes to a range of conversations on the politics of air. I am also in an ongoing process of publishing outcomes of this work in a range of outlets, including ones that are peer reviewed and cross-cut disciplines such as international relations, urban studies, anthropology, science and technology studies, environmental history and geography. Engaging with disciplinary genealogies to make the monsoon “fit” within discourses has been challenging to me and I found myself spending a lot of time surveying into the literature and ethics of possibility. The beauty and challenge of monsoonal work is that it (aspires to) makes anything that it touches rich with description and life, and the taming of that explosion in the cellularity of detail to adhere to language does strange things to/with the work. It occupies that ever present tense relationship between the university (institutions, capital, socio-economies) and the tenability of knowledge in open air, that the former asks for the latter to be archived and perhaps even colonised. In order to make a contribution to knowledge then, I have often pondered on the decolonial capacity of monsoonal elementalities. How does the rain shower the possibility of a different kind of science? Or a better more liveable science? What happens when native and indigenous colleagues and knowledge tellers, speak of death to their ways of knowing? I do not have an answer to this question, and this perhaps is a critical limit of this study – in the sense that – could it perhaps,

just be the case that the monsoon cannot be decolonised – that the violence the air absorbs and makes worlds with – is what it does with anthropogenic extractive forms – and for all that is wept into its ecology – “it” does not answer back – “it” is its own methodological entanglement, and it is breath, it is blanket, it is matter. So, I often retreated to a personal stance, one that I’ve walked a fair bit with wonder after listening to the anthropologist Dolly Kikon – that decolonisation is a feeling within the body (Kikon 2021).⁸⁷ Our contexts are very different but I thought, there had to be some force inundated here in the identification of that fact, out of which sustenance swims. There just had to be. It seemed to be materially true.

The monsoon has also over the past 4 years helped me engage with people and be part of communities of knowledge, solidarity, reading, writing and time. Walking with friends, learning and talking to friends, I have realised that monsoons can speak with each other, where they are sensed to exist. That inherently holds such potential as it gives us the ability to stitch new relationships between weather worlds. Considering the monsoon has been a much fetishized idea in western worlds that have severely catalogued it as rain and a myth about “tropicality” that originates with the invention of the white body. Walking with friends made me realise that counter-narratives to that operation of exceptional fetishism have always existed and will continue to. Those contributions that happen because of our awareness can be powerful in moments of ideological and pedagogical confrontation. We get to resist the gaslighting about the air. We get to say that the air exists.

In this study, I have addressed the fact that the monsoon can be a subject of air, even when approached through the humanities and social sciences. I have written a thesis that takes into account stories in/of a city in writing a monsoon which is an unconventional approach to something like that of the monsoon. Monsoon Assemblages enabled for that space to exist within the university, whether some agreed or not. For something that often fell into the catalogue of poetics, nostalgia, cinema and disaster meteorology, cities have not been starting point for monsoonal conversations. While it is true that issues such as water shortages and seasonal floods have spotlighted cities thanks to their political-economic visibility, they have seldom been the site through which monsoons have been addressed or understood. My work takes the National Capital Region as a starting point for a conversation on aerosols, multispecies assemblages and conceptual re-modelling of seasons in how the monsoon animates and re-animates these discourses, materials and processes. This study has followed the briefest of

⁸⁷ This was a talk Kikon gave at UCLA Centre for India and South Asia Studies via Zoom, accessible here: <https://www.youtube.com/watch?v=vRD4yQu2Heo>.

aerosols into the widening of distributive stories – that the field site is not just complicated but is inside and far outbound. The upper Himalayas via Leh and time in southern Karnataka and Kerala during this work helped me analytically and empirically figure that the air as a field is a powerful technology of knowledge cultivation, particularly when oriented with monsoonal stories – material and otherwise. Unlike the IMD map which would start Kerala and head northwards, as the South West wind, this thesis begins with Delhi in north central India. It glues the pollution of winter with the transformation of the monsoon and the broader storywork of the thesis. It shows monsoonal research can begin inside the air, in whatever has been inundated by air’s oceanic monsoonal process.

5



Figure 73: “You shall not see the entire house, the palms shall break through” The Palm House, Kew Gardens, London. May 5th. Picture by Harshavardhan Bhat.

I conclude with a brief section highlighting an insight for future research. I use the image above as an anecdote.⁸⁸ An example of speculative breakage, tropical leaking, methodological containment and post-air-conditioning theory in the Anthropocene. As I said earlier, the stakes

⁸⁸ The Palm House in the Royal Botanical Gardens, Kew was constructed in 1844.

are high to put colonial methodologies at risk. While one does not know what the future of the monsoon or monsoonal worlds will be, what I do know is that survivability is inside air's method, the monsoon being the powerful field-site of that thesis. I place the image above as an anecdote of theory production – that the laboratory of tropicality seems to have come a far away from the glasshouse of Victorian tropical fantasy.⁸⁹ Tropicality, being one of the key disrupters of global modelling and planetary science. Tropicality is a form of scientific turbulence.⁹⁰ While this notion's link to race, coloniality, bacteriology and blackness has been well researched in recent years, I'm interested in how the monsoon in particular confronts global weather imaginaries considering its placement within the tropical space-time.

If I was to link this anecdote to an anthropology of atmospheric science's struggle to figure the monsoon, I am taken to the insight from theoretical physics which acknowledges the eery problem of forecasts when versions of the Navier Stokes equation process monsoonal data in parallel supercomputing machines.⁹¹ I must acknowledge that this is an interpretive statement and not as how science or scientists speak of the problem but it is my understanding that the monsoon disorients foundational equations. Considering the monsoon has been the site of historical unforecastability (and continues to be so) (Carson 2021) puzzling global dynamics on a variety of levels, I suspect that the monsoon as a habitat of global re-theorisation will become more significant. From the connections and conversations I've made and had with scientists and colleagues invested in the climate and the monsoon over the past few years, I sense the possibility of probing into the methodological praxis of meeting and sharing. How do worlds of weather meet in these forms of knowledge production? How is the politics of moisture today, in these times of the Anthropocene following the legacies of plantational, tropical and extractive times behaving and is being studied? I sense that in the politics of moisture, or what scholars such as Da Cunha who address it as wetness is an ontological multiverse that animates and writes theory between lives, sun, ocean and earth. Resisting a classic laboratory thermodynamic interpretation of wet processes, I'm interested in the efforts of detuning (Myers) and survivability

⁸⁹ "Push open the heavy palm house door, and the world turns green. The air hands hot and humid, smelling of unfamiliar vegetation." – these sentences from Kate Teltcher's beautiful book haunt me. See: Teltcher, L. (2020). *Palace of Palms: Tropical Dreams and the Making of Kew*, London: Picador. The Palm House as a tropical zone of air has been well theorised, but also note the consistent stress here and across scholarship about what constitutes the words hot and humid, who makes those assertions and what implications they have.

⁹⁰ A literary and critical assessment made after reviewing how atmospheric science views tropicality in global dynamics theory making.

⁹¹ The Navier Stokes equation is a basic set of partial differential equations that form the foundation of a mathematics of fluids and their motion. It is a key aspect to the mathematics of weather forecasts, and is a globally applied idea in the sciences.

that is ongoing in every breath. I am interested in working with science and different knowledge assemblages in claiming that the politics of moisture is still a space of workability in these deeply precarious and often breathless times.

List of Abbreviations

Structures

NCR National Capital Region

NCT National Capital Territory

IMD India Meteorological Department

IIT-D Indian Institute of Technology – Delhi

LAMO Ladakh Arts and Media Organisation

GoI Government of India

IGP Indo-Gangetic Plain

NASA National Aeronautics and Space Administration

ICTS International Centre for Theoretical Sciences

UC University of California

RCSB Research Collaboratory for Structural Bioinformatics

CABI ISC Centre for Agriculture and Bioscience International, Invasive Species Compendium

INDOEX The Indian Ocean Experiment

ISRO Indian Space Research Organisation

Materials

CO Carbon monoxide

CO₂ Carbon dioxide

SO₂ Sulphur dioxide

NO₂ Nitrogen Dioxide

SnO₂ Tin(IV) oxide

SPM Suspended particulate matter

Processes or technology

MODIS Moderate Resolution Imaging Spectroradiometer

PM_{2.5} Particulate Matter less than 2.5 microns in diameter

PM₁₀ Particulate Matter of 10 Microns in diameter or smaller

MISR Multi-angle imaging spectroradiometer

PPFD Photosynthetic Photon Flux Density

VPD Vapour Pressure Deficit

IRS Indian Remote Sensing

AWiFS Advanced Wide Field Sensor

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