

How Does a Social Impact Startup Measure Impact?

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Introduction to Evaluation

Is this program *working*?

Efforts to quantify the benefit of social programs date back at least to Thomas Hobbes, but in the past 15 years there has been a laudable push to subject public and nonprofit programs to greater scrutiny (see Holley and Carr, 2014). Advances in computing, and in the analysis of “big data” have made it relatively easy to create complex metrics and exciting graphics. But despite these innovations, creating meaningful impact evaluations—especially for early-stage social impact ventures—is still quite challenging.

This is because the most rigorous measures of impact, which assess whether a program is actually changing conditions in the world, typically require expensive and time-consuming longitudinal or randomized controlled studies. The results of a 5- or 10-year impact study will arrive too late for those who are being hit by floods or suffering the effects of broken infrastructure today. This is why we need to be both rigorous and “realistic” about what evaluation can offer social innovators and philanthropists (Ebrahim, 2013).

The good news is that by applying a systematic evaluation framework to this challenge, we can create a hybrid approach that combines outcome evaluation with impact estimates. In this memo, we discuss Atma Connect’s approach to evaluation, and then provide an estimate of the potential benefits created by our AtmaGo app, which is a free website and Android app available in Indonesia (www.atmago.com). Our app allows users to report problems, share solutions, and receive local news and emergency alerts.

Although evaluation frameworks differ in how they define the various types of evaluation, there are two major categories: *formative* evaluations guide the design of a program and are usually carried out while a program is being developed; *summative* evaluations assess whether a program achieves its goals, and are usually carried out when a program is underway or completed (Rossi, Lipsey & Freeman, 2003). In the interest of simplicity, we will briefly discuss formative evaluation, and then look in detail at impact evaluation.

Formative evaluation for a software service/product, such as AtmaGo, can be carried out by surveying a representative sample of users. Working on our own, and with partners, we have carried out several waves of user surveys in Indonesia. These have included: Formal interviews conducted both in person and online, opinion surveys administered in person and online, and group discussions of our products and services. In this fashion, formative evaluations drive our product development process.

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Although we track a range of process and outcome statistics, the goal of this memo is to focus on *Impact evaluation*, which is the most challenging kind of summative evaluation. Estimating the impact of a program involves making an argument that an observed change in a real world phenomenon is linked to a particular program or intervention. These causal arguments are challenging for several reasons: Successful interventions often take many years to have a detectable impact on the wider world, these impacts can be difficult to measure, and the phenomenon that we are evaluating may be influenced by a wide range of factors that extend beyond the policies being analyzed (see discussion in Ebrahim, 2013).

Given these factors, and the early stage of our project, our approach uses a combination of qualitative research and quantitative estimation. We begin by talking with individual users who have benefited from, for example, an early warning of a flood and use these individual cases, in concert with research literature, to determine impact and benefit pathways. Following the approach of leading non-governmental organizations outlined in Ebrahim (2013) we then estimate potential benefits based on publically available data.

Estimating the Potential Impact of AtmaGo at Scale

In this section, we estimate potential impacts for AtmaGo, once fully deployed, to reduce flood damage, then consider other possible benefit cases for future evaluation.

Reducing Deaths and Damage from Floods

Urban flooding presents a major risk to Jakarta and to urban megacities around the world. Flooding can create a range of serious impacts that result in death, disease, and economic losses. Economists at the World Bank estimate that floods caused approximately \$6 billion in damages to coastal cities in 2005 alone and that, because of climate change and population growth, damages will increase to at least \$60 billion a year by 2050 (Hallegatte, et al, 2013).

Looking specifically at the province of Jakarta, which includes the capital city and the surrounding suburbs, recent floods have caused serious damage and loss of life. In 2007, a severe flood led to the deaths of over 29 people and forced an estimated 340,000 people to evacuate their homes (Mydans, 2007). Economic damage from the 2007 flood was estimated at \$565 million. In 2013, heavy rain in Jakarta province again caused severe flooding, displacing 40,000 people and killing 20. Economic damage from the 2013 flood was estimated at \$775 million (Wijanyanti, et al., 2017). Although the provincial government has dredged some of the 13 rivers that cross the city, heavy rains again caused widespread damage in 2016 and 2017 (Soeriaatmadja, 2017).

Indirect impacts from flooding can also be serious. After the 2007 floods, over 1,000 patients sought treatment for diarrhea, 329 sought treatment for dengue fever, and an estimated 190,000 people suffered flood related illnesses. The economic impacts from floods are also substantial and include not just damage from flood waters, but also lost income from residents who are unable to work (The World Bank, 2016).

Based on field and academic research, we believe that AtmaGo, when it reaches broad scale, can reduce the impacts from floods in three main ways:

- Reducing the damage, and mortality and morbidity created by floods, by providing improved early warnings: AtmaGo currently allows residents to share updates on flood events and share info on which areas are flooded or safe once a flood hits. We also offer flood warnings from the Jakarta Disaster Management Agency through the Peta Bencana smart city website. Research on Early Warning Systems (EWS) finds that widespread adoption of EWS can reduce fatalities by 30% to 1,000% (Golnaraghi, 2009). EWS can also reduce flood-related morbidity by providing warnings that can prevent waterborne disease, reduce disease transmission from insects, and help residents avoid injury in flooded areas (Ebi & Schmier, 2005).
- Reducing the extent and severity of flood waters by improving the functioning of existing drainage infrastructure: AtmaGo users frequently use the app to report problems with drainage infrastructure. And users have also organized neighborhood garbage cleanups. By reducing the amount of trash clogging storm drains and by improving the functioning of existing infrastructure, widespread adoption of AtmaGo could reduce the extent and severity of flooding in Jakarta.
- Improving community response to floods after an extreme weather event: Sagala, et al (2013) highlight that building social links within communities, and between communities and government agencies, improves the ability of residents to prepare for and recover from disasters caused by extreme weather (p. 7).

And EWS, once in operation, can reduce deaths and damage not just from floods, but also from other hazards such as heat waves and storms. Ensuring that EWS alerts are *credible* to the user is the linchpin of success. Alerts that are integrated with products that people use on a “routine basis” and systems that raise awareness about risks before emergencies occur create the most benefits (Rogers & Tsirkunov, 2010, pg. 14).

Based on the mortality and damage figures from the 2007 and 2013 floods, and on published data and research, our estimations of potential benefits are as follows:

- If we can reduce the death toll from floods by 30% (the low end of estimates from Golnaraghi, 2009) this is the equivalent of 14 to 16 lives saved per major flood.
- For Indonesia as a whole, the World Bank estimates that at least 28 million people live below the national poverty line. For Jakarta, researchers estimate that at least 412,000 live below the national poverty line of US \$1.24/day—although the true figure is likely much higher (Wardhani & Elyda, 2015).
- If we can help 50% of low income residents in Jakarta (206,000 people) avoid damage to a rice cooker (cost of \$30 to \$60) or a piece of property of similar value, that equates to economic benefits of \$6.2 million to \$12.4 million per flood.
- Many homes in low-income neighborhoods have additional appliances, such as fans, rice cookers, and televisions, that are commonly located on the floor—and so we use the value of a rice cooker as a proxy for the protection of a small appliance or an article of clothing.

- Recent severe storms in Jakarta have caused from \$565 million to \$775 million of damage per incidence. If widespread adoption of AtmaGo could reduce the extent and impact of a severe flood by 10% through the mechanisms described on the previous page, that creates an avoided-damage benefit of approximately \$56 million to \$77 million—depending on the severity of the flood and the protective actions that residents take. If AtmaGo can only reduce the damages of a flood by 5%, that still equates to \$28 million to \$39 million of avoided damage.
- And because many of the impacts of flooding fall most heavily on low-income communities, reducing flood damage will have strong equity benefits. We note that this estimate is dependent on several assumptions, however improved digital disaster warning and post-disaster communication has little downside beyond the potential for false positives.

Other Case Examples: Traffic Congestion

Indonesia, like many middle-income countries, suffers from other urban challenges, such as extreme traffic congestion, that AtmaGo can help ameliorate. Several users have told us in interviews that AtmaGo helps them avoid traffic and find alternative routes, which saves time and fuel. A recent study by the Indonesian Transportation Society finds that traffic in the capital region around Jakarta causes economic damages of at least \$11 billion counting fuel costs, health care spending due to air pollution, and lost productivity (Coconuts Jakarta, 2016). Thus, reducing the economic impacts from traffic congestion in the Jakarta region by 10% would equate to \$1.1 billion in savings.

Other potential impact pathways include: reducing impacts from fires, which are frequently reported on AtmaGo, and a serious threat in densely packed cities, like Jakarta; creating economic benefits by reducing crime and fixing broken infrastructure; fostering economic development by giving small business and vendors more tools to reach customers; improving health outcomes and increasing education levels by sharing information resources; and increasing social cohesion and neighborhood level resilience.

Conclusion

Estimating the public benefits that result from a social impact app such as AtmaGo is a challenging exercise—however, as the case study above shows, the benefits of reducing damage from flooding alone could be substantial. Based on a simple case study, AtmaGo at scale can save low income residents of Jakarta an estimated \$6.2 million to \$12.4 million in damage to personal property. If AtmaGo can reduce damage from a severe flood in Jakarta province by 5% to 10%, based on the damage estimates for major floods in the past ten years, this would equate to benefits of between \$28 million in avoided damage (5% reduction of a moderately severe flood event) to up to \$77 million (10% reduction for a severe flood event).

About Atma Connect

Atma Connect is a California-based nonprofit that creates technology to empower communities around the world. We create software products and digital services to connect people so they can report problems, share solutions, and improve their communities from the ground up. Atma is a winner of Tech for Good's Startup Weekend and the Amplify Urban Resilience Challenge. Learn more at www.atmaconnect.org

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