

The Global Land Rush Revisited - *a brief analysis based on data from the Land Matrix in current dynamic and complex climate & land governance discourse*

Discussion paper / literature review

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Suzanne Verhoog

VU University Amsterdam

s.m.verhoog@vu.nl

Abstract Based on data from the Land Matrix database, this paper briefly analyses large-scale land acquisitions in the context of current complex and dynamic land and climate governance discourse. The paper tries to explain the inter linkages between land and climate governance, within the *water-food-energy nexus*, and the increasing and important role for *science, technology and innovation* in agriculture in order to become more resilient to current and future challenges in climate and land governance.

Key words LSLA · land governance · climate governance · land matrix global observatory · climate change · climate resilience · Paris Agreement · SDGs · INDCs · smallholders · food sovereignty · social agrarian movements · soft law · FPIC · VGGT · elites · e-agriculture · crowdsourcing data · Climate Smart Agriculture (CSA) · ICTs · innovation · technology · science · (r)urbanization · next generation (young) farmers · women

1. Introduction

Public data from the ‘Land Matrix Global Observatory’¹ demonstrates that since 2000, 2,132 large-scale land acquisition (LSLA) transactions² in low- and middle-income countries³ were reported⁴ (Figure 1a), covering an area of more than 86 million hectares (Figure 1b). To get an idea of the total area of land that is being ‘grabbed’ (Figure 1b), compared to the size of a football field (0.72 ha), currently the total area of land that is seized (86.3 million hectares *Transnational + Domestic* LSLA) equals a total size of 119.9 million football fields.

¹ The Land Matrix database has undergone several updates since 2009 toward a public tool: *The Land Matrix Global Observatory*, hereby using an interactive map-based platform based on the concept of crowdsourcing data (e.g., Anseeuw et al. 2012a; Land Matrix 2013; McLaren and Handja 2012). Since July 2014 the Land Matrix has decentralized toward five Regional Focal Points in order to improve *transparency and accountability* with respect to data collection and to promote a policy dialogue (Land Matrix 2014b). These specific regional networks could however lead to an ‘underrepresentation of deals in regions such as Eastern Europe and Central Asia where our networks do not have a strong presence.’ (Land Matrix Global Observatory 2016, *About*, section ‘Are there biases in the data?’).

The public database covers land deals since 2000, with an area of 200 hectares or more, for agricultural production, timber extraction, carbon trading, industry, renewable energy production, conservation, and tourism. (Anseeuw et al. 2012a; Land Matrix 2013; Land Matrix Global Observatory 2016). Deals must furthermore: 1) ‘Imply the potential conversion of land from smallholder production, local community use or important ecosystem service provision to commercial use, and 2) ‘Entail a transfer of rights to use, control or ownership of land through sale, lease or concession’ (Land Matrix Global Observatory 2016, *About*, section ‘What is a land deal?’).

² As of 14 June 2016 (see also figures 1 a,b):

1. **1,535 transnational deals, covering an area of nearly 70 million hectares:**
 - a. *Concluded:* 1,234 land deals (Oral Agreement: 74; Contract Signed: 1160)
 - b. *Intended:* 204 land deals (Expression of Interest: 48; Under Negotiation: 156)
 - c. *Failed:* 97 land deals (Negotiations Failed: 63; Contract Cancelled: 34)
2. **597 domestic deals, covering an area of more than 17 million hectares:**
 - a. *Concluded:* 538 land deals (Oral Agreement: 36; Contract Signed: 502)
 - b. *Intended:* 39 land deals (Expression of Interest: 11; Under Negotiation: 28)
 - c. *Failed:* 20 land deals (Negotiations Failed: 8; Contract Cancelled: 12)

(Land Matrix Global Observatory 2016)

³ Country group categorization according to the World Bank classification system: <http://data.worldbank.org/about/country-and-lending-groups>. Accessed 25 April 2016.

⁴ Although empirical evidence indicates that land acquisition is happening on a large-scale (e.g., Cotula 2012; Land Matrix Global Observatory 2016), there still remains much ambiguity on the quantity of land that is actually being ‘grabbed’. This can mainly be explained due to gaps in data collection, differences in methodologies and datasets being used, and the ‘invisibility’ of land deals (e.g., Cotula 2012, 2013; Kaag and Zoomers 2014). The media can also offer a biased view on land deals (see also §3.2 ‘the role of ICTs & crowdsourcing data platforms’). The Land Matrix Global Observatory (2016) furthermore specifically notes that domestic deals are probably underrepresented in the database because: 1) it is difficult to obtain reliable data on domestic deals (the same accounts for failed deals), and 2) domestic deals attract less attention than foreign deals/investors (Land Matrix Global Observatory 2016, *About*, section ‘Are there biases in the data?’). Cotula (2013) also mentions that often more attention goes to foreign than to national land deals.

The majority of these land deals, also referred to as ‘land grabs’⁵, took place between 2008 and 2010, peaking in 2009. Land deals are often part of a complex system, involving a wide range of state and non-state actors (public/private) at different governance levels (horizontal/vertical). Small-scale farmers⁶ seem to be the mainly targeted and most vulnerable group to Large-Scale Land Acquisitions (LSLA) (Land Matrix 2013, 2014a).

Fig. 1a Overview domestic/transnational LSLA deals (no. deals)

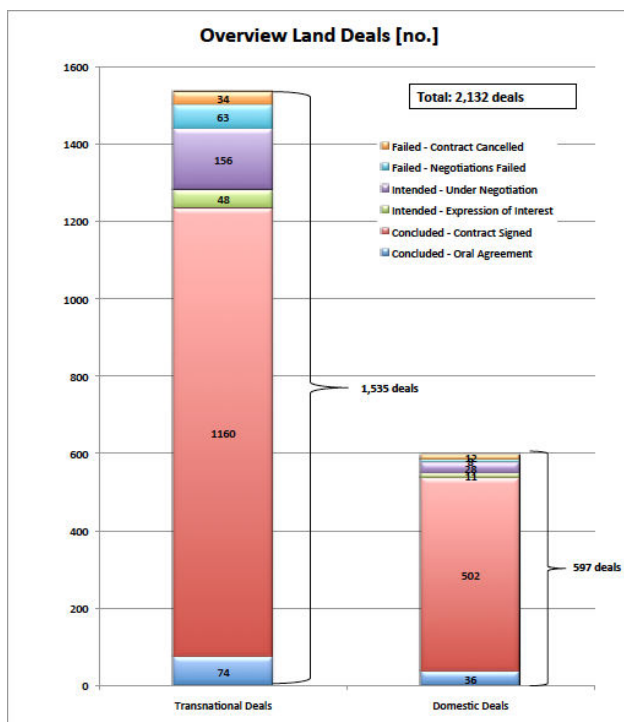
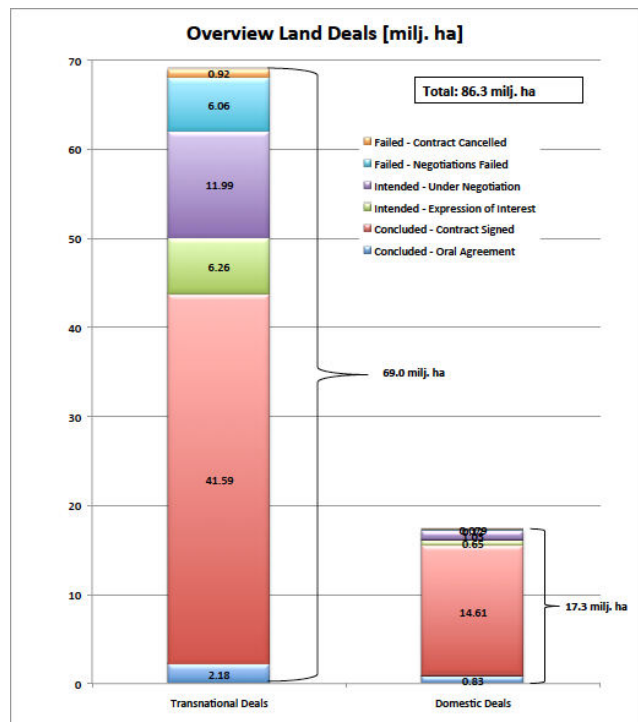


Fig. 1b Overview domestic/transnational LSLA deals (milj. ha)



*Source: author's own calculations as of 14-06-'16, based on data from the Land Matrix Global Observatory 2016

When taking a look at the *top ten most targeted countries*⁷ according to the size under contract, not much has changed since 2014 (Land Matrix 2014a,b; Land Matrix Global Observatory 2016). Relative newcomers are the Russian Federation, Congo and Argentina. The regions Sub-Saharan Africa (DRC, South Sudan, Mozambique, and Congo), South-East Asia (Indonesia and Papua New Guinea (PNG)), South-America (Brazil and Argentina), Eastern Europe (Ukraine) and Northern Asia (Russian Federation) are currently the most targeted regions in the world for land grabbing, according to their size under contract (Land Matrix Global Observatory 2016).

⁵ As defined by the International Land Coalition in the 2011 Tirana Declaration (ILC 2011, p. 2) land deals can legitimately be called ‘land grabs’, if they meet the following criteria: 1) violate human rights, and particularly the equal rights of women; 2) not based on the principles of free, prior, and informed consent (FPIC) of the affected land users, particularly indigenous peoples; 3) not based on a thorough assessment, or ignore the social, economic, and environmental impacts; 4) a lack of transparency with respect to contracts that specify clear and binding commitments on activities, employment and benefit sharing; 5) not based on effective democratic planning, independent oversight, and meaningful participation.

⁶ Small-scale farmers are often also referred to as ‘smallholders’ or ‘pastoralists’.

⁷ **Top 10 most targeted countries** as of 14 June 2016 (transnational + domestic*): 1) Russian Federation (37 deals, 6,246,312 ha), 2) Indonesia (149 deals, 4,440,173 ha), 3) Brazil (87 deals, 4,322,515 ha), 4) Papua New Guinea (46 deals, 3,979,696 ha), 5) DRC (29 deals, 3,723,459 ha), 6) Ukraine (29 deals, 3,699,407 ha), 7) South Sudan (13 deals, 2,702,583 ha), 8) Mozambique (93 deals, 2,673,938 ha), 9) Congo (7 deals, 2,148,000 ha), 10) Argentina (64 deals, 2,068,453 ha). (Land Matrix Global Observatory 2016)

The *top ten of investor countries*⁸ is dominated by:

- 1) Seven so called ‘*emerging economies*’; three of the four BRIC countries: Brazil, India and China, and Hong Kong, Malaysia, Singapore, and the United Arab Emirates (OPEC), account all together for 540 land deals covering an area of almost 21 million hectares. In where Singapore and Hong Kong represent the so-called ‘*small states with strong financial sectors*’ (Land Matrix 2014b, p. 5).
- 2) Three OECD countries: USA, UK, and Canada, accounting together for 292 transnational deals covering an area of almost 11 million hectares. Overall the USA is the largest investor in LSLA with a total of 126 transnational deals, covering an area of more than 6 million ha. *Papua New Guinea* is severely targeted by the USA with 3 land deals covering an area of almost 2 million hectares, which is more than 4 percent of the total PNG land area of 46 million hectares (OI 2013)⁹. The USA is not the only investor in PNG. PNG is totally targeted for 4 million ha of land, which accounts for almost 9 percent of the country’s total land area. The Oakland Institute however refers to an area of 14 million ha that is under some form of lease or concession; this consequently means nearly 30 percent of the country’s land is being ‘grabbed’ by foreign investors (OI 2013). Most of the targeted land in PNG is intended for forestry projects (wood and fibre), biofuels and food crops. (Land Matrix Global Observatory 2016)

As the analysis reveals, LSLA is not a typical North-South problem, but increasingly driven by emerging South-South economies in search for alternative ways in securing their food and fuel supplies¹⁰ in the nearby future.

Local and national governments¹¹ and elites play a prominent role in initiating and facilitating these land deals (e.g., Borrás & Franco 2010; Deininger et al. 2011; Faye et al. 2011; Hilhorst et al. 2011; Van Noorloos 2012; Peters 2012; Cotula 2013; Hall et al. 2015). According to Peters¹² ‘[n]ational governments and national actors, sometimes using government, sometimes independently, are as deeply involved in the land deals as are foreigners’. This ‘less visible’ process of land captures by local and national elites (Cotula 2013)¹³ need to be seen in a broader context of post-colonialism and state-ownership in where state elites often (mis)use their position to acquire land to their benefit, hereby enhancing their ‘power’, often at the expense of local communities and small-scale farmers who are highly dependent upon these ‘governmental institutions’. The increasing vulnerability of customary land rights due to weak governance structures and shortcomings in the implementation of land reform policies is a direct consequence (e.g., De Jager, 2009; Alden Wily 2011a; Cotula 2013). There were many attempts to strengthen customary land rights through law and land reform policies, however often not very successful¹⁴. As argued by Cotula (2013, p. 91-92), ‘[...] local rights remain weak and

⁸ **Top 10 investor countries** as of 14 June 2016 (transnational + domestic*): 1) USA (126 deals, 6,495,403 ha), 2) Malaysia (128 deals, 4,663,015 ha), 3) Brazil (61 deals, 3,639,428 ha), 4) Singapore (60 deals, 3,211,748 ha), 5) China (119 deals, 3,000,094 ha), 6) UK (123 deals, 2,340,635 ha), 7) United Arab Emirates (26 deals, 2,269,687 ha), 8) India (110 deals, 2,132,192 ha), 9) Canada (43 deals, 1,988,832 ha), 10) Hong Kong (36 deals, 1,748,289 ha). (Land Matrix Global Observatory 2016)

* Note: domestic in this context means; targeted/invested by the country itself. Brazil for example is both as an investor country as target country involved in the same 27 domestic deals, with a total size of 1,577,980 ha.

⁹ See OI 2013 for a discussion on land grabs as a threat to Papua New Guinea’s independency, failure of the government scheme (SABLs) with respect to (lack of) compliance, accountability and transparency, and consequently illegal ‘logging’ practices. PNG is one of the main exporting countries of illegal wood, mainly to China and Japan through a web of international illegal cartels (Nelleman and Interpol 2012).

¹⁰ As discussed in this paper (see also Figures 2a,b), land grabbing for food and (bio)fuel purposes remain the major agricultural drivers of LSLA (Land Matrix 2014a, 2014b; Land Matrix Global Observatory 2016). Land grabbing is however more than often not only limited to grabs over land for agricultural purposes, but also involves, amongst others, ‘water’ and ‘mineral’ grabs, one can therefore also speak of ‘natural resource grabs’ (Zoomers in Evers et al. 2013). Land can furthermore also be ‘grabbed’ for tourism and large infrastructural projects. Zoomers (2010) presents an overview of ‘seven processes driving the current ‘global land grab’.

¹¹ Evers et al. (2013) specifically discuss the role of the state in ‘driving, negotiating and facilitating’ African land deals.

¹² Personal communication with Prof. Pauline E. Peters, Center for International Development, John F. Kennedy School of Government, Harvard University, 12 May 2013.

¹³ See also: <http://www.iied.org/african-land-deals-policy-shift-underway>. Accessed 24 June 2016.

¹⁴ Based upon a study of more than 70 laws in Eastern and Southern Africa (Alden Wily 2000). Another paper by Alden Wily (2003) examines land decentralization processes in 20 countries in East, West and Southern Africa. Cotula (2011) explores in detail the key features of land deals (who is involved: Fig. 1, p. 20) and their wider legal frameworks, based on an analysis of 12 land contracts in Africa.

insecure, partly because of gaps in legislation, and *[...] even where local rights are protected, national law typically enables the government to expropriate land for commercial projects*. The origins of current African weak local land governance structures date back to this colonial history, based upon a system of ‘clientelism, patronage and nepotism’, in where (old) local legal rights were often not recognized by the colonial governments (Colson 1971; Amanor 2007; Brock et al. 2012; Cotula 2013).

Agriculture¹⁵ is the main driver for both domestic and transnational LSLA deals, with *forestry*¹⁶ (plus *industry* for domestic deals) on a good second place (see figures 2a and 2b), with the connotation that land deals often have multiple intentions, as accounts for the number of investors involved.

Fig. 2a Intention of Investment *Domestic* land deals (%)

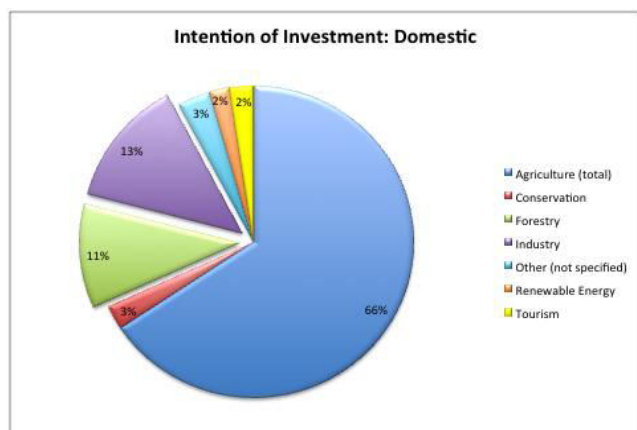
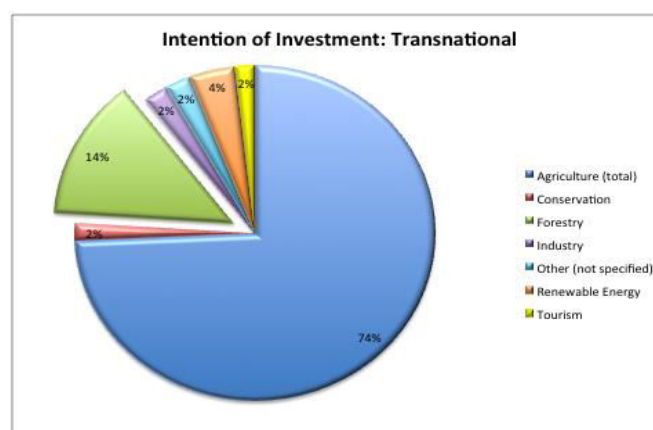


Fig. 2b Intention of Investment *Transnational* land deals (%)



*Source: author's own calculations as of 28-06-'16, based on data from the Land Matrix Global Observatory 2016

Land grabs for biofuel purposes remain controversial for several reasons, including: 1) (in)direct land-use change (ILUC), an important driver for climate change (e.g. Foley et al. 2005), 2) severe burden on water reserves (see section 2 and for example Gerben-Leenes et al. 2012), and consequently 3) the impact on food production (see section 2). The EU biofuel policy reforms are a good example of the complexity and controversy surrounding biofuel policies worldwide. The EU '20-20-20'¹⁷ climate policy agreement for example initially included a minimum target of 10% for the share of conventional biofuels, as a substitute for diesel and petrol, in the transport sector, is now downsized to 7%, in order to reduce ILUC and to put more emphasis on the production of ‘second generation biofuels’¹⁸. In order to improve the transparency in the process of organizations in meeting the biofuel targets, compliance with sustainability criteria is mandatory¹⁹. Compliance can be achieved by participating in one of the approved ‘voluntary schemes’²⁰. Biofuels remain to play a dominant role in the EU Energy policies, mainly with respect to the transport sector. The 2050 Energy Strategy²¹, as part of the 2011 Energy Roadmap, projects a representation of 40% of ‘sustainable biofuels’ in the energy consumption in the

A few case study examples: *Ghana*: Amanor 2007, *Malawi*: Peters and Kambewa 2007, *Sierra Leone*: Peters and Richards 2011, *South Africa*: Hall 2009, *Tanzania*: Shivji, 1998, *Uganda*: Green 2006 (Green focuses mainly on the role ethnicity played in the failure of land tenure reform in Buganda, Central Uganda), *Zimbabwe*: Scoones et al. 2011, Hillhorst et al. 2011 for a survey in Benin, Burkina Faso & Niger.

¹⁵ *Agriculture* (as % of total LSLA deals in category ‘Agriculture’) can be further specified in: biofuels (domestic: 14%, transnational: 16%), food crops (domestic: 30%, transnational: 41%), livestock (domestic: 12%, transnational: 10%), non-food agriculture commodities (domestic: 13%, transnational: 17%) and agri-unspecified (domestic: 20%, transnational: 19%).

¹⁶ *Forestry* (as % of total LSLA deals in category ‘Forestry’) can be further specified in carbon sequestration/REDD (domestic: 12%, transnational: 13%), for wood and fibre (domestic: 72%, transnational: 76%), and forest-unspecified (domestic: 16%, transnational: 10%).

¹⁷ The EU Climate and Energy package is also known as ‘20-20-20’, hereby referring to: (1) 20% reduction of GHG emissions, compared to 1990 levels, (2) 20% of EU energy consumption produced from renewable resources, and (3) 20% improvement of EU’s energy efficiency. http://ec.europa.eu/clima/policies/strategies/2020/index_en.htm. Accessed 27 June 2016.

¹⁸ <https://ec.europa.eu/energy/en/topics/renewable-energy/biofuels/land-use-change>. Accessed 27 June 2016.

¹⁹ <https://ec.europa.eu/energy/node/73>. Accessed 27 June 2016.

²⁰ <https://ec.europa.eu/energy/en/topics/renewable-energy/biofuels/voluntary-schemes>. Accessed 27 June 2016.

²¹ <https://ec.europa.eu/energy/en/topics/energy-strategy/2050-energy-strategy>. Accessed 27 June 2016.

transport sector (aviation, inland navigation and long-distance road freight). Higher demands for biofuels, in order to meet future sustainable energy needs, will consequently however lead to increased tensions and insecurities in the ‘*water, food and energy nexus*’.

2. The environmental impact of Land Grabbing and inter linkages with Climate Change

Anthropogenic climate change can be directly and indirectly related to land grabbing in several ways:

- Climate change negatively affects agricultural production (decrease in crop yields and agricultural output), inter alia due to the non-linear unpredictable character of climate change, consequently leading to an increase in the frequency of climate extremes like droughts, leading to desertification, land degradation, and ecological damages. (e.g. Schneider 2004; Cotula et al. 2009; Hertel et al. 2010; IPCC 2014; IFPRI 2016)
- Climate change further exacerbates poverty due to water and food shortages and leads to a decrease in nutrition levels (zinc and iron) in crops due to higher CO₂-levels, consequently further increasing the vulnerability of food insecure people and negatively affecting the global food system (IPCC 2014; Myers et al. 2014; IFPRI 2016).
- Climate change increases the likelihood of (violent) conflicts, forced migration (climate refugees), land grabs, and consequently the loss of lands and livelihoods. (e.g. Bierman and Boas 2010a; IPCC 2014).
- Land grabbing not only involves the loss of land de facto, but it is also accompanied by enormous amounts of water losses or ‘water grabs’ (Rulli et al. 2013). The production of crops for biofuel purposes for example demands large amounts of fresh water (green from the soil as well as blue (irrigation water) (Gerbens-Leenes et al. 2012). Large-scale land transactions are furthermore often accompanied by changes in land-use (Foley et al. 2005).
- Climate change and LSLA both enhance rapid rural-urban migration flows due to loss of land, and increasing water, food and energy shortages and insecurities.

Considering the above, overall can be concluded that in the context of the ‘*water-food-energy nexus*’ the impact of climate change, combined with LSLA, places an extra burden on the already most vulnerable and marginalized people in our society, namely ‘small-scale farmers’ or ‘smallholders’. Strengthening the role and resilience of smallholders in the context of climate change and agriculture is therefore crucial. The latest IFPR Global Food Policy report (IFPR 2016, ch. 2) specifically focuses on smallholders, particularly women and youth, and their ‘capacity to contribute’ to the 17 Sustainable Development Goals²² (SDGs) by means of strengthening their resilience and ‘commercial viability’.

The ‘*voice of the people*’ themselves however need not to be ignored. Smallholders are increasingly being self-organised in social movement groups (e.g. Borras 2016) in the fight for social and climate justice and to advocate for adopting a much broader concept of ‘food security’, namely ‘food sovereignty’ (Borras et al. 2015; Brem-Wilson 2015). The ‘*food sovereignty movement*’, most famously represented by peasants and small-scale farmers from the transnational organization La Vía Campesina (LVC), plays a predominant role in reframing the Committee on World Food Security (CFS) as official participants through the International Food Security and Nutrition Civil Society Mechanism (CSM) (Duncan and Barling 2012). The sharp increase of social environmental activists has however most likely resulted in an increase of violence against agrarian and environmental defenders in 2015²³.

²² Adopted in September 2015 as part of the 2030 Agenda for Sustainable Development. <http://www.un.org/sustainabledevelopment/>. Accessed 27 June 2016.

²³ According to the recent Global Witness report ‘On Dangerous Ground’ a total of 185 land and environmental activists were killed in 2015

3. Innovations in agriculture: strengthening resilience through science and technology

Current developments as a direct result from the (binding) Paris Agreement²⁴, adopted at the COP 21 December last year, are promising in terms of the crucial role *science, technology* and *innovation* plays in achieving the SDGs by means of increasing the resilience of farmers toward the negative impacts of climate change through new approaches like Climate Smart Agriculture (CSA), and the increasing role ICT plays in linking farmers to markets (e-agriculture). Specifically ‘next generation young farmers’ or the ‘(r)urban youth’ can benefit from new innovative challenges in science and technology, since they are ‘*exploring income and employment opportunities in both rural and urban areas*’²⁵.

At the recent Bonn UN climate talks²⁶, the first meeting after the Paris Agreement, there was a fierce debate about how to best adapt agriculture to climate change²⁷, through for example prioritizing agriculture by including adaptation in Intended Nationally Determined Contributions (INDCs)²⁸. Implementing Climate Smart Agriculture techniques²⁹ can be a solution for farmers in becoming more resilient toward the negative impacts of climate change. The CSA concept, firstly introduced by Lipper et al. (2014) integrates *climate change*, that is to say adaptation to climate variability and mitigation as a consequence of taking adequate climate measures, with *food security*.

3.1. Climate Smart Agriculture (CSA)³⁰: case study examples from Bangladesh and India

Farmers in the northern part of Nigeria combat high temperatures in dry seasons by growing dry season groundnut³¹. The advantages are, in contrast to growing dry-season crops as vegetables and fruit, the higher yield in the dry-season and the favorable market position due to the high demand. The residues from the crops can be sold and used as fodder to feed the animals, which generates extra income. The crop is furthermore more resilient to pests. Specifically young farmers are encouraged to participate.

Two case studies in Bangladesh (Shovna village, Khulna & Alipur village, Rajshahi)³² demonstrate that small-scale farmers can become more resilient to the negative effects of climate change by firmly improving their land-use management techniques through ‘soil moisture conservation’ and the use of machinery. The coastal areas of the Khulna district in Bangladesh are marked by soil salinity and insufficient irrigation, barriers for farmers to grow dry season crops. The farmers have learned (by means of soil management training sessions: drawing a calendar which shows rainfall and crops) that by harvesting rice (first season crop) a month earlier in the season there is still enough moisture available for growing second season crops like maize and wheat. Keeping crop residues on the land prevents the land from drying out and becoming too salty (in coastal areas). The farmers furthermore save time and money by not fully ploughing the land (strip-tillage) after the first season crop and seed and fertilize the land by using one machine. The district of Rajshahi, Central Bangladesh, is faced with high irrigation and farm labour costs. Strip-tillage has also proven to be a sustainable cost-effective solution for this region of the country, by for example using machinery that can be easily transformed from tiller to bed planting.

across 16 countries, with Brazil (50), the Philippines (33) and Colombia (26) as the most targeted countries. <https://www.globalwitness.org/en/reports/dangerous-ground/> Accessed 27 June 2016.

²⁴ http://unfccc.int/paris_agreement/items/9485.php. Accessed 27 June 2016.

²⁵ <http://www.iisd.ca/food-security/cfs/markets/hlf/>. Accessed 27 June 2016.

²⁶ http://unfccc.int/meetings/bonn_may_2016/meeting/9413.php. For a summary of the Bonn Climate Change Conference, held from 16-26 May 2016 see the Earth Negotiations Bulletin (ENB), Vol. 12 No. 676, <http://www.iisd.ca/download/pdf/enb12676e.pdf>. Accessed 27 June 2016.

²⁷ <https://ccafs.cgiar.org/blog/adapting-climate-change-agricultural-systems-update-bonn-climate-talks>. Accessed 27 June 2016.

²⁸ The INDCs outline post-2020 climate action. Rogelj et al. (2016) however argue that the individual contributions are not sufficient enough to meet the 2°C climate target.

²⁹ <https://csa.guide>. Accessed 27 June 2016.

³⁰ For other case study examples see: <http://www.farmingfirst.org/climate-smart-agriculture>. Accessed 27 June 2016.

³¹ <http://www.icrisat.org/nigerian-farmers-beat-high-temperatures-with-dry-season-groundnut-varieties/>. Accessed 2 August 2016.

³² <https://youtu.be/XPBmtl2IFXg>. Accessed 27 June 2016.

In India, Maharashtra state³³ small-scale farmers are highly dependent on cotton production. Several monsoons have however led to droughts and consequently a sharp decrease of the cotton yields. IFAD helps the small-scale farmers reducing their costs and increasing the yield through ‘sustainable (or ‘drought resistant’) cotton cultivation’ training sessions, where for example the usage of natural pesticides (in the form of local leaves or dung) is promoted. Furthermore the farmers are being trained in getting a better price for their cotton through selling collectively.

3.2. The role of ICTs and online crowdsourcing data platforms in improving transparency in land governance

Innovations in agriculture through science and technology were recently discussed in several meetings: 1) during the 1st annual Multi-stakeholder Forum on Science, Technology and Innovation for the Sustainable Development Goals (STI Forum), held from 6-7 JUNE 2016, in where inter linkages of the SDGs with technology were debated³⁴, 2) The Open Ended Working Group (OEWG) on Connecting Smallholders to Markets of the Committee on World Food Security (CFS) held from 8-9 June 2016 (see footnote 25), and 3) the Global Forum for Innovations in Agriculture (GFIA)³⁵, largely aimed at private sector stakeholders.

Farmers’ access to local, national, regional and/or foreign (export)markets can significantly be improved through ICT facilities (mobile phones). ICTs³⁶ can overall provide farmers access to and information on market prices, agricultural products, education, finance, et cetera. Mobile phones can also be used as a means to disseminate crowdsourcing data. Mobile applications for agriculture purposes can for example assist farmers (through crop management) in managing and trading crops, with the overall aim to increase production and income. Currently 4 out of 5 new connections are established in developing countries (Mammo 2015). In order to make ICTs work, mainly in developing countries sufficient ICT infrastructure need to be made available as well as training on how markets work (Mammo 2015). Constraints furthermore lie in lack of value chains, no or insufficient access to markets, and low technology³⁷. In a comparative analysis on factors inhabiting ICTs usage among farmers in Pakistan and China Yaseen et al. (2016) find that education, age and income of household heads are key in adopting various ITCs.

When designing mobile agriculture applications, through public-public, public-private or private-private partnerships, the focus should be on smallholders, specifically the ‘rural youth’.

Increasingly ‘crowdsourcing’ open data platform are being used as a new technology to share online information to improve transparency on for example land deals and land contracts with the aim to improve land governance and land tenure security (McLaren and Handja 2012). The Land Matrix Global Observatory database (2016) uses this bottom-up approach to map large-scale land transactions worldwide. Although its goals is to ‘*promote transparency and accountability in decisions over land and investment*’³⁸, crowdsourcing (big)data is however inherently connected to data biases and data unreliability, although an overall improvement in data transparency will be achieved in terms of data availability. The UK Rainforest Foundation has initiated the ‘*Mapping for Rights*’ initiative³⁹, which combines participatory mapping with geo-spatial techniques and policy development in order to supports the forest communities in the Congo Basin in improve forest governance.

³³ <https://www.ifad.org/stories/tags/india/22459920>. Accessed 27 June 2016.

³⁴ <http://www.iisd.ca/sdgs/sti/forum1/>. Accessed 27 June 2016.

³⁵ <http://www.innovationsinagriculture.com>. Accessed 27 June 2016.

³⁶ See for example the ICT Update CTA magazine, with a specific focus on ICTs for agricultural and rural development in ACP countries: <http://ictupdate.cta.int>. Accessed 27 June 2016.

³⁷ Information provided from keynote speaker Theo de Jager at the 2016 LANDac ‘International Conference on Land Governance in the Context of Urbanisation and Climate Change’, plenary session Friday 1st of July 2016.

³⁸ See also footnote 1; since 2014 the land matrix receives support through five regional focal points in order to improve the quality of the (regional) data and to enhance transparency and accountability. The Land Matrix Global Observatory specifically mentions its limitations in the sections ‘*Are there biases in the data?*’, ‘*How reliable is the data?*’ and ‘*Why do the numbers constantly change?*’ <http://www.landmatrix.org/en/about/>. Accessed 27 June 2016.

³⁹ <http://www.mappingforrights.org>. Accessed 27 June 2016.

Enhancing the transparency (*what's in the contracts?*) of land contracts is the main goal of the online platform 'open land contracts', which to date already contains data on 89 contracts in 11 countries⁴⁰. LandMark⁴¹, another recent initiative that promotes transparency of land deals in order to improve land governance, provides maps on indigenous peoples and local communities lands. The LandMark introduced several quality-control measures in order to enhance the quality of the data. The Land Portal Foundation serves as an independent knowledge interface to facilitate data inputs and to disseminate research on land issues. The Land Portal Land Book⁴² provides for example comprehensive country specific information on land governance linked with open data. Furthermore online open source information sharing platforms, like PLACE⁴³, recently launched by the Thomas Reuters Foundation, are important in raising awareness on land issues through blogs, photos and videos. Next to the increase of social movements, as discussed in the previous section, also international bottom-up initiatives take a peak. Recent examples are LEGEND⁴⁴ and Land Rights Now⁴⁵.

Although the increase of online data and information sharing platforms will overall improve the transparency, biases can easily occur since (media) attention often goes to the newest (foreign) 'land grabbers'. It is furthermore likely to assume that countries will have different policies on online open data sharing. An easy example is China with its internet censorship policies. Community-based (participatory) mapping with GPS technology on cell phones can be a simple and effective way to map and consequently register and entitle land deals. Crowdsourced land registration systems, made available through for example 'land administration apps' (McLaren and Handja 2012) might be prosperous for the future, however to ensure the accountability, legitimacy and reliability of crowdsourcing data, only verified and reliable data should enter databases, accompanied by clear guidelines and monitoring mechanisms.

4. Discussion: the main challenges in current climate and land governance discourse

Considering the pace and non-linear character of current land grabbing and climate change discourse, the transition toward a more resilient and sustainable society is urgently needed. This requires more insight in the complex processes and drivers behind land grabbing and global environmental changes, including a deeper understanding and conceptualization of climate extremes, tipping points and thresholds in order to develop adequate adaptation and mitigation strategies and scenarios. The current (combined) focus in climate talks and stakeholder meetings on 'climate and agriculture' is a step forward in achieving a more resilient society.

The main challenge the world is facing today is to cope with problems within the current fragmented global climate governance architecture, specifically with respect to increasing pressures on water, food and energy⁴⁶. Climate change will put a severe pressure on these institutions. Understanding, explaining, and analyzing the underlying causes of these fragmentations on different governance levels (horizontal/vertical) in an interdisciplinary context, to at the end offer an extensive conceptual policy framework, is of major importance to improve current and future global environmental governance architecture.

Due to a lack of commitment⁴⁷ to international (binding) agreements⁴⁸ and responsibility toward our future

⁴⁰ Cambodia: 3, Cameroon: 2, Congo: 1, DRC: 27, Ethiopia: 21, Ghana: 1, Ivory Coast: 1, Liberia: 27, Sierra Leone: 4, South Sudan: 1, Timor – Leste: 1. Source: <http://www.openlandcontracts.org>. Accessed 7 July 2016.

⁴¹ <http://www.landmarkmap.org>. Accessed 7 July 2016.

⁴² <https://landportal.info/book/regions>. Accessed 27 June 2016.

⁴³ Place stands for Property, Land, Access, Connections, Empowerment. <http://place.trust.org/>. Accessed 3 June 2016.

⁴⁴ LEGEND (Land: Enhancing Governance for Economic Development) <http://www.landportal.info/partners/legend>. Accessed 27 June 2016.

⁴⁵ <http://www.landrightsnow.org/>. Accessed 27 June 2016.

⁴⁶ Biermann et al. 2009 offer a framework of current fragmented climate governance regime. Biermann and Boas (2010b) discuss current fragmentations in the water, food and energy governance architecture. They for example discuss the fact that the variety of institutions dealing with food governance, contribute to a more complex and fragmented food governance architecture.

⁴⁷ Although states commit themselves to soft and/or hard law, for example inclusion in binding Human Rights Frameworks, in practice states however often fail to comply due to a lack of policy implementation. In her PhD dissertation Middelburg (2016) finds that states in practice do not seem to comply with the legal international and regional human rights frameworks considering the elimination of Female Genital Mutilation/Cutting (Senegal case study analysis): 'The propensity of Senegal to join international and regional human rights framework does

planet, increasingly actors other than governmental, in the form of social movements and (international) initiatives, seem to dominate the political landscape. These initiatives for example call for an overall change of the global food system (food sovereign) through better access to land, equal rights for women and men, et cetera. The involvement of civil society organizations, and all kinds of partnerships (public-public, public-private, private-private) can make the global environmental governance playing field more complex and fragmented, but seems to be of major importance in regulating global environmental governance. In current and future climate governance discourse actors acting ‘*beyond the state*’ are becoming increasingly important, as argued by Jacquet and Jamieson (2016, p. 645) ‘*The Paris Agreement is most likely to succeed if pledge and review is applied beyond the nation state*’. Rogelj et al. (2016, p. 631) also refer, with respect to the success or failure of the INDCs that ‘*Substantial enhancement or over-delivery on current INDCs by additional national, sub-national and non-state actions is required to maintain a reasonable chance of meeting the target of keeping warming well below 2 degrees Celsius.*’ A wider acknowledgement of agrarian and environmental movements can furthermore increase the power of peasant movements worldwide and hence increase their involvement in international (binding) agreement. A good example is the role civil society organizations play in the reform of the CFS through official participation mechanisms (CSM).

Considering the above, within the *water-food-energy nexus*, current (research) challenges lies in governing (in)securities in the transition toward becoming a more resilient and sustainable society; for example the crucial role that *science, technology and innovation* plays in achieving the SDGs, by making farmers more resilient toward the negative impacts of climate change through new approaches like Climate Smart Agriculture (CSA) combined with the increasing role of ICT in linking farmers to markets (e-agriculture).

Current land governance discourse faces the following challenges:

- State sovereignty: the voluntary character of international/regional guidelines, also known as ‘soft law instruments’ can be questioned, as Sulle (2013, p. 3) argues: ‘[...] *they don’t override State Sovereignty and the existing policy, legal and institutional frameworks. As such, it is difficult to impose them on any country that may not be willing to implement them*’. Do we instead better need to advocate for a ‘proper binding legislative framework’. Further more there are so many ‘soft law instruments’ (i.e. voluntary guidelines⁴⁹) available, the question remains how can they work well in coherence with each other on different governance levels.
- Land deals are often initiated and facilitated by nationals (elites) and/or national governments, as discussed in the introduction. ‘*In many places, a minority elite section of a community often claims to represent the poor even when it does not. On many occasions in many countries, local elites forge formal contracts with investors in the name of their communities despite having no real consultative process and mandate.*’ (Borras & Franco 2010, p. 11)
- Is the Law to Blame?⁵⁰ - Increasing the vulnerability of ‘customary land rights’, mainly due weak governance structures and shortcomings in the implementation of land reform policies.

not automatically mean that it will bring its human rights practice into compliance with the human rights framework. Becoming a party to a treaty is one step, but recognition of rights on paper is not sufficient to guarantee that these rights will be enjoyed in practice. This research showed that a discrepancy exist between the commitments of Senegal to comply with the human rights framework on the one hand and the actual behaviour of Senegal in relation to the practice of FGM/C on the other.’ (Middelburg 2016, p. 386)

⁴⁸ Securing indigenous peoples’ land rights is for example largely ignored in the binding Paris Agreement <https://landportal.info/news/2016/04/forest-lands-and-indigenous-people-increasingly-insecure-paris-agreement-signed>. Accessed 27 June 2016.

⁴⁹ I am currently working on a journal article that specifically addresses the effectiveness of these so-called ‘voluntary guidelines’, as developed by international institutions like the FAO-CFS (VGGT, RAI Principles), the World Bank (RAI Principles), European Union (Land Policy Guidelines (LPG)) and The African Union (Framework and Guidelines (F&G)/Guiding Principles on Large Scale Land Based Investments (LSLBI)) in an attempt to govern the global land grab, with a specific focus on recent developments and the implementation trajectory.

⁵⁰ See also Alden Wily, L. (2011b). ‘The Law is to Blame’

- Involvement (commitment) of the private sector (investors & private developers) as a key stakeholder in the policy discourse is often absent or very minimal (Sulle 2013).
- Land ceilings/bans, as established by governments to combat foreign land-grabbing (Cotula 2013; GRAIN 2013; Perrone 2013) are no solution if government are ceding the lands themselves (to internal investors)⁵¹.
- ‘Emptiness of Consultations’. According to the Tirana Declaration (ILC 2011) land deals can legitimately be called ‘land grabs’ if they are not based on the principles of free, prior, and informed consent (FPIC) (see also footnote 5), with a focus on the C of ‘consent’. The FPIC principles were initially developed as a public accountability mechanism to promote democratic decision-making (Polack et al. 2013). Although stakeholder involvement (respecting FPIC) is mentioned as a key criteria in regional and international voluntary guidelines (see footnote 46), practice reveals that ‘Acquisitions are rarely based on FPIC’, ‘[...] only very few projects seem to engage in adequate consultations with local communities’. (Anseeuw et al. 2012b, p. ix) (Anseeuw et al. 2012b, p. ix) and ‘[...] *when tested within real negotiations, government agencies invariably align with the investor rather than the local land users.*’ (Vermeulen and Cotula 2010, p. 914). Franco (2014, p.3) debates that ‘*FPIC is neither inherently ‘good’ nor inherently ‘bad’ from an agrarian justice point of view. Whether, how and to what extent FPIC processes can lead to outcomes that enhance agrarian justice will depend in part on the specific context in which they occur, and in part on whether and how pro-agrarian justice activists engage with them.*’

Overall can be stated that the future land governance discourse should focus more on democratic processes of land governance, incorporating recent promising developments in the context of urbanization toward a new land governance narrative. According to Borras (2016, p.) ‘[...] *institutions of access to and control over land, and the way production is oriented and organized in peasant societies are economically inefficient*⁵². *The efficiency argument has again become one of the powerful narratives that justify, implicitly or explicitly, the contemporary global resource rush, suggesting that while the peasant economy may be able to help poor rural villagers to self-provision, it will not be able to feed the growing world population that has now become largely urban.*’

Although in the context of the Paris agreement, there is a strong focus on adapting agricultural system to climate change by means of ‘enhancing global adaptive capacity’, ‘strengthening resilience’ and ‘reducing vulnerability’ (see last Bonn Climate talks), in order to limit global warming to a maximum of 2°C pre-industrial levels climate adaptation should go hand in hand with climate mitigation strategies.

Working with these increased challenges, complexities and uncertainties in current and future land and climate governance discourse requires new approaches in order to both facilitate incremental as well as transformative changes at difference governance levels with different actors involved. The ‘*Three Horizons approach*’⁵³, as introduced by Sharpe et al. (2016) could be a helpful framework to facilitate these new challenges.

⁵¹ Personal communication with Prof. Pauline E. Peters, Center for International Development, John F. Kennedy School of Government, Harvard University, 12 May 2013.

⁵² Hereby referring to ‘Inefficient in any of the three, or all of the three, types of economic efficiency, namely, technical, allocative and distributive’ (Borras 2016, p. 7).

⁵³ The Three Horizons practical framework consists of three so called ‘Horizons’; ‘*The first horizon (H1) represents the way things are done now, generally called “business as usual.” The starting point of a three-horizon conversation is the recognition that the first horizon pattern is losing its fit with emerging conditions. The third horizon (H3) represents the emerging pattern that will be the long-term successor to the current first horizon, and the second horizon (H2) is the turbulent domain of transitional activities and innovations that people are trying out in response to the changing landscape between the first and third horizons.*’ (Sharpe et al. 2016, p. 4-5).

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