RED

Project Borneo

PROJECT REPORT 2017

Rural Education Development (RED) Project Report for the Summer Expedition of 2017

3rd July 2017 - 4th August 2017

More information available at:

www.redprojectborneo.com

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ABOUT US

The Rural Education Development (RED) Project Borneo is a student-led project established in 2015 at Imperial College London that centres on sustainable educational development in rural and marginalised Bornean communities.

Founded in the department of Civil and Environmental Engineering, our primary focus is on the development of educational infrastructure in communities that we reach out to. With a strong aspiration to integrate engineering and education in our project, we collaborate closely with a local project partner, Life Empowerment Berhad (LEB), to realise educational development in Borneo.

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WE encourage the application of skills and knowledge learnt by providing Imperial students avenues to develop transferable skills and gain practical experience.

During the academic term, students participate in college-wide fundraising and devise strategies for project development. Over the summer, students volunteer in Borneo to build an education centre for the underprivileged.

FUNDRAISING

Figure 1: *Donut and Christmas card sales.*

In addition to grant applications, we organised fundraising and publicity events such as college-wide sales and charity dinner. Our members dedicated themselves to the design of Christmas cards, which were sold to college members and staff.

Our major fundraising event was the joint charity dinner with student societies at Imperial College London namely Enactus Imperial, Raincatcher Imperial, Engineers Without Borders and TedEx Imperial. It was an end-of-term event in December 2016 which offered members across different societies to share their volunteering experience whilst indulging themselves with exquisite Malaysian cuisine at Melur London.

Future Plans

We managed to garner support from the Imperial College Malaysian Society (ICMS) for college outreach programmes and publicity. We foresee that RED would get greater exposure among freshers for recruitment as this would help expand RED's membership and increase participation from Malaysian students.

STUDENT ENGINEERING

From the successful 2016 pilot project, we drew invaluable engineering experience in Borneo to improve on the current expedition whilst upholding RED's core values. To enhance the environmental sustainability of this project, RED innovated on green technologies such as off-grid solar panel system and rainwater harvesting technique.

Solar panel system

A 7-member project development team explored on an off-grid solar panel system. The solar panel system has the flexibility of tapping into existing 230 V power grid, allowing maintenance on the solar panel system to take place without interrupting power supply. In addition, occupants can also resort to power grid for electricity when the power output from the solar panels is unable to meet electrical demand.

This project was developed under the invaluable advisory of Dr. Ekins Daukes from the Imperial College Deparment of Physics. With kind support from Dr. Julie Varley and Mr. Vim Patel, a prototype was built in the mechatronics laboratory at Imperial College London.

A separate technical report, courtesy of Ethan Merkier and Aitor Monreal, on the development of the prototype is available upon request.

Future Plans

With the functional prototype assembled, it provides a solid groundwork for future project expansion and adaptation. We envision potential collaborations with other societies in the Community Action Group (CAG) to take place.

***Figure 2**: Prototype of the off-grid solar panel system (L) and the as-built system in Kampung Palipikan, Sabah, Malaysian Borneo (R).*


MILESTONES

Figure 3: *Chloe, Edrea and Jack in Kampung Indarasan, Sabah.*

2015 SUMMER
FEASIBILITY STUDIES

2016 SUMMER
PILOT PROJECT

Figure 4: *Edrea and Jack surveying a construction site.*

Founded in year 2015, RED's first overseas outreach dates from summer in the same year when founders, Edrea Pan, Chole Detanger and Jack Wilkinson embarked on a 3-week Bornean expedition to Kampung Indarasan in Sabah.

The expedition, aimed at gauging the feasibility of volunteering in rural Sabah, was done by assessing the region's climate, geological conditions and availability of local sustainably sourced construction material.

Furthermore, needs assessment was also carried out to channel essential input into the 2016 summer expedition. The need assessment was crucial in planning social services that address educational demands from the underprivileged in Borneo.

Figure 5: *Group photo for the 2016 expedition.*

2015 SUMMER
FEASIBILITY STUDIES

2016 SUMMER
PILOT PROJECT

Figure 6: *Kindergarten completed in Ranau, Sabah.*

Building on the 2015 feasibility studies, RED launched its pilot project in Ranau, Sabah with fourteen Imperial students. Strong partnership with LEB enabled RED to complete a single storey 6 m by 9 m kindergarten in 6 weeks.

This project was the culmination of dedication from RED members and generous support from the Institution of Civil Engineers, City and Guilds College Association, Imperial College Union, IC Trust and the Department of Civil and Environmental Engineering at Imperial College London.

Once again, our 2017 project received returning support from all the stated institutions. Together with immense financial sponsorship from the Happold Foundation and the Victoria League for Commonwealth Friendship, we successfully touched the lives of rural communities in Kampung Palipikan through a 5-week expedition in summer 2017.

2017 SUMMER
SECOND PROJECT

BACKGROUND

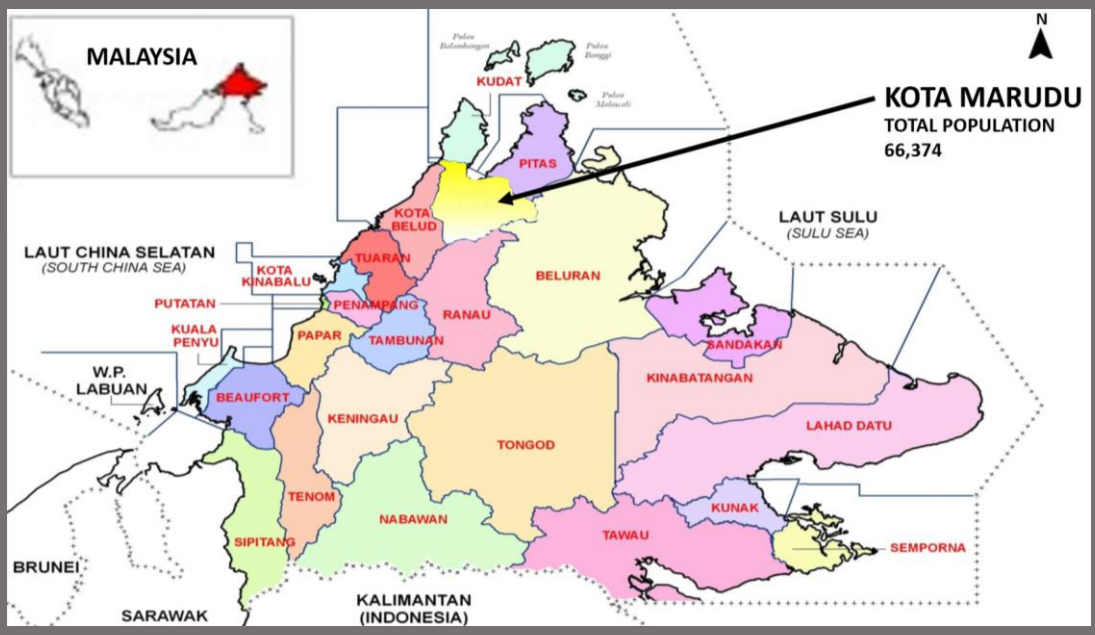

Figure 7: *The administrative districts in Sabah (Department of Statistics Malaysia, 2010)*

This year, a group of eighteen volunteers from Imperial College London travelled to Sabah, Malaysian Borneo for five weeks to construct a kindergarten for a native Dusun community in Kampung Palipikan. A tranquil village in the Kota Marudu district, Kampung Palipikan is in the northern region of the Sabah state and houses about 500 people.

Two rivers, namely Sungai Palipikan and Sungai Kanarom, isolate Kampung Palipikan from the nearest town, Kota Marudu, making the village geographically less strategic for trade and infrastructural development. The village is accessible by vehicles through gravel roads that cut through a commercial palm oil plantation. Alternatively, a shorter path passing through hanging foot bridges that span over the two rivers can be taken.

Figure 8: *Hanging bridges that span Sungai Palipikan (L) and Sungai Kanarom (R).*

Figure 9: *The green-roofed community centre that served as a temporary kindergarten.*

According to the head of village, Mr Metto bin Mositoh, most of the villagers in Kampung Palipikan are rubber tappers and farmers. To shorten travel distance, the hanging bridges are used for transporting agricultural produce to Kota Marudu. With monthly income per household of the village averaging at RM 450, which is well below the regional mean of RM 4879 (Department of Statistics Malaysia, 2014), the villagers lead frugal lifestyle to ensure that their children have access to education.

A stalwart supporter of good education, Mr Metto bin Mositoh had been relentless in lobbying for support to equip the village with an education centre. In the past, a community centre was used to conduct elementary classes. However, the community centre needed expansion to meet the growing number of students in the village and from the neighbouring Paliu Sumbu village.

This was when RED stepped in, with the objective of constructing a multi-purpose infrastructure serving not only as an education centre for children, but also as a learning area for teenagers and adults. In collaboration with LEB, RED worked together with the villagers to bring the project to fruition.

Mr. Metto Bin Mositoh
Head of Village

***Figure 10**: Group photos with skilled workers from Palipikan village in appreciation of their immense contribution.*

We believe that working together with locals in championing educational equity is integral to sustainable development. By involving the Palipikan villagers in the construction gave them ownership of the project, thus ensuring that the kindergarten will be put to good use and maintained after handover.

In continuation of our effort in educational empowerment, LEB sponsored teachers to teach in Kampung Palipikan after the kindergarten was constructed, allowing students in the rural community to receive educational support essential in fulfilling their scholarly pursuits.

***Figure 11**: Hippolyte teaching young students in the village.*

From project initiation to completion, we made sure that the following core aspects were upheld:

1 Educational Infrastructure

With the nearest public schools located an hour away on foot, remoteness of the Kampung Palipikan fuelled the need for an education centre. To attend classes, the Palipikan children trekked treacherous terrains and crossed wobbly hanging bridges. By bringing an education centre into Kampung Palipikan, travel time for the local children reduces. According to Mr Metto bin Mositoh, there is a significant number of neighbouring villages that are deprived of basic educational infrastructure. Thus, the education centre also offers children from more remote villages opportunities to pursue elementary education.

***Figure 12**: After-work leisure with the Palipikan children*

2 Safety

Locals that we worked alongside the project are seasoned builders, adept at building traditional wooden houses. Reliant heavily on past construction experience with timber structure, most of the existing traditional houses were built with no fixed guidelines. To introduce safe building practices to the Palipikan villagers, together with LEB, we implemented building designs that were in compliance with the Eurocode regulations. This is also to ensure that the education centre functions throughout its design life within the serviceable state. Moreover, the structural designs were also given considerable adaptations so that they were well suited for the tropical climate in Kampung Palipikan.

3 Sustainability

To achieve effective project implementation, we put great emphasis on functional, safe and sustainable design solutions. Construction material and equipment were sourced locally to ensure that the project contributes to the local economy. As the supply chain shortens, delivery times reduce, thus, saving logistical cost and avoiding delay in material supply.

To boosts the project's environmental sustainability credentials, solar panels and rainwater harvesting tank were installed. The green technologies give the locals exposure to harnessing solar and water resources that are in abundance in tropical Borneo.

***Figure 13**: Internal wall frames of the kindergarten.*

4 Learning experience for volunteers

During the expedition, volunteers gained first-hand project planning and construction experience, thus allowing them to not only consolidate engineering knowledge acquired at Imperial College London, but more importantly hone their transferable skills and problem-solving techniques.

As the volunteers stayed in Kampung Palipikan throughout the expedition, exploring local culture and interacting with the local communities also enriched their volunteering experience.

5 Exchange of knowledge

The usage of pre-fabricated materials aligned with our pursuit for sustainable building solutions and eliminated the need for intensive labour. Pre-fabricated components such as cement wall panels and gypsum boards were incorporated into the construction of interior and exterior walls, while pre-manufactured steel frames were used for roof truss assembly.

With simplified building processes, inherent construction hazard was minimised, thus creating a safer environment for volunteers to apply their engineering skills. Working alongside skilled Palipikan villagers promoted technical skills exchange, allowing volunteers to learn practical construction techniques. In return, the locals gave greater appreciation for sustainable construction and development.

***Figure 14**: Jeffrey and Shi Jinn painting the prefabricated cement wall panels.*

***Figure 15:**. Gagan, Paloma and Luke sharing a light session with the children during an evening English class.*

English Curriculum Design

To ensure a sustained impact to the rural community that we work with, we continued the English teaching initiative in the Palipikan village, which was first started in the 2016 summer expedition. Apart from participating in construction, student volunteers also assumed teaching roles in evening English classes. These classes took place bi-weekly during the 5-week expedition. In our effort to better structure the English classes, we had a team of 11 members who dedicated themselves in designing an English curriculum suitable for the Bornean children in the Palipikan village.

The curriculum revolved around expanding English vocabulary through interactive games and nursery rhymes. English booklets delicately designed by our members were presented to the Bornean children to accompany them in learning. Furthermore, flash cards and teaching kits, adjunct to the English booklets, were also introduced to enhance the children's learning process.

***Figure 16:** Jeffrey, Weng Mun and Jayneil teaching the children with flash cards.*

ENGINEERING AND CONSTRUCTION

Figure 17: *The completed kindergarten.*

Over the course of the 5-week expedition, we constructed a single-storey education centre of dimensions 6 m by 9 m. It is a steel-framed structure clad with cement fibre board on the exterior and gypsum board on the interior. Resting on a reinforced concrete pad, the education centre has a large central hall (approximately 6 m by 6 m) as classroom. Furthermore, the education centre houses a pantry for teacher to prepare snacks and a storage room. The latter facilities are roughly 3 m by 3 m in dimension. Steel trusses covered by metal sheets with wool insulation provide sufficient shade for the structure under torrid noonday sun.

Construction Challenges

Collaborative work between RED and three skilled Palipikan villagers allowed challenges that emerged to be overcome as the project progressed. This collaboration allowed transfer of knowledge between the locals and volunteers. Before our arrival, the site was cleared and excavated with the help from the Palipikan villagers.

Figure 18: *Cleared and excavated site upon our arrival*

***Figure 19**: Façade of the kindergarten.*

In the first two weeks of the expedition, monsoon season in Borneo posed significant challenges to our project as torrential rain disrupted our work. Recognising the evening rain pattern, we woke up before dawn to have an early start to our daily tasks. With more productive working hours, uninterrupted by the intermittent evening rain, we ploughed and moved soil to make the ground ready for concreting.

***Figure 20** Setting out.*

Once ground levelling was completed, boundaries of the site were marked with wooden planks as shown in Figure 20. Remarkable help from the villagers enabled wooden planks to be sourced locally from the forest that bordered our construction site. This eliminated the need to purchase wooden formwork and promoted a sustainable use of readily available resources. The wooden planks were also used to stabilise steel columns before they were concreted into the ground as illustrated in Figure 21

***Figure 21**: Column propping*

***Figure 22**: Site levelling*

With the columns propped and set into soil, we proceeded with slab pour to raise the ground level of the education centre. Again, with the innovative use of available construction material, we made spacers, where steel meshes rest on, from a mixture of cement, sand and water. The addition of gravel into the mixture burdened our work to obtain spacers with desired geometries. Fortunately, the final products were satisfactory and sufficient spacers were produced for the concrete slab as shown in Figure 24.

***Figure 23**: Spacer making*

Progressing into the second week, we decided to push for roof construction to reduce time working under scorching heat, with slab pour carried out simultaneously. The main supporting elements for the roof were steel tie beams that ran along the longer sides of the kindergarten.

Roof trusses were assembled on a flat ground before being lifted onto the tie beams.

***Figure 24**: Close up view of the spacers*

***Figure 25**: Truss assembly.*

The roof construction was met with a major hindrance, which impeded our progress. For the tie beams to be attached to the vertical columns, welding was required. However, as the welding process demanded large electric current, the welding set strained the electrical outlets in the village beyond their capacity, which in the end fused several of the power points available.

Recognising the need for an alternative solution, electrical drills with bolts and nuts were purchased to screw the tie beams to the columns. With the tie beams in position, they formed vertical supports for the roof trusses to rest upon.

Subsequently, steel battens parallel to the tie beams were installed to hold the metal trusses together, forming a rigid roof system. The trusses were later covered with corrugated sheets equipped with wool insulation and heat reflectors. Slab pour was carried out at the same time. Layers of water-proof polyethylene sheets were placed underneath the spacers to ensure that the slab was water tight.

***Figure 26**: Polyethylene sheets positioning.*

***Figure 27**: Concrete slab water proofing.*

***Figure 28**: Casting of the outerslab.*

***Figure 29**: Wall studs.*

***Figure 30**: Gutter and fascia.*

In the third week, we proceeded to cast the outer slab surrounding the perimeter of the inner reinforced concrete slab as shown in Figure 28. However, due to a lack of cement, the outer slab at the side and back of the building was reduced from an initial design width of 1 m to 0.5 m.

Once the outer slab had hardened, wall studs, which acted as frames supporting the wall panels, along the side of the building were assembled and installed. The side door frame was erected first to act as a reference height for subsequent placement of window frames. The wall studs, made of thin aluminium channel section, were joined together using rivets to create a grid of interlocking studs as shown in Figure 29. At the same time, gutter and fascia were installed along the edges of the roof as shown in Figure 30.

***Figure 31**: Wall panels attached onto the wall studs.*

Moving on to the fourth week, wall panels on the interior and exterior were attached with screws onto the wall studs as shown in Figure 31. While working concurrently, the back, front and internal wall studs were assembled and installed as shown in Figure 32.

Both cement fibre and gypsum boards posed some problems during installation. The soft nature of gypsum boards allowed them to be easily cut and sized. However, this also meant that the boards were easily cracked on installation. While the hard cement boards, which were less susceptible to cracking, provided little spatial tolerance, thereby making them difficult to fit in between adjacent boards. Silicone sealant was then used to fill up gaps in sections to prevent leakage.

***Figure 32**: Wall studs overview.*

***Figure 33**: Internal wall studs*

***Figure 34**: Completed solar panel housing.*

Following our commitment to promote sustainability, a solar panel system was introduced into the project this year. In order to implement this system, two solar panels were attached onto the roof. Given that the brackets to hold the panels in place had to be custom-made, a 6 m steel channel section was cut and sized to create a housing for the two solar panels as shown in Figure 34. The solar panels were then lifted and screwed onto the battens beneath the roofing sheets as shown in Figure 35.

***Figure 35**: Solar panels attached onto the roof.*

***Figure 36**: Housing lock.*

***Figure 37**: Plastering the wall panels.*

***Figure 38**: Ceilings suspended from the battens*

In the final week, plaster was applied onto the surface of wall panels to cover any imperfections such as cracks, gaps and screw holes as shown in Figure 37. A layer of white primer was then applied onto the panels followed by a layer of paint. The same process was carried out on both the interior and exterior panels.

Once the rooms were painted, ceilings were then installed. Metal frames, where the ceiling panels sit on, were suspended from battens using tie wires as shown in Figure 38.

***Figure 39**: Interior of the completed classroom.*

***Figure 40**: Wiring connecting to the charge controller and battery.*

Once the ceilings were in place, wiring and lighting were installed and connected to the solar panel system as shown in Figure 40.

At the same time, a rain water harvesting system, that collects rain water from the roof, was installed. The base, where the water tank sits on, was constructed using cement blocks filled with soil and covered with cement. A pipe was then connected from the gutter to the water tank as shown in Figure 40. Lastly, to finish off the building, doors and windows were installed and vinyl sheets were laid to cover the bare concrete floor.

***Figure 41**: Rainwater Harvesting System*

Phase 1 Volunteers

Cheng Moi, Wen Wei, ***Joot***, Neoh, Jayden, Ottilie, Gagan, Arthur, Sebastian, ***Maijol***, Quihong, ***Jamanting*** (L-R)

THE RED TEAM

Jayneil, Luke, Gagan, ***Jamanting***, Weng Mun, Paloma, Jeffrey, ***Maijol***, Shi Jinn, Arthur, Anson, Hippolyte, Sher Lynn (L-R)

Phase 2 Volunteers

Team Members of the RED Project Summer Expedition 2017

Organising Committee 2016-2017

Xiao Binn Neoh
Chair of RED Project Borneo

Arthur Mun
Vice - Chair of RED Project Borneo

Quihong Dong
Treasurer of RED Project Borneo

Sher Lynn Wong
Publicity Officer of RED Project Borneo

Anam Balbolia
Secretary of RED Project Borneo

Hippolyte Mounier-Vehier
Project Executive Officer of RED Project Borneo

Volunteers

Sebastian Kovats – *1st year MEng Civil and Environmental Engineering*

Jayden Chan Zi Heng – *1st year MEng Civil and Environmental Engineering*

Anson Chan Chun Hon – *1st year MEng Civil and Environmental Engineering*

Jeffrey Kwong Cheuk Yin – *1st year MEng Civil and Environmental Engineering*

Weng Mun Loke – *1st year Meng Civil and Environmental Engineering*

Cheng Moi Tan – *1st year BSc Mathematics*

Shi Jinn Wong – *2nd year MEng Chemical Engineering*

Liu Shi Yong – *2nd year MEng Civil and Environmental Engineering*

Paloma Rebuelta Merino – *2nd year MEng Civil and Environmental Engineering*

Wen Wei Ong – *3rd year MEng Mechanical Engineering*

Luke Richard Houghton – *4th year MEng Civil and Environmental Engineering*

Jayneil Ajay Master – *4th year MEng Civil and Environmental Engineering*

Gagandip Sehmbi – *4th year MEng Civil and Environmental Engineering*

Supporting Team Members

Eytan Merkier – *1st year MEng Mechanical Engineering*

Aitor Monreal – *1st year MEng Mechanical Engineering*

Bryan Jeng Yan Wong – *3rd year MEng Chemical Engineering*

Members of the RED Project Teams 2016-2017

1. Project Development Team

A. Solar Panel System

Project Leader
Eytan Merkier

Associate
Aitor Monreal

Members:

George Papasotiriou
Haya Muftah
Spyros Poullados
Vlad Khon
Wenqian Gan

B. Construction Management

Members:
Jayneil Ajay Master
Luke Richard Houghton

Coordinators:
Hippolyte Mounier-Vehier
Xiao Binn Neoh

2. Fundraising Team

Members:
Cheng Moi Tan
Weng Mun Loke
Jayden Chan Zi Heng
Shi Jinn Wong
Anson Chan Chun Hon
Ronnie Li Hei Long
David Cheng Ka Ming
Yang Shu Min
Lee Yan
Han Mun Mun

Coordinators:
Arthur Mun Siew Meng
Quihong Dong
Sher Lynn Wong

3. Curriculum Design Team

Members
Brianna Chang Pei Shan
Heng Hoe Cheong
Xin Jin Ho
Ze Hui Kong
Wei Ming Ng

Coordinator:
Anam Balbolia

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**** The list is non-exhaustive***

SPECIAL THANKS

A special note of appreciation to our sponsors. Without your kind support, this project would not have been possible.

The Happold Foundation

ice
Institution of Civil Engineers

City & Guilds College Association

Imperial College London

Department of Civil and Environmental Engineering and the Imperial College Trust

THE VICTORIA LEAGUE FOR COMMONWEALTH FRIENDSHIP

imperial college union

FINANCES

Our income over the year 2016/2017 is as shown in Table 1 below:

Information	Amount (£)
Opening Balance 2016/2017	4855.25
CAG RED IC Trust Grant (2015/2016)	1500.00
Joint Fundraising Dinner at Melur	76.25
Winter All-Nighter Fundraising	116.34
The Happold Foundation	5000.00
The Victoria League for Commonwealth Friendship	3500.00
The Institution of Civil Engineers	3000.00
CAG RED IC Trust Grant (2016/2017)	2920.00
City and Guilds Old Centralians' Trust	2500.00
Department of Civil and Environmental Engineering	1400.00
Total income for 2016/2017	**24867.84**

Table 1: *Sources of income 2016/2017.*

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FINANCES

Our expenditure over the year 2016/2017 is as shown in Table 2 below:

Information	Amount (£)
Construction Material for 2016 Expedition	2027.23
Fundraising Items Purchase and Publicity	256.26

Expenditure before the 2017 Expedition.

Information	Amount (£)
Construction Material for 2017 Expedition	5073.20
Tools	840.12
Wage for 3 Local Skilled Workers	933.64
Solar Panel and Rain Harvesting Systems	675.32
Food	927.78
Amenities	2140.24
Inter-city Transport	1213.84
Weekend Accommodation	1031.85
Flight Subsidy (*Courtesy of IC Trust*)	2300.00
Total Expenditure	**17419.48**

Expenditure during the 2017 Expedition.

***Table 2**: 2016/2017 expenditure (As of 14th of September 2017)*

FINANCES

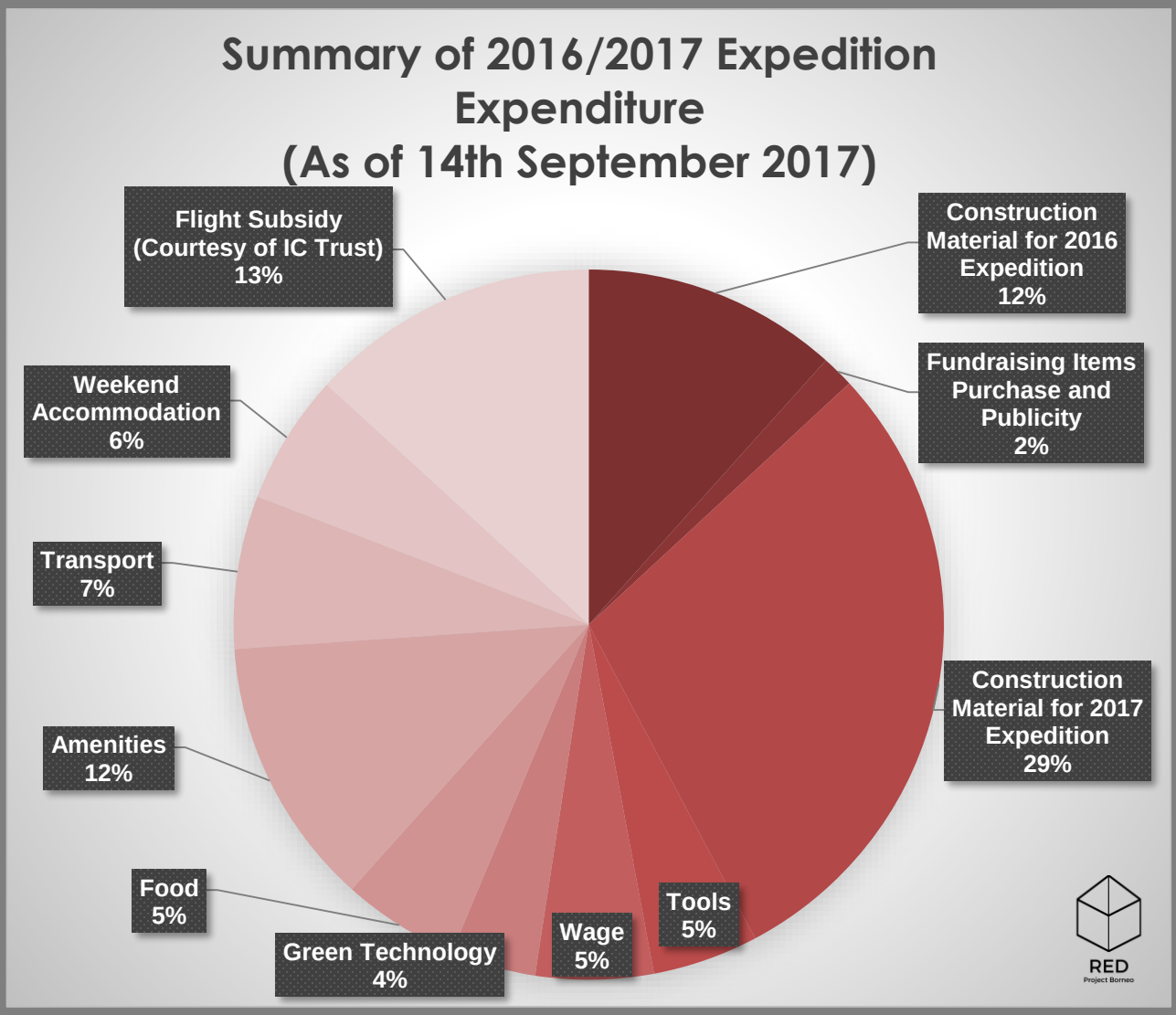

***Figure 42**: Pie chart of our 2016/2017 expenditures.*

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* Detailed breakdown and copy of receipts are available upon request.

Photo Gallery

We were always in the company of the Palipikan children, whose boundless enthusiasm, admirable conduct and great optimism coloured our expedition.

***Top**: Group photo of Phase 1 volunteers with the Palipikan children after the end of the second English class.*

***Middle and Bottom** : Led by the Palipikan children, we trekked off-the-beaten paths in the village.*

***Top**: Group photo of Phase 2 volunteers with the Palipikan children after the end of the English lesson.*

***Middle and Bottom Left** : After introducing Frisbee to the Palipikan children, it became hugely popular and occupied much of our time for after-work leisure with the children.*

A nostalgic return to Kampung Gaur, Ranau where RED's pilot project took place.

We received a warm reception from the villagers who treated us to a hearty lunch upon our arrival.

Currently, there is a permanent teacher giving classes to pre-school students in Kampung Gaur.

***Top**: Group photo in front of the kindergarten that was completed in summer 2016.*

***Middle**: The kindergarten was in an excellent condition after one year in use. Effort from Gaur villagers to furnish and maintain the kindergarten is laudable.*

***Bottom**: The traditional house that once accommodated RED volunteers was given a facelift by villagers in Kampung Gaur.*

The construction of the kindergarten was carried out in two phases.

The first phase of the construction spanned over 2 weeks and focused on structural work. It was labour intensive as ground levelling and massive in-situ concrete pour took place.

***Top**: Wen Wei, Gagan, Jayden and Cheng Moi levelling the ground.*

***Middle**: Earth moving taking place with help from the villagers.*

***Bottom**: Skilled workers in Palipikan village demarcating the boundary of the site.*

The second phase encompassed architectural work to enclose the kindergarten with prefabricated wall panels. It took another 3 weeks before RED volunteers put final touches to the kindergarten.

***Top**: Gagan and Jayneil levelling the steel battens before affixing them to the vertical steel members.*

***Middle**: Hippolyte connecting the steel battens with a screw driver to form a solid frame for wall panels to be mounted on.*

***Bottom**: Hippolyte and Paloma mixing concrete for screeding.*

The opening ceremony of the kindergarten marked the conclusion of the 5-week expedition. In the presence of the head of village and villagers, we were given a heart-warming farewell.

***Top**: The head of village presenting a certificate of appreciation to officiate the opening ceremony.*

***Middle**: Villagers putting up a cultural performance in the kindergarten.*

***Bottom**: Group photo with the van driver, Faustin Thomas (centre in red polo-tee) who was resourceful and wholly supportive of our project.*

During the expedition, we had the opportunity to explore the beauty of the Bornean island on weekends. Sabah's tropical rainforest, habitat of a plethora of flora and fauna and sandy beaches, with crystal clear waters that gleamed under the tropical sun, were among the places of interest we visited.

***Top**: Tea plantation visit.*

***Middle**: Canopy walkway in the Poring Hot Spring and Forest Reserve.*

***Bottom**: Boat ride off the coast of Sabah.*

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