'CADASTRE 2014': A BEACON IN TURBULENT TIMES

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ABSTRACT

Since the publication of the booklet 'Cadastre 2014' in 1998, the International Federation of Surveyors witnessed *global developments* making the quest for efficient and effective cadastres increasingly manifest. This paper looks at these *global developments* with a focus on rapid urbanization, food security, climate change and informal economies, because these developments in particular are high on the global political agenda: that is to say, often within an overall goal of poverty eradication. Time and again one of the solutions is found to be related to providing security of tenure for the poor, irrespective these poor are slum dwellers (urbanization), farmers (food security), land users and forest dwellers (climate change) and unrecorded citizens (informal economies). The urge for low cost information systems that allow fast and cheap recording of different types of rights has become pervasive over the last decades. The statements and principles of 'Cadastre 2014', in the 20 years of existence after their publication, did not lose strength in providing guidance to the design of such 'fit for purpose cadastres'.

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1. INTRODUCTION

Since the publication of the booklet 'Cadastre 2014' the International Federation of Surveyors witnessed *global developments* making the quest for efficient and effective cadastres increasingly manifest. Although the word 'cadastre' became a bit maligned, because 'cadastres' were too much associated with western type fully fledged state guaranteed property titles, global documents indicate that still 'something' was needed that could provide land tenure security for the unrecorded owners or users of land. That 'something' has often been phrased as a 'land administration system', a 'land recordation system', a 'land information system' or alike, but when the origin of the word 'cadastre' (namely 'list') is considered we might also say that this 'something' is a 'cadastre'. This brief paper looks at these *global developments* with a focus on rapid urbanization, food security, climate change and informal economies, because these developments in particular are high on the global political agenda: that is to say, often within the overall goal of poverty eradication. Time and again one of the solutions (sometimes a major one, sometimes a minor one) is found to be related to providing security of tenure for the poor, irrespective these poor are slum dwellers (urbanization), farmers (food security), land users and forest dwellers (climate change) and unrecorded citizens (informal economies). But it is clear from a myriad of research that fully fledged property titles are not considered to be the appropriate solution to achieve that goal. The demand is now for the recognition of a variety of human-land relationships, which has been adopted meanwhile by the UN as the 'continuum of land rights' (UN/Habitat GC 23-17). The urge for low cost information systems that allow fast and cheap recording of all these different types of rights has become pervasive over the last decades. The statements and principles of 'Cadastre 2014', in the 20 years of existence after their publication, did not lose strength in providing guidance to the design of such 'fit for purpose cadastres'.

2. RAPID URBANIZATION

Out of the total world population in 2011 of 6.9 billion people, 3.6 billion live in urban areas, which is 52.1%. The remaining 3.3 billion people live in rural areas (thus 47.9%). The growth of the urban population commenced in the 50's then being 29.4% of the world population, growing in 2000 to 46.7%, and in 2011 to 52.1%.
Of the estimated world population in 2050 of 9.3 billion people, 6.2 billion are expected to live in the urban area, which is 67.2% (UN, 2012). The rural population is then expected to be 3.0 billion people (32.8%), which is a little bit less than the current number.
Population growth thus settles in the city. By consequence there will be a dramatic need for houses: in 2050 an extra of 3 billion people need a house, which means 96,150 per day (Augustinus, 2009).

The urban population, who lives in slums, increases: while in 1990 the number of slum dwellers was 656 million, the number grew in 2000 to 766 million and in 2010 to 827 million. Because of the growing urban population in general, the percentages as such decline: from 46% in 1990, to 39% in 2000 and to 32% in 2010 (UN/Habitat, 2008).

To meet the requirements of sustainable cities, a *twin track approach* is needed, which comprises (a) prevention of future slum formation and (b) slum upgrading (Payne, 2005).

Prevention of future slum formation is a matter of urban planning: it is widely observed that conventional ways of urban planning (the 'master plan' approach) completely fails to deliver appropriate livelihood for the growing number of inhabitants.

When upgrading slums, property rights are considered as critical to sustainable approaches, amongst better governance, financial systems, and social frameworks (Cities Alliance, 1999). Employment remains of major importance: that appears to be more important than having security of tenure or access to formal credit (Payne, 2005). However, frequently, development of informal settlements is hampered by conflicting and unrecorded ownership claims and double or multiple sale of the same plot of land (Fekade, 2000).

The three basics for prevention of slums and slum upgrading are considered (1) land availability and land security – meaning that once occupied, the occupants will not be forcibly evicted, (2) responsibility of municipalities to ensure basic affordable services – road access, drainage, sanitation and water supplies, etc. – this may require credit facilities against the revenue generation of the entire city asset base, and (3) access to formal and affordable lines of credit specifically for the slum dwellers' of projects – such access is dependent upon the land and services issues being agreed with local authorities as a basis for community groups approaching the commercial banks for their involvement (FIG, 2008).

In addition to the need for new forms of spatial planning with their associated need for relevant spatial and non-spatial information, there is an manifest need to deliver quick and cheap 'cadastres' adopting methods of recording various types of land tenure, fitting into the modern approach to slum upgrading. Providing jobs and improvements of the physical environment should create a social environment where slum residents can improve their livelihood with social and tenure security as a fundament.

3. FOOD SECURITY

Worldwide about 868 million people are undernourished which is 12.5% of the world's population, of which 852 in the developing world. The UN estimates that by 2050, the world population will increase from 6 to 9.5 billion people, most of them living in South Asia and Sub-Saharan Africa (UN, 2011). Food security for 9.5 billion people requires a 70% increase of the global food production and up to 100% more in developing countries (HLEF, 2009; FAO 2011). This is –annually- a billion tons of cereals and 200 million tons of meat additional to the production of 2005 (Bruinsma, 2009).

This production growth can be realized for 80% from higher yields and increased cropping intensity and for the rest, 20%, coming from land expansion: globally it is estimated that in general 4.2 billion ha is suitable for agriculture, of which 1.6 billion hectares already is cultivated (FAO/GAEZ, 2002). Africa holds 60% of the area of uncultivated lands (McKinsey, 2010). Analysis shows that an increase of cultivated land is needed of 120 million ha, in Latin America (52 million ha) and Africa (64 million ha); 32 million ha should be irrigated (Bruinsma, 2009).

Total yield increase is then possible of 68% (Africa), 89% (East/North Africa), 53% (Latin America), 86% (South Asia) and 81% (East Asia) (FAO, 2009).

To boost agricultural production two kinds of measures are considered to be necessary, namely (a) change of institutions and policies and (b) change of technical approaches (FAO, 2011).

The *technical* approach assumes the availability of improved crop varieties, better use of water, more use of fertilizers, better control of pests and diseases, improve low mechanisation, better roads, better electricity supply, and improvement of the currently very limited technology transfer and adoption (FAO 2011b).

From an *institutional* point of view conditions should remove constraints and barriers in the field of (1) incentive structure, (2) *land tenure and access to water resources*, (3*) collaboration between land and water institutions*, (4) efficient support services including knowledge exchange, research, and finance, and (5) better and secured access to markets. Especially the access to and management of land and water needs to improve markedly; the lack of clear and stable land and water rights and the weak regulations and enforcement has contributed to conflict over land access and competition for water use: in particular the inclusion of customary and traditional use rights in national legislation is urgently needed; land and water institutions can be strengthened and common property systems should be protected to provide for secure land tenure (FAO, 2011).

Recognizing (as in the section on urbanization) that many institutional and technical factors play a role, it remains that when the 'land question' is not brought to a proper solution, problems around land and water rights will severely obstruct progress in food security, whether it concerns property claims on existing cultivated lands or lands where agricultural production is to be expanded.

'Registration of land and natural resource rights is critical to providing security to rural people and to enabling them to negotiate from a better position with both investors and government. However, levels of rights registration are very low in many parts of the world, especially in Africa. At current rates of operation, such systems will take decades to cover the territory of many countries' says (HLPE, 2011). This is a claim from outsiders not be misunderstood by our profession.

4. CLIMATE CHANGE

Urban areas are the main centres of consumption and greenhouse gas emissions. While in general emissions have grown with 70% between 1970 and 2004, buildings emissions have grown with 75% including electricity related emissions, transport even with 120%. Buildings count for 30-40% of the total energy consumption in western countries, of which 50% refers to indoor air conditioning (heating and cooling).

Land makes up a quarter of the Earth's surface and its soil and plants hold three times as much carbon as the atmosphere. More than 30% of all greenhouse gas emissions arise from the land use sector. Livestock-related emissions of carbon and methane now account for 14.5% of total greenhouse gas emissions, more than the transport sector. About 1,600 billion tons of this terrestrial carbon is in the soil as organic matter; some 540-610 billion tons in living vegetation, such as long-living forests, grasses and palms (Steinfield, 2006).

Deforestation, agriculture and livestock grazing are the major land use changes that increase the release of carbon into the atmosphere (31% of human/induced GHG emission). Land use changes and the burning of fossil fuels such as oil and coal are the two dominant sources (agriculture 27.7 billion tons CO_2 equivalents), agriculture (6.5 billion tons CO_2 equivalents) and deforestation (8.5 billion tons CO_2 equivalents). IPCC estimates that agriculture also has a sequestration potential, namely of 4.0-4.3 billion tons of CO_2 equivalents by 2030 (Scherr 2009).

As said in the sections on urbanization and food security, there are many measures needed but amongst them 'land tenure' and 'land use management' are expected to contribute. Unspecified property rights over forest areas and the allocation of forest land to commercial users by governments have led to widespread deforestation as a result of uncontrolled logging and conversion of forest land to other use (Quan, 2008).

Tenure security is central to the sustainable management of land and other natural resources and should ne mainstreamed into climate change mitigation and adaptation schemes. Without this, the livelihood are threatened, especially those of the vulnerable and voiceless (Arial, 2011).

For example cities can begin to adapt to the impacts of climate change via effective urban management: planning and land use controls can prevent people from building in zones at risk of flooding and landslides. Guidelines and regulations can increase resilience. Governments can design infrastructure that is climate proof. In rural lands, states should ensure that the legitimate tenure rights to land, fisheries and forests of all individuals, communities or peoples likely to be affected (by climate change) with an emphasis on farmers, small scale food producers, and vulnerable and marginalized people, are respected and protected by law, policies, strategies and actions with the aim to prevent and respond to the effects of climate change consistent with their respective obligations as applicable, in terms of relevant climate change framework agreements (FAO, 2012)

In conclusion, sustainable monitoring systems, land management systems and land administration systems should serve as a basis for climate change mitigation and

adaptation as well as prevention and management of natural disasters. Also here, 'Cadastre 2014' can provide guidance in how to achieve such systems.

5. INFORMAL ECONOMIES

Currently, the informal economy is still substantially present in many countries: OECD-countries average on 18% of GDP, transition countries 38%, Latin America 41%, Asia 26% and Africa 42% (Schneider, 2002). In Africa, for example, the informal economy as a percentage runs from the lowest one, South Africa 28%, to the highest one, Zimbabwe 59% of the GDP.

Economic activities require good rules; these rules include rules that establish and clarify property rights, reduce the costs of conflicts, that increase the predictability of economic interactions, and rules that provide contractual partners with protection against abuse (World Bank, 2013). The integration of the informal and the formal economy is therefore steady policy (UN/Ecosoc, 2012). This means, that informal settlements inevitably will be connected to the formal economy in the future.

Although –sometimes- there might be good reasons for citizens to protect themselves against the formal society (Graner, 2005) the existence of two different economies in one society is harmful for a nation's economic development and social cohesion (Smith, 2007). When regulations are onerous, levels of informality are higher, say the well-known Doing Business reports (World Bank, 2013). Therefore these reports explain informality and promote reform, such as in the procedures to register property.

(Jerven, 2013) shows that leaving informal economic transactions unrecorded is unsatisfactory: how can we maintain that a country shows economic growth when a major part of the economy is unrecorded? How can we speak about GDP per capita when countries don't know the number of citizens?

But the problem of informality is worse: (Setel, 2007) observes that most poor people in Asia and Africa render unseen because of the lack of up to date civil registration systems. By consequence they are born and die without being counted. Since the Universal Declaration of Human Rights in 1948 the right to an identity is a human right: to have one's identity recognized and securely registered (Szreter, 2007). Bringing informality to formality therefore has an aspect of being counted, being registered.

Although the 'Doing Business' reports emphasize registering business property (de Soto, 2000) focuses on citizens in general: citizens have possessions, but do not have access to a process of registering them. This makes them unable to generate capital. This reason for this is the lack of a necessary legal infrastructure, which is implicit to any system of property rights. Although every developing country has some form of formal property system, the majority of citizens do not have access to it. The law protects the elites under the formal economy. Therefore de Soto urges for the creation of a legal property system that does justice to the way in which people in the informal sector deal with possessions, their attitudes and their informal arrangements. A legalization process starts with a lot of fieldwork, de Soto expects.

A good example of including existing tenure relationships is Kenya, where the National Land Policy 2007 changes the post-colonial categories of 'government land', 'trust land', and 'private land' into 'public land', 'community land' and 'private land'. The new Land Act 2012 states that the National Land Commission shall 'keep a database of all public lands, which shall be geo-referenced and authenticated by the statutory body responsible for land survey'. The Act also prescribes community land to be registered in a community land register. So, Kenya will establish and maintain a public land register, a land register for private property and a community land register (Mwathane, 2010).

In the past, registration of land has often been linked to land reform. Inspired by the 1975 Land Reform Policy of the World Bank, the aim had been to replace customary land tenure by individual land tenure. Too many land registration projects have been entrenched in such land reform projects, while modern insights demonstrate that recording should respect other forms of tenure than fully fledged state guaranteed private property only (Zevenbergen, 2013).

In *overall conclusion*, the demand is clear: more than today, sustainable monitoring systems, land management systems and land administration systems ('*cadastres*') should serve as a basis for tackling rapid urbanization, food insecurity, climate change and informality. The way governments deal with the land issue is increasingly phrased as 'land governance'. Land surveyors should develop the capacity to address a broad range of people-to-land relationships and provide low cost methods for quick recording processes, including safeguarding sustainability through sound maintenance mechanisms.

6. REFLECTION ON THE STATEMENTS OF 'CADASTRE 2014'

Previous sections intend to demonstrate that without innovative 'cadastres' the achievement of the mentioned social goals will be cumbersome. Let's review the statements of 'Cadastre 2014' with regard to their future role in this innovation, beginning with the first one.
In The Economist (11 January 2014) we can read what we also know from scientific publications, namely that in general state owned lands are not well managed; also an inventory of such lands is often missing (FAO, 2007, 2012; Deininger, 2012). The same counts for public law restrictions imposed on private land (Zevenbergen, 2002). As many governments own large tracts of land, the solution of many societal problems depends on how these lands and other public interests are managed. Therefore the first statement, that 'Cadastre 2014' includes both private and public rights to lands, has had great predictive value.
Separation of maps and registers still hampers the development of information infrastructures, needed to streamline information based governance (Bennett, 2012) and create 'fit for purpose'. Thus the second statement, linking maps and registers equally remains true.
The quest for innovative systems cannot be answered without digital technology. The demand for systems that are 'cheap', 'easy to operate', 'quickly perform', to be handled by 'low educated' people, requires high tech solutions. Often 'low cost' is associated with 'low technology', but the reverse is true: without high tech, no good and at the same time

simple systems are possible, and without high tech it will not be possible to employ operators with limited vocational education. The widespread use of mobile technology and location devices is a probing example. Therefore we need high tech, which means technical system design based on conceptual cadastral modeling which is comprised by the third statement. Significant is the adoption by the ISO of the land administration domain model as a world wide standard, meanwhile embraced by many countries and adopted by the UN/Habitat as a precondition for future 'cadastres'.

Working manually has proven to be cumbersome when it comes to 'big data': working with 'pen and pencil' as the fourth statement says, is not sustainable (Williamson, 2010). Statements 5 resp. 6, on the 'privatized cadastre' and the 'cost recovering' cadastre are statements of an organizational nature, which might guide political decisions when appropriate. Reckoning that globally a majority of lands ('parcels') are not surveyed or recorded, a prediction is that land surveyors -both from public and private service- need to work together to fix the job ('all hands on deck') which does not necessarily create a 'privatized cadastre' but at least a robust private sector involvement. Further privatization will anyhow be considered within the framework of public tasks (governance issue). Cost recovery of at least the maintenance costs is definitely on the global agenda (Adlington, 2009), although the financial crisis since 2008 also reveals the darker side of the coin (see Annual Reports and Accounts from various Eurogeographics members in Europe).

In sum, 'Cadastre 2014' is a fundament for solving societal problem as described in the previous paragraphs. For designers of these future cadastres 'Cadastre 2014' will remain a guiding set of statements and principles to take care of.

7. CONCLUSIONS AND LAUDATIO

Indeed, with so many global issues developing at full scale during the last twenty or so years, the quest for purposeful land information and land information systems is manifest: whether we review policy documents on urbanization, food shortage, climate change or economic growth, one way or another security of land tenure is mentioned as an prerequisite for tackling the problems. Recognizing that thus for concepts of land information systems and other land related services is an urgent need, 'Cadastre 2014' has been a beacon in this turbulent world, providing the general statements and principles for thinking about 'cadastres' and guiding governmental and non-governmental organizations to getting their things right. The translation of the document in some 27 or so languages is an unparalleled performance. The global surveying community honors the authors Jürg Kaufmann and Daniel Steudler for their excellent work.

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