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UNCCD United Nations Convention to Combat Desertification

THE GLOBAL MECHANISM

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UNLOCKING THE MARKET FOR LAND DEGRADATION NEUTRALITY



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Established in 1994, the United Nations Convention to Combat Desertification (UNCCD) is the sole legally binding international agreement linking the environment, poverty and development to sustainable land management in the drylands. The UNCCD is particularly committed to a bottom-up approach, ensuring the participation of local communities in combating desertification and land degradation. The secretariat of the Convention also facilitates cooperation between developed and developing countries, particularly regarding knowledge and technology transfers for sustainable land management practices. The Global Mechanism (GM) is an organ of the United Nations Convention to Combat Desertification (UNCCD), mandated to support UNCCD country Parties in the mobilization of resources for its implementation. As the operational arm of the Convention, the Global Mechanism supports countries to translate the Convention into action and to achieve Land Degradation Neutrality at the national level.

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INTRODUCTION

The current global scale and consequences of land degradation make a compelling and urgent case for reaching Land Degradation Neutrality (LDN) worldwide by 2030, a target that has now been formally incorporated into the United Nations Sustainable Development Goals. To achieve LDN, large amounts of financial resources need to be mobilised, and public resources alone will not suffice. Attracting long-term capital from private investors by creating a sound market-driven investment framework is also critical.

The United Nations Convention to Combat Desertification (UNCCD), through its operational arm, the Global Mechanism (GM), is taking up this funding challenge by promoting the creation of an independent public-private partnership (PPP) investment fund that would support profit-generating initiatives that aim to avert and combat land degradation: the Land Degradation Neutrality (LDN) Fund. In 2015, Mirova was selected as the structuring partner, as well as potential fund manager of this fund.

The objective of this report is to shed light on the main characteristics and dynamics of an emerging market that connects natural capital and landscape investments with public and private conservation finance. In this context, the report is designed to provide a refined understanding of the issues at stake, summarising key elements on:

(i) the current state of the land worldwide

(ii) the positive public momentum and other enabling conditions in favour of sustainable land management and land restoration investments

(iii) the existing market actors working on initiatives that combat land degradation

(iv) the overall key opportunities and gaps in the nascent LDN market

Moreover, the specific market study in this report, conducted with more than 30 project developers and investment managers, highlights the key investment challenges to date and the conditions required to scale up investments worldwide that aim to achieve LDN.

In the light of these findings, the report concludes by discussing the various roles the LDN Fund could play to enable the LDN market to flourish, thereby achieving the GM and Mirova's mission of attracting and mobilising the large amounts of private capital required to help bring the world to a state of LDN by 2030.

ACKNOWLEDGEMENTS

We would like to express our deepest gratitude to the organisations that participated in our market study. This report would not have been possible without their contribution. The names of these groups can be found in the Annex (Section 8.1).

Note: all figures in this report are expressed in US dollars unless otherwise stated.

EXECUTIVE SUMMARY

Land degradation neutrality (LDN) became a global news headline in 2015: that year, the target of achieving LDN worldwide by 2030 was officially set as part of the United Nations Sustainable Development Goals (SDG). This means ensuring that each country's pool of healthy and productive land, on which it depends for ecosystem services[1] (such as food, water and temperature regulation), remain at least stable going forward. At a minimum, the world needs to restore and rehabilitate the equivalent of at least 12 million hectares of degraded land to offset what we lose every year due to degradation and desertification (UNCCD, 2015). Moreover, the remainder of the world's land must be managed through a broad spectrum of sustainable land use programmes.

The key rationale behind the UNCCD's conceptualisation of the Land Degradation Neutrality (LDN) Fund is a realisation that public financing and projects alone are not sufficient to achieve the LDN target. Capital, ideas and innovations from the private sector are needed to complete the canvas. The aim of the LDN Fund is hence to create a PPP (public-private partnership) whereby large pools of capital can be mobilised to invest in profit-generating projects contributing to LDN.

The investment case for the LDN Fund is clear

There is an urgent and global problem that needs to be addressed: the extent and severity of land degradation worldwide is worrying, and the negative impact on our environment, people, and economy cannot be ignored (Section 1).

On the other hand, **solutions for tackling land degradation bring benefits in multiple environmental, social and financial dimensions** (Section 2). Stopping land degradation is an important tool in mitigating climate change, as soil is the second largest carbon storage after the ocean. Land management is also at the heart of many other sustainability issues, the instrument that connects the dots between themes such as food security, poverty, gender equality, water availability, and biodiversity. Managing land wisely would allow the world to simultaneously address and alleviate these other global problems.

Just as importantly, enabling conditions that would allow the LDN Fund to succeed are strengthening: country leaders are waking up to the realisation that properly managed LDN investments[2] can bring long-term benefits that outweigh investment costs. Their support for LDN investments is demonstrated by the quickly growing number of countries that are setting commitments at the country, regional and international levels to combat land degradation.

The LDN market,[3] to date, consists primarily of sustainable land use investments, and, to a smaller extent, projects for land degradation rehabilitation. As we shall see, **the LDN market is still in its early development phase**, with various actors along the value chain playing different and evolving roles (Section 3).

Based on the market study we conducted on 31 key and emerging project developers and investment managers active in 'bankable' (i.e. profit-generating) LDN investments, we learned that **an estimated US$7.0 billion has been raised by our study participants for projects contributing to LDN to date, with the goal of doubling this amount by 2021**.[4] Their work is already spread out across a number of geographic regions and primary sectors, with forestry and agriculture being the main segments from which investment revenues are generated. As 70% of our study participants have been operating in the LDN market for less than 15 years, we expect to see continuous evolution of both investment strategies and innovation in the nascent market. **These investments are aimed at generating social, ecological and financial wealth, essen-**

1. See Glossary for definition.
2. See Glossary for definition.
3. See Glossary for definition
4. Our market study is meant to provide a fair overview of the LDN market but not intended to capture or represent the entire market size

tially decoupling economic growth from land degradation and from the old industrial model of extraction. The market needs many more of these investments to achieve the LDN target. **In the face of rising supply chain disruption and commodity price volatility risks, as well as reputational concerns, companies such as those in the food and beverage, timber, and textile sectors are, albeit from a low base, also accelerating their commitment to sustainability.**

Growth of the LDN market entails overcoming the challenges of raising and deploying capital that targets scalable profitable projects.

Key themes that emerged from our market observations (Section 4) include **a lack of track record at the manager and sector levels, a shortage of investments with risk-adjusted returns that appeal to private investors and insufficient funding for LDN investments as a consequence of the sector's immaturity.** These are often traits of a fledgling market, yet there are also opportunities for various actors to collaborate, test and scale commercial LDN projects[5] in order to attract funding.

The public sector and NGOs have contributed tremendously to LDN activities to date. The biggest missing piece of the puzzle is private capital from financial investors and industry players alike.

Overall, **we see the private sector playing an increasingly important role in funding LDN activities, but it still needs to significantly accelerate these efforts.** There are opportunities to further develop 'bottom-up' investment strategies that create sustainable land use programmes at the smallholder level in developing countries, which would also benefit industries that source from these suppliers. Across different industries, we also see huge potential in 'top-down' investments coming from corporations due to their need to build more responsible and robust chains of supply, from which local small and medium-scale producers could also benefit. As these new 'bottom-up' and 'top-down' investment strategies continue to be developed and refined, we hope to see more projects elevate to the 'landscape' level where we not only guarantee the sustainable production of a single crop, but also sustainable management and restoration of other ecosystem services in the target area.

To fully unlock the potential of private capital, the LDN Fund could be the source of catalytic capital that has thus far proved elusive.

Taking the current market challenges and opportunities into consideration, the LDN Fund could utilise different investment strategies to develop a well-structured programme that invests globally at scale, and play a pivotal role in complementing existing funding sources and channelling further capital into the sector (Section 5).

Many enabling factors already exist that would allow the LDN market to 'cross the chasm' and attract capital from more mainstream private investors. **As the world moves from a voluntary, philanthropy-driven conservation model to one that is more pragmatic and market-driven, it follows that funding for the world's LDN investments would also need to come from not only public and philanthropic funding but also the private sector.** The world is suffering an estimated US$6.3-10.6 trillion of losses per year through lost ecosystem services due to land degradation (ELD Initiative, 2015). This loss is affecting us all. The LDN Fund could be the vehicle that triggers collaboration among all of us to achieve LDN by 2030.

5 See Glossary for definition.

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1 | Current state of the land

1|1 Defining land degradation

1.1.1 What is land degradation?

Most definitions of land degradation in the past recognised only negative effects on the soil's productive capacity for current and future use. More recently, definitions have broadened to incorporate the concept of the land's capacity to provide ecosystem services.[6] The United Nations Convention to Combat Desertification (UNCCD) defines land degradation as 'reduction or loss, in arid, semi-arid and dry sub-humid areas, of the biological or economic productivity and complexity of rain-fed cropland, irrigated cropland, or range, pasture, forest and woodlands resulting from land uses or from a process or combination of processes, including processes arising from human activities and habitation patterns, such as: (i) soil erosion caused by wind and/or water; (ii) deterioration of the physical, chemical and biological or economic properties of soil; and (iii) long-term loss of natural vegetation.' Similarly, taking into account various services provided by the land, FAO defines land degradation as the **'reduction in the capacity of the land to provide ecosystem goods and services and assure its functions over a period of time for the beneficiaries of these'** – this is the definition and basis on which we will explore the topic of land degradation in this report.

1.1.2 How is land degradation assessed?

Worldwide assessment: an instant picture, a useful initial analysis

Various prior worldwide assessments of the state of land degradation are discussed in this report. They rely on a variety of different methodologies, each of these presenting its own advantages and biases.

As a first step, criteria used to characterise land degradation need to be established. Criteria differ depending on the definition of land degradation used for the assessment. As an example, degradation can be estimated based on trends in Normalized Difference Vegetation Index (NDVI),[7] therefore leading to degradation defined by a single criterion: land greenness. This was the measure used in the LADA/GLADA study, which took place between 2006 and 2010.[8] On the other hand, broader definitions of land degradation that take into consideration ecosystem services provided by the land may integrate multiple criteria to assess the level of land degradation. For example, the GLADIS[9] initiative in 2011 considers four different parameters to assess land degradation: biomass, soil health, water and biodiversity.

Besides selection criteria, the methodology and data sources used for land degradation assessment also need to be considered. For example, the assessment can be based on expert opinion or on satellite data. This diversity in data source is a main cause of discrepancies among results, but other factors also lead to variations between assessments, such as the time period over which degradation is analysed.

A recent study by Gibbs and Salmon in 2015 compares the outputs of several land degradation assessments, each conducted with a different data source, including the two most recognised ones:

- the GLASOD assessment (Global Assessment of Soil Degradation), commissioned by the UNEP in the early 1990s, based on expert opinion, and
- the LADA/GLADA project, conducted in the late 2000's, based on satellite data.

Assessments generally agree as to areas subject to little or no degradation, as well as on the overall order of magnitude of land degraded. The greatest discrepancies are found in areas regarded as strongly affected by degradation. These variations can be attributed to the methodological specifications of each assessment: GLASOD analyses soil degradation over fifty years while LADA/GLADA focuses on variations over two decades.

Assessments based on satellite data

One advantage of using satellite data over expert opinion is that it ensures better replicability of the assessment as well as a more consistent analysis.
However, one of the major limitations of satellite data-based assessments is that they fail to evaluate degradation beyond the recent past: they only capture recent or on-going degradation by measuring changes in greenness, productivity, or land currently being affected by processes of degradation. Land degraded long ago, such as parts of West Africa or India, would not be recognised (Gibbs and Salmon, 2015).
Another limitation of satellite remote sensing includes potential misinterpretations related to the capture and analysis of the Normalized Difference Vegetation Index (NDVI): land degradation is a context-based concept, therefore it requires ground-truthing based on expert and local knowledge to correctly interpret the detected changes in greeness.

Global assessments conducted using satellite imagery are still subject to certain biases and may not offer sufficient granularity to monitor yearly progress. An additional challenge is that there are trade-offs between alternative land uses, which are not necessarily captured in global-level assessments that illustrate the state of land at a given point in time. **Land degradation remains complex to define and assess, and global-level assessment is not sufficient to understand trends at the country, regional and local levels.** By comparison, for instance, with another key issue, climate change, and its causes, GHG emissions, are more easily characterised, quantified and monitored.

6. According to the Millenium Ecosystem Assessment, ecosystem services are 'the benefits people obtain from ecosystems', and four categories are distinguished: supporting, provisioning, regulating and cultural services. See Glossary for more information.
7. The Normalized Difference Vegetation Index (NDVI) is an index of plant 'greenness' or photosynthetic activity; it is one of the most commonly used vegetation indices and is usually captured by satellite imagery.
8. The LADA/GLADA project, initiated by GEF (Global Environment Facility), UNEP (United Nations Environment Programme) and FAO (Food and Agriculture Organization of the United Nations), assessed land degradation based on NDVI captured by satellite imagery.
9. The Global Land Degradation Information System (GLADIS) as set up by FAO following the LADA/GLADA project.

Country level reporting: a more detailed approach to monitoring progress over time

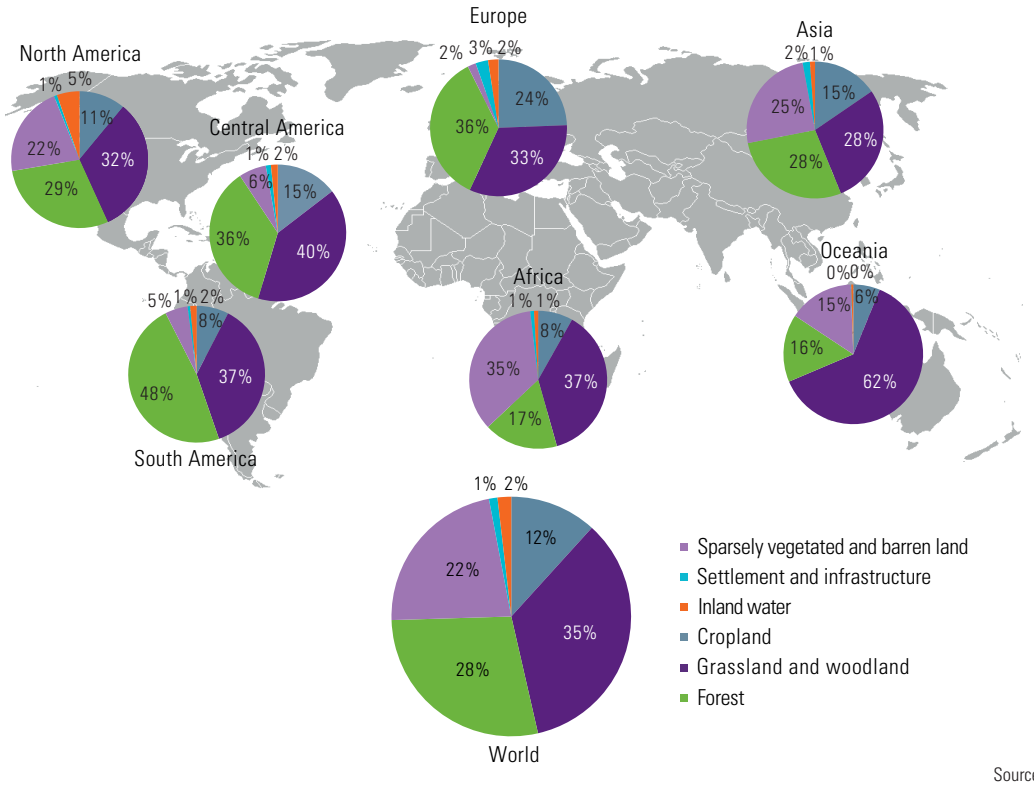
To compensate for the weaknesses of global-level assessments, and to guide implementation and monitoring of yearly progress, a conceptual framework for Land Degradation Neutrality (LDN) is currently being developed by the UNCCD Science-Policy Interface (SPI). **Country-level reporting using indicators developed by an Inter-Agency and Expert Group on Sustainable Development Goals indicators (IAEG-SDGs) and approved by the UN Statistical Commission will be established to monitor year-on-year progress.** The technical methodology of this annual national monitoring should be made available by the end of 2016. 'Proportion of land that is degraded over total land area' is emerging as the key indicator, supported by three underlying sub-indicators: 1) land cover/land cover change, 2) land productivity, and 3) carbon stock (above and below ground).[10]

1|2 World land use overview

Of the approximately 13.3 billion hectares of land surface in the world overall, woodland and grassland (including extensive pasture land) comprise 35%, while forest and cropland constitute 28% and 12%, respectively. The rest is covered by sparsely vegetated and barren land (22%), settlement and infrastructure, or water.

Over the last 40 years, cropland (farmland) and grassland areas including pastures increased significantly at the expense of forests.

Figure 1: Land use distribution around the world



Source: FAO, 2008

Table 1: Areas unchanged (thousands km²) and conversions 1987-2006 (thousands km²/yr)

Fom\To	Forest	Woodland/Grassland	Farmland	Urban areas	Net change
Forest	39 699	30	98	2	-73
Woodland/Grassland	14	34 355	10	2	24
Farmland	43	20	15 138	16	29
Urban areas	n.s.	n.s.	n.s.	380	20

Source: UNEP, 2007

n.s.: not significant. Farmland includes cropland and intensive pasture. Figures in green boxes refer to areas unchanged. Figures in grey background indicate land conversions. Source: Holmgren, 2006

10. See Glossary for definition.

1|3 Current state of degradation

1.3.1 Extent of degradation

Although differences in land assessment methodologies often lead to different results, there is consensus on some alarming trends. According to an extensive study conducted in 2016 by the International Food Policy Research Institute (IFPRI), land degradation has already reached 29% of global land area,[11] with human-induced biomass productivity decline found in 25% of cropland (including combined vegetation-crop mosaics), 29% of forest mosaics with shrub- and grasslands, 33% of grassland areas (including pasture grazing land), as well as 23% of areas with sparse vegetation. The LADA/GLADA assessment mentioned earlier led to a similar conclusion in 2008, **with one quarter of the world's land area undergoing degradation in the period 1981-2003**. Moreover, the share of degrading cropland is likely to be underestimated as practices such as intensive fertiliser application in some areas may be masking actual land degradation.

1.3.2 Most affected geographic regions

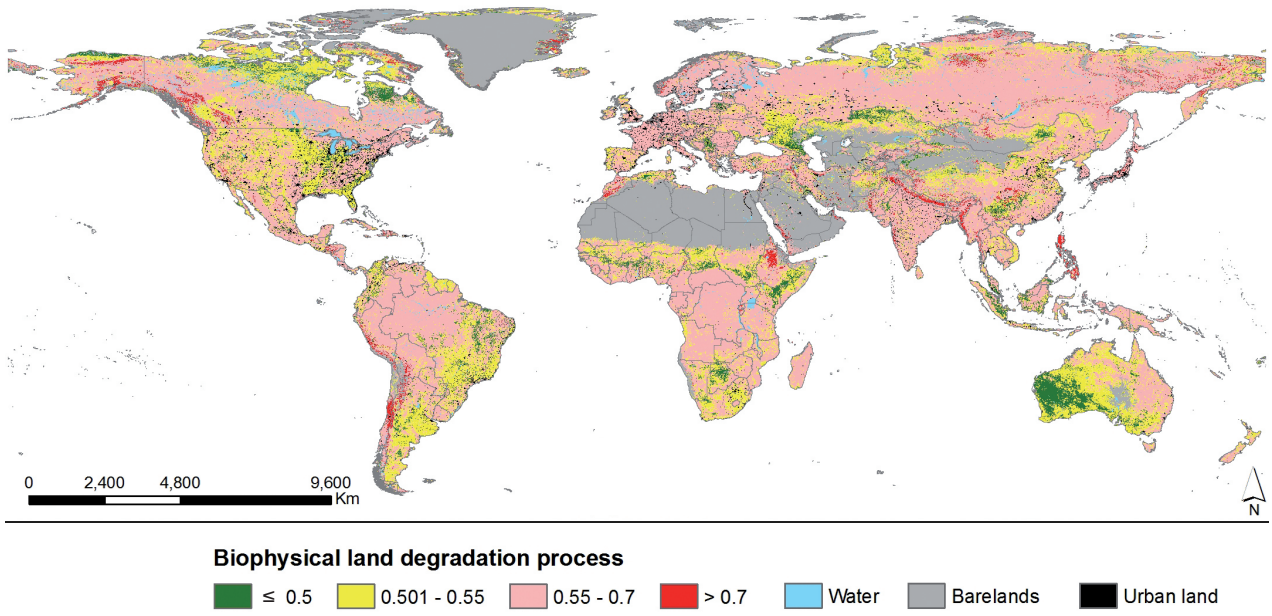
According to the LADA/GLADA analysis, the areas most affected by land degradation are:

- Sub-Saharan Africa
- Southeast Asia (Indo-China, Myanmar, Malaysia and Indonesia) and South China
- North-central Australia
- dryland and slopes of Central America and the Caribbean, as well as Southeast Brazil and the Pampas in Argentina,
- the boreal forests

The IFPRI study confirmed that Sub-Saharan Africa experienced the most severe land degradation over the last decade and is also the region with the highest rate of poverty in the world.

The map below shows the results from the 2011 GLADIS assessment, which takes into account the loss of various ecosystem services (biomass, soil health, water availability and quality, biodiversity) over a period of around 20 years.

Figure 2: Biophysical land degradation process



The scores indicate the level of on-going degradation. Higher figures indicate more severe degradation, ≤ 0.5 meaning little or no degradation.

Source: FAO, 2011

1|4 Main causes of degradation

Degradation can be subcategorised into several main biophysical types of land degradation: water erosion (56%), wind erosion (28%) and chemical degradation (12%) as well as other types of physical degradation (4%) (ELD, 2013).

It is much more challenging to use satellite data to capture the human activities that cause land degradation. For one, such data lacks the means to analyse activities that occurred historically (see text box in Section 1.1.2). Global assessments and analyses can serve as useful preliminary tools to spot potentially degraded regions on which further research should

11. Assessment based on satellite-data imagery, with corrective parameters applied to avoid certain biases such as rainfall variability.

be conducted. However, jumping to conclusions based on these high-level data, even at the regional level, may lead to biased or even wrong evaluations at the more local level, as a given geographical region may contain countries or even sub-national zones with very different conditions.

Also, land degradation is closely connected with many factors that may be directly or indirectly related to human activities. Those connections may go both ways; the most typical example is the relation between climate change and land degradation, the former accounting for drought and desertification (hence land degradation), the latter leading to an increase in carbon released in the atmosphere (hence climate change). For the purpose of this report we will focus on human activities directly generating land degradation.

The GLASOD assessment mentioned previously, which is based on an aggregation of expert analyses, can be a useful compromise for understanding the human causes of land degradation; it also has the benefit of scrutinising land degradation over a longer period of time (1945 – 1990), even though it only reflects trends up to 1990. The study concludes that the primary causes of soil degradation are:

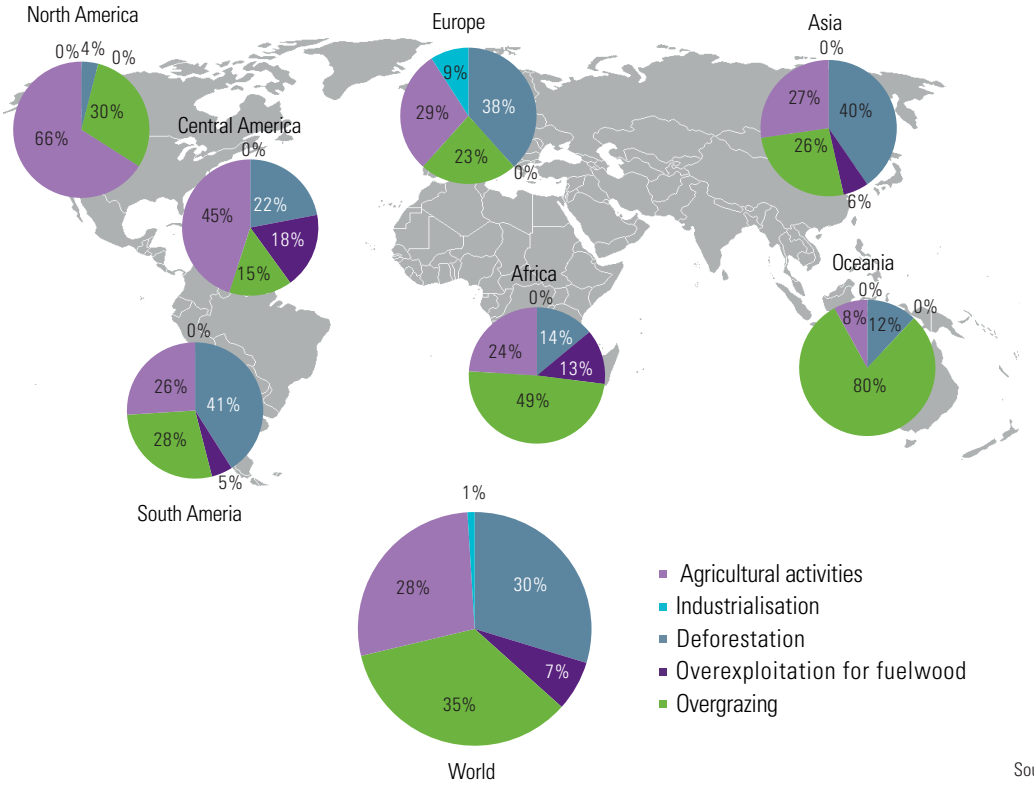
- overgrazing (35%),
- agricultural activities (crop production and intensive pasture) (28%),
- deforestation (30%),
- overexploitation of land to produce fuelwood (7%)
- industrialisation (1%).

It is important to note that agricultural activities do not cause land degradation per se. A significant part of land degradation is actually related to land use change (e.g. clearing a forest area for planting crops). Once agricultural practices are implemented, mismanagement of the land can degrade the soil over time, but implementing sustainable farming practices, on the other hand, can ensure the soil remains fertile and productive in the long run.

Human-led causes of degradation also differ dramatically depending on the region:

- In Central and South America, areas at high risk of carbon and biodiversity losses include the Amazon and the Atlantic Forest of Brazil, the Pampas of Argentina, the west coast of Colombia, and the core of the Sierra Madre del Sur and Sierra Madre Oriental areas in Mexico. Satellite images show that more than 50 million hectares of Amazon rainforest were destroyed between 1984 and 2005, replaced by agriculture and the introduction of more than 240 million heads of cattle (FAO, 2015).
- Southeast Asia is both highly populated and experiencing a rapid pace of economic development and ecosystem degradation. Overexploitation of land, with often unsustainable agricultural practices, is amongst the top challenges, and deforestation in the area is gaining speed at a high rate. Almost all cultivable lands are already under cultivation, which leads to food security pressure as demand for food continues to grow.
- Sub-Saharan Africa has experienced the most severe land degradation in the world. Overgrazing and the resulting inability of the land to support livestock was one of the

Figure 3: Causes of soil degradation around the world



Source: WRI, 1990

original major causes. The unintended consequences are conversion of (degraded) grasslands to cropland and deforestation significantly driving land use/cover change, ultimately leading to land degradation. The continent's increasing demand for livestock products could therefore represent an opportunity to implement sustainable grazing practices to rehabilitate and enhance the value of grasslands and related livestock activities (IFPRI, 2016).

Focus on forest loss

Forest covers around 4 billion hectares, or approximately 30% of the world's total land area. Forest loss (either due to deforestation or natural causes) is slowing, but remains alarmingly high according to the UNEP, with annual forest loss decreasing from 16 million hectares in the 1990s to approximately 13 million hectares in the 2000s (FAO, 2011). This still represents a net loss of roughly 4% every ten years. This global trend conceals regional variations, as Latin America and Africa continue to experience high rates of loss, and new critical regions emerge, for example in Indonesia, Cambodia, and Madagascar.

1|5 Consequences of land degradation

Land degradation is closely interconnected with the issue of poverty: according to the FAO (2011), **40% of the world's degraded land is in areas with high poverty rates, and approximately 1.5 billion people rely directly upon degraded land for their livehood.**

Food security is also at risk, as the UNCCD estimates that **degradation and desertification lead to an annual loss of 12 million hectares of land,** where 20 million tons of grain could have been grown. Over the next 25 years, land degradation could reduce global food productivity by as much as 12%, leading to a 30% increase in world food prices.

More broadly speaking, consequences of land degradation also include a reduction of various critical ecosystem services,[12] notably carbon sinks (therefore aggravating climate change and its consequences), biodiversity and water retention (resulting in water scarcity), as well as the cultural benefits healthy land provides for people.

Social consequences include migrations, conflicts and warfare. Up to 700 million people could be displaced by 2030 due to water scarcity, with as many as 50 million displaced in the next 10 years by desertification alone (UNCCD).

In financial terms, deforestation alone was estimated to cause annual economic losses of roughly €1.5-3.4 trillion in 2009,[13] equivalent to 3.3-7.5% of the global GDP in 2008 (ELD Initiative, 2013). Estimates of the overall lost ecosystem services due to land degradation hover around US$6.3-10.6 trillion annually (ELD Initiative, 2015).

Many of those ecosystem services affected are regulating, supporting and cultural services, which are considered global public goods (IFPRI, 2016). Thus, a majority of the costs of land degradation concerns the entire global community in both developed and developing economies.

1|6 Moving towards land degradation neutrality (LDN)

Land degradation neutrality (LDN) is defined by the UNCCD Intergovernmental Working Group (IWG) as **'a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remains stable or increases within specified temporal and spatial scales and ecosystems'.** LDN is the state the world needs to move towards if we are to prevent further losses in social, ecological and economic capital caused by land degradation.

Given the current trends observed in land degradation, either directly caused by human activities or indirectly induced by other factors such as climate change, there are two necessary pathways to achieve LDN:

- ➜ Avoiding further degradation by developing sustainable land use on all land
- ➜ In addition, working on restoring already degraded land

As shown earlier, the main trends of land degradation are heavily tied to land use change (deforestation) and unsustainable agricultural practices (crop mismanagement or unsustainable grazing management). As a consequence, reversing these trends **by promoting sustainable forestry and agriculture practices will be key to combating land degradation.** Sustainable land management strategies in forestry and agriculture can include reforestation, sustainable forest management, agroforestry, crop production that ensures long-term soil health, and sustainable grazing management. Depending on the condition of the land, productive land uses could require initial complementary approaches of land restoration (for degraded or abandoned land) and reclamation (for previously industrially contaminated land) before long-term sustainable land management practices are implemented.

12. See Glossary for definition.
13. Equivalent to $2.1-4.7 trillion in 2009.

2 | LDN enabling conditions

There is much need for and potential in restoring and properly managing land using sustainable management practices. For the world to achieve land degradation neutrality (LDN), projects contributing to LDN[14] would need to be developed and implemented on a global scale. In this section, we discuss various favourable conditions around the world that could enable LDN-related investments to flourish.

2|1 A horizon of opportunities

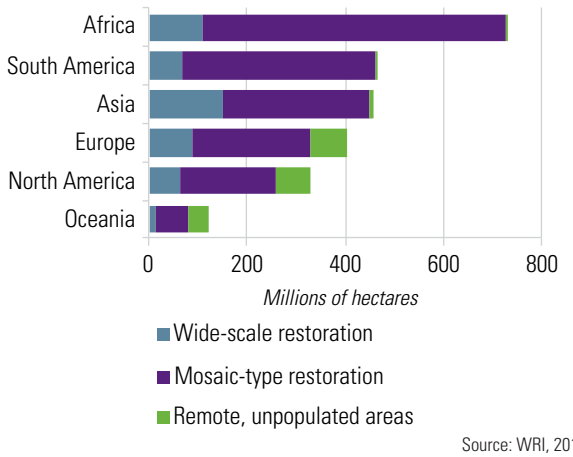
We see a horizon of opportunities in restoring and rehabilitating land worldwide. Implementing projects contributing to LDN would not only restore and regenerate the land and environment; the benefits such activities would engender could also outweigh their cost in economic terms, generating long-term profits.

2.1.1 Land potential

In 2011, as part of the Global Partnership for Forest and Landscape Restoration, the World Resources Institute (WRI) analysed potential opportunities for land restoration across the globe. The study focused on the possibilities for restoring forests under a broad range of land uses. **It concluded that an estimated 2 billion hectares are suitable for forest restoration and tree regeneration, an area larger than the entire continent of South America:**

- One and a half billion hectares would be best suited for restoration in which forests and trees are combined with other land uses, such as agriculture ('mosaic-type restoration')
- Up to about half a billion hectares would be suitable for wide-scale restoration of closed forests, not combined with other land uses ('wide-scale restoration')

Figure 4: Forest restoration opportunities



Source: WRI, 2011

In addition, it is estimated that another billion hectares of cropland and settled areas could benefit from planting additional trees, which would help maintain the land's ecosystem functions.

Achieving LDN involves both reversing degradation in degraded biomes and managing land that is not yet degraded in a sustainable manner. In this regard, agricultural land is particularly critical due to its connection with crucial social issues such as food security and poverty: the implementation of sustainable farmland management practices is necessary in order to ensure that the land can provide food and that ecosystem services[15] and ecological resilience[16] can be maintained over the long term. For any given land use (e.g. crop plantation, forestry, cattle management), various land management practices can be considered sustainable, as long as their design and implementation is suited to the local environmental and social context. The inclusion of local stakeholders' requirements is also key to a project's success, taking into consideration their expectations and needs, cultural, historical, spiritual habits, and also the local political, regulatory and legal situation.

2.1.2 Benefits of sustainable land management

2.1.2.1 Direct environmental and social benefits

Healthy soil and fertile land allow society to produce necessities such as food and timber to sustain itself and **help address issues such as food security, income inequality, poverty, and resource availability.** Conversely, degraded land not only impacts soil health and productivity, as demonstrated by signs such as soil erosion, compaction, reduced water retention and availability, it ultimately affects our lives and activities. For example, degraded soil affects crop and timber yield and quality, grass availability for livestock, and a whole host of ecosystem services that our lives rely upon, such as underground water recharge and insect pollination.

Healthy soil also provides two additional ecosystem services of great importance:

- Firstly, soil is the second largest carbon storage after the ocean. Land degradation reduces the soil's capacity to store carbon, while rehabilitating the land can reverse the trend and enhance the soil carbon stock. This is the core idea behind the '4p1000' initiative launched by France and joined by more than 20 countries to date: increasing the soil carbon stock by 0.4% per year could halt the annual increase in atmospheric CO_2. Increasing soil carbon storage through land restoration and sustainable land management represents a significant opportunity to mitigate climate change.
- Secondly, forests and other dense vegetative areas store and release water into the atmosphere over time and help regulate temperatures. Sustainable forest management and stopping deforestation would allow forests to continue delivering this service.

14. See Glossary for definition.

15. See Glossary for definition.
16. Ecological resilience is defined as the capacity of an ecosystem to respond to disturbances by resisting and recovering from damage (ELD, 2015).

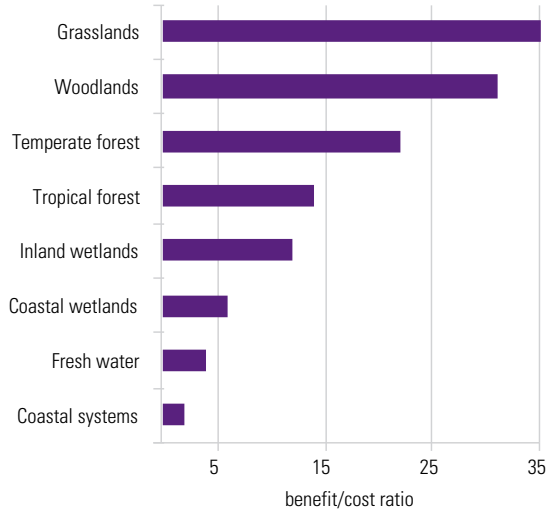
2.1.2.2 Economic benefits

On a global scale, the Economics of Land Degradation (ELD, 2015) initiative estimates that adopting sustainable land management practices alone to increase crop production could generate up to US$1.4 trillion in economic benefits.

The recent IFPRI study, conducted in 2016 on the economics of land, similarly concluded that global benefits from investments in sustainable land management practices could exceed their costs by a multiple of at least two over a 30-year horizon.

At the individual project level, the benefit/cost ratio varies depending on the geography and type of land use involved. If one compares restoration for all different types of ecosystems, grassland restoration is generally understood to yield the highest benefit/cost ratio, estimated to be in the range of 4:1 to 35:1 inclusive of benefits from increased productivity, improved water retention and carbon sequestration.[17]

Figure 5: Estimated benefit/cost ratio of restoring natural ecosystems



Source: FAO, UNCCD, 2015

2|2 Public momentum

The world is becoming more prepared to combat land degradation. Land degradation neutrality has now been acknowledged as a major global challenge and been incorporated into the United Nations SDGs (Sustainability Development Goals). Moreover, a growing list of countries are committing to LDN and setting targets to move forward, with some countries showing particularly favourable conditions promising success in implementing LDN projects.

2.2.1 LDN in the Sustainable Development Goals

The **recent integration of land degradation neutrality as one of the targets of the SDGs 2015** confirms the integral role that land plays in solving the world's sustainable development challenges going forward.

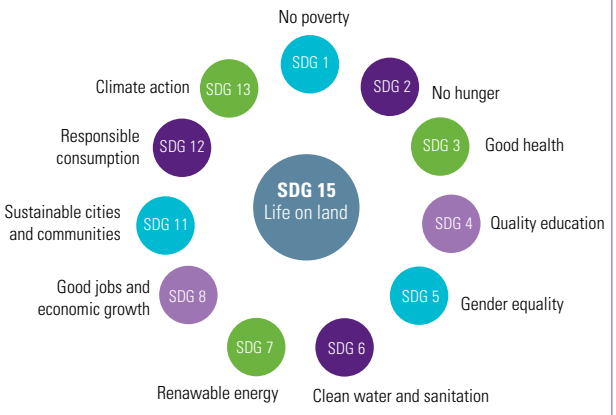
Sustainable Development Goals 2015

Goal 15: 'Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss'

Goal 15.3: 'By 2030, combat desertification, restore degraded land and soil, including land affected by desertification, drought and floods, and strive to achieve a land degradation-neutral world'

The incorporation of LDN into the SDG illustrates the world's increased recognition of the significance and potential of land management as both a problem and a tool. Land management itself is a holistic subject, as land brings together many key social and environmental issues. Based on this observation, we tackle not just a particular piece of ground but its entire surrounding landscape and integrate all the necessary environmental, social and financial factors into our consideration. This holistic way of thinking offers a new opportunity for using land management as a tool to address many other challenges such as biodiversity, climate change, food security, poverty, water availability, health, and gender equity.

Figure 6: SDGs related to land management



Source: Mirova, Bonterra Partners, 2016

2.2.2 Country-level readiness

2.2.2.1 A growing list of countries committed to fighting land degradation

Through various initiatives, the UNCCD has been working with a number of volunteer countries to tackle land degradation. **In particular, the UNCCD is in the process of establishing a global 'LDN target-setting programme',** which is designed to assist countries in adopting voluntary LDN targets.[18] The number of countries that have expressed interest in participating has increased rapidly, from 30 in January 2016, to more than 70 countries at the end of March 2016, and continues to grow apace.

In addition, more than 100 affected countries have already established concrete plans to address land degradation

17. De Groot et al, 2014.
18. More information on the Target Setting Programme available at: http://www.global-mechanism.org/content/supporting-countries-set-land-degradation-neutrality-targets.

in the National Action Programmes (NAP) submitted to the UNCCD. Aside from programmes managed at the UNCCD level, since the creation of UNCCD in 1994, various international initiatives related to land rehabilitation have been launched. These have further multiplied since 2010. First among these was the creation of the Bonn Challenge, then several other important initiatives followed suit (see table below).

These initiatives demonstrate the strong and increasing awareness of governments regarding the issue of land degradation. More importantly, they indicate concrete positive enabling signals for LDN-related activities to take hold, since the support of governmental and public bodies is often an important factor in success for the development of large-scale land projects in a country. **To date, more than 100 countries have committed to one or several of these initiatives, showing positive momentum in favour of LDN actions.**

Table 2: Main initiatives on LDN-related topics

Initiative	Founding year	Scope	Target
LDN target setting (UNCCD)	On-going	World	LDN by 2030
The Bonn Challenge	2011	World	Restore 150 Mha by 2020
The 20x20 (WRI)	2014	Latin America	Restore 20 Mha by 2020
AFR100	2015	Africa	Restore 100 Mha by 2030
The New York Declaration of Forests	2014	World	Restore 350 Mha by 2030
4p1000	2015	World	Yearly increase of soil carbon by 0.4%

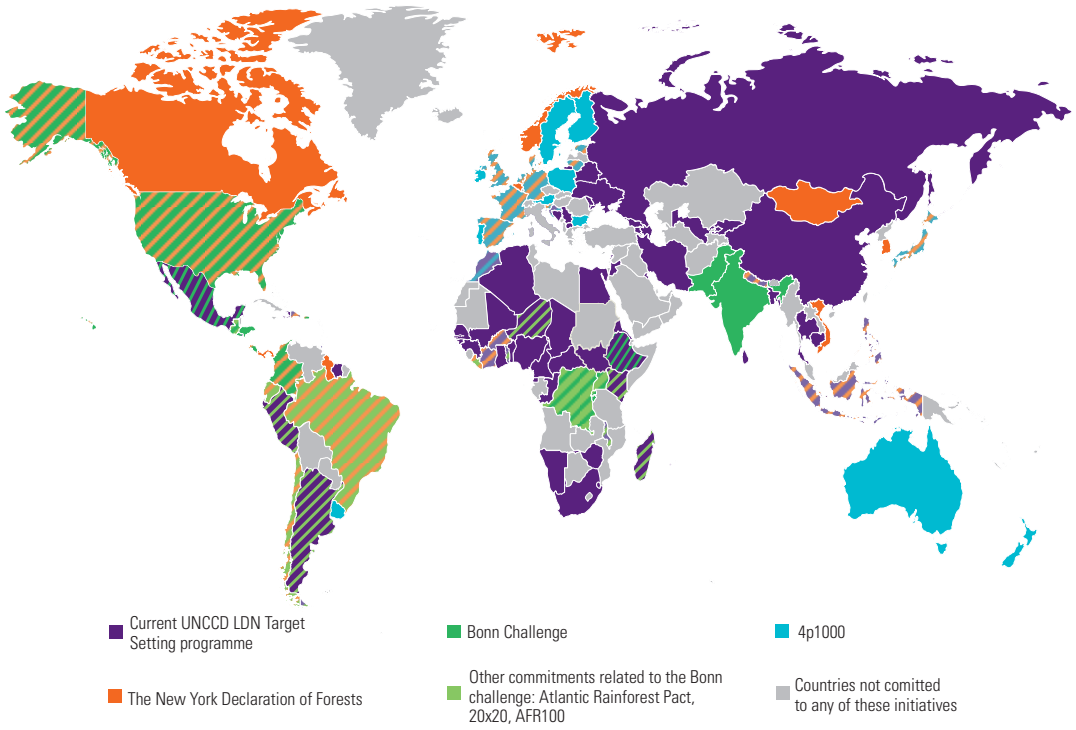
Mha = million hectares

Source: Mirova, Bonterra Partners, 2016

Each of these initiatives either complements or reinforces other previously existing programmes aimed at tackling land degradation, such as the UN-REDD or the WWF Zero Net Deforestation programme.

The following map shows the countries that have committed to the various LDN initiatives.

Figure 7: Countries with complementary commitments to LDN



Note: For countries participating in 2 initiatives, stripes are used to display both commitments. For countries committed to more than 2 programmes,[19] only 2 are displayed. [20]

Source: Mirova, Bonterra Partners, 2016

19. Chile, Colombia, Costa Rica, Ethiopia, Kenya, Mexico, Peru, The Democratic Republic of Congo.
20. See Annex Section 8.2 for the table of country commitments.

2.2.2.2 Complementary assessment of country-level attractiveness

Other parameters must also be assessed to determine the overall readiness for and interest of countries in LDN project development. Considerations such as public governance or market attractiveness are key to identifying favourable geographies for LDN projects.

Given the goal of the LDN Fund to invest in land-based projects, **land tenure will be of paramount importance to ensure legal security and social performance for most of its investments**, particularly in countries where land use and tenure rights are vaguely defined in national legislation and/or not properly implemented or enforced.

Land tenure – issues and topics at stake

The question of land rights requires the study of many subjects, ranging from law to institutional structure. Land rights can be formal or customary, leading to very different situations. In addition, in the absence of an international agreement on land rights, the topic must be addressed at the national, and even frequently sub-national, levels.

Moreover, the topic of land tenure goes beyond land rights, as it requires that appropriate governance be in place to ensure proper implementation. Recognition and respect for existing rights, dispute resolution and conflict management (for example land use conflicts between agriculture and pastoralism) are only some of the issues directly related to the quality of land governance.

More broadly, land governance also has implications for local land use planning and zoning programmes, notably for agricultural management practices.

Land tenure and environmental conditions are also closely related: land tenure can promote land use practices that harm the environment, including land degradation, or it can serve to preserve and enhance ecosystems.

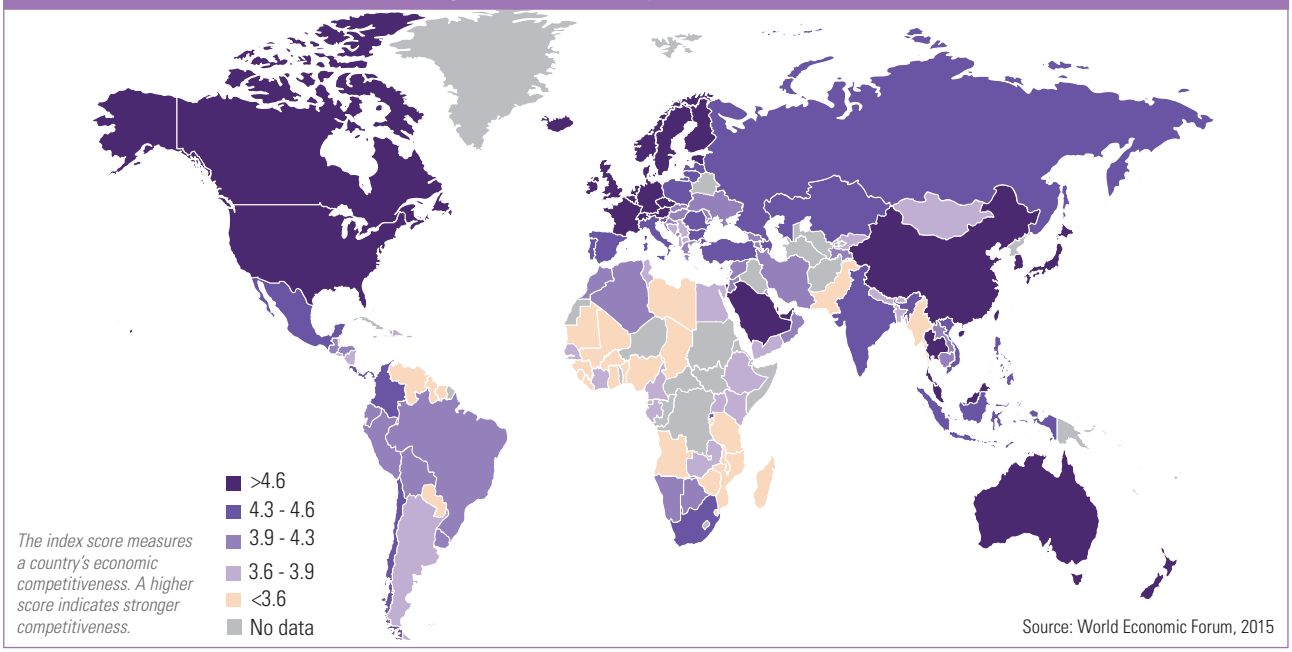
Challenges when considering land tenure are major and numerous, as the topic is closely related to considerable economic, but also social issues: poverty, gender equality, food security, health and welfare, security of supply and access to natural resources, etc.

An in-depth risk analysis, especially attentive to the local context, must be carried out during the feasibility study phase before undertaking any LDN project investment. This shall be included as part of the broader environmental and social risk assessment to be performed for each project. The FAO's voluntary guidelines on the responsible governance of tenure provide an example of a recognised framework addressing those topics.

Typical issues that might arise at the project level include clarity as to land title and conflicts between customary rights-holders and private or state owners. Disputes over customary land use are all the more critical in areas where there are indigenous populations without statutory rights. In some cases, the implementation of LDN projects might first require clarification as to land tenure. This is likely to be a lengthy process, as it involves complex technical land and policy reforms, and requires extensive stakeholder consultation to ensure that a responsible resolution can be reached.

As a preliminary approach, for illustrative purposes, we use the International Global Competitiveness Index (GCI) created by the World Economic Forum to assess countries in relation to governance, policies, as well as other factors influencing the level of competitiveness of an economy (e.g. ethics and corruption, land and property rights, infrastructure, health, accountability, etc.) through a 12-pillar analysis.

Figure 8: Global Competitiveness Index 2015



Source: World Economic Forum, 2015

Comparing public commitments to foster LDN with this assessment of country competitiveness provides a high-level glimpse of the geographies that appear most favourable for investing in projects contributing to LDN.

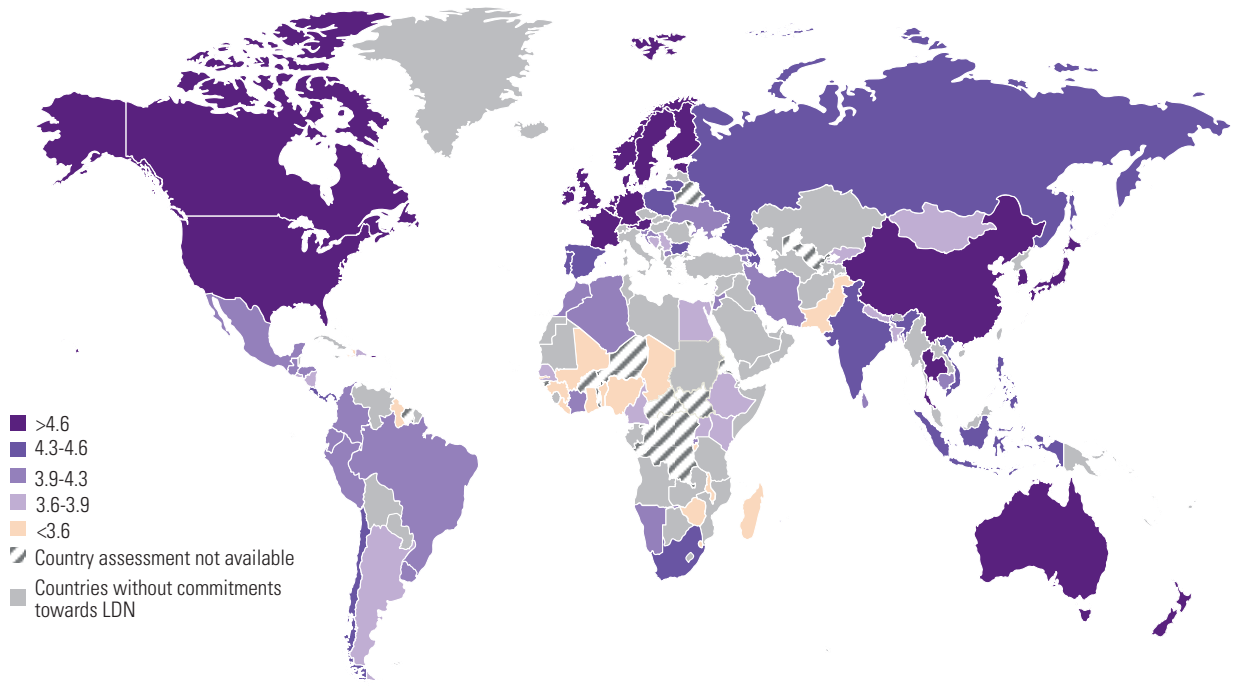
The following map displays the GCI index of countries with existing commitments to work towards LDN. It illustrates that around twenty countries committed to LDN have a GCI score greater than 4.6, indicating that they are highly competitive economically. Twice that many countries qualify if we extend the analysis to GCI scores of 4.3 or above, which corresponds to countries ranked in the top 40% of the world in terms of competitiveness.

Based on commitments to LDN and country competitiveness, there are countries on all the continents that potentially offer fertile ground for LDN projects.

Examples include Australia, China, Thailand, Indonesia, South Africa, Chile, and the Unites States.

Overall, we see tremendous opportunity for developing profitable projects that restore degraded land and/or implement sustainable land management practices worldwide. Reaching LDN by 2030 is now officially an SDG target. Political momentum continues to build, with more and more countries committing to LDN targets at the country, regional and international level. Many of those countries are also economically competitive. These are favourable conditions that stack up one another as building blocks to help construct an enabling environment for LDN investments to flourish in different regions worldwide.

Figure 9: Global Competitiveness Index of countries committed to LDN



The index score measures a country's economic competitiveness. Higher score indicates stronger competitiveness.

Source: Mirova, Bonterra Partners, 2016

3 | Driving forces of the LDN market

Building upon the earlier sections of the report, which lay out the investment case for the world to achieve Land Degradation Neutrality (LDN), this section begins to explore the investment-readiness of the LDN market[21] by looking at the various players in the value chain that make this market viable.

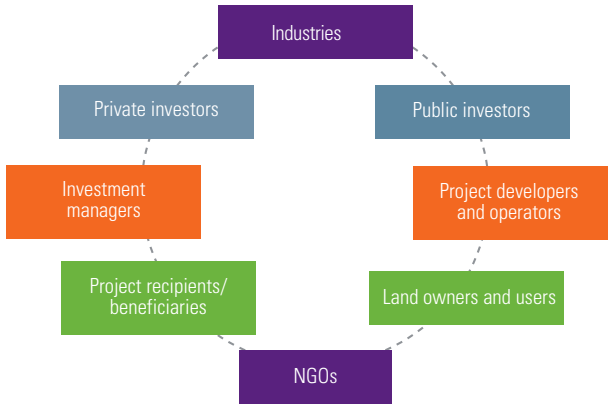
As LDN is still a novel concept, there is no predefined LDN market to date; for the purpose of clarity of this report, the 'LDN market' needs to be characterised: it is made up of actors, activities, projects and investments that are directly engaged in the rehabilitation of degraded land and/or sustainable land management practices with the aim of improving the capacity of the land to provide ecosystem services. Based on this definition, the LDN market is currently a young sector that consists primarily of sustainable land use projects, and to a smaller extent, land degradation rehabilitation projects.

Most of the players active in the current LDN market originate from more mature arenas such as the REDD+, sustainable agriculture, and sustainable forestry sectors. We first present findings from our market study, which focuses on the project developers and investment managers that create and invest in projects contributing to LDN.[22] The market study provides an overall analysis of how these actors have been deploying capital to date and how this is projected to shift over the next five years. Our discussion then leads into the existing and expected contributions made by public and private investors as ultimate funders of the LDN investments[23] and the role played by industries.

3|1 Key actors in the LDN market

The LDN investment landscape is comprised of several key actors each playing a different role.

Figure 10: Key actors in the LDN market



Source: Mirova, Bonterra Partners, 2016

- **Project developers/operators:** organisations that develop a project from conception and feasibility to initial commercialisation and execution. Often these developers continue to manage the fully-operational projects. In this report, we shall refer to both groups simply as project developers. Their funding is usually provided by public and private investors, investment managers (who are not also operating projects themselves), or industry players. Examples include the UNIQUE Forestry & Land Use and Pur Projet (See Section 3.2).

- **Investment managers:** asset managers and financial institutions that raise capital from investors to make investments. They are responsible for investment selection, capital deployment and deal completion to monitoring and exit. Some partner with project developers and NGOs to create and operate the investments. Some also play the role of project developer and oversee investments directly through their own in-house team. Examples include Ecotrust Forest Management, Finance in Motion, and Moringa Partnership (See Section 3.2).

- **NGOs:** non-profit organisations are multi-faceted service providers that often ensure a critical link between governments, businesses and the people and environment. Their activities range from campaigning and advocacy (e.g. communication campaigns that raise public awareness and funding), operational (e.g. offering capacity building, technical assistance, certification services for sustainability programmes) to being the thought leader in creating social and environmental measurement standards. They are often a good source of on-the-ground information, since they have deep local knowledge and extensive networks with various stakeholders, including local communities. NGOs sometimes also act as local project developers and manage projects on behalf of funders. We also see large international NGOs, such as The Nature Conservancy and Conservation International, increasingly supporting and launching impact investment products to expand their potential funding beyond philanthropy. In countries like the United States, non-profit land trusts are critical to raising and packaging the funding for acquiring conservation easements in order to limit land use to protect specified conservation values. Examples of NGOs, in addition to those already mentioned, include The Conservation Fund and Etc Terra.

- **Public investors:** public institutions, including government at the national, state, regional, and local levels, regional and bi- and multilateral development finance institutions (DFIs) and development agencies. For the purposes of this study, we also include mixed public and private DFIs such as FMO, the Dutch development bank. Public investors invest for the public good in areas and projects in which commercial investors typically would not. Examples include the Norwegian Agency for Development Cooperation (Norad), the Asian Development Bank, and the CAF (Latin America Development Bank) (See Section 3.3.1).

- **Private investors:** include retail, (ultra-)high-net-worth, family offices, and institutional investors and others who do not invest with public money and who are potentially interested in alternative investment strategies. Private

21.See Glossary for definition.
22. See Glossary for definition.
23. See Glossary for definition

investors include traditional investors that are profit-driven and also impact investors that value both profit and impact. Examples include AP2 and other pension funds, Harvard Management Company and other university endowments, private wealth management groups at investment banks such as Credit Suisse and JPMorgan, foundations such as the David & Lucile Packard Foundation, and impact investment groups such as Sonen Capital (See Section 3.3.2).

- **Industries:** industry players in the food and beverage, timber and in other sectors (e.g. textile) that rely on productive land directly or indirectly for sourcing inputs and materials for their operations. Industries can participate in any or all part(s) of the supply chain, from production, processing, trading/intermediating, to wholesale and retail. Many of these are direct off-takers of food and fibre and other raw materials (e.g. Nestlé for cocoa and coffee beans) while some are end-buyers (e.g. Marks & Spencer sourcing chocolate bars and instant coffee) (See Section 3.4).

- **Project recipients/beneficiaries:** these are the stakeholders that ultimately receive project funding in exchange for conserving or managing the land in a sustainable manner. Fund recipients may include public or private landowners, small- or large-scale food and fibre producers, or local communities. If land is managed properly, sustainable goods and services, such as crops, timber, environmental credits and ecosystem services in addition to financial profits can be delivered to those who fund, manage and operate the projects. These goods, particularly ecosystem services,[24] also benefit the rest of society.

- **Land owners and users:** People or entities owning land, as well as those making use of it, are critical stakeholders of any LDN investment project. They can be different from or the same as the project recipients/beneficiaries. For any project, these stakeholders must be properly identified in a preliminary due diligence covering land tenure issues (See Section 2.2.2.2). Their involvement in projects must be ensured through clear consultation processes, which should notably make it possible to avoid or mitigate any detrimental social impact of a project.

Other types of actors not included in this typology that are nonetheless potentially active in this market include service and equipment providers, certification bodies, etc.

3|2 Project developers & investment managers

Our intention to analyse project developers and investment managers more closely through a market study stems from the recognition that much of the private investment deployed into LDN projects to date has been led by these actors. We see them as an important growth engine for the LDN market as they are the main agents that raise capital, design and manage LDN projects. Many are pioneers and first movers in this nascent market, especially in developing countries. Scaling up the LDN market requires an understanding of what motivates these actors and the challenges they face. Our study focuses on analysing a select sample of key and emerging actors and does not attempt to capture all the participants in the market.

3.2.1 Scope of market study

3.2.1.1 Actor and project selection parameters

In determining the type of actors and projects to include in our study, the following parameters were used in accordance with the envisioned investment scope of the LDN Fund.

- **Geography:** all countries worldwide

- **Scalability:** the projects must be replicable on a larger scale at a regional, national or international level to maximise their impact

- **Clear and direct benefit of LDN:** the projects must have a **clear and direct benefit for ecosystem services**, and lead to progress under at least one of the following three criteria, as defined in Section 1:[25]

  - **Land cover/use**
  - **Land productivity**
  - **Carbon storage**

- Our focus on direct (i.e. on-site) benefits for the market study results in the exclusion of certain investments, such as mainstream renewable energy projects (e.g. wind turbine projects on farms or building rooftops) that generate mostly off-site indirect benefits for the land. **This by no means implies that the LDN Fund would only invest in projects that deliver direct LDN benefits.** We recognise the importance of land benefits and impact from investments that contribute to LDN in an indirect way; such indirect benefits can potentially be large enough to justify investment

- **Direct investment in projects but not companies:** we focus on actors such as investment managers, project developers, NGOs and industry players with whom the LDN Fund can partner to invest directly in land-based projects. Investment in businesses (e.g. services or equipment providers) is excluded from our analysis since direct private equity is not envisaged to be a primary strategy for the LDN Fund.

- **Bankability:** the projects must be 'bankable' or designed to generate a financial profit for investors in order to make the investment case for LDN activities, even if the financial return is below market rate. The predominate income stream(s) must be generated from tangible products such as food and fibre, or from tangible services such as tourism, for which a ready market demand

24. See Glossary for definition.

25. Also see Glossary for definition of 'contribution to LDN'

exists independent of government legislation. Projects that generate income partially but not primarily through carbon, biodiversity, habitat and other natural resource credit offsets are included, however, since the valuation of such ecosystem services can enhance the return of projects.

Pure credit-based investments such as REDD+ projects with revenues mainly based on carbon credits are excluded for the time being. Our view is that sustainable projects should be able to produce and monetise goods that society is ready to pay for even in the absence of government regulations. Offset projects are only bankable to the extent that industries are required by law to pay for and offset any unavoidable ecological damage caused by their operations, or that they are committed to purchasing such credits in the long run.

Based on our criteria regarding bankability and direct contribution to LDN, **key sectors in the study include sustainable agriculture, sustainable forestry (including agroforestry), land rehabilitation/ conservation, and ecotourism**. These selected few sectors are the most obvious and relevant ones for the study to focus on in regards to tackling land degradation. **Other sectors that directly contribute to land degradation rehabilitation or avoidance of degradation or sustainable land use are also included**. We note that there are other sectors that can contribute to LDN, such as renewable energy, in which the LDN Fund could consider investing.

Regarding forestry, we have only included in this study TIMO (timber investment management organisations) and other forestry projects that clearly demonstrate sustainable practices or implement conservation practices that go above and beyond what sustainable forestry management typically involves.

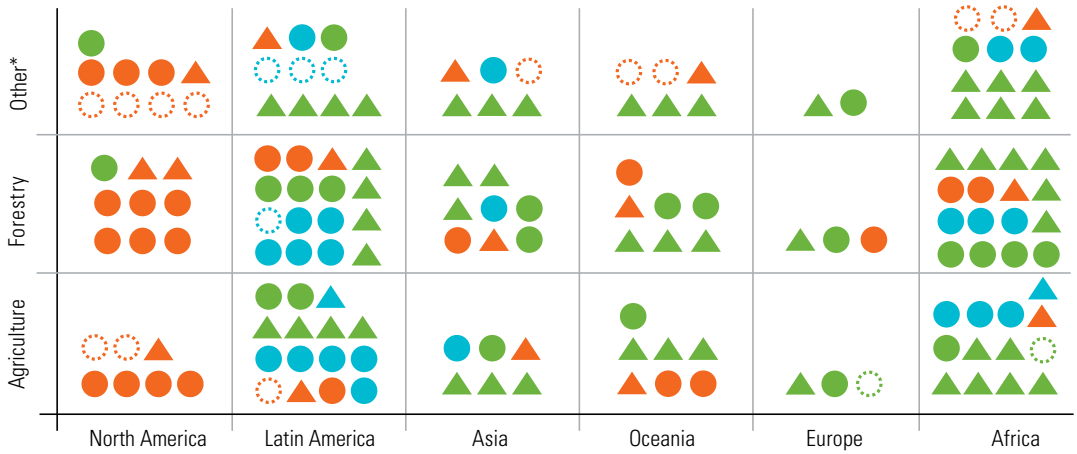
3.2.1.2 Study methodology

As our study pool, we compiled an initial list of 42 actors identified as key or emerging players in the LDN market as defined by our study parameters. We leaned towards analysing actors that have demonstrated past success or prior experience in developing and managing LDN-related investments. A combination of meetings, phone interviews, and email correspondence with 31 of these entities was conducted to collect essential data about their operations. A few actors have since confirmed that their work is not directly relevant to the LDN topic or to our market study. Confidential information is only displayed at the aggregate level in this report. Desktop research was also carried out to gather publicly available information useful for the study. For further details about the market study methodology, please refer to Annex Section 8.3.

3.2.2 Findings from market study

Qualified and defined by the study parameters in Section 3.2.1.1, the current LDN market is led by a relatively small number of pioneering project developers and investment

Figure 11: Mapping of project developers and investment managers active in the LDN market, segmented by project region and sources of project revenue



* Other includes revenue from renewable energy, ecotourism, mitigation banking, conservation easement, carbon credits, and other conservation activities

Note:
Each organisation can be represented by more than one data point. E.g. a group with projects that generate revenue from all three primary sectors would be represented by three data points.

Not-for-profit actors' projects tend to generate revenue from a mix of sectors. Each NGO is represented by three data points (one in each primary sector), with the exception of the few that focus only on one sector.

For-profit actor	Not-for-profit actor
Projet Developer + Investment Manager	Projet Developer + Investment Manager
Project Developer	Project Developer
Investment Manager	Investment Manager

Primary source of project revenue

Secondary sources of project revenue

Source: Mirova, Bonterra Partners, 2016

managers spanning several geographic regions and primary sectors (see mapping analysis above). These include not only private organisations but also non-profit groups that act as project developers, and in some cases also investment managers. The organisations included in this mapping can be found in Annex Section 8.4. **The group of actors in our study is illustrative only, and by no means exhaustive, but is intended to be broadly representative of key players in the existing LDN market.**

Investments made by for-profit entities in our study broadly generate revenue from three main sources:

- **Agriculture**
- **Forestry, including agroforestry**
- **Other, which include renewable energy, ecotourism, mitigation banking, conservation easement, carbon credits and other conservation activities**

Most for-profit actors have either agriculture or forestry as their primary sector of activity, or key sector from which a majority of their financial return is generated. However, some deal with projects or investment strategies that we refer to as 'diversified-sector'. **Diversified-sector investments do not depend heavily on any one income source.** Rather, income generation is distributed relatively evenly among multiple streams, such as agriculture, forestry, and sectors that fall under 'Other' in our mapping analysis.

Few not-for-profit organisations focus their efforts on any one particular sector. Their projects can generate revenue from any or a mix of sources and are considered diversified-sector in our study.

It is also worth noting that **the LDN market to date primarily consists of sustainable land use projects; investments in land degradation rehabilitation form a small but growing minority.**

The sub-sections below explore the investment strategies to date of these project developers and investment managers, and their projected changes over the next five years.

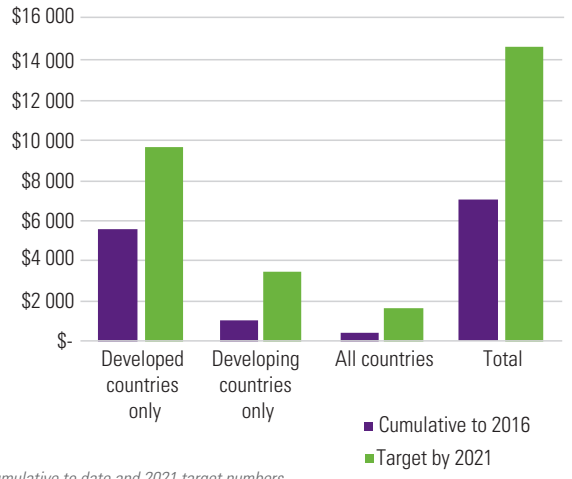
Findings are based on information provided by the pool of participants in our market study and are not meant to reflect the comprehensive market size. Rather, the participants selected for our study are those whom we consider to be either key or emerging players in the sector and hence exhibit the current main traits of the LDN market as defined by our study parameters discussed in Section 3.2.1.1. Our findings represent only the existing LDN market, as characterised by these current actors; the future LDN landscape may look very different as it continues to develop.

3.2.2.1 LDN investments to double from a cumulative $7.0 billion as of 2016 to $14.7 billion by 2021

The project developers and investment managers in our study have raised $7.0 billion in total since their inception to date for LDN investments globally. They are targeting a cumulative $14.7 billion by 2021. In other words, **they are expecting to double the capital they manage for LDN investments over the next five years**. Over 90% of the capital raised to date is in the form of equity, which is also expected to be the case for the projected 2021 target.[26]

A majority of the capital raised has already been deployed, as most project developers raise funding on a per project basis, and most investment managers in our study are fundraising in 2016 for their next funds. Of the $7.0 billion currently raised, $5.6 billion (80%) is allocated specifically for projects in developed countries, $1.0 billion (14%) for developing countries, and the remaining 6% is split across both types of economies.

Figure 12: Capital raised for LDN investments by project region, cumulative to 2016 vs. 2021 targets (US$ millions)[27]



Cumulative to date and 2021 target numbers based on 27 and 31 data points, respectively. Source: Mirova, Bonterra Partners, 2016

It is worth noting that the number of private project developers and investment managers working in Asia identified in our study is noticeably small. This might be due to our research filters, which may not have allowed us to capture these Asian actors; in other words, actors in Asia may have been investing very differently from those active in other geographies, in terms of investment types, activity, or purpose.

For-profit organisations accounted for 90% of the capital raised to date. Not-for-profit entities are estimated to grow from only 10% currently to 17% by 2021.

26. Most of our study participants provided only the equity amount they raised or plan to raise. Including their debt financing in our analysis is estimated to raise the $7.0 billion cumulative figure to at least $7.5 billion, based on our knowledge of the leverage levels some of them assume.

27. All figures that could be related to previous years and past performance are no indicator of future performance.

Figure 13: Distribution of capital to be raised for LDN investments by organisation types

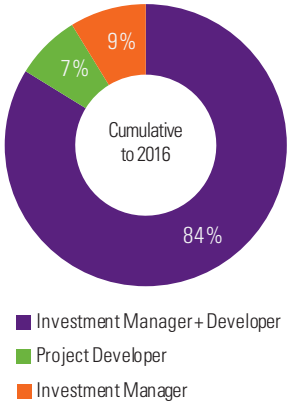


Based on 31 data points. Source: Mirova, Bonterra Partners, 2016

3.2.2.2 Majority of capital raised by investment managers who are also project developers

Of the capital raised to date, 84% is managed by 'full-service' investment managers who also develop and manage projects. It is estimated that they will continue to manage over 80% of the projected total LDN capital raised by 2021. **Almost all investment managers in our study active in developed countries work on this 'full-service' basis and manage real asset strategies.**

Figure 14: Distribution of capital raised for LDN investments by actor type, cumulative to 2016

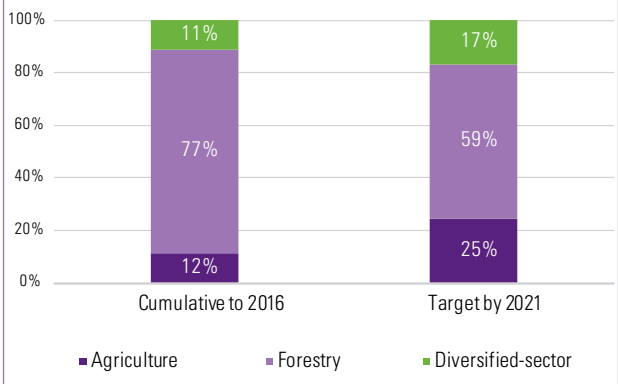


Based on 27 data points. Source: Mirova, Bonterra Partners, 2016

3.2.2.3 Forestry projects dominate the sector, with agriculture and diversified-sector investments anticipated to accelerate

The forestry sector has garnered 77% of LDN investments to date. This is likely a reflection of forestry (or deforestation) having been at the forefront of environmental and climate change discussions for a longer period of time and timber overall being a well-understood asset class within the investment community.

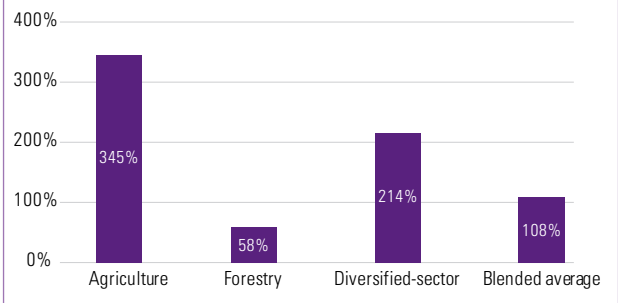
Figure 15: Distribution of capital raised for LDN investments by sector, cumulative to 2016 vs. targeted 2021[28]



Cumulative to date and 2021 target numbers based on 27 and 31 data points, respectively. Source: Mirova, Bonterra Partners, 2016

However, **LDN investments are expected to be more evenly distributed among agriculture, forestry and diversified-sector investments by 2021.**[29] Agriculture is expected to see the strongest acceleration over the next five years, growing nearly 350% by 2021. Investments into diversified-sector projects are also estimated as likely to increase by more than 200% over the same time period.

Figure 16: Expected cumulative growth in LDN investments by sector, 2016-2021[30]



Cumulative to date and 2021 target numbers based on 27 and 31 data points, respectively. Source: Mirova, Bonterra Partners, 2016

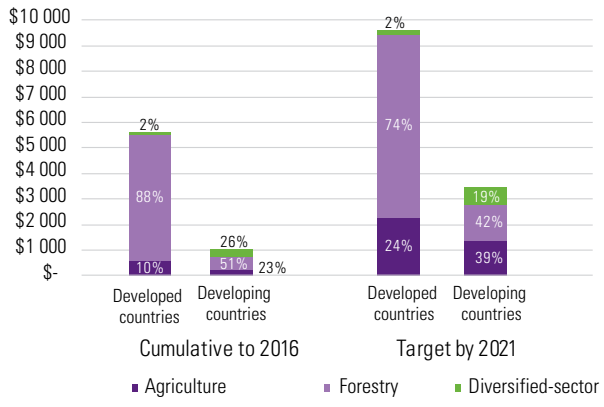
3.2.2.4 Investments in developing countries are more balanced by sector

Only 2% of all investments in developed countries are in what we consider diversified-sector projects. Comparatively, the proportion of diversified-sector investments in developing countries reaches 26% and is further expected to grow to 2.5 times its current size over the next five years. In other words, **developing countries see a more balanced mix of LDN activities by sector compared to the market**

28, 30. All figures that could be related to previous years and past performance are no indicator of future performance.
29. See Glossary for definition of 'diversified-sector'.

in developed countries, which is dominated by forestry investments.

Figure 17: Distribution of capital raised for LDN investments by sector and project region, cumulative to 2016 vs. 2021 targets (US$ million)[31]

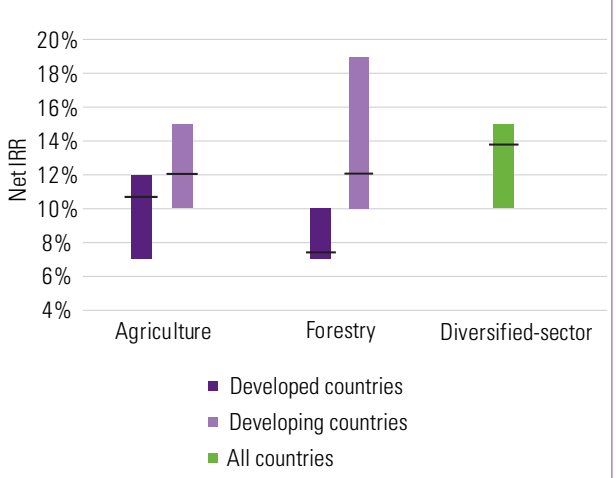


Cumulative to date and 2021 target numbers based on 27 and 31 data points, respectively. Source: Mirova, Bonterra Partners, 2016

3.2.2.5 Relatively consistent range of IRR target across sectors and geographies

We were only able to collect net IRR targets (after all management and performance fees) on 18 investment funds and projects, however, our dataset was relatively consistent. Overall, **we see investments in developed economies targeting a slightly lower IRR range compared to those in developing countries, reflecting some degree of political and currency risk premium.** With timber being a more mature asset class in developed countries generally, we also see forestry investments in these regions targeting a relatively narrow IRR range of 7-10%. We have aggregated the few data points we collected for diversified-sector projects in developed and developing countries and present them as one range in the graph below.

Figure 18: Target net IRR by sector and project region[32]



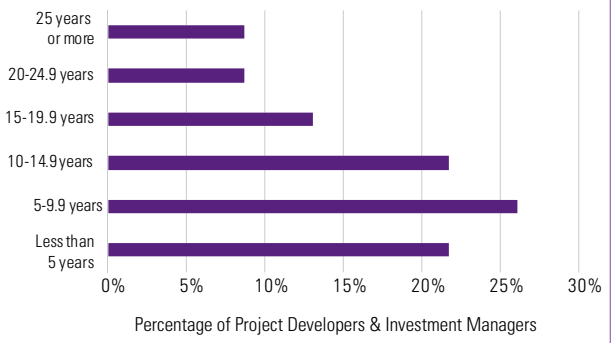
Bottom and top of each bar represent the respective lowest and highest net IRR target in the data collected. Black line indicates median target. Data based on 18 data points. Source: Mirova, Bonterra Partners, 2016

The return target from our limited sample size is overall similar to the 5-9.9% net IRR target[33] for global conservation investments presented by NatureVest and EKO Asset Management (now Encourage Capital) in 2014, which were also dominated by real assets, in particular, forestry investments. Moreover, **our study participants' ability to raise funds to date based on their target IRR ranges reflects the existence of investor interest in these types of LDN investment products.**

3.2.2.6 Nearly 50% of actors have been in operation for less than 10 years; those with large funds have been operating for 10 years or more

LDN is still a developing sector, with new entrants continuing to appear. Based on each organisation's year of incorporation, **70% of our study participants only started operating after the year 2000, while 48% have been operating for less than 10 years.**

Figure 19: Years of operation in LDN market (based on year of incorporation)



Based on 23 data points. Source: Mirova, Bonterra Partners, 2016

Contrastingly, **the project developers and investment managers that have raised large amounts of capital for LDN investments to date, defined for the purposes of this exercise as a cumulative minimum of $300 million, are all groups that have been operating for at least 10 years** (prior to or since 2005). It is not mere coincidence that these are all organisations working in the forestry sector in developed countries, since timber in developed economies such as North America has been a well-developed asset class for a long time. These key players' assets under management account for a large majority of forestry investments in developed economies, as covered in Section 3.2.2.3 earlier.

3I3 Funding sources

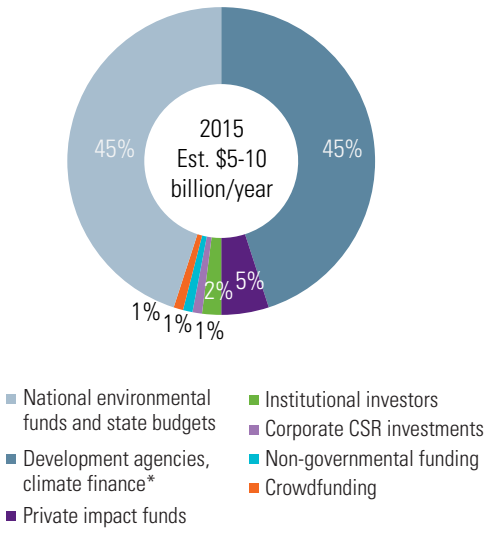
3.3.1 Public funding sources

Of the $5-10 billion in annual investments currently being deployed into LDN activities, it is estimated that as much as 90% is contributed by public funding sources (FAO and

31. All figures that could be related to previous years and past performance are no indicator of future performance.
32. These projected IRRS are no indicator of future performance.
33. Investment in the strategy is mainly subject to loss of capital risk. The information submitted reflect data reported by the market study participants to Mirova and Bonterra Partners as at the date of this document and are subject to change without notice.

Global Mechanism of UNCCD, 2015). These public sources are primarily made up of DFIs, technical assistance agencies, national climate finance and adaptation funds, as well as national environmental funds and state budgets.

Figure 20: Distribution of LDN investments by funding source, 2015



** Development agencies and climate finance includes DFIs, technical assistance agencies and climate funds such as national climate funds, adaptation funds*

Source: FAO, Global Mechanism of UNCCD, 2015

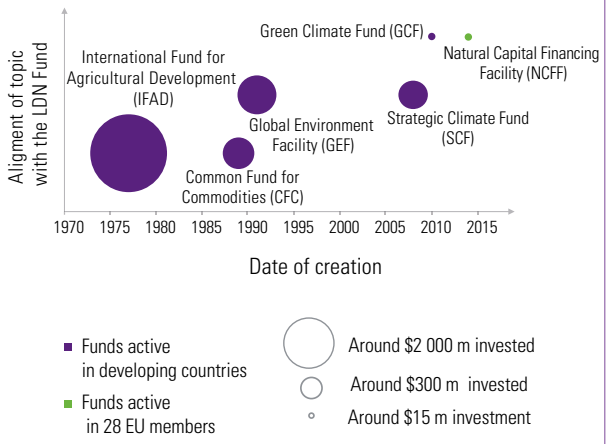
A number of financing instruments are employed by public entities to support LDN activities, with the most common being grants, loans, debt relief and guarantees. Public financing in almost all cases does not seek market-rate financial return, if any return at all, making this capital pool much more flexible and appropriate for backing conservation activities that are currently not 'bankable', or conservation projects that have not been tested and proven in the eyes of private investors. Besides project implementation, public money also finances feasibility studies.

These public financing instruments have been successfully utilised in the past for public-private structures, so-called blended finance structures, to absorb and lower the investment risks for private investors so that additional private capital would flow into the LDN market. For example, the Multilateral Investment Guarantee Agency (MIGA), as a member of the World Bank Group, has provided a 15-year political risk insurance policy to enable investors of Eco-Planet Bamboo, a company that restores degraded land by establishing commercial bamboo plantations, to invest in Nicaragua and South Africa. The policy guarantees against financial losses due to political risks of expropriation, war and civil disturbance in these developing countries up to a pre-agreed amount (FAO, Global Mechanism of UNCCD, 2015).

A majority of public funding deployed to date is contributed through official development assistance (ODA). According to the latest UNCCD and OECD reports on aid targeting desertification, relevant bilateral ODA amounted to nearly $5.5 billion in the 2012-2013 period.

In addition to ODA, there are also a few key multilateral dedicated public funding initiatives that include LDN-related activities as part of their investment mandate.[34] While annual investment disbursement amounts are not publicly available for all those funds, **the cumulative amount that these key public funds have invested to date on projects related to land management in total is estimated to reach at least $3 billion.**[35]

Figure 21: Examples of major public funds' spending to date on LDN-related projects since fund creation



Note: bubble size reflects approximate fund spending on land management projects.

Source: Mirova, Bonterra Partners, 2016

Several observations can be made about these pioneering funds:

- While IFAD is the largest historical contributor to LDN investments in our analysis, as a 'first-of-its-kind' multilateral funding organisation set up in 1977, it focuses exclusively on rural poverty reduction, with fighting land degradation as a core strategy rather than its mission.

- Within the scope of public finance, the LDN market is proving increasingly dynamic with the recent emergence of funds such as the GCF or NCFF, both of which extend beyond the public sector to support private sector projects. These newer funds are likely to grow rapidly given the positive momentum on issues surrounding climate resilience and natural capital, and could overtake IFAD in LDN investment contribution over time.

- The Green Climate Fund (GCF), though founded only in 2010, has a target fund size of $10 billion. A minority of

34. We attempt to cover only LDN-related projects in this analysis. This includes: GEF's projects that focus on land degradation, GCF's 'Wetlands' and 'Resilience of Ecosystems and Communities' projects, NCFF's entire budget to date, SCF's projects under the themes of landscape approaches, agriculture and landscape management and agroforestry, IFAD's budget dedicated to projects related to the objectives of the UNCCD, and CFC's entire budget. All based on public information available on these institutions' respective websites.
35. Figure based only on data voluntarily reported by some of the multilateral institutions; the actual exhaustive figure would be higher.

projects funded so far by GCF are land-based projects that combat land degradation, a pattern likely to hold steady going forward.

- Almost all of the investment vehicles are focused exclusively on developing markets, with the exception of the Natural Capital Financing Facility (NCFF), which focuses on Europe.

- As the only main public funding source devoted to developed countries (specifically EU-28 countries), the European Investment Bank-managed NCFF is looking to invest up to €125 million ($140 million) in projects that promote and enhance natural capital during its pilot phase from 2014 to 2017. With an emphasis on climate change adaptation and nature and biodiversity, NCFF has an investment strategy that is closely aligned with that of the LDN Fund.

3.3.2 Private funding sources

To protect our planet's ecosystems, public financing alone is not sufficient. **To fill this gap, the private sector would need to step up.**

Generally speaking, there is no shortage of private capital. Total bankable assets of retail, (ultra-)high-net-worth, and institutional investors, amounted to approximately $175 trillion in 2014 (Credit Suisse, WWF, McKinsey, 2016). A majority of the approximate $6.3 billion that for-profit project developers and investment managers in our study have raised to date is private capital, with a much smaller proportion coming from public funding sources, illustrating private investors' appetite for sustainable forestry investments in developed economies in particular, but also for LDN investments globally in general. The for-profit entities in our study also believe they can raise close to another $6 billion over the next five years, mostly from private capital. **Leveraging senior debt financing from commercial banks is also one option that should be explored and encouraged.** Still, the challenge is to significantly accelerate private investors' allocation from where it is now to fill the large funding gap in order to help the world achieve LDN by 2030. Solving this challenge could fully unlock the potential of private capital, allowing LDN investments, or conservation finance in general, to have a shot at becoming a more mainstream investment product. We will discuss the barriers currently faced by the LDN market in attracting private capital at scale in Section 4 and address how the LDN Fund can help remove some of these barriers in Section 5.

3|4 Industries

We have seen an increasing number of industry players committing to LDN-related initiatives and other environmental targets over the years. From a mere 50 companies or so that committed to reducing the ecological impacts of their commodity supply chains in 2009, the number grew to nearly 300 by 2014 (Supply Change, 2016). Many are consumer-facing retailers and manufacturers, but even some commodity producers, processors, and traders are now setting sustainability goals. All are businesses that, in one way or another, depend on agricultural and/or forestry commodities as a form of raw material. The following are examples of corporate commitments to initiatives that contribute to LDN:

- Unilever, among the world's largest buyers of palm oil, is committed to achieving zero net deforestation associated with four commodities: palm oil, soy, paper and board, and beef, no later than 2020;

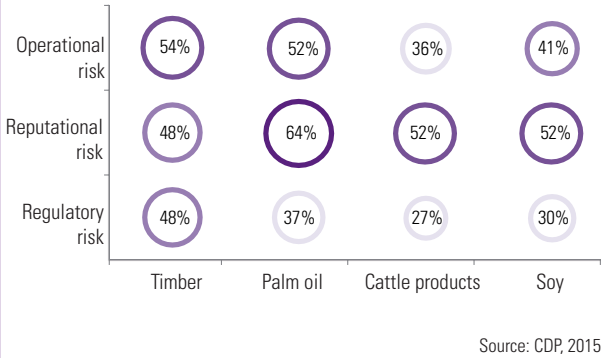
- The adidas Group, as a pioneer member of the Better Cotton Initiative, has committed to using 100% Sustainable Cotton by 2018;

- IKEA aims to source 100% of its wood from recycled and FSC-certified sources by 2020;

- General Mills has committed to sustainably sourcing 100% of its 10 priority ingredients by 2020, representing more than 50% of its annual raw material purchases.

In addition to these individual corporate programmes, industry players and associations have also formed alliances to discuss issues related to sustainability and natural capital, the Natural Capital Coalition being one example. Businesses are becoming increasingly aware that long-term factors, including continued degradation of the land and climate-change induced pests or diseases are taking a serious toll on crop quality and yield. The last 10 years' huge volatility in commodity supply and prices are also causing businesses to rethink their supply chain operations, as the risk is impacting growth and directly translating to the financial bottom-line. **Even more important than these operational risks, companies in some of the key commodity industries, such as palm oil, cattle and soy, are concerned about their reputations,** highlighting reputational risk as their biggest concern in the recent CDP report, followed by operational and to a smaller degree, regulatory risks (CDP, 2015).

Figure 22: Proportion of companies recognising substantive operational, reputational and regulatory business risks in the supply chain



Source: CDP, 2015

Under the different pressures, an increasing number of industry corporations are working with their suppliers, governments, NGOs, local communities and investors to support LDN-related activities. Many, but not all, of these

industries' discussions concern ways to green their supply chain so as to improve and stabilise raw material sourcing from agricultural and forest land. **We believe there is a huge opportunity in increasing collaboration among different stakeholders to improve the supply chain**: currently only 13% of manufacturers and retailers who participated in the CDP 2015 survey are engaged in joint projects with their suppliers (CDP, 2015).

Multiple sustainability standards and initiatives have sprung up around the production and procurement of raw materials, bringing leaders from the public and private sector together to at least agree on a minimum set of actions that need to be taken to help impacted land achieve LDN. These initiatives include the Forest Stewardship Council (FSC), Better Cotton Initiative (BCI), Roundtable on Sustainable Palm Oil (RSPO), Round Table on Responsible Soy (RTRS), Standard for Sustainable Cattle Production Systems, and others. There are also certification schemes, such as the Rainforest Alliance, UTZ, that consumer-facing brands participate in to demonstrate their commitment to sustainability.

For companies working closest to the upstream part of the supply chain, or whose businesses actually own or are directly linked to the land, some have also taken steps to invest directly in land restoration activities. Typical examples include the food or paper and pulp industries.

Still, industries need to continue to up their efforts in supporting LDN. For example, **according to CDP, 50% of companies committed to sourcing certified soy are lagging behind in implementation as they have yet to organise their supply chains** (CDP, 2015). Also, many of the commodities that have caused land degradation, such as corn and soy, are used by the animal feed industry, traditionally more insulated from consumer scrutiny. Yet around three quarters of soy globally go into animal and fish feed, according to the WWF Soy Report Card 2014. In their study, which covers European companies that use soy for animal feed or animal products, only seven feed companies have made some sort of commitment to use responsible soy while at least eight others have not even acknowledged the problems inherent in irresponsible soy (WWF, 2014).

Figuring out how all the actors along the value chain, from producer and processor to trader, retailer, and end-consumer, can each play a part in supporting LDN activities is something that would require extensive cooperation among all stakeholders, including small- and large-scale producers, businesses, governments and NGOs.

The fledging LDN market continues to grow. We expect to see the various actors in the LDN value chain continue to evolve the way they engage, invest and participate in the market. Part of the development of the sector requires that these actors tackle the challenges each of them faces in scaling and successfully deploying capital. In the case of industry players, engaging a higher proportion of them to begin with examining their own supply chains would represent an important step. Section 4 explores some of these challenges, and how existing gaps in the market can be turned into opportunities for the LDN market.

4 | Investment readiness of the LDN market – opportunities & gaps

Based on our earlier analysis of key actors in the LDN marketplace, in this section we highlight several key market trends, opportunities and gaps that reflect the level of investment-readiness of the market. We present our findings in two parts: 1) those that relate to the overall LDN market and 2) those that are investment-specific. As one would expect, many of the opportunities and challenges are integrally tied to one another.

4|1 Market observations

4.1.1 Gap between the investment needed to achieve LDN and the typical $100-250 million fund size in market

A majority of the investment managers in our study have raised or are targeting to raise capital in the range of $100-250 million for each of their investment vehicles. Some of the funds are even smaller. These managers typically raise capital every 2-4 years and structure their investment products as Limited Partnership funds with a duration of 10 years or more.

Many of the first-time or emerging investment managers cited fundraising as their biggest challenge, and expressed the desire to see stronger investor demand and raise much larger funds (See Section 4.1.2).

Most of the more established managers also tend to raise funds not much larger than the indicated range, however, they cite a different reason for doing so: they have found the 'sweet spot' where they can most effectively deploy capital over the investment period and do not wish to raise more than they can deploy. These larger investment managers build up their sizable assets under management over time through a series of fund offerings.

Based on the above, we see a gap in expectations between the emerging and more experienced managers: the former try to raise as much capital as they possibly can, while the latter have found a sweet spot in which to operate. More critically, **there remains a large gap between what these managers intend to raise and deploy and the large amount of investment required globally to move the world towards LDN.**

4.1.2 Funding gap due to lack of track record

Participants in our study that have raised a minimum of $300 million of LDN capital to date are all organisations that have been operating for at least 10 years. Contrastingly, only four of the actors who have been operating for less than 10 years have raised more than $200 million to date, suggesting the need for an established management track record to attract capital. **The lack of capital willing to fund new, emerging project developers and investment managers represents a big hurdle for the LDN market,** which in turn makes it difficult for these actors to implement cost-effective projects that reach scale, as investments often benefit from economies of scale and suffer from lack thereof.

Raising capital for most emerging investment managers and project developers is challenging, as they have not yet proven their ability to make good investments, execute, exit, and deliver the returns they promise. **The sector's youth and potential are demonstrated by the fact that 48% of our market study participants have been operating in the sector for less than 10 years. These actors require special support in developing and scaling investment models that are impactful from an LDN perspective but also generate the kind of risk-adjusted returns that investors want to see.**

4.1.3 Lack of deals with attractive risk-adjusted returns in a nascent market

We see the LDN segment as a subset of the conservation finance sector, experiencing some of the same investment challenges. According to private investors, the single largest constraint to the growth of conservation impact investing is the **lack of deals with an appropriate risk-return profile** (NatureVest/EKO, 2014). This investor concern, in turn, is related to several key project and market barriers that have hampered the growth of conservation investments, as identified by Credit Suisse, WWF and McKinsey in the 2016 Conservation Finance report:

- High project identification costs due to lack of a standardised process for tracking and evaluating investable opportunities
- Capacity constraint (no 'one-stop' shop in the market currently possessing all the skills required to identify investable projects)
- Lack of project and management track record
- Unpredictability of underlying income sources
- Absence of collateral to reduce project risk
- Lack of tested and agreed conservation impact monitoring frameworks
- Project scalability/replicability
- Lack of cash flow aggregators to bundle a diverse set of small projects into a single investment product large enough for most investors

The above challenges for investors are often observed in any immature industry such as conservation finance, but are especially applicable to the LDN market. Many of the LDN projects seeking investments take on considerable risks by working in politically unstable countries where land is most degraded, or are trying to use innovative and ecological approaches to managing land which have not yet been tested on a large scale. Most private investors would expect to see higher returns on these riskier investments, however, there is a mismatch between their expectations and what they are presented with by project sponsors. **As the LDN market is still developing, innovative financing structures need to be created to reduce the risk for investors or enable them to achieve better risk-adjusted returns.**

4.1.4 Opportunity for a fund dedicated to fighting land degradation worldwide

Our analysis of existing public funding sources in Section 3.3.1 suggests that **there is currently no dedicated public funding pool that invests globally in projects to combat land degradation.** This helps to confirm the opportunity and need for a new dedicated funding source, such as the LDN Fund, that combines public and private capital to support LDN activities in both developed and developing countries. We see multiple synergistic opportunities for the LDN Fund to collaborate with public financing. Examples include the LDN Fund investing in LDN projects on behalf of DFIs, sharing project pipeline and due diligence, or structuring and co-investing in transactions through blended capital structures to attract other private capital (see Section 5).

4.1.5 Opportunity to increase collaboration amongst stakeholders

We believe that close collaboration with all stakeholders, particularly in developing countries, is critical to the success of LDN investments. In fact, we would argue that it would be operationally risky to 'do it alone' in emerging markets, without involving other stakeholders.

Due to the social and land distribution structure, projects in developing countries require a collaborative approach, where all the stakeholders are consulted and involved in decision-making. These include the project developers and investment managers structuring the investment, government bodies, local communities, industry corporations serving as project off-takers (e.g. coffee and cocoa bean buyers), and other local businesses. Last but not least, **it is often local NGOs that provide the connections and experience to convene everyone; they are often the local champion with valuable field knowledge.** NGOs play a particularly important role in giving a voice to local communities and ensuring projects will benefit wildlife and habitat. In developing countries, project developers and investment managers tend to be two different parties, in contrast to developed economies, and often form partnerships with NGOs to establish LDN projects; sometimes NGOs also operate these projects at the local level.

LDN investments in developed economies require a collaborative approach that manifests itself differently. It is often easier to develop and replicate a project in countries where the rule of law is generally followed and enforced. Even in developed countries, however, we often see investment managers working closely with NGOs, seeking advice and feedback during the LDN strategy development phase and throughout project implementation and monitoring.

4|2 Investment-specific observations

4.2.1 Opportunity to restore land in developed economies by building on existing real asset investment strategy

Almost all of the for-profit investment managers in our study that operate in developed economies acquire real assets (land) as part of their investment strategy. In addition, they play the role of project developer in creating and managing the entire project themselves. Land acquired includes forests, farms and grasslands, some in degraded condition where restoration is the goal and some with high conservation value where conservation and sustainable land use is intended. Even some of the not-for-profit participants in developed countries also acquire land as a strategy to protect or restore it.

In developed countries where there is strong rule of law and clear land title, there remains an opportunity to acquire and restore privately-owned farmland, grasslands and forests. Many private properties in countries such as the USA and Australia suffer from land degradation either due to mismanagement, neglect or abandonment. For LDN activities to deliver the intended environmental and economic returns, long-term investments in improving land conditions and infrastructure are required which ultimately add value to the property. Making permanent improvements on leased land and leaving the economic upside to the landowner would not make financial sense. A landowner may also prohibit tenants from adopting certain land management approaches, preventing them from implementing the appropriate LDN activities.

As investors become increasingly interested in real asset investments due to their protected investment downside and inflation-adjusted returns, a real asset strategy combined with land restoration activities can be compelling to investors. This is also an opportunity to allow more projects focusing on land degradation rehabilitation to be developed, thus expanding the young LDN market beyond investments in sustainable land use. As a side note, a few study participants also pointed out similar opportunities to acquire and restore privately-owned degraded land, such as degraded plantations, in developing countries.

Most mainstream investors are still sceptical of ecological land management strategies that have not been widely practiced or view them as risky or complex compared to more conventional farmland investments. On the other hand, some of the more progressive investors cannot mobilise the large amounts of capital required to help these projects achieve scale. An impact-focused investor with available capital would bring tremendous value to this type of LDN investment strategy, particularly in developed countries.

4.2.2 Opportunity to support 'bottom-up' diversified-sector investments in developing countries

Compared to the situation in developed markets, land tenure is a more sensitive issue in developing countries. Land title and laws are often murky, the land is often distributed and scattered across thousands of small landholders, and indigenous people may have been previously displaced. Often foreign investors are prohibited from outright land ownership, and ecologically-sensitive areas such as tropical rainforests can only be leased from the government. Under these more complex political and social circumstances, buying land at scale in developing countries is usually not feasible, nor considered culturally sensitive (an exception to this could be degraded private plantations).

Many of the LDN projects in developing countries adopt a 'bottom-up' approach: they are aimed at working with and improving the livelihood of a large number of small/medium-sized producers and landholders, with an investment strategy dependent on the specific needs and structure of these local communities. These projects often require less straightforward but more innovative strategies. These 'bottom-up' investments, though coming from the field level, can also translate to benefits for industries that look to source more reliable and sustainable supply from these producers. Community buy-in on these projects, typically through NGOs and local governments, and social impact measurements are essential. **To the extent possible, 'bottom-up' projects also utilise, sustainably manage, and restore the wide array of natural resources and ecosystem services available in their landscape.** Project developers and investment managers are gaining interest and experience in creating these types of diversified-sector 'landscape' projects in developing countries, generating income not only from agricultural and forestry production, but also from sources such as renewable energy, forestry carbon credits, ecotourism and other activities while rehabilitating the whole ecosystem. If managed properly, these triple-bottom-line projects can provide sustenance for small-holders, improve productivity and profitability of small-scale food and fibre production, create employment and economic value across multiple sectors, restore nature's ecosystem functions, and help the land move towards LDN while delivering financial returns to investors.

One way to encourage these 'bottom-up' investments is to support the project developers and investment managers who are developing these projects. There is also the opportunity to invest in or work with microfinance institutions and local financial institutions that disburse loans to small and even subsistence producers in developing countries.

The early phases of these projects, typically feasibility studies, often require grant funding, but once they are proven to be commercially and financially viable, debt and equity funding and patience from investors can help these projects deliver results at scale. While many investors do not appreciate the complexity of these projects, having investors that have the patience and long-term investment horizon is critical to success.

4.2.3 Opportunity for industries to create 'top-down' sustainable supply chain strategies

In Section 3.4, we discussed how corporations in different industries are increasingly committed to a sustainable sourcing model. **The strategies and approach of industries to achieving sustainability is driven primarily by a growing base of end buyers and consumers that demand to see sustainable sources of supply, and also by a market environment wracked by climate and price volatility.** Becoming vertically-integrated or an upstream producer is not the only, nor may it be the best option for industries to secure the natural resources they need. We see a large opportunity for industries to work hand-in-hand with project developers to invest in projects that target commodities, such as fruits and nuts, that they can purchase through long-term off-take agreements. Financial investors and investment managers can also participate in corporate-backed LDN projects through co-investments, as most industry players would prefer to share the investment costs and risks with other parties.

Industrial players are overall still in their early phase of conceptualising these types of investments. But these 'top-down' approaches, in which investment demand comes from the corporations due to their need to build more responsible and robust chains of supply, can also benefit the local small- and medium-scale producers at the other end of the supply chain. Many of these potential investments would also require piloting and engagement with NGOs and the underlying local communities responsible for producing raw materials. We believe a value-adding investor in this regard would be one that can encourage and facilitate discussions among the various parties and can help incubate or fund some of the pilot testing.

4.2.4 Challenge of generating returns from most conservation activities

Most conservation projects that focus on preservation of resources, such as habitat restoration, protecting forests through a no-harvest policy, and taking farmland out of production to improve water quantity and quality are currently not 'bankable' or even revenue-generating without regulatory support. This is a reflection of our society's inability to put a price on ecosystem services in most cases, forcing **LDN and other conservation projects to depend heavily on public and philanthropic funding for the moment.** A few exceptions are as follows:

- Restoration activities that increase land value when the property is sold. This could include activities such as improving soil drainage, thinning degraded, sick or overcrowded forests, or repairing wetlands, with the assumption that the next buyer would pay a higher price for an improved property.

- Ecotourism generates revenue from tourist activities. However, most ecotourism projects are small (e.g. investing in a local eco-lodge business which protects surrounding natural areas), limiting the scalability of such investment models. Ecotourism on a large scale would involve leasing or purchasing large areas of land. **In most cases in both developed and developing countries, the revenue from ecotourism alone is not sufficient to make a conservation project profitable** or fully cover the costs of maintaining the property.

Other conservation activities that can be profitable and have received considerable private investments are backed by government legislation in developed countries. Essentially, the strong regulatory framework provides certainty to the market and helps create end-buyers for these services. Examples include mitigation banking, conservation easement, and the development of carbon credits for the Australia Emissions Reduction Fund

or California's AB32 cap-and-trade programme. These investments have over time attracted more steady flows of private capital than those that depend on a voluntary market, such as REDD+ credits, which developers find challenging to sell and monetise. As several project developers we spoke with commented, REDD+ credits are for now considered an upside to investment return only since carbon prices remain low.

Because of these challenges, LDN projects that incorporate at least some component of food and/or timber production would have a higher likelihood of generating stable cash flow and hence appear more appealing to private investors.

4.2.5 Investment gap in agriculture, in terms of regions and crop production diversity

Dealing with deforestation and forest carbon issues has long been an important part of climate change and public policy discussions. Meanwhile, poor farmland management continues to contribute globally to land degradation and loss of ecosystem services provided by the soil.

Our market study reveals that the forestry sector has absorbed more LDN investments than the agriculture segment. This is particularly true in developed economies, where LDN investments in agriculture are expected to continue to lag those in forestry despite a projected acceleration in investment pace.

In developing countries, our study participants have placed a strong emphasis on helping and working with small producers and landholders to invest in sustainable coffee and cacao production. While the global demand for these high-value crops is strong and continues to grow, it is important to ensure that local small producers have the opportunity to achieve a sustainable livelihood and diversify their income beyond these crops.

We see this also as **an opportunity to engage food and beverage and other industries as off-takers and participants in design initiatives that can benefit the land and all stakeholders, including small producers.**

Several key themes emerged: lack of track record at the manager and sector level, shortage of investments with risk-adjusted returns that private investors find appealing, and insufficient funding for LDN investments as a consequence of the sector's immaturity. These challenges speak to the need for a kind of investor that is resourceful and willing to take a long-term view and support newcomers for growth of the LDN market to accelerate. The market gaps also represent an opportunity for different actors along the value chain to collaborate and devise new strategies for developing profitable and sustainable LDN projects in order to attract new sources of funding. Section 5 discusses in further detail the potential role the LDN Fund can play in all these developments.

5 | The LDN Fund as a source of transformative capital

The LDN market is gradually improving its investment-readiness, as new talents enter the sector and innovative projects continue to be created. Actors (with 10 years of track record or more) have gained traction in raising capital and delivered ecological and financial returns with proven bankable projects. However, many new entrants have yet to establish a track record and are finding themselves fundraising in a challenging environment.

The actors in our study have the ambition to raise $7.6 billion for LDN investment by 2021. To reach that target in such a short timeframe, the following two market conditions must be met:

1) additional investment cases that are proven to be scalable and profitable, which in turn will help drive capital to the sector, including, potentially, debt capital from commercial banks; and

2) more investors ready to step up and invest in promising but unproven actors and projects to help the LDN market build track record.

The LDN Fund was conceptualised on the assumption that public and philanthropic funding alone is not sufficient to invest in all the projects required for the world to achieve LDN; the participation of private capital and talents is required as well. Recognising the two market conditions that need to be met to make the LDN market more investor- and investment-friendly, the LDN Fund can bring considerable value by being a source of transformative capital that barely exists in the current market, through the following mechanisms.

5|1 The LDN Fund could invest worldwide in both developed and emerging economies

Land degradation is happening worldwide. For the LDN Fund to make a meaningful impact, it should invest in scalable projects that aim to restore degraded public and private land in both developed and developing countries. This is the only way for the whole world to move towards LDN by 2030.

5|2 The LDN Fund could be a source of patient, long-term capital

From the LDN market perspective, the issue with the existing financial market is not a lack of capital per se, but the lack of long-term patient capital.

The LDN Fund could represent a patient investor, understanding that some of the LDN activities take a long time to implement and see results, often longer than the 10- to 12-year investment horizon (or less) that most investors are willing to wait. A few investment managers in our market study are considering structuring their investments as evergreen vehicles that do not need to divest and exit by a fixed timeframe, as that would allow them more time to create the right type of exit, one able to guarantee the sustainability and longevity of their LDN projects. A typical investor that only invests via a private equity type of 10-year Limited Partnership fund structure would not be able to finance these types of impactful investments, but a patient investor with a long-term horizon willing to notably consider innovative investment structures could.

5|3 The LDN Fund could incubate 'bottom-up' and 'top-down' investment strategies through its Technical Assistance Facility

Given the limited maturity of the market, the LDN Fund intends to set up a Technical Assistance Facility (TAF) to fund proven investment concepts in their scaling-up phase in order to help them become investment-ready projects. While other TAFs currently exist and are backed by various DFI or foundation donors, the LDN Fund's TAF could help scale and commercialise projects that have passed the proof-of-concept stage.

However, given the clear need for feasibility study financing in the market, a distinct and complementary vehicle to this TAF could support pre-feasibility ideas and pilot studies of greenfield projects that are still in their proof-of-concept phase and needing more patient incubating.

All in all, these two TAF structures could be utilised to **fund 'bottom-up' diversified-sector projects that target small-scale producers in developing countries during the proof-of-concept or scaling-up phase.** Furthermore, they could **fund 'top-down' collaborative pilot projects between industry players, project developers, NGOs and local communities to secure sustainable raw materials for industries' supply chains,** which industries can purchase through long-term off-take agreements.

5|4 The LDN Fund could support promising emerging project developers and investment managers

The issue of (lack of) track record sheds light on the need to help promising emerging actors establish track records. By being a 'first mover' to support and invest in projects established by these emerging actors, the LDN Fund would enable them to more easily raise capital from other investors. **Most investors tend to follow and derive comfort from seeing a large credible investor taking the position as a lead investor.**

Although it may be difficult to deploy large investment tickets into these emerging actors, since their fund size remains

small (as discussed in Section 4.1.1), it is important for the LDN Fund to find an efficient way to invest in and support their projects. **Helping fund LDN projects that ultimately become scalable and successful would help build track record not only for the project developers and investment managers but also for the LDN market overall.** Backing promising actors and helping them raise additional funds from other investors constitutes an efficient way for the LDN Fund to utilise its funds in a scalable way.

5|5 The LDN Fund could develop synergies with established project developers and investment managers

As regards actors that already have a track record of success in investing in and creating LDN projects, the LDN Fund could work with them to devise customised investment programmes that would deliver the specific types of impact and return profile the LDN Fund wishes to see. Or similarly, the LDN Fund could consider hiring these actors as investment advisors to identify LDN investment opportunities in a specific sector or region, or co-invest alongside them. These established actors tend to work with and invest in larger projects through which the LDN Fund would be able to scale its investment impact.

5|6 The LDN Fund could be a sector aggregator and coordinator

As the world's first dedicated investment fund to focus on LDN investments, the LDN Fund is in one of the best positions to build a strong global pipeline of deal flow and develop expertise in the area. Combined with the global mandate and sizable pool of capital that it expects to have, the LDN Fund could become the leading authority in the market, potentially allowing it to serve as an investment and sector aggregator, connecting project ideas and lessons learned from one region with another and linking investors around the world with project developers and investments seeking funding. Investors that lack the time, the team or the knowledge to manage the investment process can invest in the LDN Fund or set up a co-investment programme to invest alongside the LDN Fund in specific regions or sectors.The Fund can also play the role of a coordinator that convenes relevant representatives from public, non-governmental and private sectors to identify and structure investment opportunities.

5|7 The LDN Fund could invest concessionary capital in blended finance structures

Mainstream private investors have an appetite for conservation finance, in particular wealth-preservation and return-seeking investment structures (Credit Suisse, WWF, McKinsey, 2016). Yet as discussed in Section 4.1.3, the lack of deals with appropriate risk-return profiles is still the single largest challenge to growth of conservation impact investments (NatureVest/EKO, 2014). To overcome this, the LDN Fund could invest in projects that have blended finance structures which combine concessionary but still return-seeking funding with market-rate capital. Within these structures, the LDN Fund can be the provider of 'smart' concessionary capital to promising projects of various stages in order to attract private capital.

Concessionary capital can come in various forms, depending on the investment-readiness of the projects, for example:

- First-loss loan (e.g. ranked junior to commercial bank loans) or loans with below-market-rate interest for 'investment-ready' but early-stage projects
- First-loss equity (e.g. junior equity shares) or mezzanine-type financing (e.g. principal payment plus small upside) for projects that are ready to scale, allowing private investors to potentially receive a higher return

Distinguishing which type of financial instrument to use for funding different stages of investment is critical. One of the pitfalls in the conservation finance sector is unproven early-stage projects seeking private equity funding when in fact they should be funded by grant or subsidised capital due to the projects' high exposure to capital losses (NatureVest/EKO, 2014). On the other hand, more than one actor in our study commented that there is an abundance of concessionary debt in the market competing for less-risky projects that have passed proof-of-concept, especially in developed economies; what is desperately missing to scale these later-stage projects is concessionary equity so that these projects can attract private investors looking for market-rate returns. Investments with more appropriate risk-return in private investors' eyes could also help trigger the interest of commercial banks in providing loans for some of these projects. Investing in a well-structured and sensible manner could allow the LDN Fund to maximise its capital allocation towards the most impactful investments and permit its capital to catalyse the sector to attract more private investments.

The key to success for the LDN Fund in acting on any of the above potential strategies is to maintain flexibility. For the LDN Fund to mobilise large pools of its own and other investors' capital to invest in the LDN market, it needs to be creative yet pragmatic, take calculated risks, and adopt strategies that most other investors have not attempted before. Hence **being open to new ideas, taking a phased investment approach in scaling its activities, and having the willingness to experiment by testing different models are all vital to success**.

6 | Conclusion

Land is the fulcrum that provides for humanity's basic needs: food, water, shelter, and clothing. As the focal point of our many global socioeconomic challenges, land managed sustainably and wisely can help alleviate issues of food insecurity, gender inequality, poverty, water and energy shortage, in addition to providing an important lever to tackle climate change. Yet **land degradation around the world has already led to enormous losses in social, ecological and economic capital.** For the world to reach the SDG target of achieving land degradation neutrality by 2030, land restoration and sustainable land use projects that contribute to LDN need to be developed and implemented globally at scale. Private capital needs to step in and fill the gap.

Meanwhile, **the market for developing and operating commercial LDN projects continues to grow.** As a nascent sector, we expect to see various actors in the LDN value chain evolve and adapt the way they engage, invest and participate. The project developers and investment managers in our market study that are pioneering the market aim to double the assets they manage for LDN projects to nearly $15 billion by 2021. Private investors are most likely to invest in those actors (as opposed to investing in NGOs or industry players), so **we see project developers and investment managers as an important engine for the LDN market that require support to grow.** Their investments are aimed at generating social, ecological and financial wealth, essentially decoupling economic growth from land degradation and the old industrial model of extraction. The market needs many more of these investments to achieve the LDN target. Our analysis reveals that these actors are struggling most with a lack of track record at the manager and sector level, a shortage of investments with risk-adjusted returns that appeal to private investors, and insufficient funding for LDN investments as a consequence of the sector's immaturity.

On the other hand, **we see much potential in project developers and investment managers working with other actors in the market to develop 'bottom-up' sustainable land use investments that aim to improve the livelihood of small to medium scale food and fibre producers and also 'top-down' large-scale LDN investments targeted to help industry players build a robust and sustainable supply chain.** As these new investment strategies continue to be developed and refined, we hope to see more projects elevate to the 'landscape' level where they not only guarantee the sustainability production of a single crop but also the sustainable management and restoration of other ecosystem services in the target area. **The involvement of local communities, NGOs, industries and government will be crucial in all of these.**

The LDN Fund could be the source of transformative capital that helps remove existing barriers, making the sector more investment-friendly and ready in private investors' eyes. It could help pave the road for long-term market growth by supporting emerging actors, incubating promising projects, allowing proven models to scale up, and permitting private investors to comfortably participate through blended capital structures. **For the LDN Fund to become the type of catalytic capital that is lacking in the market today is a view that resonates with almost everyone we spoke with in our market study.**

We see grounds for hope of the world reaching a state of LDN. The LDN market has the ability to 'cross the chasm', moving from being financed mostly by (limited) public and philanthropic funding to become a more traditional and commercial-oriented market that investors would participate in. The enabling conditions are there: restoring and sustainably managing large tracts of land requires the type of large, scalable investments that attract private investors; world leaders are supporting the sector with their LDN commitments at the country, regional and international levels; industry players and other project off-takers are increasingly examining their supply chains and engaging in conversations around LDN activities; and project developers and investment managers are continuing to test different investment models that may appeal to private investors. **The LDN Fund could leverage its own capital and other public funding sources to be the bridge that links LDN investments with the more mainstream investors that target financial return and impact.**

As the world tries to move towards a more sustainable and pragmatic model, the way society deals with protecting our planet is slowly changing. **We are seeing a transformation from voluntary, philanthropy-driven conservation behaviours to more market-driven, pragmatic approaches:** from NGOs solely relying on donor funding to some engaging the private sector and impact investment community to develop financially-sound projects; from leaving land untouched for conservation purposes to embracing the idea of working landscapes when appropriate; from compensating local communities through the voluntary REDD+ mechanism for not deforesting to helping them develop revenue-generating agroforestry projects; from taking livestock off overgrazed grasslands to encouraging ranchers to regenerate their land and livelihood through sustainable grazing practices; from trying to halt land degradation to proactively implementing programmes that would rehabilitate degraded land and generate a profit. These types of pragmatic approaches to engaging with the private sector while still upholding our obligation to take care of the land and its people offer the only way we can raise the funds necessary to achieve LDN by 2030.

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8| Annex

8|1 List of market study participants

Across Forest
Akuo Energy
Althelia Ecosphere
Beartooth Capital Partners
BioCarbon
Brinkman Group
Commonland
Conservation Forestry
Conservation International
EcoEnterprises Fund
ECOM Agroindustrial Corp. Ltd
Ecotrust Forest Management
Etc Terra
Farmland LP
Fauna & Flora International
Finance in Motion
Form International
Global Environment Fund
Grasslands LLC
IDH Sustainable Trade Initiative
Lyme Timber
Moringa Partnership
Naga Foundation
NatureVest
New Forests
Root Capital
SLM Partners
Technoserve
The Conservation Fund
The Forestland Group
UNIQUE

8|2 Table of commitments to LDN

Table 3: Table of commitments to LDN (1/3)

Country	LDN Target setting countries	The Bonn Challenge	WRI 20x20	AFR100	4p1000	The New York Declaration of Forests
Algeria	x					
Argentina	x		x			
Armenia	x					
Australia					x	
Austria					x	
Azerbaijan	x					
Bangladesh	x					
Belarus	x					
Belgium						x
Benin	x					
Bosnia and Herzegovina	x					
Brazil		x				x
Burkina Faso	x					x
Burundi		x				
Cabo Verde	x					
Cambodia	x					
Cameroon	x					
Canada						x
Central African Republic (the)	x					
Chad	x					
Chile			x			x
China	x					
Colombia		x	x			x
Congo (the)	x					
Costa Rica		x	x		x	x
Cote d'Ivoire	x					x
Croatia	x				x	
Denmark					x	x
Dominica	x					

Table 3: Table of commitments to LDN (2/3)						
Country	**LDN Target setting countries**	**The Bonn Challenge**	**WRI 20x20**	**AFR100**	**4p1000**	**The New York Declaration of Forests**
Dominican Republic	x					x
Ecuador			x			x
Equatorial Guinea	x					
Egypt	x					
El Salvador	x	x	x			
Eritrea	x					
Estonia					x	x
Ethiopia	x	x		x	x	
Finland					x	
France					x	x
Gambia	x					
Georgia	x					
Germany					x	x
Ghana	x					
Grenada	x					
Guatemala		x	x			
Guinea (Republic of)	x					
Guinea Bissau	x					
Guyana						x
Haiti	x					
Honduras		x				
India		x				
Indonesia	x					x
Iran	x					
Ireland					x	
Japan					x	x
Jordan	x					
Kenya	x			x		x
Kuwait	x					
Kyrgyzstan	x					
Lebanon	x					
Liberia				x		x
Lithuania					x	x
Madagascar	x			x		
Malawi	x			x		
Mali	x					
Mauritius	x					
Mexico	x	x	x		x	x
Mongolia						x
Morocco	x				x	
Namibia	x					
Nepal	x					x
Netherlands					x	x
New Zealand					x	
Nicaragua			x			
Niger	x			x		
Nigeria	x					

Table 3: Table of commitments to LDN (3/3)

Country	LDN Target setting countries	The Bonn Challenge	WRI 20x20	AFR100	4p1000	The New York Declaration of Forests
Niue	x					
Norway						x
Pakistan		x				
Panama						x
Peru	x		x			x
Philippines	x					x
Poland					x	
Portugal					x	
Republic of Korea						x
Republic of Moldova	x					
Russian Federation	x					
Rwanda		x		x		
Saint Lucia	x					
Senegal	x					
Serbia	x					
Seychelles	x					
Slovenia					x	x
South Africa	x					
South Sudan	x					
Spain					x	x
Sri Lanka	x					
Suriname	x					
Swaziland	x					
Sweden					x	
Thailand	x					
The Democratic Republic of Congo		x		x		x
The former Yugoslav Republic of Macedonia	x					
Timor Leste	x					
Togo	x			x		x
Trinidad and Tobago	x					
Uganda		x		x		
Ukraine	x					
United Kingdom					x	x
United States		x				x
Uruguay					x	
Uzbekistan	x					
Vietnam						x
Zimbabwe	x					

Source : Mirova, Bonterra Partners, 2016.

8I3 Market study methodology

We compiled an initial list of 42 project developers and investment managers identified as key or emerging players in the LDN market as defined by our market study parameters. A combination of meetings, phone interviews, and email correspondence with 31 of these entities was conducted to collect the data we needed about their operations. A few actors have since confirmed that their work is not directly relevant to the LDN topic or to our market study. Confidential information is only displayed at the aggregate level in this report. Desktop research was also carried out to gather publicly available information useful for the study.

The group of actors included in our study is illustrative only and by no means exhaustive, but is intended to be broadly representative of the key players in the existing LDN market.

We aimed to learn the following through the market study:

- Amount of capital raised by these actors to date and over the next five years through 2021
- Geography and sector(s) in which they have or plan to deploy investments
- Investment model in terms of use of proceeds, sources of financial return and investment horizon
- Key constraints and risks in their investments and industry
- How the LDN Fund can potentially add value to what is missing in the industry

No extrapolation of figures was made in our analysis. In reporting data from our study, where exact figures were not provided, estimates were made to the extent possible based on other data provided by the actors and our understanding of their investment and fundraising plans. In cases where we were presented with a range of figures, the average or midpoint was used for our calculations when necessary.

Most of the participants provided us with data only on the equity amounts they raised or plan to raise. Debt figures were provided as an estimate in some cases, or in most cases not provided or applicable.

8I4 Market study participant segmentation

The mapping analysis in Figure 11 of section 3.2.2 was created based on the characteristics of the project developers and investment managers covered in our market study as shown in the following table. In this table, the actors are segmented by project region and sources from which their projects generate revenue.

Table 4: Mapping of project developers and investment managers active in the LDN market - For-profit actors (Illustrative only, not exhaustive)

PROJECT GEOGRAPHY	MAIN SOURCES OF INVESTMENT REVENUE								
	Agriculture			**Forestry**			**Other (see explanatory note below)***		
	Project developer	Investment manager	Investment manager + Project developer	Project developer	Investment manager	Investment manager + Project developer	Project developer	Investment manager	Investment manager + Project developer
North America			Beartooth Capital			Beartooth Capital			Beartooth Capital
				Brinkman Group			Brinkman Group		
						Conservation Forestry			Conservation Forestry
			Ecotrust Forest Management			Ecotrust Forest Management			Ecotrust Forest Management
			Agriculture Capital Management						
			Farmland LP						
			Grasslands LLC						
			Lyme Timber			Lyme Timber			Lyme Timber
						New Forests			New Forests
						The Forestland Group			The Forestland Group
Europe	Akuo Energy							Akuo Energy	
	PUR Projet			PUR Projet					
						SLM Partners			

Main source of investment revenue Secondary sources of invesment revenue

*Note: Other includes renewable energy, ecotourism, mitigation banking, conservation easement, carbon credits, and other conservation activities.

Table 4: Mapping of project developers and investment managers active in the LDN market - For-profit actors (Illustrative only, not exhaustive)

PROJECT GEOGRAPHY	MAIN SOURCES OF INVESTMENT REVENUE								
	Agriculture			**Forestry**			**Other ***		
	Project developer	Investment manager	Investment manager + Project developer	Project developer	Investment manager	Investment manager + Project developer	Project developer	Investment manager	Investment manager + Project developer
Latin America	ECOM Agroindustrial Corp. PUR Projet	Althelia Ecosphere EcoEnterprises Fund Finance in Motion Livelihoods Moringa Partnership	Across Forest SLM Partners	Brinkman Group PUR Projet UNIQUE Forestry & Land Use	Althelia Ecosphere BioCarbon Group EcoEnterprises Fund Finance in Motion Livelihoods Moringa Partnership	Across Forest The Forestland Group	Brinkman Group	Althelia Ecosphere EcoEnterprises Fund Finance in Motion Livelihoods	
Africa	Akuo Energy PUR Projet	Althelia Ecosphere Livelihoods Moringa Partnership		PUR Projet UNIQUE Forestry & Land Use	Althelia Ecosphere BioCarbon Group Finance in Motion Livelihoods Moringa Partnership	Form International Global Environment Fund		Althelia Ecosphere Akuo Energy Livelihoods	Form International Global Environment Fund
Asia	PUR Projet	Livelihoods		PUR Projet	BioCarbon Group Livelihoods	New Forests		Livelihoods	New Forests
Oceania	PUR Projet		Grasslands LLC SLM Partners	PUR Projet	BioCarbon Group	New Forests			New Forests SLM Partners

Source: Mirova, Bonterra Partners, 2016.

Main source of investment revenue Secondary sources of invesment revenue

*Note: Other includes renewable energy, ecotourism, mitigation banking, conservation easement, carbon credits, and other conservation activities.

Table 5: Mapping of project developers and investment managers active in LDN market – Not-for-profit actors (Illustrative only, not exhaustive)

PROJECT GEOGRAPHY	Project developer	Investment manager +project developer	Investment manager
North America		NatureVest	
		The Conservation Fund	
Europe	Commonland		
Latin America	Commonland		
	Conservation International		
	Fauna & Flora International		
	IDH		
		NatureVest	
			Root capital
Africa	Commonland		
	Conservation International		
	Etc Terra		
	Fauna & Flora International		
	IDH		
	Naga Foundation		
		NatureVest	
			Root capital
Asia	Conservation International		
	Fauna & Flora International		
	IDH		
		NatureVest	
Oceania	Commonland		
	Conservation International		
	Fauna & Flora International		
		NatureVest	

Source: Mirova, Bonterra Partners, 2016

Note: Not-for-profit organisations tend to work with projects in more than one sector.

9 | Glossary of selected terms

Carbon stock. The quantity of carbon in a 'pool', meaning a reservoir or system which has the capacity to accumulate or release carbon. It includes carbon in above-ground biomass (carbon in all living biomass above the soil, including stem, stump, branches, bark, seeds, and foliage) and soil carbon (organic carbon in mineral and organic soils (including peat) to a specified depth) (FAO, 2005).

Conservation easement. A legal agreement between a landowner (seller) and a non-profit or government entity (buyer) to limit uses of the land in order to preserve certain conservation values. The transaction typically involves the buyer paying the seller a fixed sum of money upfront in return for the landowner permanently surrendering the real estate development right on specific parts of the property. Depending on the type of easement, the landowner may continue to make productive use of the land as a working farm or forest. A permanent easement is binding and effective even if the seller sells the land to another party in the future.

Contribution/Contribute to LDN (land degradation neutrality). Actions, initiatives, projects or investments that lead to LDN (see definition of 'land degradation neutrality'), or more concretely, that are directly engaged in land degradation rehabilitation and/or sustainable land management practices with the aim of improving the capacity of the land to provide ecosystem services. More concretely, this contribution should allow to improve at least one of the following three conditions as defined in Section 1: land cover/use, land productivity, carbon stock.

Developed countries/economies. Our definition of developed countries in this report is according to the International Monetary Fund's (IMF) category of 'Advanced Economies', which includes USA, Canada, Western and Eastern Europe, Israel, Japan, South Korea, Hong Kong SAR, Singapore, Taiwan, Australia and New Zealand.

Development finance institutions (DFIs). DFIs occupy the space between public aid and private investment. They are financial institutions, which provide finance to the private sector for investments that promote development. They focus on developing countries and regions where access to private sector funding is limited. They are usually owned or backed by the governments of one or more developed countries (Griffith/Evans 2012). Some of the world's leading development agencies and banks include: World Bank Group (WBG), African Development Bank (AfDB), Inter-American Development Bank (IDB), Asian Development Bank (ADB), European Bank for Reconstruction and Development (EBRD), as well as national agencies such as the United States Agency for International Development (USAID), Germany's KfW Development Bank, and Japan Bank for International Cooperation (JBIC).

Diversified-sector investments. Defined as those investments that do not depend heavily on any one income source. Rather income generation is distributed relatively evenly among multiple streams, such as agriculture, forestry, and others sectors, which include renewable energy, ecotourism, mitigation banking, conservation easement, carbon credits, and other conservation activities.

Developing countries/Emerging economies. All countries in the world not included under the definition of 'developed countries/economies'.

Ecosystem services. According to the Millenium Ecosystem Assessment (2005), ecosystem services are 'the benefits people obtain from ecosystems', and four categories are distinguished: supporting, provisioning, regulating and cultural services.

- Supporting services are those that are necessary for the production of all other ecosystem services. These include services such as nutrient recycling, primary production and soil formation.
- Provisioning services are products obtained from ecosystems (food, crops, wild foods, raw materials (including lumber, skins, fuel wood, organic matter, fodder, and fertilizer), genetic resources, water, minerals, etc.
- Regulating services include climate regulation, flood regulation, water purification, disease regulation, etc.
- Cultural services are nonmaterial benefits people obtain from ecosystems through spiritual enrichment, cognitive development, reflection, recreation, and aesthetic experiences

FAO. Food and Agriculture Organization of the United Nations

Farmland. Includes cropland as well as intensive pasture.

Forest. Based on the FAO categories of land use, forests are determined both by the presence of trees (tree canopy cover of more than 10%) and the absence of other predominant land uses.

Grassland. Grassland refers to grassy, partly dry biomes and also includes extensive open land used for pasture and grazing.IFPRI. International Food Policy Research Institute

LDN (Land degradation neutrality). As discussed in Section 1 and defined by the UNCCD Intergovernmental Working Group (IWG), LDN is 'a state whereby the amount and quality of land resources necessary to support ecosystem functions and services and enhance food security remains stable or increases within specified temporal and spatial scales and ecosystems.'

LDN (Land degradation neutrality) projects/investments/activities. Projects, investments, activities that contribute to LDN. (See definition of 'contribution to LDN').

LDN (Land degradation neutrality) market. Made up of actors, activities, initiatives, projects and investments that contribute to LDN. (See definition of 'contribution to LDN'.) Based on our definition, LDN is currently a young sector that primarily consists of sustainable land use projects, and to a smaller extent, land degradation rehabilitation projects.

Mitigation banking. The preservation, enhancement, restoration or creation (PERC) of a wetland, stream, or habitat conservation area which offsets, or compensates for, expec-

ted adverse impacts to similar nearby ecosystems. The goal is to replace the exact function and value of specific habitats (i.e. biodiversity), or other ecosystem services that would be adversely affected by a proposed activity or project (Wikipedia 2016). The proposed activity usually involves real estate or infrastructure development. In countries such as the USA, restoration and conservation of the biodiversity found in the high conservation areas can result in the development and creation of mitigation offset credits, which are sold to parties carrying out the proposed activities requiring mitigation.

NDVI (Normalized Difference Vegetation Index). Index of plant 'greenness' or photosynthetic activity; it is one of the most commonly used vegetation indices.

Official development assistance (ODA). Capital flows to countries and territories and to multilateral institutions which are:

i) provided by official agencies, including state and local governments, or by their executive agencies; and

ii) each transaction of which: a) is administered with the promotion of the economic development and welfare of developing countries as its main objective; and b) is capital provided to developing countries that is concessional in character and conveys a grant element of at least 25 per cent (calculated at a rate of discount of 10 per cent) (OECD).

REDD+ (Reduced Emissions from Deforestation and Forest Degradation). REDD is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. 'REDD+' goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks (UN-REDD).

Sustainable Development Goals (SDG). The Sustainable Development Goals are a UN Initiative, officially known as 'Transforming our world: the 2030 Agenda for Sustainable Development'. They are a set of 17 Goals associated with 169 targets for 2030, adopted in September 2015 by the 193 countries of the UN General Assembly.

UNCCD. United Nations Convention to Combat Desertification

Woodland. Includes vegetation types where trees cover a majority of the area, as well as shrub and bushlands.

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