

Engaging People Prior to Problems: Providing Drinking Water for Villages in South Kalimantan, Indonesia

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In 2012, a report by the Kabupaten Banjar (South Kalimantan) identified 35 villages of approximately 40,000 residents, in grave need of drinking water. I initially engaged a local non-profit, Yayasan Kaganangan Banua and in time, a local engineering consultancy, Solusi Berinovasi Indonesia. With a team of Indonesians and some expatriates, we began creating a local, sustainable, reproducible, and culturally acceptable solution. By applying action research, we have the flexibility to develop more effective solutions through a series of ongoing iterations in real time. First we listened to the people, understanding them and building trust. This enabled us to establish buy-in which formed the foundation to begin challenging cultural norms in the areas of health and water use. Only then could we begin constructing the infrastructure. The systems are made entirely from local materials and we train locals in both the health education and construction techniques for the purpose of sustainable replication. Today, this project has successfully provided drinking water, year round, to over 500 people with an annual economic impact of over 500 juta across 70 systems in 6 villages. In addition, our team is contributing to most of the SDGs. When we focus first on people and genuine community relationships, regardless of nationality, age, religion, language or culture, we can together overcome the hardest problems and see generational transformation.

Keywords: Community Engagement, Cultural Engineering, Public Health Education, Rural Water and Sanitation Infrastructure, Sustainable Reproduction.

INTRODUCTION

The primary objective is to engage with the community, for the purpose of seeing lives transformed today while creating a legacy for the future generations tomorrow. The community This may seem cliché in the development sector, but the gulf between the theory and application of this statement is wide and often difficult to traverse in reality. The proper application of this sentiment is a determining factor between the success and failure of the long-term goals we strive for in rural development.

Only once trusting relationships are in place, do we have the luxury of being invited into their lives to hear of their passions, struggles, dreams and needs. This enables us to seek authentic partnerships on the ground with local people to begin formulating solutions to their greatest needs. It is from this position that the secondary objective is defined as related through the development programs themselves. This objective is to be a catalyst towards creating a new standard for development in regional

Indonesia through partnership with local communities.

During my first visit to South Kalimantan in 2010, the resilience and perseverance of the local people was impressive. Hundreds of thousands of people were living directly on contaminated rivers, waterways and swamps in hot, humid conditions with minimal access to drinking water (as opposed to clean water) and no effective sanitation. In the wet season, villages were flooded and in the dry season, many waterways ran dry. In addition to the challenging physical conditions, the general health of the people across Indonesia in 2014 was hindered by the fact that more than two thirds of men smoked, one quarter of the population had hypertension, and cardiovascular disease contributed to over one third of the annual mortality rate [1]. This is not even to mention the 150,000 children under five years of age that died each year nationwide from preventable disease, such as diarrhoea and pneumonia [2]. Given that these statistics were nationwide and that South Kalimantan currently has a HDI of 69.65 and ranks 22nd of 34 provinces in Indonesia, there is little doubt that these statistics are even more alarming in the lower socio economic spectrum of South Kalimantan [3].

Back in 2012, there were very few local or international social non-profits with their central office in South Kalimantan. Outside, non-

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government assistance seemed very limited despite the obvious needs and challenges the residents of South Kalimantan were experiencing on a daily basis. After further investigation and in conjunction with the local government, Kabupaten Banjar (Kab. Banjar), a number of leaders were identified who wanted to support these objectives presented. A report by Kab. Banjar identified thirty five (35) villages of approximately 40,000 residents, in grave need of drinking water. While the urban municipal water supplier, Perusahaan Daerah Air Minum (PDAM), was focused on the urban centres and a federal government initiative, Penyediaan Air Minum dan Sanitasi Berbasis Masyarakat (PAMSIMAS), on the rural areas, many of the 270 villages in Kab. Banjar were still in great need for drinking water supply.

Yayasan Kaganangan Banua (YKB) was an local non-profit formed soon after this time with local visionaries focused on assisting those in greatest need in South Kalimantan. This non-profit is focused on providing drinking water, sanitation and public health education to those in rural areas.

It soon became clear that drinking water and sanitation were and still are the greatest physical needs in Indonesia, especially in South Kalimantan. On March 22, 2018, Mr H.E. Dian Triansyah Djani, the Permanent Representative of The Republic of Indonesia to the United Nations, recently spoke on behalf of Indonesia at the plenary launch of the United Nations new initiative, the International Decade for Action: Water for Sustainable Development. He confirms our observation, stating that, "at the individual level, people need safe, clean and readily available water to ensure a decent life. Clean water and sanitation are crucial to improve health and human dignity." [4]

It was within this context that Project Drink and Live, a drinking water initiative in conjunction between YKB and Kab. Banjar, was born. While engineering held the scientific knowledge to unlock the solution to the problem, it soon became evident that there was a history of the local people rejecting viable engineering solutions provided by the local governments in the past. As the team of Indonesians and a few expatriate field experts based onsite, began to interview communities it became evident that cultural and religious views dominated the beliefs and values of the people.

Given that my motivation in life is primarily based on loving God and loving my neighbours Holy Bible ESV (Mark 12:30-31), it was important

to better understand the people not only in order to develop a working solution, but to show love and care for them. Early on a decision was made not to put the infrastructure or problems before the people themselves, regardless of their race, age, gender, social standing or religion. This required a higher investment of time and effort on the front end but one we were willing to make.

With a foundational philosophy of serving and loving the people first, strong partnerships with local government and a local non-profit, we were ready to initiate the implementation of the drinking water program.

My aim with this study is to reflect on what role engaging the person plays in community participation and ultimately a successful development project. I will use the drinking water project over the previous six years to reflect on the lessons learned and what can be done to impact the SDG going in the future

MATERIAL AND METHOD

This working experiment is being carried out in real time in Kab. Banjar, South Kalimantan, Indonesia. The initial project began in 2012 and has carried through to today (2018). As the project grows, further data is collected in order to build a data set over a longer period of time for both quality control and also further development. This datasets gathered focus on both the people and the infrastructure.

In an attempt to broaden my perspective on this topic, research was carried to obtain relevant papers dealing with the specific challenges we face in regional Indonesia. While there were some academic papers on social engagement, there was very little literature available specifically focused on how social engagement plays a pivotal role in the successful application of infrastructure development in the rural developing world.

This research is currently being undertaken as action research in order to develop and experiment in the field through an iterative process of identification (of the problem), planning, implementation, observation and reflection. This gives the freedom to engage across numerous faculties from engineering and sciences to humanities and anthropology. This is allowing our teams to achieve stronger long term observations and results.

Rather than providing infrastructure that could potentially lay dormant, the program was developed on our philosophy of people before problems as outlined in the Introduction.

First we listened to the people, understanding them and building trust. That was done through a social survey program that enabled our teams to travel from house to house asking basic questions to better understand the people at a deeper level, especially what motivated their values and decisions around water supply and consumption. After a summary presentation and mutual agreement, we formulated a memorandum of understanding (MOU) between the village leadership, local government and YKB outlining expectations and responsibilities.

Secondly, we developed our public health education program (similar to WASH, Water Sanitation and Hygiene) [5]. We modelled it around adult learning rather than simply pushing information at them. This program was then interspersed through the remainder of the project. Part of this included the development of a board game by one of the expatriate staff that could be played with men, women or children to learn about the basics of water supply, contamination and the impacts on daily life.

By this point of the program, we had built solid relationships with the people and communities. Usually a deeper buy-in is established at this point. This formed the foundation to begin challenging cultural norms in the areas of health and water. Only then could we begin constructing our infrastructure.

The third phase of the program was the infrastructure construction component. Two critical components of this phase in terms of sustainable reproduction were (i) the commitment for each village to provide 10 men to learn how to build these systems alongside the YKB construction team and (ii) all building materials were to be available onsite within a 60 minute commute from any village. The initial project began with one large 16,500 litre concrete cast insitu tank with a first flush system and was designed to service five families year round (Option 1). The design was based on local rainfall with a focus on collecting the rain from the wet season and storing the water through the dry season. A 20% factor was applied for any variation in the rainfall from year to year. Further details on the design will be included in later discussion.

Finally, the fourth phase was the maintenance and follow up necessary to ensure the infrastructure was cared for and used properly. Early on it was evident that the education team needed to become an integral part of this component and not just the construction team fixing infrastructure issues. This ensured the

people became the focus from the beginning right through to the very end.

RESULT AND DISCUSSION

Project Results (2012-2018)

Mr H.E. Dian Triansyah Djani affirmed, "that achieving our targets related to water issues would bring multiplying effects including enhance human dignity and health, food and energy security, sustainable urbanization, and climate resilience community." [6] This statement is core to the decision to begin by focusing on drinking water and sanitation.

When we began our initial surveys in 2012, it was evident that the water in the local rivers and waterways was high in human effluent, animal excrement and solid waste, making filtration only a short term solution. Any long-term solution must require eliminating the contamination of the waterways before any larger filtration system can be considered (e-coli < 150ppm). The most obvious solution to clean water supply in South Kalimantan was rain water (mindful of the smokey season August - November). After asking people from numerous villages about the consumption of rainwater, it became clear that as far as the local people were concerned, rainwater was responsible for rheumatic arthritis, rotten teeth and stomach aches. At first, we hoped it was an isolated belief but as more people were interviewed, it clearly was a cultural belief across the wider area.

It was not until the end of 2013 that the construction phase in our pilot project began. This phase consisted of constructing three Option 1 systems to service a total of fifteen families. With it being a pilot project, a lot of challenges were encountered across most phases of this project and these challenges formed the first revisions applied to the proceeding projects.

Because drinking rainwater was the most practical and cost effective source, we proceeded knowing this was counter cultural in this area of the world. To help communicate the benefits of rainwater, scientific reasoning was used as part of the education program. Rainwater was collected and tested in a nationally accredited laboratory for pH, turbidity and other physical and chemical elements. The results where favourable and the pH ranged from 6.5 to 7.5. The local river water was also tested and the results showed very high levels of e-coli (50 to 1800+ ppm), turbidity, chemicals and other contaminants. We learned that this information made very little impact in the context of the cultural beliefs of the local people.

A different argument needed to be discovered to convince the masses since there was no precedent for a project with these variables. It was revealed to us that within the Islamic Holy Books, rain was referred to as pure water from heaven, given for the benefit of creation Quran (Surah 25:48). By living and working in the local communities, insight was being revealed in ways that allowed more effective and clear communication. Engaging the worldview of the local people was essential if building a simple system was to be successful.

Our target for personal consumption is 5-6 litres/day/person for drinking, cooking and hand washing. This is well below the UN target of 50 litres/day/person but in this situation, adequate drinking water supply for internal consumption was the highest priority. [7] Usually for a family of 4-5 people, 1 'gallon' (a 20 litre container) is enough for 1 day. Most families, based on our research, use less than 10 litres per day for consumption and are clearly not drinking enough for healthy hydration.

The first tank built has been a standout success. While it was built for five families to utilise, it has consistently provided drinking water for more than 30 families during the wet season each year from 2013. The storage capacity is inadequate for the dry season so the tank is empty approximately one or two months into the dry season. When asked, the local community leader responded, "How am I to select only the five families that can consume the drinking water year round?". The sense of community was so strong that they would rather everyone have access to drinking water for eight months of the year than five families having drinking water year round. This was a powerful perspective on community. The leader also told the story of a neighbouring community that had been invited to participate in the pilot project but rejected the invitation. Their community members travel approximately one kilometre across rice fields on foot, in the middle of the night, to take drinking water from their tank. These distances travelled were also counter cultural given that most people surveyed would travel no further than fifty metres to access a drinking water supply.

The second tank that was built was located next to a small mosque in the village. This was done intentionally for the purpose of observing how the water would be used when given a choice of using it for drinking water or wudu (obligatory cleansing rituals performed in order to render the believer ritually pure. Required prior to prayer for

both men and women.) At first, the people said they would only use the water from the tank for drinking and not wudu but in reality it took from 2014 until 2017 for this to happen. In the first three years, the water was used primarily for wudu because of the large religious significance. Rather than reprimand them over this choice, we continued to love and care for the people, encouraging them and being in community with them. Over time, the necessity for drinking water took highest priority and now, the water is used primarily for drinking water.

The third tank built in the pilot project had the roof partially collapse and eventually the wall leak at the base. This began to highlight the issue of quality control. From experience, it can be the case that the change agent is not seen to understand something because they do it different to how the local people do it. In this case, it was the concrete mixture where seven bags of cement should be used for one cubic metre of concrete. Often it was said that only four bags were used. Because the design involved formwork and slurry walls, the right viscosity of the concrete was critical as was the density of the concrete to prevent leaking walls. In addition, the people were not using the system for drinking water but only for clean water, for washing clothes, and bathing. Note that 'clean water' (air bersih) as defined in Indonesia, is not classified safe to use as 'drinking water' (air minum) without further treatment. While this tank seemed a failure for the first few years, the lessons learned and the remedies applied not only impacted our quality control revisions but also later became a source of drinking water as was the initial intention.

Due to the nature of our concrete cast insitu tanks (Option 1) difficulties began to arise. Access to many villages in South Kalimantan is difficult by road and shallow waterways therefore making the deliver of materials challenging. The previously mention quality control issues were also becoming evident. Because of this, an additional two options were designed. Option 2 was the same capacity as Option 1 (16,500l) but it consisted of 3 x 5,500 litre precast plastic tanks that were in series and together sat on a concrete slab foundation (5 families). Option 3 was a single 3,300 litre precast plastic tank for a single family. This tank was also on a concrete slab foundation. All options still maintained a first flush system.

The first flush system designed within this system is free of any moving parts, valves or requirements from the user. This was done to make sure the first flush system had capacity to

function after every storm regardless of the user. It was determined that 3mm is adequate to provide WHO standard water quality.[8] The first flush system capacity is therefore designed specifically to each system based on a simple formula (roof area x 3mm = volume to be retained).

The pilot project throughout 2013/14 was highly successful in time across all four phases of the project. The application of these initial lessons helped provide a very strong framework for the project moving forward.

Our social survey program, since inception, has interviewed over five thousand (5000) people and our education program has directly trained more than seven hundred and fifty (750) participants. The indirect impact of the education program is yet to be measured but given the cultural aversion to rainwater and the fact that three to four times as many people are using the systems than the design allows for, there is certainly a wider influence.

Since 2015, more than five (5) additional villages have been engaged with the drinking water program. There are now approximately seventy (70) systems in place across Kab. Banjar, officially providing drinking water to more than five hundred (500) residents in rural villages. The geographical settings vary from freshwater inland peat swamps to salinated swamps adjacent to the ocean.

One measurable way to assess the results obtained through the successful implementation of philosophies is to use the SDG as a benchmark. Below are abbreviated summary statements on the impact our drinking water program with YKB is having in relation to the SDG.

SDG #1 - No Poverty

Kab. Banjar has over 17,000 people living below the poverty line (360,000 IDR/person/month). [9] We are attempting to impact this figure by providing drinking water to some of the poorest villages in Kab. Banjar. Our local research indicates that the cheapest drinking water in the province is approx 16,000 IDR for a 20 litre container (a 'gallon'). Clean water supply (non-drinking) is provided as 'isi ulang' and is on average 5,000 IDR per 'gallon'.

As a benchmark, the UN in 2006 defined a human persons right to water as, (i) 50-100 litres per day, (ii) free from micro-organisms, chemical substances and radiological hazards, (iii) acceptable colour, odour and taste, (iv) physically accessible (within 1000 metres or 30 minutes),

and (v) affordable (not exceed 3 per cent of household income). [10]

A basic analyse of the UN basics rights in numerical terms for South Kalimantan (assume 6 litres drinking and 44 litres clean only) would be [6 litres / person / day @ 16,000 IDR / 20 litres] and [44 litres / person / day @ 5,500 IDR / 20 litres] is the equivalent to a total of 514,042 IDR / month / person. If this was limited to 3% of the personal income, the income should be no less than 17.15 juta. The poverty line in South Kalimantan for comparison is 360,000 IDR per person. This is out by over 4700% and therefore completely unrealistic.

For purely drinking water at this stage, we are providing 6 litres / person / day. If the local people were to purchase this for drinking water @ 16,000 IDR / 20 litres, the equivalent cost is 146,000 IDR / month / person. Against the poverty line in our province of 360,000 IDR, that represents 40.6%. To provide affordable and accessible drinking water would create a significant step forward in poverty reduction.

We currently offer Option 3 to a single household, providing drinking water year round (6 litres / person / day) including the dry season. At a current cost of 9 juta, the system pays itself off (interest free) in 19 months. The systems have only been in existence for up to 5 years and required very minimal maintenance. Being very conservative and adopting a 5 year life for a system, the household will experience a net saving of [(16000 IDR x 365 days x 5 years) - 9 juta project costs] = 20.2 juta savings over the 5 year period. For every additional year the system functions after the 5th year, the savings will be 5.84 juta per household.

SDG #5 - Gender Equality

Our program works very closely with both the men and women in the villages. Our small cooperative groups that keep responsibility over the rainwater systems are usually lead by women. The women are also invited for input as they are usually the members of community with the day to day experience of dealing with a lack of water supply, sanitation, or public health issues. We train women in each village to carry on our public health education program as part of our sustainability goals.

SDG#6 - Clean Water and Sanitation

Our primary options for drinking water all incorporate collecting and storing rainwater. With the required first flush system to WHO standards, we can ensure that households have adequate access to drinking water all year round in areas

that have been notoriously difficult to help in the past.

We also make our own ceramic filters that are ideal to use clean water such as PDAM. We hope to work more closely with the PDAM with a vision to see potable water available in every urban home either using our ceramic filters and other appropriate technologies we will introduce.

We continue to trial our sanitation solutions that are made from local materials to suit the local environment and local culture. With flooding throughout the wet season and dry river beds in the dry season, the challenges are plentiful. In our rural areas almost 100% of the human effluent goes directly into the waterways. We hope to roll out our first rural pilot later in 2018.

SDG #8 - Decent Work and Economic Growth

Part of our training program teaches men in every village to build rainwater catchment systems. We are giving them the skills to go and start their own local business to build rainwater catchment systems throughout their local areas.

SDG #10 - Reduced Inequalities

The motivation to not discriminate against those we work with or provide our services to, is that humanity is made in the image of God (Holy Bible, ESV Gen 1:27). We work in South Kalimantan because we believe that the inequalities (economic, social, etc) that our neighbours experience are not right. As Christ taught in the Good Samaritan, we are to love our neighbour, even if we are of a different race, language, or religion (Holy Bible ESV, Luke 10:25-37).

SDG Objectives Proposed By Sbi / Ykb (2019-)

"We need to mitigate and to enhance resilience towards water related challenges, such as floods, droughts and rising sea-level. For many of us, we tend to observe these challenges through a screen or maybe know someone affected by these challenges. However, for those living in disaster areas, these challenges are real and could easily setback many developmental achievements in the past." [11] To help us achieve this challenge presented by Mr H.E. Dian Triansyah Djani, a recent additional partnership with a local engineering consultancy, Solusi Bernovasi Indonesia (SBI), has opened even more opportunities for us. Focused on urban infrastructure in the fields of roads, drainage, water supply, wastewater treatment and contract management, SBI provides a complimentary partnership alongside YKB to have an even greater

impact on the Sustainable Development Goals (SDG) in South Kalimantan.

With challenges such as (i) 35% of Kab Banjar being less than 7m above sea-level and 30% prone to flooding year round [12], (ii) a Neonatal and Infant Mortality rate of 3% (31st of 34 provinces in Indonesia) [13], and (iii) the mortality rate for live births of 5.7% across the province, (25th of 34 provinces), the opportunities in South Kalimantan remain abundant. Leveraging our experience and networks (both local and international) and within context of our community and professional relationships, SBI, in partnership with YKB as appropriate, anticipates the following opportunities to impact the SDG in South Kalimantan:

SDG #2 - Zero Hunger

One of the ways we are planning to counteract stunting of the children in our area is to encourage and provide plants (such as Cassava or Chaya) as part of our community public health education. [14] In terms of the average nutritive value, chaya leaves are by far superior to other leafy green vegetables. [15] Stunting has long-term impacts: children who are stunted are more susceptible to illness, they have more problems in school, and as adults, they have far worse prospects for jobs – if they have any prospects at all. [16]

SDG #3 - Good Health and Wellbeing

We are currently rolling out our health program initiative in partnership with local authorities. We are looking to provide a supporting role to assist village health clinic (puskesmas) in the areas specifically of women, mothers and children.

SDG#6 - Clean Water and Sanitation

We are currently undertaking a local urban drainage design project in which we hope to begin initiating a new dialogue about water resource management and usage.

Over the last 12 months, we have begun a discussion with the IPWEAQ (Institute of Public Works Engineers Australia - Queensland division) and EA (Engineers Australia) about sharing knowledge and assisting us in our desire to see South Kalimantan develop to an international standard and become a model example in Indonesia. These discussions are still in progress.

In the urban centres, we hope to provide an alternative to the 'bottomless septic tanks' by trailing our first urban wastewater treatment system at our office facility in September of this year.

SDG #7 - Affordable and Clean Energy

We have begun a partnership with a small Australian company to develop basic and affordable solar power for rural homes. We are also currently investigating biogas in cooperation with our potential sanitation solutions.

SDG #9 - Industry, Innovation and Infrastructure

Innovating solutions that are suitable, reliable, reproducible and sustainable are what we do. Developing innovative infrastructure across the community, be it rural or urban, can vary from roads and drainage to water and wastewater.

SDG #11 - Sustainable Cities and Communities

While we help develop essential infrastructure in our rural communities, we are also committed to being proactive in developing urban infrastructure in partnership with our local governments. The basic services of drinking water and sanitation are our highest priority before roads, drainage, waste management, parks and recreation, etc.

We frequently petitioning the local government leaders to consider implementing infrastructure planning (similar to Australia) that puts most of the financial responsibility of new developments onto the developers and not the local government.

SDG #13 - Climate Action

Understanding and designing infrastructure to account for any climate changes in the future is necessary in today's world. Our water storage capacities for our rainwater systems, our drainage systems and more require specific design considerations.

SDG #15 - Life on Land

By providing sanitation solutions, we hope to significantly reduce the human effluent going into the local water ways. This will provide a stronger water supply for any river surface supply downstream for PDAM.

As part of our drainage systems, we are also encouraging water sensitive urban design (WSUD). These systems will also include wetland designs that will help strengthen the local environment, flora and fauna.

We are currently proposing new erosion and sediment control policies for any new developments to help maintain the current land profiles and limit the runoff into river systems.

SDG #16 - Peace, Justice and Strong Institutions

Last year in 2017, it was reported that, "Indonesia's business environment suffers from widespread corruption" and that "companies should be aware of a high-risk of corruption when dealing with Indonesia's public administration." [17] Being in regional Indonesia made the risk

potentially even higher for us. As a certified practicing engineering with Engineers Australia, I abide by their Code of Ethics which disqualifies me from participating in any corrupt act (Engineers Australia, Our Code of Ethics).

Our company's policies clearly communicate that we can not participate in corruption regardless of what anyone else may do. We continue to look for men and women of integrity to work alongside in order to best serve the local public. We have since found some of these people in Kab. Banjar.

SDG #17 - Peace, Justice and Strong Institutions

We are working with the LPJK for South Kalimantan to help develop a partnership hopefully with a number of institutions in Australia (IPWEAQ, EA). The purpose of this is to share knowledge and build local capacity onsite in Indonesia so the benefits will be ongoing and sustainable

Discussion

Challenges

The challenges faced in the aid and development sector are numerous and constant. Finances, reporting, communication, and staffing are just to name a few. Mr H.E. Dian Triansyah Djani states that we must, "Ensure provision of adequate and affordable innovation and technology that can overcome most of today's water related challenges. We have to connect the missing links to ensure access to safe, clean and readily available water to all. We must be true to our principle of 'leaving no one behind'." [18] This sentiment that few would refute, speaks specifically of the technical know-how we are all so comfortable with in problem solving. The question we struggle with becomes what is this missing link we are to connect? I will discuss this within the context of our previously establish experiences.

We first need to have open and transparent communication. Statistics and definitions can be areas of ambiguity and confusion. For example, in 2004, the World Health Organisation (WHO) said Indonesia had a drinking water coverage of 77%.[19] Webster's Dictionary defines drinking water as, "water that is clean enough for people to drink." That implies no further treatment is necessary. The only places in Indonesia I can confidently drink water directly from the tap without further treatment, excluding purchased bottle water, are the seventy systems we have installed throughout Kab. Banjar. In 2018, without a doubt, Indonesia still does not have drinking water coverage even close to that number based

on a common definition of drinking water. Using terms such as 'improved water supply' only build an immunity and apathy to the real problems. In 2010, Indonesia has 82% coverage for 'improved water supply'. [20] While this is an admirable achievement over the last 2 decades, what is the actual drinking water coverage? It could theoretically and is more likely closer to 0% than 82%. My experience is that these figures can provide false security if not clearly understood.

Again considering context, statistics say that less than 4% of the population of South Kalimantan have no access to a toilet. While this is true, most toilets in South Kalimantan have no form of water treatment before the effluent is discharged into the waterways. [21] In addition, the local 'septic tanks' discharge into the shallow ground where the water table is usually just below the ground surface level, often inundating the bottomless sewer pits. Despite the catfish that are regularly placed in these pits to 'treat' the effluent, the treatment offered is only marginally better than direct discharge into waterways.

Further to clear communication, at times we need to understand the political dynamic of a situation between multiple stakeholders. A struggle between the desire of the people and the agenda of the village leadership has recently arisen in our drinking water program. There have been a number of experiences where the people have expressed the desire to expand the drinking water program through YKB's multiplication program but the local leadership want to pursue another avenue that has proven to be less effective. These instances are still under investigation and must be handled carefully in order to not disrupt momentum or community relationships. The sensitivity required is causing us to form deeper community relationships to better understand what is happening under the surface. The challenge faced for small, local organisation is the lack of authority or position. While government and others tend to lean on their position of authority, we are not in a direct position to do so despite our government references so a different approach is necessary to succeed.

Clear communication, diplomatic / anthropological skills and finally a breadth of experience straddling two worlds is necessary for strong orientation. The introduction of new ideas and concepts across culture and language requires an understand of the context from the origin to the destination. One of the more difficult decisions we made and have continually had to

defend is that of living onsite. It requires great sacrifice by our families so the decision to commit must be total and together. Without being onsite, the ability to transfer knowledge and concepts accurately, is fraught with danger. Even more dangerous is the lack of local relationships through which grounding is established.

Overcoming

So how have we faced these challenges that have stood in the way, day after day? What has allowed us to overcome is without a doubt the worldview I possess as a follower of Jesus Christ. My motivation, perseverance, vision and passion are rooted in His love for me and those in this world.

My faith does not lessen the necessity for me to still learn how to communicate more effectively. This is an evolution that has allowed me to gather data from the ground that has informed my decision making. Driving on the roads, talking to people in their language, buying materials at the local stores, all side by side with local partners, allowed me to understand the reality rather than only reading statistics and reports. We do not have to rely on anything second-hand coming out of the community because we are directly engaged and can gather the information ourselves. The first rainwater system we built was at our family home because we want to practice what we preach. We invite government officials to our house to talk and drink rainwater. They see my family is strong and healthy and hear how we have personally saved nearly 30 juta in 5 years.

The power plays we at times encounter in politics and community hierarchy can be best overcome from a position of influence, not power. This is largely counter cultural in Indonesian from our experience. Our hope is that "when you influence people so they reach a place of genuine commitment, working relationships begin to improve. You see greater sustained effort and resiliency." [22] We press on in this vain, encouraged by the success that is has already delivered to the program in South Kalimantan.

Having the opportunity to bring fifteen (15) years of engineering experience from Australia into Indonesia provided a necessary foundation for the program we established. Key relationships with local influencers, knowledgeable and visionary, have also assisted in my transition across cultures. We have learned that just because we speak the same language or live in the same geographical location, we cannot assume that we hold the same worldviews. My experience

here has placed me as a minority in my community where my race, language, religion, socio-economic status, are all different from my neighbours. This has forced me to work harder, invest more, and listen more, to understand my adopted community. There is no doubt that if I had chosen to live off site, flying in and out periodically, the success of this program would have been compromised. My life outside of the workplace and within my kampung (neighbourhood), has enabled my family and I to share meals, celebrate events, share sicknesses, and experience life in a way that has helped me to become a better engineer and successfully implement a program such as this. Only when one can breakdown the concept from the point of origin and pass it through the grid of culture and the labyrinth of language, can successful conveyance occur.

Practical Outcomes

Although no less important, the physical applications of the program are only successful once the relationship components are functional. Following are some of the recent outcomes we have applied from our experience to date. We have incorporated into our public health education program the training of four women from the village. We are hopeful that this will help strengthen the program throughout the whole village and not just for those with drinking water systems. This builds the foundation for this program to be easily sustainable and reproducible from village to village without the direct involvement of YKB.

Ideally, we aim to provide drinking water for 5-10% of the village population. This gives a sustainable, reproducible, working example to the people given that they can obtain the materials locally and they have the knowledge to build the systems themselves. The goal of this project was never for YKB to supply drinking water to every person in the village. It was envisaged that the training and example would empower the people to eventually provide for themselves. Local ownership from the start is an important concept within the program, with YKB never claiming to own the infrastructure at any point throughout the process so therefore avoiding any type of 'handover' ceremony.

With so many more families using the systems than can be adequately supported during the dry season, the education team is now implementing a multiplication program to encourage the people to consider adding onto their current system or

building new materials. The biggest obstacle to this has been finances.

Finances

Mr H.E. Dian Triansyah Djani, as identified earlier, said in relation to funding, "First, we must enhance participation of all stakeholders including national and regional Governments, UN system, private sectors, financial institutions and civil society, to strengthen necessary water infrastructure in all levels. Governments alone could not achieve Goal 6. We must muster all resources and stakeholders in an open, transparent and inclusive manner. We must mobilize commitment, cooperation and coordination all relevant stakeholders to ensure the implementation of SDG 6." [23]

For context, an average village in our area with 250 families would require an initial capital outlay of 2.25 milia IDR (approx 160,000 USD) to build the systems but would receive net savings (after the initial costs) of more than 5 milia IDR over the first five (5) year period. That is a return on investment of over 200% in 5 years. For every additional year after Year 5, the village would save 1.46 milia IDR in drinking water costs. That is currently more than most villages in our region receive from the federal government as 'Dana Desa' (Village Subsidy).

We are currently challenging the local governments and villages to give contributions in-kind. This has happened in smaller amounts in the past but our current challenge is ten percent of the total program cost from the village and twenty percent from the local government. Recently, two villages just signed the updated MOU, taking responsibility for their ten percent commitment. This is further evidence of the continued progress of the program and relationship investments.

One of our objectives is to help achieve the desire of Mr H.E. Dian Triansyah Djani, as mentioned above, in South Kalimantan. We are in discussion with bank managers in our area negotiating a program, potentially accessing their CSR contributions, to help provide low interest loans to rural community members for the purpose of obtaining infrastructure such as our drinking water systems. This will also help provide new clients to the banks while assisting the poorer community members to get the infrastructure necessary to thrive. We are encouraging private investment through local business CSR contributions into the infrastructure and not relying completely on government to provide this basic requirement for life.

Advocating for South Kalimantan in Jakarta is also something we undertake annually. Dennis Rondinelli quotes, "The inability to identify, formulate, prepare and execute projects continues to be a major obstacle to increasing the flow of capital into the poorest societies." [24] Despite the strong partnerships formed with our local governments, we have constantly been hampered in terms of access to capital funding for South Kalimantan despite their HDI positioning the province in the bottom half of Indonesia (22nd of 34 provinces). It is also ranked fourth of the five Indonesian provinces on the island of Borneo. [25] Even so, we are consistently told by international aid organisations in Jakarta that South Kalimantan is not eligible to receive funding due to the province not being included on an official list provided from the central government. This list includes the other four Indonesian provinces of Borneo, three of which have a higher HDI than South Kalimantan. Despite looking for answers since 2013, I am yet to understand why this major obstacle of capital flow to South Kalimantan exists.

We can all imagine the overwhelming thought of implementing a new technology, on a limited budget, in a difficult location, across language barriers and through the grid of culture. This is point at which our worlds collide and it is at this point of our greatest challenges that we can begin to clearly see what it means to be weak and vulnerable human beings. We, the change agents, are not superheroes here to change the world. We are no different to our neighbours and the opportunity for us is to sit beside them and commune in relationship with them. At the purest level, this is one of the things we were created to do. I propose that we are not responsible to connect the missing link. Instead, you and I are the missing link that innovative technology cannot replicate. We are the bridges, in real time and on location, across which worlds can engage. Together alongside our neighbours, we can turn ideas and visions into realities that will transform generations and change the world.

CONCLUSIONS AND SUGGESTION

Infrastructure is a fundamental component of development but in and of itself, it is useless. It is only when we build this infrastructure within the context of healthy community relationships that lasting transformation across generations has any hope of taking place. Successful infrastructure projects, especially within the rural development sector, first requires trust between the change

agent and the eventual collective caretakers for us to ever hope of bridging the gulf between theory and application. We must be careful not to exert change through power but rather through influence. When an entire community buys into a shared vision that we cast, they will hold a majority of each other accountable rather than the policing authorities.

When we place our primary focus on the people, sit in their homes, hear of their experiences and engage the values that they hold dear, we will see them open their lives and communities to ideas they never thought possible. I can say this with confidence because this has been our experience in some of the most challenging situations in South Kalimantan. My team and I have seen cultural norms challenged and overcome through primarily relationship. Once this primary foundation is in place, the process of infrastructure development becomes a collaborative effort rather than a top-down enforcement. From this posture, and in my experience, the final success of the infrastructure project become much more likely.

It is important to note that due to the relative short time frame of this study, further observation will be necessary in order to determine if this philosophy is indeed transformative over more than the current generation.

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