

A Rapid Assessment of Spatial Data Management and Governance Related to Exploration Targeting in Indonesia

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Research aims:

This research had two objectives:

- to understand the challenges and opportunities in working with geo-spatial data – specifically for pre-competitive data associated with mineral exploration in Indonesia
- to understand key respondents' perceptions in relation to pre-competitive data for minerals exploration – targeting data such as geo-scientific and other social and environmental data – and how it can be better managed and governed in Indonesia

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IM4DC Action Research Report



Summary of Action Research Activity

A rapid assessment of spatial data management and governance related to exploration targeting in Indonesia

The Centre for Exploration Targeting, the University of Western Australia and Centre for Social Responsibility in Mining, Sustainable Minerals Institute, University of Queensland conducted a collaborative research project entitled: A GIS-Based Initiative to Help Steer Sustainable Development: a pilot project for Indonesia.

The overall aim of this collaborative research was to provide an example of pre-competitive data releases, to not only provide new geoscience products but also, for the first time, to integrate data relevant to environmental, community and infrastructure development with the geologically formulated prospectivity maps.

This companion report to the main project describes a rapid assessment of spatial data management and governance related to exploration targeting.

A semi-structured questionnaire was designed with specific open-ended questions. Through the questionnaire, the author captured the experiences, opinions and perceptions of key stakeholders in Indonesia in applying GIS for regional planning and exploration targeting. Representatives of national, provincial and regency government were interviewed as well as those from mining companies and a regional university. The responses were analysed, triangulated with literature and summarised in this short report.

The main project report 'A GIS-based exploration initiative to steer sustainable development' can be found on the IM4DC website's Action Research publications page.



Centre for Social
Responsibility in Mining

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The Centre for Social Responsibility in Mining (CSR) is a leading research centre, committed to improving the social performance of the resources industry globally.

We are part of the Sustainable Minerals Institute (SMI) at the University of Queensland, one of Australia's premier universities. SMI has a long track record of working to understand and apply the principles of sustainable development within the global resources industry.

At CSR, our focus is on the social, economic and political challenges that occur when change is brought about by resource extraction and development. We work with companies, communities and governments in mining regions all over the world to improve social performance and deliver better outcomes for companies and communities. Since 2001, we have contributed to industry change through our research, teaching and consulting.

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Introduction

Background

The Centre for Exploration Targeting, the University of Western Australia and Centre for Social Responsibility in Mining, Sustainable Minerals Institute, University of Queensland conducted a collaborative research project titled: *A GIS-Based Initiative to Help Steer Sustainable Development: a pilot project for Indonesia*. This collaborative research was funded by the International Mining for Development Centre (IM4DC) through an Australian Aid initiative. .

The overall aim of this collaborative research was to provide an example of pre-competitive data releases, to not only provide new geoscience products but also, for the first time, to integrate data relevant to environmental, community and infrastructure development with the geologically formulated prospectivity maps. The final research report has been published by the University of Western Australia¹.

As part of the collaborative research, a specific task was given to CSRSM to conduct a *rapid assessment of spatial data management and governance related to exploration targeting* with findings documented in this research report (**the research report**).

Objectives

The research report presents two main objectives:

1. to understand the challenges and opportunities in working with geo-spatial data – specifically for pre-competitive data associated with mineral exploration in Indonesia
2. to understand key respondents' perceptions in relation to pre-competitive data for minerals exploration – targeting data such as geo-scientific and other social and environmental data – and how it can be better managed and governed in Indonesia

Methodology

During the period of January – March 2015, the author contacted and invited relevant respondents to participate in telephone and face-to-face interviews. As a result of being unable to contact some key respondents by telephone, a trip to Indonesia (Jakarta and Kendari) was conducted from 22nd until 27th March 2015. In total, 12 interviews were conducted consisting of:

- 3 respondents from the representatives of National Government officials
- 3 respondents from the representatives of Provincial Government officials
- 2 respondents from the representatives of Regency Government officials
- 3 respondents from the representatives of mining companies

¹ Ford A, Micklethwaite S, Devi B and McKeena P. 2014. A GIS – Based Exploration Initiative to Help Steer Sustainable development: a Pilot Project for Indonesia. <http://im4dc.org/wp-content/uploads/2015/04/GIS-Sulawesi-Final-Complete-Report.pdf> (May 2015)

- 1 respondent from a regional university

A semi-structured questionnaire was designed with specific open-ended questions. Through the questionnaire, the author captured the experiences, opinions and perceptions of key stakeholders in applying GIS for regional planning and exploration targeting. The responses were analysed, triangulated with literature and are summarised in this report.

Summary of Research Findings

Key government institutions involved in managing geospatial data

The Geospatial Information Agency or “*Badan Informasi Geospasial*” (BIG), formerly known as the National Coordinating Agency for Survey and Mapping (BAKOSURTANAL), is responsible for providing an implementation strategy and fund for base maps (mostly from 1:1,000,000 to 1:1,000). Overall, the BIG has the mandate to manage the National Spatial Data Infrastructure (NSDI) across Indonesia.

The idea of NSDI was introduced through the *Geospatial Information Act 2011* and it aims to: assist the uptake of GIS across Indonesia; reduce the duplication of GIS work among agencies; improve data quality; and reduce costs. There are three mandates within the Act, namely: increasing access to reliable geo-spatial information; effectively delivery of geo-spatial information; and ensuring the use and sharing of necessary geospatial information between ministries.

As a result of the NSDI project, the BIG is expected to assist good governance of Indonesian geospatial data between national, provincial and local governments, and civil society groups. Several tasks that have been given to NSDI include to:

- support more efficient data administration to eliminate duplication of data sets
- provide a foundational system for the creation and acquisition of data
- support regional development planning for provincial governments, as well as the management of natural resources; protecting the environment; and mitigating natural hazards

During the interviews, all respondents acknowledged the role of BIG as the institution that provides and manages geo-spatial data. However, none of the respondents either mentioned, or discussed, the NSDI initiative.

Challenges in managing geo-spatial data

Analysis of the interviews with the key respondents indicated that there are several challenges in managing geo-spatial data, namely: geo-spatial data availability; a lack of data integration; data exchange and the power of data; and human capacity and technology availability. Below is a summation of each of the challenges identified by key respondents.

Geo-spatial data availability: In Indonesia, the national government has been the primary compiler of national spatial data (mainly for the purpose of managing domestic natural resources, national infrastructure, and regional development plans). However, a number of government ministries and other entities had a tendency to capture, possess and utilise data for their own purposes without actually sharing any of the data. Subsequently, this saw duplication of data capture and use by various ministries where they were not aware that another ministry had similar data. As a

consequence, the national government sought to minimise duplication of data capture and delays in decision-making that resulted from this piecemeal approach.

A respondent from the mining industry mentioned that geo-spatial data was not available in Southeast Sulawesi approximately five years ago when the company initially sought specific data for their area of operation. Eventually, some data was provided; however, the data concerning mineral reserves contained little information in relation to methodology for data capture and the data was later protected and withheld subject to a government inquiry which added to the confusion as it was not made clear to the company why the data was protected.

Furthermore, there are many examples of companies undertaking investment in regional and remote areas of Indonesia under the belief that a particular site (e.g. Bombana, Southeast Sulawesi) is home to large gold reserves. This information is often based on erroneous data provided by the government and this forces many companies to invest more in their own data acquisition and reduces confidence in government data. Overall, government provision of geo-spatial data has tended to be variable with incomplete coverage and many inconsistencies. For the government to provide rigorous geo-spatial data sets, it is vital that the data has complete coverage for the study area and a relatively homogenous level of detail in the mapping.

Lack of data integration: currently the national government does not have a specified standard for geo-spatial data management and sharing. As a consequence, it is difficult for sectoral geo-spatial data to be integrated within the GIS system. This is because each government organisation has its own policies and actions for managing geo-spatial data. In this context, a number of technical and non-technical issues were suggested by key respondents.

The technical GIS caveats comprise:

- various spatial reference systems (horizontal datum, vertical datum and coordinate system)
- various storage formats and data duplication
- various scales
- differences in geo-spatial data quality (especially data resolution and acquisition methods)
- various data models (object definition, geometry, features name, attributes, field type and topology)

The non-technical barriers in managing spatial data comprise:

- different policies and rules between organisations that manage geo-spatial data
- different understanding and knowledge between organisations about NSDI
- no regulation has been implemented to ensure that all geo-spatial data providers contribute to the development of NSDI

- most geo-spatial data providers do not publish enough information on geo-spatial metadata to enable users to understand and readily access spatial data

Data exchange and ‘the power of data’: the respondents suggested that the lack of exchange and sharing of data is a recurring issue for the national and sub-national governments. This issue has been acknowledged widely by the Government of Indonesia with the issuance of Presidential Regulation No 85 2007. This legislation mandates that national and sub-national governments must have better data sharing and management. However, to date there is little evidence of this occurring. Some respondents suggested that this may stem from a mind-set among some government officials that ‘holding data means holding power’. Therefore, some officials tend to hold the data without any intention of sharing with other ministries or the sub-national governments.

Human capacity and technology availability: All respondents indicated that the human capacity for managing GIS data for exploration targeting in Indonesia is limited. In general, it is the private companies that develop better GIS systems than the government institutions. For the government institutions, it is the national government institutions that have higher qualified GIS staff than sub-national governments. This is also reflected in the availability and use of modern GIS technology and equipment. However, a government respondent mentioned that GIS technology is expensive which makes it difficult to obtain permission for purchase by their ministry. In addition, a separate government officer suggested that his office tried to establish a modern GIS system; however, it was difficult for their ministry to operate and maintain the system over time. Therefore, the human capacity and technological capability, in conjunction with funding, are a considerable constraint for geo-spatial data capture and use in Indonesia.

Opportunities in managing geo-spatial data

Analysis of the interviews with the key respondents indicated that there are several opportunities in managing geo-spatial data, namely: NSDI; the potential of geo-spatial data and open access data; and the role of social and environmental aspects in sustainable prospectivity mapping. Below, is a summation of each of the opportunities identified by key respondents.

National Spatial Data Infrastructure: The NSDI was created to aid the uptake of GIS and: reduce the duplication of effort among agencies; improve data quality; and reduce costs. The NSDI began through the establishment of the Geospatial Information Act 2011 and has three mandates: increasing access to reliable geo-spatial information; effectively delivering geo-spatial information; and the ability to use and share necessary geospatial information between ministries.

The NSDI project is expected to assist good governance of Indonesian geospatial data between national, provincial and local governments as well as NGOs. Several tasks that have been allocated to the NSDI include to:

- support more efficient data administration and eliminate duplicate sets of the same data
- provide a foundational system for easier data creation and acquisition
- support regional development planning for provincial governments and to manage natural resources, environmental protection and mitigation of natural hazards

In Indonesia, there are two central government agencies that are involved with, and are responsible for, the production of geo-spatial data, namely: the National Coordination Agency for Surveys and Mapping (*Badan Koordinasi Survei dan Pemetaan Nasional: Bakosurtanal*) and the National Land Agency (*Badan Pertanahan Nasional – BPN*). Bakosurtanal has the responsibility for the development and maintenance of the national geodetic networks, the production of topographic maps and the national atlas. BPN is responsible for mapping and registering land parcels to ensure the legal status of lands.

The potential of geo-spatial and open access data: Geospatial data has been recently used to assist decision making in minerals exploration targeting in developed countries. In Australia, pre-competitive geoscientific data acquisition refers to ‘the collection, collation and integration of basic geoscientific data by government agencies, essentially Geoscience Australia and the states’ geological surveys’.² This institution conducted research programs that aimed at upgrading historic data sets and filling data gaps by acquiring, efficiently and economically, modern geoscientific data at geologic province scale. Research was conducted over areas that were considered to be prospective, yet under-explored. Geo-science Australia has developed flexible and powerful online services via the internet for digital data delivery to ensure there is open and easy access.

In Indonesia, geoscientific data relevant to the mining sector has been of limited quantity with difficulty of access and comprehension for interpretation and use. However, all respondents agreed that pre-competitive data for mineral exploration must be further developed and each signalled the importance of an open and easy access approach for geo-scientific data capture and provision in Indonesia. Some respondents suggested that it is fundamental for Indonesia’s future to encourage more investment in exploration and this is one approach that may facilitate this.

The role of social and environmental aspects in sustainable prospectivity mapping: In this research, the respondents suggested that the collaborative research project that was conducted by CET and CSR³ that piloted sustainable prospectivity maps by incorporating social and environmental data was valuable. A representative from Indonesian Geology Research suggested that this research has significant potential in Indonesia due to the complexity and diversity of Indonesia’s environment and society. This respondent suggested that this type of initiative has not been previously undertaken in Indonesia, yet, if this initiative can be undertaken the

² <http---www.aphref.apf.gov.au-house-committee-isr-resexp-chapter4.pdf>

³ Ford A, Micklethwaite S, Devi B and McKeena P. 2014. A GIS – Based Exploration Initiative to Help Steer Sustainable development: a Pilot Project for Indonesia. <http://im4dc.org/wp-content/uploads/2015/04/GIS-Sulawesi-Final-Complete-Report.pdf> (May 2015)

respondent suggested that it would be an additional benefit for the mitigation of conflicts at the local level and assisting governments to better allocate areas for exploration activities. Similarly, a representative from a mining exploration company suggested that companies are mostly aware about existing conditions and communities that they deal with, yet an improved geo-spatial data capture and management approach by government would assist companies understanding and engagement with local communities, which in turn would assist their internal decision-making and overall business decisions.