

# **Global Campaign to Achieve 80% Security of Tenure by 2030**

**Robin MCLAREN, United Kingdom and Stig ENEMARK, Denmark**

**Key words:** Fit-For-Purpose, Land Administration, Strategy for Implementation, Global Campaign

## **SUMMARY**

The global eradication of infectious diseases through highly coordinated campaigns has been successful. Although insecurity of tenure is not a disease, its impact is devastating in terms of trapping people in poverty, displacing communities and making them homeless, and reducing food security and creating hunger. Only about 30% of the world's population are covered by official land administration systems while the rest potentially suffer from insecurity of tenure. This is a human rights issue. Therefore, should a global campaign to achieve 80% global security of tenure by 2030 be planned and initiated?

It is time for the land sector communities to be more ambitious in their goals, involve new partners to support innovation, adopt highly scalable approaches, collaborate more effectively under this common objective to eradicate this scourge on the earth and create land rights for all. This proposed global campaign could well be the necessary catalyst for change.

The paper initially investigates the drivers that are emerging at the highest levels to raise the necessity and urgency to initiate a scalable, global campaign to eradicate insecurity of tenure. The paper then discusses how the global community needs to change and coordinate to make it happen.

# Global Campaign to Achieve 80% Security of Tenure by 2030

Robin MCLAREN, UK and Stig ENEMARK, Denmark

## 1. INTRODUCTION

The global eradication of infectious diseases through highly coordinated campaigns has been successful. Smallpox affecting humans was officially eradicated in 1980 and rinderpest, affecting ruminants, was declared completely eradicated in 2010. Global campaigns to eradicate polio, guinea worm disease, yaws and malaria are under way.

Although insecurity of tenure is not a disease, its impact is devastating in terms of trapping people in poverty, displacing communities and making them homeless, and reducing food security and creating hunger. Only about 30% of the world's population are covered by official land administration systems while the rest potentially suffer from insecurity of tenure. This is a human rights issue. Therefore, should a global campaign to accelerate the eradication of insecurity of tenure be planned and initiated? To say achieve 80% global security of tenure by 2030.

The timing is apt: methodologies and supporting technologies have recently emerged to scale up the capture and recording of land rights; the 'Fit-For-Purpose Land Administration Guiding Principles for Country Implementation' (GLTN/UN-HABITAT, 2016), recently launched by Global Land Tool Network (GLTN), provides an overall framework for quickly delivering affordable, nationwide land administration solutions; the Open Geospatial Consortium (OGC) is creating new standards for land administration; land administration is now a focus for UN-GGIM; the Voluntary Guidelines on Responsible Governance of Tenure are published by the UN and globally recognised; and the Sustainable Development Goals (SDGs) have highlighted the key role of land rights in achieving many of these global objectives. Land issues are currently high on political agendas and therefore the timing appears right to initiate this global commitment.

The proposed timeframe for this global campaign will not be achieved using the current set of stakeholders active in the land sector. Global technology players such as Facebook and Google, for example, need to be encouraged to support this campaign to provide innovative technology solutions. For example, Facebook recently used artificial intelligence software to scan 14.6 billion satellite images to identify human-built structures in 20 countries across Africa (BBC, 2016). The social network hopes to use the information to determine where internet-beaming Aquila drones would best be deployed. New valuable sources of data to prioritise and implement security of tenure could be achieved through new partnerships.

However, building sustainable land administration systems is not just a technical fix. This global campaign will only have a chance of succeeding if strong political support is generated within the countries most at need of achieving nationwide security of tenure. This campaign, with the right champions, has the opportunity to raise insecurity of tenure as a global affliction to be defeated and trigger this essential political support.

---

Global Campaign to Achieve 80% Security of Tenure by 2030 (8702)  
Robin McLaren (United Kingdom) and Stig Enemark (Denmark)

FIG Working Week 2017

Surveying the world of tomorrow - From digitalisation to augmented reality  
Helsinki, Finland, May 29–June 2, 2017

It is time for the land sector communities to be more ambitious in their goals, involve new partners to support innovation, adopt highly scalable approaches, collaborate more effectively under this common objective to eradicate this scourge on the earth and create land rights for all. This proposed global campaign could well be the necessary catalyst for change.

The paper will initially investigate the drivers that are emerging at the highest levels to raise the necessity and urgency to initiate a scalable, global campaign to eradicate insecurity of tenure. The paper will then discuss how the global community needs to change and coordinate to make it happen.

## **2. GLOBAL CAMPAIGN DRIVERS**

A number of global initiatives in the land sector, new approaches to implementing land administration solutions that are scalable and affordable, and supportive technologies have recently emerged to act as significant drivers for agreeing, designing and implementing a global campaign for eliminating insecurity of tenure. These drivers are discussed below.

### **2.1 High and Unacceptable Global Levels of Insecurity of Tenure**

Although there have been significant investments in the land sector globally to attempt to reduce insecurity of tenure, governments, aid agencies and development banks have not been successful in truly scaling up their solutions to make a major impact on implementing this human right. It is estimated (McLaren, 2015) that 70% of the world's population are excluded from participating in formal land administration systems and cannot register and safeguard their land rights. The majority of these are the poor and the most vulnerable in society and without any level of security of tenure they constantly live in threat of eviction.

### **2.2 Supporting the 2030 Global Agenda**

The Millennium Development Goals (MDGs) ended by 2015 and are now replaced by the Sustainable Development Goals (SDGs) with a new, universal set of 17 Goals and 169 target that UN member states are committed to use them to frame their agenda and policies over the next 15 years, see Figure 1. The goals and targets integrate economic, social and environmental aspects and recognise their inter-linkages in achieving sustainable development in all its dimensions (UN, 2015). While the MDGs did not mention land directly, the SDGs include a number of goals with a direct reference to the land issues. Land governance is now placed at the very top of the global agenda.

Land governance is about the policies, processes and institutions by which land, property and other natural resources are managed. This includes decisions on access to land, land rights, land use, and land development. The operational component of the land governance concept is the range of land administration functions that include the areas of: land tenure (securing and transferring rights in land and natural resources); land value (valuation and taxation of land and properties); land use (planning and control of the use of land and natural resources); and land development (implementing utilities, infrastructure, construction works, and urban and rural developments). Land administration systems, this way, provide a country with an

infrastructure for implementing land policies and land management strategies in support of sustainable development (Enemark, 2004, Williamson et.al. 2010).



Figure 1. The Sustainable Development Goals (UN, 2015).

The SDGs include six goals with a significant land component mentioned in the targets. For example, in Goal 1, that calls for ending poverty in all its forms everywhere, target 4 states that by 2030 all men and women will have equal rights to ownership and control over land and other forms of property. This calls for closing the security of tenure gap that exists in most developing countries. Similarly, the land component is referred to in target 3 of Goal 2 on ending hunger, and more generally in Goal 5 on gender equity, Goal 11 on sustainable cities, Goal 13 on climate action, Goal 15 on life on land, and Goal 16 on peace, justice and strong institutions. These goals and targets will never be achieved without having good land governance and well-functioning countrywide land administration systems in place (Enemark and McLaren, 2017).

### 2.3 Fit-For-Purpose Land Administration

New approaches have recently been tested in implementing countrywide land administration solutions in countries such as Rwanda, Ethiopia, in the Europe and Central Asia region, in the South East Asia region, and also in many Eastern European Countries in the 1990s when undergoing a transition from centrally planned to market based economies. The experiences in these countries have informed the FFP approach to land administration. Rwanda provides one of the best examples, where a nationwide systematic land registration started after piloting in 2009 and was completed in only four years. Boundaries of spatial units (plots of land) were identified on prints of orthophotos in a highly participatory approach using locally trained land officers acting as trusted intermediaries. This reduced the need for conventional surveying techniques to a minimum. The highly efficient approach resulted in 10.4 million parcels being registered and 8.8 million land lease certificates being issued. The average unit cost was around US\$ 6 per parcel. This radical approach required considerable political commitment to achieve in the timeframes. Benefits are already being accrued, especially in social stability and economic development, and the national framework of land rights is providing opportunities for raising property based taxes, improved state land management,

greater inward investment and better stewardship of land. Prior to this initiative, only 40,000 of Rwanda's spatial units had been registered (GLTN/UN-HABITAT, 2016, p. 2-3).

This new type of approach in creating integrated and scalable land administration solutions has the following characteristics:

- The solution is directly shaped by the country's requirements for managing current land issues and is not biased towards the need to always use the latest technology and costly, time consuming field survey procedures.
- A countrywide solution encompassing all tenure types and all land is attainable within a reasonable timeframe, depending on size of country, and is affordable.
- The 'minimal viable product' (MVP) philosophy is adopted to create an entry point solution that is initially suitable for the stakeholders' needs. The outcome can then be upgraded in terms of the quality and scope of evidence of land rights information when relevant and required according to societal development.
- The solution can be adapted to different regional needs within a country, e.g. differences in topography and density of development, to provide solutions along variations in types of tenure (the continuum of land rights) that are most appropriate to specific regions and communities.
- The creation and maintenance of the solution is sustainable through the use of a network of locally trained land officers that expands the outreach of the limited number of land professionals.

This approach is called Fit-For-Purpose (FFP) land administration and has emerged as an enabler, accelerator and game changer and offers a promising, practical solution to provide security of tenure for all and to control the use of all land. UN-HABITAT Global Land Tool Network (GLTN) has released the reference document "Fit-For-Purpose Land Administration: Guiding Principles for Country Implementation," (GLTN/UN-HABITAT, 2016). Politicians and senior civil servant decision makers involved in formulating policies in the land sector need to read this Guide to start solving their land issues.

## **2.4 Responsible Governance of Tenure**

Responsible governance of tenure is now incorporated as part of the global agenda through the Committee on World Food Security's Voluntary Guidelines on Responsible Governance of Tenure (UN-FAO, 2012). These Guidelines are an international "soft law instrument" that represents a global consensus on internationally accepted principles and standards for responsible practices.

The Guidelines outline principles and practices that governments can refer to when making laws and administering land, fisheries and forests rights. While the Guidelines acknowledge that responsible investments by the public and private sectors are essential for improving food security, they also recommend that safeguards be put in place. These protect tenure rights of local people from risks that could arise from large-scale land acquisitions (land grabbing), and also to protect human rights, livelihoods, food security and the environment.

The Guidelines promote secure tenure rights and equitable access to land as a means of eradicating hunger and poverty, supporting sustainable development and enhancing the environment. The guidelines thereby place tenure rights in the context of human rights, such as the right to adequate food and housing. With the help of the Guidelines a variety of actors can determine whether their proposed actions and the actions of others constitute acceptable practices.

## **2.5 UN-Global Geospatial Information Management (UN-GGIM)**

UN-GGIM is mandated, among other tasks, to “provide a platform for the development of effective strategies on how to build and strengthen national capacity on geospatial information...” UN-GGIM has included land administration activities into their remit of global information management and an Expert Group on Land Administration and Management has been established. UN-GGIM is gaining influence in the geospatial domain and is increasing the amount of standards, e.g. geodetic framework, and guidance to the geospatial user community. For example, UN-GGIM has published “A Guide to the Role of Standards in Geospatial Information Management” (UN-GGIM, 2014) that provides good background to the range of standards available and examples of their use. UN-GGIM has an important role in promoting the FFP approach to land administration.

## **2.6 Open Geospatial Consortium (OGC)**

OGC has created a new Domain Working Group (DWG) (OGC, 2016) that will focus on the examination of existing systems of land administration, preparation of best practices that enable nations to address their needs in less time, cost and effort through standards-based implementations, and dialog on the integration of emerging information resources and / or technologies to assist nations in leapfrogging capability. Additionally, this DWG will identify and mature proposals for industry interoperability assessments, interoperability testbeds, pilots and experiments designed to bring together users and technology providers to test, demonstrate and validate best practices that can be used to guide the acquisition and implementation of sustainable, scalable and interoperable systems.

The Land Administration DWG aims to merge existing standards, e.g. LADM, OGC Landinfra, and existing approaches, e.g. FFP and STDM, for operationalization. The ultimate concept is that LADM will be operationalized into a Land Administration language that will be the basis for interoperability, allowing the implementation of a wide range of policies.

## **2.7 Creation of a Core Set of Land Indicators**

Over the past decade the global land community has seen a growth in consensus that land tenure security for all and equitable land governance are foundations for sustainable economic development and the elimination of poverty (GLTN / UN HABITAT, 2014). This consensus is reflected in the Voluntary Guidelines on the Responsible Governance of Tenure, Forests and Fisheries (FAO 2012) and in other related regional and global instruments such as the Framework and Guidelines on land policy in Africa (LPI 2012) and the Principles for Responsible Investment in Agriculture and Food Systems (CFS 2014). The international

donor community has also paid renewed attention to land governance in responding to the new wave of private land acquisition and land-based investment in the global south, seeking to improve their potential to drive agricultural growth and economic development (GLII, 2015).

Effective monitoring is central to ensuring changes in land governance result in improved conditions and sustainable development opportunities for all, especially for vulnerable groups and those living in poverty. In 2013, the G8 committed to support greater transparency in land transactions, including the responsible governance of tenure of land, increased capacity in developing countries; and release of data for improved land governance. The UN High-Level Panel of Eminent Persons on the Post-2015 Development Agenda report proposed a target on “secure rights to land, property, and other assets” as a building block for people to lift themselves out of poverty. These targets integrate land into the framework for measuring progress towards the agreed set of post-2015 SDGs. Better knowledge and understanding of a) the extent to which people benefit from secure land and property rights; and b) the effectiveness of land-related policies and land administration systems in helping to deliver tenure security for all and achieve sustainable utilization of land resources are now needed. These developments have created the need for a core set of land indicators that have national application and are globally relevant and comparable (GLII, 2015).

To date, however, development agencies and programmes undertaking land related interventions have established their own systems for monitoring the outcomes of land-related development interventions reflecting specific agency and project goals; there is no overall comparability of progress in different countries or the effectiveness of different approaches. Monitoring has also tended to focus on land policy and legislative processes and on performance of individual projects rather than on people’s perceptions of tenure security and the development outcomes of land governance systems as a whole. In addition, there are large gaps in available data, including baseline conditions, and coverage of national land information systems / National Spatial Data Infrastructures (NSDIs) is extremely limited, fragmented and confined to segments of the population. These circumstances led to collaboration between the UN-HABITAT, the Millennium Challenge Corporation and the World Bank in 2012, facilitated by GLTN to establish a Global Land Indicators Initiative (GLII) a platform for knowledge generation, sharing and dissemination on land indicators, which aims to develop a set of core land indicators to measure tenure security globally and at country level (UN-HABITAT/ GLTN 2014). A Conceptual Framework for the Development of Global Land Indicators has been formulated (GLII 2015) that includes the SDGS land indicators.

Traditional sources of security of tenure data are currently very limited, expensive and do not normally have the outreach to connect with the most vulnerable. New, innovative sources of data, e.g. PRIndex on perception of insecurity of tenure (PRIndex, 2016), that can support much more comprehensive and meaningful statistics that are technically feasible, politically acceptable and obtain stakeholder ownership are being developed. However, these statistics are only interim until widespread land administration solutions are implemented worldwide.

## **2.8 Increased Land Sector Capacity**

---

Global Campaign to Achieve 80% Security of Tenure by 2030 (8702)  
Robin McLaren (United Kingdom) and Stig Enemark (Denmark)

FIG Working Week 2017  
Surveying the world of tomorrow - From digitalisation to augmented reality  
Helsinki, Finland, May 29–June 2, 2017

A key feature of the FFP Land Administration approach is the use of a network of locally trained land officers acting as trusted intermediaries and working with communities to support the identification and adjudication process. This approach builds trust with the communities and allows the process to be highly scalable. The training, support and supervision of these local land officers will require new strong partnerships to be forged with land profession associations, NGOs, CSOs and the private sector. The land administration institution needs to introduce strong supervision of these partners with an associated quality-monitoring program. The recruitment process for these local land officers can be very simple: those who apply have to demonstrate that they can understand the aerial images, find their position on an image and have the attention to detail to draw boundaries. The use of local people to support the program can also have significant socio-economic benefits across communities. In Rwanda, for example, the land reform program provided income through contracting and allowances to over 100,000 Rwandans (GLTN/UN-HABITAT, 2016). Many staff used their earnings to partake in master level courses and many of those used were recruited in government positions at the end of the program.

## **2.9 New Global Players and Emerging Innovative Technologies**

There are a number of emerging innovative technologies that could potentially be game changers within land administration. Examples include:

- The DigitalGlobe’s Tomnod platform (<http://www.tomnod.com>) is using Artificial Intelligence (AI) powered by crowdsourcing to automatically identify features of interest in satellite and aerial imagery. Tomnod runs crowdsourcing campaigns that attract 10,000s of volunteers around the globe. One campaign is mapping populations across Ethiopia. Population data is important for growing economies and stopping the spread of preventable diseases. Volunteers are supporting the mapping of Ethiopia by validating the results of a village detection image-mining algorithm. These techniques could equally be applied to efficiently mapping land parcels
- Facebook recently used artificial intelligence software to scan 14.6 billion satellite images to identify human-built structures, through automatic feature extraction, in 20 countries across Africa (BBC, 2016). The social network hopes to use the information to determine where internet-beaming Aquila drones would best be deployed. New valuable sources of data to prioritize and implement security of tenure could be achieved through new partnerships.
- An increasing number of satellites, especially micro / nano satellites, e.g. Planet Labs, are being commissioned within the Earth Observation domain that are delivering a range of resolutions of imagery. This range of imagery, from satellite to drones, provides significant opportunities to support the FFP Land Administration approach (McLaren, 2015).
- Blockchain (Lemmen, et al, 2016) technology is threatening to revolutionize land administration through the provision of authentication and time stamping of transactions. Honduras and Georgia are early adopters.

- Emerging global cloud platforms, e.g. Cadasta Foundation, to directly allow communities to manage their land rights and potentially integrate with government solutions.

### **3. HOW CAN WE MAKE THE GLOBAL CAMPAIGN HAPPEN?**

To design a truly global campaign that can be sustained over a 12 year period and deliver security of tenure for all will take some extraordinary commitments and well-structured and highly coordinated approaches by a wide range of stakeholders. The key elements and characteristics of the proposed global campaign are outlined below:

- The key aid institutions and global players in the land domain need to fundamentally believe in this campaign and step up to take the lead and promote the campaign. For example, the World Bank, Department for International Development (DFID) in the UK and USAID need to build desire and support across the land domain to be apart of this historic campaign. All players have to be fully committed to the cause and build momentum.
- The global campaign fundamentally needs to adopt truly scalable solutions to achieve its aim within a relatively short timeframe. Therefore, the FFP Land Administration approach (GLTN/UN-HABITAT, 2016)) that has emerged as an enabler and accelerator and provides a practical solution to provide security of tenure for all, needs to be actively advocated as the primary means of implementing the campaign at the country level.
- Recipients of advice and aid in the land sector often receive inconsistent messages and recommended approaches from the UN family and donors. This is confusing for many countries and leads to inefficiencies and the inability to join-up and scale land initiatives. A much more consistent set of advice needs to be agreed and broadcast that converges on the FFP Land Administration approach. The World Bank, UN-GGIM, UN-HABITAT and UN-FAO should ensure that the land administration projects they support are designed around FFP by default and the donor community needs to ensure their project designs are FFP compliant. The recently initiated land administration ‘One-Map-Policy’ project in Indonesia is a very good example (Enemark and McLaren, 2017).
- The FFP Land Administration approach has its routes in implementing solutions in the countries in transition in Eastern Europe and Central Asia within the EU and World Bank funded projects. More recently, experiences in Rwanda and Ethiopia have strengthened the rationale for adopting this approach. However, there is a pressing need to quickly provide support to early adopter countries to create and test country specific strategies for FFP land administration (Enemark and McLaren, 2017) – and share this best practice through a network of FFP Land Administration learning and knowledge.

- The support of land professional organisations in scaling up their involvement in the implementation of the campaign is required. Many professions need to leave monopolies and self-preserving stances behind and adopt new approaches to the delivery of their services. This will require migrating from traditional, conservative, expensive and time consuming approaches to much more innovative approaches that use new, local stakeholders. FIG could effectively encourage this transition by creating a new genre of Land Professional to provide a home for Trusted Intermediaries (McLaren, 2016). If some elements of the land professions do not quickly change and adopt approaches that are more compatible with the aims of this campaign then alternative sources of services will be found and embraced.
- This top down, national approach of implementing FFP Land Administration needs strong support at the political levels. The politicians and decision makers in the land sector are key in this change process and need to become advocates of change through understanding the social, environmental and economic benefits of this journey of change. Land professionals need to ensure that their messages and arguments are attuned to politicians and key decision makers.
- In many developing countries land issues are highly political and controversial. Therefore, drivers and support for change will not always emanate from the politicians, but will have to be initiated through influencers at other entry points in the network of stakeholders across the land sector. This is where bottom-up pro-poor land rights initiatives are important to activate a variety of touch points to influence change.
- The global campaign needs to be sequenced and targeted on areas of greatest need where there is a high perceived insecurity of tenure through the impacts of land grabbing, conflict and climate change, for example. Currently, these high priority regions are hard to identify since we have very poor indicator information on perceived insecurity of tenure. The campaign needs to support and accelerate the Global Land Indicator Initiative being led by GLTN to make it more feasible to identify and target priority countries / areas through determining perception of insecurity of tenure. This highly targeted and coordinated campaign will pool global resources, be more effective at eradicating insecurity of tenure and leave behind sustainable solutions.

#### **4. CONCLUDING REMARKS**

As some countries turn inward and ignore the global challenges of the 21st century, it is essential that Land Professionals refocus and re-energise their efforts on more effectively communicating and solving global land issues. Just as advocates of free markets and globalisation have failed to convince many citizens of the benefits of this approach, Land Professionals must not be complacent and need to rethink and reshape their message, providing clearer evidence to politicians on the benefits of their land interventions and investments.

Land Professionals have been guilty of designing and implementing land administration solutions that are inappropriate and non-sustainable for developing countries. Global land issues require multi-disciplinary solutions, but professional silos have significantly limited the effectiveness of the solutions. The key stakeholders in the land sector also need to attract new technology partners to provide truly scalable solutions, for example, Facebook who are actively mapping settlements across Africa to prioritise the provision of Internet services. Our engagement strategy has been ineffective at communicating with politicians and key decision makers. Technical rather than socio-economic messages prevail and land rarely sits at the top table. If we are not careful, the already limited resources focused on land within the UN family will further decline and be marginalised, tipping the number of land professionals below the required critical mass for global engagement and delivery of solutions.

This challenge of initiating a global campaign provides an opportunity for Land Professions to rethink their strategy for coordinating, designing, communicating and solving global land issues. The land issues must not be side-lined and Land Professions need to retain their global perspective and values. This new SDG agenda presents a historic and unprecedented opportunity to bring the countries and citizens of the world together to decide and embark on new paths to improve the lives of people everywhere. The perfect storm of change has arrived. The time is right to launch a Global Security of Tenure Campaign, but it requires strong political will.

## REFERENCES

- BBC (2016): MWC 2016: Facebook uses AI to map people's homes.  
<http://www.bbc.com/news/technology-35633915>
- CFS (2014): *Principles for Responsible Investment in Agriculture and Food Systems*. UN Committee on World Food Security <http://www.fao.org/3/a-au866e.pdf>
- Enemark, S. (2004): Building Land Information Policies. Proceedings of United Nations, FIG and PC IDEA Inter-regional Special Forum on the Development of Land Information Policies in the Americas. Aguascalientes, México, 26-27 October 2004.  
[http://www.fig.net/resources/proceedings/2004/mexico/papers\\_eng/ts2\\_enemark\\_eng.pdf](http://www.fig.net/resources/proceedings/2004/mexico/papers_eng/ts2_enemark_eng.pdf).  
Full proceedings in English and Spanish:  
[http://www.fig.net/resources/proceedings/2004/2004\\_mexico.htm](http://www.fig.net/resources/proceedings/2004/2004_mexico.htm)
- Enemark, S. and McLaren, R. (2017): Fit-For-Purpose Land Administration: Developing Country Specific Strategies for Implementation. World Bank Land & Poverty Conference, Washington DC, March 2017.
- GLII (2015): *Conceptual Framework for the Development of Global Land Indicators*, Global Land Indicators Initiative. <http://www.gltn.net/index.php/resources/publications/recent-publications/462-global-land-indicators-initiative-glii-progress-and-prospects>
- GLTN/UN-HABITAT (2014): Technical guide for the development of land indicators. Nairobi: UN-HABITAT.
- GLTN/UN-HABITAT (2016): Fit-For-Purpose Land Administration: Guiding Principles for Country Implementation. Nairobi. 120 pp.  
<http://www.gltn.net/index.php/publications/publications-list/send/2-gltn-documents/2332-fit-for-purpose-land-administration-guiding-principles-for-country-implementation>

- Lemmen, C., Knight, K., Vos, J., Unger, E., and Beentjes, B. (2016). Blockchain/Bitcoin Functionality in Land Administration Proceedings of FIG Working Week Christchurch, NZ, May 2016.  
[https://www.fig.net/resources/proceedings/fig\\_proceedings/fig2016/papers/ts01a/TS01A\\_1emmen\\_knight\\_et\\_al\\_8407\\_abs.pdf](https://www.fig.net/resources/proceedings/fig_proceedings/fig2016/papers/ts01a/TS01A_1emmen_knight_et_al_8407_abs.pdf)
- LPI (2012): Tracking Progress in Policy Formulation and Implementation In Africa.  
[http://www.uneca.org/sites/default/files/PublicationFiles/tracking\\_progress\\_in\\_land\\_policy\\_formulation\\_and\\_implementation\\_in\\_africa.pdf](http://www.uneca.org/sites/default/files/PublicationFiles/tracking_progress_in_land_policy_formulation_and_implementation_in_africa.pdf)
- McLaren, R. (2015): How Big is Global Insecurity of Tenure? GIM International, Nov. 2015.  
<http://member.gim-international.com/Geomares/magazine/gim/magazine.jsp>
- McLaren, R. (2016): How Big is Global Insecurity of Tenure? Proceedings of FIG Working Week Christchurch, NZ, May 2016.
- OGC (2016): Land Administration Domain Working Group.  
<http://www.opengeospatial.org/projects/groups/landadmin>
- PRIndex (2016): Global Property Rights Index, an indicator of citizens' perception of the security of property rights. <http://www.prindex.net/about>
- UN (2015): Transforming our World: the 2030 Agenda for Sustainable Development. UN-General Assembly resolution on 25 September 2015.  
[http://www.un.org/ga/search/view\\_doc.asp?symbol=A/RES/70/1&Lang=E](http://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E)  
<https://sustainabledevelopment.un.org/post2015/transformingourworld>
- UN-FAO (2012): Voluntary Guidelines on the Responsible Governance of Tenure of Land, Fisheries and Forests in the Context of Food Security. Rome.  
<http://www.fao.org/docrep/016/i2801e/i2801e.pdf>
- UN-GGIM (2014): A Guide to the Role of Standards in Geospatial Information Management. New York. [http://ggim.un.org/docs/meetings/GGIM4/E-C20-2014-8\\_Essential%20Standards%20Guide%20for%20UNGGIM.pdf](http://ggim.un.org/docs/meetings/GGIM4/E-C20-2014-8_Essential%20Standards%20Guide%20for%20UNGGIM.pdf)
- Williamson, Enemark, Wallace, Rajabifard (2010): Land Administration Systems for Sustainable Development. ESRI Academic Press, Redlands, California, USA.  
<http://www.esri.com/landing-pages/industries/land-administration/e-book#sthash.Lp4BYcKW.vmY1XWxG.dpbs>

## BIOGRAPHICAL NOTES

**Robin McLaren** is director of the independent consulting company Know Edge Ltd, UK. He has supported many national governments in formulating land reform programmes and National Spatial Data Infrastructure (NSDI) strategies.

**Stig Enemark** is Honorary President of the International Federation of Surveyors, FIG (President 2007-2010). He is Professor Emeritus of Land Management at Aalborg University, Denmark. He is an international consultant in land administration and capacity development.

## CONTACTS

Prof Stig Enemark  
 Professor Emeritus of Land Management  
 Aalborg University

Dr Robin McLaren  
 Director  
 Know Edge Ltd

---

Global Campaign to Achieve 80% Security of Tenure by 2030 (8702)  
 Robin McLaren (United Kingdom) and Stig Enemark (Denmark)

FIG Working Week 2017  
 Surveying the world of tomorrow - From digitalisation to augmented reality  
 Helsinki, Finland, May 29–June 2, 2017

Department of Development and Planning  
Fibigerstrede 11, DK 9220 Aalborg  
DENMARK  
Tel. +45 9635 8344; Fax + 45 9815 6541  
Email: [enemark@land.aau.dk](mailto:enemark@land.aau.dk)  
Web site: [www.land.aau.dk/~enemark](http://www.land.aau.dk/~enemark)

33 Lockharton Ave  
Edinburgh EH12 1AY  
Scotland, UK  
Tel: +44 131 443 1872  
E-mail: [robin.mclaren@knowledge.com](mailto:robin.mclaren@knowledge.com)  
Web: [www.knowledge.com](http://www.knowledge.com)

---

Global Campaign to Achieve 80% Security of Tenure by 2030 (8702)  
Robin McLaren (United Kingdom) and Stig Enemark (Denmark)

FIG Working Week 2017  
Surveying the world of tomorrow - From digitalisation to augmented reality  
Helsinki, Finland, May 29–June 2, 2017