

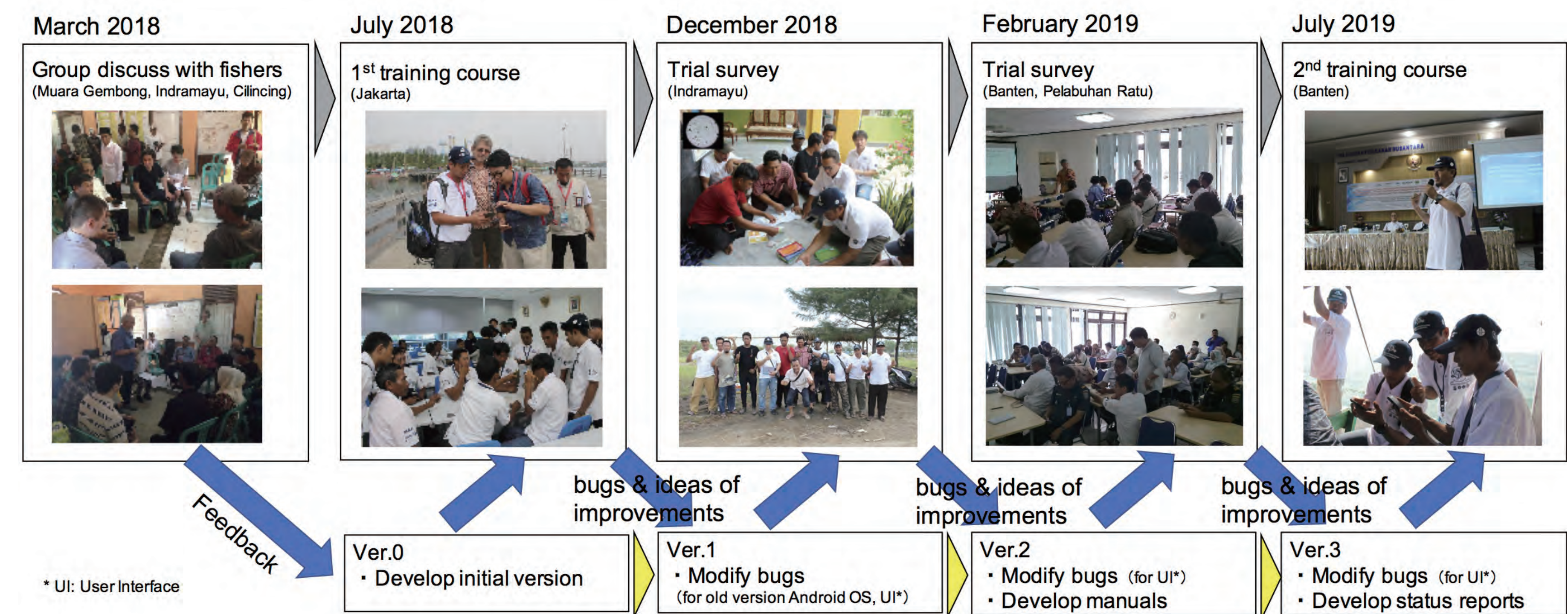
Developing a community-based coastal environmental monitoring system in Indonesia using smartphone app

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Introduction

- * Citizen science is an effective research approach used to understand large-scale patterns of change in the distribution, abundance, and presence of organisms across time and space (1).
- * There are many successful examples of citizen-based monitoring in developed countries (e.g. 2, 3).
- * However, this approach has not been widely applied yet for collecting environmental and fisheries data in developing nations (e.g. 4).
- * The objective of this research was to develop a community-based coastal environmental monitoring system using a smartphone app in Indonesia where coastal ecosystems face various challenges due to ecological and social changes.

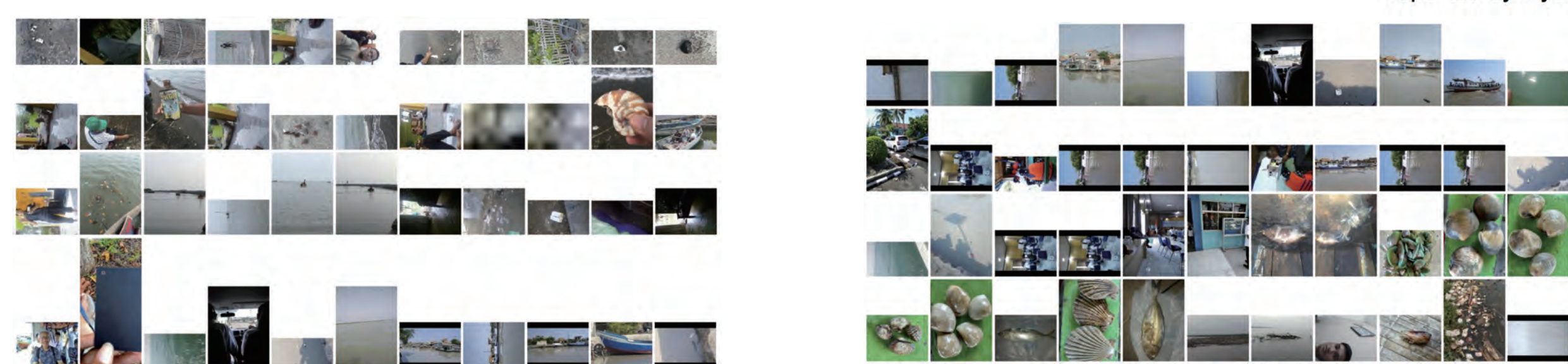
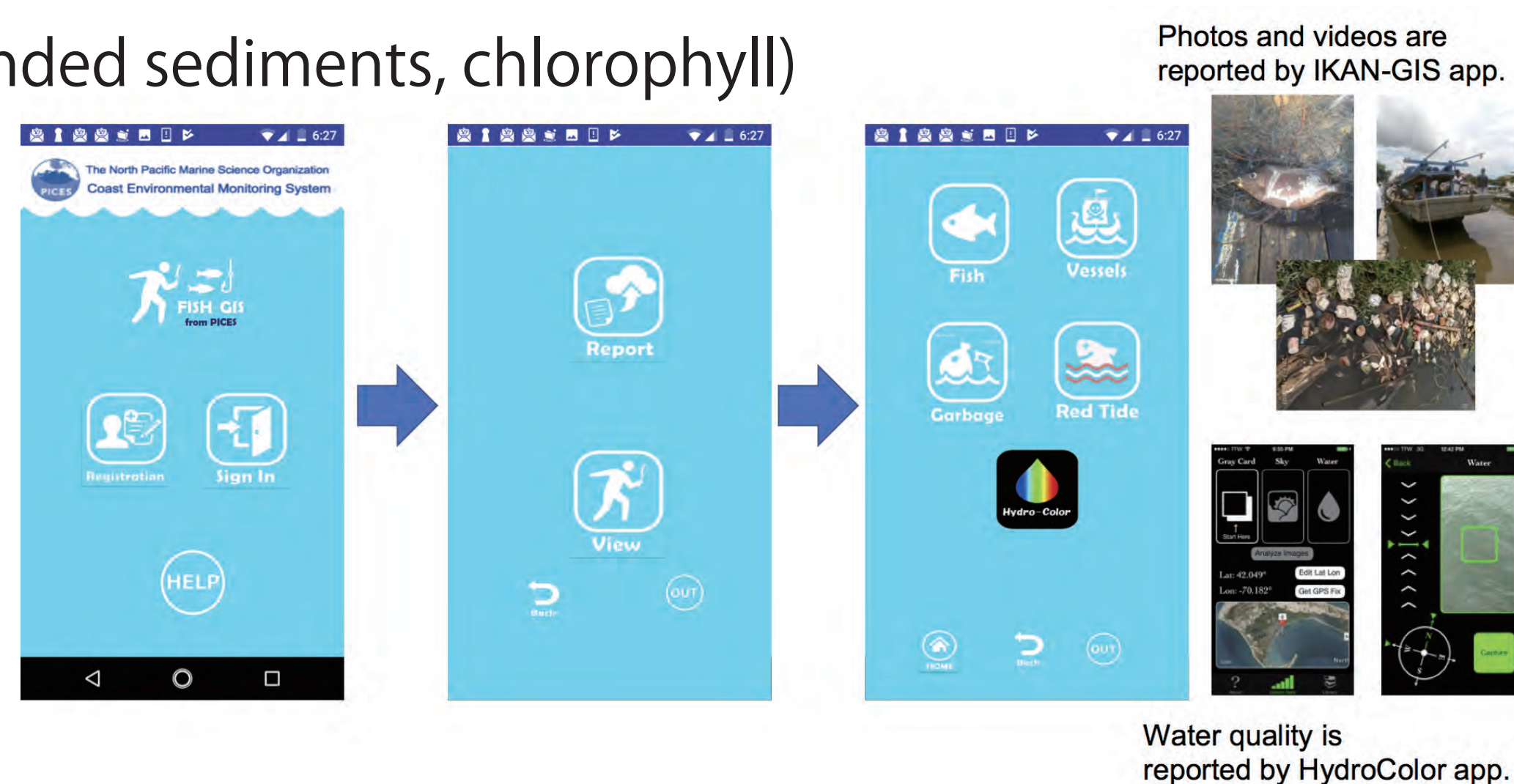
Method (Transdisciplinary research approach)



Results and Discussion

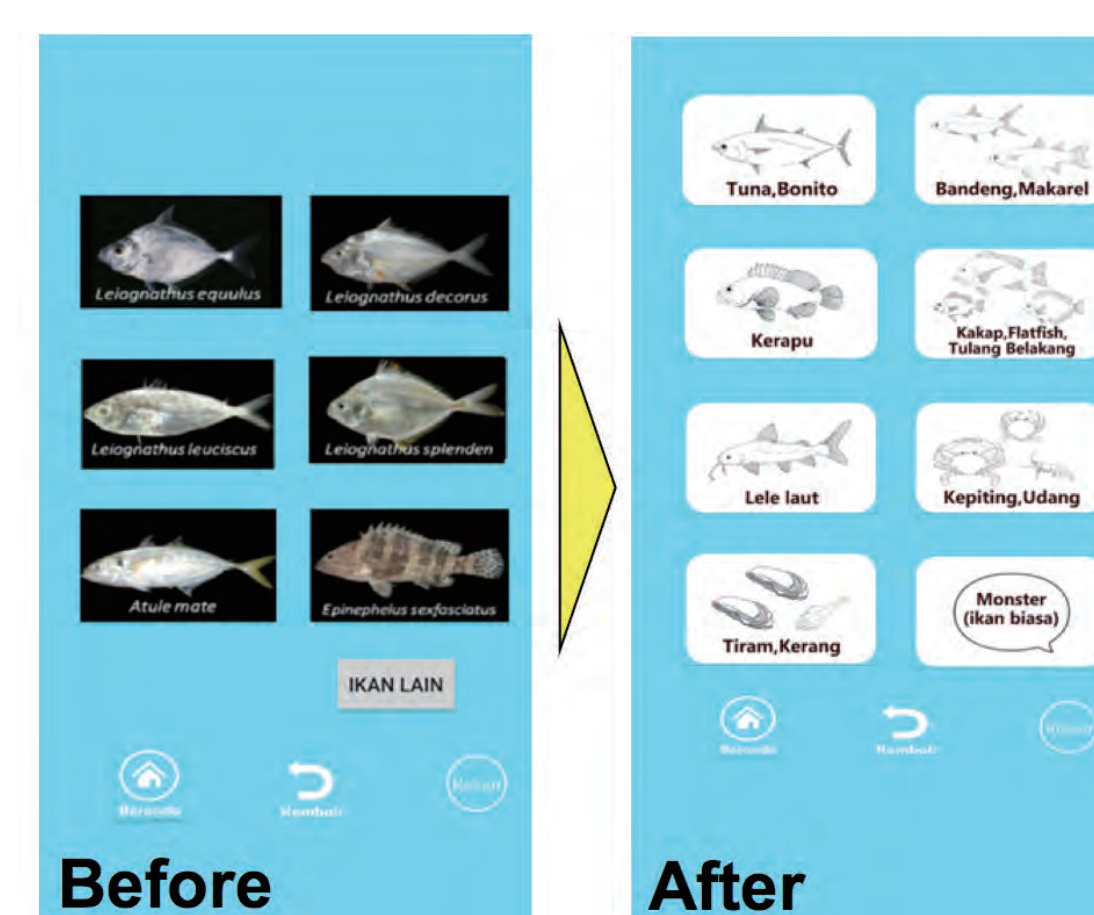
1 Smartphone App (IKAN-GIS)

1. Water quality (suspended sediments, chlorophyll)
2. Red tide/fish kill
3. Fish landings
4. Illegal fishing vessels
5. Floating garbage



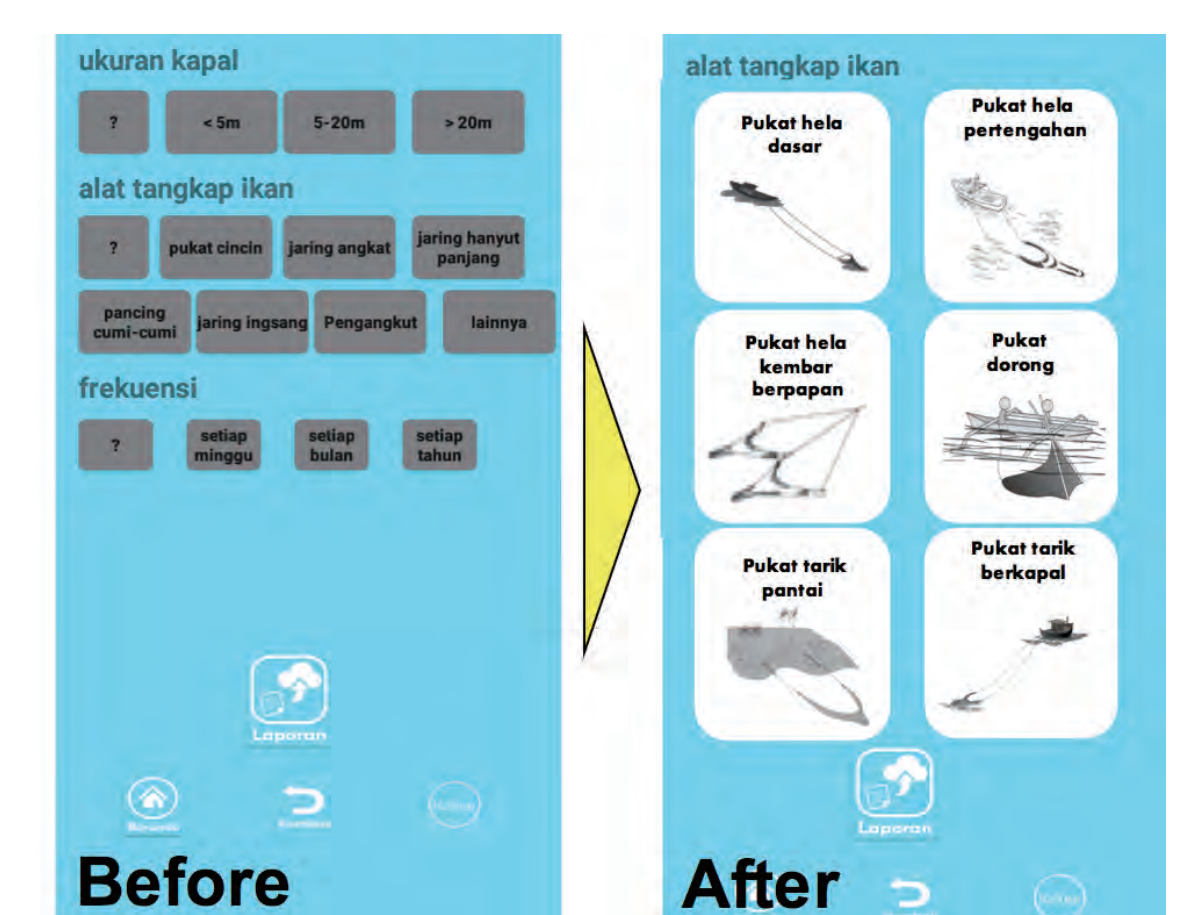
2 Modified App with local stakeholders

Fish speecis



- * Local fishers pointed out the gaps between the App and fish species on thier fishing grounds.
- * We added some fish species and re-categorized them based on the ecological characteristics.

IUU fishing gear



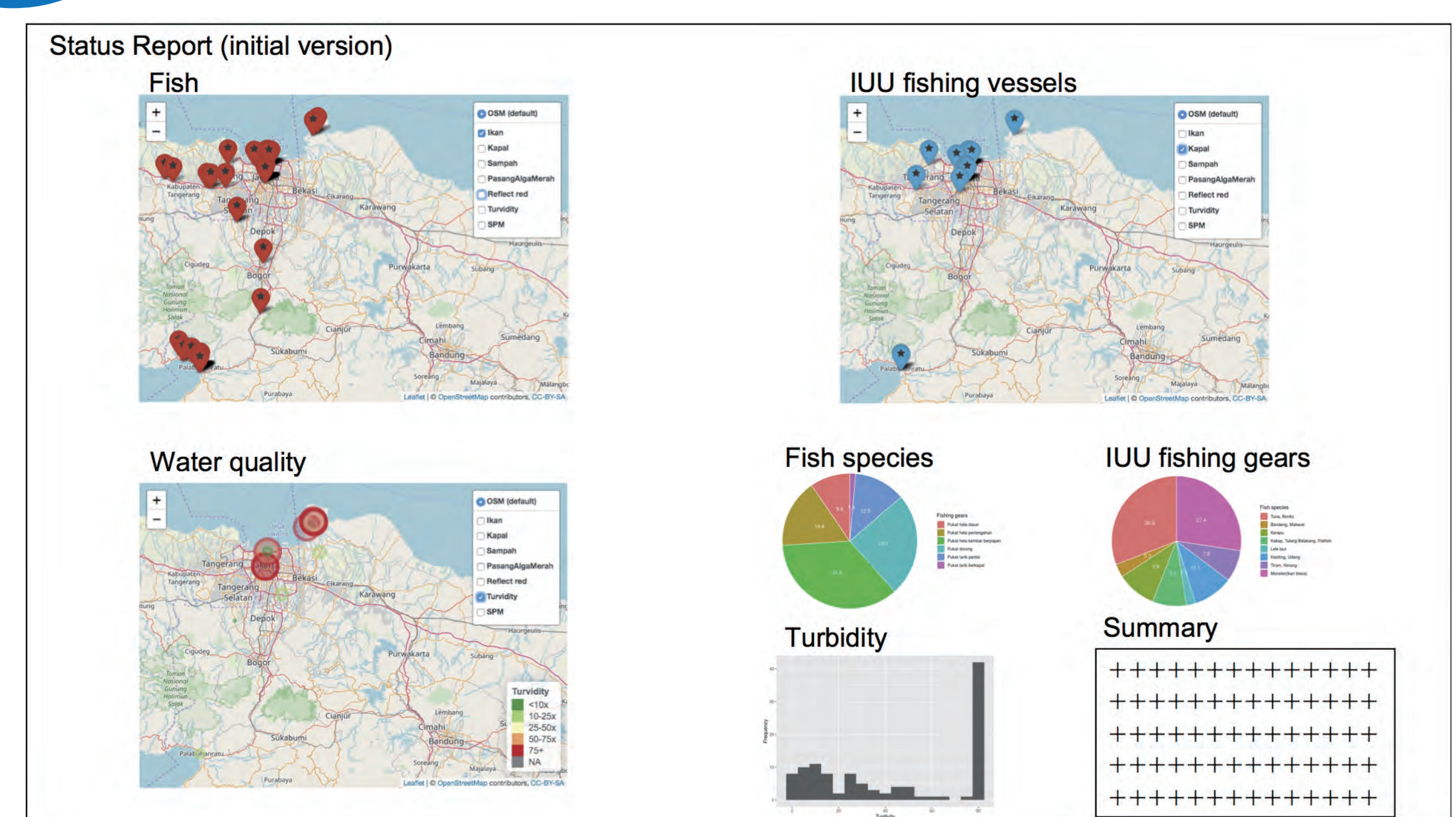
- * Government officers pointed out the gaps between the App and the list of illegal fishing gear by Indonesian government.
- * We re-categorized fishing gear based on the government' s list.

3 Operation manuals



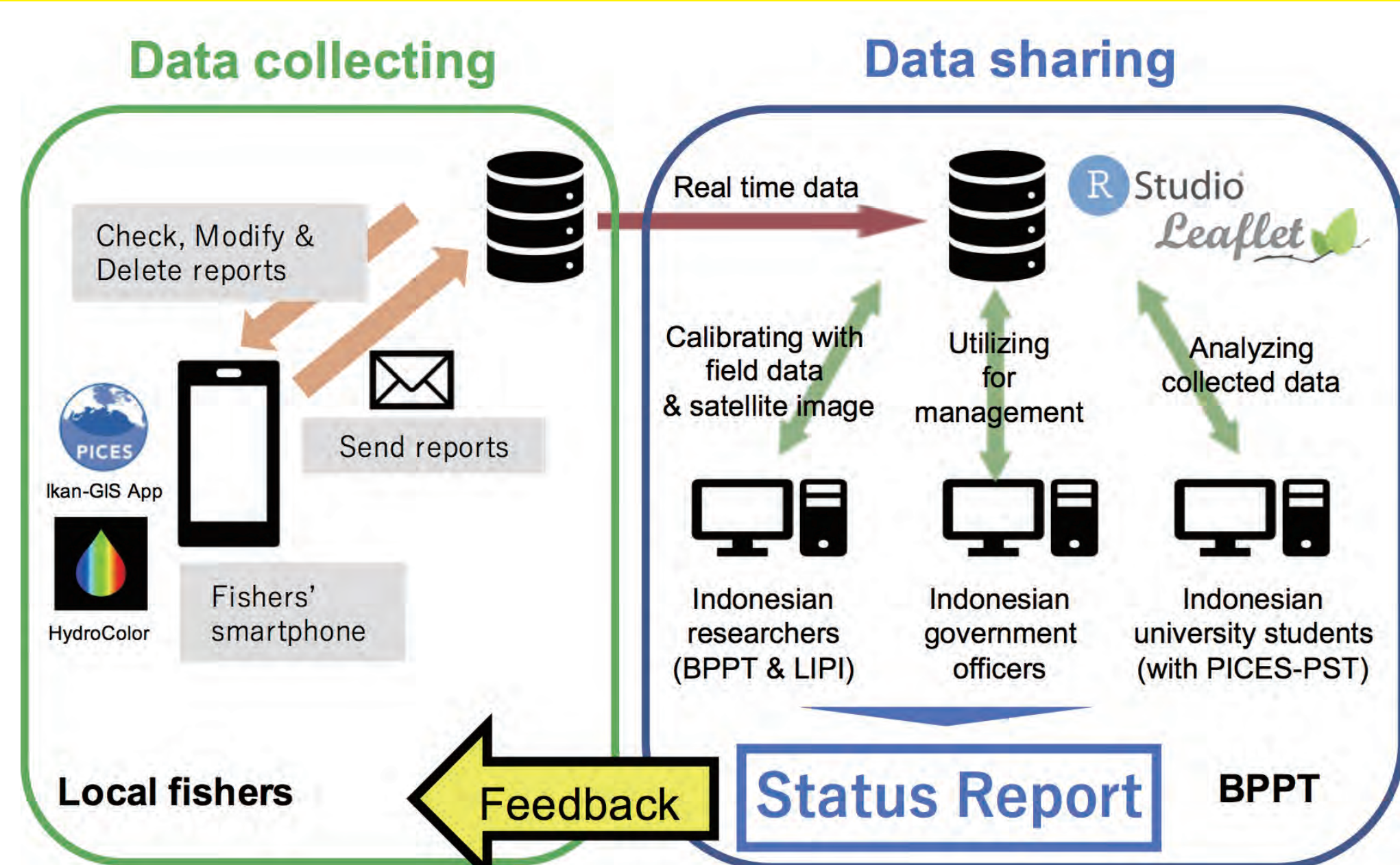
- * BPPT staffs prepared the operation manuals of IKAN-GIS app (Indonesian and English) and taught how to use IKAN-GIS app to fishers at training course.
- * Local fishers can easily install the app on their own smartphone and try to report by themselves through the training course.

4 Data sharing system



- * Monitoring results are stored on the cloud server.
- * A preliminary status report can be automatically generated from the database in the cloud server.

Conclusion



- * Administrative officers and researchers in Indonesia can utilize the IKAN-GIS system for research projects and coastal management.

Working on the smartphone app, we faced various challenges.

- * Local fishers' smartphone device and OS are often old .
- * Cell phone signal is weak at fishing ground in Indonesia.

But, these challenges proved to be an opportunity to learn from each other.

- * The local fishers and government officers learned the concepts and importance of coastal monitoring from the PST,
- * we learned the realities and needs of the local communities on how to implement the monitoring using smartphone technology.

Smartphone technology facilitates dialogue and discussion between local fishers, local government officers, BPPT staffs and PST as boundary object.