Summer smells
Understanding experience through the sense of smell
No:08; 2012
Landscape Environment Advancement Foundation, LEAF
Summer smells
Swati K. Noble
July 2012

Landscape Environment Advancement Foundation (LEAF), 2012

LEAF is engaged in research and publication in the area of landscape design and environmental planning. It supports research programs of varying durations every year.

Material produced by LEAF may be freely reproduced. LEAF and the author should be acknowledged while doing so.

LEAF invites applications for research positions.

For details please write to,
M/S. Prabhakar B. Bhagwat, 901-Panchtirth,
Opp. Aristoville, S.M.Road, Ahmedabad-380 015.
INDIA

T # 91 79 2692 3054
E # landscapeindia@usa.net
## CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>01. Introduction</td>
<td>02</td>
</tr>
<tr>
<td>02. Object, smell, memories</td>
<td>07</td>
</tr>
<tr>
<td>03. Materials, smells, experiences</td>
<td>21</td>
</tr>
<tr>
<td>04. Smells of space</td>
<td>29</td>
</tr>
<tr>
<td><strong>Sarkhej Roza</strong></td>
<td></td>
</tr>
<tr>
<td>05. Place and smells</td>
<td>33</td>
</tr>
<tr>
<td>a. Residential area</td>
<td>34</td>
</tr>
<tr>
<td>1. Street, Kaka Baliyani pol</td>
<td></td>
</tr>
<tr>
<td>b. Organic produce markets</td>
<td>42</td>
</tr>
<tr>
<td>2. Spices &amp; grain market, Madhupura</td>
<td></td>
</tr>
<tr>
<td>3. Fish market, Bhatiyar gali</td>
<td>50</td>
</tr>
<tr>
<td>4. Flower market, Jamulpur</td>
<td>58</td>
</tr>
<tr>
<td>c. Temples</td>
<td>66</td>
</tr>
<tr>
<td>5. Dharnidhar temple, Paldi</td>
<td></td>
</tr>
<tr>
<td>Kalupur Swaminarayan temple</td>
<td></td>
</tr>
<tr>
<td>Hanuman temple, near IIMA</td>
<td></td>
</tr>
<tr>
<td>d. Industrial area</td>
<td>74</td>
</tr>
<tr>
<td>6. Narol</td>
<td></td>
</tr>
<tr>
<td>e. City edges</td>
<td>82</td>
</tr>
<tr>
<td>7. Fields near S.P. ring road, Pirana</td>
<td></td>
</tr>
<tr>
<td>06. Smell map</td>
<td>91</td>
</tr>
<tr>
<td>07. Inferences</td>
<td>95</td>
</tr>
<tr>
<td>08. Bibliography</td>
<td>98</td>
</tr>
</tbody>
</table>
Osmosis

A little square shop, a dark wall all along one side. As one’s eyes adjust to the soft light, you can see that the dark wall is actually a series of tiny drawers; of dark wood. Inside each one is a spice – turmeric, fennel, red chilli, cloves, cinnamon, bay leaf and many more. One can almost visualize the fine powder of the spices getting embedded in the grain of the wood till the inside surface of each drawer is no longer wooden – it has transformed to become something else.

One did not see the inside surface of the wooden drawer, one saw only the dark, smooth outer surface. However, you can smell each of the spices. The various smells combined with the wood conjures up images of a warm wooden surface so deeply impregnated with the aroma of the spices, that it becomes difficult to separate the two; indeed one wouldn’t want to. It is almost as if each of the spices was inhabiting and making the space of the drawer its own.

Though this is completely opposite to ‘clean’, ‘hygienic’, storage in stainless steel containers; there is something alchemical and poetic in the process of the reaction between the wood and what it contains.

The act of living – of dwelling, of everyday movement, of eating, of storing, of walking, leaves its marks and traces on the spaces that it is enacted in. As Peter Zumthor says in ‘Atmosphere’; “People interact with objects”. He goes on to say, “(architecture), it collects different things in the world, different materials, and combines them to create a space like this. To me it’s a kind of anatomy we are talking about”.

Like the wood in the spice shop, the body and material of the built begin to be permeated by the actions they are subjected to, a depression due to years of walking on them, a wooden door layered with years of human touch and the grime in the air, hard stone with tiny pores that accumulate the miniscule particles of dust and dried and powdered flowers over decades. This slow process of accumulated osmosis transforms materials and spaces into different beings – some hollow, some sad, some alive, some colourful, some smooth as silk, some rough.

Our bodies perceive all of this and more. After all, it is an instrument of perception and interaction. Though we primarily ‘see’, all the senses co ordinate with the body for a full sensory perception. Some senses make you feel, while others make you remember. The sense of smell triggers of memories that the eye has forgotten.

In this small study, Swati (a second year landscape architecture student) sought to explore this haptic world of atmosphere, smell and memory. She has chosen places within the city of Ahmedabad to understand these processes. She has specifically chosen the sense of smell as a tool to understand these phenomena. She has documented the places through her maps and photographs.

Facing a complex task, she has begun the study by looking at objects and smells; and the memories they trigger - building upto embedded smells and their layering through activities of weathering; of atmospheric and human action. She has finally taken seven case studies and examined their several odours representing them through maps and photographs.

The study is not aimed towards a specific conclusion or inference; but tries to expand the notion of ways of seeing and representing place.

Anjali Jain
Oct 2012
Smell and the city

Odor: “An odor or odour (commonly referred to as a smell) is caused by one or more volatilized chemical compounds, generally at a very low concentration, that humans or other animals perceive by the sense of olfaction.” (www.wikipedia.com)

The ability of humans and other animals to perceive odor is known as smell.

The olfactory system, which senses odour, is important to our lives, and comprises one of the most primary parts of the brain. Clues that the smells send to our brains come in the form of chemicals found in the surrounding environment. The sense of smell is a sense that is often underrated but works overtime. You are, all the time, unconsciously reacting to different smells.

Our lives are not ruled by the sense of smell only. However, consciously or subconsciously, it plays a very important part in our daily lives. Human beings can identify up to thousand different odours but not everybody can recognize them to the same degree. Our expressions, emotions directly relate to this sense. Environmental odours can affect mood and stress levels. Our sense of smell not only provides us with warnings about the environment, but also plays an important role in how we recognize each other, communicate with each other, and recall memory. Aroma also plays an important role in our social and cultural life. The use of fragrance in various rituals, cooking and other activities has become an inextricable part of daily life such that, knowingly or unknowingly various odours have also made their place in our existence.

“When from a long distant past nothing subsists, after the people are dead, after the things are broken and scattered, taste and smell alone, more fragile but enduring, more unsubstantial, more persistent, more faithful, remain poised a long time, like souls, remembering, waiting, hoping, amid the ruins of all the rest; and bear unflinchingly, in the tiny and almost impalpable drop of their essence, the vast structure of recollection.” - Marcel Proust

Places have distinctive smells too. This is expressed very well in the blog; www.tangdynastytimes.com, by Peony. Quoting Mahmoud Darwish, “Acre is the smell of iodine and spices. Haifa is the smell of pine and wrinkled sheets. Moscow is the smell of vodka on ice. Cairo is the smell of mango and ginger. Beirut is the smell of the sun, sea, smoke, and lemons. Paris is the smell of fresh bread, cheese, and derivations of enchantment. Damascus is the smell of jasmine and dried fruit. Tunis is the smell of night musk and salt. Rabat is the smell of henna, incense, and honey. A city that cannot be known by its smell is unreliable. Exiles have a shared smell: the smell of longing for something else; a smell that resembles another smell. A panting, nostalgic smell that guides you, like a worn tourist map, to the smell of the original place.” Peony goes on to say that, “Many cities in the world have distinctive smells even today but many of them are a perception of the mind. For example, Venice smells swampy and sweaty and you notice it the minute you arrive; Bali is overwhelmingly like heavenly frangipani and temple incense; each has their own beautiful colors and culture; their own spirit and fragrances. Cityscapes like landscapes attain a particular atmosphere to which those who live in become attuned. It is this spirit, which enables people to say that great cities are all more than just the sum total of their parts.”

For this document, I chose to investigate the layers of smells of Ahmedabad where I live and study. Ahmedabad is one of the largest and fastest growing cities in India. As in the case of a developing city, the smells of gasoline, vehicular & industrial fumes are a majority in the atmosphere. But under this layer of grey, lies a mosaic of other characters.
Places have a distinctive smell that can be associated with them. For instance, the smell around a fuel station or a meat market would automatically generate an image in a person’s mind. The quality of smell (pleasant/unpleasant) is subjective and may vary from person to person.

To understand the complexity of this phenomenon, I decided to start my study with the inherent smell of certain objects and understand how the smell is generated. I also included some examples of where the object ‘changes’ when two or more smells come together.

Finally, seven locations were chosen in the city to understand the layering of odors within them - their sources, their intensity, spread and their ability to linger in the atmosphere.

These were observed through photographs and maps were generated for each location.

How the olfactory system works

**Nose:** Serves only to take in and channel the air containing odorous molecules.

**Olfactory epithelium:** Contains the neurons that sense the odour molecules.

**Chemo Receptor:** Chemical sense is detected by sensory cells called chemo receptors. They pass on electrical impulses to the olfactory bulb.

**Olfactory Bulb:** Sorts sensation into perception.

**Limbic system:** A system that includes the amygdala and hippocampus: the received structures vital to our behavior, mood and memory.

The brain then interprets patterns in electrical activity as specific odors and olfactory sensation becomes perception - something we can recognize as smell.

The chemical detected by the sensory system needs to have certain properties. It must be **volatile** so that it gets easily evaporated at normal temperatures and atmospheric pressure and it can be carried through the air in to the person’s nose. It must be some what **water soluble** to pass through the mucus and reach the olfactory cells. It must also be **lipid soluble**, because the olfactory hair are composed primarily of lipids and the surface of the olfactory cells are also lipid containing.

Local weather conditions like temperature, humidity, wind direction also affect the movement of gaseous odour molecules.

Ahmedabad falls in the category of hot, dry, temperate climate. Observations have been made in the month of May, June, July. During these months, the climate is extremely hot and dry; the average summer maximum is 41 °C and average minimum is 27 °C. During early mornings and late evenings, since the temperature is low and because of the presence of humidity, one can smell various odours more than at other times of the day.
Sometimes memories of a place and time are embedded in our minds through sensory remembrances; the strongest being smell. Smells of specific objects can remind us of ‘other places and other times.’

02. Object, smell, memories
Damp ‘Khus’
Freshly mowed grass

Memories of a fresh summer morning
Dust in the air

Memories of an afternoon in May
Damp earth

Memories of the first shower of the monsoon
Damp ‘Khus’

Inherent odor of complex root structure, which has fine rootlets.

They absorb complex molecules from the earth.

Moisture and breeze spread the fragrance.
Temporary smell

Cutting of the grass causes the molecular structure of chlorophyll to break.

This releases green leaf volatile (GLVs), which emits a sharp, pungent fragrance.
Dust in the air

Dust particles are **thrown up** in to the air by wind and vehicles.

These get **suspended** in the atmosphere.
Bacteria that are present in the soil produce spores. These spores are thrown up into the air by raindrops. These spores are responsible for the earthy fragrance.
03. Material, smell, experience

Distinct smells work with other ones to completely transform the original ones - indeed, the very experience of the object/place itself.
Tea has an **inherent** smell

Paper / Clay / Styrofoam / Plastic are **porous in structure**. They **absorb** liquid and thus, change the flavour of the tea.

Steel / china utensils are not porous and do not add/remove anything from tea. In fact we feel the ‘cold’ steel also when we drink a hot liquid in a steel cup/glass.
“Lignin, the stuff that prevents all trees from adopting the weeping habit, is a polymer made up of units that are closely related to vanillin. When made into paper and stored for years, it breaks down and smells good.”

http://bookishlady.com/?p=763
Stone, layer of dust, thin film of water on stone.
Plumeria - fallen, slightly decayed.

The three together remind me of a garden, water being sprinkled, and a tree or a grove of Plumeria near by.

A small fragment can remind one of a full picture. A picture can make you recall the experience of a place triggering off sensory memories including their smell(s) and touch.
Smells can convey both the tangible and the intangible - history, neglect, stone, dust, silence. All these come together to create a place; an atmosphere.
Ruins, sand stone, weathered, accumulated dust, moisture penetrated, silence, openness, abandoned, dogs, bats.

Space exposed to activities absorbs traces of them, almost adding layers of memories to surfaces.

The nature of the physical surface decides the degree of absorption.
05. Place and smells

Places - surfaces - activities - people impregnate a place with innumerable odours, which subconsciously become a part of the experience of a place. The act of dwelling, gets embodied in various forms. The following are studies looking at this phenomena by focusing on smell as an instrument of experience.
A pol is a housing cluster in the walled city of Ahmedabad, which comprises many families of a particular group, linked by caste, profession, or religion. A common gate guards a pol.

A long narrow street, edged by houses with a shared wall. Some houses have a courtyard inside. The edge of the house facing the street have ‘olta’ (raised plinth) made of stone. On the ‘olta’, carved wooden pillars supporting a wooden ceiling. The main entrance of the houses are intricate wooden doors.

The street is also punctuated with vacant houses, some collapsing. The life of the street is magnified by the presence of dogs, cows, bird feeders and also potted plants of Tulsi (Ocimum sanctum) and Ajwa (Ocimum gratissimum). At the end of the street there is a Jain temple.
Odour map, *Kaka Baliya ni pol*

Observation time 10:00 a.m. to 2:00 p.m.
OBSERVATION:

At dawn, the primary smell is that of agarbatti and dhoop from the temple at the end of the street.
As the sun rises, smell of the daily activities (toothpaste, soap, water) performed by the people of the pol starts infusing the air.

Mid morning, smell of cooking fills the air.
Latent smells include that of cow dung and spilled food. This causes foul smell due to decomposition.

The smell of dust and damp wood from old vacant houses adds to the distinct odour of the pol.

Due to occasional breeze, the smell of Tulsi (Ocimum sanctum) and Ajwa (Ocimum gratissimum) also lingers in the air for some time.

The shaded, narrow character of the street intensifies the smell in the pols.

SMELL TIME SCALE:

NOTE:
This map is based on personal observation. It is a broad map of sources of odor and their spread. Each one is represented with a corresponding colour as shown in the legend.
Sources of smell within the observed space

a. The main street is a busy road. There is a continuous movement of vehicles.

b. Ventilation for toilets opens onto the narrow service lane between houses.

c. Kitchen window on first floor

d. All the services of the house open on the street.

Wooden carving adds another layer of wood and dust to the street. Cloths hanging on the verandah emanate smell of soap.

In each pol, there are cows, bird feeders and dogs.
Tulsi (Ocimum sanctum), Ajwa (Ocimum gratissimum), Money plant (Epipremnum pinnatum) at the entrance of the house

The smell of sandalwood and dhoop emanates from the Jain derasar

Ventilators open on the narrow street

Collapsed structure

Kitchen and wash area
Place, matter, experience
b) Organic produce market

Madhupura is a retail and wholesale spice and grain market located near Delhi Darwaza.

The wide street has shops on both sides with various spices on display for people to touch and smell while shopping.

Shops open around 9:30 a.m. and close by 9:00 p.m. The street remains busy through the day due to the movement of shoppers and goods.
Odour map, Madhupura spices and grain market

Observation time 11:00 a.m. to 1:00 p.m. & 6:00 p.m. to 7:00 p.m.
As you enter, the street is dominated by the smell of strong spices and a distinct smell of jaggery. The bright colour of the spices makes this place vibrant and the colours catch your eyes as you enter in the street.

As one walks deeper into the market, the pungent smell of oil and ghee takes over.

Layers of oil, flour and mud on the street surface decompose and release a foul odour.

Some niches in the street sell ayurvedic medicinal products that release smells of herbs that is noticed as you pass them.

Some times due to the extremely strong smell of spices, it becomes difficult to breath freely near the shops.

**SMELL TIME SCALE:**

This map is based on personal observation. It is a broad map of sources of odor and their spread. Each one is represented with a corresponding colour as shown in the legend.
Sources of smell within the observed space
Place, matter, experience
<table>
<thead>
<tr>
<th>Product</th>
<th>Inherent + Dampness</th>
<th>Jaggery Inherent</th>
<th>Oil Inherent</th>
<th>Dried coconut Sugar Inherent</th>
<th>Garlic Inherent</th>
<th>Flour Decay</th>
<th>Ghee Inherent</th>
<th>Tea Inherent</th>
<th>Chips Inherent</th>
<th>Tea Inherent, Boiling,</th>
<th>Incense sticks Mud Decay</th>
<th>Toast Baking</th>
</tr>
</thead>
</table>

**Duration of lingering** - L - Long, M - Medium, S - Short

**Intensity** - High 🌟🌟🌟🌟🌟, Medium 🌟🌟🌟🌟, Low 🌟🌟🌟
Bhatiyar Gali is the biggest fish market located in the walled city, near Teen Darwaza.

Early morning, these streets are filled with varieties of fish mounds and thermocol boxes full of fish placed in front of the shops. The designated market, located at the centre of the street starts after the informal market wraps up.

Afternoon onwards, the street turns into a food street that serves non vegetarian food, late into the night.
**Odour map,** Fish market, Bhatiyar gali

Observation time 6:00 to 8:00 A.M.
At the beginning of the day a strong smell of fish pervades the atmosphere because of unloading of fish on to the street pavement. This can be sensed from afar.

The process of cleaning and cutting of the fish happens inside and outside the market. The waste is thrown on the streets or at the rear side of the market. Accumulated layers of waste, and stagnant water with blood starts releasing foul gases, which causes an unbearable stench on the road.

Early morning the bakery on the street is a source of the smells of freshly baked bread, buns and cookies.

As the market transforms into an eating joint, the aromas of various preparations takes over; varying from deep frying of meat to Indian spices. Towards the end of the day, smoke from the cooking exhausts takes over the entire street.

**SMELL TIME SCALE:**

<table>
<thead>
<tr>
<th>Time of Day</th>
<th>Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00 - 9:00 a.m.</td>
<td>Fish, Fish waste, Baking, Chicken</td>
</tr>
<tr>
<td>12:00 - 3:00 p.m.</td>
<td>Meat, Tea, Soap, Milk</td>
</tr>
<tr>
<td>7:00 - 9:00 p.m.</td>
<td>Pot holes, Garbage, Non-veg food</td>
</tr>
</tbody>
</table>

**NOTE:**

This map is based on personal observation. It is a broad map of sources of odor and their spread. Each one is represented with a corresponding colour as shown in the legend.
Sources of smell within the observed space

a. Wholesale selling of fish on the street during early hours of the morning

b. Dump yard at the rear side of the fish market
Fish selling amidst the narrow street

Permanent fish market

Stacked crates of fish

Pot holes and waste along the street

Key plan
Place, matter, experience
Fish Decay
Meat waste Decay
Butter Decay
Tea Boiling
Cookies Baking
Bread Baking
Tea Boiling
Milk Inherent
Cigarette Combustion
Mutton Decay
Lever Decay
Chicken Decay
Rotten food Decay
Soap water Dissolving

Duration of lingering - L- Long, M- Medium, S- Short
Intensity - High 🌟🌟🌟🌟 Medium 🌟🌟🌟 Low 🌟🌟
3. Flower market

The Jamalpur market is a big wholesale market for the city selling vegetable & flowers. The market is meant to be contained within the flower market (04) & APMC building (05) but spreads out on the pavement, till the river bank and space below the fly over. The fly over carries intense traffic coming from the bridge adjacent to the Jamalpur market.
Odour map, Flower market, Jamalpur

Observation time 6:00 to 11:00 a.m.
This map is based on personal observation. It is a broad map of sources of odor and their spread. Each one is represented with a corresponding colour as shown in the legend.

**LEGEND:**

- **Rose (Rosa centifolia)**
- **Marigold (Calendula officinalis)**
- **Jasmine (Jasminum spp.)**
- **Lilies (Hymenocallis littoralis)**
- **Construction dust**
- **Mango (Mangifera indica)**
- **Tea/Bhajiyas**
- **Vegetables**
- **Garlic (Allium sativum)**
- **Onion (Allium cepa)**
- **Vehicular smoke**
- **Dhoop / Incense sticks**
- **Urine**
- **Garbage**
- **Sewage**
- **Cigarette smoke**

**NOTE:**

This map is based on personal observation. It is a broad map of sources of odor and their spread. Each one is represented with a corresponding colour as shown in the legend.

**OBSERVATION:**

3:00 - 6:00 a.m.
The market is dark with dim spots of light, illuminating white, yellow, pink and green. A gust of wind from the river brings the fragrance of roses, jasmine and marigold towards you.

6:00 - 9:00 a.m.
As the sun rises, one can see mound of colour and fragrance. In the air are also hints of hot tea, and fried bhajiyas. As the day progresses, the floral fragrances get suppressed by dust, smoke and discarded, decayed petals and leaves. By 9:30, the fragrance of the flower has given way to the mild and pungent smell of vegetables.

**SMELL TIME SCALE:**

- 4:00 - 9:00 a.m.
- 12:00 - 3:00 p.m.
- 7:00 - 9:00 p.m.
Sources of smell within the observed space

Gerbera (Gerbera jamesonii) + Rose (Rosa centifolia)
Cow dung + Urine
Lilies (Hymenocallis littoralis) + Roses (Rosa centifolia)
Garbage box
River front construction site
Marigold (Calendula officinalis)
Asopalav Lilies (Polyalthia (Hymenocallis littoralis) leaves
Roses (Rosa centifolia)
Bhajiya
Marigold (Calendula officinalis)
Marigold (Calendula officinalis)
Tea
Jasmine (Jasminum spp.)
Tea + Maska bun
Lemon (Citrus × limon)
Garbage
Mint (Mentha arvensis) + Chillies (Capsicum annuum)
Temple dhoop
Onion (Allium cepa) + Garlic (Allium sativum)
Vegetables
Vehicular smoke

Key plan
Place, matter, experience

- Dust
- Suspension of dust particles
- Paperwire
- Burning
- Spider lilies
- Inherent
- Jasmine
- Inherent
- Marigold
- Inherent
- Rose
- Inherent
- Lotus
- Inherent
- Jute
- Inherent + Dampness
- Cigarette Combustion
- Tea
- Inherent + Boiling
- Bhajia
- Frying, decomposition
- Sewage
- Inherent
- Decay
- Mint
- Inherent
- Chillies
- Inherent

- Dust
- Suspension of dust particles
- Paperwire
- Burning
- Spider lilies
- Inherent
- Jasmine
- Inherent
- Marigold
- Inherent
- Rose
- Inherent
- Lotus
- Inherent
- Jute
- Inherent + Dampness
- Cigarette Combustion
- Tea
- Inherent + Boiling
- Bhajia
- Frying, decomposition
- Sewage
- Inherent
- Decay
- Mint
- Inherent
- Chillies
- Inherent

- Dust
- Suspension of dust particles
- Paperwire
- Burning
- Spider lilies
- Inherent
- Jasmine
- Inherent
- Marigold
- Inherent
- Rose
- Inherent
- Lotus
- Inherent
- Jute
- Inherent + Dampness
- Cigarette Combustion
- Tea
- Inherent + Boiling
- Bhajia
- Frying, decomposition
- Sewage
- Inherent
- Decay
- Mint
- Inherent
- Chillies
- Inherent

- Dust
- Suspension of dust particles
- Paperwire
- Burning
- Spider lilies
- Inherent
- Jasmine
- Inherent
- Marigold
- Inherent
- Rose
- Inherent
- Lotus
- Inherent
- Jute
- Inherent + Dampness
- Cigarette Combustion
- Tea
- Inherent + Boiling
- Bhajia
- Frying, decomposition
- Sewage
- Inherent
- Decay
- Mint
- Inherent
- Chillies
- Inherent
| Lemons Inherent | Mangoes Inherent | Tomatoes Inherent | Onions Inherent | Garlic Inherent | Bhajiya Frying, decomposition | Tea Inherent, Boiling | Incense sticks Bidi | Bidi Combustion | Dhoop Burning | Sewage Decay | Garbage Decay | Dung Decay | DDT powder Suspension |
|----------------|------------------|-------------------|----------------|----------------|-------------------------------|----------------------|-------------------|----------------|--------------|-------------|---------------|-------------|

**Intensity**

- **High**: ★★★★★
- **Medium**: ★★★★
- **Low**: ★★★

**Duration of lingering**

- **L- Long**: ★★★★★★
- **M- Medium**: ★★★★★
- **S- Short**: ★★★★
c) Temples

1. Dharnidhar Jain temple is located near 120 ft circular main road.

2. Swaminarayan temple is located in Kalupur area. It is constructed mainly with Burma teak wood and stone. A large courtyard located in the temple complex is used for parking and as a gathering space.

3. A small shrine near the IIMA cross road attracts small groups of devotees who offer coconuts and hang them on nearby tree.
Observation time 5:00 to 7:00 a.m.

01. Dharnidhar temple

Observation time 8:00 to 9:00 a.m.

02. Kalupur Swaminarayan temple
For puja ceremonies in a Jain temple, only materials that are fragrant like Jasmine, Rose, Damro, Hibiscus etc. are used. During the morning rituals, people rub sandalwood and saffron on stones and this fragrance dominates the entire temple and immediate environment.

In the Kalupur temple, the smell of old wood and stone lingers in the air. Devotee’s synthetic smell of perfumes, talcum powder and flowers mix with the fragrance of ghee from the prasad and garlands of flowers.

The Hanuman temple, adjacent to a very busy road, smells of incense sticks, oil, sindoor and coconut mixed with the smoke from vehicles.

Outside all the temples, people feed grass to cows.

**SMELL TIME SCALE:**
- 5:00 to 7:00 a.m. Dhamidhar temple
- 7:00 to 10:00 a.m. Swaminarayan temple
- 7:00 to 9:00 p.m. Hanuman temple

**LEGEND:**
- Rose (Rosa centifolia)
- Sandal (Santalum album)
- Saffron (Crocus sativus)
- Tulsi (Ocimum sanctum)
- Lamp
- Incense sticks (Agarbatti)
- Orange sindoor
- Mustard oil
- Milk
- Stone
- Prasad
- Grass

**NOTE:**
This map is based on personal observation. It is a broad map of sources of odor and their spread. Each one is represented with a corresponding colour as shown in the legend.
Sources of smell within the observed space

01. Dharnidhar temple

Dharnidhar temple

People outside temple

Puja in Jain temple

Mixing of Sandalwood (Santalum album) and Saffron (Crocus sativus)
02. Kalupur Swaminarayan temple

People feeding cows

Swinmarayan temple; devotees waiting for darshan

Vegetable vendors outside temple

03. Hanuman temple, near IIMA

Hanuman temple, devotees queue up to offer oil, coconut
Place, matter, experience

01. Dharnidhar temple
02. Kalupur Swaminarayan temple

Grass: Inherent
Tulsi: Inherent
Sandstone: Inherent
Mango: Inherent
Banana: Burning
Lamp: Inherent
Kankoo: Inherent

Breaking: Inherent

Duration of lingering: - L: Long, M: Medium, S: Short
Intensity: - High, Medium, Low

03. Hanuman temple, near IIMA

Laddoo: Inherent
Sindoor: Inherent
Oil: Inherent
Akda (Calotropis procera): Inherent
Coconut: Cutting
Incense sticks: Burning

Incense sticks: Burning

Duration of lingering: - L: Long, M: Medium, S: Short
Intensity: - High, Medium, Low

73
Narol industrial area is situated on south east side of the city.

Continuous movement of heavy vehicles makes this space busy and extremely dusty. There are rows of trucks parked, along the road. Tall chimneys fill the air with dark industrial smoke.

There are slums at the periphery of the dried lake.

Along the road the major industries are chemical units, used oil refineries; textile, dyeing and printing units, wood sawing and metal craft units etc.
Odour map, Narol industrial area

Observation time 11:00 A.M. to 1:00 P.M.
LEGEND:
As one walks along the industrial area, a nasty chemical smell is the most dominant odour.

Along the dry Chandola lake, the stench emanating from the sewage generated from the slum is very strong.

Toxic odours from the oil refinery, chemical dyes and wood burning from the boilers hangs heavily in the atmosphere.

Dusty roads and smoke from vehicles combining with the acrid industrial odour covers the entire area making the atmosphere unpleasant.

SMELL TIME SCALE:

6:00 - 9:00 a.m.  12:00 - 3:00 p.m.  7:00 - 9:00 p.m.

LEGEND:
- Industrial smoke
- Vehicular smoke
- Used oil refinery
- Textile dyeing unit
- Block printing unit
- Tea / Snacks
- Wood burning
- Moist timber
- Bleach
- Muddy road

NOTE:
This map is based on personal observation. It is a broad map of sources of odor and their spread. Each one is represented with a corresponding color as shown in the legend.
Sources of smell within the observed space

a. Used oil containers
b. Oil refinery
c. Drums containing chemicals
d. Stagnant & muddy water on internal road
d. Slums on the lake edge

e. Dry lake bed

Chimneys

Narol road
Place, matter, experience

- Used oil
  Decay, release of inorganic gas
- Barrel of oil
  Release of inorganic gas
- Oil residue
  Release of inorganic gas
- Filtered oil
  Release of inorganic gas
- Grease
  Decaying
- Mud
  Decay
- Used oil
  Decomposition
- Oil residue
  Decomposition
- Wood pieces
  Inherent + dampness
- Tea
  Boiling
- Bhajiya
  Frying
- Mud
  Dampness, decay
- Dust + cloth
  Suspension of particles
- Printing
  Release of chemical molecules
Decay, release of inorganic gas

Release of toxic gas

Suspension of particles

Combustion

Printing

Colour Decay, release of inorganic gas

Release of toxic gas

Color Release of chemical molecules

Colors Release of chemical molecules

Color Printing Release of chemical molecules

Broom stick Suspension of particles

Petrol Suspension of inorganic gaseous molecules

Vehicular fumes Combustion

Vehicular fumes Combustion

Vehicular fumes Combustion

Burning chamber Combustion

Duration of lingering - L- Long, M- Medium, S- Short

Intensity - High  Medium  Low

Broom stick

Petrol

Vehicular fumes

Burning chamber
At the edge of the city, one can observe built areas set amidst working fields.

Small settlements can be seen near roads, rivers and at the edges of canals. During this season (May-July) farmers cultivate paddy, pulses etc.
Odour map, Fields near S.P. ring road, Pirana

Observation time 6:00 to 11:00 A.M.
At sunrise, the smell of milk and cooking is first noticed as one walks between the settlements.

With continuous breeze around the settlements, the smell of fresh cow dung hangs in the air which gives the place a very earthy fragrance.

After the first shower of the monsoon, the atmosphere is filled with the smell of damp mud.

The city’s sewage is released into the river. This sewage releases foul odours that suppress the ‘freshness’ of the air of the place.

**OBSERVATION:**

**SMELL TIME SCALE:**

<table>
<thead>
<tr>
<th>Time Period</th>
<th>Legend</th>
</tr>
</thead>
<tbody>
<tr>
<td>6:00 - 9:00 a.m.</td>
<td></td>
</tr>
<tr>
<td>12:00 - 3:00 p.m.</td>
<td></td>
</tr>
<tr>
<td>7:00 - 9:00 p.m.</td>
<td></td>
</tr>
</tbody>
</table>

**NOTE:**

This map is based on personal observation. It is a broad map of sources of odor and their spread. Each one is represented with a corresponding colour as shown in the legend.
Sources of smell within the observed space

a. Farm land
b. Depression with vegetation

River, breeze, vegetation on edge
Settled sewage slurry
Paddy fields, damp earth, water, breeze

Chimney

Settlement, cattle, fresh dung, burning chulah

Fields

Stall

S.P. ring road
### Place and smell perception

<table>
<thead>
<tr>
<th>Odours:</th>
<th>Places:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flowers</td>
<td>Sabarmati</td>
</tr>
<tr>
<td></td>
<td>Old Vadaj</td>
</tr>
<tr>
<td></td>
<td>Ashram road</td>
</tr>
<tr>
<td></td>
<td>Navrangpura</td>
</tr>
<tr>
<td></td>
<td>Aambavadi</td>
</tr>
<tr>
<td></td>
<td>Paldi</td>
</tr>
<tr>
<td></td>
<td>Vadavpur</td>
</tr>
<tr>
<td></td>
<td>Satellite</td>
</tr>
<tr>
<td></td>
<td>Vejalpur</td>
</tr>
<tr>
<td></td>
<td>Makba</td>
</tr>
<tr>
<td></td>
<td>Bopal</td>
</tr>
<tr>
<td></td>
<td>Vasva</td>
</tr>
<tr>
<td></td>
<td>Shahibagh</td>
</tr>
<tr>
<td></td>
<td>Duthbeethwar</td>
</tr>
<tr>
<td></td>
<td>Asanwa</td>
</tr>
<tr>
<td></td>
<td>Madhupura</td>
</tr>
<tr>
<td></td>
<td>Naroda</td>
</tr>
<tr>
<td></td>
<td>Odhav</td>
</tr>
<tr>
<td></td>
<td>Gomtipur</td>
</tr>
<tr>
<td></td>
<td>Kankeria</td>
</tr>
<tr>
<td></td>
<td>Ishanpur</td>
</tr>
<tr>
<td></td>
<td>Behanpur</td>
</tr>
<tr>
<td></td>
<td>Narol</td>
</tr>
<tr>
<td></td>
<td>Pirsa</td>
</tr>
<tr>
<td></td>
<td>Bhaiyar gali</td>
</tr>
<tr>
<td></td>
<td>Jamulpur</td>
</tr>
<tr>
<td></td>
<td>Rajpur</td>
</tr>
<tr>
<td></td>
<td>Khamasa</td>
</tr>
<tr>
<td></td>
<td>Kalajpur</td>
</tr>
<tr>
<td></td>
<td>Pola</td>
</tr>
<tr>
<td></td>
<td>Manek chowk</td>
</tr>
<tr>
<td></td>
<td>Fields near Chalod and Pirsa</td>
</tr>
<tr>
<td>Crops</td>
<td></td>
</tr>
<tr>
<td>Vegetation</td>
<td></td>
</tr>
<tr>
<td>Wet earth</td>
<td></td>
</tr>
<tr>
<td>Fresh water</td>
<td></td>
</tr>
<tr>
<td>Stagnant water</td>
<td></td>
</tr>
<tr>
<td>Sewage</td>
<td></td>
</tr>
<tr>
<td>Fish / Meat</td>
<td></td>
</tr>
<tr>
<td>Chicken / goat</td>
<td></td>
</tr>
<tr>
<td>Spices</td>
<td></td>
</tr>
<tr>
<td>Vegetables / fruits</td>
<td></td>
</tr>
<tr>
<td>Baking</td>
<td></td>
</tr>
<tr>
<td>Food</td>
<td></td>
</tr>
<tr>
<td>Waste near slums</td>
<td></td>
</tr>
<tr>
<td>Wood</td>
<td></td>
</tr>
<tr>
<td>Stone</td>
<td></td>
</tr>
<tr>
<td>Dust</td>
<td></td>
</tr>
<tr>
<td>Urine</td>
<td></td>
</tr>
<tr>
<td>Garbage/Rotten food</td>
<td></td>
</tr>
<tr>
<td>Dhoop/Incense sticks</td>
<td></td>
</tr>
<tr>
<td>Herbal product</td>
<td></td>
</tr>
<tr>
<td>Temple smells</td>
<td></td>
</tr>
<tr>
<td>Fresh dung</td>
<td></td>
</tr>
<tr>
<td>Industrial smoke</td>
<td></td>
</tr>
<tr>
<td>Used oil</td>
<td></td>
</tr>
<tr>
<td>Vehicular fumes</td>
<td></td>
</tr>
<tr>
<td>Burning smoke</td>
<td></td>
</tr>
<tr>
<td>Rubber</td>
<td></td>
</tr>
<tr>
<td>Perfume</td>
<td></td>
</tr>
</tbody>
</table>
Odour map of the city

NOTE: Based on observations for this document this map has been generated as a hypothetical exercise. Each coloured dot is based on the legend shown on the facing page.
07. Inferences
01. Kaka Baliyani pol
   History, stone, wood, weathered, layered, porous, accumulation.

02. Spice/grain market, Madhupura
   Sharp, pungent, colour, fresh, engaging.

03. Fish market, Bhatiyar gali
   Stagnant water, congealed blood, decomposition, ice, dissolution.

04. Flower market, Jamalpur
   Flowers, dust, smoke, fragrance, ephemeral.

05. Temples: Hanuman temple, near IIMA
   Orange, oil, coconut, husk, thick air.
Temples: Dharnidhar Jain temple 05. Sandalwood, Saffron, light, dawn.

Temples: Kalupur Swaminarayan temple 05. Old and new, food, heavy, decomposition.

Industrial area, Narol 06. Soot, layered, embedded.

City edge: fields near S.P. ring road, 07. Pirana Earth, mud, water, air, flow.
Bibliography

01. Unpublished work - Seminar on 'Fragrance as an attribute of plants', by Chouhan Ambika, CEPT university
02. www.wikipedia.org
03. www.manchester.academia.edu
04. www.smellandthecity.wordpress.com
05. www.serendip.brynmawr.edu
08. www.theonlyperception.blogspot.in
11. www.sensetheplace.it
12. www.ecastudent.blogspot.in
13. www.wanderingmist.com
14. www.sensorymaps.com
15. http://science.howstuffworks.com
Swati K. Noble is a student of the post graduate program in Landscape Architecture at CEPT University, Ahmedabad. This study is part of her summer training of 12 weeks. She graduated in architecture from Sarvajanik College Of Engineering Technology, Surat.

E #
swati.vachhani@gmail.com