

Land Administration for Climate Change in Practice: Developing a Research Agenda

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SUMMARY

The United Nations Framework Convention on Climate Change (UNFCCC) has reached a nearly universal ratification with 198 countries participating in its supreme governing body the Conference of the Parties (COP). Nevertheless, climate and disaster records continue to be broken as world leaders meet annually at the United Nations climate summits to publicly renew their commitment to ‘take action on climate change’. Much more needs to be done in practice.

The unique function of land as both source and sink for greenhouse gas emissions has been recognised by the IPCC (2019). The centrality of land is also highlighted in recent recognition of the role that indigenous peoples play in amplifying climate mitigation efforts through forest stewardship. So what role for surveyors? Within the land and surveying domain, the contribution of good land governance and land administration to sustainable development is well recognised (Williamson, Enemark, Bennett, McLaren), and strong linkages have been made between tenure insecurity and climate vulnerability (and vice versa) (Quan and Dyer, 2008; Mitchell et al. 2019). But it is clear that those working in the climate change domain could gain a stronger knowledge of the contribution that land administration professionals – in particular- can offer to addressing this challenge of our time.

This paper seeks to draw on practical experience to grow the climate change discourse within FIG – with the intent to see FIG and its member associations and affiliates play a more visible and leading role in climate change fora. It draws on the experiences of Land Equity International to commence discussion of a broader mapping of land administration roles and actions to climate change mitigation and adaptation. From these and a preliminary review of the literature, recommendations are made as to next steps. This paper is intended as an initial mapping of the contributions that can be made, and a first step towards developing a research agenda that supports localised solutions and an increased role for land administration in mitigating and adapting to climate change, in part by analysing the impact of existing land administration project investments towards national climate change commitments.

Land Administration for Climate Change in Practice: Developing a Research Agenda

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1. INTRODUCTION

This is not the paper I (and my original co-author) set out to write. We wanted to at least commence the process of undertaking a systematic literature review of publications that straddle the themes of land tenure, land administration, climate change and biological diversity (biodiversity conservation) – understanding that this is a large piece of work. Many existing publications have contributed to this¹ – but are beginning to be dated, and, understandably, many address just a small subcategory of these topics – e.g. only resiliency, or only REDD+, etc. Recognising the size of this task, and perhaps the need for a few more authors to support² we downsized our expectations early on, and hoped to instead develop an initial mapping of the land sector's contributions (both existing and potential) to climate change mitigation and adaptation efforts. Again, however, with a broad range of terminologies in place, a systematic approach to this within the timeframe proved elusive. Also, the initial intent was always to focus on *land administration in practice* rather than theory.

So, in its current form, this paper commences first with a review of one company's experience working across the realms of climate change and land administration. From this, some insights are drawn with regards to an initial mapping of the role and contribution of land administration professionals to efforts in climate change mitigation and adaptation. The paper then provides a quick, preliminary review of the literature with particular emphasis on contributions that have arisen from FIG. This review serves to situate the practical experience and expand on recommendations made. Finally, the paper presents a preliminary set of recommendations and actions as a beginning discussion for a future FIG agenda on climate change.

There are several limitations to this paper. Firstly, the methodology is not robust. An exploratory, experiential approach has been adopted. A small selection of in-practice projects has been selected, and the literature review is smaller than ideal. As identified above, a systematic literature review would be extremely useful in capturing the extent of land sector contributions to the climate change domain to date, clearly mapping these against climate adaptation and mitigation efforts. Climate change is such a far-reaching topic, with a range of terminologies associated with it, and so an initial scoping of appropriate terms and themes may be needed prior to conducting any systematic literature review.

¹ See, for example: (Barnes & Quail, 2010; Boateng et al., 2014; Childress et al., 2012; Cotula & Mayers, 2009; Enemark, 2014; Klass & Wilson, 2010; Knox et al., 2011; Mitchell, 2010; Mitchell et al., 2011, 2021; Quan & Dyer, 2008; Sommerville, 2011a, 2011b; Unger et al., 2017; Unruh, 2008)

² NB: reach out to the author if you'd like to volunteer!

2. LAND EQUITY INTERNATIONAL'S EXPERIENCE OF LAND AND CLIMATE CHANGE

Land Equity International (LEI) is an international development consulting organisation, specialising in land administration, land policy and tenure. LEI's expertise spans the development and reform of land information and technology systems, valuation and taxation systems, land policy and legislation, spatial planning systems, surveying and mapping. Across these areas, LEI has worked closely with various public, private and citizen-led stakeholders to research, design, develop, manage and monitor land sector project. Project implementation varies from project to project, but might span, for example, co-designing land administration solutions with governments, documenting customary tenure with communities, providing technical assistance and institutional strengthening support to local through to national governments, and co-developing integrated national information system strategies.

With over 20 years' experience in the land sector, and as one of the few remaining 'niche' land sector companies, LEI's experience provides a clear insight into the extent to which climate change is impacting the design of land administration projects and vice versa. This section will provide a quick overview of LEI's project experience, and deep dives into current LEI projects as a starting point for identifying how project proponents are driving climate and land agendas.

2.1 Overview of LEI projects

In 2021, LEI celebrated 20 years as a company, and since inception, LEI has undertaken land projects in over 45 countries, with a range of donors and partners across the full suite of actors in the space - multilaterals, national governments, private sector, civil society and academia.

At time of writing, LEI has 11 active projects. Many of these have some form of climate change theme as a core driver.

Table 1 provides a snapshot of core projects (note four are omitted as smaller in size, or commercial in confidence), mapped against key themes or drivers as drawn from development partner briefs or Monitoring, Evaluation and Learning documentation. Four of these projects have been selected as case studies in the following sections (shown in bold in Table 1). Case studies are first introduced, and then preliminary comments made regarding climate change thematic linkages, and FIG and land administration domain opportunities.

2.2 Case Study 1: Papua Spatial Planning

2.2.1 Overview

The Reducing Deforestation through Improved Spatial Planning project (known as Papua Spatial Planning or PSP) is a collaboration between the UK and Indonesian governments to provide support for spatial planning and low carbon development. The program commenced in 2019 and was implemented by LEI in partnership with the Indonesian-based Daemeter Consulting, establishing a Technical Assistance Facility with staff located in Jakarta, Manokwari and Jayapura and working across the 2 provincial and 4 district locations. The project began September 2019, and received a small administrative extension to end February 2023.

Table 1: LEI current project overview. Projects in bold are detailed further in this paper.

Project Name	Activity Locations	Financing and Implementing Partners	Year Commencing	Objective	Key Themes and Drivers
1 Reducing Deforestation Through Improved Spatial Planning in Papua Provinces	Indonesia	UK Foreign, Commonwealth and Development Office (FCDO) and Government of Indonesia	2019	Support local government capacity to revise spatial plans and integrate indigenous peoples claims.	Climate change, spatial planning, low-carbon development
2 Vision & Feasibility Master Plan in support of the Higher Ground Initiative	Nauru	Government of Nauru, Metrocology	2021	Support the future sustainability, sovereignty, and safety of Nauruans.	Climate change, urbanisation, sea level rise, economic development
3 Technical Assistance for Digitalisation of Land Administration in Lao PDR	Lao PDR	World Bank, Government of Lao PDR	2022	Improve government land administration process efficiency.	Land registration, institutional strengthening, capacity development, digitalisation
4 Enhancing Renewable Energy Investments and Access to Land	Bangladesh	World Bank, Government of Bangladesh	2022	Support achievement of national renewable energy targets.	Renewable energy, climate change, urbanisation, food security,
5 Transformative Land Investment	Lao PDR and Myanmar	SDC, CIFOR, ICRAF, RECOFTC, SNV	2022	Sustainable food systems that empower vulnerable communities and galvanise action and innovation.	Food security, Climate change, Pandemic, Agribusiness, Investment
6 Australian Infrastructure Financing Facility for the Pacific Support Unit	Pacific	DFAT, TetraTech	2022	Technical advice on land and safeguarding pertaining to infrastructure investment	Infrastructure
7 Mekong Region Land Governance Project (Phases I – III)	Cambodia, Lao PDR, Myanmar, Vietnam	Swiss Agency for Development and Cooperation (SDC)	2023 (Phase III)	Improve land governance, natural resource management and pro-poor investments.	Rural Development, food security smallholder farmers

Outcomes for the project included:

- Revised and agreed spatial plans for Papua and West Papua provinces and 4 districts, with clear distinction of conservation and development areas implemented in an accountable and transparent manner;
- Better recognition of Indigenous people (adat) claims and communal community management of forest in Papua and West Papua spatial plans, translated and formalized into development plans;
- Secured national support to protect Papuan forest and support the Papua provinces in their low carbon development pathways.

LEI's work on PSP allowed knowledge carry over from past projects with other donors – including the Green Prosperity Program's *Participatory Mapping and Planning (PMAP)* sub-projects (implemented under the Millennium Challenge Account-Indonesia) and the World Bank *One Map Technical Assistance Project*. All projects fundamentally supported good governance through good data and enabling good data management practices.

Further key outputs for the programme include facilitating stakeholder inputs into spatial plans, linking spatial planning with development planning, improving national policies based on regional experiences, strengthening district and provincial government capacity, improving public participation and increasing dialogue between national, provincial and district governments.

Key outputs above and beyond core project deliverables included development of a 'green spatial planning tool' that draws on quantitative indicators to determine the extent to which a spatial plan supports sustainable development, development of a substance approval tool that breaks down the steps for spatial plans to be approved at national level in Indonesia, REDD+ capacity building and collaboration on green business development, linking sustainable technical production of nutmeg and cocoa with sustainable spatial planning.

2.2.2 Climate change linkages

The key focus of the program is clearly reducing deforestation – it's in the title. Deforestation and land use change account for as much as 80% of Indonesia's total emissions, so addressing this will have a major impact on Indonesia's national accounts and contribution to global change. The mechanism for addressing climate change is in this case spatial planning. Spatial planning is a key facilitating mechanism to curb carbon emissions – in the case of reducing deforestation by classifying and documenting protected areas, improving local through to national government capacity to manage licensing and reporting, and facilitating community monitoring and infraction reporting. But there are also wider benefits – spatial planning enables national and local economic confidence alongside no net loss and protection/conservation mechanisms, and it supports private sector confidence and certainty – enabling more sustainable initiatives and systematically shifting the development paradigm towards lower carbon pathways. In the case of Indonesia, spatial planning is also an important mechanism for recognising and protecting indigenous – adat – territory rights – well recognised at recent UNFCCC COPs as essential to reducing deforestation.

PSP also played an important network building role, facilitating the connections between multiple stakeholders – civil society, non-government organisations, indigenous groups, private sector, academia and government. These relationships can become fraught when interests appear to be at odds, but facilitating open communication and trust is important for achieving climate change aims.

Finally, spatial planning is an early step in achieving national autonomy in climate change mitigation (and adaptation) initiatives and provides confidence in initiatives like, for example, REDD+ and the Clean Development Mechanism, by building local government capacity to manage and monitor information. PSP developed information management systems, and provided significant training in geospatial information systems, information and communication technologies etc. to support and enable district and provincial governments to effectively manage spatial data and the spatial planning process. In Indonesia, the carbon credit market has been paused³, but supporting spatial planning and information management are essential steps to ensuring a successful market if and when it is enabled – noting in particular recent media around concerns on the quality of credits generated in other parts of the world⁴.

2.2.3 Comment on FIG and land administration domain opportunities

- Spatial planning is unique in Indonesia, but emblematic of the need for preliminary steps prior to individualisation and formalisation of land titles.
- There is still work to do in articulating the interaction between land administration and planning (and arguably, in particular from the planning side).
- Inclusivity and localisation were fundamental to PSP success – the LEI and Daemeter team was predominantly made up of Indonesian experts, and significant emphasis was placed on partnership-building.
- There is much ongoing work – the project only targeted two provinces and four districts – since then, three new provinces have been created, and other districts have also begun to ask for support.
- Indonesia has a chance to be a world leader – and surveying and surveyors have the knowledge and skills to support this.
- The key driver of PSP is Indonesia’s Low Carbon Development focus, whereby Indonesia seeks to achieve growth and development alongside more sustainable pathways. In this way, spatial planning is taken hand in hand with development policies and implementation.

³ <https://www.spglobal.com/commodityinsights/en/market-insights/latest-news/energy-transition/040722-carbon-credit-issuances-from-indonesia-on-hold-developers-await-clarity>

⁴ See e.g. <https://www.theguardian.com/environment/2023/mar/10/biggest-carbon-credit-certifier-replace-rainforest-offsets-scheme-verra-aoe>

2.3 Case Study 2: Mekong Region Land Governance Project

2.3.1 Overview

Implemented by LEI in partnership with GRET, and with funding from the Swiss Agency for Development and Cooperation (SDC) and additional support by the German Cooperation, BMZ, GIZ and Luxembourg, the Mekong Region Land Governance (MRLG) project seeks to ensure that smallholder farmers in Cambodia, Lao PDR, Myanmar and Viet Nam (CLMV countries), especially those belonging to ethnic minorities, have secure and equitable access to and control over agricultural land, forest and fisheries. The underlying thinking of the project was to enable new and existing actors to favourably influence changes in policies and practice relating to land sector governance.

In implementation since 2014, and now in its third phase MRLG provides an ongoing platform for dealing with the continuing land challenges in the region. Recent studies have found that there is an increase in the inequality in land distribution, illustrated by a reduction in the size of smallholder land holdings, alongside a large and growing proportion of agricultural land allocated to concessions and a boom in commodity export crops. Despite perceptions of high urbanisation rates, the agrarian transformation is far from complete, and farmers remain the majority of population in each of the project countries.

Phase I of the project undertook an exploratory approach toward the project goal, growing the knowledge and connected stakeholder base and establishing alliances. MRLG Phase II was designed to be more strategic and politically informed, supporting the strategic engagement of Reform Actors in the policy making processes at national, sub-national and regional levels in a more deliberate and purposeful manner – directly leading to improved policy and practice implementation. Phase III then – commencing in 2023 - seeks to solidify the aims and goals of Phases I and II in practice: improving land policies and practices, and seeing these approved and implemented with support from regional platforms.

The core of MRLG thus revolves around: capacitated reform actors and networks, evidence-based research to inform policy and practice (and good ideas!), and the implementation of reforms by public, private and civil society actors – including identifying/establishing channels for policy dialogue.

2.3.2 Climate change language and linkage

In contrast to PSP, MRLG is not overtly a climate change project. But, by virtue of targeting land and smallholder farmers, climate change is one of many disciplines that the project encompasses.

The project was founded on evidence-based research and well recognises the complexities and trans disciplinary of working in this sector – essential elements across both land and climate change.

Like PSP, MRLG successfully draws on and empowers local actors. This happens through innovation grants (PSP implemented a flexible fund mechanism) and the alliance building

mentioned above. This localisation of action and knowledge, and recognition of local actors is a critical and well-recognised climate change response (Eisenack et al., 2014; Pisor et al., 2022) – and is also fundamental to contextualising land administration.

The long-phasing of MRLG should also be noted – it is well-recognised that long standing projects and relationships in-country have better project sustainability success rates (recognising, though, the challenges of dependency).

2.3.3 Comment on FIG and land administration domain opportunities

- Surveyors are well-placed to facilitate alliance building, given that surveying professionals typically work at the intersection of many others – be it a building site, government agency, data management role or boundary dispute.
- But arguably surveyors are less successful at self-promotion and have struggled to gain traction in the international policy domain (fields of earth observation and geospatial aside).
- A key point of difference and innovation of the MRLG project is that it has developed a program that works with and supports multi-stakeholder alliances to achieve its objective. The alliance members are from existing organisations in the region, and thus considered a stronger and sustainable avenue for continued reform beyond the life of the Swiss funded project. MRLG may be the connector and proponent in many sub-project instances but recognises that change is more effective when locally owned, and integrated by reform actor alliances in their own strategies and plans. This is not a dissimilar approach to that of the Global Land Tenure Network (www.gltm.net) – but the suggestion here is that it could be applied more specifically to professional domains in action towards climate change.

2.4 Case Study 3: Nauru Higher Ground Initiative

2.4.1 Overview

Commencing work in September 2021, LEI is working with Metrocology and the Government of Nauru – the client – to provide tenure solutions in support of an ambitious plan for the relocation of Nauru’s people, assets, and communities to the higher ground inland. Named the ‘Higher Ground Initiative’ (HGI), the overarching project is to develop the master planning and related design and delivery services needed to support the priorities of the Higher Ground Initiative (HGI). HGI has been established as a generational undertaking, critical to the long-term survival and viability of Nauru. Beyond migration, it seeks to mobilize the country around a collective national vision that fundamentally changes the development trajectory of the country for the better by (1) addressing its inherent vulnerability to climate change, (2) restoring balance between the economic development and protection of the natural environment, and (3) building a foundation for a healthier and more prosperous population in the future. Compounded by the irreversible effects of phosphate mining and the imminent threat of sea level rise a government initiative, the Higher Ground Initiative (HGI) attempts to support future sustainability, sovereignty, and safety for its citizens.

The project will develop a vision and feasibility master plan for the whole island, but with an initial focus on one Government-owned site prioritized for rehabilitation, Land Portion 230. The island nation has insufficient mapping of the existing conditions of its developable land, and needs planning for community structure, connectivity means, public realm amenities, and architectural morphology and the legal and institutional requirements to support the visioning process.

LEI's contribution is to provide support and core technical assistance to the project under the themes of land tenure and social safeguarding. With customary land comprising more than 90% of Nauru's area, Nauru has limited legal frameworks and institutional capacity for a systematic transformation of land rehabilitation. Nauru further, at present, has limited ability to protect and conserve land and there is a need to review and support a more systematised approach to Nauru's land tenure, so that it underpins the proposed master plan and ultimately meets the needs and desires of Nauru's population.

2.4.2 Climate change language and linkages

At its essence, Nauru's HGI is seeking to balance a sustainable economic growth trajectory to benefit its citizens, whilst hoping to mitigate and/or take action to adapt to climate change impacts. As per other profiled projects, the key themes are again much broader than would appear at the first pass – with internal migration and urbanization the initial drivers, but accompanied by issues such as food security, national sovereignty, employment and cultural and heritage preservation. Covid-19, in particular, highlighted the risks that Nauru faces if it continues to be reliant on outside support and provision of food and materials – as it did to many other small island developing states, whether dependent on tourism or other industries.

The crux of the challenge – and opportunity – for Nauru is how best to evolve customary land tenures to meet both present and future needs. In a domain that has been – and perhaps continues to be – driven by colonial thinking, there is a need to hold onto what is quintessentially Nauruan whilst also updating to reflect practice, needs, diversity, equity and inclusion.

Sovereignty, mentioned above, is also a key consideration. This project is one of LEI's few projects that is not – directly or indirectly - overseen by a development partner (donor) client. With a history – and to some extent, present – of having colonial powers dictate policy, the Nauruan government is keen to drive the agenda, at least in these early stages. Development partners, are, however, still a consideration as potential future funding sources (ADB, as an example, has provided funding to several related projects, including the port development, water and sanitation improvements, and solar energy installation).

2.4.3 Comment on FIG and land administration domain opportunities

- Repeated themes in climate change are balancing a sustained economy and growth trajectory whilst taking action on climate change (though there is of course significant debate on this that is beyond the scope of this paper). Land and surveyors are at the core of this, and there is scope to grow the body of work on 'good practices' to do this (e.g.

linking spatial planning to development planning; supporting economic activities on customary tenure).

- Relating to sovereignty, the breadth of FIG’s potential representation – through member associations and beyond is considerable – and there is scope for FIG to do more to capacitate national actors (including member associations) to adopt good practices, and to be more active in sharing experiences and needs on the global stage. This is especially true for non-European and developing state actors.
- More needs to be done to promote the recognition of indigenous relationships to land and indigenous spatial knowledges; likewise more needs to be done to ensure the continued legitimacy and recognition of customary tenures.
- Marine tenures have not been mentioned in this paper, and there is insufficient space to go into detail, but growing FIG’s body of work in this space will also contribute to the domain.

2.5 Case Study 4: Transforming Land Investments

2.5.1 Overview

Transforming Land Investments (TLI) is a program of work funded by SDC under the Global Food Security Program and led by a consortium of Centre for International Forestry Research and World Agroforestry (CIFOR-ICRAF), the Centre for People and Forests (RECOFTC), SNV Netherlands Development Organization, and Land Equity International (LEI). Working closely with investors and key stakeholders the project’s overall goal is to contribute to more sustainable food systems, with efforts targeting Ethiopia, Mozambique, Ghana, Laos and Myanmar. Drawing on gender-sensitive and socially inclusive land tenure, the program is targeting systems transformation by zoning in on three interrelated pathways – investors, the national business ecosystem and the global and regional development community. Seeking to change investor practices and enabling environments at all levels to promote and incentivize transformation.

Project beneficiaries are marginalized, and vulnerable rural communities, that are materially affected by private sector agriculture and forestry investments. The project will enhance food, nutritional and tenure security, especially of women and young people, and empower farmer and indigenous women and men in agricultural and forestry value chains.

LEI’s particular role is implementing activities in Lao PDR and Myanmar. The scope of LEI’s assignment is to develop and mainstream TLI knowledge products, support capacity development, perform a ‘brokering’ role in partnership formation activities, support community of practice establishment and sustainment and liaise across donors, governments and alliances to provide board support across the Asian region.

2.5.2 Climate change language and linkages

“Walk into any grocery store and you’d be forgiven for overlooking the complicated journey from crop to shelf that many products have taken. But around the world, climate change, the pandemic and natural disasters have led to empty shelves and unreliable supply issues,

reminding us all of the intricacies of the world's food systems.” – TLI promotional materials (unpublished).

Large-scale land investments across Africa and Asia have often caused repercussions to food security and supply issues, exacerbated by climate change and natural disasters. These investments have often compromised the livelihoods of smallholder farmers, exacerbated land tenure conflicts and caused environmental degradation. This project is also driven by a lack of private sector adoption of the Voluntary Guidelines on the Governance of Tenure, and the importance of addressing the power imbalances that underly land and agri-system governance.

TLI takes a unique approach to the challenge of large-scale land investments by going to the root of investment practices themselves, seeking to:

- Help countries better leverage private sector investment to transform their food systems;
- Strengthen the contribution of agricultural and forestry investments to tenure security, environmental resilience and social inclusion;
- Improve private sector compliance with national and global regulation and best practice.

In particular, the project addresses the trade-offs that can occur when a holistic perspective is not taken. For example, being ‘green’ and ‘responsible’ does not necessarily mean a net positive contribution, and whilst zero deforestation commitments and initiatives are laudable, these may compete with and lead to an exclusion of small holder farmers since these are comparatively difficult to monitor. Whilst there are existing frameworks, there remains a gap of translating these into practice.

2.5.3 Comment on FIG and land administration domain opportunities

- Working with the private sector – for example, going directly to banks, private sector investors, agribusiness, resource extractors etc.
- Noting the limited private sector uptake of the VGGTs - what other foundational documents have had limited uptake outside FIG's immediate domain? How can materials be better promoted?
- Compliance has been a repeated theme across projects – and is another field that land administration has a lot to contribute to.

2.6 Points for Reflection

From the above, the following points for reflection are made:

- **Key contributions lie in the intersection between domains.** As one example, many of LEI's contributions from the projects presented in this paper lie in the intersection between surveying and planning. This is in part because of the unique role that spatial planning has in Indonesia – but also reflects in part the opportunities that may lie in the space of ‘tenure security’ (where spatial planning can provide this through tenure recognition) rather than ‘land titling’. There is a growing body of work around the contribution of tenure security to mitigating climate change (e.g. Murken & Gornott, 2022, and also the work of Prindex) and building on this may be an opportunity for FIG.

- **There are significant opportunities for south-south knowledge exchange, but support to do so is needed.** There are significant overlaps between LEI projects, both within a country and between different contexts, present strong opportunities for south-south cooperation and knowledge exchange. LEI plans to do this shortly between the MRLG, TLI and PSP projects, but there is an opportunity for this to happen at a higher level between donors and partners, and more directly between in-country implementers (rather than just between international consultants). In the same vein, it should be recognised that development partners present a single channel of perspectives on these type of projects – which can be limiting because of discrete durations and the effort needed for localisation and contextualisation. There is a need to support a diversity of project proponents, and for FIG and partners to review wider opportunities for financing in this space.
- **The solutions are social, rather than technical.** A comment that is reiterated annually in FIG papers, but which is worth playing on repeat. In all of LEI’s work – even in highly technical projects involving the development of ICT systems or mapping systems – there is always a social component, and it is typically this component that is the most critical to project success and sustainability. It may be building trust with indigenous peoples and representatives to map territories or include territory data into national, formal systems. It may be building alliances between existing NGOs, the private sector, government and academia to develop holistic land policies or more sustainable supply chains. It may be socialising new processes – within both government service centres, and within communities accessing these services. In all cases, identifying, designing and implementing the technology solution is typically the easy part – whilst addressing the social – gaining political buy-in, ensuring appropriate and inclusive consultation, building alliances and socialising changes/technologies – take time, cannot be rushed, but ultimately can make or break a project. In these activities, too, projects have the best chance of addressing entrenched inequalities and ensuring meaningful participation and the promotion of vulnerable groups’ interests.
- **Partnerships are key, and non-traditional partnerships may lead to further success.** There is an emerging trend of working with the private sector to mobilise funds and expertise in land administration (and other sectors), and a growing focus on ‘climate finance’ – itself looking for non-traditional (i.e.: non-aid) funding resources. Alliance-building efforts within LEI projects have all included the private sector, and indeed strong partnerships are emerging in particular in the agribusiness and fair trade space with land administration providing additional certainty to consumers (see e.g. <https://www.meridia.land/cases/clap>).

3 FIG AND CLIMATE CHANGE

3.1 Existing literature

It would be remiss to go much further without a preliminary discussion of climate change. Naturally, this shouldn't be necessary – in much the same way as surveyors consider a discussion of the importance of land administration shouldn't be necessary – but it is.

There is a significant body of work on climate change (see e.g. IPCC, 2014)⁵ and it should not need to be restated that climate change is one of the defining challenges of the 21st century⁶. Climate change has been linked to food insecurity (Gregory et al., 2005; Wheeler & von Braun, 2013), housing vulnerability (United Nations, 2022), poverty (Hallegatte & Rozenberg, 2017), biodiversity loss (Habibullah et al., 2022; Skogen et al., 2018), intensified frequency and size/impact of disasters (IPCC, 2014), deteriorated health and increased likelihood of pandemics (WHO, 2018), low economic growth (Dellink et al., 2019) and many other global challenges.

UNEP (2016) has estimated that between 140-300 billion USD per year would be required to overcome climate change in developing countries. Yet climate finance to date has reached only 79.6 billion U.S. dollars (OECD, 2021). Studies of aid flows in climate change are insightful – with studies showing that recipient country's institutional quality is an essential factor in the effectiveness of green aid flows (Li et al., 2020), whilst fragmented aid in particular, combined with poor institutions, was seen to negatively impact effectiveness (Anderson, 2011). Pinar (2023) in particular advocates for coordinated aid (i.e.: less fragmentation) to support the effectiveness of climate finance.

3.2 Climate literature within FIG

FIG affiliated authors have been by no means inactive in the climate change literature space. From 2010-2014 there was a Task Force on Surveyors and Climate Change, resulting in a number of conference papers and FIG Publication 65 (Boateng et al., 2014). Authors affiliated with FIG have contributed widely to the carbon credit and sequestration space (e.g. Barnes & Quail, 2010; Mitchell et al., 2011), and to land administration in the context of resilience and disasters (e.g. Mitchell et al., 2021; Unger et al., 2017). In addition, there has been extensive work targeting earth observation, global navigation satellite systems (GNSS), geospatial data

⁵ The IPCC's sixth assessment report will be released imminently and should be available by the time of this conference.

⁶ The United Nations Framework Convention on Climate Change (UNFCCC) was signed in 1992, more than 30 years ago, and sought to stabilize greenhouse gas concentrations and transition the world to low-carbon, more circular economies. Implementation is, however, ongoing – with the Kyoto Protocol signed in 2005, the Paris Agreement in 2015 and annual Conference of the Parties (COPs) – the latest being COP27 held in 2022 in Sharm El-Sheikh, Egypt. Progress, however, has been slow. The 2030 Agenda for Sustainable Development followed the 8 Millennium Development Goals, establishing 17 Sustainable Development Goals in close connection with the Paris Agreement. Climate- and environmentally-oriented SDGs are notably SDG 6 "Clear water and sanitation", SDG13 "Climate action", SDG14 "life below water" and SDG15 "life on land".

contribution, hydrography and the wider facets of surveying and their contribution to climate change – these are beyond the scope of this paper.

In the land administration and climate change space Mitchell and colleagues (2015) – recognise the additional vulnerability that climate change brings – ” *Poverty, a shortage of alternative suitable land, the need to access livelihoods, and high land values forces the poor to settle on unsuitable or unsafe lands. This is compounded by inadequate or poorly enforced planning zones and building codes, eviction linked to speculative development by the private sector, and exclusion of the poor from formal land markets. These pressures result in people on or below the poverty line living in poorly constructed houses on unsafe sites.*” They also note that surveyors have a role in supporting appropriate risk evaluation of hazardous/disaster prone land, and appropriate and dynamic pricing of this risk, land use and building controls.

There are clear trends and years when contributions have been dominant – especially if counting contributions from FIG. At a broader level, it is clear that many sectors are now drilling down into the detail – the vagaries of ‘property rights in carbon’ are now being replaced by case studies of land tenure and REDD+ in practice (e.g. Alusiola et al., 2021; e.g. Soliev et al., 2021; Wunder et al., 2020) – and arguably the FIG community is being left behind (or at least, out of the debate). This is not unexpected, and FIG has only limited resources. But perhaps it’s time for FIG to play more of a leading role?

4. FIG OPPORTUNITIES AND RECOMMENDATIONS

As identified from the outset, this is an exploratory paper that is neither systematic nor comprehensive. However, it has been developed as a starting point for discussions, and a basis from which to grow an FIG “participation” and “research” agenda, grounded in experience and practice.

From the above, the following recommendations are made:

- 1. FIG has a mandate and role to play in demonstrating the contribution that surveyors and land practitioners can make towards climate change mitigation and adaptation.**

This has commenced, and a Task Force on Climate Change is again being recommended for this term. Likewise, more capacity is undoubtedly needed – both from FIG volunteers, as well as FIG leadership and administration, and given the reliance of FIG’s own member associations on volunteers. But this is a key opportunity to grow member association capacity, and an opportunity for all to grow and innovate in this space – and the success of the earth observation and geospatial sciences in garnering recognition and traction is something to build on.

FIG also has a role to advocate for member associations in developing regions⁷.

⁷ For example, Donner et al. (2016) identify the uneven distribution of adaptation aid between countries facing similar challenges.

2. An ‘in practice’ agenda as much as a research agenda is required.

An ‘in practice’ agenda is one that comprehensively maps out, and prioritises, the contributions that land administration can make – in particular, documenting good practice contributions that are already being made, and extrapolating how these could be improved and knowledge shared between contexts. An ‘in practice’ agenda also encourages development partners and actors to coordinate, collaborate and cooperate – and FIG is in a unique position to achieve this level of advocacy and alliance-building at the global scale, whilst supporting member associations and partners to do likewise at regional through to local scales.

Building on this point, this paper has concentrated largely on projects driven by the development partner community, who hold considerable power and influence in the international development space. But there are a myriad of opportunities above and beyond traditional ‘international development’ projects – presenting another ‘in practice’ opportunity within FIG, to identify and promote these. For example, Weber (2018) identifies wider types of financing that could also be explored – i.e.: private sector, microfinance, impact investing etc. Beyond financing, there are also many indirect entry points for land administration in climate change initiatives – from safeguarding, addressing risk and confidence, through identifying opportunities spatially and socio-legally⁸.

3. Building the evidence base will also promote the surveying profession.

At present, there appears to be no comprehensive compilation of the multiple contributions and opportunities the land administration domain has for climate change. Past studies have provided some insights, but most are dated and restricted to a single category (e.g. carbon forestry, resilience). An update is needed, that captures how land administration is now being applied – and this will both identify activities as being within the land administration domain (advertising the profession) as well as identify opportunities for partnerships between surveyors and beyond.

A “meta-analysis” of in-practice land administration and climate change projects will also provide a solid evidence basis to be built upon. In the land tenure space, this is particularly important, given the evolution of debates around land titling.

One starting point might be reviewing the Land Portal’s ‘global database of land and property rights projects’ at <https://landportal.org/community/projects>. This database has the purpose to track project funding and provide project overviews for the purpose of supporting knowledge sharing in the field and finding synergies between projects. At present, the site reports holding 1034 project overviews, with 47 of these being active (or currently being implemented globally). In the same way that reviewing LEI’s projects provides some insights into how development partners and national agencies are thinking about land administration and climate change, reviewing these projects may provide key insights into present examples and fundamental gaps in the application of land administration for climate change mitigation and adaptation. A further, though more labour-intensive opportunity, may be to review climate

⁸ LEI has also supported a World Bank project assessing site selection for renewable energy projects in Bangladesh, as one example of this.

change projects and/or commitments in operation, and identify the contribution of land administration to this (either in practice or as opportunities).

Further questions or topics to explore include:

- Documenting what is “climate resilient land administration” – and what are the good practices.
- Identifying a role for FIG and member associations in forest governance
- Identifying how fit-for-purpose land administration can be applied in the climate change realm (or related sectors – e.g. planning).

4. FIG is in a unique position to build partnerships and promote less powerful voices.

As identified above, partnership and alliance building is at the core of sustainability and success. Working in partnerships helps to decrease the load, localise and contextualise solutions, identify alternate and mixed funding sources and leads to innovation and good practice. There is a clear opportunity for FIG to identify and partner with key neighbouring sectors and identify sectoral linkages across core themes.

Given the spaces we work in, FIG and member associations also have a responsibility to promote less powerful voices – be these the experiences of surveyors in developing nations, promoting indigenous rights and approaches, small island states, women or beyond. Approaches that recognise and support customary land tenures are critically needed – these are known to be complex domains, but represent a sizeable tract of valuable biodiverse environments, as well as sites of peoples homes and livelihoods. As recognised in the Glasgow Leaders’ Declaration on Forests and Land Use, Indigenous Peoples and local communities are among the most effective groups at conserving and sustainably managing land and forests – FIG and the surveying community has a larger role to play in recognising and supporting this.

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