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Grant Cycle 2016

Final Report for Internet Society

Executive Summary

This report covers Internet Society's first experience supporting the Seed Alliance as a global initiative. The Internet Society contributed US$ 212,500 to the Seed Alliance to support five projects. FRIDA and ISIF Asia selected initiatives working on Cybersecurity while FIRE Africa offered funding to support Internet access.

Application process. The 2016 grants cycle was a successful one for Seed Alliance, with 1486 proposals received between the three regions. Specifically, for the Internet Society grants, FRIDA and ISIF Asia programs thus focused their efforts on securing few, but high-quality applications. In the case of FIRE, the focus on Internet Access allowed to secure a greater number of applications.

Projects Supported. As the result from Internet Society's support:
- BOSCO Uganda brought about a stable and reliable connectivity and power supply to existing free-entry remote ICT youths centres in Northern Uganda. An increase has been noted in the usage of computer as well as in the number of users.

- Mucho Mangoes program, *The 21st Century Digital Farmer!* empowered rural smallholder farmers in Kenya. They have trained 376 farmers and have increased internet access to rural farming communities. Due to proper access to information and relevant sources there has been a significant reduction in farm wastage and post-harvest losses.

- The University of Campinas developed a platform to analyze malicious traffic in the Deep Web with a 98% level of accuracy in identifying traffic connected to cybercrime.

- Colombia's National Academic Network of Advanced Technology (RENATA) implemented origin validation for BGP routes in its network backbone which provides interconnection services to SNCTI in Colombia and the rest of the world. The project has become a leading initiative in the LAC region and results have been presented at the IETF Singapore 2017.

- The Kingdom of Tonga developed a National Computer Emergency Response Team (CERT), the first of its kind in the Pacific region. The CERT is growing its involvement in activities that are related to the cybersecurity and cyber safety and is now playing a vital role in the Tonga Police investigation process.

Other initiatives supported. Beyond the 5 Internet Society grants, in the 2016 cycle, Seed Alliance offered 22 additional grants and 8 awards. Projects range across a wide array of topics including:

- **Internet and Technologies for Participation and Inclusion:** initiatives to get women and girls involved in ICT and prevent gender-based violence in Rwanda, Kenya, The Gambia and Myanmar; ICT to preserve African languages; libraries for the visually-

impaired in Cameroon and Uruguay; digital solutions for individuals with speech impediments in Colombia; platforms for greater accountability of electoral processes in Malaysia and whistleblowing in Mexico.

- **Internet and Technologies for Communities:** education and health initiatives such as waste management through online platforms in Nigeria, gamifying math and science lessons for basic mobile phones and feature phones in Tanzania, remote prenatal care in Ghana nd digital medical records and complementary services for mothers and children in India. Workforce support initiatives such as a platform to facilitate the financial management of emerging startups in Singapore and mobile apps for the support of rural farmers in Trinidad and Tobago. Disaster management and prevention, such as devices for restoring connectivity and UAV applications for resilient communications in the Philippines, and GIS mapping platform for vulnerable communities in Guatemala.
- **Internet Access and Technical Research**: IPv6 deployment in Argentina, hardware development for community networks, connectivity for the Brazilian Amazon through High Frequency Radio stations, Wifi access for underserved communities in South Africa. Research on peering strategies for pacific islands, detection of BGP anomalies, improved experiments around satellite connectivity and research on honeynet as a means to improve cybersecurity in Pakistan.

Effective Alliance for Technical Grants. One of the main takeaways from this experience has been recognition of the increased value achieved by Seed Alliance and Internet Society working together to offer technical grants in what has proven to be an effective mechanism to support technical innovation through small grants in the Global South.

Introduction

Internet Society is a longstanding partner and supporter of Seed Alliance and its member programs, FIRE Africa, FRIDA, and ISIF Asia. Building on Internet Society's prior regional collaborations with each one of these initiatives, Internet Society officially joined the Seed Alliance in late 2015, becoming a global partner. This report covers Internet Society's first experience supporting the Seed Alliance as a global initiative.

Under this initial agreement, the Internet Society contributed US$ 212,500 to the Seed Alliance, that directly supported five projects to further the mission of both Internet Society and the Seed Alliance in a joint effort to reach and support innovative local initiatives in the Global South. These grants were offered as part of Seed Alliance's 2016 cycle; FRIDA and ISIF Asia supported initiatives working on Cybersecurity while FIRE Africa offered funding to support Internet access. In addition to these 5 grants, the Seed Alliance offered a number of grants and awards in every region with support from other donors and sponsors, which are also included in this report, as follows:

- FIRE Africa: 7 additional grants and 4 awards, for a total of 9 grants and 4 awards in 2016;
- FRIDA: 6 additional grants and 2 awards for a total of 8 grants and 2 awards.
- ISIF Asia 9 additional grants and 2 awards, for a total of 10 grants and 2 awards in 2016

The present report is structured in four sections. Section 1 covers the results of the 2016 selection process, with specific indicators about the number of grant applications received for specifically for the Internet Society grants. Section 2 focuses on the Internet Society Grants, covering both project summaries and joint activities at the 2016 Internet Governance Forum. Section three includes brief summaries of other projects supported by the Seed Alliance during the 2016 cycle. Lastly, Section 4 of the the report concludes with a brief analytical section highlighting the successes and areas for further work based on this initial Internet Society grant to Seed Alliance.

Section 1. Seed Alliance Call for Proposals 2016

The 2016 grants cycle was a successful one for Seed Alliance, with 1486 proposals received between the three regions. In spite of this volume in applications, the Cybersecurity focus for the Internet Society Grants proved to be a challenging category. The FRIDA and ISIF Asia programs thus focused their efforts on securing few, but high-quality applications. In the case of FIRE, the program opted to concentrate on Internet Access.

The results of the 2016 call for proposals speak of two trends worth highlighting. On one hand, there is a marked interest across all three regions in small grants and awards programs; this shows that the funding approach of Seed Alliance continues to be relevant across all three regions, as non-refundable financial support is still needed to kickstart innovative projects. Despite new funding mechanisms available, most focus on those that are "investment ready" when the risk for early stage investment has been already absorbed by the innovator. Second, it speaks to the reach and established track record of the Seed Alliance which, in its fifth year of collaborative work, has managed to garner widespread interest in all three regions of work.

Section 1. A. FIRE

The FIRE's 2016 call for proposal received a total of 580 applications.
In terms of geographic distributions, 55 countries throughout the Africa sent applications. There were countries from which FIRE received more than fifty applications during the call for proposal. This goes long in saying that FIRE's reach as well as the promotion of past projects, awards and grants have raised awareness and given hope to those communities to keep on developing and creating new projects.

In the 2016 year, FIRE offered two grants in Access Provision, three Scale up Grants (one in Technical Innovation and two in Education), two grants in Community Development, one grant in Government Enhancement as well as one grant in Education. All of those nine grants were designed to encourage, support and develop innovative online solutions to Africa's education, information, infrastructure and communication needs.

Table 1. FIRE Application Results - 2016 Cycle

2016 Applications
By type of support
Awards: 130
Scale-Up Grants: 450
Total: 580
Acceptance rate: 1.9%
Per thematic category
Technical Innovation: 110
Community Development: 130
Education: 100
Governance Enhancement: 140
Unspecified: 0
Per Organization Type
Society: 209
Private initiative: 274
Academic sector : 77
Government: 31

Section 1. B. FRIDA

FRIDA's 2016 selection cycle was a successful one, as measured by number of applications. In 2016 the FRIDA program offered 2 awards, 6 small grants and 2 scale up grants. In this period, FRIDA received a total of 551 applications, a record peak for the program.

This increased number in applications responds directly to a concerted effort by FRIDA and LACNIC's Communication Department to actively promote available funding opportunities. Beyond these efforts, this growth in applications also speaks to the continued interest of regional stakeholders in small-grants and mentoring opportunities for early-stage technology innovations.

Table 1 below summarizes some of the key statistics from the 2016 and 2017 application cycles. Some pointers that we can draw from this data include:

Civil society continues to be main constituency that applies to the FRIDA program, followed by private sector, government and lastly academia. However, when looking at the most technical category, civil society and academia lead proposal submissions.

In terms of geographic distribution, over 20 countries were represented in recent application cycles which speaks to the program's regional reach.Countries with very active civil society and academic communities tend to submit more applications; these include Argentina, Colombia, Brazil, Mexico and Ecuador.

In terms of thematic categories, "Internet and Technologies for Participation" and "Internet and technologies for Communities" received the most applications; the most technical category, "Innovation for Internet Development" ranked third. This trend is understood to be a result of FRIDA's focus on social projects and regional perception based on previously supported projects. Nonetheless, the renewed focus on more technical thematic priorities is transforming this view and contributing to increase the submission of technical proposals.

For the Internet Society Cybersecurity Grant, FRIDA received total of 10 applications; these represented 18% of the technical submissions for grants. The reduced number responds in part to FRIDA's scope for the Internet Society grants which focused on security for naming and routing. The program worked together with LACNIC's technical department to reach out to potential applicants and secure a small pool of high quality applications.

Table 1. FRIDA Application Results - 2016 Cycle

2016 Applications
By type of support
Awards: 126
Small Grants: 335
Scale-Up Grants: 89
Total: 551
Acceptance rate: 1.8%
Per thematic category
Innovation for Internet Development: 12%
Internet and technologies for participation: 42%
Internet and technologies for communities: 42%
Unspecified: 3%.
Per Organization Type
Civil Society: 309 (56%)
Private sector: 105 (19%)
Academia: 71 (13%)
Government: 55 (10%)
Unspecified: 11 (2%)

Section 1. C. ISIF Asia

ISIF Asia 2016 call for grant proposals and award nominations received 303 grant proposals and 52 award nominations. For 2016 ISIF Asia offered 2 awards and 10 grants. The program worked across different categories and grant mechanisms, offering 2 awards, 7 small grants (up to AU$ 30,000) and 3 Impact grants (around AU$ 50,000) on Internet Operations Research, Cybersecurity, Technical Innovation and Community Impact. In addition, each of the Impact Grants recipients received over AU$ 25,000 in mentoring support, the largest pool offered so far by ISIF Asia on capacity building to a single organization.

Consistent efforts across the organization were conducted to expand the reach of the application process to widely promote the funding opportunities available, especially around economies that ISIF Asia did not received applications before, and on the categories that target a smaller group of researchers and innovators, such as the Network Operations Research and Cybersecurity categories. The interest raised provides evidence of the continued interest of regional stakeholders in small-grants and mentoring opportunities for early-stage technology innovations.

Table 1 below summarizes some of the key statistics from the 2016 application cycle. Some pointers that we can draw from this data include:

For the grants application process, civil society continues to be main constituency that applies to the ISIF Asia program, followed very closely by the Academic sector and Social Enterprises, with as the Private Sector and Government agencies lagging behind. However, the awards process paint a different picture with the Civil Society still on the lead, but followed closely by the Private sector, leaving the Academic sector, the Government and Social Enterprises last.

In terms of geographic distribution, 22 economies applied during the 2016 cycle, consistent with previous years. The economies with the largest numbers of submissions for the Awards were Bangladesh and India, while for the Grants, the higher number of applications came from Malaysia and Indonesia.

In terms of thematic categories, "Internet for Development" outranked the other 2 categories, followed by the "Network Operations Research" and lastly by "Cybersecurity". This trend is understood to be a result of ISIF Asia focus on development projects and regional perception based on previously supported projects. Nonetheless, the renewed focus on more technical thematic priorities is transforming this view and contributing to increase the submission of technical proposals.

For the Internet Society Cybersecurity Grant, ISIF Asia received total of 16 applications; these represented 15% of the total number of proposals received. The lower number of applications responds to in part to the defined scope, but also reflects the nature of the cybersecurity space, which is highly needed but not widely staffed. ISIF Asia worked together with technical staff across APNIC to reach out to potential applicants and coach them to submit their applications.

Table 1. ISIF Asia Application Results - 2016 Cycle

2016 Applications
<u>**By type of support**</u> Awards: 52 Grants: 303 submitted. 291 accepted for evaluation and 12 rejected (out of scope). <u>Acceptance rate</u>: 3,38% <u>**Grants Per thematic category**</u> Internet for Development: 221 Network Operations Research: 54 Cybersecurity: 16 <u>**Per Organization Type**</u> Civil Society: 28.1% Academia: 21.1% Social enterprise: 21.1% Private sector: 17.5% Government: 12.3%

Section 2. Internet Society Regional Grants.

A total of five grants were distributed by the three programs, summaries of which are provided below.

Section 2. A. FIRE

Project name: Expanding Bosco Uganda Internet/Intranet Network Access to the Rural Remote Communities in Northern Uganda
Organization :BOSCO-Uganda
Grant Size: 25,000 USD.
Thematic Category: Access Provision
Video: https://www.youtube.com/watch?v=Rs9q0PEPvo4

About the project

In an endeavour to end the digital divides in their country, BOSCO-Uganda, a non-governmental organization which was started in 2007, proposed to provide an efficient communication infrastructure as well as access to information as one of the vital pillars for innovation, creativity, economic opportunity, peaceful coexistence, recovery and development in North-Uganda.

This project *Expanding BOSCO UGANDA Internet/intranet Network to access to the rural remote communities in Northern Uganda* would enable BOSCO Uganda to provide free internet access to the already existing free entry remote ICT youths centres. This would have as results to enhance access to internet irrespective of sex, gender, age, language, religion as well as physical or mental abilities.

The project should also contribute to rural development as it targets to enhance socio-economic growth where by farmers can advertise for their goods, communities can learn about new innovation and creativity which will lead to poverty reduction in Northern Uganda.

This was planned to be achieved by installing point to point network infrastructure to bring connectivity to remote places.

Projects Results

Procurement of power equipment and network equipment for the expansion of BOSCO-Uganda internet/intranet network to the remote rural communities of northern Uganda.

The following equipment for power and network for the expansion were procured in an attempt to expand BOSCO-Uganda internet/intranet.
1. Solar panels and batteries have been procured for the upgrade of the network back bone 4 relay towers

2. Network switches have been procured for upgrade of the network back bone
3. Network Radios and their dishes have been procured for the expansion of the network to 4 remote ICT sites
4. 80 % of Other Installation materials like charge controllers, network cable, power cable, connectors, mounting material, and battery cages have all been procured and have been deployed at the 4 relay towers and 4 remote ICT sites.

Such procurement of equipment has brought about a stable and reliable connectivity and power supply. An increase has been noted in the usage of computer as well as in the number of users.

The usage of computer and internet facilities for communication have increased in the targeted communities since the expansion of internet connectivity to their ICT site.

BOSCO-Uganda intranet/internet connection have been expanded to 4 ICT sites of the 7 ICT remote sites to be connected in Northern Uganda. These sites are; Acandano ICT site in Lira, Rackele ICT site in Lira, WarocoKwo ICT site in Gulu and Pader Town Parish ICT site in Pader all has been connected already to BOSCO-Uganda internet/intranet network. There has been an increase in the number of people who come to get trained on Web 2.0 and the use of internet. They are also getting used to social media and modern forms of communications. There has been an improvement in regards to the communication flow between BOSCO-Uganda and people within the community.

Solar Power has been stable at the upgraded relay towers and the Network switch has led to the increasing number of port which contributed to the expansion of internet/intranet connectivity to the 4 ICT sites and between the 4 relay point to point towers.

Project name: The 21st Century Digital Farmer!
Organization: Mucho Mangoes Ltd
Grant Size: 25,000 USD.
Thematic Category: Access Provision
Video: https://www.youtube.com/watch?v=K4-EPEdKwl0

About the project
Mucho Mangoes program, _The 21st Century Digital Farmer!_ Sought to empower rural smallholder farmers to mass produce better quality mangoes, then provide a ready and reliable market for their produce.

To equip the 21st Century rural smallholder farmer to optimize production, Mucho Mangoes aimed to setup mobile ICT centres which provide 3 months training to rural smallholder farmers in Taveta Sub County, Kenya, on a 2 hour per day model. Participation is drawn from the farming community but includes women and Youth. The training program is free and is provided after undergoing another 3 days to one-week training on Horticultural Crops Pre and Post-Harvest Handling skills and Crop Husbandry, which is also free. After graduating from the training, participants have access to a computer lab at Mucho Mango offices in Taveta, with

internet facilities where they can access the internet and do online research, sells, and access online agricultural materials and further training.

Projects Results

Mucho Mangoes has seen considerable progress since its conception. They have trained 376 farmers and have increased internet access to rural farming communities. Due to proper access to information and relevant sources there has been a significant reduction in farm wastage and post-harvest losses.

There has been an increased yields and incomes for rural small holder farmers. Throughout those trainings, Mucho Mangoes has improved the communication skills for the 376 farmers as well as their livelihoods for their whole families.

Within the first 6 months in the project, the organization was able to train more than 60 % of the project targeted number of beneficiaries and by now have achieved more than 90%. There has also been requests from farmers from several other areas and regions to provide training for them.

Section 2. B. FRIDA

Project name: Protecting the TOR Network against Malicious Traffic.
Organization: Lab of Security and and Cryptography at the Campinas State University (Brazil).
Grant Size: 25,000 USD.
Thematic Category: Innovation for Internet Development
Video: https://youtu.be/72Fdi3CLeXo

About the project

TOR is an overlay network that enables anonymous communication between applications that communicate over TCP. This network serves hundreds of thousands of users, allowing them to decide when they wish to be identified, thus keeping their online data from being tracked and protecting the privacy of their activities against third-party tracking attempts. Despite being used mainly to avoid online censorship in countries under dictatorial regimes, this anonymity network is also used for cybercrime, such as sending SPAM and DDoS attacks. In this context, the project sought to provide a solution to the growing traffic of malicious code that is being sent over this network. The goal of the proposal was to research methods and techniques for protecting the TOR network against malicious traffic, while maintaining the privacy and anonymity of harmless traffic.

Projects Results

-   Implementation of a platform to analyze malicious traffic in the Deep Web, capturing samples of malicious traffic to be analyzed. GitHub: https://github.com/LascaTorbot. The

platform was successful in 98% of cases in recognizing malicious traffic over a sample of 1,000.
- Development underway of methods for blocking malicious traffic, techniques and tools to collect real time information about the evolution and impact of malicious software. These methods and tools are to be instrumentalized in future stages of the project.
- Capacity building courses offered about security in TOR for the academic community reaching over 200 people. Workshops and presentations include:
    - Internet Governance Forum (IGF) Guadalajara, México. 2016.
    - LACSEC - LACNIC 27, Foz de Iguazú, Brazil. 2017.
    - Computing Week at UNICAMP. Campinas, Brazil. 2017.
    - VII Meeting in Security and Computing by CERT.Bahia. Salvador, Brazil. 2017.
- Direct collaboration with TorProject - original developers and supporters of the TOR network to structure the research following the network's code of ethic for research within the Deep Web.
- Collaboration with Project CaUMA, the Catalog for Malicious URLs to automatize the detection of fraudulent URLs in the Deep Web.
- Thorough documentation of initiative: http://143.106.60.114/mediawiki/index.php/Torbot

Project name: BGP Security in RENATA's Infrastructure.
Organization: RENATA, the National Academic Network of Advanced Technology (Colombia).
Grant Size: 25,000 USD.
Thematic Category: Innovation for Internet Development
Video:

About the Project
RENATA is Colombia's National Academic Network of Advanced Technology. The goal of the project was to implement origin validation for BGP routes in RENATA's network backbone, which provides interconnection services to SNCTI in Colombia and the rest of the world. Specifically, the project focused on the major exchange points in Bogotá which provides connectivity to the Clara Network and Barranquilla which connects directly to the Internet. The goal was to implement public key infrastructure for Internet resources (RPKI) of participating organizations, using the model for cryptographic validation (Route Origin Authorization) hosted by LACNIC. Working towards the university of the future, RENATA embarked on this project – the only one of its kind worldwide– in order to increase the region's leadership in BGP security.

Project results

- First project worldwide seeking to implement origin validation in a nation-wide network. Participating organizations included not only the Universities that are members of RENATA, but also service providers such Telefonica and Red Clara.
- Activation of origin validation in 3 nodes of the RENATA infrastructure. All prefixes that circulate through RENATA's infrastructure were monitored to know what percentages of the routes were deemed valid, invalid and not found; the latest measurements were taken between August 14-31, 2017. Those exiting through Red Clara were 6% valid,

93% not found and 1% invalid. Those exiting to NAP Colombia and the Internet showed the following percentages: 46% valid , 51% not found, and 3% invalid. This shows that additional awareness-raising is needed with Red Clara to encourage resource signing.
- Connection completed between routers ASR9001-Bogotá amd ALU-Bogotá Centro with RPKI, establishing communication among them and offering BGP origin validation.
- Patch developed with the support of CISCO to be able to implement RPKI in CISCO Routers.
- Project results presented in the IETF 2017 in Singapore
- 4 online and 2 in-person workshops with institutions connected to RENATA network and services providers of the Colombia NAP. A total of 328 online 69 in-person participants trained on RPKI, resource signing by participating institutions, route hijacking and origin validation in the RENATA infrastructure.
- One additional workshop conducted with Telefonica which resulted in the creation of Route Origin Authorizations (ROAs) for 100% of their resources.

Section 2. C. ISIF ASIA

Project name: Developing Tonga CERT
Organization: Department of Information & ICT under the Ministry of Meteorology, Energy, Environment, Climate Change, Information, Communication, Disaster Management (MEIDECC) (Tonga)
Grant Size: AU$ 56,000
Thematic Category: Cybersecurity
Video: https://www.youtube.com/watch?v=eBJDKBFSLqs

About the project

This grant supported the development of a National Computer Emergency Response Team (CERT) for the Kingdom of Tonga, the first of its kind in the Pacific region. In August 2013, the submarine cable connecting Tonga to the Internet was commissioned and finally connected Tonga in 2016. The Government realised that the improved connectivity will bring many opportunities for social and economic development, but acknowledge that it will also bring challenges for the people of Tonga. The government established the Cyber Challenges Taskforce and one of its mandates was to establish a CERT. In July 2016, the Government of Tonga established Tonga's National CERT including a Board to provide oversight and a Terms of Reference with the vision: _"A safe and secure digital environment for the Kingdom of Tonga and its citizens"_ and the a mission: "To coordinate and collaborate amongst stakeholders to prevent through public awareness, detect and manage cyber threats in the Kingdom of Tonga". The Internet Society Cybersecurity grant was allocated to MEIDECC just as the formal announcement to establish the CERT was made public to help MEIDECC to establish a team and get the CERT up and running. The funds from the Internet Society Cybersecurity grant supported the following activities:

1. Identify of the key technical role that needs for the initial launch of the CERT team
2. Install, test and launch of a communication system for the CERT team
3. Install, test and Launch of the certTonga website
4. Identify support roles to assist with CERT operation.
5. Equip the CERT team with computer equipment to provide services with.
6. Establish a closed computer network for the CERT operation

Since the launching of this project in 2016, there has been a lot of activities that strengthen management ability of the team due to the establishing of a proper Standard Operating Procedures (SOP) for the certTonga team to follow, engaged in different workshops and short training from APNIC as well as other CERTs study visits to the some of the established CERT in the region to learn of their best practice. The ISIF funding has instrumental in building of a well-managed communication system for the CERT as well as equipped the operation with computers and capacity building opportunities for the team. This also ensures the delivering of the desired results according to the CERT different goals and mandates.

Projects Results

This project has been successful so far in achieving of the outlined objectives and goals for this project and organizations and members of society are better aware of the role of CERT and they are starting to get CERT involvement in activities that are related to the cyber security and cyber safety. The Tonga CERT is now playing a vital role in the Tonga Police investigation process which has placed the Tonga CERT in a position to be actively planned to grow in all areas to be able to cope with the demand. There is a particular focus on building capacity of the team as it now essential to the continuous operation of the CERT as well as obtaining a reliable information obtained from a verified sources and undisturbed evidences. Considering the size of the Tonga population, we are now realizing the crucial role of the CERT in providing security alerts and forensic services for our law enforcement agencies that they currently don't have capacity and procedures in place within their own respective organizations.

The full report of the certTonga projectd is available for download at
https://application.isif.asia/theme/default/files/ISIFAsia_2016_Grants_TechReport_TongaCERT_vFinal.pdf

Section 2. D. 2016 Internet Governance Forum Activities

- **Booth**: As part of the Seed Alliance activities, a booth at the IGF Village was organized. The booth provided a meeting spot for program officers of all 3 regions, as well as all the fellows supported.
- **Cybersecurity workshop**: Grantees from the cybersecurity grants allocated by FRIDA and ISIF Asia received support to present their work at the "Cybersecurity – Initiatives in and by the Global South" workshop. The video of the session and its report are available

at https://www.intgovforum.org/multilingual/es/content/igf-2016-day-1-room-3-ws-26-cybersecurity-initiatives-in-and-by-global-south

- The Internet Society also supported the development of a **Social Event for the Seed Alliance.** Hosted at the Santo Coyote Cantina, the event gathered 150 delegates that attended the IGF.

Section 3. Seed Alliance 2016: Other Projects Supported

Beyond the 5 Internet Society grants, in the 2016 cycle, Seed Alliance offered 22 additional grants and 8 awards. As member of the Alliance, these additional initiatives also make part of the overall work and impact of the international consortium that makes up Seed Alliance, and hence, are included in this report.

Projects range across a wide array of topics including:

Internet and Technologies for Participation and Inclusion: initiatives to get women and girls involved in ICT and prevent gender-based violence in Rwanda, Kenya, The Gambia and Myanmar; ICT to preserve African languages; libraries for the visually-impaired in Cameroon and Uruguay; digital solutions for individuals with speech impediments in Colombia; platforms for greater accountability of electoral processes in Malaysia and whistleblowing in Mexico.

Internet and Technologies for Communities: education and health initiatives such as waste management through online platforms in Nigeria, gamifying math and science lessons for basic mobile phones and feature phones in Tanzania, remote prenatal care in Ghana and digital medical records and complementary services for mothers and children in India. Workforce support initiatives such as a platform to facilitate the financial management of emerging startups in Singapore and mobile apps for the support of rural farmers in Trinidad and Tobago. Disaster management and prevention, such as devices for restoring connectivity and UAV applications for resilient communications in the Philippines, and GIS mapping platform for vulnerable communities in Guatemala.

Internet Access and Technical Research: IPv6 deployment in Argentina, hardware development for community networks, connectivity for the Brazilian Amazon through High Frequency Radio stations, Wifi access for underserved communities in South Africa. Research on peering strategies for pacific islands, detection of BGP anomalies, improved experiments around satellite connectivity and research on honeynet as a means to improve cybersecurity in pakistan.

In light of Internet Society's 2018 pledge to Seed Alliance, it is worth highlighting the contributions made to the Community Networks movement through the scale-up and interregional grants offered to AlterMundi (Argentina) and Zenzeleni Networks /University of Western Cape (South Africa) through the LibreRouter project. Summaries of these additional projects are provided below.

Section 3. A. JOINT SCALE UP AND INTERREGIONAL GRANTS

LibreRouter. Zenzeleni Networks and AlterMundi (South Africa and Argentina). $30000 from FIRE, US$40,000 from FRIDA. US$30,000 Interregional Grant. Community Networks depend on modifying existing off-the-shelf routers to adapt them to their particular needs. Software development that originated in Community Network groups and the Free Software movement as a whole has pushed the barrier of innovation and helped commercial enterprises

develop new products over the years. This virtuous relation between hardware vendors and the community has been threatened by new regulation from the Federal Communications Commission (FCC) - U.S.A., which has led vendors to globally close up their routers to third party modifications, hindering open innovation and effectively closing the door to Community Networks in terms of access to the hardware they depend on. The Libre Router project prototyped multi-radio wireless router targeted at Community Networks' needs.

Section 3. B. FIRE

Over and above the two Internet Society Regional Grants, FIRE offered four awards, three scale up grants and four grants more. The below information includes a brief description of each projects supported.

Awards

- **Tobetsa and WiFi TV Extension Project (South Africa) US$ 7000.** Tobetsa is Tshwane Free WiFi's unlimited access content portal which provides users with content and resources to develop and grow the knowledge and skills of low-income, under-served communities who benefit from Free WiFi. Tobetsa features WiFi TV content: hyper-local, mobile video content produced by young, aspiring videographers from local communities. As Tobetsa grows into its next phase of development, this project will enable the opportunity to further extend the impact and reach of WiFi TV, including a more integrated and collaborative approach to ensuring the content on Tobetsa and WiFi TV is more closely aligned across the platform as a whole, enabling a consolidated strategy towards ensuring the platform's continued development towards sustainability.
- **DocmeUP, Prenatal care for communities and remote ultrasound imaging (Ghana).US$7000**. DocmeUP promote antenatal care. A health worker can monitor her own community, and is able to continuously communicate with her community and remind them to go to the closest clinic. Moreover, health workers can also detect dangerous signs on her patients and report them immediately to the clinic or ambulance. An easy way to support community health workers is to equip them with a mobile app which contains medical advice and is connected to the main server so that tracking can be enabled. Even with continuous reminders from the health workers, some pregnant women still find it difficult to attend gynecological visits, therefore the system will enable health workers to remotely check ultrasound scans.
- **Kids Comp Camp (Kenya). US$7000.** The overall goal of Kids Comp Camp is to equip young learners in marginalised communities with digital literacy skills. The specific objectives are to expose young learners, who have no prior experience with digital devices, to their 'First Digital Experience' through interacting with different digital devices, to teach the learners to operate these devices for productive learning and leisure, and to broaden learners' horizons and scope as they use the acquired digital literacy skills in accessing more information and knowledge on the internet.
- All Girls Tech Group (The Gambia) US$7000. All Girls Tech Camp builds awareness of the various career options in STEM field for girls. The aim is to Improve digital literacy among girls. All Girls Tech Camp aims to create a platform that will build and nurture

self-esteem and confidence in girls, help them compete and succeed in the world of computers and information technology and create positive and productive networking opportunities for participants. It also aims to encourage and empower the next generation of coders, designers and programmers for sustainable development, empower and encourage more females into the field of technology to break the stereotypes most of the girls are facing, cultivate and nurture the spirit of leadership and entrepreneurship and, finally, provide mentorship opportunities for participants to help in career guidance.

Grants

- **eTrash2Cash (Nigeria) US$25000.** eTrash2Cash's goal is to use ICT to register online and collect all varieties of waste (paper, plastic, glass, electronics, metal, food) from 10, 000 pre-registered households and commercial hubs in Kano City and awards them instant online incentives based on the quality and quantity of their waste, redeemable by cash. eTrash2Cash turns the waste into valuable and reusable materials, like tissue paper from paper waste and lumber from plastic waste. The overall aim of the project is to positively impact the environment through reducing pollution, flooding, deforestation, and mitigating effects of global warming as well as to create more jobs, empower households with little income through awarding them incentives for their waste. Another goal is to use the power of ICT to raise awareness and advocate for climate change and to educate, encourage and illustrate to the local communities how ICT could be deployed to drive positive social change.
- **AfChix (Kenya).US $25000.** AfChix is a network of women in Technology who consider gender diversity in the Computer Science and ICT industry as very critical for increased creativity and innovative performance of the industry. AfChix's activities impact over 25 African countries and the network is involved in mentoring girls to consider careers in Computer Science and IT. They achieve this through visits to schools, celebrating annual Girls in ICT Days, running technical workshops such as the AFNOGChix Linux Administration Series and sponsoring members' participation in tech conferences such as the Grace Hopper Conference for Women in Computing and the Africa Internet Summit (AIS). AfChix believes that by exposing young girls and women to possible career opportunities in Computer Science & ICT, they empower them to join technical fields confidently. They target the upper primary and high school girls between the age of 9 and 18, young women who have freshly joined careers in ICT/Computer Science at Universities and workplaces and those established and looking to grow into technical leadership positions.
- **Library for blind and sight impaired people. BIBLIOTHEQUE LE PAVILLON BLANC (Cameroon) US$25000.** The Pavillon Blanc library in Yaounde is specially dedicated to the blind and partially sighted. Its main aim is to spread knowledge and to positively influence the academic and socio-professional inclusion of the blind and partially sighted in general as well as those with Albinism in particular. The Yaounde library will train youths with visual impairments in the following professions: Computer maintenance, Computer graphics and Secretarial skills.
- **Rwanda GBV Monitor. Association Pour l'Encadrement Sûr des Enfants orphelins**

et autres enfants vulnérables de Kivumu (Rwanda). US$ 25000. Rwanda GBV Monitor aggregates data on gender based violence from disparate sources in Rwanda including GBV Helpline, Isange One Stop Centers, online news, and NGO reports, among others. Data and insights on GBV available through Rwanda GBV Monitor aim at sensitising the public and media on the extent of gender based violence in Rwanda. Monitor also provides details on the extent to which victims are able or unable to access psycho-social, medical, legal services and remedies in various state and civil society institutions. Availability of such data in the public domain empowers civic groups and media to compel such institutions to deliver and improve the timely delivery of such services to the victims.

Scale-up Grants

- **Ubongo (Tanzania) US$30000.** Through this project, Ubongo provides gamified Ubongo Kids lessons and quizzes to viewers via interactive SMS (for basic mobile phones and feature phones) and via an Android App. Ubongo has already created a library of over 3000 quiz questions that go along with its Ubongo Kids TV episodes and topics, and have delivered these to over 120,000 users on the Tigo Mobile network in Tanzania during a 1 year beta test. Through this project Ubongo plans to: Expand the library of quiz questions to include lessons and tutorials in maths and science for Tanzania, Kenya, Uganda and Rwanda for Classes 2-5 in both Kiswahili and English, build an API (application program interface) to allow other mobile learning partners, including Eneza Education and Shule Direct, to directly pull quiz questions to their platforms, and build an Android game which delivers the same quiz questions in through a series of fun games starring Ubongo's cartoon characters.
- **The NatiV Project. Purple Zoom (Zimbabwe). US$ 30000.** At NatiV, we are advocates of mother-tongue learning. We are also passionate about the conservation of African languages using ICT. Thousands of children in Zimbabwe and millions across Africa have little or no access to early-learning material. UNESCO points out the advantages of mother tongue based education in the early years: when children are offered opportunities to learn in their mother tongue, they are more likely to engage and succeed in school. Digital tablets offer an intuitive, rich platform for children to learn, in comparison to the ordinary pen-paper methods. Research has shown that children who have had a more interesting way of learning a certain concept will commit it to memory and apply it better. NatiV is an award-winning project that aims to create mobile mother-tongue learning solutions for children, including those that have reading disabilities and those that live in marginalized communities. Our solutions span mobile games and apps that are feature-rich and engaging, as well as native language text-to-speech technologies.

Section 3. C. FRIDA

Beyond the two Internet Society regional grants, FRIDA supported 2 awards, 4 additional small grants and 2 scale up grants.

Awards

- **FRIDA Award: AgriNeTT. University of the West Indies, St. Agustin Campus (Trinidad and Tobago). 5,000 USD.** AgriNeTT is an e-Agriculture project which infuses ICT into the agriculture sector of Trinidad & Tobago to build a knowledge intensive agriculture economy. The project provides ICT tools for the farming community and agricultural institutions to help to drive economic growth of the agriculture sector and increase its competitiveness. The project aims to increase agricultural productivity and incomes of small-scale farmers, in particular women and youth and family farmers. The AgriNeTT team has developed two Open Data platforms which serve as a repository for agriculture data sets from institutions and associations. Several mobile and web-based applications have been developed for the platform: AgriExpense – a farm financial management tool, AgriPrice – provides up-to-date data on market prices, AgriMaps – a Land Suitability tool which recommends preferred crops for various parcels of land, and AgriDiagnose – a pest and disease diagnosis system.
- **FRIDA Award: Mexicoleaks (Mexico). 5,000 USD.** Méxicoleaks is an independent whistleblowing platform for leaking information that is of public interest in Mexico. In addition to offering a platform where whistleblowers can share information safely and anonymously, Méxicoleaks is an alliance of media outlets and NGOs working together to build a more transparent and democratic Mexico. Since its creation, the partners behind Méxicoleaks have published 27 news stories based on 13 leaks, including information regarding embezzlement in the public real estate loans system, the systematic mass destruction of pre-Hispanic ruins, and other corruption cases.

Small Grants

- **Digital Mapping. Perpendicular (Guatemala). 25,000 USD.** There are more than 300 informal settlements in the metropolitan area of Guatemala. The goal of the Digital Mapping project was to design a solution to identify risk factors and vulnerable urban areas, and test this solution in a number of pilot settlement. The mapping tool was developed and applied to 3 settlements. Information was collected by the local residents and field workers with the help of drones and mobile devices. It is expected that this data will help streamline and prioritize public policies and/or actions for disaster prevention in these vulnerable urban territories. The information will be made available through an online platform. The project seeks to become a benchmark for multisector participation in the production of urban information and diagnosis.
- **BIDYA: Digital and Accessible Library. UNCU, the National Association of the Blind (Uruguay). 25,000 USD.** The goal of BIDYA is to promote the inclusion and continuity in the formal education system of children, teenagers and young people with visual disabilities, thus guaranteeing equal opportunities. The limited availability of study material in braille, audio, electronic, or extended character format is one of the greatest

difficulties visually impaired students encounter in the educational system. BIDYA digitized books and required reading as established in the Uruguayan primary and secondary school curricula. These will be made available online through a repository of books and other materials in various formats. The Digital and Accessible Library will allow universal access, regardless of geographic and physical barriers or mobility limitations.

- **Amazon Digital Radio Network using High Frequency. Department of Planning, Urbanism and Environment at the Sao Paulo State University (Brazil). 25,000 USD.** The goal of the project was to provide digital communication infrastructure for traditional communities of the isolated rural rainforest areas in Acre State, in the Amazon region of Brazil. This research is the continuation of the Fonias Juruá academic research project where, in 2015, five High Frequency (HF) radio stations where installed inside the Alto Juruá Reserve in communities without any communication infrastructure, sometimes taking more than one day by boat to reach the nearest phone. The project expanded and improved the already existing radio network, adapting this social technology with the feedback from the local community. Each HF station is equipped with a digital modem, connected to the radio, which allow digital data exchange between the communities.
- **LACNIC IPv6 Grant: IPv6 Deployment at UNT. National University of Tucuman (Argentina). 20,000 USD**. Universidad Nacional de Tucumán (UNT) is the largest university of Northern Argentina and its community includes more than 80,000 people. The project supported IPv6 deployment in the University's networks.

Scale up Grants

- **Speaking with Julis (Colombia). Scale-up grant. US$40,000.** Hablando con Julis (HCJ) is a digital solution for people with speaking, reading and writing difficulties. The HCJ solution helps users communicate, improve their pronunciation, and learn to read and write in short periods of time. HCJ targets users with speech difficulties, Down syndrome, autism, cerebral palsy as well as adults with loss of speech due to illness, and illiterate populations.
- **Libre Router (Argentina). Scale-up grant. US$40,000.**

Section 3. D. ISIF Asia

During 2016, ISIF Asia allocated AU$ 450,000 in funding, including the Internet Society Cybersecurity grant listed above across 2 awards and a total of 10 grants. Below, the list of Award winners and grant recipients that received support from APNIC and IDRC.

Awards

A brief introduction and video presentation of the 2 award winners is available at https://isif.asia/awards-2016/

- **Community Impact Award: Restoring Connectivity: Movable and Deployable Resource ICT Unit (MDRU). CVISNET Foundation. The Philippines.** The MDRU is a

unit that can be quickly deployed to restore communications in communities in the aftermath of a disaster. The unit is self-reliant running on its own power source, and/or is able to harness other power sources such as power generators or local active power lines. It has the ability to accommodate communication and information processing functions that can be rapidly transported or moved to the disaster zone, and can be deployed within a reasonable short time to establish the network at the disaster site and launch ICT services. An ideal MDRU is equipped with an array of communications equipment, servers and storage devices, and is designed to bring not only a communications infrastructure but also data center functions to a disaster-stricken area in a very short time. The MDRU system is capable of expanding by connecting to another MDRU and thereby creating an MDRU network. This extends the coverage as big as the number of units is connected. The project extended the MDRU to Designated Evacuation Areas using Fixed Wireless Access (FWA). The project implements an FWA IPAS (Wireless IP Access System), a broadband wireless point-to-multipoint communication system operating at 26 GHz that provides high-speed IP access up to 80 Mbps transmission rate.

- **Technical Innovation Award: Towards A Fairer Electoral System: 1 Person, 1 Vote, 1 Value. Tindak Malaysia. Malaysia.** The project has brought the following benefits to the community: 1) Lowered the barriers to effective objections to the Electoral Delimitation process, whereby a hitherto impossible task has now been made possible; 2) Provided free and open access through the Internet to our equalized digital maps and objections menu to assist electors make representations, counter-proposals and objections to the Election Commission's (EC) recommendations; 3) Education programmes through YouTube on the Delimitation process as a voter awareness and empowerment tool; 4) The item below is an ongoing activity as, other than Sarawak, the EC has not tabled their Delimitation Recommendations for public objections yet; and 5) To organize 100,000 electors to register as objectors in groups of minimum 100 per Constituency in readiness for the EC's launch of the Delimitation exercise.

The grant recipients reports are available at https://isif.asia/2016-grant-recipients/ as follows:

Internet Operations Research Grants (AU$115,000)

- **Realistic simulation of uncoded, coded and proxied Internet satellite links with a flexible hardware-based simulator. The University of Auckland, New Zealand.** The main focus of this research is to establish realistic satellite simulator of UDP flows. It also automates experiments run on non-coded and coded configurations. The project builds upon a 2014 ISIF Asia grant to improve connectivity in the Pacific islands.
- **Rapid detection of BGP anomalies. Centre for Advanced Internet Architectures (CAIA), Swinburne University of Technology, Australia.** This research focuses on producing techniques for the real-time detection of different types of BGP anomalies that can be used by an operator. The evaluation of this tool will be carried out with a controlled testbed using BGP Replay Tool (BRT) to emulate past BGP events.
- **A Peering Strategy for the Pacific Islands. Telco2 Limited, New Zealand.** This research continues and expands a set of Internet measurements of latency to Pacific Island telecommunications providers from various locations around the world, that when evaluated in conjunction with submarine cable availability, can be used to determine a metric for efficiency of transit that can be considered along with the economic impact of having an efficient transit. The measurements will be made available in real-time via a web interface to help operators, regulators, and funders understand the physical routing

of network traffic, availability of content, and benefits of peering to improve availability, reachability and security of the Internet in the Asia Pacific region.

Community Impact Grant

- The AU$ 50,000 Community Impact Grant was awarded to **Equal Access to the Information Society in Myanmar, the Myanmar Book Aid and Preservation Foundation, Myanmar.** This project focuses on women and youth, and benefits 500 people through 20 libraries across the country. The curriculum, developed specifically for Myanmar, focuses on critical thinking in a digital environment of smartphones and tablets. It develops the skills of young female leaders by providing them with specialized information technology training, leadership and job skills, and opportunities to engage in critical public discussion. Myanmar Book Aid and Preservation Foundation will also participate in a three-week mentoring program in Singapore, facilitated by JFDI.Asia, valued at AUD 25,000 plus expenses during their stay.

Technical Innovation Impact Grant

- The AU$ 50,000 Technical Innovation Impact Grant was awarded to **Khushi Baby, India.** This project improves digital medical records for mothers and children by streamlining data collection, improving decision making in the field, aiding in district resource management, and delivering effective dialect-specific voice call reminders to mothers. Khushi Baby will also participate in a three-week mentoring program in Singapore, facilitated by JFDI.Asia, valued at AUD 25,000 plus expenses during their stay.

Four projects received small grants under the the Technical Innovation category for up to AU$ 30,000.

- **My Community Reader: a Mobile-First Distributed Translation Tool and Reader for Ethnic Minority Languages. The Asia Foundation, Thailand.** This project will build, test, and deploy a tool to translate text into minority languages books, significantly expanding the available online library of digital and printable mother-tongue children's books. It will also deliver a mobile app so people can search the library and download titles on local Android devices.
- **UAV-Aided Resilient Communications for Post Disaster Applications: Demonstrations and Proofs of Concept. Ateneo de Manila University, Philippines.** This project will design and demonstrate UAV-borne radio payloads as critical network nodes in the development of a post-disaster resilient, delay tolerant communications system, using both multi-rotor and fixed wing platforms with long range radio payload to demonstrate the concept. The UAV will act as data aggregators and wireless store-and-forward relays for collecting important information and providing connectivity to evacuation centers, ground teams and concerned agencies. Data can be gathered from multiple sources below and delivered to another ground team or to a central station, while it can use the wireless link to broadcast messages to the ground nodes. Relayed information can include survivor profiles, food supply audits, medicine requests, and images of victims. This system will be used to assist response team coordination, hasten rescue efforts, and deliver timely updates, among others.
- **Legalese. Legalese Pte. Ltd. Singapore.** This is a web application that will enable the growing Asian population of first-time entrepreneurs and first-time investors to transact

seed-stage financing with confidence and without expensive legal fees. The app educates end-users about entrepreneurial finance, facilitates choosing and configuring investment agreements, manage signatures through to completion, and develops libraries of contract templates for Asian languages and Asian jurisdictions.

● **Deployment of Collaborative Modern HoneyNet to improve Regional Cybersecurity Landscape (CMoHN). Institute of Systems Engineering, Riphah International University, Pakistan.** The project will deploy and establish the core skills required to manage and integrate different honeynets and design new honeypots for countering cyber-attacks. The project will connect with other honeynets in the region to form a regional collaborative honeynet network, and promote R&D activities to secure network infrastructure through publications and conducting community awareness seminars.

Section 4. Technical grants for the Global South

This report marks the end of Internet Society's first cycle supporting the Seed Alliance as a global initiative. The goal of this concluding section is to summarize some of the main lessons from this experience

Effective Alliance for Technical Grants. One of the main takeaways from this experience has been recognition of the increased value achieved by Seed Alliance and Internet Society working together to offer technical grants. Funding for technical Internet development initiatives is rare, particularly for early-stage and experimental projects. Initiatives such as the Seed Alliance and Internet Society's Beyond the Net are recognised as unique opportunities for those working in Internet development to secure funding. This joint collaboration has proven to be an effective mechanism to support technical innovation through small grants in the Global South.

Innovation and Best Practices. The Internet Society's support has allowed 5 initiatives in the global south to experiment, innovate and contribute to the identification of best practices for developing regions. Some lessons include:

> *Cybersecurity*. The **TOR Project** has demonstrated that academic research is a means both to push innovation and to contributes the development of capabilities in cybersecurity in the region. In the case both of RENATA and the certTonga, seed funding has allowed for the development of high-impact initiatives that otherwise would not have been undertaken and that are now considered regional examples of how to move towards more secure networks in the Global South. In the case of **RENATA**, it is the first project worldwide seeking to implement origin validation in a nation-wide network. The **certTonga**, on the other hand, is a great example of what can be achieved when planning service delivery at a low cost, following best practices. The support of international and national partners was key to be able to establish this new organization. certTonga is a great example of effective multi-stakeholder collaboration, as the new team was able to structure proactive and reactive services, improve their capacity and set the course for future development and growth.

Internet Access. Rural Internet access is a both challenge and an opportunity to address development changes in the global south. Both the Bosco Uganda project and Mucho Mangoes are examples of the potential impact of bringing connectivity in rural areas. **BOSCO Uganda** has already taken the step to reduce the digital divide that exists between some African countries and the rest of the world. **Mucho Mangoes**, on the other hand, has also provided the opportunity for out of school youth in rural farming communities to learn a skill that will help them to gain employment, or improve their production as they transition to farming and agribusiness. It brought the youth and the elderly together with the eldest being 27 years old small scale farmer.

Story telling. Another key lesson from this joint collaboration has been the importance of storytelling as a means to promote innovation and replication of the projects funded. In the case of certTonga, storytelling through video has been key to illustrate the impact of CERT creation in the Asia Pacific region. Similarly, in the case of RENATA and the TOR project, the videos are proving key to communicate and explain the initiatives developed. In the case of Bosco Mango and Mucho Mangoes also serve as tools for fundraising, as they show first hand, the impact of bringing connectivity to rural settings.