

Designing a Water safety use case for a Water Data DPI

INREM

The Problem Statement:

Ensuring that a source of water is Safe for specific purpose such as drinking or irrigation, and to ensure that Water resource as a whole is safe from contaminants

User location is taken as input towards identifying Water safety. Additionally, get reported of Water quality problems so that corrective action can be taken.

Setting

We are setting a boundary to this problem right now with a rural situation. However, with the same framework, one can extend the same to urban areas too.

User insight

One user setting (Use case 1) is within the context of a national programme such as Jal Jeevan Mission (JJM) where the goal is to supply safe drinking water to every rural household.

Another user setting (Use case 2) is that of farmer and/ or water user groups working on rural water conservation, and ensuring safe water in a watershed or aquifer, for basic purposes of drinking, irrigation and other needs.

With the context of Jal Jeevan Mission (JJM) for Use case 1 and taking example for the state of Maharashtra specifically, a user empathy mapping and user journey has been carried out in detail (available upon request).

Data Sources

Primarily, we are looking at Water Quality Data or groundwater sources here, which form the bulk of such user needs. We list the following potential Data sources:

- Data source 1: Historical Drinking Water Quality Data available from 2010 till 2015 on data.gov.in
- Data source 2: Central Groundwater Board Data in detail from [2019](#), specific districts with [NAQUIM](#) data and sparse historical data
- Data source 3: Citizen Data sources from [SamaajData](#) , [People's Water Data](#) , [JalXChange](#) and other sources
- Data source 4: Laboratory based Water Quality measurements done by rural Drinking water programmes eg. Jal Jeevan Mission
- Data source 5: Field based Water Quality measurements done by field personnel in villages using Field Test Kits (FTK)

- Data source 6: Other Laboratory based Water Quality measurements in NABL certified (or other) laboratories commissioned by NGOs, Panchayat, CSRs or other interested citizen groups.

Intelligence layers and User interfaces

Some intelligence layers being designed are:

These following are being designed by INREM with support of IBM:

- Data extraction tool from NAQUIM reports
- Historical, NAQUIM and Citizen Data Fusion tool

Following has been proposed to CoRE Stack by INREM

- Water Quality Data informing Water Recharge in a Watershed

User Interfaces are being designed:

- INREM manages a WhatsApp Bot as part of JalXChange suite with user facing advisories based on Water Quality Data
- SamaajData has an AI enabled platform for Citizen access to Data
- People's Water Data has a geospatial interface for Water Quality Data access

Water Data DPI and Water Safety use cases

With the objective as defined above for a Water safety use case, and with the user needs, Water data sources and potential intelligence layers along with user interfaces, we now see the potential for Water safety use cases to be developed along an Open network of a Water Data Digital Public Infrastructure (DPI).

The Water Data Exchange (WDE) is an open network being designed with the Beckn protocol that will enable Water Data to interact with Intelligence layers, and through them towards user facing applications.

The JJM Water Data DPI is being envisaged by Arghyam to enhance standardized Data exchange across the JJM programme nationally and across states.

With the above description of Water safety use cases, we can develop more such use cases, which expand the Water data sources, intelligence and user facing apps, to serve greater number of needs of users.

Use case 1: Safe drinking water supply within a village

Goal:

To ensure that Drinking water supply within a village is safe, and to be sure that there are no significant health impacts due to Water contamination.

Users:

Users here are frontline workers (FLW) of government programmes for rural Water supply (such as Jal Jeevan Mission) or NGOs (ensuring Safe drinking water supply) and can also be Panchayat members, or citizens broadly such as students or concerned community members.

Data producers and consumers:

Several of the users such as Water operators (eg. Jal Mitra in Assam, and Jal Surakshak in Maharashtra) are also Data producers partly since they test water with Field test kits (FTK) and they are Data consumers also (requiring consistent information on local Water safety). Such form of dual nature of producer-consumer can also be women's groups, NGO field personnel and students, who also frequently are involved in Water testing locally.

Sources of Data:

Here the first level of opening up and agency-enhancement is just to enable Data source no 5 be accessible in a consumable form to this user, which is to say that their own FTK based contributed data to be accessed back to the user.

Secondly, for Data sources 4 or 6 to enhance this information further, and perhaps for Data source 1-3 to add the context of the place and nearby for a better understanding.

User facing interfaces:

Voice or conversation based interfaces such as AI enabled whatsapp or or chat mediums, or AI enabled phone based conversations that layer in the context of Water Data are more helpful. In some cases, map interfaces could be of utility, but they need a bit more expertise and skill enhancement.

Challenges:

Job related functions can be part of the reason why some of the FLW personnel would access and interact with this Data. Some challenges are:

- Motivational issues regarding their own jobs/gigs and problems of timely payment and future uncertainty around continuity of their roles.
- Skill deficits in terms of being able to understand information such as this and put it to use to solve problems of Water safety.
- Burden of work is a problem, especially with some of the women FLWs such as ASHA, Anganwadi workers (AWW) or Self-help group (SHG) members.

- Tech accessibility/affordability: One challenge is also of smart phone access; using phone data for such purpose beyond personal use or entertainment; or gender and other inclusion related issues
- Cultural and local contexts: AI enabled conversations, while enhancing access, also are restricted by LLMs that are trained on global (and western) cultural contexts, thereby missing nuances and in some cases, creating newer problems

Usage of Data:

The potential of access to Water Quality data for this use case goes a long way in ensuring community safety and reducing burden of public health. Here are some uses of this data:

- Local communication around which water sources to use for which purpose
- Taking corrective action such as finding pollution sources or water treatment
- Escalating local issues for wider action by concerned authorities

Use case 2: Managing Water resources safely in a village

Goal:

To ensure that Water resources within village watershed and aquifers, including ponds, canals and checkdams are safe and suitable for all purposes

Users:

Users here are frontline workers (FLW) of government programmes such as (formerly) NREGS or NGOs (working on Watershed conservation, aquifer management, revival of water bodies and regenerative agriculture) and can also be Panchayat members, or citizens broadly such as students or concerned community members.

Data producers and consumers:

Several of the users such as Community resource persons (CRP) can also be Data producers partly since they test water with Field test kits (FTK) and they are Data consumers also (requiring consistent information on local Water safety). Such form of dual nature of producer-consumer can also be women's SHG livelihood groups, NGO field personnel and students, who also frequently are involved in Water testing locally.

Sources of Data:

Here the first level of opening up and agency-enhancement is just to enable Data source no 5 be accessible in a consumable form to this user, which is to say that their own FTK based contributed data to be accessed back to the user.

Secondly, for Data sources 4 or 6 to enhance this information further, and perhaps for Data source 1-3 to add the context of the place and nearby for a better understanding.

Additionally, here we need significant data from other layers such as Watershed boundaries, geological understanding, local streams and land use. These may be already available in a Data stack system such as CoRE Stack.

User facing interfaces:

Voice or conversation based interfaces such as AI enabled whatsapp or or chat mediums, or AI enabled phone based conversations that layer in the context of Water Data are more helpful. In some cases, map interfaces could be of utility, but they need a bit more expertise and skill enhancement. Additionally, here some of the CRPs could be attuned to using App based interfaces such as Commons Connect, CLART, ITC MAARS and other such environments which could also be a means for user facing interfaces

Challenges:

Job related functions can be part of the reason why some of the FLW personnel would access and interact with this Data. Some challenges are:

- Motivational issues regarding their own jobs/gigs and problems of timely payment and future uncertainty around continuity of their roles.

- Skill deficits in terms of being able to understand information such as this and put it to use to solve problems of Water safety.
- Burden of work is a problem, especially with some of the FLWs such as Rozgar Sahayak (formerly NREGS)
- Tech accessibility/affordability: One challenge is also of smart phone access; using phone data for such purpose beyond personal use or entertainment; or gender and other inclusion related issues
- Cultural and local contexts: AI enabled conversations, while enhancing access, also are restricted by LLMs that are trained on global (and western) cultural contexts, thereby missing nuances and in some cases, creating newer problems

Usage of Data:

The data usage goes here to ensure that root causes of water contamination are addressed and sustainability ensured through means of community action:

- Locating water harvesting and recharge for ensuring that Water contamination is reduced
- Safety of water source for irrigation in food production; ensuring cattle and livestock are ensured safer water
- Locating root causes of contamination and taking corrective action such as Fencing, behavioral changes for root problems such as chemical usage in agriculture and other such correct action strategies