Environmental Monitoring of Yogyakarta Rivers

Jogja River Project (JRP) started as a simple initiative from a number of people who considers themselves as citizens wanting to explore their own rivers in the city. It all begun with a morning walk on the riverside areas to explore and see what's going on around. There are three main rivers that pass through the urban areas of Yogyakarta: Code River, Winanga River and Gajahwong River. From gathering documentations (images, stories, etc), JRP has done several activities that involved cleaning the riverbanks from plastic waste, vegetation mapping, taking water samples, etc. The idea on how to conduct JRP evolved as Lifepatch started collaborating with Microbiology Department (Agricultural Faculty of Gadjah mada University), Cantigi (Green Tech Community) and other communities.

This node will focus on Code River where the people living in the riverbanks raise fish in the traditional 'keramba' (cage with floating nets to rear fish) even if the river has become polluted with plastic and other wastes that made seasonal flooding as a common issue. The coliform bacteria contaminations within Code River is also high. This node aims to enhance the relationship that JRP has built with communities along the riverbanks in order to disseminate the knowledge that have been gained both by the people through their experiences and by JRP through their curiosity and findings.

JRP is also one of the curriculums offered in Biodesign For The Real World, a collaboration between (Art)Science BLR, École Polytechnique Fédérale de Lausanne (EPFL) and Lifepatch.

The river mapping
by Agus Tri Budiarto aka Timbil, Budi Prakosa aka Iyok, Novel Ramadhan, Robin Scheibler, Sachiko Hirosue & Yashas Shetty

How does one map contamination in a river, or a fleeting sample, which all require some time to arrive at a result? Who will be this map for?

We started by going over the existing maps. Robin talked about the hardware and mapping of radioactivity (cumulatively, single value and geolocalized data plotted) and about the safecast project. We already had a map for JogjaRiver Project, for which Iyok from Lifepatch has previously made an interactive map based on the Ushahidi platform, geolocating the coliform counts and panoramic photos of the sample collection sites. Yashas is working with Bangalore Urban Metabolism Project (BUMP), and shared with us the challenges of massive data and the visualization of it.

We agreed that we need to step back and take the opportunity to rethink the perspective of maps: – does River data have to be on a 2D map or is the river actually 1D? We had further interesting discussions on how we "read" maps. In Yogyakarta, the North is indicated by the Merapi volcanic Mountain, and the South by the Queen of the sea, and everywhere you will usually meet people who give directions based on landmarks. We also found out that there are many on-going projects that deal with the waters and rivers in Yogyakarta organized by other NGOs and local initiatives. We learned that there are historical projects, one of them run by Romo Mangun, an architect, activist, and priest who worked with the citizens living by the river,being an active worker   in the river communities and mainting the rivers clean

almost all his lifetime.

Some maps that were brought into attention, like the 1854 Broad Street Cholera map by John Snow, called "spatial epidemiology", was one of the first if not the first example of map used for determining the source of the cholera epidemia. The interest of Lifepatch is to locate the sources of contamination along the river, so that the contamination source can be addressed.

During our initiative to bring narratives to the maps, another map was brought to our attention by Pei-Ying. In Documentation: the Shape of the Singapore River, Debbie Ding collected sketches made by people and what they think the shape of the Singapore River looks like, without making reference to anything else (currently showed at the Singapore Art Museum). The shape of the river reflects the memories and the individual's relationship with the river. This relationship with rivers was echoed during a late dinner conversation, when Novel, who lives near Code River told us how "The river was a friend – it was green, beautiful, we played there…but now the river is no longer like that. We try to keep distance".

Within these 2 weeks, we decided to focus on the following:

- research the list of known water/river/ mapping projects in Yogyakarta
- enrich the mapping by using narratives
- visit the waste water processing plant
- request to have data on the sewage infrastructure from the local government

- sampling as performance/ ritual
- organize/agree to build a database to accommodate the different types of data to be mapped – an open platform that would be available for other projects mentioned above

Concretely, what we experimented during this time was to try to set up and test out a new workshop looking for diatom diversity in the Code River, and the exchange of memories/impressions of the river. From Karkhana, we have learned workshop basics and ice-breakers to get over language barriers, and with the v.1 of the digital webcam microscope, we visited X-CODE films headquarters with kind interns willing to try the fresh-out-of-the-oven workshop. Together, we visited the river and collected the water samples, and went through the process of concentrating and observing the diatoms under the microscope. Later, what Shreyasi found out by taking water from the nearby rice patty, was that while diatoms can be readily seen in the water from the rice field without any process of concentration, the river water had to be processed to see any diatoms. We also asked people to write and share their river experience. It was a long afternoon – and we were amazed how everyone was willing to stay until the end. In debriefing on the workshop, we listed what needs to be improved, and brainstormed for the 2nd version.

The prototypes and the process were shared during the finalHLab14 exhibition, curated by Grace Samboh from Hyphen. This exhibition was conceived as a pathway for collaborations, organized by the HLab14 research nodes, the

Volcano, Forest and River.

Within this exhibition related to the river node, regarding the hardware used, there was a GPS/temperature sensing coconut made by Urs from GaudiLabs, and a zebra-fish immersed yet segregated in the water (a conceptualization of having a toxin-sensing fluorescent reporter fish in the field) exhibited as Exosynthesis. This prototype stems from the concerns of the "BIO-DESIGN for the REAL WORLD" biosensor projects, where reporter bacteria, or fish, for example, transgenic zebrafish that can sense environmental toxins, must be confined from the environment. Also, there was the Water Sampling Probe (WASP), a mock-up of a GPS-triggered water sampling raft, collaboration between members of Lifepatch and WAFT-Lab, and a member from the Taiwanese Bioart Community. MusikBatu di Kali Code (Stone Music in Code River) video, was made working with youth in Tukangan, an area along the Code River.

A major concern was "why should people go take river water samples?" - while testing the coconut in the waters, the group noticed that garbage is directly thrown into the river. The technologies used for the detection of contaminants is not the limiting factor. If awareness-building is the issue – then a water sampling robot competition can be just as effective. Even awine-making workshop requested by the community, where vessel sterilization is performed, can also raise awareness of the water source.