

ENGINEERS WITHOUT BORDERS – HOW ARE WE MAKING A DIFFERENCE?

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ABSTRACT

Engineers Without Borders New Zealand is a not-for-profit organisation that connects, educates and empowers people through humanitarian engineering. The objective of international development is to create a better world free from poverty. Engineers Without Borders New Zealand believes that access to engineering knowledge and resources can make a positive difference in this respect. The organisation has two core portfolios that enable members this difference.

Firstly Learning and Change provides opportunities to learn about sustainable development via curriculum integration, sector engagement, and leadership and training sessions. Secondly, Working with Communities uses the appropriate engineering skills and knowledge to support communities undertaking development work. This paper elaborates on these initiatives, including specific water related examples.

Engineers Without Borders New Zealand's development philosophy adopts a community-first approach with four key principles. These are (1) partners before projects, (2) community identified needs and project ownership, (3) fund people not projects, and (4) effective communications. The Wawan water supply project summarised in this paper demonstrates how Engineers Without Borders New Zealand works at a functional level.

The intention of Engineers Without Borders New Zealand is to become the most effective, efficient and innovative small-scale development non-governmental-organisation in the South Pacific. High level goals for organisational development, membership and stakeholder engagement, Learning and Change and Working with Communities are outlined in this paper.

KEYWORDS

Engineers Without Borders, New Zealand, South Pacific, International Development

1 INTRODUCTION

The international development industry is primarily focused on providing humanitarian aid. This encompasses emergency disaster relief and sustainable development. In the context of this paper, international development includes working with developing countries to enable them to meet their own humanitarian and development needs. Less developed communities commonly have lower life expectancies, less education and less income, and therefore lower standards of living.

Engineers Without Borders New Zealand (EWBNZ) was founded in 2008 by a group of enthusiastic students seeking to make a positive change within disadvantaged communities in the South Pacific. The organisation has grown to become a recognised professional international development organisation.

To achieve this, EWBNZ had to:

- facilitate greater consistency across the organisation
- increase quality control and risk management
- refine their development philosophy and approach

- provide greater structure to the organisation
- clarify the engagement for external stakeholders.

Today EWBNZ includes both students and professionals who want to overcome the challenges associated with poverty and sustainable development. Improving the quality of life within communities in New Zealand and in the South Pacific region is a primary focus of the organisation. There are six chapters throughout New Zealand - (1) Auckland students, (2) Auckland professionals, (3) Canterbury students, (4) Canterbury professionals, (5) Palmerston North, and (6) Wellington. EWBNZ provides members with educational and development opportunities so they can become more aware of global issues and feel empowered to make a difference. A national body manages the programme and coordinates the chapters, providing assistance in achieving the goals of EWBNZ.

This paper discusses EWBNZ's big picture objectives for international development and what they are doing to make a difference. Initiatives under the two portfolios, Learning and Change and Working with Communities, are reviewed. Specific water related examples are included. Lastly, one particular project relating to the challenge of access to clean water is summarised.

2 EWBNZ'S BIG PICTURE OBJECTIVES

Poverty and development are defined in this section, with relevance to EWBNZ's big picture objectives. Poverty is low income and the lack of access to resources while development is growth or process of advancement. EWBNZ's big picture objective is to make a positive difference in the lives of those in poverty. This includes community capacity building with access to the necessary skills and knowledge.

Poverty is generally associated with extremely low income and a lack of material resources. Arguably, it should also include factors such as inequality, poor health, lack of access to education, polluted environments, limited access to opportunity and freedom, and low safety or security.

EWBNZ has the ability to make a difference to the lives of those in poverty through supporting communities with a range of resources and opportunities. Jade Leung emphasised in her Learning and Change presentation (2014) that EWBNZ is working towards building socially conscious communities where people can make positive choices in their professional and daily lives. The aim is to increase capacity and awareness in humanitarian engineering within New Zealand and create positive and sustainable change within our partner communities. EWBNZ does not only focus on engineering work, but also individuals and groups who can contribute towards creating a better world free from poverty.

Development by definition in the Oxford Dictionary means "a specified state of growth or advancement" and "an event constituting a new stage in a changing situation". In Sam Davies's Big Picture presentation (2014), development in the EWBNZ context is defined as a process of gaining access to knowledge and resources to lead a life of opportunity and freedom.

The organisation's approach is centred on developing community strength to improve community health, wellbeing and opportunity (EWBNZ, 2012). To achieve this EWBNZ shares their skills, resources, time and passion. EWBNZ's values, community, sustainability, respect, learning and quality, are applied through their mission to connect, educate and empower people through humanitarian engineering.

There are a number of ways for members to contribute towards development including:

- develop personal knowledge, skills and understanding of global issues
- contribute to the community
- volunteer engineering and other skills
- consider purchases and consumption

- teach and empower others

3 CORE INITIATIVES

EWBNZ's core initiatives fall under their two key portfolios. The first is Learning and Change which includes curriculum integration, sector engagement and leadership training. The second is Working with Communities which includes development philosophy and the Wawan Water Supply Scheme. These key areas and initiatives are discussed below.

3.1 LEARNING AND CHANGE

EWBNZ provides advocacy and education opportunities to empower people in local communities to make a positive change. Jade Leung explains in her Learning and Change presentation (2014) that EWBNZ's Learning and Change initiatives provide opportunities and pathways to actively learn and reflect on sustainable human development. Learning and Change is promoted through curriculum integration, sector engagement and leadership and training.

3.1.1 CURRICULUM INTEGRATION

Curriculum integration is about providing students of different ages, the opportunity to learn and build awareness about sustainable human development. Students are encouraged to reflect upon themselves and think about how they can make a difference. Through school activities, tertiary design competitions and research, these opportunities allow students to use their own skills and knowledge to develop sustainable solutions.

The 'In Schools' programme attempts to connect, educate and empower local students to make a positive change. Fun and interactive visits are used to teach students about engineering in international development. Two modules are presented by EWBNZ student and professional members. In particular, the 'Clean Water for Life' module teaches students about the challenges of access to clean drink water and sanitation in developing countries, and the importance of using appropriate technologies. Students participate in a fun team activity to build the best water filter from simple materials. Roanna Salunga took the photograph below from a Water for Life session in July 2014.



Photograph 1: Comparing water filters made by Girl Guides

EWBNZ design challenges are offered to tertiary students, focusing on engagement with local and international communities. For example, in 2012 students were asked to identify and design options for a human effluent disposal system on a block of land within Christchurch's earthquake zone. The main stakeholder was the local Ngai Tahu community.

The EWBNZ 'Research' division links community partners with the expertise of the New Zealand tertiary sector. This provides access to innovative and appropriate solutions. Final year undergraduates at the University of Auckland are currently optimising the design of a small-scale linear turbine for developing communities nearby water. Flow conditions and possible configurations will be analysed to determine the most appropriate solution for the materials available.

3.1.2 SECTOR ENGAGEMENT

While spreading awareness, it is also necessary to connect with other organisations and people who are interested in making a positive change. New ideas for expanding memberships and increasing industry profile are important to the success and sustainability of the organisation. Sector engagement is also important in up-skilling, learning more about sustainable human development, as well as advocating for EWBNZ's vision. Humanitarian individuals are able to get together, share skills and experiences, work together and have a bigger voice.

A national conference, Engineering Change, is held every year to bring together industry professionals, students, leaders, and community representatives. These people are passionate about social change and international development. The aim is to challenge perspectives and stimulate discussions. Themes of this year's conference (2014) include trends in development, Pacific in focus, engineering sustainability and disaster risk and recovery.

EWBNZ members and subscribers are invited to attend local chapter events. The Auckland Professionals Chapter was invited to a Water NZ Rising Tide event in August 2014 where EWBNZ's executive director, Carys Everett, spoke. Members are also encouraged to get involved in local development work, support and organise fundraisers, learn and develop new skills, build larger networks, gain experiences and share knowledge.

3.1.3 LEADERSHIP AND TRAINING

Leadership is required from organising local chapter events and managing projects to advocating for EWBNZ. In conjunction with succession of the organisation, leadership and training sessions are offered to members to facilitate them in becoming humanitarian engineers. This is another opportunity to empower people to make real differences with the necessary skills and knowledge.

Workshops are designed to create pathways to development. For example, the nEWBie workshops are aimed at new EWBNZ members. In these sessions, members are introduced to EWBNZ and what pathways are available to be more involved. The EWB101 workshop enables members to have a working understanding of EWBNZ systems, a basic understanding of global issues, and EWBNZ's development philosophy. An aid education workshop series has also been developed. The objective was to create discussion around aid issues such as culturally inappropriate solutions, corruption, uneducated donors and volunteers, and malice. Understanding aid issues will enhance EWBNZ and the wider engineering community to achieve a real difference.

In recognition of voluntourism or volunteer travel, pilot Dialogues on Development trips to Samoa were organised. The aim of the study tour is to share a snapshot of the ongoing developments occurring in Samoa, learn about its people and culture, and gain insight and understanding of the structure, politics and skills required to continue advancement. A report with recommendations was drafted after the first pilot, and a second pilot trip was launched in July 2014.

3.2 WORKING WITH COMMUNITIES

EWBNZ endeavours to provide appropriate engineering knowledge and support to assist communities seeking to undertake development initiatives to meet their own needs. This is done by drawing skills and knowledge from a network of professionals, students and companies. Members are able to get involved and gain experience in community development at home and abroad. Projects vary and comprise of concept design and development, facilitation and networking. EWBNZ cooperates with partners in developing communities who

understand the local context. The appropriate technical assistance can therefore be given to the specific communities.

The main focus of Working with Communities is the partnerships between EWBNZ and local communities. These relationships are based on mutual respect and understanding of community partners and pivotal to the success of EWBNZ's work. The ability to connect and work with partners very much determines the projects that EWBNZ participates in - this is highlighted in EWBNZ's development philosophy.

Working with Communities offers direct assistance to partner communities via placements. In addition to implementation of solutions, EWBNZ assists with skills development, project management, technical communications, and linking local and international expertise. EWBNZ recognises the importance of capacity building in communities for the sustainability and success of the development work. Remote assistance can also be provided from New Zealand while someone is on placement.

3.2.1 EWBNZ'S DEVELOPMENT PHILOSOPHY

Over the years, EWBNZ has learnt a significant amount from working with communities that has helped to them ingrain a development philosophy into their organisation. This philosophy provides a 'best practice' guide for the work that EWBNZ carries out.

A community partnership focused approach is also adopted. This means that EWBNZ seeks to assist communities who are drivers and owners of development work. EWBNZ does not 'do' development, but rather support partners so that they might achieve their own goals.

The development philosophy consists of four key principles:

- Partners before projects – “The strongest determinant of our ability to successfully assist a community to create sustainable positive change is our ability to form strong and meaningful relationships with that community”. EWBNZ partners with organisations with similar goals and values.
- Community identifies needs and owns the project – “We believe for development to be sustainable and appropriate it must be community driven and owned”. EWBNZ partners with organisations who seek assistance with projects they have identified.
- We do not fund projects – “EWBNZ's expertise is that of development engineering not fundraising, additionally a community cannot truly 'own' work that they have not assisted in 'purchasing'”. EWBNZ provides funding to “build partnerships, create links and support volunteers”, not to buy materials and equipment.
- Excellence communications – “Communication is the foundation of a solid partnership”. EWBNZ communicates regularly and directly with partners.

EWBNZ uses this approach when working with communities. The Wawan water supply scheme discussed in the next section is an example of where this development philosophy has been applied.

3.2.2 AN EXAMPLE OF THE EWBNZ DEVELOPMENT PHILOSOPHY: THE WAWAN WATER SUPPLY SCHEME IN VANUATU

One of the most recent EWBNZ projects is the Wawan water supply scheme in Ambrym, Vanuatu. With a population of 7,000, the island is almost entirely self-sufficient. Three of the nine villages currently rely on rainwater tanks for water supply. These tanks however are empty for several months every year during the dry season. As a result, villagers need to either walk two hours to a spring source or they must drink from the local brackish well. The Wawan Fonhal Development Council identified the need for technical assistance with a water supply project for the three villages and approached EWBNZ in April 2013.

In October 2013 EWBNZ volunteer, Jen Johnstone, spent three months in Ambrym working with the Council. Over this period she undertook the assessment of water supply options and conducted community consultations in the project villages. It was important to understand the partner communities' priorities and

opinions of a water supply solution. Through effective communication, households were visited and community meetings were held in each of the three villages (Johnstone, 2014).



Photograph 1: Jen Johnstone with one of the local families in Ambrym

The three water supply options assessment can be briefly summarised as:

- A new pipeline from a spring source – used more advanced technology favoured by the older men, however was not viable as the spring source also dries up in the dry season. This option was the most expensive, and difficult to construct and maintain.
- Improving the existing rainwater tanks – preferred by rotary due to the highest yield of water for the lowest cost. This option had very little community support and therefore was unlikely to be sustainable in the long term.
- A new rainwater harvesting system – compromise to satisfy all stakeholders including the chiefs of the three villages. This option was cost-effective, sustainable and has visible high-tech assets for the community to take pride in.

Upon agreement, the proposed solution was to install new rainwater harvesting tanks and connect roofing catchments via gravity pipelines to tapstands throughout the villages. As community ownership is important for sustainability the villages are raising 10% of the costs themselves and will also be paying monthly tariffs over the lifecycle of the system. This covers the maintenance and replacement of the system at the end of its lifespan, without needing any further external intervention or funding in the future. Selected locals will receive training and with guidance carry out the construction of the system themselves, adding to the sense of ownership (Johnstone, 2014).

Back in New Zealand, three colleagues volunteered to produce the structural design, hydrological analysis and design drawings. Jen Johnstone will be returning to Ambrym with another EWB NZ volunteer, Mark Holden, later this year for the construction stage. Mark will remain on the island for approximately six months to provide training and construction supervision of the new water supply.

EWB NZ will carry out capacity development of the Wawan Fonhal Development Council to improve their management and planning capabilities. This way, they will be better equipped to develop their community. Mark will also be assisting the Council in scoping further projects in the area, during his time on the island. EWB NZ hopes to continue to create a positive difference throughout the Wawan area.

4 THE FUTURE OF EWBNZ

Over the past eight years, EWBNZ has grown from a voluntary student organisation into a professional international development organisation. EWBNZ hopes to consolidate and build on the progress towards becoming the most effective, efficient and innovative small scale development NGO in the South Pacific. They will continue to provide opportunities for members and partners to engage in sustainable development and making a positive difference in communities.

High level goals were identified for organisation development, membership and stakeholder engagement, as well as the two portfolios - Learning and Change and Working with Communities. To be a successful organisation, EWBNZ has to maintain effective management processes with diversified funding streams and sufficient human resources. It is important that EWBNZ also continues to provide members and stakeholders with fulfilling experiences that allow them to feel empowered so that they can make a positive change in communities and be recognised as leaders within the industry.

Learning and Change will provide greater engagement opportunities, involvement and understanding of sustainable development globally. For this, formal curriculum integration and more involvement from non-engineering students and professionals is required. There are more workshops and events, online conversation platforms, corporate engagement and advocacy in the pipeline for the sector. Additionally, leadership and training initiatives are to be more specific and comprehensive. Working with Communities will lead technical development support and sustainable improvement within the South Pacific. This will be achieved through forging and fostering relationships with community development organisations and conducting 'best practice' human development. Work shall be carried out in accordance with EWBNZ's development philosophy (EWBNZ, 2012).

5 CONCLUSIONS

The big picture for development organisations such as EWBNZ is to initiate positive change to create a better world free from poverty. EWBNZ believes that access to engineering knowledge and resources can make a difference. Through their portfolios -Learning and Change and Working with Communities- EWBNZ aims to connect, educate and empower people through humanitarian engineering.

Learning and Change provides opportunities to learn about sustainable development. This consists of curriculum integration, sector engagement and leadership and training. Such initiatives include the EWBNZ 'In Schools' programme, university design challenges, tertiary research, annual national conferences, chapter events, workshops and training sessions, and the Dialogues on Development study tours.

Working with Communities uses the appropriate engineering skills and knowledge to support communities to meet their own needs. EWBNZ works with partners who have mutual respect and understanding in developing communities. Placements allow EWBNZ to aid capacity building within communities and assist with skills development, project management, technical communications, and linking local and international expertise.

The Wawan water supply project is a clear example of how EWBNZ worked with the local villages and stakeholders to solve a common global issue in developing communities. Jen Johnstone carried out community consultations and an options assessment in the villages. Detailed design of the new rainwater harvesting system was later developed in New Zealand. Mark Holden will return to the island to provide training and construction supervision later this year. Recognising the importance of community ownership, the villages will be raising 10% of the cost themselves and households will also be paying monthly tariffs. EWBNZ will continue to work with the local Council to make a positive difference throughout the Wawan area.

EWBNZ's development philosophy focuses on community partnerships with four key principles. These are (1) partners before projects, (2) community identified needs and project ownership, (3) fund people not projects, and (4) effective communications. It is used as a guide for 'best practice' human development.

In the future, EWBNZ hopes to become the most effective, efficient and innovative small scale development NGO in the South Pacific. The organisation requires effective management processes with diversified funding

streams and sufficient human resources. EWBNZ will continue to promote fulfilment of involvement, provide greater engagement opportunities and support developing communities.

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