



*Map the world
a better place*

Mapping the World a Better Place: The FIG's Volunteer Community Surveyor Program (VCSP)



FIG Young Surveyors Network

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INTERNATIONAL FEDERATION OF SURVEYORS (FIG)

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FOREWORDS



THE VOLUNTEER COMMUNITY SURVEYOR PROGRAM (VCSP) is a significant milestone in the FIG Young Surveyors Network activities. This publication presents the program's purpose, impact, and the global collaborative cooperative efforts between the FIG Young Surveyors Network and FIG strategic partner, the Global Land Tool Network (UN Habitat – GLTN).

The VCSP is designed to encourage young surveyors to volunteer their time and skills to humanitarian and environmental causes to “Map the World a Better Place”. The program facilitates the deployment of young surveyors who volunteer to support land administration in Africa and Asia.

The program exemplifies the current vision of FIG, to ‘Serve society for the benefit of people and planet’. Outlined is the very idea of establishing sustainable development through a humanitarian surveyor lens. Young surveyors participating in this program have the opportunity to make a lasting and positive impact for people. The global to local impact resonates across the surveyor’s working for people in their local places.

The VCSP has built upon FIG’s partnership agenda. Notably, it collaborates not only with the important global partner GLTN but also with FIG corporate member Trimble, both organisations have provided incredible support. Additionally, it has also outreached to 12 other partners that includes government ministries, academics, and civic society organizations.

The results of the VCSP empowers surveyors of all ages. While passion and adventure are expected from FIG young surveyors, the program has also highlighted their qualifications, skills, and professional maturity. Further the VCSP chair leadership, all have since risen into professional leadership positions.

The Journey of VCSP has been impressively led. Since its inception in 2017, the VCSP has achieved remarkable milestones. Initially deploying 12 Volunteer Community Surveyors (VCSs) across 7 countries, it has now expanded to an additional 30 VCSs with contributions in 9 countries. But, the impact extends beyond borders. Through co-created platforms, such as Wisdom Workshops and e-Volunteering mapathons, participants from over 45 countries have come together to learn and share knowledge and drive change.

Behind this success lies a network of passionate young surveyors. They collaborate, innovate, and co-create, leaving their mark on the world. There were so many who, working together with partners, became the architects of change and are rightly acknowledge. FIG community thanks them all.

The VCSP stands as a testament to the collaborative spirit that binds us professionally together. At its core, this program is about capacity building – equipping young surveyors with the skills, professional networks, and opportunities to make a positive impact on our world. As they volunteer their time and expertise, they not only map physical landscapes but also shape a better future for humanity.

We would like to acknowledge the efforts of the authors in providing this publication and the contributions from the wider YSN community whether through their tireless

work, unwavering support, and creative ideas. Seeking to address issues such as land equality in tenure security, climate action and ultimately poverty alleviation, with the aim articulated by the UN Habitat agenda – to “leave no one behind”.

The VCSP has shown that, together, we continue to map not just land but also hope, opportunity, and a brighter future for generations to come.

**Diane A Dumashie,
FIG President (2023–2026)**



THE INTERNATIONAL FEDERATION OF SURVEYORS (FIG) has been a central partner in the Global Land Tool Network (GLTN) from the Network’s very earliest days, and continues in that role today. Its membership and activities emphasise applied skills and practical solutions to challenges in the land management and administration professions. This emphasis is also a defining characteristic of GLTN. The Network was founded on, and still lives by, a clear set of objectives and principles. Our central premise is that inclusive land tenure security advances a number of, if not most, sustainable development objectives. Much of the world’s population does not enjoy tenure security, frequently because the administrative and technical tools to provide it are not available or are not effective and sometimes because the relevant legal and policy frameworks do not provide for those tools.

Partnering with FIG, and in particular the FIG Young Surveyors’ Network, to establish the Volunteer Community Surveyor Programme has been a rich and rewarding experience for GLTN. From the earliest pilots in 2017 through to fuller implementation in support of GLTN’s Phase 3 Programme from 2020 to 2023, we have improved skills, shared knowledge and built professional experience for thirty five young surveyors, as well as for tens, if not hundreds, of GLTN implementing and community partners in seven countries. In most of these countries, community level work on land administration has fed directly into national level legal and policy reform processes, amplifying direct benefits for hundreds into improved frameworks that benefit millions. Through the skills and knowledge that the young surveyors bring with them, GLTN partners have access to the latest developments and thinking in land administration. By applying their skills and knowledge in some of the most challenging contexts and with very practical objectives, young surveyors are able to adapt and refine them and to deepen their understanding of the importance and role of their profession. The development of ‘wisdom workshops’ and ‘e-volunteering’ as supporting components to the central in country deployments has provided a more holistic project that has allowed us to navigate disasters such as the COVID pandemic, as well as to respond even when facing conflict or insecurity. These supporting components have also naturally led to the development of the knowledge portal, which we hope to launch in the course of 2024.

The various chapters presented here provide a diverse and detailed source of information on the development and implementation of the Volunteer Community Surveyor Programme. This has provided FIG and GLTN with the opportunity to reflect on their

combined experience. Without hesitation, we will work to continue and expand the Programme and to use it for all of the existing objectives but also to further the integration of, and connections among, the global land management and administration community. That common cause will support the further development of a progressive and inclusive land management and administration profession that contributes to an improved and fit for purpose legal and policy framework. Whether the challenge is climate adaptation, food security, poverty, inequality or human security, inclusive and effective land administration providing tenure security and that implements good land governance and management is an essential prerequisite. Today's young professionals are tomorrow's leaders. We are pleased to support and encourage them and to play a part in enabling them to help those most in need.

Robert Lewis-Lettington
Secretary to the Global Land Tool Network,
Land, Housing and Shelter Section, UN-Habitat



AS THE INITIATOR OF THE VCSP and the former chair of the FIG Young Surveyors Network (YSN), it is with a deep sense of pride and gratitude to read this publication detailing the journey and successes of the Volunteer Community Surveyor Programme (VCSP). And with this – big time congrats to the whole team who have been working so hard on the VCSP! This programme, a collaborative initiative of the FIG, FIG Young Surveyors Network, FIG Foundation and the UN-Habitat Global Land Tool Network (GLTN), stands as a testament to what can be achieved when pas-

sion, expertise, and a shared vision come together to address some of the world's most pressing challenges in land administration.

I remember that in one of my reports to the FIG General Assembly I called each Young Surveyor a 'Star in the Sky' and this is also how this journey began with 'stars' who participated in the STDM Training of Trainers (ToT). This ground-breaking initiative left us wanting to do more – to take the rich experiences and knowledge each Young Surveyor, each star, has gained to the actual ground, where it matters most. With support of great mentors such as Teo CheeHai (FIG President at the time), John Hohol (FIG Foundation director at the time), Louise Friis Hansen and Claudia Stormoen Pedersen (FIG Office) together with a dedicated team of UN-Habitat GLTN (Clarissa Augustinus, Oumar Sylla, Danilo Antonio and John Gitau) we could make these stars even shine brighter.

31.05.2017 – this was the starting point to the VCSP, a volunteer program designed to connect the skills, talents, and education of young surveyors with the needs of communities worldwide, through GLTN's country-level implementation plans and partnerships. The VCSP is more than just a volunteer program-It is a platform for societal impact, professional development, and, most importantly, empowering young surveyors to contribute their skills towards significant global challenges.

I remember how nervous we all have been when the first volunteer was sent off but as soon as we got the first feedback from both the volunteer and the receiving organisation we knew we are on the right path.

The pilot phase of the VCSP, initiated in mid-2017, was definitely a leap of faith but the successful deployment of 11 young surveyors across various GLTN projects worldwide the pilot was successfully completed. This initial group of volunteers not only met but exceeded our expectations, demonstrating the profound impact that skilled and motivated young professionals can have on community development projects.

This has laid the groundwork for scaling up the initiative and with this also my term as FIG YSN chair ended and I happily handed over the programme with the idea of not interfering in the further development.

Now, 6 years later, the success of the VCSP pilot and its subsequent phases fills us (and now I write on behalf of the whole initiator team) with immense pride – not just in the program itself but in every young surveyor who has contributed their time, skills, and passion to this cause. Their dedication is a reminder of the power of volunteerism and the impact that skilled professionals can have on the world.

With deepest gratitude and respect,

Eva-Maria Unger
Developer and Coordinator during Pilot Phase,
Volunteer Community Surveyor Programme (VCSP)
Former Chair, FIG Young Surveyors Network (2014–2018)



IT IS NOT OFTEN ONE CAN CLAIM to have traveled the world from the comfort of their desk chair. And while the COVID-19 pandemic was a strange, uncertain, and devastating time, I was lucky enough to find fulfillment and comfort in the company of my VCSP team. This is a record of the efforts of many volunteers who share a vision. One that gives young surveyors hope that they can do more good in the world while using, and building on, their own skillset.

Being an ‘action’ person, from a private consulting background, the written word can sometimes be too academic for my attention-span. This publication is a refreshing change for me, and I hope you find the same refreshment. One of the greatest lessons that I got from Hartmut Mueller who was my FIG mentor while I led this program, was recognising the importance of recording the experiences of the Volunteer Community Surveyors, partners, which in term, honours the efforts our VCSP team who dedicated hours of their lives to make the program thrive. As you will read here, this program has improved the careers of a growing number of young surveyors and improved the lives of the communities they have volunteered within: either from afar or on the ground.

I urge you to support the growth of this program so that when the VCSP is still going in a decades’ time or more, we can collectively look back and remember that we did something that was beyond our own status quo and that effort causes a great wave of positive influence, all starting from the FIG Young Surveyors.

Claire Buxton (BSurv, CLS, LCS),
VCSP Lead 2019–2021

1 WHAT IS THE VCSP?

1.1 *Humanitarian Surveying as an Opportunity for Young Surveyors*

Our planet Earth contains large portions of water and land which serve as habitats to many life forms. Humanity depends largely on the land surfaces for most of their survival, therefore, proper management of land resources through a collective and effective land administration system is essential.

With rapid technological advancements, development of industries, changing geopolitical situations, shifting population dynamics and significant shifts arising from climate change, the surveying profession has a critical role to play in creating and sharing knowledge for a sustainable future. From a surveying perspective, food insecurity, forced evictions, geopolitical conflict are just a few of the impacts that arise from these megatrends. Within this, young surveyors are uniquely positioned to be able to take a proactive approach to existing local challenges, with their thirst for knowledge, flexibility in how and where they work and learn, fresh skill sets and education, and technological adeptness.

Deploying young surveyors to support land administration efforts, whether in-Country or supporting these works virtually, offers a valuable opportunity for those in their early career to make a real difference in the world. These experiences often help them to find diverse mentors to support their growth. This often has a marked impact in helping them link their values to help others and make the world a better place into a fulfilling career pathway. They have the opportunity to address global challenges, utilise their technical skills in areas of need, promote sustainable development, build cross-cultural competencies and soft skills, network, and fulfil a greater sense of purpose.

As a collaborative global outreach program, the Volunteer Community Surveyor Program (VCSP) encourages FIG Young Surveyors to volunteer their time and skills to humanitarian and environmental causes to “Map the World a Better Place”. Young Surveyors from across the globe come together, bringing the energy of young blood into the fight for two of the most important issues our generation and the world face today – the climate crisis and the lack of equal access to land rights.

1.2 *What is the Volunteer Community Surveyor Program?*

1.2.1 What we stand for

The essence of the Volunteer Community Surveyor Program (VCSP) is capacity building to empower young surveyors with the skills, networks and opportunities to map the world a better place. This occurs at a community level, a country level, and on a global level for our common future with regards to three core areas relating to global dynamics that lead to insecure tenure:

- lack of equal access to land rights,
- climate crisis, and,
- establishing sustainable development through humanitarian surveying.

The VCSP commits to enabling young surveyors to volunteer for the future through projects that prepare them for the world (career and personal). Through learning different perspectives and allowing them to connect, promote, and share knowledge with others, they grow both personally and professionally.

The core values of the VCSP solidify the foundation of our workflows and operations. These core values are:

- volunteerism,
- curiosity,
- respect, and,
- sustainability.

The FIG Young Surveyors Network (YSN), through the VCSP as its signature outreach program, recognises that the key challenges many communities face are ineffective land administration, population growth, poverty, and socio-economic challenges. The VCSP aims to bridge this gap by providing pathways for young surveyors to engage in activities related to land administration, promoting sustainable practices, and addressing specific issues faced by communities in land management. It brings together partnerships of young surveyors, host organisations and communities in need to benefit people and the planet. Although established as an initiative of the YSN, the VCSP operates independently underneath the YSN with its own Core Team and Annual Work Plans.

1.2.2 VCSP Paths for Action



The VCSP is designed to work in three core ways which brings together three key path through which Volunteer Community Surveyors (VCSs) can make a difference:

- **Wisdom Workshops** are held periodically for capacity building. They involve a virtual or hybrid seminar, preceded by a MOOC (massive open online course), which builds technical and soft skills in humanitarian surveying and provides the opportunity for participants to meet, network, and hear from industry leaders, and benefit from hands-on experiences.
- **e-Volunteering** allows young surveyors who are interested in volunteering, but committed to certain requirements that hinder mobility to in-Country work,

to have the flexible opportunity to remotely work on programs and projects online. In this way, the VCSs are able to volunteer time to contribute towards humanitarian and environmental efforts without the significant time and costs associated with travelling in-Country.

- **in-Country Deployments** are one of the most exciting aspects of the VCSP, these offer young surveyors the opportunity to become VCSs, where they are deployed in-Country to a community in need. They work with a VCSP Partner organisation such as the Global Land Tool Network (GLTN) and its partners or the Cadasta Foundation, and spend several weeks supporting land administration efforts on the ground. All VCSs are supported and guided by the VCSP in-Country Team before and during their deployment period.

Supporting these three paths are two additional streams of the VCSP Core Team:

- The **Knowledge Portal** is a key aspect of the VCSP, where ideas, knowledge, cutting-edge, and state-of-the-art technologies, and practices are shared to sustain the VCSP to keep updated with recent trends. This online platform, under development and due to be launched in late 2024, connects Young Surveyors, VCSs, VCS mentors, VCSP partners and VCSP members to log in before, during, and after a project. Lessons learned, implementations and better action plans can be proposed and considered here. In-Country deployment operations will make use of this Knowledge Portal to share understanding before and after deployments.
- The **Engagements Team** oversees both communications and marketing as well as partnership engagement and management, which sustain the lifeblood of the VCSP. The Engagements Team runs initiatives such as ensuring regular social media updates are created for each of the initiatives of the VCSP's three paths. They also work on creating podcasts, newsletters, and other ways of sharing what the VCSP is doing and upcoming opportunities and working regularly with VCSP partners to ensure mutual benefit.

1.2.3 Achievements to date

The VCSP Pilot program ran from 2017–2018 with a focus on testing the concept of young surveyors volunteering with the GLTN country-level activities to support land administration efforts across the globe. The pilot produced fantastic outcomes:

- 12 Volunteer Community Surveyors (VCSs) deployed to 7 countries.

Following the Pilot program to 2023, the VCSP has been scaled up to produce a suite of impactful contributions to humanitarian surveying which include:

- 30 VCSs deployed to 9 countries
- 4 separate Wisdom Workshops, each preceded as a Massive Open Online Course (MOOCs). In total these have been attended by over 300 participants from over 40 countries globally.
- 3 e-Volunteering mapathons with a global impact, which collectively involved more than 140 e-Volunteering mappers from over 45 countries mapping over 37,000+ features.
- A Knowledge Portal with a comprehensive and ambitious structure for which technical development is well underway and which is on-track for delivery in 2024.

2 OVERVIEW OF VCSP IN-COUNTRY DEPLOYMENTS

2.1 Pilot Phase (2017–2018)

In 2017, the FIG Young Surveyors Network (YSN) was taken by the realisation that approximately 70% of land rights worldwide was undocumented. Recognising that this would lead to significant flow-on effects with the increasing effects of climate change, rapid urbanisation and increasing competition over land, the YSN saw an opportunity for young surveyors to help create a better future for present and future generations. Kate Fairlie (YSN Chair 2011–2014) and Eva-Maria Unger (YSN Chair 2014–2018) had been leading an initiative to train over 300 young surveyors from 65 countries in the Social Tenure Domain Model (STDM). STDM is one of GLTN's land tools that promotes the recognition and recordation of all people-land relationships irrespective of the technical accuracy, formality and legality. It also represents a land recordation system brings together mature and stable open-source software projects through a consistent, easy-to-use interface, which allows non-technical users to manage tenure information.

This newly trained group of STDM Ambassadors within the YSN understood that secure land rights set the tone for sustainable land use. They sought to find a way for young surveyors to support securing of land rights to reduce environmental degradation and enable proper planning. The YSN recognised that this would work towards reducing barriers to land-related conflicts and legal disputes, contributing to community safety. Having a land administration system in place also works to alleviate poverty, promote food security, and secure indigenous people's rights. Increased tenure security enables people to participate in economic markets by allowing them to access credit, have freedom to invest, diversify, and engage in other entrepreneurial pursuits with freedom of choice. This is particularly important for women and girls, who historically have had limited opportunities to have access to land rights.

There was a strong desire to initiate a volunteer programme to match the Young Surveyors' adventurous spirits, qualifications and skills with GLTN's dedication to securing land and property rights for all to facilitate access to adequate housing, food security and livelihoods, across developing countries. After positive partnership discussions and preparations, it was clear that the GLTN country-level activities could be the foundation of such a match. Thus, the VCSP was born as a pilot program to deploy several young surveyors, known as Volunteer Community Surveyors (VCSs), to governments and civil society organisations (CSO) to support the GLTN's country-level activities towards promoting land tenure interventions in the Asia-Pacific and African regions. Eva-Maria Unger (FIG YSN Chair) developed and coordinated the pilot program with the support of Oumar Sylla (GLTN Unit Leader), Danilo Antonio (GLTN Country Operations and Land Tools Development Coordinator), John Gitau (GLTN), Louise Friis-Hansen (FIG Office), and John Hohol (FIG Foundation President).

This program involved VCSs providing technical support and guidance in processing documentation for GLTN programs in Zambia, Uganda, the Philippines, Kenya, Nepal, and the Democratic Republic of Congo (DRC). The key objectives of this partnership were to:

- Provide technical support and strengthen the capacity of implementing partners at the country level,

- Strengthen the role of young surveyors in promoting and improving land governance at country level, and
- Enhance and enrich the professional career development of young surveyors.

Within this pilot VCSP program, these VCSs volunteered their time for a relatively short period (2–4 weeks) to take part in projects that worked to address unequal access to land and other natural resources, unsustainable land use, tenure insecurity, conflicts, dysfunctional land markets, and inappropriate land administration systems. VCSs had accommodation, travel and meal allowances covered by GLTN. They gained valuable experience and skills on-the-ground in using tools such as STDM, investing time, knowledge, and skills in humanitarian surveying, and building capacity. Thus contributing positively to local communities in need through the application of their surveying skills. Working both individually and as part of a team, they supported solving challenges in land registration and documentation using open-source technologies and their technical training, gaining valuable training and mentorship along the way. The program allowed these young surveyors to gain real-world exposure to different cultures, learn invaluable career soft skills, and build their professional network.

The 2017 Pilot program saw 12 VCSs deployed across seven countries, as outlined in Table 1.

Table 1: VCSs of the 2017 Pilot Program and Deployment Information.

VCS name	Deployment country	Deployment dates	Deployment partner organisation	in-Country host organisation
Shristi Paudel	Nepal	11-10-17 to 05-11-17	GLTN	UN-Habitat Nepal
Jordan Friis	Nepal	11-10-17 to 05-11-17	GLTN	UN-Habitat Nepal
Biplov Bhandari	Nepal	online	GLTN	UN-Habitat Nepal
Adama Sarr	Democratic Republic of Congo (DRC)	08-01-18 to 28-01-18	GLTN	UCBC (Université Chrétienne Bilingue du Congo)
Ikenna Arungwa	Kenya	08-01-18 to 28-01-18	GLTN	Pamoja Trust
Brenda Ayo	Uganda	27-11-17 to 22-12-17	GLTN	UCOBAC
Israel Taiwo	Uganda	28-1-18 to 18-2-18	GLTN	UCOBAC
Casper Fibæk	Uganda	04-01-18 to 03-02-18	GLTN	Ministry for Housing and Development Uganda
Donmarl Camua	Philippines	18-12-17 to 14-01-17	GLTN	TAMPEI
Chandan Prasad Das	Philippines	13-1-18 to 3-2-18	GLTN	TAMPEI
Thandinkosi G Chari	Zambia	13-11-17 to 03-12-17	GLTN	Lusaka City Council, Zambia

2.2 Establishment Phase (2020–2023)

The pilot program provided a platform for all stakeholders to test logistics, work cooperatively, and prove the value and benefits of such an initiative. It was mutually successful for FIG and GLTN, and encouragement was provided to scale up these deployments. Eva-Maria Unger handed over the initiative in 2018 to Claire Buxton who, in collaboration with Tom Kitto, Melissa Harrington, and Kwabena Asiam, conceptualised and proposed this new phase of the VCSP.

In order to scale up, sustainably, a four-year strategy was developed with the goal to diversify options and increase the team behind the scenes. The VCSP has been expanded and invigorated under the leadership of Claire Buxton (2019–2022) and Roshni Sharma (2022–2025), supported by successive YSN Chairs and Vice-Chairs in this time – Melissa Harrington, Dr Kwabena Asiana, Ferah Koksai and Shirley Tendai Chapunza. The collaboration with GLTN remained strong, and the VCSP Core Team broadened partnerships to include The Cadasta Foundation and others in deployments at times.

2.2.1 COVID-19 creates challenges for deployments in 2021

During this time, the COVID-19 pandemic created a significant challenge for the VCSP – suddenly, deploying people outside of their home countries became extremely risky and logistically challenging. In 2021, in-Country deployments operated under the leadership of Claire Buxton as VCSP Core Team Lead and Sylion Muramira as VCSP in-Country Lead, supported by David Elegbede as his mentee. Vice-Lead, Tom Kitto VCSP acted as in-Country Lead for Cadasta and Roshni Sharma supported everyone as the VCSP Communications Team Lead.

In the first year of deployments, VCSP partnered with two organisations – GLTN and the Cadasta Foundation. Deployments were done in Tanzania, Kenya, and Uganda, with the strategic decision made to select VCSs from within these countries who had the ability to travel within COVID-19 restrictions to the communities that they would be supporting on-the-ground.

Table 2: VCSs deployed in 2021 during COVID-19.

VCS name	Deployment country	Deployment dates	Deployment partner organisation	in-Country host organisation
Diana Kyalo	Kenya	1 April 2021 to 14 May 2021	Cadasta Foundation	Cadasta Foundation
Gundelinda Ringo	Tanzania	1 April 2021 to 1 July 2021	Cadasta Foundation	Cadasta Foundation
Deborah Haggith Jepkoech	Kenya	1 April 2021 to 1 July 2021	Cadasta Foundation	Cadasta Foundation
Arthur Mukwaya	Uganda	3 May 2021 to 14 June 2021	GLTN	UCOBAC
Edwin Nyandechi	Kenya	3 May 2021 to 14 June 2021	GLTN	Pamoja Trust
Kezia Erumbi	Uganda	3 May 2021 to 14 June 2021	GLTN	ACTogether
Francis Nyokabi	Kenya	3 May 2021 to 14 June 2021	GLTN	Pamoja Trust

These VCSs were also supported by Mentors (Table 3), who helped them solve complex problems in deployment work, provided guidance on professional conduct and responsibilities as a VCS and, helped them clarify uncertainties around the projects they were working on.

2.2.2 Restarting after COVID-19

Following the ‘return to a new normal’ that arose after the worst of the COVID-19 pandemic, the VCSP began two parallel approaches to in-Country deployments.

A team led by VCSP Lead, Claire Buxton, and in-Country Team Lead, David Elegbede, fa-

Table 3: VCS Mentors from various countries and their respective Mentee (Supporting VCS).

Mentor name	Mentor country	Supporting VCS
Maurice Nyangkori	Uganda	Diana Kyalo (deployed to Kenya)
Atieno Owino	Kenya	Gundelinda Ringo (deployed to Tanzania)
Method Gwaleba	Tanzania	Deborah Haggith Jepkoiech (deployed to Kenya)
Aaron Hick	Australia	Arthur Mukwaya (deployed to Uganda)
Donmarl Camua	Australia	Edwin Nyandeché (deployed to Kenya)
Innocent Egbuh	Nigeria	Kezia Erumbi (deployed to Uganda)
Gertrude Njar	Nigeria	Francis Nyokabi (deployed to Kenya)

cilitated the deployment of two VCSs to Sierra Leone in West Africa. Within Sierra Leone, there are less than 30 registered surveyors in total. Less than 10% of land is formally registered, and over 80% of land is held under customary arrangements. In 2021, the Sierra Leone Government began implementation of a 6-year World Bank-funded land administration project, and in 2022 planned the development of the National Land Commission and Customary Land Rights Acts. The program, nicknamed ‘Drones for Good,’ supported land administration in Sierra Leone as they implemented reforms and sought to halt land-grabbing and informal transfers. This project involved using satellite aerial imagery, GNSS data from Trimble Catalyst units and SmartLandMaps to support fit-for-purpose digital documentation of land rights in a pilot area. An attempt at using a drone to capture the aerial imagery was made with support from Place but due to weather, the mission was unable to be completed.

In the first part of this deployment, the team undertook an initial visit to the study location in Sierra Leone with project partners to create a proof-of-concept for using SmartLandMaps with GNSS data collected using Trimble Catalyst and Penmaps (Figure 1). SmartLandMaps enables a simple conversion of map-drawn data into a digital GIS-ready format, combining photogrammetry, computer vision and machine learning and is designed as a Software-as-a-Service. Alongside this, the Trimble Catalyst offers positioning-as-a-service in a simple-to-use way that offers cm to sub-metre level accuracy.

Also involved in the broader project were Green Scenery Sierra Leone, who was the project’s main CSO, the Ministry of Lands, Housing and Country Planning Sierra Leone (MLHCP), who aided in groundwork and logistics for contact personnel/local coordinator for the VCSP, and Engineers without Borders, who helped to introduce VCSP to project with their long-term history of similar project management in Sierra Leone.

To support this in-Country deployment, VCSP also held a Wisdom Workshop on 26 January 2023 to support the capacity building of the local surveying community. This involved a pre-workshop MOOC available online for participants, where they were able to learn online about soft skills for land tenure security projects, how to get started with using drones for mapping, drone-based data for land administration, how to use SmartLandMaps, and how to undertake GIS data collection with Trimble Penmap and Catalyst (content provided by Allan Kiptoo of the VCSP, Claudia Stöcker of SmartLandMaps and Markus Koper of Trimble). The Wisdom Workshop event itself featured international experts, including an introduction from FIG President Diane Dumashie, insights from Jobo Samba (MLHCP), Linus Pott (World Bank, Senior Land Specialist), Dr Mila Koeva (ITC – University of Twente), and active participation from the 27 on-site participants and more than 30 virtual participants.

Table 4: VCSs deployed to Sierra Leone in 2023

VCS name	Deployment country	Deployment dates
Hassan Barrie	Sierra Leone	23–27 January 2023
Sylvester Momoh	Sierra Leone	23–27 January 2023



Figure 1: Phase 1 training group of the Sierra Leone Deployments.

2.2.3 Ramping up in 2022–2023

Over the 2023 calendar year, the VCSP has deployed 21 VCSs in GLTN projects across Uganda, Kenya, Namibia, and the Philippines (Table 5). Due to the increased scale of these deployments, please see Chapter 3 for details of the experiences of the VCSs and the projects they were involved in.

Table 5: VCSs deployed in 2022–2023.

VCS name	Deployment dates	Deployment partner organisation	in-Country host organisation
Kenya			
Michael Ndadema	24 January – 14 April 2023	GLTN	Pamoja Trust
Christine Muriungi Wanja	24 January – 14 April 2023	GLTN	Pamoja Trust
Solomon Gitau	26 April 2023 – 28 July 2023	GLTN	Pamoja Trust
Milcah Cherotich	26 April 2023 – 28 July 2023	GLTN	Pamoja Trust
Eliud Obandah	25th September – 29th October 2023	GLTN	Pamoja Trust
Faith Muthomi	2nd October – 10th November 2023	GLTN	Pamoja Trust
Kenya – GLTN Secretariat			
Atieno Jedydah Owino	5th December 2022 – 17 February 2023	GLTN	GLTN Secretariat
Orina Viola	18th September – 29th October 2023	GLTN	GLTN Secretariat
Uganda			
Emmanuel Akandwanaho	22 January 2023 – 4 March 2023	GLTN	IIRR
Caroline Amayo	22 January 2023 – 5 May 2023	GLTN	Makerere University
Hadjah Naggayi	3 April 2023 – 23 June 2023	GLTN	ACTogether
Amon Mbaho	3 April 2023 – 23 June 2023	GLTN	UCOBAC
Musenze Edwin	25th September – 3rd November 2023	GLTN	Makerere University
Aine Mukasa	25th September – 3rd November 2023	GLTN	Makerere University
Nanky Lydia	25th September – 3rd November 2023	GLTN	Makerere University
Oyana Victor	25th September – 29th October 2023	GLTN	ACTogether
Ndahiro Francis	25th September – 29th October 2023	GLTN	ACTogether
Namibia			
Kamuike Muundjua	9th October – 10th November, 2023	GLTN	NUST
Aune Kamosho	9th October – 10th November, 2023	GLTN	NUST
Philippines			
Alejandro Enriquez	10 September 2023 – 29 October 2023	GLTN	TAMPEI
Joven Wadwachan	7 September 2023 – 29 October 2023	GLTN	TAMPEI

2.3 In-Country Host Organisations Worked With Over Time

2.3.1 GLTN

The Global Land Tool Network (GLTN) of the UN-Habitat is an international alliance dedicated to combating poverty by enhancing access to land and ensuring secure tenure for everyone. Comprising diverse partners from various sectors, including civil society organizations, research institutions, and governmental bodies, GLTN focuses on developing and implementing gender-responsive land tools. These tools aid in promoting land reform, good governance, inclusive administration, sustainable management, and effective coordination within the land sector. GLTN recognizes the pivotal role of secure land tenure in achieving fundamental rights, poverty alleviation, economic growth, and sustainable development, aligning with global initiatives such as the Sustainable Development Goals and the New Urban Agenda. As a key part-

ner of the Volunteer Community Surveyor Program (VCSP), GLTN provides essential support in terms of funding, technology, knowledge, and opportunities, significantly influencing VCSP's identity and impact. Their collaborative efforts underscore the critical importance of land tenure security in fostering human rights, prosperity, and progress towards shared global objectives.

GLTN has been the primary driver and facilitator for the VCSP in-Country Deployments, and the host organisations listed in this section are in-country partners of GLTN (except Trimble and the Cadasta Foundation). the VCSP is wholeheartedly thankful for the support and dedication from GLTN in the shared cause of supporting young surveyors in humanitarian surveying efforts globally.

2.3.2 Trimble

Trimble Inc., a leading industrial technology company, provided the FIG VCSP with Catalyst (DA2) GNSS and Penmap software for various in-country deployments. Trimble focuses on enhancing global productivity through innovative solutions that bridge the physical and digital realms. Their technologies in positioning, connectivity, and data analytics empower customers to boost efficiency, quality, safety, and sustainability across industries like agriculture, construction, and transportation. Renowned for their surveying and mapping tools, Trimble's Penmap for Android facilitates field data collection, including land rights and parcels, with a map-based interface. Trimble Catalyst offers GNSS positioning-as-a-service, delivering high accuracy globally, even in remote areas. As a longstanding partner of VCSP, Trimble continues to provide cutting-edge solutions for cadastral surveying and land administration. Trimble Inc. have been a longstanding technology partner of VCSP. Find out more about Trimble Inc. here: <https://ffp.trimble.com/>.

2.3.3 UN-Habitat Nepal

UN-Habitat started its operation in Nepal to support reconstruction after the 1988 earthquake and has continued its work in collaboration with partners' ranging from the government and local authorities to a wide cross-section of Non-Governmental Organisations and civil society groups. Aiming for a liveable and sustainable urban area and human settlements, its mission is to promote development of environmentally and socially sustainable settlements and achieve adequate shelter for all. The key sectors that UN-Habitat in collaboration with the Government and people of Nepal are working in include (1) Urban Planning and Climate Change, (2) Land Management, (3) Water, Sanitation, and Hygiene (WASH), and (4) Inclusive Development and Housing. UN-Habitat works with both national and sub-national governments, providing technical support for policy formulations, strengthening capacities for localization of the policies, and collaborating to execute projects and initiatives to demonstrate policy implementation. UN-Habitat in Nepal remains committed to support implementation of the NUA and SDGs, through mainstreaming green, resilient, inclusive development and sustainable settlements for all, with a particular attention on the needs of women, youths, marginalised populations, urban poor, and slum-dwellers. For more information about UN-Habitat Nepal, please visit: <https://unhabitat.org.np/>.

2.3.4 The Université Chrétienne Bilingue du Congo (Democratic Republic of Congo)

The Université Chrétienne Bilingue du Congo aka Christian Bilingual University of Congo (UCBC) was established as a center part of a holistic and integrated development pro-

gram with five others operating under the non-profit organization called Congo Initiative. CI-UCBC's mission is to create and develop an authentic, regenerated, and shaped community of followers of Christ with the mission of transforming the society of the Democratic Republic of Congo. For more information about UCBC, please visit: <https://www.ucbc.org/en/>.

2.3.5 Pamoja Trust (Kenya)

The Pamoja Trust (PT) is a Kenyan non-profit organisation founded in 1999. PT aims to promote and provide access to basic services, land and shelter for the vulnerable residents and communities of Kenya to lead dignified lives. The organization takes a pragmatic approach to protection and promotion of the right to the city through advocacy and action research amongst others. Pamoja Trust has collaborated closely with Muungano wa Wanavijiji and aided over 30,000 households living in four hundred informal settlements across the country. Pamoja Trust's exemplary advocacy and facilitation work has helped strengthen better livelihoods for the urban poor and directly impacted the urban economy and resilience work of the nation. For more information about the Pamoja Trust, please visit: <https://pamojatrust.org/>.

2.3.6 Uganda Community Based Association for Women and Children's Welfare (UCOBAC) (Uganda)

Uganda Community Based Association for Women and Children Welfare (UCOBAC) is a Non-Government Organization in Uganda whose mission is to promote human rights and improve welfare of women and children in Uganda using community-based initiatives. Since 1990 UCOBAC has worked with millions of children, women and youth empowering them with the most powerful tools to transform their lives as individuals, families, and communities. Emerging from being a purely child-oriented organization supporting millions of orphans and vulnerable children who became victims of civil war, HIV/AIDS, and other health related factors at the time to providing holistic, comprehensive, sustainable programs focusing on empowering and transforming children, women, and their communities. For more information about the Uganda Community Based Association for Women and Children's Welfare (UCOBAC), please see: <https://ucobac.org/>.

2.3.7 Ministry for Housing and Development, Uganda

The Ministry for Housing and Development, Uganda, hold the vision of "Sustainable Land Use, Land Tenure Security, Affordable, Decent Housing and Organized Urban Development", working towards ensuring sustainable land management, planned urban and rural development and decent housing for all. The Ministry plays a pivotal role in the coordination and oversight of lands, housing, and urban development sectors. Its key functions include formulating national policies, legislation, and standards for sustainable land use and housing. It monitors and supports local government initiatives, updates maps, and liaises with stakeholders and neighboring countries. Additionally, the Ministry provides guidance, management, and mobilizes resources for the advancement of these sectors, ensuring safe, planned, and improved human settlements nationwide. For more information, visit <https://mlhud.go.ug/about-us/>.

2.3.8 The Technical support unit of the Homeless People's Federation Philippines Inc. (TAMPEI)

TAMPEI was founded in 2010 to support the Philippine Alliance, who provide technical assistance to the urban poor communities. TAMPEI provides assistance to community-

led initiatives such as provision of technical services, low-cost incremental housing design, community upgrading, settlement mapping and planning initiatives at different scales. They also develop tools and methodologies to carry out these processes from community to city-level developments. TAMPEI is guided by the belief of the Philippine Alliance that communities have the capacity to find solutions to issues affecting them and that they should be the prime planners of their own development. For more information about TAMPEI, please visit: <https://www.tampeio.org/>.

2.3.9 Lusaka City Council (Zambia)

Lusaka was established as a settlement in 1913. For more information about Lusaka City Council, please visit: <https://www.lcc.gov.zm/>.

2.3.10 ACTogether (Uganda)

ACTogether Uganda is all inclusive and collects community data, supports youth empowerment, women empowerment, includes safe and resilient cities, and community advocacy and documentation. ACTogether implements project activities in the areas of water and sanitation, land rights, waste management, youth skilling, housing, and physical planning, among others, cooperating with policymakers and government. ACTogether is located in Kampala, Uganda and was used as a host organization for deployed VCSs to serve the community of Kampala, Uganda. For more information about ACTogether, please visit: <https://www.actogetherug.org/>.

2.3.11 International Institute of Rural Reconstruction (IIRR)

The International Institute of Rural Reconstruction (IIRR) is a global organization. The IIRR partnered with the VCS to work in the community of Uganda. Together with several development partners, IIRR builds on the unique assets and strengths of rural people, with a focus of learning what works for them through action research sharing, and enriching knowledge in field programs that empower rural communities. For more information about the International Institute of Rural Reconstruction (IIRR) and IIRR Uganda, please see: <https://iirr.org/> and <https://iirr.org/uganda/>.

2.3.12 Makerere University

Established in 1922 as a humble technical school, Makerere University is one of the oldest and most prestigious Universities in Africa. Makerere University is a University in Kampala, Uganda. This was one of the host organizations for the Uganda deployments. For more information about the Makerere University, please see: <https://www.mak.ac.ug/>.

2.3.13 Namibia University of Science and Technology, Windhoek, Architecture and Spatial Sciences Department

The Namibia University of Science and Technology (NUST) is a vibrant institution of higher learning with over 15,000 students studying on a full time, part time and distance education basis. The Namibia University of Science and Technology (NUST) Windhoek, Architecture and Spatial Sciences Department supported the VCSP in-Country venture and hosted the VCSs during Namibia Deployments. For more information, visit: <https://www.nust.na/>.

2.3.14 The Cadasta Foundation

The Cadasta Foundation, established in 2015, advocates for the utilization of user-friendly digital tools to efficiently record, analyze, store, and disseminate crucial land and resource rights information. By digitizing land records, Cadasta empowers individuals, communities, governments, and businesses to make informed decisions, highlighting the needs of vulnerable populations. The lack of documented land rights affects over one billion people globally, hindering stability, development, and perpetuating conflict. Cadasta envisions a world where marginalized communities can benefit from secure land rights, aiming to bridge the gap between government systems and community efforts in land documentation. Through platforms and digital tools, such as participatory mapping and mobile applications, Cadasta supports the documentation of land rights, providing training and technical assistance. As a partner of the Vertical City Startup Program (VCSP), Cadasta facilitates in-country deployments, offering funding, technology, knowledge, and opportunities. Find out more at <https://cadasta.org/>.

3 THE EXPERIENCE OF VOLUNTEER COMMUNITY SURVEYORS

This chapter provides details about the experiences of individual Volunteer Community Surveyors - what they learnt on their deployments, how it's changed their future career path trajectory, and how they've helped their local communities. Please see the back of this chapter for photos of each of our VCSs while on their deployments.

3.1 *Pilot Phase (2017–2018)*

3.1.1 Nepal

In 2017/2018, VCSs **Shristi Paudel** (from a different region of Nepal) and **Jordan Friis** (from New Zealand) were deployed to the remote communities of Dolakha in partnership with UN-Habitat Nepal. They supported work of UN-Habitat Nepal, Kadaster and Huradec in identifying the land tenure types and social tenure relationship of households affected by 2015 earthquake (7.8 magnitude) in order to facilitate their access to government provided grants for house reconstruction as well as land re-adjustment and integrated settlement process. Shristi and Jordan undertook fieldwork to collect spatial data, including working with the local community to administer questionnaires about households, house tenures, farm tenures, and to collect spatial data about parcel boundaries using high resolution satellite images and using handheld GNSS. They also worked in QGIS to georeference collected satellite imagery, digitised farm boundaries and establish social tenure relations between parcels and households in STDM. Jordan and Shristi found the cultural experience of working with the Dolakha community extremely valuable, and it was a formative experience that has influenced the direction of each of their careers.

Shristi went on to join the Survey Department of Nepal as a Survey Officer, serving another remote area in Nepal for almost two years supervising, monitoring and reporting cadastral surveying and mapping activities and supporting resolution of land-related disputes. She then studied her Masters degree in Germany before returning to work as an Instructor in the Land Management Training Center under the Government of Nepal. She takes joy in lecturing part-time at University, helping her students to enhance their knowledge and skills in field surveying and mapping technologies. Shristi was recognised as one of xyHT's '40 under 40' in 2019, and has also gone on to join the VCSP Core Team to support other young surveyors to undertake in-Country Deployments. She says, "I have been fortunate enough to be a member of VCSP Core Team, which has taken VCSP to new heights by diversifying these activities compared to where we started at first. From deploying volunteers to across-Country/in-Country volunteering projects with diverse themes, the program now also runs online Wisdom Workshops, e-Volunteering activities, and is creating a Knowledge Portal platform. We are many young people from diverse countries and diverse surveying backgrounds in the team, where we share ideas, views, opinions and laughs with each other. I have improved my documentation skills, social skills, communication skills and team-building/working skills from these experiences, which I am always thankful for. Although continuing volunteering works in professional life might feel challenging sometimes, but coming this far with my VCSP journey I have realised that it is still possible. All we need is to have the desire to work together for a cause and find a meaning together within a team. The VCSP Core Team gives me a meaning to work for a global cause and meeting such like-minded people from around

the world and learning different things from them gives me a connection/bond to stick to VCSP and experience something bigger/interesting other than my work environment.”

Jordan is now a registered Land Surveyor in New Zealand working in Australia and has retained his passion for humanitarian surveying, continuing to be involved in initiatives where he can while working in New Zealand. In 2023, he visited Tokelau as part of the NZ Ministry of Foreign Affairs and Trade project to carry out site investigations for a proposed new runway, during which he was reminded of and used some of the soft skills that he learnt on his deployment. He says, “Being part of the in-Country volunteer program gave me an insight into working with other cultures and adapting my knowledge and experience to work alongside different people and communities. It also gave me confidence and resourcefulness when problem solving.”

Not long after Shristi and Jordan, VCS **Biplov Bhandari** (from a different region of Nepal) was also deployed to support the Dolakha community. Biplov actively participated in the data conversion process at the Dolakha survey office, ensuring a smooth transition between different projections. Notably, he made significant contributions to the STDM codebase, enhancing data automation and potentially saving hundreds of hours of manual entry. He collaborated closely with GLTN consultants on this. Biplov found that the experience of this deployment, following on from being a recipient of the FIG Foundation Young Surveyors Grant in 2017 and attending the FIG Working Week 2017 in Helsinki, Finland, were instrumental in shaping his career passions and pathways. They provided invaluable learning opportunities for him, fostering a firsthand understanding of the challenges and opportunities associated with community engagement and land administration. Through his involvement in community land mapping and advocacy for transparent and equitable land registration systems, Biplov takes pride in his ability to make a lasting impact on local communities. Today, Biplov continues to leverage his experiences through the NASA-SERVIR Program, where he serves as a Research Scientist at the University of Alabama in Huntsville (UAH). In this role, Biplov leads cloud and machine learning initiatives aimed at enhancing the capacity of the SERVIR network and making a lasting impact in the field of geospatial research and application for environmental monitoring.

3.1.2 Democratic Republic of Congo

In 2017, VCS **Adama Sarr** (from Senegal) was deployed to DRC with UCBC. He supported their work through ground surveying, GIS mapping and use of STDM. Adama found that his experience in this deployment helped unleash his passion for the use of STDM in francophone African countries. He has remained active in the FIG, and has gone on to teach surveying to University students and works as an Engineering Surveyor. He is also the Mayor of Keur Massar Nord, one of the biggest cities in Senegal with almost 280,000 people. He attributes some of the leadership skills gained in his time with the VCSP as contributing to achieving being the second youngest mayor in Senegal. His experiences learning from mediation between customary land tenure holders and land registry staff and the role of STDM in creating good outcomes for all have been a strong guiding force in his career path.

3.1.3 Kenya

In 2017, VCS **Ikenna Arungwa** (from Nigeria) was deployed to Nairobi, Kenya to work with Pamoja Trust, a GLTN partner organisation. He visited the Kibera Soweto and Mururu

slums to understand the social impact of the slum upgrading and relocation program in these areas, and supported training on the formulation of data collection tools and review of RAP processes. He also prepared STDM training for the Ex-Grogon and Kawan-gare communities as well as the Kwabulo settlement in Mombasa. Ikenna learnt about the continuum of land rights and its far reaching implication in achieving economic prosperity, and that an equitable and functional land administration systems/tools in a developing economy is possible in the real world. Inspired by his experience, Ikenna has gone on to postgraduate study in geodesy and geodynamics and is now an assistant lecturer in his field. He says, “My understanding of the challenges and opportunities that exist the area of land policies, fit-for-purpose cadastre, and pro-poor approach to land management was greatly enhanced by the experienced I had during the VCSP”

3.1.4 Uganda

In 2017, VCS **Israel Taiwo** (from Nigeria) was deployed to Northern Uganda where he worked with UCOBAC to facilitate the pilot phase of a land registration and tenure security initiative, processing documentation to support technical training, data capture and management. He found it valuable to be exposed professionally to community land mapping and land rights data capture and data management, and to be involved in awareness raising and sensitisation. He was also involved in domesticating the STDM tool to suit the requirements of the Ministry of Lands Uganda regarding acquisition of Customary Certificates of Occupancy. During his deployment, he was exposed to the Uganda method of customary land registration and was given the opportunity to make recommendations for fit-for-purpose aspects of the program. He also found it valuable to have on-the-ground experience with how women and children become more vulnerable when land registration systems lack transparency, fairness and equity. These experiences unleashed a passion for fit-for-purpose land administration, and Israel has gone on to pursue a PhD in this in his home country since. He was also inspired by his experience as a VCS that he joined the VCSP Core Team, leading VCSP Wisdom Workshops from 2021–2022 and mentoring his successors.

At the same time, VCS **Casper Fibæk** was deployed with the Ministry for Housing and Development Uganda in 2018. During this time, Casper had the opportunity to learn about the land administration system in Uganda and supported a pilot project on registering customary lands in the Kabale district, which aimed to issue 2,000 Certificates of Customary Ownership (CCO). He was involved in STDM-related fieldwork, which supported a technical team in improving the accuracy of fit-for-purpose land administration mapping through digitisation using Systematic Land Adjudication And Certification (SLAAC) and aerial and satellite imagery, which was of great interest to the communities involved. He says, “Using satellite images to assist in registering land and improving tenure security had a big impact on my future career trajectory. It was a contributing factor in my choosing to focus on Earth Observation and Artificial Intelligence in further studies, and I ended up doing an Industrial PhD on the topic of Earth Observation, Artificial Intelligence and the United Nations Sustainable Development Goals.” Casper now works as a researcher at the European Space Agency, building AI foundation models and mapping and classifying schools in collaboration with UNICEF-GIGA to improve internet and power connectivity in the Global South.

3.1.5 Philippines

In 2017, VCS **Chandan Das** (from Nepal) and **Donmarl Camua** (from Australia) were deployed to the Philippines with TAMPEI, where they worked with diverse communities in

informal settlements using STDM to collect data to help policy makers and government agencies to provide them with secure land access. They worked in cities such as Muntinlupa and Davao cities with community leaders and people on-the-ground. As part of this work, they also learnt GeoODK, a mobile data collection tool that speeds up data collection and database development in community profiling. They both remain active within FIG and look back on their deployment as providing them real-world experience in a different country of the urgent and tangible benefits that humanitarian surveying brings to communities in need, which they otherwise wouldn't have had access to.

Chandan valued deeply how tools such as STDM can act as a language to communicate with people about the problem they are facing and how they can help find a better future. He says, "VCSP has been a legacy to the development of my career and the experiences I had during my deployment always gives me good vibes to be active and contribute to the community in new ways so as to pursue our collective vision to promote the surveying community." Chandan very much valued the opportunity to explore new communities and the different land tenure situation to that of his home country, Nepal. He worked with a young team of land professionals at TAMPEI, who were undertaking community profiling and mapping. He had the chance both to help and learn STDM implementation as a tool to prepare a comprehensive database for informal settlements, including integrating the data collection tool GeoODK into STDM. He also learned about the challenges of software development and needs for an active community to resolve bugs associated with open software tools. For Chandan, getting to know the community and how the organisation works to bridge the gaps in land tenure security was a rewarding experience. Chandan is now working as District Secretary of Nepal's National Land Commission supporting the provision of land ownership certificates to informal settlers and landless people. The experience with VCSP helped him to develop custom tools for data collection, community profiling and mapping using STDM, satellite imagery, and the NALCIS data collection platform to store the information about the informal settlers and the landless. Chandan found that having the chance to work as a VCS overseas helped him understand the impact of open standards in adapting the tools and software to cater needs of local communities.

Donmarl found this deployment helped him to get a much deeper understanding of the community mapping process with grassroots communities. He met with communities in Muntinlupa City and Davao City, and served as liaison of the NGO to community partners in the University of the Philippines (UPDGE Department of Geodetic Engineering, a University department for surveying and mapping) and the Geodetic Engineers of the Philippines – National Capital Region (GEP-NCR), a regional professional organisation for Surveyors in the Philippines). "The experience exposed me to the aspect of Community Mapping which is seldom discussed in survey schools. I learnt about the concerns of communities in dealing with Geodetic engineers (surveyors) – especially concerns around dealings with unlicensed, pricing or rates of services and other related concerns in the mapping and titling of the community subdivision. I was able to meet with young surveyors from Davao and was able to get to know the differences and similarities in the surveying practice in the Mindanao region". Don says, "The VCSP was a great learning experience for a Young Surveyor. The program helped me get a deeper understanding of the community mapping process. It also served as a venue for me to promote the role and importance of geodetic engineers (land surveyors) to grass root communities such as the ones being helped by the NGO." He is now a Graduate Surveyor working in a small surveying firm in Bankstown, NSW, Australia where he works in strata subdivision and urban cadastral surveys. He spends most of his work time draft-

ing but occasionally goes into the field to do strata surveys and assist in construction set-out surveys. He is excited to be working towards his registration, and hopes to become a Registered Surveyor in the near future.

3.1.6 Zambia

In 2017, VCS **Thandinkosi Gracious Chari** (from Zimbabwe) used STDM in her work with Lusaka City Council. The Support to Occupancy Licence project involved surveying and mapping almost 3,000 households in Zambia's largest informal settlement, Kanyama (Ward 10). Thandie supported GPS data collection by the community enumerators and led training on the use and functionality of STDM. Surveyors may be required to work in unfamiliar environments and communities. For Thandie, one of the key lessons derived from this experience is that effective communication and strong interpersonal skills are paramount in fostering trust and collaboration. Articulating technical information clearly and active listening, creates rapport with stakeholders, ensuring smooth project execution. She found the experience of this deployment formative, unlocking a passion for working to achieve UN SDGs. On returning to her home country, she conveyed to the Zimbabwean Young Surveyors Network the importance of supporting a community on-the ground and how this helps to advance the SDGs. Thandi is now studying at the University of Calgary, in Canada. She notes that some of the things that have helped her thrive in this multi-cultural environment are the professional relationships and interpersonal skills she gained during the VCS Program.

3.2 Establishment (2020–2023)

3.2.1 Uganda

In 2021, VCS **Arthur Mukwaya** was deployed in Uganda to work with UCOBAC. Like Israel, he had the opportunity to work with STDM efforts, also working to support mapping land requirements by the District Land Board and organisation of District Physical Planning Meetings and District Land Board Meetings. The experience with VCS helped him learn a lot more about the documentation side of land registration. He says, "Previously, I had worked on a similar project as a graduate surveyor mapping parcels in the field. During this, all we did was mapping and helping the people fill out the application forms and also handle area land committee meetings. Working with VCSP gave me a chance to experience what happens after the mapping and the technical aspects (ie STDM and Post-Gres in QGIS) that flow onto handling District Land Board meetings and physical planning meetings. I also learnt how to compile a file for parcels of land to be registered for a Certificate of Customary Ownership. I learnt how a CCO is printed and what it consists of and all that is necessary for the entire process." Arthur still uses the knowledge he gained from his deployment in his work doing cadastral surveys in Uganda today. He found that the soft skills he learnt from his time on deployment help him more confidently express himself when working in new areas and with completely new people. He now works as a Survey Engineer working on a water project for Sogea Satom, Uganda.

At the same time, VCS **Kezia Erumbi** was deployed in Uganda, working with ACTogether. Kezia used STDM tools to help urban poor get customary certificates of land ownership in Mbale City, training others on how to use Kobo ODK for data collection, as well as using GIS tools to map criminal gangs in Kampala. For Kezia, the deployment supported learning soft skills such as teamwork, presentation, meeting deadlines and

reflexivity were unexpected but highly valuable aspects of her deployment, as was the invaluable opportunity to meet different stakeholders involved in land registration. The VCSP mentors also continuously supported her and other VCSs in writing papers which they presented to the FIG in 2022. These experiences have inspired and increased her professional expertise, especially in the mapping sector, with exposure to different GPS tools. Her report writing and communication skills also greatly improved over the course of her deployment. She says, “because of this knowledge and professional exposure from this deployment, I can now comfortably use any GPS equipment for setting out and defining geographical locations in my work.” Kezia is now a Land Surveyor and GIS Analyst in Kampala, working in the Survey Department producing hydrology maps used to design channels on roads.

In early 2023, VCS **Emmanuel Akandwanaho** was deployed with IIRR (the International Institute of Rural Reconstruction) under the Land-at-scale project, where he participated in mapping of parcels and issuing of customary certificates of ownership to rural households in Buhara Parish, Kabale District. During his 90 day hands-on experience, Emmanuel learned about the importance of improving land tenure security and its key role in modernising agriculture and unlocking the financial aspect that people can access credit on land. For Emmanuel, the most valuable aspect of his deployments was being able to work in a remote area, associating with the locals, and appreciating the level of humility that they had. He appreciated the natural environment and beauty of the remote area, and through his experiences on deployment came to realise the needs of local communities and how they live, share, and empower each other as a way of resilience building. Upon completion, he was inspired to continuously support community development projects and advocate for equitable land governance in underserved communities. He has gone ahead to start Cities Youth Initiative, a youth-led organisation that focuses on spotlighting data gaps in land governance in slums. In November 2023, he presented a conference paper at the India Land & Development Conference 2023 titled “Integrating Geospatial with Statistical data in monitoring Land Tenure Security in Uganda” at FLAME University.

At the same time, VCS **Caroline Amayo** was deployed with Makerere University, where she supported their work on a project for improving tenure security of small farm holders in Uganda. She found it valuable being involved in awareness raising and sensitization of the community, being professionally exposed to data capture, land mapping and data management using the STDM tool and Kobo collector. Being a female Ugandan, she valued the experience of being able to witness equity in customary land ownership using the fit-for-purpose land administration approach in land registration. She was also involved in the process of preparing the CCOs. She found that it was sometimes challenging to work outside her comfort zone when learning new skills, working in cold weather and hilly terrain while on fieldwork, or even learning the western language (Rukiga) to properly communicate, but she found these especially useful lessons for growth. As part of her deployment, she improved her skills with STDM tool, QGIS and Kobo collector. With these experiences, she has been able to grow professionally and is looking forward to pursuing her Masters degree in land management. With inspiration drawn from her time on deployment, she continues to practise Land Surveying privately while working on her registration with the associated professional body, and also takes the time out to mentor fellow young surveyors.

In late 2023, VCSs **Musenze Edwin**, **Aine Mukasa** and **Nanky Lydia** were deployed with Makerere University. They worked on supporting navigating legal frameworks,

sealing CCOs, and extracting insights from data. The team was actively engaged in contributing to implementing the GLTN/UN-Habitat-supported “Community based land registration on customary land in Kabale District in Southwestern Uganda. They participated in the final phase of the initial stage of the CCO process, involving the preparation of hard copies of Certificates of CCOs for uploading onto the Uganda Land Information System (ULIS). The project, aimed to secure customary tenure and empower communities through the implementation of STDM, and they learnt about the creation of CCOs, capturing data, and integrating systems in the context of Uganda’s legal and institutional framework. Reflecting on the deployment experience, they have each found it has been instrumental in shaping their career trajectory. The practical exposure to navigating complex legal frameworks, collaborating with diverse communities, and honing technical skills like QGIS has equipped each of them with a versatile skill set that they continue to leverage in my professional endeavours.

Edwin valued the opportunity for hands-on learning, the chance to improve his QGIS capabilities, the deep dive into legal frameworks, and the opportunity for mentorship and career guidance. Edwin’s perspective on land surveying has been revolutionised by challenging traditional methods, introducing innovative approaches like fit-for-purpose surveying, and offering glimpses into the future of the profession. Through practical experiences and exposure to diverse perspectives, he has gained a deeper appreciation for the dynamic and multifaceted nature of surveying, empowering him to approach the field with curiosity, adaptability, and foresight.

Aine found the experience with communities on-the-ground really deepened her comprehension of the impact that the surveying profession can have in helping people in the real world. On reflecting about the deployment experience, Aine affirms that it has been instrumental in shaping his career trajectory thus far. The practical exposure to navigating complex legal frameworks, collaborating with diverse communities, and honing technical skills like QGIS has equipped him with a versatile skill set that he continues to leverage in his professional endeavours. Presently, he is in a transitional phase exploring new opportunities and furthering his education to enhance his expertise and contribute positively within his field.

Lydia very much valued the improvements she noticed in her problem-solving, communication, time management and goal setting skills, as well as the opportunity to build her professional network. Lydia further attests that the deployment has aided the diversification of her skill set in respect to technical proficiency while also broadening her knowledge about stakeholder engagement, systematic land adjudication, and the legal and institutional framework involved in implementing projects aimed at achieving smart, sustainable, equitable, and resilient cities. She is confident that the skills, knowledge, and experience acquired during the deployment serve as the foundation for realising her passion to further her role as a surveyor in addressing tenure insecurity and urban slums within Uganda, should the opportunity arise.

Overlapping with Emmanuel and Carolines deployment periods in early 2023 was the deployment of VCS **Hadjah Naggayi** with ACTogether. Hadjah worked on familiarising the community with ACTogether’s project, and collecting, cleaning and processing data. She was given the opportunity to host training with the communities and report her findings to the team. She improved her skills with STDM for fit-for-purpose applications alongside her interpersonal skills through this deployment. She says, “Working as a VCS was a great opportunity for me to network with different stakeholders concerning land matters, understand the gaps and possible waypoints to achieve tenure security

for the people in our local communities. I was equipped with a number of skills and knowledge on how to handle the different aspects in both office and fieldwork. As I finished my VCS period with ACTogether Uganda, they also gave me an opportunity to work as a project supervisor in the other site of their project implementation of which I gladly applied the skills and knowledge I had obtained to achieve project success.”Hadjah is currently using the skills obtained in her deployment combined with her passion as a climate activist to help communities achieve sustainability through communal tree planting and the mapping skills to identify the hotspots for tree planting.

At the same time as Hadjah, **Amon Mbaho** was deployed with UCOBAC, where he supported them with parcel field data collection for applicants from different sub-counties, assisted in training data collectors, supported data cleaning and database updates, and supported interviews and consultative meetings towards amendment of land laws in Uganda. Amon improved his skills in Postgres and SQL for database interoperability, learnt a lot about data management systems, and was glad for the opportunity to improve skills in working with the local community through interviewing, and free and prior informed consent consultative meetings and more so was on alternative dispute resolution in the communities where he assisted the mediation team. Amon has gone on to be strongly engaged in the SLAAC project being implemented in the Oyam and Kabale districts of Uganda as a supervisor, which was a direct outcome of the exposure and inspiration he gained in his time on deployment. He is also working with the Uganda Ministry of Lands at one of the zonal offices in western Uganda.

In mid 2023, VCSs **Oyana Victor** and **Ndahiro Francis** were also deployed with ACTogether.

During their deployment, there was an ongoing GLTN/UN-Habitat-supported project named “Scaling up Support to Tenure Security Improvement Interventions in Lira and Mbale cities”. Francis and Victor supported land surveyors in Lira City East in estimating sizes of land parcels, taking field notes and pictures, database migration and cleaning, and were also involved in mobilisation activities. Victor found that this deployment showed him insights into the multi-dimensional views that people have on their land and how they go about dealing with it, alongside the intermixing play of land use, value, tenure and development. He reshaped his understanding of fit-for-purpose land administration, and the need for large scale interventions to upscale land rights. Francis found that the experience helped him understand the different organisations and parties involved in land governance in a community, and the land use dynamics that occur in slum settlements. Due to the experience and skills gained from this deployment, Francis immediately got an opportunity to work with Alpha surveyors company in systematic land adjudication and demarcation, SLAAC in areas of Oyam and Apac districts.

3.2.2 Kenya

In May 2021, VCS **Edwin Nyandeché** was deployed with Pamoja Trust, where he worked under the partnership of Pamoja Trust, Cadasta Foundation and GLTN. During this time, He found it valuable to be exposed professionally to community land mapping which mostly include urban slums and land rights data capture and data management, and to be involved in awareness raising and sensitisation. This enabled the creation of an Atlas of Informal Settlements in Nairobi County for purposes of policy making and urban slum upgrade. During his deployment, he got familiarised with the method of customary land registration and the process involving urban slum upgrade. He is glad to have made an impact to communities in Turkana Region in terms of Land Title acquisition.

These experiences which came with responsibilities and tasks saw him in 2022–2023 join the VCSP Core Team to support delivery of its various offerings to young surveyors.

In 2021, VCS **Francis Nyokabi Kyoni** was deployed with Pamoja Trust, where he worked to extract building footprints from satellite imagery using ArcGIS Pro for Turkana County and three slums (Kangemi, Kibera and Mathare). He also supported the process of mapping infrastructure (schools, hospitals, roads, police posts, water points), and producing maps of the above for the upcoming Nairobi Urban Atlas, including complex spatial analysis using ArcGIS. For Francis, the experience of this deployment helped him understand more about the land rights of communities in slums and land transfer areas in these areas, as well as understanding more deeply how teamwork is a valuable professional skill. Francis has gone on to become a Geospatial Engineer and Land Surveyor with strong skills in earth observation, programming and software development. He says, “My experience in this deployment has been vital in shaping my career. From mapping infrastructure in the slums, I developed an interest in leveraging high-resolution satellite imagery to map out existing infrastructure to create spatial suitability models to prioritise areas that need more water and sanitation facilities in Kenya and Monrovia (Liberia).” Francis is now pursuing a Masters in GIS and Remote Sensing with a keen interest in precision agriculture, UAV imagery, and GeoAI, while working as a Spatial Data Analyst for a German Earth Observation firm.

In early 2023, VCSs **Michael Ndadema** and **Christine Muriungi Wanja** were deployed together at Pamoja Trust. They worked to map the informal settlements of Mabatini and Mashimoni in Nairobi using STDM, and trained urban-poor communities about the Kenyan Community Land Act (2016).

Michael worked with the Mabatini and Mashimoni villages in the Mathare slum settlement, and got hands-on experience with the issues the slum dwellers face. He saw that their primary concern was how to acquire tenure rights for the land they occupy, because they are faced with constant threats of eviction from land grabbers who prey on their land right vulnerabilities. He worked with the community undertaking sensitization on how they can register their land as a community as per the Community Land Act of 2016, and was also involved in data collection in collecting coordinates and creating sketch maps for the two settlements. Michael also conducted an enumeration of the Mabatini community to ascertain the number of people in that community and their socioeconomic issues. This enumeration data was used to set up a community register and STDM, crucial for advancing their fight to acquire tenure security. He says, “This work awoke a passion in me and showed me that I could be instrumental in advancing land rights for all in society through my skills.”

Christine found the experience of being a VCSP to be an exciting and transforming experience. She worked with Pamoja Trust Kilimani, Kenya, where she got to work with amazing people who trained her on how to use the STDM tool and about the Community Land Act 2016. As a surveyor in Kenya, she learnt more about the urban poor and their fight to own the community land they reside on. She says, “Most of the surveyors in my country barely know what the urban poor go through or how much their support may be of great help to them. I used this opportunity to get to know the community, learn about their challenges and helped in surveying the land and mapping it so that they can officially reclaim it from the government and register it as a community land as per the Kenyan Land Act 2016. The program was life changing as I also got to interact with other surveyors thus growing my network.”

In mid 2023, VCSs **Solomon Gitau** and **Milcah Cherotich** were deployed together at Pamoja Trust. They worked on preparing guidelines for registration of land/housing rights, and assisted stakeholders in the subdivision process of land in the Komarock area of Nairobi County. Importantly, they also trained leaders from the Mabatini and Mashimoni informal settlements on the importance of due diligence in land occupation, the application of the Community Land Act (CLA), local markets, STDM, Community Groups Registration Act (CGRA), Sectional Properties Act (SPA), and Cooperatives Act.

During the three months, Milcah engaged with Mabatini informal settlement community members on data management within the Mabatini informal settlement. She rapidly improved her skills and learnt a lot more about data collection, data entry using STDM & subsequent data verification, community awareness, informal settlements, and market mapping. Her leadership in these areas underscored the transformative potential of data in community development. She says, "This viable opportunity was inspiring, fulfilling, and empowering. Witnessing Mabatini residents embrace their land ownership fueled my passion for community-driven initiatives and data's role in social good. This experience steered my career towards fit-for-purpose land administration, evident in my ongoing pursuit of a master's degree and involvement in mentoring through the VCSP Core Team. My time as a Volunteer Community Surveyor instilled in me a deep commitment to leveraging data for positive change in communities."

Milcah found that the experience of the deployment allowed her to work with experts in the field to solve issues affecting communities, and to build relationships, network, and learn about the community. Solomon worked on preparing guidelines for the registration of community land/housing rights and assisted stakeholders in the subdivision process of land in the Komarock area of Nairobi County.

Solomon found it useful to learn and work towards ensuring that good land governance was supported by advocacy initiatives and digitised land/household information. He has gone on to work in Nairobi, Kenya, as a Surveyor and Managing Director of surveying firm Ngirigaca Solutions Ltd. He also lectures part time and works with Ford Foundation/Africa Gender and Development Network (AGDEN), supporting a project evaluating and understanding taboos in the Agikuyu community, including those related to Indigenous land and Land rights practices in central Kenya. He says, "The valuable exposure to professional experience and the courage I gained from my time on this deployment is a key pillar to confidently offer my services to interested stakeholders in my professional life today."

Finally in late 2023, VCSs **Eliud Obandah** and **Faith Mugure** overlapped in their deployment at Pamoja Trust. They used STDM to document and analyse land tenure information, collected and analysed data on land rights, housing conditions and access to basic services in informal settlements. Throughout this process, they built relationships, collaborating with local authorities and policymakers. Alongside this work, they also supported training of Mnazi Mmoja and Kwa Bulo community members on STDM and mapping exercises in Mombasa. Both Eliud and Faith have gone forward to progress their careers in surveying. Eliud is now a Graduate Surveyor in Alliance Survey Limited, where he is working on the KISIP 2 Project at Nandi and Baringo. He works on informal settlement boundary confirmations, local demarcation, topographical surveys for engineering drawings and design, generation of basemap reports and enumeration processes to enable generation of titles for secure tenure.

Faith worked in the Action and Research Team, where she presented her previous skills in land surveying, land administration, remote sensing and GIS in mapping of residential areas in informal settlement. She was actively engaged in initiatives towards securing land tenure among community members at Mashimoni and Mnazi Mmoja in Nairobi and Mombasa counties respectively. She was involved in data collection, mapping, analysis and updates of the land tenure system in the STDM. Faith gained valuable insights on problems faced by the urban communities in unequal resource allocation such as market spaces, water and social amenities and appreciated the initiatives undertaken by community leaders, Pamoja Trust, GLTN, policy makers and government institutions in advocating for land rights among the urban poor. Through these experiences, Faith developed an interest in land sustainability where she is currently a GIS consultant at the county government on matters of land administration and urban planning.

VCSP also supported two VCSs, **Atieno Jedydah Owino** and **Orina Viola**, to be deployed with the GLTN Secretariat in 2022 and 2023.

VCS Atieno Jedydah Owino, a Kenyan, was deployed to the GLTN Secretariat in Nairobi in 2022. During her deployment, Jedydah contributed significantly to reporting Social Tenure Domain thematic findings and played a pivotal role in reviewing STDM reports for Kenya, Zambia, and the Philippines. Having the opportunity to undertake fieldwork in Kenya provided Jedydah with valuable first hand experience in the field of land tenure. Networking with UN-Habitat staff was a highlight for Jedydah, who particularly valued witnessing community engagement in Mabatini alongside Pamoja Trust and the GLTN team. These experiences ignited a passion for access to land, especially for women and people with disabilities in our communities, particularly in informal settlements. Jedydah has gone on to pursue a Master's degree. She was also inspired by her experiences to mentor other young surveyors, especially young women. Jedydah has been actively involved in mentoring programs such as the URISA mentoring network and the Women+ in Geospatial Mentorship Programme.

VCS Viola Orina was deployed with the GLTN Secretariat (Nairobi, Kenya) in 2023. During her deployment, Viola supported updates to documentation for the STDM tool and user manual. She gained insights into the challenges and disparities related to land access and ownership in various contexts and how to work directly with communities to empower them in securing their land rights in different contexts globally. This includes the importance of participatory approaches and involving local communities in decision-making processes. She also learned about data collection and analysis techniques for assessing land tenure systems and gathering information on land rights, which are vital for informed decision-making. Viola's participation in the VCSP significantly influenced her career path and professional growth. The hands-on experience shaped her career trajectory towards geospatial analysis, land management and sustainable development. Additionally, the VCSP provided her with valuable skills in documentation, software testing, and data analysis that are directly applicable to her current role as a Geo Information and Data Engineer at the Kenya Space Agency.

3.2.3 Sierra Leone

In 2022, **Hassan Barrie** and **Sylvester Momoh** were deployed in Sierra Leone as part of the project nicknamed Drones for Good that VCSP supported. As part of their deployments, they learnt how to use Trimble devices to collect waypoints, and use this alongside SmartLandMaps to help landowners demarcate their boundaries. During the

VCSP Wisdom Workshop, they also took key roles in training dozens of participants in the use of Trimble GNSS tools.

3.2.4 Namibia

In late 2023, VCS **Aune Kamosho** was deployed with NUST (the Namibian Institute of Science and Technology), where she was involved in a variety of tasks aimed at empowering the communities of Ekunde and Vyf Rand, including concept mapping and planning studios, training community members in data collection and guidance through their data collection process, and community engagement and empowerment. She improved her data analysis and community engagement skills as she worked as part of these strategic planning projects, and valued learning about data-driven decision-making and how community engagement sessions facilitate transparency, communication, and collaboration. For Aune, the deployment taught her valuable lessons in resilience and adaptability and the power of empathy and collaboration.

Aune says, “The FIG Young Surveyors Network Country Deployment Program in Namibia provided me with an extraordinary opportunity to immerse myself in community-driven development initiatives. Collaborating with passionate teams and directly engaging with residents in Vyf Rand and Ekunde informal settlements was a transformative experience. Facilitating the creation of concept maps, which encapsulated the aspirations and needs of the communities, was both humbling and inspiring. Despite encountering challenges such as political scepticism and language barriers, witnessing the enthusiastic participation of community members underscored the significance of inclusive, grassroots approaches to development. This hands-on involvement not only deepened my understanding of community dynamics but also reinforced the importance of empathy and cultural sensitivity in driving meaningful change. Now, as I near the completion of my studies in Geoinformation Technology, currently in my final year, I find myself reflecting on how this experience has shaped my trajectory. Beyond honing technical skills, it has instilled in me a profound sense of responsibility to leverage my expertise for the betterment of society. Inspired by the resilience and spirit of the communities I had the privilege to work with, I have integrated volunteering into my routine, notably by preparing meals for those in need. Through these actions, I endeavour to honour the lessons learned during the deployment program, fostering connections and making a tangible impact in the lives of others. As I embark on the final stretch of my academic journey, I am grateful for the invaluable insights gained and remain committed to championing community empowerment through geospatial technology/surveying and compassionate outreach.”

During her deployment to NUST at the same time, **Kamuike Muundjua** actively participated in report writing, data collection, and data analytics. This experience provided her with valuable insights into the enumeration process and the complexities of community engagement. She recognized the critical role of community participation in the development of informal settlements. Moreover, the deployment underscored the significance of data-driven decision-making. By analysing data and understanding community dynamics, Kamuike gained a deeper appreciation for the impact of informed choices. Her involvement in this project likely influenced her subsequent career path, emphasising the importance of community-centred approach and evidence-based strategies.

3.2.5 Philippines

In 2023, VCSs **Alejandro Enriquez** and **Joven Wadwachan** (both from Philippines) spent time deployed with TAMPEI.

Alejandro worked full-time, so spent six weekends volunteering to improve his STDM capacity, surveying in an area where there are more than 600 households and families illegally settling on an area of 2.3 hectares, with no recorded claim of the land. He gained a lot from the deployment, improving his professional skills in data gathering, encoding and mapping, and time management capabilities through the fieldwork, and was rewarded at how this work helped him give back to the community. He was inspired to continue to work in and share his skills to help solve land-based community problems in his career as a Geodetic Engineer and Mine Surveyor. Alejandro has found that the knowledge he learnt from his time with TAMPEI on how to use STDM functions is something he carries with him as part of the daily work he does everyday as a surveyor.

Joven seized the opportunity to apply his surveying skills and expertise to address real-world challenges related to land tenure security, registration, and documentation. Collaborating with local communities, he collected geospatial information to help them map their boundaries and land history. He utilised QGIS and the STDM plug-in to process this data and conduct spatial analytics, resulting in the creation of various maps. His experience with TAMPEI underscored the significance of community-driven data collection, mapping, profiling, and planning in informal settlement communities. His work in mapping informal settlements in Muntinlupa City using STDM exemplifies how this tool can support community efforts in land tenure security and upgrading informal settlements. He is optimistic that STDM will bridge the gap between the formal system and tenure arrangements not recognized by the statutory and legal system. Now, as a GIS Specialist at the National Commission on Indigenous Peoples (NCIP) in the Philippines, Joven's role further emphasises the necessity of inclusive and participatory approaches in land administration to safeguard the tenure rights of Indigenous communities.

3.2.6 Deployments with The Cadasta Foundation

Later in 2021, VCSs **Diana Kyalo** and **Deborah Haggith Jepkoech** were deployed with the Cadasta Foundation in Kenya. Diana supported their work in creating informal settlement maps and collaborated closely with team members to facilitate training sessions for communities and local partners. These sessions focused on utilising fit-for-purpose technologies to map, document, and secure land and resource tenure rights for communities.

Diana has gone on to work extensively in land administration across both East and West Africa with remote and underserved communities using affordable digital tools to document land rights, particularly those affected by climate change. Directly engaging with communities during this time was profoundly motivating for Diana, reinforcing her dedication to working with Indigenous and local communities to document and secure their land rights. She firmly believes that secure land tenure lays the groundwork for sustainable development, poverty alleviation, and social justice. Diana has gone on to work with the Cadasta Foundation, supporting project implementation across West, East, and Southern Africa. Actively participating in these community-led and action-oriented activities continues to fuel her passion for working alongside communities as they spearhead efforts to secure tenure and address climate change, ultimately foster-

ing more prosperous and sustainable communities. Diana recognizes securing tenure rights as a crucial strategy in combating climate change. Grateful for the opportunity to serve as a VCS in this deployment, Diana is committed to remaining an active member of the FIG YSN community.

Deborah Jepkoech worked in the field and the Cadasta office, employing geospatial technologies to secure land tenure. She learnt a lot about using ArcGIS products online, such as designing Survey123 questionnaires, and offline, such as mapping areas of ancestral lands. Through her work, she gained insights into securing land tenure, extending beyond individuals to encompass broader issues such as climate change mitigation. Deborah witnessed firsthand how land tenure can empower local communities, offering stability, security, and a sense of ownership over their land. This empowerment fosters sustainable land management practices, including measures for land degradation neutrality, crucial for combating environmental challenges like deforestation. Furthermore, Deborah's utilisation of geospatial technologies underscored their pivotal role in advancing land tenure efforts, enabling mapping, documentation, and monitoring of land rights. These tools not only enhanced efficiency and transparency but also amplified the voices of marginalised communities, providing indispensable evidence to uphold their land rights amid competing interests. Her ongoing dedication contributes to the pursuit of a more equitable and sustainable world for all.

In 2021, VCS **Gundelinda Ringo** was deployed with the Cadasta Foundation in Tanzania, where she learnt about and applied ArcGIS, Survey123, Survey Online and ArcGIS Pro to support communities on-the-ground. As part of her deployment, which led her to pursue ongoing work in this area, the Ministry was able to identify areas of Dar es Salaam that have been mapped in ways that are not current, complete or representative of what is actually on the ground. They have been implementing the ILMIS system, which has been used in other parts of Tanzania since also, in collaboration with each relevant Municipality and Ministry of Lands to resolve issues such as overlap, shifting, unrealistic survey, double allocation of plots, etc. In her time deployed with The Cadasta Foundation, she completed this work with some landowners in the Bunju area, an informal settlement area in Dar es Salaam, where she completed a survey of almost 300 plots. Linda is now a Cadastral Surveyor and GIS Expert in Dar es Salaam, and feels passionate about helping people in the process of obtaining title deeds.

3.3 Feedback from VCS Mentors

VCS Mentors were not able to be provided to all VCSs during their deployments. However, where mentors were involved, they gained just as much as the VCSs that they supported, as evidenced by feedback from selected mentors:

Aaron Hick (Australia) enjoyed being part of the VCSP as a mentor, and found that he also learnt from his mentees while he mentored them. He said, *"Both volunteering and mentoring have given me the ability to understand more deeply the challenges faced, especially by those in developing nations, and given me renewed enthusiasm and drive to continually strive for better outcomes in my work. It's so rewarding to see and be involved in. Thank you! Now go get involved!"*

Chief Innocent Egbuh (Mentor) (Nigeria) said that mentoring long-distance brings him great joy, and suggested others to be mentors and get involved, to have commitment and give their valuable time.

Donmarl Camua (Philippines/Australia) mentored a young surveyor in Nairobi in Kenya, whom through coaching, he shared his experience in projects of digital atlas of informal settlements in Nairobi County. Don said that personally he had to step up and be an inspiration as a mentor. He said that while mentoring requires one to be prepared and share what you know, you learn at the same time.

3.4 Photos of our Volunteer Community Surveyors on deployment



Jordan Friis (Nepal)



Shristi Paudel (Nepal)



Shristi Paudel (Nepal)



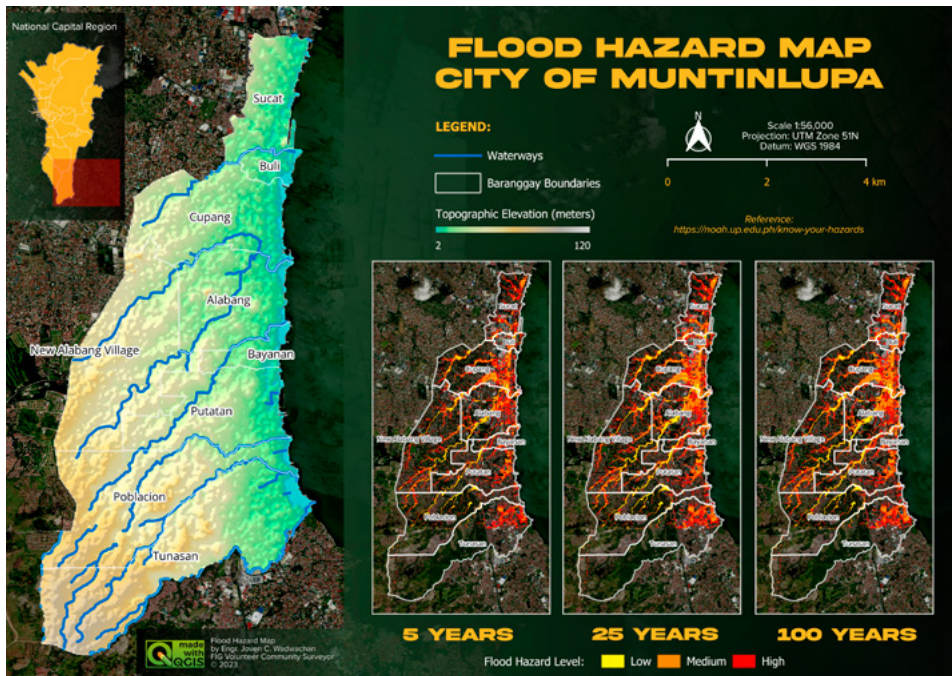
Chandan Das (grey jacket) with some of the TAMPEI team (Philippines)



Donmarl Camua (white shirt) with some of the TAMPEI team (Philippines)



Alejandro Enriquez (Philippines)



Joven Wadawachan (Philippines)



Joven Wadawachan (Philippines)



Thandikosi Gracious Chari (Zambia)



Ikenna Arungwa (Kenya)



Working with Cadasta has not only helped my growth in technical skills but also developed a holistic young professional. My confidence grows every day and I am certain I can work and be more useful in any corner of the world. I am very grateful for the safe healthy community that VLSP is creating and I hope for more young people to get the same opportunity.

Diana Kyalo - VCS in Kenya - 2021

VCSP impacting lives & livelihoods of young surveyors

Personally, I have been able to see and learn many things from you including working in organization, unity and cooperation, being transparent, discipline in time and work, how you communicate

Gundalinda (Linda) Ringo - VCS in Tanzania - 2021



Earlier in the year [the FIG VCSP] organized a workshop where I learned about the various tools Cadasta uses in securing land tenure for communities across the globe. Since then, I have been working in the capacity of a CIS Assistant within the program team at Cadasta. My technical skills have increased greatly.

Deborah Haggith Jepkoach - VCS in Tanzania - 2021



Francis Kioni - VCS in Kenya - 2021

Testimonials from Cadasta VCSs



Michael Ndadema (red shirt) working with Pamoja Trust 2023 (Kenya)



Christine Wanja (green hat) undertaking data collection of Mabatini in Mathare (Kenya)



Milcah (green jumper) working with members from the Mabatini informal settlement to verify land and housing records (Kenya)



Solomon Gitau (in white shirt) training members of the Laini saba on cooperatives (Kenya)



Solomon Gitau working with members from Mabatini informal settlement to digitise land and housing records (Kenya)



Solomon Gitau working at Pamoja Trust office (Kenya)



Solomon Gitau engaging community and market members on the need for land and housing due diligence (Kenya)



Obandah Eliud (Kenya)



Obandah Eliud (Kenya)



Faith Mugure (Kenya)



Faith Mugure (Kenya)



Viola Orina during her deployment in Kenya with the GLTN Secretariat (Kenya)



Israel Taiwo (Uganda)



Israel Taiwo (Uganda)



Arthur Mukwaya (Uganda)



Arthur Mukwaya (Uganda)



Ndahiro Francis (Uganda)



Caroline Amayo (Uganda)



Caroline Amayo (Uganda)



Aine Mukasa standing next to Lydia (Uganda)



Edwin on the right, Lydia in the middle and Aine on the left preparing CoC documents (Uganda)



Hadjah Naggayi in denim skirt and white shirt (Uganda)



Amon Mbalo (Uganda)



Linda Ringo (Tanzania)



Aune Kmaosho (Namibia)



Kamuike Muundjua during her deployment (red shirt with white text on it) (Namibia)



Hassan Barrie and Sylvester Momoh (Sierra Leone)

4 LOOKING TO THE FUTURE: HUMANITARIAN SURVEYING AS AN OPPORTUNITY FOR YOUNG SURVEYORS

4.1 *Impact of (and on) Volunteer Community Surveyors (VCSs)*

As the impressive results of the Volunteer Community Surveyor Program (VCSP) have showcased, Young Surveyors play an important role in humanitarian surveying, contributing to sustainable urban development, poverty reduction, and the promotion of secure land tenure rights for all individuals, including those affected by crises. Young surveyors bring fresh perspectives, technical skills, and energy, which can accelerate capacity building efforts within communities on-the-ground in helping them to better understand and manage their land and property rights. The knowledge and skills in emerging technologies and innovative approaches to surveying that young surveyors bring can lead to the adoption of new tools and methodologies that improve the efficiency and accuracy of data collection in these communities, supporting efforts towards greater transparency, communication, trust-building and respect and driving long-term change.

Young surveyors can play a crucial role in advocating for policy change and influencing decision-makers to prioritise land rights issues in humanitarian contexts and other related areas including developmental contexts and research contexts. Their involvement strengthens the advocacy efforts of organisations like GLTN, leading to more effective policies and interventions. The beneficial impact that these young surveyors have on local community projects is evident – as Pamoja Trust has said, “The involvement of the VCSs we hosted significantly expedited project timelines and enhanced data accuracy, ultimately improving the quality of our technical documentation and training materials. They were of great benefit in capacity building to our staff on emerging trends... Having got regular feedback from the supervisor who worked closely with the volunteers in various community projects in our Action Research Department, I can attest to their invaluable contributions to our projects.”

Similarly, TAMPEI has said, **“The VCSP program was indeed a good platform for both the volunteers and the partners to exchange knowledge and learn from each other. Since inception with Don Camua, the role of colleagues from surveying profession gives more clarity especially on leveraging land administration and land management concepts and tools. Although countries have varying context especially on the discussion around land, the VSCP in one way or another bridged the traditional concept on land management and its broad application in the built environment.**

The clear impact with engaging VCSP volunteers, I must say, is that data management and data collection, especially on mapping, can be a more valuable tool when translated by the volunteers into technical maps. Their proficiency in GIS tools have been beneficial especially in giving a clearer picture on the spatial situation not just limited to geographic but also capturing areas on environmental and hazard mapping particularly on the discussion around climate adaptation. A good example of it is the flood forecast projected in different timelines done by Joven in one of the project areas, Muntinlupa. A different scenario happened during the time of Donmarl wherein he provided an orientation about the roles of surveyor, the process of land acquisition, and how to avoid being deceived by false/fake surveyors. That particular undertaking created awareness at the level of the community and brought confidence to them especially in negotiating with the land owners.”

“Succinctly, linking the professional (technical) and social side, bridges the gap between the big picture on the map versus the reality on the ground, and immersing the surveyors on the community processes promotes evidence-based data output plus broadening the perspective of the technical professionals into the realities and the actual social issues.”

The VCSP stands unique in the global surveying landscape as being a program that allows young surveyors the opportunity to experience what it’s like to apply their professional skills and training on-the-ground to a community in need, understanding complexities that are unable to be taught in a classroom. All 42 VCSs who have gone through the VCSP program have said that there would not have been another way for them to do this without being accepted into the VCSP.

The experiences that these in-Country deployments provide has so often been a pivotal point in the career journeys of these VCSs. The capacity building experience, the technical knowledge and skills gained, and the exposure to cultural situations are guiding beacons that have strongly influenced the future career pathways that these young people have taken in the global surveying profession. **Programs such as the VCSP contribute directly to FIG’s goal of strengthening surveying capacities worldwide, but their most valuable impact is in shaping career pathways of future leaders who go on to shape capacity building efforts, elevate other young surveyors and create programs which scale up land administration efforts in meaningful ways.**

4.2 The role of Volunteer Community Surveyors in workforce development and wholistic sustainable development at a global level

Diversity, equity, and inclusion (DEI) are integral to addressing global workforce development challenges, particularly in industries like surveying. Before the COVID-19 pandemic, the surveying industry already faced workforce development challenges due to factors such as an ageing workforce, skills shortages, and insufficient representation of underrepresented groups. These challenges hindered the profession’s ability to meet the demands of a rapidly changing world and to effectively address emerging issues such as climate change, urbanisation, and technological advancements. The pandemic exacerbated these challenges by disrupting education and training pipelines, exacerbating inequalities, and highlighting the need for more resilient and adaptable workforce development strategies.

Importantly, the young surveyors who are emerging into the industry globally are coming from much more diverse backgrounds and cultures than their predecessors, bringing a range of perspectives to the table. This diversity enriches discussions, fosters creativity, and ensures that solutions proposed for land tenure issues are inclusive and culturally sensitive. In this context, young surveyors play a particularly crucial role in advancing the surveying profession and support it to retain its relevance. As a diverse and digitally native generation, young surveyors bring fresh perspectives, innovative ideas, and technological skills that are essential for driving industry growth and adaptation.

It is already abundantly clear that climate impacts will be most catastrophic for people and communities who do not have security of their land rights. Within this context particularly, young surveyors play a critical role in fostering climate resilience through their ability to bring new technologies to build capacity, facilitate resilience for local

communities, and deliver policy and technology solutions at national and regional scales. At the local level, involvement of young surveyors in community land administration projects utilises their knowledge and skills to conduct detailed land surveys, assess vulnerabilities, and develop tailored adaptation strategies for communities facing climate-related challenges such as sea-level rise, extreme weather events, and land degradation. By engaging with local stakeholders and leveraging geospatial data, they contribute to the design and implementation of infrastructure projects that enhance resilience, such as flood defences, coastal protection measures, and sustainable land-use planning initiatives.

Young surveyors also play a vital role in driving climate resilience efforts at national and regional scales by advocating for evidence-based policies, promoting the adoption of innovative technologies, and facilitating cross-sectoral collaboration. Through their involvement in professional organisations, research institutions, and government agencies, they contribute to the development of policies that integrate climate considerations into land management practices, urban planning strategies, and disaster risk reduction initiatives. Through taking both a generalist and specialist approach to surveying and geospatial, young surveyors are well-placed to harness the power of geospatial data analysis and remote sensing techniques to rapidly provide valuable insights into climate trends, vulnerabilities, and adaptation options. This informs decision-making processes and guides investments in resilient infrastructure and sustainable development projects. Their contributions help build the adaptive capacity of societies to withstand the impacts of climate change and ensure a more resilient and sustainable future for all.

4.3 Looking forward

Programs such as the Volunteer Community Surveyor Program, made possible only through the efforts of a dedicated team of volunteers and the financial contribution of sponsors such as GLTN, have astounding and long-reaching impacts. Having deployed 42 VCSs from 2017–2023, the VCSP stands witness to the sheer impact of these unique experiences on shaping the future career direction of these young surveyors through the inspiration and real-world perspectives they gain from these deployments. Through their dedication, innovation, and tireless efforts, they have demonstrated their capacity to drive meaningful change, contributing to sustainable urban development, poverty reduction, and the promotion of secure land tenure rights for vulnerable communities worldwide. These VCSs have proven themselves to be invaluable assets in capacity-building efforts, leveraging emerging technologies and innovative approaches to address complex challenges on the ground.

Looking ahead, the role of young surveyors in addressing global workforce development challenges and fostering climate resilience cannot be overstated. Their diversity of backgrounds and perspectives enriches discussions and fosters creativity, ensuring that solutions proposed are inclusive and culturally sensitive. Moreover, their commitment to driving positive change at local, national, and regional scales through policy advocacy, technology adoption, and community engagement underscores their potential to shape a more resilient and sustainable future for all. As the surveying profession continues to evolve in response to shifting global trends and challenges, young surveyors will undoubtedly remain at the forefront, guiding the way with their passion, expertise, and unwavering dedication to building a better world for generations to come.

APPENDIX I: VCSP CORE TEAM EVOLUTION OVER TIME

In order to live true to its values, the VCSP Core Team has strived to hold a diverse composition over the course of its existence. This has extended to diversity of gender, cultural background, surveying disciplines, geography or country of origin, and diversity of spoken language.

The VCSP Pilot Program was first established in 2017 (Chapter 2 for further details of the team involved in this). Eva-Maria Unger (FIG YSN Chair) developed and coordinated the pilot program with the support of Oumar Sylla (GLTN Unit Leader), Danilo Antonio (GLTN Country Operations and Land Tools Development Coordinator), John Gitau (GLTN), Louise Friis-Hansen (FIG Office), and John Hohol (FIG Foundation President).

When the VCSP Core Team was first established in 2020, it was led by Claire Buxton and assisted by respective teams in Year 1 (2020) and Year 2 (2021). Each team had one team lead and one mentee to support the lead. Mentees rotated over time, allowing exposure to the workings of different teams to help them see where their passions and inclinations might lie.

- **VCSP Core Team Lead:** Claire Buxton (Canada / New Zealand)
- **in-Country Deployments Team:** Sylion Muramira (Rwanda) as Team Lead, supported by Rasvan Manea (Romania)
- **e-Volunteering Team:** Tom Kitto (Canada) as Team Lead, supported by Kamal El-Ouhoudi (Morocco)
- **Wisdom Workshop:** Israel Taiwo (Nigeria) as Team Lead, supported by David Elegbede (Nigeria)
- **Knowledge Portal Team:** Chethna Ben (Fiji) as Team Lead, supported by Kamsin Raju (Fiji)
- **Communications Team:** Roshni Sharma (Australia) as Team Lead, supported by Angela Omamuyovwi Anyakora (Nigeria)
- **Partnerships:** Jordan Palk (Canada) as Team Lead

In Year 3 (2022), the Core Team evolved in its composition:

- **Core Team Lead:** Claire Buxton (Canada / New Zealand) supported by Edwin Nyandeché (Kenya)
- **in-Country Deployments Team:** David Elegbede (Nigeria) as Team Lead, supported by Shristi Paudel (Germany) and Sylion Muramira (Rwanda)
- **e-Volunteering Team:** Tom Kitto (Canada) as Team Lead, supported by Opeoluwa Akinradewo (South Africa)
- **Wisdom Workshop Team:** Israel Taiwo (Nigeria) as Team Lead, supported by Kamsin Raju (Fiji / New Zealand)
- **Knowledge Portal Team:** Chethna Ben (Fiji) as Team Lead, supported by Michelle Nagawa (Uganda) and Kumbirai Nicholas Matingo (Zimbabwe)
- **Communications & Marketing Team:** Roshni Sharma (Australia) as Team Lead, supported by Hilal Atkin (Turkey)

- **Partnerships Team:** Jordan Palk (Canada) as Team Lead, supported by Angela Omamuyovwi Anyakora (Nigeria)
- The 2023 VCSP Core Team evolved under new leadership, as the lead role lasts for a term of two years. Within this structure, teams grew in size to accommodate the growing demand for VCSP initiatives:
- **Core Team Lead:** Roshni Sharma (Australia)
- **in-Country Deployments Team:** David Elegbede (Nigeria) as Team Lead, supported by Shristi Paudel (Nepal), Edwin Nyandeché (Kenya), Moses Mwanja Mulyungi (Kenya) and Mayuya Kausa (Zambia)
- **e-Volunteering Team:** Opeoluwa Akinradewo (South Africa) as Team Lead, supported by Godfrey Hussain (Kenya), Prajwal Sharma (Nepal) and Sebastian Forero (Columbia)
- **Wisdom Workshop Team:** Allan Kiptoo (Kenya) as Team Lead, supported by Rose Mutagi (Kenya) and Letwin Pondo (Zimbabwe)
- **Knowledge Portal Team:** Kumbirai Nicholas Matingo (Zimbabwe), followed by Michelle Nagawa (Uganda), as Team Lead, supported by Michelle Nagawa (Uganda) and Joseph Kang'ara Muta (Kenya)
- **Engagements Team** (merger of Communications & Marketing Team and Partnerships Team): Angela Omamuyovwi Anyakora (Nigeria) as Team Lead, supported by Stefan Fiddler (Jamaica), Emmanuel Akandwanaho (Uganda) and Sutoidem Theophilus (Nigeria)

At the time of publication, the VCSP Core Team in 2024 was:

- **Core Team Lead:** Roshni Sharma (Australia)
- **in-Country Deployments Team:** David Elegbede (Nigeria) as Team Lead, supported by Shristi Paudel (Nepal), Edwin Nyandeché (Kenya), Moses Mwanja Mulyungi (Kenya) and Mayuya Kausa (Zambia)
- **e-Volunteering Team:** Opeoluwa Akinradewo (South Africa) as Team Lead, supported by Prajwal Sharma (Nepal)
- **Wisdom Workshop Team:** Letwin Pondo (Zimbabwe) as Team Lead, supported by Rose Mutagi (Kenya)
- **Knowledge Portal Team:** Michelle Nagawa (Uganda), as Team Lead, supported by Joseph Kang'ara Muta (Kenya)
- **Engagements Team:** Angela Omamuyovwi Anyakora (Nigeria) as Team Lead, supported by Stefan Fiddler (Jamaica), Emmanuel Akandwanaho (Uganda) and Sutoidem Theophilus (Nigeria)

Please check for the current VCSP Core Team membership at <http://fig.net/vcsp>.

APPENDIX II: ONLINE HUMANITARIAN SURVEYING EFFORTS BY VCSP

1 VCSP Wisdom Workshops

1.1 2018 Dunedin – Volunteering Toolkit

The ability for young surveyors to use our skills in volunteering situations was a hot topic at the FIG Working Week in Christchurch back in 2016. Inspired by the work the FIG Young Surveyors' Network were doing with the VCSP, the Survey and Spatial New Zealand (S+SNZ) Young Professionals Group grabbed the concept with both hands and organised the Volunteering Toolkit workshop in Dunedin, New Zealand. It was held in September 2018 in a partnership between Te Kura Kairūri (the School of Surveying) at the University of Otago and Survey and Spatial NZ.

The objective of the two-day workshop was to educate attendees on different programs available, land tenure systems, software solutions, and challenges previously encountered. The focus was on Pacific Islands and Territories. A range of both local and international speakers attended to share their experience and give attendees the skills to hit the ground running if they get the opportunity to volunteer abroad. An afternoon of hands-on learning

This workshop was the catalyst for Wisdom Workshops. The structure and general content were followed for future workshop designs. The topics for this workshop were as follows:

1. Aid Work – What is an aid agency looking for in a volunteer?
2. Volunteering as a Surveyor – What is it really like?
3. Land Tenure – Theory and wisdom (the Land Rights Continuum)
4. Community Mapping – Give it a Go
5. Geodetic Networks – Where do I start and what value can I bring? Bonus: Group discussion on the future of the 'Surveyors Beyond Borders' initiative.

Dedicated and passionate presenters co-designed this workshop with Claire with advocacy and marketing support from the S+SNZ head office. As a collective gift to the many volunteering speakers, a Kahikatea tree was planted in Hereweka on the Otago Peninsula.

Thanks go to: Dr. David Goodwin, Malcolm Archbold, Dr. James Berghan, Claire Buxton, Bill Robertson, Claire McClintock, Aaron Hick, Jordan Friis, Peter Ollivier, Kelly Gragg, Dr. Chris Pearson, Dr. Mick Strack, Neil Pullar, Andrew McDowell, Eva-Maria Unger, and Hon Clare Curran (MP).

"[The attendees] had the sort of briefing that many of us would have liked before our initial mission." – Bill Robertson



*A Kahikatea tree was planted as a collective gift for the Volunteering Toolkit speakers.
Photo taken 2018.*

1.2 2019 – Dakar, Senegal – Mini-Wisdom Workshop

‘This was a 90 minute session where the experiences of being a Volunteer Community Surveyor were shared. The session was organised by Adama Sarr, and VCSP Lead Claire Buxton presented remotely.

1.3 January 21–29, 2021 Wisdom Workshop: Sustainable Solutions for Land-Based Community Problems – Tools and Modern Approaches

This Wisdom Workshop, led by Israel Taiwo, was preceded by a one-week long Massive Open Online Course (MOOC) to provide participants with the background knowledge they might require, and attended by 125 young and ‘seasoned’ surveyors from 44 countries from around the world.

With support from leading organisations such as Cadasta, the Global Land Tool Network (GLTN) of the UN-Habitat, Kadaster, Land Equity International, and Spatial Collective, the workshop’s content was delivered over two days:

- Day 1: Community Problems, Land Tenure and Tools for Land Management
- Day 2: Building Capacity and Implementing Modern Land Management Approaches.

On Day 1, Solomon Njogu of GLTN spoke to land management, community develop-

ment and open technologies, followed by Aaron Hick who shared experiences gained from previous humanitarian surveying events about the skills of a humanitarian surveyor. Then, using a question-and-answer approach, Dr Kwabena Asiamah helped assess the level of knowledge attained by participants on the relationship between land management and community development. The program then featured an interactive training workshop introducing participants to Cadasta and GLTN tools with Paul Gothago of GLTN and Justus Wambayi of the Cadasta Foundation. They explored the implementation of STDM and Cadasta tools for land management, and how to leverage land management tools for problem-solving and decision-making.

Day 2 began with Justus Muhandu of the Spatial Collective speaking about gathering resources for land management projects, providing case studies to illustrate the complexities involved. Then, Ernst Peter Oosterbroek spoke to the challenges of having a country-scale solution for land rights and tenure security in different nations, before Kate Fairlie of Land Equity International led the discussion on how much land rights and tenure insecurity have impacted countries. After lunch, Chethna Ben from the VCSP Knowledge Portal Team shared the importance of documenting and publishing experiences for 'sustainable land-based solutions before breakout rooms allowed participants to gather into FIG regions and discuss what's next together, collectively agreeing on next steps. The program ended with closing remarks by VCSP Lead Claire Buxton.

1.4 November 27 – December 3, 2021 Wisdom Workshop: Promoting Tenure Security in the Face of Legal, Institutional & Social Challenges

This Wisdom Workshop, led by Israel Taiwo and Kamsin Raju, was also preceded by a one-week long Massive Open Online Course (MOOC) to provide participants with the background knowledge they might require. It was attended by almost 60 participants from around the world.

The program opened with insights from FIG Vice President Diane Dumashie speaking to how young surveyors are the bridge between the inevitably high policy and actual implementation required to foster land related solutions. Past Volunteer Community Surveyors Shristi Paudel and Jordan Friis, deployed to Nepal in 2017, then spoke about experiences and opportunities of humanitarian surveyors, before Solomon Njogu from GLTN and Justus Wambayi from the Cadasta Foundation spoke to volunteering for pro-poor land administration projects, facilitated by Aaron Hick, a seasoned surveyor actively involved in FIG. Claudia Stöcker, a research associate at the University of Münster, then presented on tools for identifying the challenges of tenure security on different scales, before participants brainstormed how to influence regional land based solutions across different FIG regions, led by Royal Menare from the Namibian University of Science & Technology. The program then split into parallel sessions run by deployment partners to explore skills required to volunteer for mapping rights, before expert sessions from technology partner Trimble on the Trimble Catalyst for land based solutions and RICS on harnessing solutions for land related challenges, before closing remarks by VCSP Lead Claire Buxton.

Collaboration founded during this Wisdom Workshop led to several papers by workshop participants being accepted for the FIG Working Week 2022 on these topics, which was a key success for this Wisdom Workshop.

1.5 August 18 –25, 2022 Wisdom Workshop: Increasing Climate Resilience Using Geospatial Technologies

With the sustainability of our planet in perspective, VCSP hosted a climate-themed Wisdom Workshop led by Kamsin Raju. This workshop held a week-long MOOC followed by a 3-hour live event. The workshop had 140 expressions of interest and almost 70 live participants.

The workshop was opened by Israel Taiwo, VCSP Wisdom Workshop Team Lead, and Ferah Koksai, FIG Young Surveyors Network Chair. Following this, Five alumni Volunteer Community Surveyors (VCS) from the 2017 VCSP Pilot (Thandinkosi Chari, Shristi Paudel, Chandan Das, and Adama Sarr) shared their experiences with attendees of the workshop. They further outlined the very important qualities needed for a successful volunteering experience, which includes; respect for cultural values, curiosity and networking among other values. Israel Taiwo then presented on SDG Goal 13 (Climate Action), and Dr Lesley Arnold provided an introduction to the IGIF. VCSP Core Team member Jordan Palk then led a session allowing participants to take part in a HOT OSM mapathon, before parallel technical workshops occurred. In these, Caroll Chan spoke about QGIS for climate action, Leigh Luna spoke on WedODM and image analysis, and Adimou Sena spoke on using GEE (Open Data Cube) for climate action. Participants then heard from a panel of Carrol, Leigh, Lesley and Admiou about how to increase climate resilience with geospatial technologies pre- and post- climate disaster related disaster mapping activities, before closing by Kamsin Raju and Israel Taiwo of the VCSP Wisdom Workshop Team.

1.6 January 26, 2023 Wisdom Workshop: Building Capacity for Sierra Leone Land Tenure Security

Land tenure security has been recognized as instrumental to make economic security available for all and therefore provide for stable livelihoods and smart management of natural resources. With the government of Sierra Leone and various CSOs seeking ways to capture and record an entire country of land rights to prevent further land grabbing, surveyors are needed now more than ever. With this in mind, the VCSP sought to help to build capacity for tenure security and mapping projects in Sierra Leone. With this hybrid workshop, young surveyors in Sierra Leone were able to learn about how innovative geospatial technologies can help to record land tenure, what is being done by CSOs and Government both locally and abroad, and what solutions are suitable for local contexts. Fifty young surveyors were selected to attend the workshop virtually, alongside in-person participation from young surveyors based in Sierra Leone.

The program opened with introductions by Diane Dumashie of FIG, Jobo Samba from Sierra Leone's MHLCP, and VCSP Wisdom Workshop Lead Allan Kiptoo. Jobo Samba then provided a history of Sierra Leone's land administration with Joseph Randall from Green Scenery, giving an overview of customary lands, the results of poor recordation (land grabbing, conflicts, poor land management) and attempts to fix this (such as reforms tried), the VGGT journey, today's legislation, and SLLAP. Linus Pott from the World Bank, training consultant Amit Epstein and Charles Turah from YILAA then spoke to the roles of private surveyors, Government surveyors, para surveyors, technology readiness and available technology, current and required capacity, and the mixture of stakeholders. Mila Koeva (UT-ITC) and Claudia Stoker (SmartLandMaps) then led sessions exploring international practice and different approaches to large scale mapping of family lands. Markus Koper from Trimble then led a demonstration with Claudia and Volunteer Community Surveyors Sylvester Momoh and Hassan Barrie on using Trimble devices to

collect waypoints, and use this alongside SmartLandMaps to help landowners demarcate their boundaries. The wisdom workshop ended with closing remarks from David Elegbede, VCSP in-Country Deployments Team Lead.

2 VCSP e-Volunteering

2.1 October 31, 2020: FireWater Mapathon with the Surveying & Spatial Sciences Institute, Australia

The FireWater Mapathon was the second mapathon initiative of SSSI, held on 31 October 2020 and focused on bushfire preparedness efforts. Participants collected data on static water infrastructures (such as dams, water tanks and swimming pools) to support firefighting efforts by providing information on where these vital sources of water could be found for emergency management personnel. This crowdsourced data is being validated and used to update the accuracy and completeness of foundation spatial data used by emergency management such as the Australian Static Water Supply System, through the efforts of Geoscience Australia (GA) and the Intergovernmental Committee on Surveying & Mapping (ICSM). The OpenStreetMap (OSM) Platform and Hot Task Manager were used to coordinate the mapping effort, set up by NGIS Australia. High-quality aerial imagery were donated to the mapathon event by Nearmap and the Department of Environment, Land, Water and Planning (DELWP Victoria), providing the detail required to detect these relatively small on-the-ground features accurately. Additionally, the Growing Data Foundation has created a web application called FireWater, which will use the data collected in the mapathon alongside existing data to more accurately direct fire crews to nearest available water sources during bushfire events.

The SSSI Young Professionals and VCSP collaborated to create the Mapathon Training Information manual, which was provided for all participants prior to their mapping.

Over 400 people from 45 countries came together to participate in this 24-hour Mapathon, mapping 515,000 hectares with over 37,000 edits and digitising 37,000 new infrastructure features.

2.2 June 24, 2021: Map Femal Genital Mutilation out of Tanzania with Crowd2Map Tanzania

Awareness and benefits of e-Volunteering has gained significant importance in the current status of the world. After helping to run the SSSI Firewater Event, members of the FIG Volunteer Community Surveyor Program (VCSP) Corea Team seek to share knowledge on the benefits of e-Volunteering to not only communities in need but also to surveyors doing the mapping. The VCSP Team in collaboration with Working Group 3.6 "Geospatial Next" presented a paper and ran this mapathon as part of the FIG Working Week 2021. They provided stories from experts in this field, a short training video and some hands-on experience prior to participants launching into the e-Volunteering event starting at the end of the workshop and running over the following 24 hours.

The team shared lessons from previous e-Volunteering events before leading a collective discussion on the potential for e-Volunteering to bring surveyors into the realm of high-value, high-impact change projects. Participants then joined a 24 hour long e-Volunteering sprint, featuring both absolute beginners to OpenStreetMaps as well as seasoned OSM mappers and validators.



2.3 April 17 – May 19, 2023: Creating a Land Tenure Reform System for Mars

The VCSP e-Volunteering Team designed a fictional story about Martian residents on Mars meeting for the first time with colonising Earthers, presenting a scenario for young surveyors to consider in small teams:

The year is 2050, and humans have succeeded in interplanetary travel and the development of life support systems to allow the settling of neighbouring planets. With a growing population, and no near-term solutions to the devastating impacts of climate change, rapid efforts are being made to settle Mars. An intrepid band of citizens have made the journey and are in the process of developing the building blocks for a new society of Mars Humans to grow roots there. Technology has been developed to allow our societies to survive in 'bubble' civilisations with shelter from the harsh solar radiation. Within these bubble cities, we are able to generate atmosphere and have adapted to the different gravity levels to be able to grow food and sustain ourselves. Life is different to that on Earth, but still good.

As they draw on their key expertise – health, agriculture, surveying, civil engineering, etc. – and explore options to settle the Martian surface (the flat lands), these early colonisers are greeted by a pre-existing Martian civilisation already living within the subsurface system of caves and runnels. Early communications are open and friendly, enabled by a novel translation system that works seamlessly, so there is no language barrier.

The Earth settlers are keen to ensure that past colonisation mistakes on Earth are not repeated, and so it is up to the land tenure team to discuss and negotiate land for the settlers and to undertake proper safeguarding reviews to ensure minimal negative impacts on martian populations. Initial discussions with the Martians are promising: they are willing to allocate portions of the flatlands to Humans.

Participants were required to develop and describe a land administration system for development control and environmental management, to allow human colonists to exist harmoniously with the indigenous Martian populations and sustainability with the Martian environmental systems. The VCSP team provided overview documents that provided details on the (fictional) needs of the land tenure system that would be

useful to develop for Mars, alongside a detailed background document based on a variety of different land tenure problems we are currently experiencing on Earth. Participant teams took part in a 12-day sprint, with new information about the hypothetical situation being introduced every 2–3 days, and teams required to submit short exercise reports every 2–3 days as well as a final report at the end of the sprint.

The VCSP Team presented a workshop on this e-Volunteering event at the FIG Working Week 2023 in Orlando. A total of 67 young surveyors undertook the e-Volunteering event, with 12 groups submitting final reports.

3 *Knowledge Portal*

In order for the VCSP to sustain through time, sharing lessons and knowledge is vital. The Knowledge Portal in its final form will be an online platform that Partners, VCSs, mentors, and the VCSP Team can log in to before, during, and after a project.

All of the three active paths of the VCS will make use of, and add to, the Knowledge Portal. A Knowledge Portal with a comprehensive and ambitious structure is underway for delivery in 2024.

ABOUT AUTHORS AND CONTRIBUTORS



Having traversed environmental science and management, human geography, palaeoclimatology & business studies, **Roshni Sharma** is a thought leader, a compassionate disruptor, a connector and someone who gets things done. She is dedicating her life to harnessing geospatial to create hope and tangible change in the face of climate change. Roshni is a project manager and industry engagement expert with FrontierSI, where she oversees and delivers complex, multistakeholder geospatial innovation projects bringing together industry, academia and government. She is the Core Team Lead for the FIG's Volunteer Community Surveyor Program at the time of this publication, with a passion for elevating and empowering young surveyors to have a positive impact on the communities and world around them. She is also Co-Chair of FIG's Climate Compass Task Force, and a recognised thought leader in Australia as the youngest Director with the Geospatial Council of Australia and the NSW Government's Board of Surveying and Spatial Information. Roshni is a passionate advocate for diversity, equity and inclusion, an avid reader and experimental cook, and her five chihuahua fur-children are the favourite part of her day.



David Elegbede is a diligent and intelligent young professional who has risen to the occasion of bridging the gap in geospatial solution availability, integrity and management as a whole. His focus extends to empowering young professionals, fostering their skill development, and contributing to establishing a sustainable society. He is the Director of Operations at GEOSYS Nigeria Limited, an excellence-driven geospatial enterprise that provides surveying support and consultancy services, where he excels in project management, geospatial modeling & analytics, and public speaking, amongst others. David Elegbede is a licensed surveyor with the Surveyors Council of Nigeria (SURCON) and a member of the Nigerian Institution of Surveyors. Over the years, David has served in both local and international committees in various capacities. He is currently the Chair of the FIG Young Surveyors African Network and the Lead of the in-Country Deployment team of the FIG Volunteer Community Surveyors Program (VCSP). He is also a member of the FIG Climatic Compass Taskforce and The FIG Mentoring Program for Africa.



Darion David Mahadeo is a full-time researcher from Trinidad and Tobago, pursuing his PhD Surveying and Land Information degree at the Department of Geomatics Engineering and Land Management, the University of the West Indies. Darion holds a BSc. Geomatics (Hons.) and an MSc. Geoinformatics (Dist.) from the same University.



Israel Oluwaseun Taiwo is a geomatics lecturer at the Federal Polytechnic Ado-Ekiti and a PhD Scholar at the Federal University of Technology, Akure, Nigeria. He is a Registered Surveyor with the Surveyors Council of Nigeria and a member of the Nigerian Institution of Surveyors. Israel currently chairs the FIG Commission 7 Working Group 7.2 'Fit-for-Purpose Land Administration (FFPLA)', where he focuses on engaging the challenges of scaling up FFPLA approaches and fostering efforts to ensure the security of tenure for all.



Chethna Ben is a doctoral candidate at University of Melbourne, where she is pursuing her PhD in housing and how climate impacts residents decisions. She is passionate about conducting quality research to help communities and policy makers in the area of sustainable development and climate resilience. She has published two papers in reputable journals and received multiple awards and grants for her academic excellence and leadership. She is also an affiliate member of the Young Surveyors Network and Commission 2 of FIG (International Federation of Surveyors), where she was the Knowledge Portal lead for the Volunteer Community Surveyor Program from 2021–2022.



Angela Omamuyovwi Anyakora is a Registered, highly skilled and passionate professional in the field of Surveying and Geo-Informatics. With her extensive expertise, she has made remarkable contributions to the industry while working with different organizations and supporting various projects. She has a deep commitment to volunteer work and humanitarian services, such as serving as the Engagements Team Lead with the FIG's Volunteer Surveyors Community Program and Chair of the Generational Sustainability Working Group 3 under the FIG Diversity and Inclusion Taskforce. Through her dedication, she not only advances her own career but also uplifts other young professionals in the surveying and geo-informatics industry.

FIG PUBLICATIONS

The FIG publications are divided into four categories. This should assist members and other users to identify the profile and purpose of the various publications.

FIG Policy Statements

FIG Policy Statements include political declarations and recommendations endorsed by the FIG General Assembly. They are prepared to explain FIG policies on important topics to politicians, government agencies and other decision makers, as well as surveyors and other professionals.

FIG Guides

FIG Guides are technical or managerial guidelines endorsed by the Council and recorded by the General Assembly. They are prepared to deal with topical professional issues and provide guidance for the surveying profession and relevant partners.

FIG Reports

FIG Reports are technical reports representing the outcomes from scientific meetings and Commission working groups. The reports are approved by the Council and include valuable information on specific topics of relevance to the profession, members and individual surveyors.

FIG Regulations

FIG Regulations include statutes, internal rules and work plans adopted by the FIG organisation.

List of FIG publications

For an up-to-date list of publications, please visit www.fig.net/pub/figpub

ABOUT FIG



International Federation of Surveyors is the premier international organization representing the interests of surveyors worldwide. It is a federation of the national member associations and covers the whole range of professional fields within the global surveying community. It provides an international forum for discussion and development aiming to promote professional practice and standards.

FIG was founded in 1878 in Paris and was first known as the Fédération Internationale des Géomètres (FIG). This has become anglicized to the International Federation of Surveyors (FIG). It is a United Nations and World Bank Group recognized non-government organization (NGO), representing a membership from 120 plus countries throughout the world, and its aim is to ensure that the disciplines of surveying and all who practise them meet the needs of the markets and communities that they serve.



Embark on a transformative journey with the Volunteer Community Surveyor Program (VCSP) and witness how young surveyors are mapping a better world. Supported by GLTN, VCSP has deployed 42 surveyors to 9 countries, making a tangible impact on global dynamics that lead to insecure tenure, from supporting post-earthquake reconstruction efforts in Nepal to facilitating land registration initiatives across Africa and the Asia Pacific. Young surveyors have gained hands-on experience in fieldwork, data collection and community engagement, shaping their careers and perspectives. These experiences have not only influenced their career paths but also instilled in them a deeper sense of purpose and commitment to humanitarian surveying.

