

# A Community-based monitoring system for peat swamp forest restoration

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## Introduction

The Indonesian government has launched an initiative to restore degraded peat swamp forests across various provinces in the country, in response to extensive damage resulting from deforestation, drainage and fires. Monitoring is important for evaluating the success of restoration activities, but has so far been challenged by the expense of equipment, which limits the possibilities of undertaking large-scale monitoring, as well as demonstrating restoration impact at local scale. Community-based monitoring systems have been proposed as an alternative to conventional systems, involving the local community so as to decrease costs, increase monitoring area coverage, and measure the impact of restoration activities on ground water levels and soil moisture. This study explored the potential to involve the local community in monitoring the impact of peatland restoration activities, with technological support to log measurements of ground water levels and peat moisture into online database systems.

## Key activities

As part of the Participatory Action Research to Community-based Fire Prevention and Peatland Restoration Project, we undertook restoration activities, blocking drainage canals to raise water levels and ensure peatland remained wet. To measure the effects of canal blocking in each action arena, we installed two dipwells along blocked canals and two within a 100-meter range of the canals. We also installed dipwells on the opposite side of canals to monitor areas not affected by canal blocking.

We engaged communities in monitoring the ground water levels and peat moisture of areas affected by canal blocking (treatment areas), as well as unaffected areas (control areas), measuring and reporting data on a weekly basis. We used the Open Data Kit (ODK) platform that consists of ODK-Collect on offline mobile devices and the cloud-based Kobotoolbox, combined with the Microsoft Power BI application, to publish measurement data on an online dashboard.

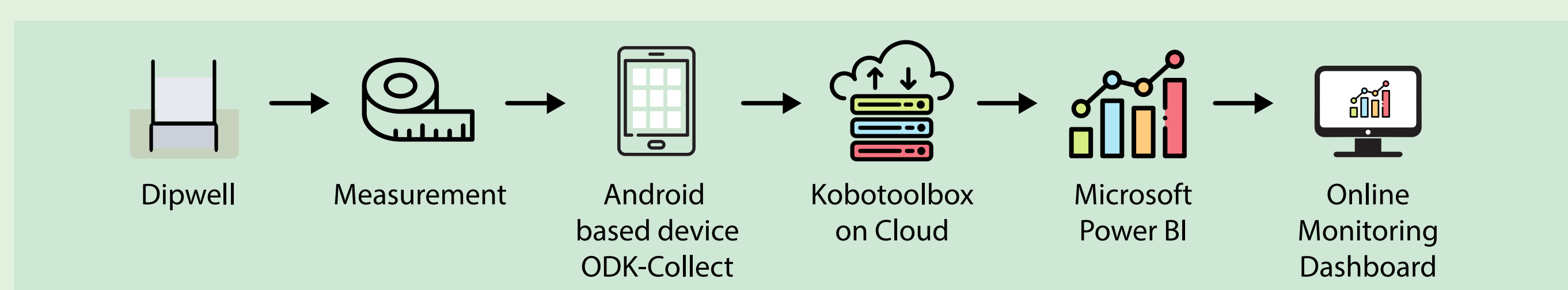


Figure 1. Monitoring system workflow



Figure 2. Canal blocking and measurement activities

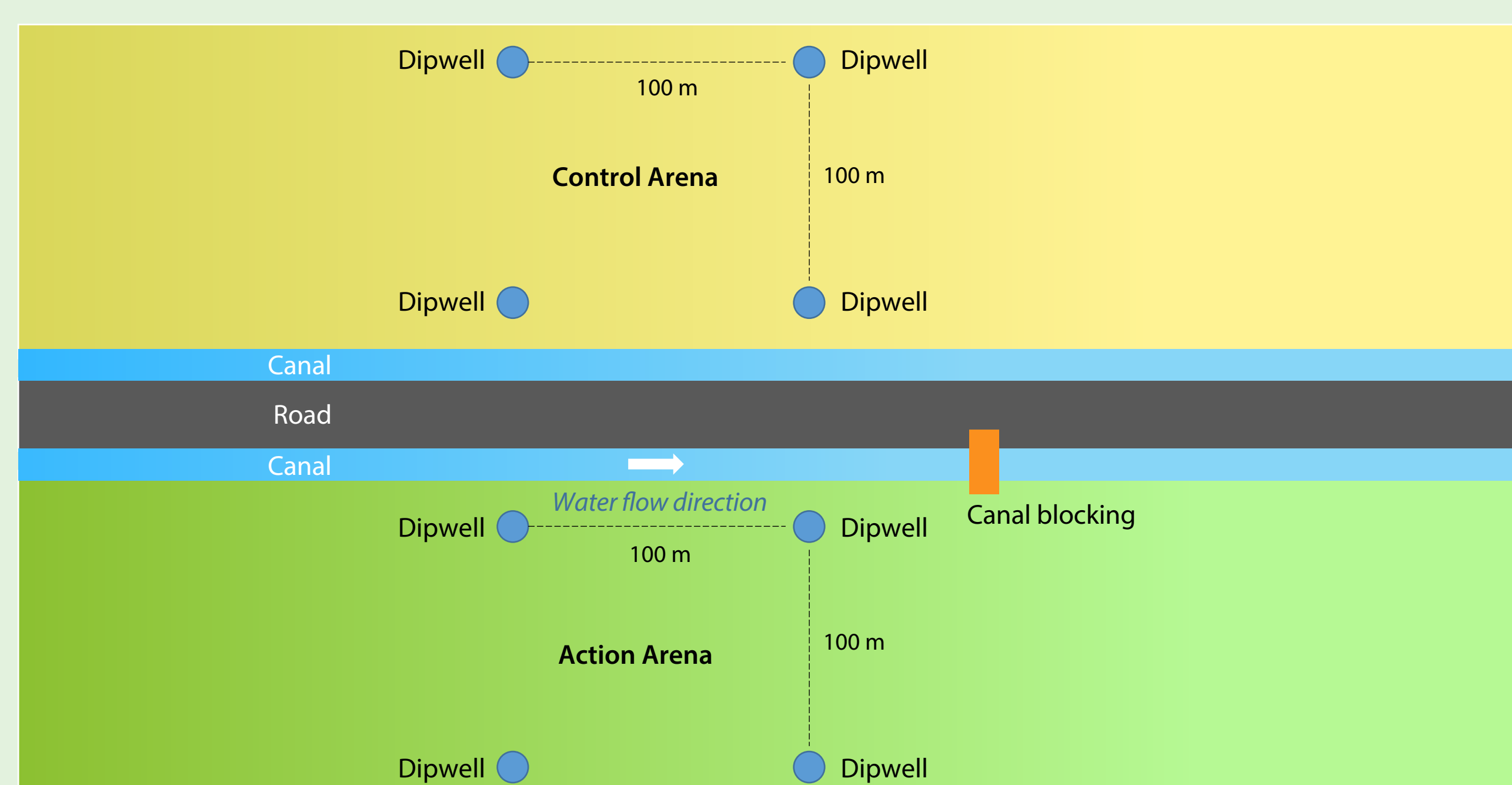


Figure 3. Illustration of canal blocking, control area and treatment area



Figure 4. Local communities members measure ground water level

## Results

Compared to conventional monitoring systems, community-based monitoring offers certain advantages, in that it is more efficient and has the potential to cover a large area. The participative nature of the system also empowers people to restore nearby peatlands and prevent them from being burned. This system combines the use of manual measurements, gathered by trained local people, with the use of communication technology, in terms of data submission and the monitoring platform. The project demonstrated that involving local communities can significantly increase the number of monitoring sites in target restoration areas (one versus 48 sites), and uncover any variance in ground water levels and soil moisture. The data generated can be complimentary to other data, helping to build a more detailed understanding of the effects of restoration. With the support of online submission and a monitoring dashboard, a community-based monitoring system can show the impact of peat swamp forest restoration in a periodic and timely manner.

### Ground Water Level Monitoring



Figure 5. Screenshot of monitoring dashboard

## Conclusion

Community-based monitoring systems are a feasible alternative for evaluating peat swamp forest restoration activities at site level.

