PhiGO 2020 Stakeholder Workshop: information dissemination and data portal design

Environmental Change Adaptation and Resilience Programme

Open Report OR/20/070

BRITISH GEOLOGICAL SURVEY

ENVIRONMENTAL CHANGE ADAPTATION AND RESILIENCE PROGRAMME

OPEN REPORT OR/20/070

PhiGO 2020 Stakeholder Workshop: information dissemination and data portal design

D Mallin Martin, A McKenzie, A Barkwith, R L Ciurean, Ma. A L G Guzman, E Espiritu, Engr. S Abaño, M L Guico, J C Monje, C Oppus, J Yousaf

Editors

E Crewdson, J C Gill

Keywords

Philippines, information dissemination, data portal design, groundwater forecasting, PhiGO.

Front cover

Poster for information access routes, drawn by participants at the Iloilo workshop.

Bibliographical reference

D MALLIN MARTIN, A MCKENZIE, A BARKWITH, R L CIUREAN, MA. A L G GUZMAN, E ESPIRITU, ENGR. S ABAÑO, M L GUICO, J C MONJE, C OPPUS, J YOUSAF 2021. PhiGO 2020 Stakeholder Workshop: information dissemination and data portal design. *British Geological Survey Open Report*, OR/20/070. 29pp.

Keyworth, Nottingham British Geological Survey 2021

BRITISH GEOLOGICAL SURVEY

The full range of our publications is available from BGS shops at Nottingham, Edinburgh, London and Cardiff (Welsh publications only) see contact details below or shop online at www.geologyshop.com

The London Information Office also maintains a reference collection of BGS publications, including maps, for consultation.

We publish an annual catalogue of our maps and other publications; this catalogue is available online or from any of the BGS shops.

The British Geological Survey carries out the geological survey of Great Britain and Northern Ireland (the latter as an agency service for the government of Northern Ireland), and of the surrounding continental shelf, as well as basic research projects. It also undertakes programmes of technical aid in geology in developing countries.

The British Geological Survey is a component body of UK Research and Innovation.

British Geological Survey offices

Nicker Hill, Keyworth,
Nottingham NG12 5GG

Tel 0115 936 3100

BGS Central Enquiries Desk

Tel 0115 936 3143
email enquiries@bgs.ac.uk

BGS Sales

Tel 0115 936 3241
email sales@bgs.ac.uk

The Lyell Centre, Research Avenue South,
Edinburgh EH14 4AP

Tel 0131 667 1000
email scotsales@bgs.ac.uk

Natural History Museum, Cromwell Road,
London SW7 5BD

Tel 020 7589 4090
Tel 020 7942 5344/45
email bgslondon@bgs.ac.uk

Cardiff University, Main Building, Park Place,
Cardiff CF10 3AT

Tel 029 2167 4280

Maclean Building, Crowmarsh Gifford,
Wallingford OX10 8BB

Tel 01491 838800

Geological Survey of Northern Ireland, Department of Enterprise, Trade & Investment, Dundonald House, Upper Newtownards Road, Ballymiscaw,
Belfast, BT4 3SB

Tel 01232 666595
www.bgs.ac.uk/gsni/

Natural Environment Research Council, Polaris House,
North Star Avenue, Swindon SN2 1EU

Tel 01793 411500   Fax 01793 411501
www.nerc.ac.uk

UK Research and Innovation, Polaris House,
Swindon SN2 1FL

Tel   01793 444000
www.ukri.org

Website www.bgs.ac.uk
Shop online at   www.geologyshop.com

Foreword

Half of the world's cities with populations above 100,000 are located within water basins where over half of the available water supply is depleted for part of the year. These water-stressed cities are finding it extremely difficult and expensive to secure the additional water supplies needed to support their growth. Water security is of particular concern for Filipino cities, which have been designated amongst the worst in Asia for urban water security. Changing climate and increasing urban population density will put more stress on their water resources. Current projections of climate up to 2050 suggest the Philippines will become warmer, with increasing temperature and decreasing rainfall during the dry season and more extreme rainfall events during the wet season. This will undoubtedly exacerbate both water availability during periods of drought and the magnitude of flood events during periods of heavy rainfall. This susceptibility has led to the Philippines being consistently ranked near the top of countries most at risk to climate change. In addition to water stresses from a changing climate, population is expected to increase by ~50% up to 2050, with urban population set to double over the same period. This will further exacerbate pressures on future water resources.

Through a programme of data gathering, knowledge exchange, fieldwork, numerical modelling and stakeholder engagement the Philippines Groundwater Outlook (PhiGO) project seeks to undertake assessments of population and climate change impacts on regional groundwater resources and translate these into usable forecasts of flood and drought risk. There are two distinct timeframes at which uptake and potential benefits of the project will be realised. Short term, seasonal-scale forecasts will aid in reactive preparedness, whilst long term, decadal-scale forecasts can be used to take proactive steps towards reducing the future physical and economic impacts of extreme hydrometeorological events. To better understand the potential socio-economic impacts of groundwater level extremes and potential water management strategies, PhiGO is also focussed on quantifying the cascading impacts of flood and drought through key infrastructure and analysing the cost-benefit of differing water management and urban planning scenarios.

The following report presents the summarised outcomes of two stakeholder workshop sessions held in January and February 2020, in the Iloilo and Pampanga regions of the Philippines as part of the Philippines Groundwater Outlook (PhiGO) project. These workshops focussed on local expectations of future potential population, climate and land use change, along with dissemination strategies to present the data and forecasts in the most usable format possible.

Acknowledgements

The project team would firstly like to thank the following individuals for their contributions and guest speeches during the 2020 workshops:

- Dir. Sevillo D. David Jr., Ph.D.
- Engr. Rowen R. Gelonga, ChE, CESO II
- Engr. Susan P. Abaño, MSc
- Rusy G. Abastillas
- Oskar D. Cruz
- Thelma A. Cinco
- Mary Michelle M. Quiambao

The team would also like to thank all the attendees of the PhiGO 2020 workshops. Also, a significant thanks to the project team and research assistants at Ateneo de Manila University and Department of Science and Technology - Philippine Council for Industry, Energy and Emerging Technology Research and Development (DOST-PCIEERD), for their invaluable help in running and organising the workshop, and their ongoing support and effort with the PhiGO project. Thanks are also due to Emma Crewdson and Joel Gill at BGS for their review of this report.

Contents

FIGURES

TABLES

Summary

This report presents the summarised responses from participants at two stakeholder workshops, held in Iloilo and Pampanga, between 28th January and 5th of February 2020. The workshop focus centred on how stakeholders access hydrological information relevant to their jobs, and the required format that this data needs to take. Participants were asked about their current access routes to information, and their ideal access platform/web portal for hydrological data. This was so that the outputs of the PhiGO project could be tailored to meet as many stakeholder requirements as possible.

Stakeholders clearly identified several common points for data access and formats across a number of sectors, and both in their professional and personal environments. Stakeholders required that data is predominantly visual, with a strong focus on maps, figures, and graphs, but backed up by information that can be interrogated, whether that be tabular data or summarised reports. Stakeholders desired a web portal that needed to be clean and easy to use, with guidance for navigation and explanation of complex terms. Detailed information must also be readily available, and the data should be available for offline downloading.

The feedback from these stakeholders will feed directly into the final design of the PhiGO data portal.

1 Introduction

1.1 PROJECT OVERVIEW

The Philippine Groundwater Outlook (PhiGO) is a three-year collaborative project (2018–2021) lead by Andrew Barkwith, Ph.D. from the British Geological Survey (BGS) and Ma. Aileen Leah G. Guzman, Ph.D. from the Ateneo de Manila University (ADMU). This project is under the PH-UK Newton Agham Joint S&T Cooperation Programme on Understanding the Impacts of Hydrometeorological Hazards in the Philippines.

The main objective of the project is to deliver consistent, accessible, and transferrable assessments of climate and population change on regional groundwater resources, and to assess the subsequent influence on flood and drought risk, and socio-economics. This objective will be accomplished through a combination of historical data analysis, real-time observational data, climate downscaling, ensemble-modelling, data assimilation, and statistical analysis.

For this project, the study sites chosen were Iloilo City and its surrounding areas, and Angeles City and Mabalacat, Pampanga. These sites were named as part of the nine highly urbanized water critical cities in a study done by the National Water Resources Board (NWRB) and the Japan International Cooperation Agency (JICA) in 1998.

Given the scope of work and various disciplines involved, the Philippine Groundwater Outlook collaborates with both the academe and national government agencies. UK constituents include Imperial College London, while the National Water Resources Board (NWRB), the Philippine Atmospheric, Geophysical, and Astronomical Services Administration (PAGASA), Ateneo de Zamboanga University (ADZU), and Mariano Marcos State University (MMSU) form part of the Philippine constituents. These agencies act as support for both BGS and ADMU in delivering the project outputs.

Through the course of three years, the project will develop near-real-time groundwater monitoring systems, enhanced models of regional groundwater dynamics, seasonal and long-term forecasts of groundwater levels, and stakeholder-focused reports of flood and drought risk and cascading hydrological and socio-economic impacts. These outputs will be available through web-based platforms such as a project website (https://admuwater.com/phigo) and social media, as well as through dissemination routes defined by the stakeholders. Workshops and training for capacity building will be held throughout the duration of the project both for the project constituents and the stakeholders.

At the end of the project, two self-constrained hubs (encompassing the remote monitoring stations, and forecasting models outlined above) will be developed for the project study sites. These self-constrained hubs will act as blueprints for undertaking similar research across other highly-urbanised water constrained regions in the Philippines.

1.2 2020 STAKEHOLDER WORKSHOPS

The first set of PhiGO stakeholder workshops were held in Iloilo (28th and 29th January, 2020) and Pampanga (4th and 5th February, 2020). Each workshop consisted of two days of activities with invited stakeholders. These workshops focused on obtaining stakeholder input in the early stages of the project, for long range (decadal) forecasting (Day 1) and output dissemination strategies and requirements (Day 2). Guest talks were given by the Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA), NWRB, local and regional Department of Science and Technology (DOST) representatives, and local government representatives. Activities were delivered by members of the BGS, ADMU, DOST, NWRB and PAGASA.

Day 2 centred on understanding the stakeholder requirements for the dissemination of project outputs and the design/functionality of the data portal, which will be the central hub for accessing outputs from the seasonal water level forecasting and viewing the real-time water level and quality data for the telemetered sites. Findings from this session will directly inform project data and forecast delivery mechanisms, ensuring project outputs reach those who require the information in a useable format.

2 Workshop Format

2.1 WORKSHOP ATTENDANCE

A number of national, regional and local stakeholders were invited by DOST-PICEERD, ADMU and NWRB to the workshop session. Stakeholders were selected based on their proximity to NWRB monitoring wells, and for their association with the hydrological sector. These included regional and local government representatives, government agencies, local education institutions, and relevant private and industrial sectors/abstractors:

- Local government officials
- Department of Agriculture
- Department of Health
- Department of Education
- Department of Science and Technology
- National Economic Development Authority
- Provincial Planning and Development Office
- Provincial Disaster Risk Reduction and Management Office
- National Commission on Indigenous Peoples
- Local primary and high schools
- Local universities
- Local water districts/suppliers
- Local private/industrial abstractors (e.g. food and drinks industry)
- National Water Resources Board (NWRB)
- Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)

One hundred stakeholder attendees were present at the workshop sessions in Iloilo and Pampanga in total. Table 1 shows a breakdown of the attendee numbers for each session in each regional workshop. Over half of the attendees were present at both days, with a small number only attending one day or the other.

Table 1. Number of registered attendees for 2020 information dissemination strategies stakeholder workshop

	Iloilo	Pampanga
Day 1	29	20
Day 2	31	20
Total	60	40

Attendees were present from the following list of organisations:

- Local Government Units
    - Local Government of Iloilo City
    - Local Government of San Miguel
    - Local Government of Oton
- Regional Government Units
    - National and regional DOST representatives (Region III & VI), including DOST-PCIEERD
    - Department of Education
    - Department of Agriculture (Region VI)
    - Provincial Disaster Risk Reduction and Management Office (PDRRMO) (Region III & VI)
    - National Economic and Development Authority (Region III)

- Government Agencies
  - PAGASA
  - NWRB
- Education institutions
  - Cambitu National High School
  - Pavia National High School
  - Pagsanga-an Elementary School
  - Gelacio Allones Memorial Elementary School
  - University of the Philippines Visayas
  - Ateneo de Manila University
  - Mabalacat Elementary School
  - Mabiga Elementary School
  - Holy Angel University
  - Tacondo Elementary School
  - University of San Agustin, Iloilo
- Water supply sector and private industries
  - Alimodan Water District
  - Pepsi Cola Products Philippines Incorporated
  - Balibago Waterworks System Inc.

2.2 WORKSHOP: STAKEHOLDER INPUT ON PROJECT DISSEMINATION PATHWAYS AND STRATEGIES

To deliver the aims set out in Section 1.2, participants were randomly grouped, and tasked with three distinct activities. For Activities 1 and 2, each group was asked to summarise common responses at the end of each activity. This was done to identify overlap in stakeholder needs and allowed the project team to assess the most common stakeholder requirements. The latter will allow the PhiGO project to tailor outputs to suit the majority of end-user stakeholders.

2.2.1 Activity 1

Activity 1 was targeted at understanding the unique actions or decision-making processes requiring hydrological information that the stakeholders/participants had within their workplace roles. An "ideastorm" technique (Seeds for Change, 2020) was used to carry out this activity. Participants were provided with post-it notes, and asked to provide as many of their own individual responses to three questions:

1. What decisions do you make in your role?
2. What data do you need to make your decision?
3. What timescales do the data need to cover?

An example response would be "managing water supply, needing spatial data on well locations and groundwater levels, and timescales being real time and forecasted (ideally based of historical data)". Once all participants had provided their responses, the group then collated them into similar themes/categories on the posters. Groups then relayed these summarised groupings back to the rest of the workshop.

2.2.2 Activity 2

Activity 2 tasked participants to identify the routes via which they access information in both their professional and private lives, and how this information typically appears to them. A similar "ideastorm" technique (Seeds for Change, 2020) was used as in Activity 1, but participants were asked to only sketch a representation of the pathway or appearance, avoiding the use of text where possible. Sketches were chosen to keep the activity entertaining and hold the engagement of the stakeholders. Individual post-it notes were then collated together by the small groups, dividing between their professional and personal responses.

By asking for responses relevant to both the participants' professional and personal lives, a better understanding could be obtained for how the data portal could be designed to be beneficial to both a professional and public audience. An example response would be "using the internet, with information appearing as charts or graphs", or "Facebook for news relevant to my daily life". However, considering that those present were all educated professionals, their responses relevant to their personal lives may not fully represent those of the wider general public within the Philippines. These responses are therefore taken as a proxy, and are expected to approximate the range of pathways and formats which could be utilised by the general public. The final design will aim to meet the requirements of the majority of stakeholders, including as much of the general public as possible.

2.2.3 Activity 3

Activity 3 was focussed on assessing web portals for data access and consisted of two smaller activities (referred to as Activity 3.1 and 3.2). Activity 3.1 provided participants a chance to engage with and critique a number of example data portals. One such example was the Daily Groundwater Forecast portal from the BGS[1]. It is a generic web-based, map-centric GIS application initially developed by BGS to display hydrological borehole data in the UK. Borehole information was displayed along with daily water level values and predicted risk levels based on modelling by BGS. For the purposes of the workshop, the web application was extended to show the Philippines region with hypothetical locations for boreholes.

The design strategy was based on existing, successful BGS data portals, such as Geology of Britain[2] where data can be retrieved by interacting with elements on a map. It visually shows the location of hydrological station on a map of the Philippines and data disseminated by interaction with these stations. The goal of this activity was to explore map-centric portals that convey spatial data, and to see how well this concept was received and how easy the stakeholders find the application to navigate and retrieve data that is important to their specific needs.

Some of the questions that the activity hoped to answer were:

- Is it clear what information they are viewing and are they able to find it quickly and intuitively?
- Are they able to download the data that they want?
- Is the portal accessible and usable on different devices such as computers, mobiles and tablets?
- Is there sufficient help available to answer questions that the user might have?

Alongside the BGS designed data portal, two other examples of hydrologically-focussed data portals were demonstrated during the workshop. These included, the National Weather Service from NOAA[3], and the Groundwater Management Plan from ADMU[4]. These were chosen for their different ways of handling and presenting datasets. Participants, in their groups, commented on the user interface (UI), functionality and resources available on the data portals for each of the three data portals, again using an "ideastorm" technique (Seeds for Change, 2020).

Activity 3.2 provided participants, in their groups, a chance to design and incorporate their responses in Activities 1, 2 and 3.2 into a "dream data portal". This would provide the project team not only guidance on how participants prefer a data portal to be laid out and arranged, but also the ease of which to access resources. Once all groups had finished designing their data portals, they were asked to review and vote on aspects of the other groups' designs, using a "Prioritisation Dots" technique (Seeds for Change, 2020). This allowed all the participants to articulate the elements they wished to be present in the final data portal design.

---

[1] Website currently under development, a demo version was shown to stakeholders during the workshop
[2] https://mapapps.bgs.ac.uk/geologyofbritain/home.html
[3] https://water.weather.gov/ahps/
[4] http://www.admuwater.com/gmp/dashboard

3 Workshop results

The following sections present the summarised responses for the dissemination strategies and requirements workshop activities for both regions. Discussion and analysis of the results and comparison of regional responses is given in Section 4.

3.1.1 Activity 1 – Decisions, characteristics and timescales in the workplace

Activity 1 asked participants about the unique actions or decision-making processes requiring hydrological information within their workplace roles. Table 2 presents the number of unique responses from groups at each location (with examples in Figure 1), alongside the total number of unique responses across both locations. Table 3 presents 12 summarised themes captured by the individual responses, relating to several sectors.

Several of the decision-making themes in Table 3 are typically the responsibility of those in central or regional government settings (such as hazard management, health, planning and water resources management). This is indicative of the stakeholders who participated in the workshops. Within the private sector, water is typically viewed as a resource (e.g. production of foodstuffs or supply of water to populations) or a hazard to be managed (e.g. within private construction). Those in the education sector also require hydrological information for both learning purposes (especially with regards to water conservation), and the safety of the students under their supervision.

Whilst the number of decision-making themes is considerable, the types of data and timescales required are much fewer. The required data characteristics were less than the number of decision-making processes for both locations, and are notably lower when the unique responses across both locations are combined. A total of 11 distinct groups of data characteristics were identified, and are shown in Table 3, alongside four distinct timescale groupings.

Table 2. Activity 1 - Total counts for unique responses to each question. Responses are taken from summarised presentations from each group.

	Iloilo	Pampanga	Both locations
Decisions	47	30	57
Characteristics	29	28	34
Timescales	8	5	8

Table 3. Activity 1 – Summarised responses

Decision themes	Characteristics	Timescales
Water and wastewater resources management/monitoring	Maps/Spatial Data/Shapefiles/Locations	Historical - monthly, yearly, averages
New water sources	Physical Groundwater Data - levels, flows, hydrogeology	Present/Real Time - seconds, minutes, days, weeks
Water quality status/safety/monitoring	Hazard events/monitoring	Forecasted - weekly, monthly, annual, 2020-2050
Hazard or event management/adaptation/ preparation	Raw Data/instrument data/data collected first hand	Academic years/periods
Regulation/Permitting/Planning/ Government Level	Water quality reports/information	*For all of the above - daily. weekly, monthly/bimonthly, yearly/annual, decadal time periods were quoted by participants*
Education/Research/Outreach	Weather data/climate data	
Construction/Development/Industry/ Energy	Water resources status/updates/information	
Medical and Health	Published data/verified data/reported findings	
Agriculture/foodstuffs/products for human consumption	Wider environment - hydrology/soils/environmental/ geology	
Finance	Information on the built-up environment/population	
Water Conservation/recycling	Baseline Data	
Environmental management		

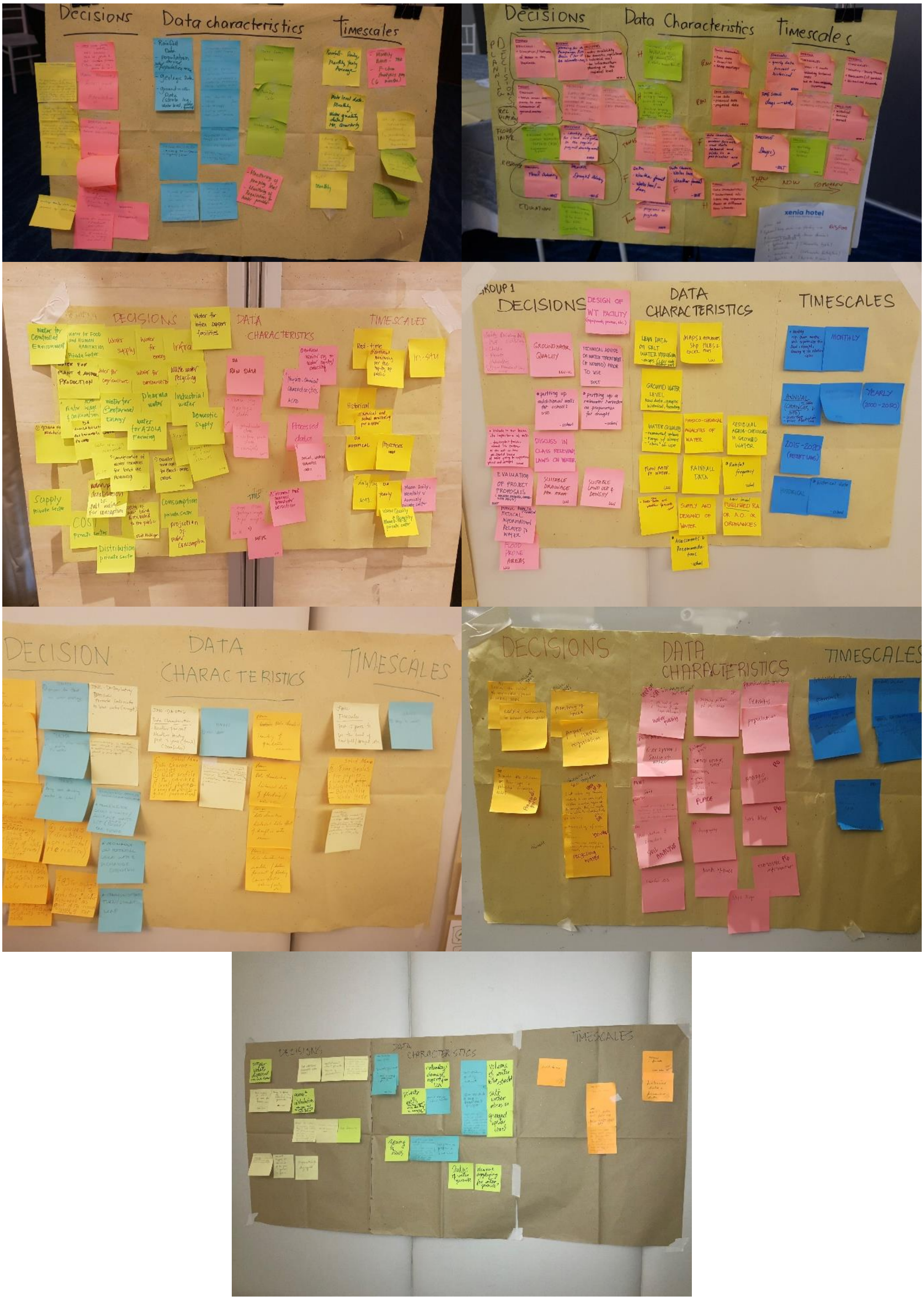

Figure 1. Example outputs from stakeholders for Activity 1 (Photos courtesy of ADMU and © BGS)

3.1.2 Activity 2 – Access routes and data types

Activity 2 explored the routes via which participants access information in both their professional and private lives, and how this information typically appears to them. The number of unique responses for each workshop location are presented in Table 4, with summarised access routes and appearances shown in Table 5 and Table 6. For both access routes and data formats/appearances, there were no personal-life specific ones that were not shared within the workplace. For access routes, these included social media, personal devices, personal and digital communications, “Quad Media” (TV, Radio, social media and print media), and internet services. For appearance and presentation, these included visuals/graphics, maps, and written media. Within the workplace, there were a few unique routes that would be much more limited to professional usage, including Databases and APIs, Journals, and primary data acquisition (including surveys and questionnaires). For appearance types, the unique workplace examples were tabular data, unprocessed results (typically from primary data acquisition), and technical graphics.

Table 4. Activity 2 - Unique responses for data/information access routes and appearances

	Iloilo	Pampanga	Both locations
Access routes	49	41	21
Appearances	6	8	5

Table 5. Activity 2 – summarised access routes

Shared access routes	Work specific access routes
Personal devices - computers, phones, tablets, personal storage	Databases/APIs
Internet services - news, online information and resources, websites	Group communications - workshops, seminars
Search engines – Google	Google Scholar/Elsevier - journal search engines
Social media – Facebook, Twitter	Bulletin boards, internal group communications
Quad Media - TV, radio, newspapers, phones	Surveys/Questionnaires
Communications - digital (email, messaging)	Primary Data - collected first hand/sensor data
Communications - in-person/ interviews/ gossip/ conversation	*Journals/published reports and outputs*
Dedicated apps	
Weather forecasts	
Mapping services - Google Earth/Maps, GIS platforms	
Print Media - newspapers/magazines/hard copies	
Video services - YouTube (Netflix)	
Government sources - LGUs, Departments/Councils, authorised sources, ordinances	

Table 6. Activity 2 – Summarised data formats/appearances

Shared data formats	Work specific data formats
Maps - spatial visualisations/files	Tabular data
Infographics/visualisations/pictures	Figures/technical graphics
Written media - reports, news, articles, social media	Raw data/unprocessed data
Written communications – messages/letters/ emails	
Video reports - news/weather forecasts	
Summarised data displays - graphs, charts	
Spoken word - recorded or person to person	

Figure 2. Example poster outputs from stakeholder participants for Activity 2 (Photos courtesy of ADMU)

Figure 2 (cont.)

Figure 2 (cont.)

3.1.3 Activity 3.1 – Data Portal Feedback

Activity 3.1 provided participants a chance to engage with and critique three example data portals. Typically, the NOAA web portal was considered the most overwhelming to use, with a poor layout, lack of “layman” terminology, and large data resource, but it was also considered the most robust for having access to a large number of resources in one location (Table 7). It could be better suited towards professional users versus a typical member of the public. The BGS data portal was considered to be easier to navigate than NOAA, with handy visuals and the option of an interactive map view, but lacked some clearer descriptions, a guide for new users to make the most of it, and tabular views for the graphs shown (Table 8). The ADMU portal was considered the most visually pleasing, with an easy to navigate interface, graphical and tabular views, and descriptions to guide and help users (Table 9).

From the feedback in Activity 3.1, it was clear that visual presentations, including maps, graphs, and a clean layout, made a big impact with the participants. However, detailed information, including tabular views, definitions and descriptions also were seen to be a positive with some users, but for it not to be too complex or inaccessible.

Table 7. Feedback on the NOAA data portal

User Interface	
Positives	*Negatives*
Detailed	Can be overwhelming
Lots of graphs/visuals (when you find them)	Poor site map/layout
Quick colour coding for alerts	Targeted at technical users
	Text heavy
	Lots of empty white space
Functionality	
Positives	*Negatives*
Interactive	Poor descriptions of data shown/lack of layman’s terms
All related data on one page	Poorly optimised for slower internet/lots of data to transfer
Graphs with analysis and maps	
Comprehensive/full featured	
Resources	
Positives	*Negatives*
Data rich, lots of information	Overwhelming amount of data
GIS Integration	Difficult for new users to understand resources

Table 8. Feedback on BGS data portal

User Interface	
Positives	*Negatives*
Straightforward	Icons can be too small
Good looking graphics	Gridlines on graphs needed
User friendly/well presented	Tooltip/data display on graph
Easy to navigate on PCs	Needs better guide to website use (for new users)
Map views	Needs better navigation on mobile devices
Functionality	
Positives	*Negatives*
Forecasted data and historical data together	lack of data table for graph view
Interactive/map driven	Need clearer definitions/glossary of terms for new users
	Needs clearer notes on when/why data is missing
	Clearer definition for geological logs
Resources	
Positives	*Negatives*
Lots of UK data	Lack of Philippines data
Groundwater levels - forecasted	Limited to Groundwater levels, excluding Groundwater quality

Table 9. Feedback on ADMU/NWRB data portal

User Interface	
Positives	*Negatives*
Novel layout, clean and easy to navigate	Some drop down menus slow to load / not working
Some definitions and reference to standards	Some descriptions could be simplified for new users
Functionality	
Positives	*Negatives*
Easy for planners / planning use	Graph could be in 3D / have 3D option for comparing two variables
Data properly labelled	Map view could show more information in pop up window - live readings etc
Table views / data can be downloaded as tables	optimise for mobile viewing
Clean / novel graph views	
All data in one location for each station	
Resources	
Positives	*Negatives*
Lots of information - water quality and levels	Few sampling points / stations available
Up to date	Some clearer explanation on site selection
	Could have standards plotted on graphs alongside data
	Could have a clearer contact path for queries
	Better censor control – explanations for absent/ poor data coverage (e.g. sensor issues/status)

3.1.4 Activity 3.2 – Data portal designs

Activity 3.2 provided participants, in their groups, a chance to design and incorporate their responses to the previous activities, into a “dream data portal”. The list (Table 10) below identifies the key features that the participants included in their web portal designs. The layouts can be seen in Figure 3. It was clear that the participants preferred map views and lots of visuals, with text reserved for definitions, FAQs and contact services. Where possible, the data portal should be able to straddle a number of platforms, including both mobile and PC versions, along with social media and SMS. There should also be options to download the data for external use.

Table 10. List of key features for data portal identified by workshop participants

Data portal features
Maps
Graphs
Data - as much in one place as possible
Downloadable
Search functions
Layers for maps
Publications
Citizen reports/input/monitoring - upload local results
Pop-up menus with standards/definitions
Built in bots - contact point (automated responses based on user questions)
SMS alerts
Mobile friendly
Hazard data
Water quality
FAQs
Mobile app
Social media integration
News
Project details
Database point/tabular data
Forecasting
"About water" - information for non-specialists

Figure 3. Select examples of stakeholder "dream data portal" designs from both the Iloilo and Pampanga workshops. (Photo courtesy of ADMU)

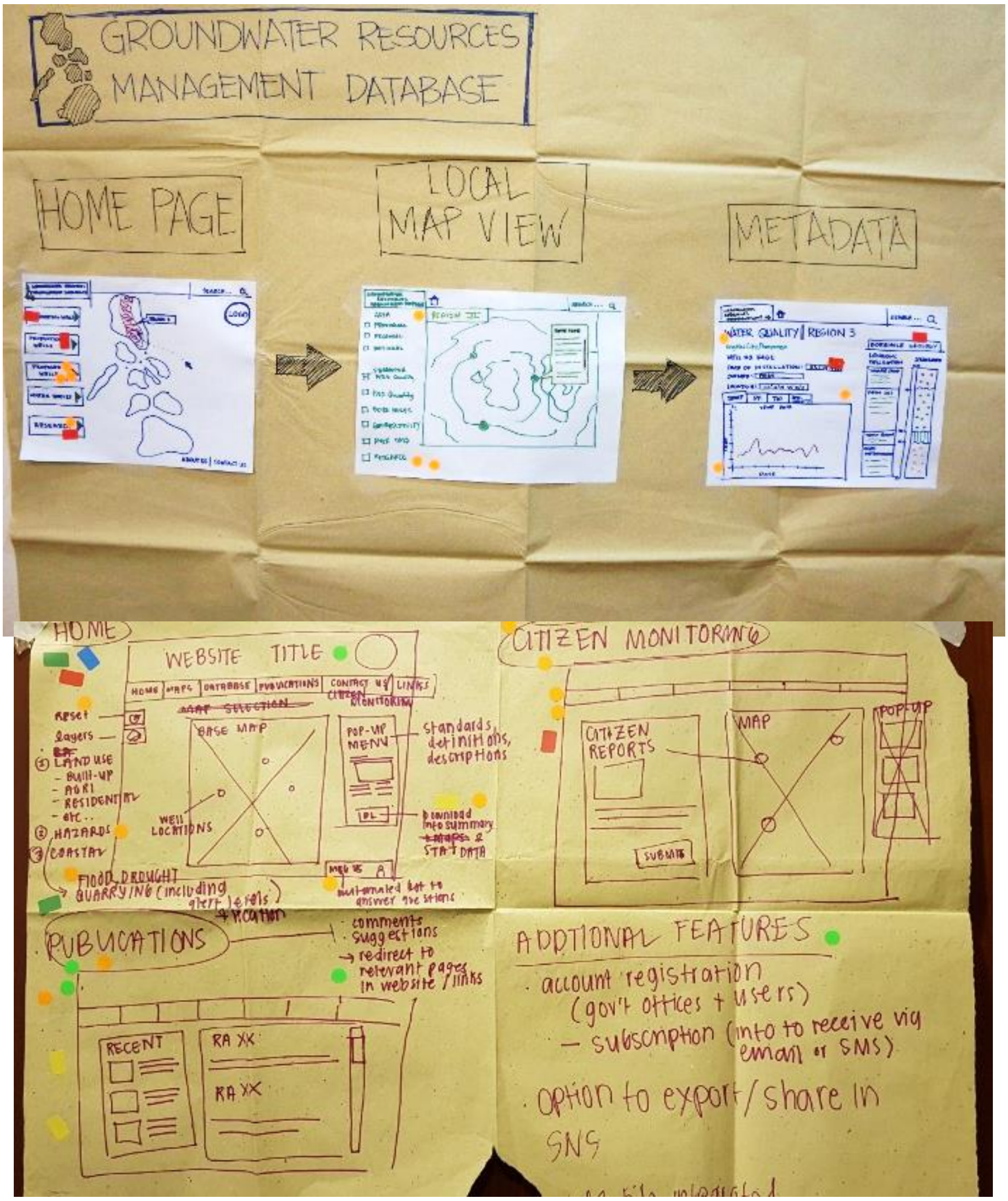

Figure 3. (cont.)

4 Discussion and next steps

4.1 DISCUSSION OF WORKSHOP RESULTS

4.1.1 Activity 1

Responses for Activity 1 presented up to 57 unique decision-making processes from participants across both locations (Table 2). However, for characteristics and timescales, many of the decisions shared similar requirements. This included several spatial data requirements (well inventories, hazard maps), water quality, quantity, and status records, and primary data collection specifically for the role.

The combined responses across both locations highlight that there is a gradual “step down” from many decisions, to fewer unique characteristics and time scales. This identifies that whilst the decision-making processes required by the stakeholders is varied, their requirements can be satisfied by a smaller subset of data characteristics and available timescales.

Between the two locations (Iloilo and Pampanga), the number of unique responses were less in Pampanga (Table 2). Fewer responses were recorded in Pampanga because of the smaller number of participants at the workshop events (Table 1), and the limited number of stakeholder groups (LGOs, education etc.) represented.

The limited number of represented stakeholder groups in Pampanga may mean that the development of the data portal does not fully meet the needs of the region. Project partners at ADMU intend to re-run the workshop events, in conjunction with DOST Region III, in the hope to attract a greater number of participants and stakeholder feedback which would be beneficial for the PhiGO project. However, the spread of represented organisations across the two regions may be able to provide a generic enough picture to meet the needs of many groups of individuals who would benefit from the outputs of the PhiGO project.

Within the PhiGO project, the main output will be both short term (weekly) and long term (seasonal, decadal) groundwater level forecasts. It was identified that such forecasted data (Table 3) could be beneficial to a number of end users, alongside other key sources such as weather, risk and hazard mapping, and infrastructural and population information.

4.1.2 Activity 2

Activity 2 demonstrates two distinct preferences for accessing data – access via physical devices or media, and access via software and internet-based services. Access to software services is facilitated by physical devices. Access mechanisms can be either active (where data is actively acquired/modified) or passive (data is delivered with no input). Active delivery might be considered as field data collection, surveys, or interviews, whilst passive might be weather reports, printed media, and programming on TV or Radio services.

There was also a clear trend that most data access routes and data types/appearances are shared in both the work and personal environment. For a data portal, this helps identify several mechanisms and tools that can be used to get data to both technical end-users and members of the public/non-specialists. There were no specific access routes or data types that would be solely found in a personal/home environment.

Some work specific access routes included technical IT solutions like database access and APIs (Application Program Interfaces) to pull data out directly, and more professional group discussion formats like workshops, conferences and seminars. Specific data gathering techniques also included surveys and questionnaires, academic search engines like Google Scholar, and primary data collection from both fieldwork and field sensors. Specific data types or appearances in the office environment included raw, unprocessed data, and technical graphics and figures.

The outputs from the PhiGO project will likely be delivered by passive access routes (website, app, SMS), in the form of tables, graphs and figures. Reports will be the format for the long term, decadal scale forecasting, but will be accessible via a number of digital media, and potentially physical media, routes.

4.1.3 Activity 3

For the data portals, there was a great deal of common responses in both Iloilo and Pampanga. Both locations, and nearly all stakeholders agreed that the "cleaner" or less cluttered layouts felt more user friendly and approachable (BGS, ADMU/NWRB). However, the data rich portals (ADMU/NOAA) were still well regarded, but there was a need to make sure that information was clearly explained and delivered in a way that was not too overwhelming (all three data portals applied). Much of these design ideas were translated by participants into their web portal designs, along with many of the access routes and data types observed in activities 1 & 2.

For the "dream data portals", map views and the ability to navigate spatially were important for nearly all designs, along with having quick access to information in the form of tabs, overlays and search functions. Some groups took the clean design ethos forwards from the previous activity, with evidence of layering for datasets over a map view, or the ability to only show the information required. Most data portal designs emphasised visualisation (such as graphs) as a key delivery method for information, with interactive "tooltips", or pop-ups with discrete values at given locations on the figures. Alongside clean and modern interfaces, the ability to view on mobile platforms was also considered important. For Activity 3.1, a number of participants attempted to view the data portals on mobile devices, with mixed results across the three examples. Integrating scalable views and better integration for touchscreen interfacing could be considered a valuable development.

Having FAQs or tutorials for how to use the data portal, guidance in understanding the data, or the process in generating the data, were deemed important for the sake of transparency and supporting the end user. The ability to download this data was considered very important across all groups. A few groups did include a number of alternative pathways for information access/delivery, including social media routes and SMS alerts.

The data portal designs (Figure 3) ultimately showed that making the data clear, well presented, and intuitive to navigate was important. Figures, maps and graphs convey much more information quickly versus descriptive text. However, text was still a requirement of the data portals, both for discrete data points, descriptive text for visual images (where necessary), and for aiding in providing context and guidance on using the portal. The final format of the PhiGO data portal will ultimately aim to integrate these desires/designing principles into its final presentation. A map interface will make it easy to navigate to each monitoring location, with graphs (supported by tooltips and tabular interfaces where required) an ideal approach to showing the historical, current and forecasted groundwater levels for the location. Behind the data presentation, website guidance, FAQs, and access to appropriate contact sources is required to complete the wider data portal framework.

4.2 IMPACT OF WORKSHOP ON PHIGO PROJECT

The findings from the information dissemination strategies workshop will directly feed into the development of the PhiGO data portal. Both the desirable elements from Activity 3.2 (Table 10), and the familiar data types and access routes from Activities 1 and 2 (Table 5 and Table 6), will have an impact on its final appearance and functionality. The PhiGO specific data portal will be designed on the foundations of the BGS data portal demonstrated in Activity 3.1. The first iteration of the PhiGO data portal will incorporate much of the feedback received in Activity 3.1, and be developed further to capture as much of the information obtained relevant to the stakeholders in Activities 1, 2 and 3.2.

The key features summarised in Table 11 will be passed onto the team developing the user interface for the portal. The initial iteration of the PhiGO specific web portal will then be shared with stakeholders. Further feedback will be vital to ensure the user interface and functionality is still suitable (following the results of this workshop), and offer a chance to improve the user experience even further, and refine any functionality that is important to stakeholders.

Table 11. Main design and functional elements to be taken forward to the development of the web-based data portal

Key functions and design elements for data portal			
Interactive UI	Historical, real-time and forecasted water levels	Downloadable data	Summarised data/statistics
Strong use of visual aids – maps, graphs, figures	Guidance and support on using the data portal	Support for both desktop and mobile interfaces	Comprehensive metadata – site details etc
Simple interface, with fast access to detail where needed (tables, tooltips)	Glossary/information on what presented data means	API integration	

5 Conclusion

The outcomes of the second day of workshop activities demonstrated that stakeholders have job-specific decisions to make, but often share similar data requirements and access routes. These data types and access routes can also be seen to cross-over between the professional working and private home life environments. Stakeholders also identified a number of critical design decisions for the final data portal design, including both tabular and map-based views, rich descriptions, and easy access to as much information in one location as possible. The comments and feedback will feed in directly to the design of the end-of-project data portal, where both real-time monitoring, and forecasted results will be available for the two study areas.

References

British Geological Survey holds most of the references listed below, and copies may be obtained via the library service subject to copyright legislation (contact libuser@bgs.ac.uk for details). The library catalogue is available at: https://envirolib.apps.nerc.ac.uk/olibcgi.

SEEDS FOR CHANGE. 2020. Facilitation tools for meetings and workshops. https://seedsforchange.org.uk/tools.pdf