



A national upgrade of the climate monitoring grid in Sri Lanka. The place of Open Design, OSHW and FOSS.

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The National Climate Observatory of Sri Lanka is a proposition designed for the Government of Sri Lanka in September and discussed with private and public stakeholders in November 2014.

The idea was initially to install a networked grid of weather instruments from locally-made open source hardware technology, on land and seas, that report live the state of climate. After initial stakeholder meetings, it was agreed to first try to connect any existing weather stations from different governmental and private sector agencies. This would bring existing information to a common ground through the Internet. At this point, it was realized that extracting information from various vendors set up would take a large amount of efforts, that is still the best and fastest anyway, as considerations from ownership and maintenance are the most important issues in a tropical humid country as Sri Lanka.

Thus, the question of Open Design, open source hardware (OSHW) and free and open source software (FOSS) became a pivotal element in considering operationalization of any future elements of a national grid. Reasons range from ownership, to low-cost and customization, but prominently it is about technology ownership, royalty-free and local availability.

Building on previous work from (Chemin and Bandara, 2014) we proposed to open design specifications and prototypes for weather monitoring for various kinds of needs, the Meteorological Department clearly specified that the highest variability observed spatially in Sri Lanka is rainfall, and their willingness to investigate OSHW electronics using their new team of electronics and sensors specialists. A local manufacturer is providing an OSHW micro-controller product, a start up is providing additional sensor boards under OSHW specifications and local manufacture of the sensors (tipping-bucket and other wind sensors) is under development and blueprints have been made available in the Public Domain for CNC machine, 3D printing or Plastic Molding.

The Lanka Rainwater Harvesting Forum was in need of volumetric estimation of rainfall-runoff contributed to recharge of the aquifers. Regular reporting of high quality rainfall events and intensity is still a challenge to be addressed in Sri Lanka. A combination of OSHW and FOSS is being used to create a royalty-free, cheap raingauge design, with full control of on-board data collection and statistics. Development of an initial 15 raingauges include capacity-building, joint set up from the ground to scouting and installation, and full ownership of all aspects (hardware sourcing locally, software modification, communication troubleshooting, etc.).

The Irrigation Department in Malwatu Oya had a requirement for real time rainfall information to manage reservoirs in cascade ("daisy chain") and mitigate flooding consequences downstream. 5 generic prototypes are now reporting to reservoir managers, and the reservoir management model is now rerun as often as needed to re-assess decision-requirements from any new rainfall about certain, already-known, dangerous intensity. The irrigation department capacity-building was provided in two trainings, one for engineers (decision-making support) and technicians (reporting and maintenance). Interest for further level of control in the system is low.

Reporting online is following several potential routes, and an open design GPRS protocol is being developed, to simplify future weather stations design specifications in Sri Lanka.