Land Valuation and Taxation: Key Tools for Disaster Risk Management

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SUMMARY

Much has been written about land issues in responding to natural disasters and on the role of land administration in Disaster Risk Management (DRM). It is important to address these land issues in all stages of DRM to help protect the rights of the more vulnerable. This paper looks at one of the three elements of land administration – the valuation of land – and considers its role in DRM. The work is considered in the context of the emergency response and post-disaster phases of a DRM Framework that draws on existing literature, and case studies developed by the authors and others in developing countries.

The impact of natural disasters on property values is considered, as well as the relationship between land tenure, land value and land use control, and how land valuation can support emergency response, recovery and reconstruction after natural disasters. We also consider how land valuation and taxation are related in the context of Disaster Risk Management. This includes valuation to support estimates of damage and loss, effective decisions on resettlement and compensation, and for insurance purposes. We conclude that land valuation and taxation are key tools in Disaster Risk Management.

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1. INTRODUCTION

This paper provides an overview of the role of land valuation in emergency response, recovery and reconstruction. It includes a review of the potential role and requirements for land valuation and property taxation in the context of a Disaster Risk Management Framework, particularly with regard to the way in which land valuation and property taxation can help address the land issues that can result after a natural disaster. These issues have been identified in various papers (e.g. UN-HABITAT/FAO/CWGER/GLTN 2010, Mitchell, 2010), and include the loss of access to land, shelter and livelihoods due to damage from the disaster, resettlement or an inability to prove the legal or social legitimacy of their rights to land. The poor and vulnerable are often most at risk.

The Hyogo Framework for Action 2005-2015 (UNISDR, 2005) aims for a substantial reduction in loss of life and economic losses through the implementation of Disaster Risk Reduction (DRR) strategies in disaster risk management. This includes the incorporation of pre-disaster and post-disaster activities into a Disaster Risk Management (DRM) approach. DRM is defined by UNISDR (2009) as "the systematic process of using administrative decisions, organization, operational skills and capacities to implement policies, strategies and coping capacities of the society and communities to lessen the impacts of natural hazards and related environmental and technological disasters". It is a management approach that combines prevention, mitigation and preparedness with emergency response and recovery.

The DRM Framework breaks the process of DRM into three phases – pre-disaster, emergency response and post-disaster. It brings together development activities of mitigation and prevention as well as relief and recovery, with preparedness linking the development and humanitarian activities. This paper will concentrate on the emergency response and post-disaster stages.

We consider how effective land valuation and property taxation can support post-disaster emergency response, recovery and reconstruction activities. The emphasis is primarily on valuation as it is integral to assessing the impact of a disaster and resettlement on affected persons. However, taxation is a related issue and is considered here where relevant. Also discussed are some of the barriers to effective land valuation in a post-disaster context. These include the difficulties of effectively valuing informal tenures such as customary land, or

informal settlements and the impact on disaster management. This work builds upon previous work by the authors and provides a foundation for further research.

2. HOW NATURAL DISASTERS IMPACT LAND VALUE

In this section we explore the relationship between land tenure, value and use in the context of disaster management, and the impact of climate change and natural disasters on land value.

2.1 The relationship between land tenure, value and use in the context of disaster management

The provision of shelter and livelihoods, and therefore food security, depends on access to land. In very disaster-prone areas, where land tenure has either legally secure (de jure) or socially legitimate (de facto) security people have confidence in undertaking disaster mitigation and prevention actions, and have confidence they can return to their land after a disaster. If, however, they lack tenure security they face a real risk of either the government preventing them from rebuilding in the same place, or of being the victims of land-grabbing. Improved tenure security and therefore access to land provides an incentive for landholders to invest in measures to improve their land such as soil protection measures, tree planting, pasture improvement, irrigation or sustainable cropping (FAO, 2011).

Correa *et al* (2011) noted that land use and occupation reflect the prevailing development model in a country and argued that disaster risk is a cumulative result of deficiencies in this development planning. The result is some people more at risk than others and this is often reflected in more insecure tenure (e.g. informal settlements) and also lower land values.

Changes in government policy can affect property value. There are very strong links between changes made under land use planning or master planning processes and resultant changes in land value. Similarly releasing information identifying an area as hazard-prone, or as an area to be investigated for potential resettlement, can result in property devaluation. Jha *et al* (2010) noted this impact in both urban and rural areas. In urban areas land values are higher and land tenure is more complex. Pre-disaster or post-disaster changes to land use planning controls have an impact on property value, meaning a transparent approach to planning is essential. In rural areas, the settlements form a relatively small part of the landscape and values are lower. Land tenure issues tend to be less complex and the sense of ownership is higher in rural areas. Unlike urban areas land use planning may not dramatically change rural land values.

Changes made to create no development (buffer) zones after a disaster can also have a dramatic impact on property values and tenure. For example, in Padang city in Indonesia the land use master plans that created zoning (both the 2004-2024 and 2008-2028 plans) established some of the forested areas as buffer zones. This led to the land office not being able to register the land of

people who had been living there for a long period (since before the change in zoning), and were not able to issue building permits. The result is a reduction in the tenure security of the people living in the forested area, and a resultant impact on the value of property (Syahid, 2011).

2.2 The impact of climate change and natural disasters on land value

Climate change is expected to lead to changes in the frequency, intensity, spatial extent, duration, and timing of extreme weather and climate events, and can result in unprecedented extreme weather and climate events (IPCC 2012). It will potentially magnify the existing patterns of disaster risk and place extra pressure on the capacities of governments and agencies to respond. The UN FAO note that one of the more severe consequences of climate change will be on food security and agricultural livelihoods in vulnerable countries. They argue for urgent investments in DRR above and beyond present levels to support food and nutrition security (FAO, 2011). UN-HABITAT (2011) stated that urban development can bring increased vulnerability to climate hazards. Many cities are facing rapid growth due to urbanisation that results in the creation of informal settlements that are often vulnerable to natural disasters.

While the focus of this paper is on the role of land valuation in supporting DRM activities to enhance the resilience of livelihoods, there are also direct and indirect benefits to settlements and shelter and these are discussed throughout. Quan and Dyer (2005) argued that the more vulnerable within hazard-prone areas may be forced to settle in hazard prone areas (such as near a flood-prone river or at the base of an unstable hillside), because of the lack of any affordable alternatives. This includes people with little or no security of tenure such as informal settlers, farm labourers, lessees and sharecroppers. Also vulnerable are the elderly, women, children, and minority groups. Their rights may or may not be considered in post-disaster decisions. It is these people who may not be adequately considered when post-disaster decisions on compensation are made.

Wherever there are involuntary changes after a disaster to the location a person lives, or the quality of their housing, or their access to livelihoods land valuation can help estimate those changes for the purposes of compensation. Decisions made to resettle people under a DRM or land use planning process also impact property values. Those who are resettled require valuations to ascertain that they receive at least as good conditions after the resettlement as they had before. However, others may also be affected. Where people are resettled with a host community there may be an impact on their property value and accurate valuations can help to assess this impact.

Damage due to the impact of a disaster can also have a significant impact on property values. Syahid (2011) reported that following earthquakes in Indonesia in 2004 and 2007 some people left their properties located in the high hazard-risk zone resulting in a considerable depreciation in property values. In post-tsunami Japan concerns over living in the lower areas near the coast

placed downward pressure on property values. According to the *National Land Use Planning Act*, the government could declare an area under land price surveillance when an unusual rise in land price is a concern. In order to prevent unusual price rises due to a preference for high lands, the government issued a press release stating that it would watch land prices (Kaidzu, 2011).

A series of approximately 8,000 earthquakes and aftershocks starting in New Zealand in 2010 caused widespread property damage to land and buildings and had a significant impact on the confidence in the property market. The relative property values across Christchurch City were permanently altered with the underlying physical features of the land, and proximity to water channels, being most important determinants of buyer confidence (Sullivan and Grant, 2012).

3. LAND ADMINISTRATION AND LAND VALUATION

In countries with a market economy, property has a value and this is critical for all property-related decisions – by individuals to purchase, by banks deciding to consider what is appropriate to lend against a property, by local government with regard to decisions to deal with land and buildings under its control. Valuation is undertaken according to accounting standards at the international and national levels, and effective property valuation underwrites many aspects of a functioning market economy. It is common that property is taxed by government at various levels and the basis for this taxation is through determining the value of the property. This taxation may be in the form of an annual charge (e.g. rates) based on an estimate of the value of the property or may be on the basis of a tax on the transfer of property (e.g. stamp duty). Annual taxation forms a significant income source for government and may contribute greatly towards reform to decentralise land administration (Dale *et al* 2007, Munro-Faure 2012). This paper will argue that this may be extended to other areas such as reform of land agencies in line with DRR activities

Valuation (assessment of property values) is typically needed to support:

- Transfer of ownership
- Financing and Credit
- Gathering of revenues through property taxation
- Decisions on compensation related to land acquisition or resettlement of people
- Cost-benefit analysis of various scenarios related to DRM projects.
- Insurance
- Litigation (e.g. compulsory acquisition / expropriation and legal liability

An efficient and transparent land market helps to make the valuation of property more transparent and allows for the implementation of fiscal policy in a way that citizens can understand. Another benefit is that it provides more reliable information on property values. Incorrect valuations can lead to disputes and social tension and processes are required for the adjudication of valuation and taxation disputes (Dale *et al*, 2007).

Land administration comprises three components – the administration of land tenure, land value and land use – and each impact upon the other. In countries with more formal legal systems of land tenure where rights to land are typically managed based on an accepted land policy and legal framework, land agencies are often decentralised. Provincial land authorities maintain cadastral maps and records of land ownership, in a form of "cadastre", which may be paper-based. Initiatives to convert these land records from paper records to digital records, increase the security of these records and also increase the protection for the proprietors in the event of a disaster.

Where land taxes are collected, property valuation records are maintained and are important for establishing appropriate levels of compensation when private land is acquired by government, or when people are resettled under a DRM program. The revenue generated from the land taxes based on effective property valuation may be considerable and allow capacity building or disaster risk reduction activities.

The aftermath of a disaster poses special challenges for real property valuation. During these periods real property markets in affected areas often exhibit instability, even chaos. Analysing market data after a disaster can be difficult. In developing countries and emerging markets the challenges include:

- Inadequate legal frameworks that do not allow for the efficient functioning of the property market.
- Lack of published information or difficulty in obtaining information regarding transactional as well as other data requisite for proper valuation.
- Greater volatility of property markets.
- Lack of adequately trained professional Valuers.
- Out-dated (or lack of) national standards.
- External pressure.
- Excessive or insufficient government interference.

4. LAND VALUATION AND TAXATION IN EMERGENCY RESPONSE, RECOVERY AND RECONSTRUCTION PHASES

This section outlines some of the ways that effective land valuation and property taxation measures can support the post-disaster emergency response, recovery and reconstruction activities. Also considered is the effect of poor land valuation on land governance in a post-disaster context.

4.1 Post-disaster rapid assessments

These assessments are undertaken to determine the scope, scale and distribution of the impact of the natural disaster and identify issues that may affect the response. They provide information on the needs, possible intervention types and the resource requirements. They can include damage and loss, shelter, livelihoods, agriculture, infrastructure and vulnerability assessments. Land agencies valuation departments should be involved to provide valuation information and estimates.

4.1.1 Estimating damage and loss

Although the emergency phase is mostly about saving lives and getting basic temporary restoration of transport, communications networks, and preliminary repairs to critical public utilities, there is also need to do preliminary estimates of the loss of public and private property. In completing the damage, loss, and needs assessment phases of disaster recovery, valuations are essential in estimating the economic losses. To calculate losses, Valuers need to estimate the economic value prior to the disaster (retrospective value) and then in current condition (post disaster). These valuation can be used for insurance or compensation purposes, for mortgage lending (homeowners need to refinance / borrow to rebuild), rental assessment, and as cost benefit analysis on where to allocation limited resources in the disaster recovery. The World Bank publication *Safer Homes, Stronger Communities* (Jha *et al*, 2010) stated:

> *"Accurate, comparable, and appropriately scaled information provides the basis for damage and loss assessments (DaLAs), and related decision making concerning recovery and reconstruction. Assessments are time- and labour-intensive, must be conducted rapidly, and must meet quality standards. For these reasons, numerous initiatives have been launched to expand the use of technology to improve the timeliness, quantity, and quality of assessment results".*

In 2010 these did not use digital geospatial information or spatial analysis techniques. However the GFDRR and the World Bank were developing standards and training manuals for mission teams to integrate spatial analysis into assessments. The authors believe that it is important for post-disaster rapid assessments to include questions on the quality of land valuation records, the legislation with regard to land acquisition and compensation, and for information on land value to be available along with other spatial data.

In addition to economic loss, cultural goods or landmarks may suffer losses. Traditional valuation approaches are not appropriate for these special properties and goods, and thus non-economic valuation methods should be applied such as Derived Benefits Methods, Cost Based Methods, Revealed Preference Methods, and Stated Preference Methods.

4.2 Valuation to support a cost-benefit analysis for recovery planning

Valuations are essential in post disaster for planning for recovery. In the loan assessment process, valuation needs to be completed so that property owners can quickly obtain financing to begin the rebuilding of their properties, both home and business. Valuation is also required of public assets, such as government buildings, schools, and public infrastructures such as roads and utilities.

Valuations are essential in needs assessments in determining the financial resources needed to implement recovery, reconstruction, and risk management. The valuations can be used to determine best use of available resources and where such funds are best allocated.

4.3 Moving from transitional shelter to resettlement

The Pinheiro Principles outline that all displaced persons have the right to have restored to them any land and housing for which they were arbitrarily deprived. Resettlement for the long-term should not be the first option as there are many difficulties to overcome. Correa *et al* (2011) stated:

> *"Relocating a population, its economic activities, and its social networks and relations, as well as its natural physical and built environment (buildings, infrastructure, and facilities) is a complex process with significant impacts—direct and indirect—on the population and on governments. A resettlement process may become an opportunity for comprehensive improvement in the quality of life of the population, even exceeding the direct objectives of disaster risk reduction. But if not duly planned or conceived as a complementary action integrated into a comprehensive risk management strategy, it may lead to ineffective and unsustainable processes that create frustration for families and governments alike…A poorly planned and executed resettlement program can lead to social, economic, and cultural disasters even more serious than the natural disaster risks it is intended to prevent".*

Decisions on whether to resettle hazard-prone people are best made before a disaster as a preventative response (Correa *et al*, 2011) where the decisions and options can be based on in-depth technical analysis and extensive community consultation. However, often this has not occurred and a disaster can highlight the vulnerability of individuals or communities.

Studies of the pre-disaster conditions (including property value) make it possible to identify the requirements of people who need to be resettled. These requirements allow a search for suitable locations and existing housing supply. Resettlement options can include:

- Collective resettlement - where land is provided for more than one family, as well as activities to reestablish the lost livelihoods.

- Individual resettlement - of an individual family to an available dwelling and adequate compensation is sufficient to find decent and safe housing, but does not consist solely of financial compensation (Correa, 2011).

Jha *et al* (2011) included the following measures to consider when responding to landless and refugees who need to be relocated:

- Acquire suitable public land - using public land for relocation is a common solution as it does not involve acquisition from proprietors and the related compensation However, they note that use should be preceded by a good site evaluation and availability is not sufficient justification;
- Acquire private land – involves a market-based acquisition from landowners willing to sell and should be based on the best available land valuation information.
- Government offers limited fiscal incentives to sellers (property tax rebate).

4.3.1 Compensation for individual resettlement

Individual resettlement includes payment of compensation for the property in the at-risk area, plus additional compensation for loss of income, and to cover the costs of moving. When the occupants don't have title to the land or their housing is low-cost, a subsidy to purchase a property on the market may be provided. In some cases a combination of these two options is offered. Information on the value of the land and structures indicate the amount invested into the property, and therefore the amount of compensation they may receive. It is important for the head of household (or productive unit) to be present at the time of the valuation (Correa, 2011).

Correa (2011) noted the principle of shared responsibility of the state in which the state has the responsibility to protect people. Under this principle, it is assumed that the human settlement was sited in a high risk area based on government decisions to grant permits or that there was a lack of land use planning to prevent the establishment of these settlements in high-risk areas. They stress that property valuations must not depreciate the property because of the disaster risk, to ensure the compensation is sufficient to purchase suitable lawful and safe housing on the market.

4.3.2 Compensation for land acquisition

Often public land is chosen for the site where people will be resettled, or where infrastructure is to be constructed. Where private or communal land is used for resettlement or construction land acquisition may be required. However, there is potential for conflict where the land acquisition arbitrarily displaces people, and the process does not involve adequate consultation or compensation. Land acquisition and compensation disputes may also delay recovery and reconstruction.

The FAO Voluntary Guidelines state that "States should ensure a fair valuation and prompt compensation in accordance with national law. Among other forms, the compensation may be, for example, in cash, rights to alternative areas, or a combination" (FAO, 2012).

In determining appropriate compensation, the guiding principles of equity and equivalence should be applied. Equivalence in this context means that people should receive no more or no less than their loss. Government should balance interests to safeguard the rights of those who lose ownership or rights whilst ensuring public interest is not jeopardized, and be flexible with lucid guidelines but also allow flexibility to situation to provide equivalence compensation (FAO 2009).

5. VALUATION AND TAXATION IN THE RECONSTRUCTION PHASE

5.1.1 Valuation for insurance purposes

Following disasters property owners will seek either compensation as cash payout or monies to reconstruction their properties and businesses. To make a claim and before an insurer pays out, they will need a valuation to determine the economic loss to determine the insurers responsibility under the terms of the insurance contract. Some contracts offer full replacement, thus insurer will be responsible to fund a full replacement of property.

Other insurance policies only pay for the loss of the improvements. If the property is no longer new it will suffer some type of depreciation such as functional obsolescence, physical deterioration, and sometimes external obsolesce. Under these situations, the insurance payout may not be sufficient for property owners to rebuild their home or business. In the case of an individual property loss (such as fire) not related to a natural disaster, the property owner can use the insurance proceeds to buy a replacement property. However, in a community wide disaster often there won't be other properties to purchase. Thus, these under-insured property owners may need additional financial support to rebuild.

Sources of additional financial support can be in traditional bank loans, through low interest government loans, or government grants, or through special government compensation schemes such as in New Zealand. For example, valuation was essential in supporting insurance claims in Christchurch, New Zealand following the earthquake. In excess of 120,000 insurance claims were made to the Earthquake Commission for significant damage. Government designated "Red Zones" unfit for human habitation due to ongoing risks, and in these zones the government will acquire land from the land owners. The government announced that this would be based on the Christchurch mass appraisal rating valuations dated August 1st, 2007. These are assessed using a market value definition for both Capital Value and Land Value (Sullivan and Grant, 2012).

In some communities, particularly rural small communities, following disasters many residents relocate to other communities to find jobs and many of these never return. Thus these rural towns and their town centers are not rebuilt. This can even happen to large cities, such as New Orleans following Hurricane Katrina. Many older pre-disaster neighbourhoods remain as virtual ghost towns with vacant house lots.

Material loss affects different groups in different ways. Compensation may be provided in the form of cash, livestock or building materials. An assessment of the e damage and loss suffered is needed in preparing a compensation package. Valuers can provide information to support decisions on financial compensation and provide advice on the breakdown of costs and in kind supports such as materials, labour and tools (Lloyd-Jones, 2009).

We also note that the above comments on insurance may not apply to informal tenures such as customary land or informal settlements that are adversely affected by disasters, where there are more difficulties in establishing the value of the property (both pre-disaster and post-disaster). This presents challenges for assessing a fair compensation and may lead to disputes over the compensation offered. These challenges are discussed further in Section 6.2.

5.1.2 Tax concessions and protection of land markets for affected areas

Tax concessions can remove a disincentive to rebuild after a disaster and may also have a positive distorting effect on property markets. Following the 2004 earthquake that hit Padang in Indonesia the mayor of Padang city issued a regulation waiving the normal requirement for a retribution tax to be paid for the construction of a new building. According to this regulation, those who want to get approval for re-constructing houses affected by the earthquake would not be charged until 2010 (Syahid, 2011). In another example, soon after the tsunami struck Aceh, the Land Agency (BPN) issued a decree prohibiting the transfer (sale) of land as an attempt to protect the vulnerable tsunami victims from being pressured into hasty transfers (BRR and International Partners, 2005).

6. CHALLENGES FOR EFFECTIVE POST-DISASTER VALUATION

6.1 Limitations in capacity

Following a disaster, there are numerous barriers for Valuers in carrying out essential valuation tasks. These barriers include:

- Potential loss of experienced staff
- Potential loss of facilities
- Loss of Data Resources
- Property Market Volatility / Risk

Depending to the scale of the disaster, there is potential loss of experience valuation and land administration personal. Some losses could be through either incapacitating injury or death, or more often the relocation of qualified local staff and experts to other communities seeking shelter and livelihoods for their families.

There is a potential for loss of facilities, either entire offices, or public infrastructure (e.g. electrical and water systems, roadways to get offices) to access and run the valuation office. Entire offices could be destroyed, along with all professional equipment and especially essential information critical to complete a valuation. Even if a Valuer can physically get to the office, a typical valuation office still needs electrical power to power their lights, and run their computers and printers. Without power, Valuers often will not have access to the equipment and information sources needed to complete competent, and particularly fast valuations needed for recovery assessment.

In addition to a Valuers loss of their private resources (e.g. office buildings and equipment), Valuers rely on public resources such as tax and property records, including ownership, land boundaries, and market sales transactions. Thus the loss of public resources or loss of access to public resources will create substantial barriers for Valuers to carry out their work efficiently.

A major disaster will have immediate impact on market values, and often for many years following. In some communities, there may be looting and other civil turmoil that can negatively impact values. In other markets, those affect by the disaster may relocate to other area in the community that weren't impacted. This will create more demand and thus increases in values in non-affected areas. This may create a situation where insurance or government compensation is not sufficient to assist affect property owners to relocate in the same community. This is especially true for rental housing as displaced homeowners seek short term rentals and for influx of outside aide workers and trades persons working on the recovery.

Other ongoing limitations or barriers for Valuers include the lack of current market information following a disaster that reflects the current market values. Property records may be lost and thus there may be no information on specific transactions (sales, leases, etc.) or the property themselves. In some developing countries, property records are still recorded on paper documents, and thus can be easily destroyed in a disaster. Without such documents, Valuers, land surveyors and other land administration functions are severely hampered. Also without access to documents, there may be conflict on property ownership. Also unscrupulous land dealings may happen where 'owners' claim larger areas or even property that was not theirs. Without accessible and reliable public records can lead to land conflict.

In many developing countries the land administration system is inefficient and this creates barriers to quality market valuations even prior to a disaster. These include the lack of:

- detailed public records on properties (ownership, legal boundaries, description of improvements, zoning / planning restrictions)

- lack of or ease of access to public records for specific properties
- lack of any valuation practice standards
- Lack of adequately trained and qualified Valuers

Also Valuers external pressure from property owners who 'know their properties are worth more, from lenders that need a certain value 'to make the loan', or government agencies that may be seeking 'low values' to save money or even 'high values' for political favours.

6.2 Difficulties in valuing communal and informal tenures

6.2.1 Communal and customary tenure

The FAO Voluntary Guidelines states in relation to indigenous peoples and other communities with customary tenure systems:

> *"9.1 State and non-state actors should acknowledge that land, fisheries and forests have social, cultural, spiritual, economic, environmental and political value to indigenous peoples and other communities with customary tenure systems".*

The valuation of customary or communal land is a very specialised area of valuation not often encountered by most Valuers. This speciality has been described as "a special field of real property valuation that frustrates many of those who accept such assignments, and is anomaly that mock the practitioners of valuation art" (Lowry, 1987, Bannerman, 1993).

Often customary and communal lands have not been formally registered, may have conflicting claims of ownership, and often is inalienable (i.e. cannot be sold). Thus, there may be no formalised market, and therefore there is little or no market data for which Valuers can use to estimate any type of value.

In many countries with a large percentage of customary / communal lands (such as many of the South Pacific island countries) often customary lands have not been formally registered or ownership is held under customary practice. Sometimes this leads to conflict of ownership and use between introduced law and customary law, and often the ownership is unclear.

Another issue facing Valuers is that often customary owners lack knowledge and information about property rights and economic value. This can lead to market volatility and land conflict between neighbouring land owners, within families, and most often with government. In many developing countries there is a risk that customary owners and traditional freehold property owners will suspect government of paying 'low-ball' values for compulsory acquisition compensation or that government officials and their acquaintances are paying a below-market

price for their own financial or personal stake in the value outcome. Thus to minimise land conflict clear land ownership records need to be established, and customary land owners need access to readily-accessible affordable, competent, unbiased property advice.

6.2.2 Informal settlements

Informal settlements are often disproportionally affected in disasters as these are often located on marginal lands, such as low lying coastal areas or steep hillsides. However, the lack of formal ownership and registration creates issues for compensation as these properties cannot be bought and sold in a formal market, and thus Valuers are challenged to find the market value using traditional valuation practices and methods. Also in markets with significant informal settlements, it may be difficult to find suitable and available lands nearby in which to resettle. However, in the post-disaster recovery there is potential to formalize replacement settlements and enhancing the livelihoods of these residents. Along with formal registration, there is potential to assess land taxes that can be used for public services.

6.3 Resolving disputes over land value

Poor estimates of the value of a property often lead to disputes. These include disputes over the amount of compensation paid for the resettlement of communities or individuals away from their pre-disaster land, or disputes relating to claims for compensation for the impact of a disaster on land or livelihoods. For example, a community that hosts a resettled community may experience a decline in the value of their property.

7. CONCLUDING COMMENTS

The value of land is an important element of the information required during much of the process of emergency response, recovery and reconstruction. It supports cost-benefit decisions during recovery planning, and helps to protect the rights of people resettled due to the disaster. Decisions on land tenure, land valuation and land use planning controls are some of the major roles of land administration which has an important function post-disaster. Information on the value of land and buildings is critical for all property-related decisions. Property taxes generate an important source of income for government and may even support DRR activities. Equally, decisions to offer tax concessions during the response and recovery phase can remove disincentive to rebuild.

However, this paper has discussed some of the significant barriers to valuation that exist post-disaster and these should be considered in DRR programs. Responsible governance of land also requires that we have effective and transparent valuation systems and guidance is now provided in the FAO *Voluntary Guidelines* and the World Bank *Land Governance Assessment Framework.*

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BIOGRAPHICAL NOTES

David Mitchell is a licensed cadastral surveyor and has a PhD in land administration. David is co-chair of Commission 7 Working Group 2 "Land administration, natural disasters, and climate change" (with Jaap Zevenbergen), and a member of the FIG Taskforce on Climate Change. At

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