# Rainwater Harvesting in Mumbai: A study of perceptions and practices



Presented By:
**SALMAN ZAHEER**
**TISS, MUMBAI**

# Research Problem

Rainwater Harvesting is a free source of water and many **Social**, **Economical** and **Environmental** benefits claimed by different scholars, as well as BMC regulations introduced in 2002 and later revised in 2007, why has the ROOFTOP RAINWATER HARVESTING technology not yet been fully implemented on a large scale. Further, I will try to understand what kind of spatial, social, political, economic, environmental reasons behind low uptake of RWH in Mumbai.

# Insights from Literature

- Rainwater Harvesting was practised since **Indus Valley Civilisation** (2500 to 1500 BC). Due to colonisation and introduction of technology there has been a shift in the importance of this practice *(Nathalie et. al, 2004).*

- Rainwater harvesting is an **environmentally** sound solution to address issues brought forth by large projects **utilizing centralized** water management approaches. *( Julius, Prabhavathy, May, 2013).*

- Rainwater harvesting may be one of the best methods available to recovering the **natural hydrologic cycle** and enabling urban development to become **sustainable**. *(Kim at al, 2005)*

- Button, 2018, studied that, it is very difficult for BMC to constant water supply, so people are looking other sources, RWH is creates opportunities for more water use. *(Button, 2018.)*

# Insights from Literature

**German**

- A study conducted by ***Herrmann and Schmida (2008),*** showed that the potential of potable water saving in a house might vary from 30% to 60%, depending on the demand and roof area.

**Australia**

- ***Coombes et al.(2011) ,*** Did a survey in 27 houses in Newcastle and analysed and concluded that rainwater usage would promote potable water saving of 60%.

**Brazil**

- ***Ghisi et al. (2009)*** showed the potential water saving by using water harvesting in 62 cities ranges from 34% to 92%, with an average potential for potable saving of 69%.

**India**

- **Dewas** district's community water management works in the best three water management practices in the world under the category of "**Best Water Management Practices**" *(United Nation,2011-2012).*
- **Bangalore**, Vishwanath S. Doing work for water conservation for last 23 years, encouraged, Bangalore water supply dept. to incorporate RWH**. (Vishwanath, 2009)**

**Mumbai**

- **According to Rainwaterharvesting.org, Mumbai has 70,000 housing societies but RWH is installed hardly in 2% societies.**

# Rainwater Harvesting- Legislation

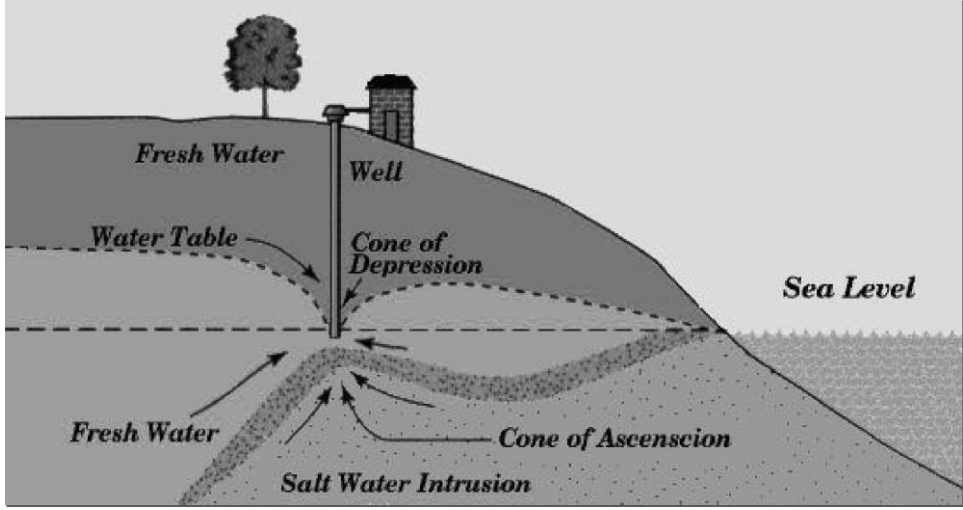
- **National Water Policy (2002**) stresses for Practise **artificial recharge of Groundwater and rooftop Rainwater Harvesting** to increase utilizable resources.
- All new buildings on plots over 1000 sq. m since 2002 and over 300 sq.m since 2007 must have rainwater harvesting to obtain **occupancy Certificate**

*(Municipal Corporation of Greater Mumbai (MCGM), 2008):*

- "…it has been further decided that henceforth, **no building permission [sic] be granted** unless provision is made for Rain Water Harvesting Scheme" (Government of Maharashtra, 2007).

# Importance of RWH in Mumbai

- Urbanisation/ Concretisation.
- Gap in Demand And Supply.
- Depletion of Aquifers.
- Unauthorised water Supplier/ Tanker
- Floods.
- Salt water Intrusion.
- BMC trying to reduce water supply from 145 LPCD to 90 LPCD *(2016,BMC)*





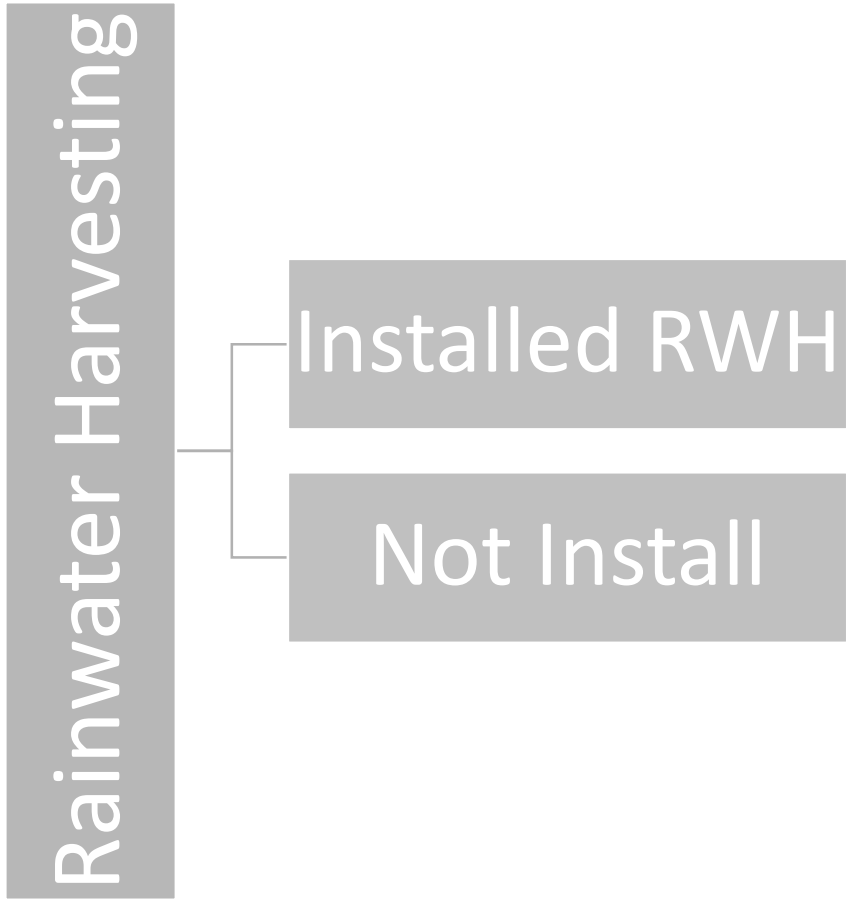

**RAINWATER HARVESTING SYSTEM IS LESS EXPENSIVE, SELF PAYING & EASY TO IMPLEMENT, OPERATE & MAINTAIN.**

# Research Questions

- What are the possible changes that came after implementation of RWH legislation in Mumbai?
- How can the incorporation of Rainwater harvesting systems impact urban water supply in cities like Mumbai?
- What could be the possible factors behind official policies on rainwater harvesting projects and their non-implementation on the ground?
- Which actors are facilitating or resisting Rainwater harvesting projects and what could be the possible reasons behind their motives?



# Methodology




- **Research Method**: Qualitative Research Method

- **Sampling Method:** Purposive and snowball sampling
- **Tools used for Data Collection:** Semi Structure interviews, Observation

***Sources of data:***

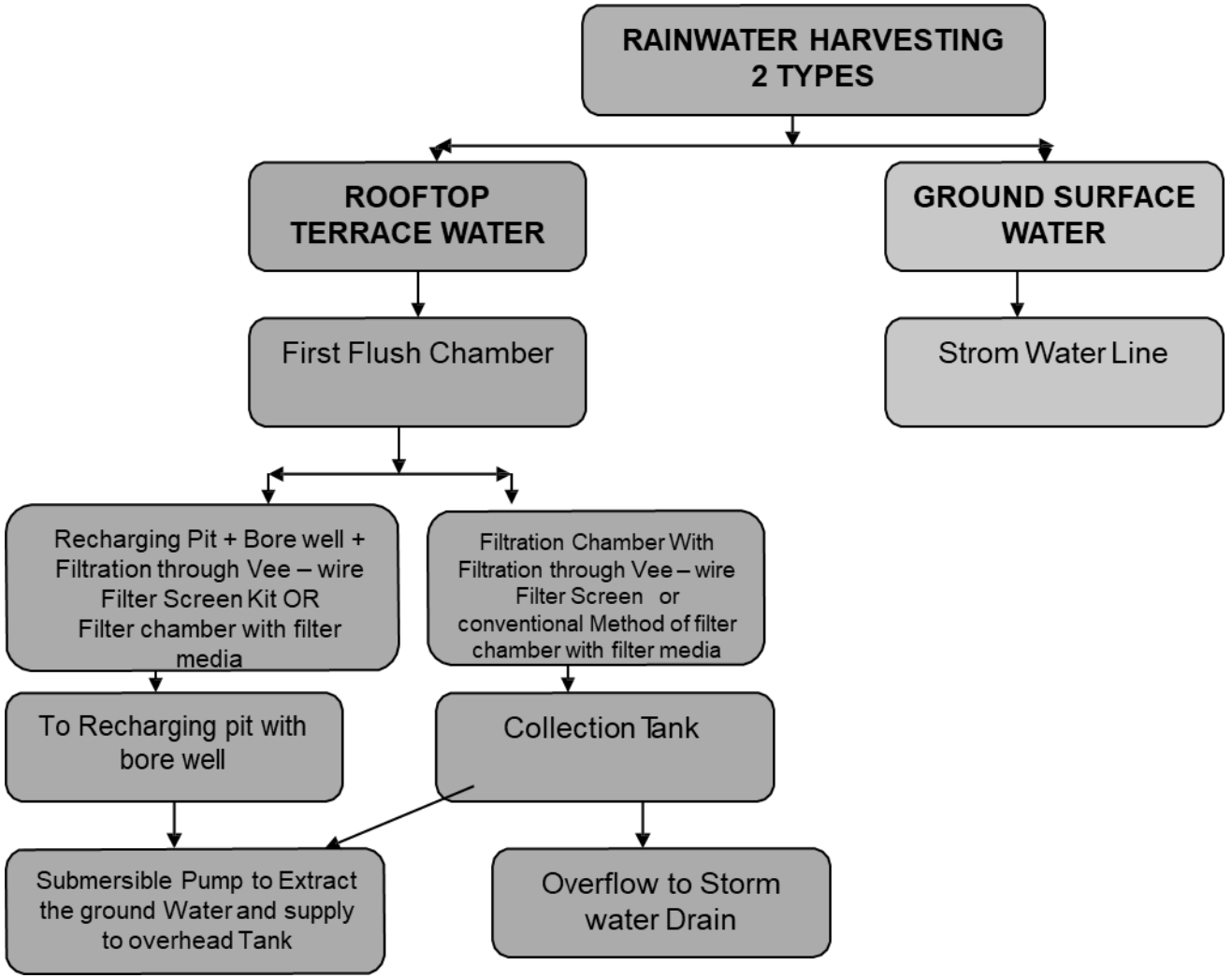
- Cooperative Housing Societies
- Manager of Commercial complex
- Consultants
- NGOs
- Builders
- BMC/ Govt. Officials

# Types of Rainwater Harvesting





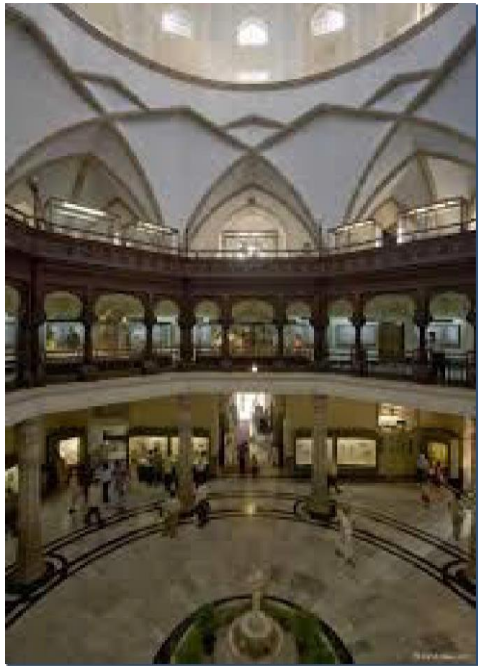




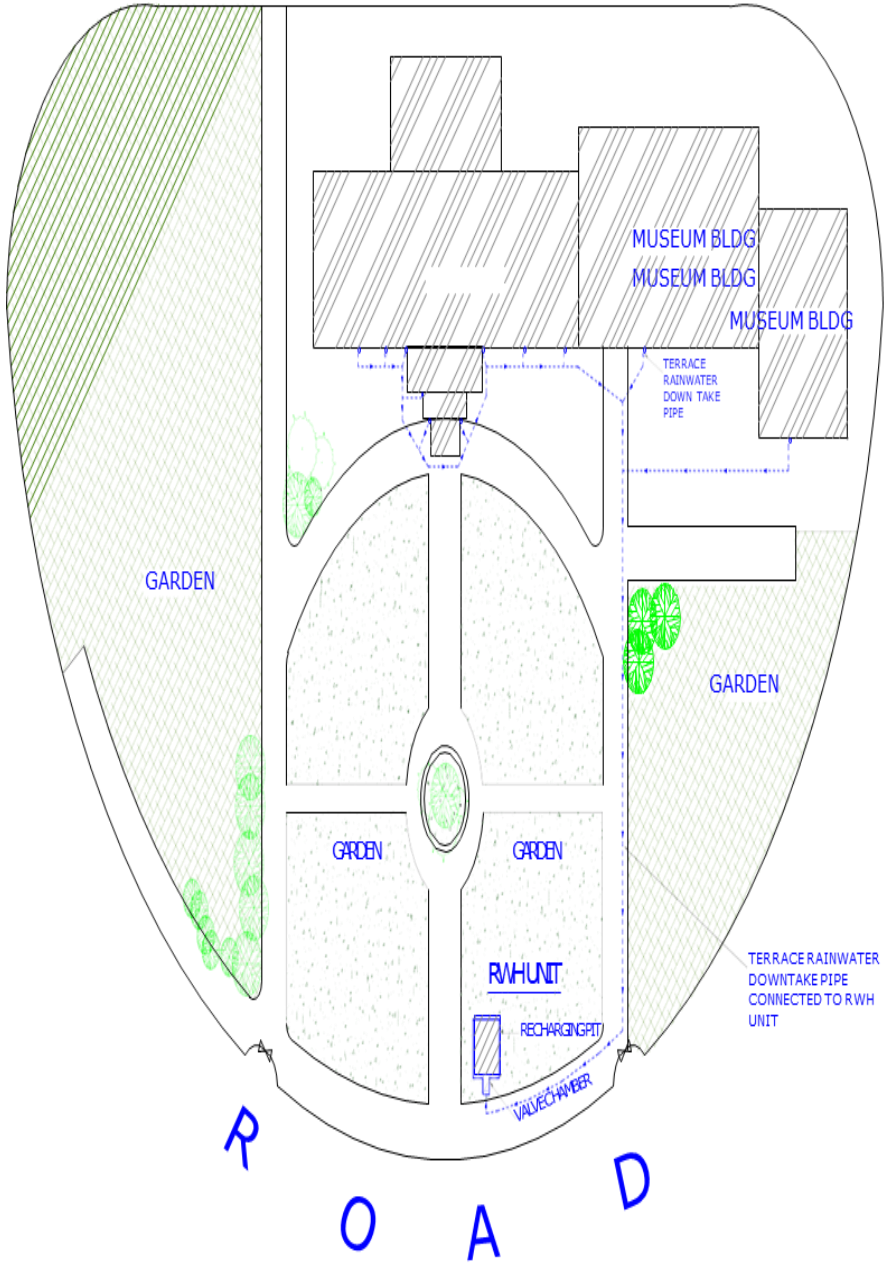
# Chatrapati Shivaji Maharaj (Prince of Wales) Museum

- Total Terrace Area: 4000 Sq. Mts
- Garden area: 24,000 Sq. Mts
- Highly dependent on Tanker Water
- Average Yield of Borewell Approx. 10,000 LITRES/DAY
- After RWH Yield of Borewell Increased to 20,000 LITRES/ DAY



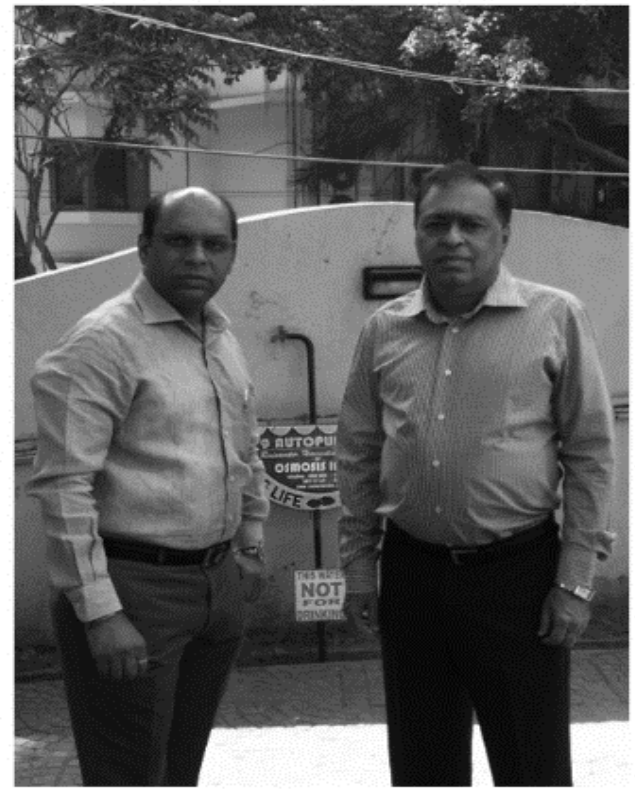


| Description | Units |
|---|---|
| Rainwater runoff from Terrace Area considering 25mm inch rainfall/hour. | 45 Cu. Mt |
| Annually water harvested considering 2.25 mt rainfall. | 3600 Cu. Mt (36 lakh litres |

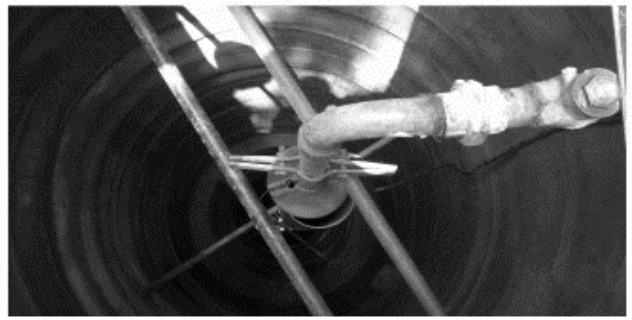


# RWH System Installed at
# Seahill Co - Operative Housing Society Ltd.

**SeaHill Co - Operative Housing Society Ltd.**
had been facing shortage of drinking water for a long time and we had to take about 20 water tankers per month at high cost and health risk.
Thanks to UPRA's "Jago Mumbai' persuasion we installed the Rain Water Harvesting system in 2010 at the cost of Rs 6.5 lakh approx.
We are very happy at the substantial resultant benefits we have derived in the last 3 years ;
There is 24/7 water supply in the Society
The tankers- supply costing Rs 20,000/month was stopped.
The quality of water improved
Saving of the precious drinking water from BMC by using bore-well water for non-drinking purposes
Our total monetary savings in the last 3 years are estimated at over Rs 7.5 lakh which means that our investment has already been paid back.












## NAAZNIN HUSEIN

"MASKAN", CARTER ROAD, BANDRA (WEST), MUMBAI – 400 050.

We faced severe shortage of water for a long time.
Even though there was enough water for necessary activities, other places like garden, effective cleaning suffered.
After Mr. Navin Chandra explained, how simple the entire process of rain water harvesting was, our entire building members agreed to implement the plan. Initialy we weren't sure of the Borewell water quality since we were opposite the sea side.
But the quality of water was also thankfully very good.
We harvest water from our open terraces & collect it. Initially the expenses incurred was a pinch but 3 years down, Today we are all happy to be environment friendly.
For all our flush tanks, garden & other cleaning activity we use Rain Harvested Water.
Our Experience is indeed been a very Happy, & fulfilling one.





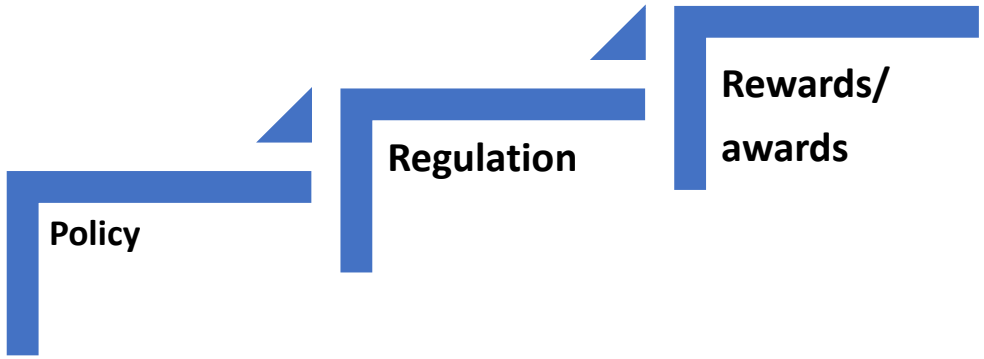





# Key Findings and Analysis

- Landlord Vs Tenants in the existing buildings.

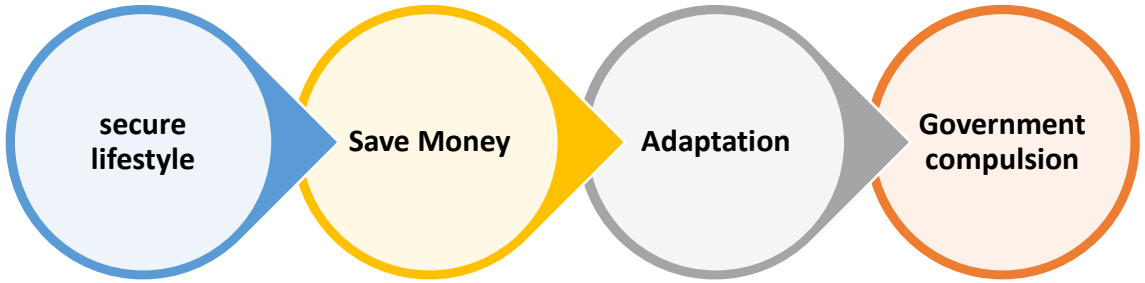
- Tools of Rainwater Harvesting governance.




- Monitoring process and Corruption.
- Rainwater Harvesting and Subsidy.

# Key Findings and Analysis

- There are multiple layers of reason of installations of rainwater Harvesting system within a housing society and commercial complexes.
    I. Desire to secure their lifestyles
    II. The economic benefits of supplying their own water and
    III. To build resilience to extreme weather event
    IV. Government compulsion



# Key Findings and Analysis

- Very few people are installing rainwater harvesting.
- The ones who are incorporating RWH are only due to BMC compulsion
- Lack of interest in environmental issues and natural resources
- Economic Factors:
  - Cost of Installation (reluctancy of Builders)
    - New construction
    - Existing building
- Space Availability
- Lack of Policy Framework
  - Design
  - Storage
- Political Influence
- The Media and Publicity
- Groundwater: Common Pool Resource

Thank You.