

Narrative Visualization Essay

- **Messaging.** What is the message you are trying to communicate with the narrative visualization?

The message of narrative visualization is to communicate the state of India's Water Crisis. The messaging is supported with various metrics like ground water usage, per-capital water availability and rainfall levels.

- **Narrative Structure.** Which structure was your narrative visualization designed to follow (martini glass, interactive slide show or drop-down story)? How does your narrative visualization follow that structure? (All of these structures can include the opportunity to "drill-down" and explore. The difference is where that opportunity happens in the structure.)

Martini Glass Structure is used for narrative visualization design. Visualization structure consist of total seven scenes, each presenting a different water metric and chart or map. First six scenes are author driven content to help reader understand and grasp India's water situation at global scale and local district level. Last Scene which is a jump off point provides opportunity for user to explore all metrics in one view at district and state level.

- **Visual Structure.** What visual structure is used for each scene? How does it ensure the viewer can understand the data and navigate the scene? How does it highlight to urge the viewer to focus on the important parts of the data in each scene? How does it help the viewer transition to other scenes, to understand how the data connects to the data in other scenes?

The scenes follow a consistent visual structure and have annotated charts used. All scenes have a title, followed by contextual text, then followed by a chart or a map and navigation buttons at the bottom. Legends are provided in most charts to aid in understanding data. With use of annotations, important data points are highlighted. Moreover, consistent annotation template is used throughout visualization story so user can quickly follow important data points when they move to next scenes. Visualization is constructed with a consistent structure of slide navigation to first give user grasp of current state of water crisis in India and at the end help them explore and compare different metrics at state and district level.

- **Scenes.** What are the scenes of your narrative visualization? How are the scenes ordered, and why

The Scenes are arranged in order from a high-level perspective (India vs Other countries) to a low level (Districts in India) with each scene charting a different metric.

Scene 1 - High level comparison of India with other countries for annual Groundwater extractions.

Scene 2 - Per capita usage trend over the years in India.

Scene 3 - Sector wise usage of water in India.

Scene 4 – Groundwater levels at India's district level (Map View)

Scene 5 - Rainwater levels at India's district level (Map View)

Scene 6 - Per-capita water availability at India's district level (Map View)

Scene 7 - Explore various Indian states (dropdown) and district regions by comparing different metrics.

- **Annotations.** What template was followed for the annotations, and why that template? How are the annotations used to support the messaging? Do the annotations change within a single scene, and if so, how and why

D3-annotation library is used to plot annotations over chart. Standard template of a note, connector and subject is used for annotation. Standard template is selected as most people are familiar with it. Subject is either shown as a dot for chart or circle for map for highlighting point in the chart or a map area. Annotations are not changing within a single scene, they are static, but they are changing from scene to scene as underlying metric is changing and there is a need to highlight different parts of chart or map to convey message.

- **Parameters.** What are the parameters of the narrative visualization? What are the states of the narrative visualization? How are the parameters used to define the state and each scene?

Following parameters are used for this visualization -

- Scene Number
- Chart
- Annotation
- Country
- State/Districts
- Water metric (Ground water usage, Per-capita water availability or Rainwater measure)
- Metric Year
- Industry Sector

States of Narrative Visualization & Parameters used

State	Name	Parameters	Scene
1	India vs Other countries	Scene = 1 Chart = Bar Chart with countries on x-axis and ground water usage on y-axis Annotation = Yes Animation = Yes (Bar animated when rendering chart)	1

		Country = All available countries in dataset are included Metric = Ground water usage State/Districts= Not Applicable Metric Year = Recent Industry Sector = Not Applicable	
2	Per-capita water availability	Scene = 2 Chart = Metric year on x-axis and per-capita water availability (water drop size) shown on y-axis Annotation = Yes Animation = Yes (Water drops animated when rendering chart) Country = India Metric = Per-capita water availability State/Districts = Not Applicable Metric Year = 1951 - 2021 Industry Sector = Not Applicable	2
3	Water usage by sector	Scene = 3 Chart = Pie Chart with sector wise water usage Annotation = Yes Animation = Yes Country = India Metric = Water Usage State/Districts = Not Applicable Metric Year = Recent Industry Sector = Yes	3
4	India Ground Water Levels	Scene = 4 Chart = Map View Annotation = Yes Animation = No Country = India Metric = Ground Water Usage State/Districts = Yes Metric Year = Recent Industry Sector = Not Applicable	4
5	India Rain Water Levels	Scene = 5 Chart = Map View Annotation = Yes Animation = No Country = India Metric = Rain Water Level State/Districts = Yes Metric Year = Recent Industry Sector = Not Applicable	5

6	India Per-capita water availability	Scene = 6 Chart = Map View Annotation = Yes Animation = No Country = India Metric = Per-capita water availability State/Districts = Yes Metric Year = Recent Industry Sector = Not Applicable	6
7	Explore India's Rainfall, Per-capita water and Ground Water metrics	Scene = 7 Chart = Map View (State & Districts - Left Chart) , Map View (Country - Right Chart) Annotation = Yes Animation = No Country = India Metric = Ground Water Usage, Per-capita water availability & Rain water level State/Districts = Yes Metric Year = Recent Industry Sector = Not Applicable	7

- **Triggers.** What are the triggers that connect user actions to changes of state in the narrative visualization? What affordances are provided to the user to communicate to them what options are available to them in the narrative visualization?

Navigation buttons at the bottom of each scene page are triggers that change state of narrative visualization. There are two buttons provided at the bottom of each page i.e. Back and Next. Back button will take user to previous state and Next button will take them to next state.

Triggers -

- Scene = 1
 - Animate Bars
 - Show Annotations
 - Country = All
 - Metric = Groundwater Usage
- Scene = 2
 - Animate Water Drops
 - Show Annotations
 - Country = India
 - Metric = Per Capita Water Availability
 - Year = 1951 to 2021
- Scene = 3
 - Animate Pie Chart
 - Show Annotations

- Country = India
 - Metric = Sector wise Water Usage
- Scene = 4
 - Stop Animation
 - Show Map
 - Show Annotations
 - Country = India
 - Metric = Ground water levels
- Scene = 5
 - Show Map
 - Show Annotations
 - Country = India
 - Metric = Rain Water level
- Scene = 6
 - Show Map
 - Show Annotations
 - Country = India
 - Metric = Per-capita Water availability
- Scene = 7
 - Show State map and Country map
 - Remove Annotations
 - Country = India
 - Metric = Ground water level, Rain water level & Per-capital water availability
 - State selection dropdown = yes
 - Highlight preselected state in country map.

User has exploration option available in last scene to compare metrics for a state selection.
 User can select any combination of state and metric.
 User also has the ability to hover mouse to check further information using tooltips.

Affordance for tooltip are provided on each scene. For instance Scene 1 has an info icon followed by a message *"hover mouse over bars to see tooltip"*.

- **Data Source**

[Data Source Link](#)