

# Making Finance Work for Food



Literature  
review & survey  
of the data

**September, 2021**



Prepared in collaboration with the Food  
System Economics Commission (FSEC)



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Literature  
review & survey  
of the data



FINANCE FOR  
BIODIVERSITY  
Initiative



Food System  
Economics  
Commission

## About this literature review

*This literature review is part of Finance for Biodiversity's (F4B) first output covering the nexus between food and finance. It has been prepared in the context of F4B's collaboration with the Food System Economics Commission (FSEC), and as a contribution to the UN Food Systems Summit as well as ongoing international climate and biodiversity negotiations.*

This literature review is based on about 410 institutional and academic publications and outlines the major ongoing debates on the food-finance nexus. Building on F4B's broader work on nature and finance, it supports the 'Making Finance Work for Food' report covering the nexus between the global food and financial systems and explores how the two can be better aligned to deliver an inclusive, healthy, and environmentally sustainable food system.

The literature review was prepared by Nicolas Solonakis, with contributions from Simon Zadek, Andreas Merkl, Rupesh Madhani, Felipe Posada, and Pippa Wisbey. It has benefited from insights and comments from many colleagues and partners, including Jean-Paul Adam, Alex Barkawi, Tim Benton, Jason Eis, Marcelo Furtado, Franziska Gaupp, Ravi Kanbur, Per Klevnas, Rachel Kyte, Justin Mundy, Jeremy Oppenheim, Mattia Romani, Vera Songwe, Bryan Vadheim, and Shally Venugopal. Our thanks go to FSEC's Principals, Commissioners, knowledge partners and the Secretariat for their insights and help along the way. The contents of the report, including any errors and omissions, remain the responsibility of the authors.

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# About Finance for Biodiversity



F4B's goal is to increase the materiality of biodiversity in financial decision-making and so better align global finance with nature conservation and restoration.

Our work on the food-finance nexus draws from the entirety of our portfolio, which is organised across five workstreams:

**Market efficiency and innovation:** including a leadership role in the Taskforce on Nature-related Financial Disclosures (TNFD), and support to a number of data and fintech-linked initiatives.

**Enhanced liability:** focusing on extending the legal liabilities of financial institutions for biodiversity outcomes, such as extended use of anti-money laundering rules.

**Citizen engagement:** public advocacy and campaigning, and advancing digital approaches to catalysing shifts in citizen's financing behaviour.

**Public finance:** advancing measures and advocacy linked to stimulus and recovery spending, and the place of nature in sovereign debt markets.

**Nature markets:** catalysing nature markets by developing new revenue streams and robust governance innovations, including the governance of voluntary carbon markets.

**F4B** has been established with support from the MAVA Foundation, which has a mission to conserve biodiversity for the benefit of people and nature. F4B's work benefits from partnership with, and support from, the Children's Investment Fund Foundation (CIFF) and the Gordon and Betty Moore Foundation.

**For more information and publications, visit [www.F4B-initiative.net](http://www.F4B-initiative.net)**

# About FSEC

The Food System Economics Commission (FSEC), an independent scientific commission, is developing a report to address the economics and political economy of the food system transformation towards sustainable, inclusive, health-supporting and resilient food systems, contributing to achieving the Paris Agreement and Sustainable Development Goals.



Food System  
Economics  
*Commission*

**For more information, visit [www.foodsystemeconomics.org](http://www.foodsystemeconomics.org)**



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# Summary

This literature review is based on about 410 institutional and academic publications. The purpose is to outline the major ongoing debates on the food-finance nexus, and centralise references to the most relevant publications. Following a methodological framework applied in our long paper 'Getting the Financialisation of Food Right: Financing the Transition to a Sustainable Food System' this entails an extensive definition of both the financial system and the food system. In short, the review attempts to present the state of the literature on three essential questions:

To what extent is the agri-food system financialised – acknowledging the variety of competing definitions of 'financialisation'?

In which ways does the financial system shape the food system?

What kind of financial instruments or mechanisms could be implemented in order to support practices that are conducive to a more sustainable agri-food system?

While 80% of the review conforms to a standard academic literature review, 20% of it is made of 'connective tissue' in the form of newly presented data and analysis.

The literature review is structured as follows:

**Section I** presents the research questions, hypothesis and methodology guiding the review.

**Section II** presents the food-finance nexus-related publications from a bibliometric perspective.

**Section III** compiles available information on financial stocks and flows.

**Section IV** outlines the financial determinants of the different components of the agri-food system.

**Section V** outlines the literature on potential financial strategies to improve nutrition outcomes.

The research reveals five key findings:

That **publication trends in the food-finance nexus landscape have been continuously rising since ca. 2008**, after decades of stagnation, following the increased financialisation of the food system;

That **the agri-food system has been increasingly financialised, steadily since the 1970s, and at an accelerated pace since 2007-2008**;

That this financialisation translates into a considerable diversification of actors in the food system;

That while financialisation has direct impacts on the agri-food system, its most significant effects are indirect, namely: consolidation of the agri-food value chain, and changes in the forms of land tenure;

That there are instruments that could support the positive effects of financialisation while tackling its negative impacts to support the transition towards a healthy, efficient, sustainable and inclusive food system.

The literature review also exposes four main gaps:

That there is a lack of quantitative assessment and tracing of agri-food related illicit financial flows;

That the role of finance in stimulating or bending agri-food research and development (R&D) in a sustainable and health-positive perspective remains understudied;

That there is no systematic comparison between a sub-set of potential solutions;

That the precise mapping and quantification of investment flows into agri-food remains obscure.

This literature review supports the main report 'Getting the Financialisation of Food Right', covering the nexus between food and finance.

# Key Findings

## 1

The food-finance nexus has been the subject of ever **increasing scholarly and institutional interest since 2008**, following the trends of accelerated financialisation of the agri-food system.

## 2

Since the 1970s, and even more during the last two decades, the agri-food system has undergone a **process of increasing financialisation**, defined as *the increasing influence and involvement of financial motives, markets, actors, channels and institutions in agri-food value chain, and the increasing overlap between the roles of farmer/agri-food enterprise operator and investor*.

## 3

The financialisation of the agri-food system partly translates into a considerable diversification of actors, of which the most important include: **institutional investors, retail investors** (incl. High Net Worth Individuals), **sovereign wealth funds, Microfinance and Development Finance Institutions (DFI), agribusiness companies, Private Equity (PE) and Venture Capital (VC), trade finance and value chain finance, asset managers, governments and public authorities** (acting through subsidies) etc.

## 4

While financialisation has direct impacts on the agri-food system, such as on **farmland inflation**, the **operating conditions of farmers** (access to credit, interest rates etc.) or the much-debated effect of speculation on commodity prices, its most significant effects are indirect, namely: **consolidation of the agri-food value chain** and **changes in the forms of land tenure** (increased share of tenancy), both generating or reinforcing poorly sustainable practices.

## 5

In order to support the positive effects of financialisation while tackling its negative impacts to support the transition towards a healthy, efficient, sustainable and inclusive food system, several potential instruments have been explored. From this scattered literature, it emerges that two different, highly complementary goals should be pursued:

**(a) On the quantitative side, unlocking or redirecting the necessary public and private funds to support the agri-food transition.** This can be done through various instruments, ranging from central banking actions to foster compliance to a green agenda or taxonomy, environmental, social and governance (ESG) disclosure, carbon pricing and biodiversity offsetting mechanisms, behavioural nudging, environmental decoupled subsidies, agricultural finance instruments etc.

**(b) On the qualitative side, mainstreaming structural changes in business models, in particular: facilitating land ownership to small- and middle-scale farmers and promoting cooperatives/community-supported agriculture,** which are strongly correlated with environment- positive outcomes.



# Main Gaps

## 1

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In the landscape of the food-finance nexus-related literature, the question of the **quantitative assessment and tracing of agri-food related illicit financial** flows remains dramatically under-investigated.

## 2

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Very little literature exists on the role of finance in stimulating or bending **agri-food R&D** in a sustainable and health-positive way.

## 3

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While several publications explore potential financial strategies, regulations or instruments that would support a sustainable agri-food transition, **the present review could not find a systematic comparison between a sub-set of potential solutions** (e.g. the benefits and drawbacks of nature markets vs. ESG disclosure vs. alternative business models). Comparing the potential benefits, limitations and issues of different existing pathways is thus largely left to the reader's initiative.

## 4

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While there is scattered evidence on some important investment flows towards the agri-food system, **the precise mapping and quantification of such flows remains obscure** mostly due to undisclosed or hardly extracted data.



# Contents

|  |           |
|--|-----------|
| <b>Summary</b>   | <b>4</b>  |
| <b>Introduction &amp; context</b>  | <b>8</b>  |
| <b>1</b> Research questions, hypothesis and methodology                    | <b>9</b>  |
| <b>2</b> State of the art & bibliometry                                    | <b>12</b> |
| <b>3</b> Agri-food related financial flows & stocks : mapping & assessment | <b>14</b> |
| <b>4</b> Financial determinants of agri-food system components             | <b>24</b> |
| <b>5</b> Finance-related strategies to improve nutrition outcomes          | <b>31</b> |
| <b>Conclusion &amp; perspectives</b>                                       | <b>37</b> |
| <b>Endnotes</b>  | <b>39</b> |
| <b>Bibliography</b>  | <b>43</b> |

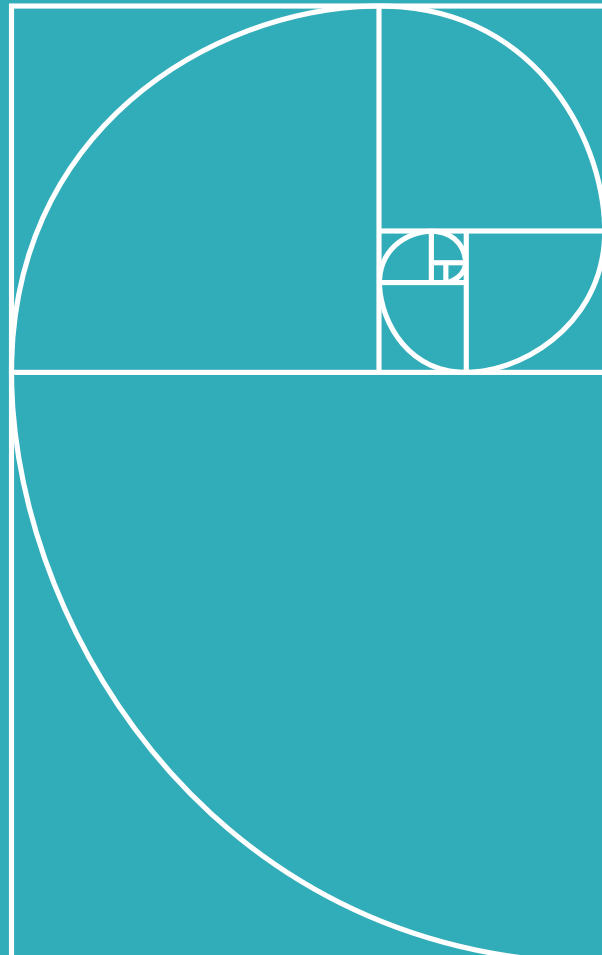
## Exhibits

|   |           |
|---|-----------|
| <b>1</b> The Food System Wheel and Global Finance   | <b>11</b> |
| <b>2</b> Number of FFN-related publications per year (1970 – 2021)  | <b>13</b> |
| <b>3</b> Risk/Return profile of a series of asset classes (among which farmland)  | <b>15</b> |
| <b>4</b> Evolution of the NCREIF Farmland Index (1991 – 2017)   | <b>15</b> |
| <b>5</b> Percentage of institutional investors in agriculture/farmland by source of allocation (5.a) & type (5.b)           | <b>16</b> |
| <b>6</b> Proportion of institutional investors in agriculture/farmland by investor preferences in process/stage & commodity | <b>16</b> |
| <b>7</b> Landscape of the main sustainable farming practices  | <b>17</b> |
| <b>8</b> Annual Venture Capital investments in AgriTech (2008 –2020)  | <b>19</b> |
| <b>9</b> Share of the main investment channels in the FA sector   | <b>19</b> |
| <b>10</b> Landscape of financing sources for private sector in agricultural value chain                                     | <b>20</b> |
| <b>11</b> Types of finance preferentially involved in the agri-food system (upstream & midstream segments)                  | <b>20</b> |
| <b>12</b> The ‘flesh-and-bone institutions behind finance-gone farming (simplified version)                                 | <b>21</b> |
| <b>13</b> Estimated value of the agri-food system   | <b>22</b> |
| <b>14</b> Summary of retrieved data on the value of agri-food related investment flows                                      | <b>23</b> |
| <b>15</b> Capital requirements vs. main targets of rural and agricultural finance instruments                               | <b>25</b> |
| <b>16</b> Evolution of the farm share of consumer prices in the US (1929 – 2017)  | <b>26</b> |
| <b>17</b> Concentration trend in the seed industry represented by the market share of C1 C5 companies (1985 - 2016)         | <b>27</b> |
| <b>18</b> Evolution of the profits of ABC companies (1996 – 2014)   | <b>28</b> |
| <b>19</b> Long-term trends in real prices of food commodities   | <b>30</b> |
| <b>20</b> Typology of financial strategies to promote nature-positive & inclusive nutrition outcomes                        | <b>33</b> |
| <b>21</b> Example of a proposed scheme of agri-food related green securitization  | <b>35</b> |
| <b>22</b> Summary of the main financial strategies and their purpose  | <b>36</b> |
| <b>23</b> Bad vs. Good financialization   | <b>38</b> |

# Introduction and context

Since 2007, more than 50 per cent of the world population lives in cities. This is an unprecedented event in human history, posing considerable challenges to our civilisation. On top of this spatial and demographic shift, our global agri-food system, despite impressive achievements, is now facing serious systemic issues: an increase of absolute and relative undernourished populations (after decades of decline)<sup>1</sup>; an increase of diet-related health hazards<sup>2</sup>; contributions to climate change; and perhaps most critically, considerable soil depletion and biodiversity loss.

With the increasing involvement of finance – in the broad sense – in the agri-food system since the late 1970s (but most particularly after 2008), the dynamics of the food and agricultural sector are now massively shaped by the financial system, in such a way that the two systems can barely be isolated from each other. Therefore, any large-scale attempt at transforming (parts of) our food system requires profound changes in the financial system. But what form does this interconnection between finance and food – the ‘food-finance nexus’ – actually take? How concretely is the financial system shaping the food system? And what financial levers should/could be activated as a priority to obtain the desired effects in our food and agricultural system? This literature review is geared towards the clarification of these essential questions.





## 1

# Research questions, hypothesis and methodology

## a. Objectives and scope of the review

This paper does not aim to create novel or hitherto unseen research. Nor is it a meta-analysis -implying systematic access to the raw data examined in each publication - which is out of the scope of this study. Rather, this literature review aims to provide a first extensive survey of the academic and institutional literature on the entanglement between the global financial system and the global agri-food system, and present the major scholarly debates on some key associated topics. In this regard, its main value-add is to synthesise and bring together research results and debates that have so far remained largely segregated in different intellectual silos, while they all contribute to unearthing an essential part of the food-finance nexus. After a brief explanation of the main concepts and hypothesis guiding our work on food and finance (cf. section I.2), it will open on an outline of the current state of knowledge (cf. section II) on the food-finance-nexus, highlighting the gaps in the data as well as the ongoing research trends.

Then, section III presents the available evidence that could be gathered on the mapping and quantification of financial flows towards – and assets under management in – the agri-food system, in an attempt to answer the following questions:

- (a)** How large is the agri-food system with regard to global GDP?
- (b)** How much money is invested each year in the agri-food system?
- (c)** Where does the money come from?
- (d)** Which segments of the agri-food value chain are primarily financed?

On the basis of this mapping, section IV is devoted to outlining the main financial determinants of the food system, focusing on ongoing debates about the impacts of finance on various segments of the agri-food value chain. In other words, this section highlights how the global financial system contributes to the shaping of the global food system.

Finally, section V explores possible finance-related strategies that could lead to a more sustainable, inclusive, healthy, and accessible food system.

## b. Sources and data

This review is based on the systematic collection, reading and analysis of 408 publications, of which 324 are academic papers (79.6 per cent) and 84 are institutional papers, reports of international organisations, think tanks or NGOs, policy briefs, other non-academic articles (20.6 per cent). Major databases (Organisation for Economic Co-operation and Development (OECD), Food and Agricultural Organization (FAO), World Bank (WB)) were also consulted in order to collect raw quantitative data. This study, as far as the authors are aware, is based on the largest sample of publications on the food-finance nexus that has been assembled in (predominantly) English-speaking literature.

## c. Definition of the main concepts

### An extensive approach to finance and to the agri-food system

This literature review follows F4B's standpoint of a wide definition of the financial system, not restricted to private capital flows, but also including public finance, central banking, and citizen's money as well as illicit financial flows.

As for the global food system we broadly follow the definition provided by the FAO, defining it as *"the entire range of actors and their interlinked value-adding activities involved in the production, aggregation, processing, distribution, consumption and disposal of food products that originate from agriculture, forestry or fisheries, and parts of the broader economic, societal and natural environments in which they are embedded."*<sup>3</sup>

### 'Financialisation': contested definitions

Having presented our definition of the financial and food systems, agreeing on a definition of the financialisation of the agri-food system is the second necessary prerequisite for undertaking the review of the relevant publications. Several definitions are found in the literature, some remaining fairly general and defining financialisation as *"the growing involvement of financial actors in food production"*<sup>4</sup>, or *"the increasing tendency to treat [land or commodities] as a financial asset."*<sup>5</sup>

A second, more specific, group of papers, agrees upon defining financialisation mostly in terms of influence and role of financial actors in the agri-food system. Sommerville & Magnan (2015) define financialisation as *"the growing influence of financial actors, logics and modes of accumulation at various points along the agro-food chain"*<sup>6</sup>, broadly in line with the definition presented in the seminal paper of Burch & Lawrence (2009), where financialisation relates to the observation that *"the agri-food system is increasingly influenced by financial actors and interests."*<sup>7</sup> In this considerable scholarly stream, a significant amount of articles adopts the definition elaborated by Epstein (2005): *"the increasing role of financial motives, financial markets, financial actors and financial institutions in the operation of the domestic and international economies."*<sup>8</sup>

Other scholars however slightly revise or nuance this approach, such as those adopting Krippner's definition of financialisation as *"the tendency for profit making in the economy to occur increasingly through financial channels rather than through productive activities."*<sup>9</sup> Williams (2014), on another level, rather points towards *"the emergence of farmers as investors and investors as farmers."*<sup>10</sup> Finally, Ouma (2016) criticises the abstract and unspecific use of 'financialisation' as a catch-all term aimed at grasping a considerable variety of dynamics that often have little to do with one another. Instead, he prefers the concept of 'operations of capital', which he defines as *"the situated modes, processes and practices of financial economization that have reworked organizations, economic relations, labor and nature at specific historical conjunctures."*<sup>11</sup>

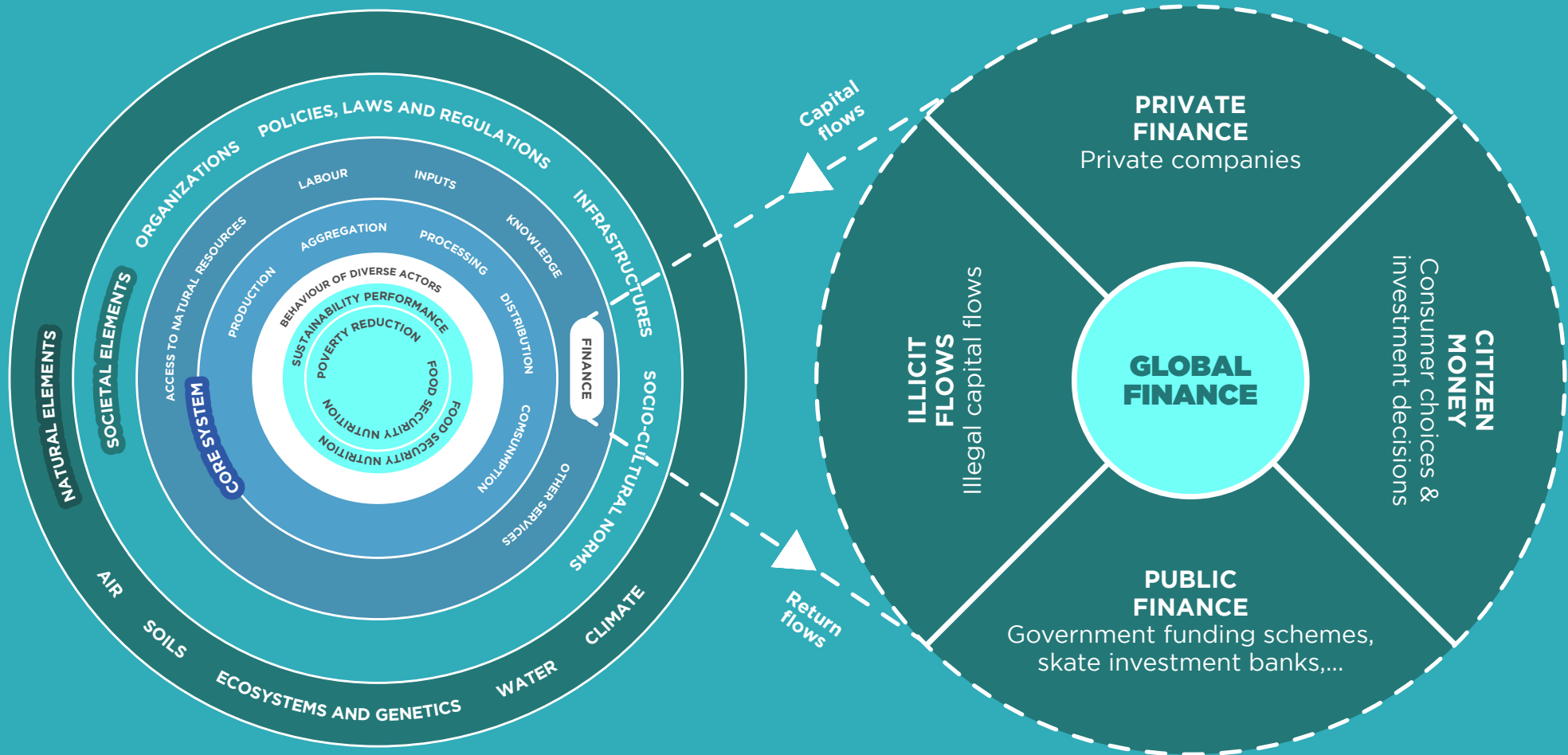
In an attempt to remain as inclusive as possible, building on Epstein's definition while taking into account relevant aspects of competing ones, we will hereafter define agri-food related financialisation as the increasing influence and involvement of financial motives, markets, actors, channels and institutions in the agri-food value chain, and the increasing overlap between the roles of farmer/agri-food enterprise operator and investor.

### The financial and food system as one integrated structure

Our economic, social and physical world is increasingly shaped by financial motives, financial markets, public and private financial actors, financial institutions and financial governance. The agri-food system is no exception: as will be outlined below, it is increasingly fuelled by financial investments and credit, while its activities also have consequences which, particularly when related to natural capital and ecosystem services, might have (positive or negative) impacts on financial assets and their associated risks. It is therefore our assumption to consider global finance and the agri-food system as two elements operating as parts of one integrating structure (cf. Fig.1).

## The Food System Wheel and Global Finance

Source: FAO, F4B



## 2

# State of the art and bibliometry

## a. Overview of the landscape of food-finance nexus-related literature reviews

Several aspects of the food-finance nexus have been covered by specific literature review. A first overview of the general trends and research themes can be found in what is probably the most complete and up-to-date starting point on the subject - the book by Bjorkhaug et al. (2020) labelled *The Financialization of Agri-Food systems: contested transformations*.

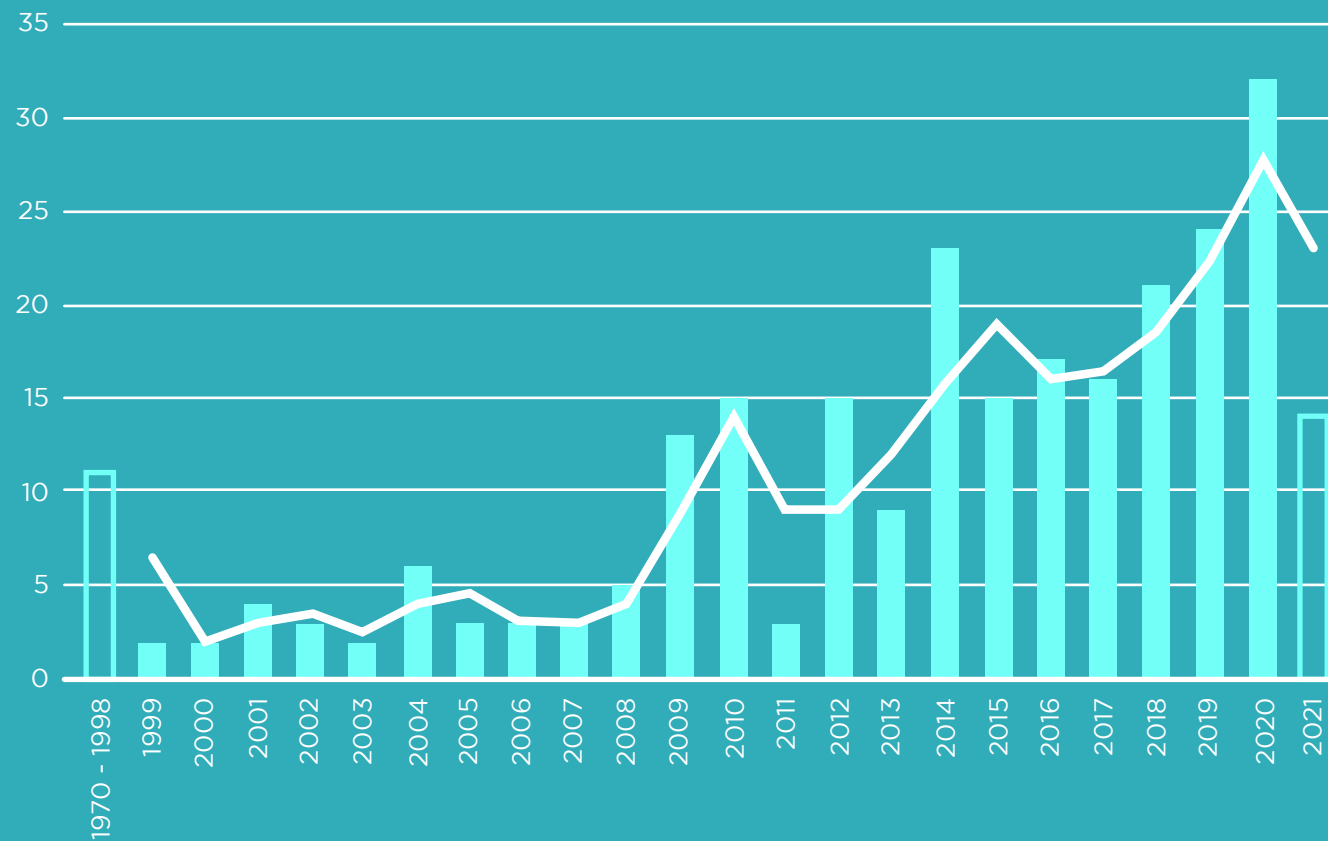
Beyond this reference book, other specific literature reviews have been covered. Ouma (2014) explored the dynamics of the increasing involvement of global finance in farmland. Will et al. (2016) reviewed a sample of academic and institutional publications on the impact of financial speculation on agricultural commodities. Yadav & Singh (2019) reviewed the relevant publications on the application of blockchain technology, including blockchain finance, in agriculture. An analysis of the major gaps and issues in agri-food supply chain management (with India as a case study) has been performed by Ganneshkumar et al. (2017), which complements a prior literature review on agricultural credit in support of small farmers in Emerging and Developing Countries (EDC) undertaken by Yadav et al. (2015). Finally, a review of the application of the collaboration model in sustainable supply chain in the food and agriculture industry has been performed by Dania et al. (2015).

Nevertheless, no systematic literature review of the scale of the present one, attempting to combine all of the aforementioned aspects, can be found in the academic or institutional literature.

## b. Chronological trends in food-finance nexus-related publications

Among the 410 publications that have been covered by this literature review, 263 are explicitly and specifically focused on the links between finance and food or agriculture. Of these 263 publications, 11 were published between 1970 and 1998<sup>12</sup>. The other 252 (97%) relevant papers, books or reports were released between 1999 and (March) 2021. What is particularly interesting in this bibliometric analysis is that these post-1999 publications were published at a rather constant annual flow between 1999 and 2008, while a clear take-off is noticeable from 2009, following the global financial crisis and the increasing interest of global finance for farmland and the agri-food supply chain (see below).

Number of food-finance nexus-related publications per year (1970-2021)





# Agri-food related financial flows and stocks: mapping and assessment

## Introductory word

The interactions between the food and agricultural sector and the financial sector are not a new phenomenon: in a way, credit and various financing schemes, public or private, have always played a role – albeit a marginal one – in the European agrarian economies since Antiquity<sup>13</sup>. As far as the modern era is concerned, Chayanov (1927) already emphasised the role of credit in peasant agriculture<sup>14</sup>, while Martin & Clapp (2015), Gertel & Sippel (2016) and Ouma (2018) have described the evolution of the links between finance, agriculture and states throughout the 19th<sup>15</sup> and 20th centuries<sup>16</sup>. What seems to characterise the process of ‘financialisation’ of food and agriculture is rather a *diversification* of financial actors, channels and sources of funds<sup>17</sup>, together with – as outlined above (cf. section I.b) – an increasing *role* and *influence* of private capital. The food-finance nexus therefore appears to be rather grounded on a change in degree than a change in *nature*.

## a. Key aspects of agri-food ‘financialisation’

A vast majority of the academic literature on the financialisation of food and agriculture has focused either on farmland investments and securitisation, or commodity markets and derivatives.

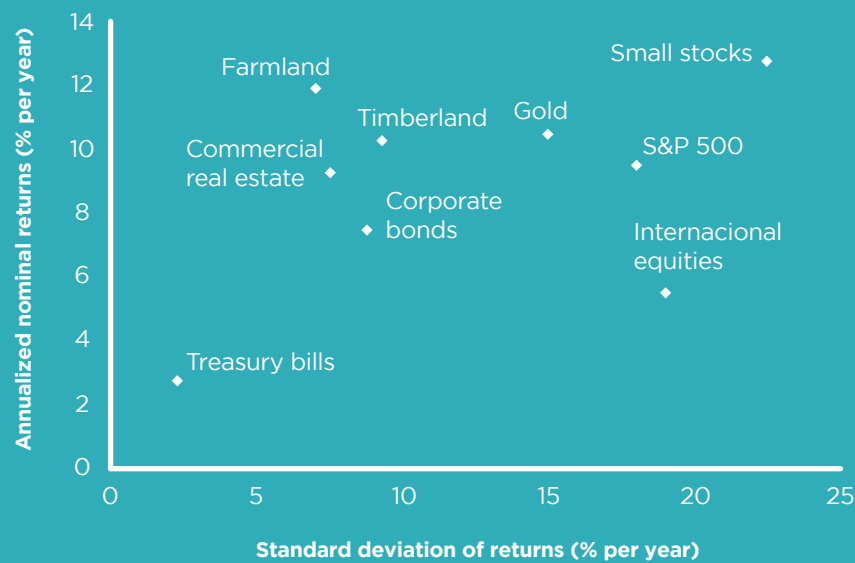
A considerable amount of publications have highlighted the rush of financial investors towards farmland that took off from the first decade of the 21<sup>st</sup> century, and even more spectacularly after the global financial crisis, when financial investors were seeking alternative asset classes to secure their portfolios. Between 2005 and 2017, the number of food and agriculture investment funds increased more than tenfold, reaching total AuM worth \$73 billion<sup>18</sup>.

Several reasons explain this global ‘land rush’ by financial capital towards farmland: in addition to having seemingly represented ‘tangible assets’ in a context of financial instability, farmland displays a rather high return/risk profile – regularly outperforming the Dow and S&P 500<sup>19</sup> (cf. Fig.3 below) – while its P/rent ratio compares favourably with Price/Earnings ratio of stocks<sup>20</sup>. Moreover, prices display a high correlation with inflation and a low correlation with other investments<sup>21</sup>. Finally, farmland has also the particularity of generating income streams both from the productive activities and from an increase in intrinsic land value<sup>22</sup>.

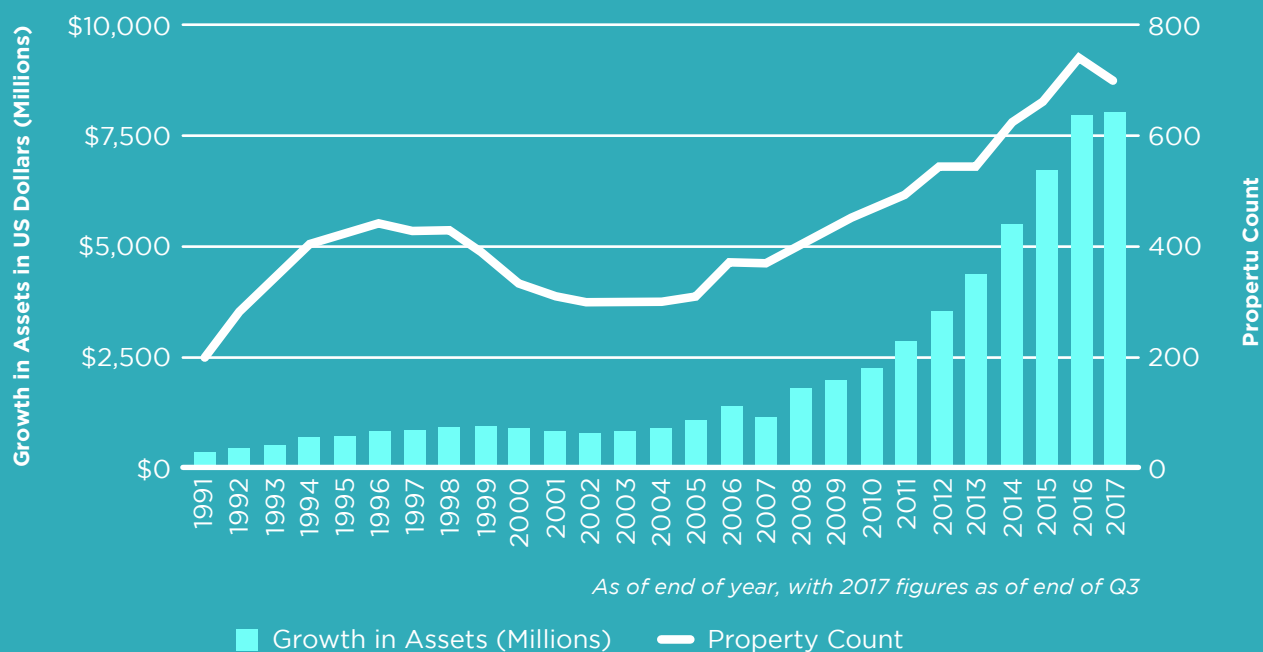
An important obstacle to the exposure to farmland returns is, however, the illiquidity of farmland. One important way to overcome this obstacle is through the securitisation allowed by Real Estate Investment Trusts (REITs), and more particularly through the development of Farmland-Real Estate Investment Trusts (hereafter F-REITS)<sup>23</sup> – first launched by Gladstone Investment Corporation in 2013<sup>24</sup> – which amalgamate income streams from agriculture-related investments into a fund purchasable by investors<sup>25</sup>. As outlined by Clapp & Isakson (2018), they function “*much like mutual funds that hold conventional financial assets like stocks and bonds, compile multiple properties (or simply mortgages on those properties) into a single holding, and sell shares of the associated income streams to investors.*”<sup>26</sup> F-REITS are usually constituted by the purchase of land from various agricultural businesses and derive their income primarily from rent<sup>27</sup>, with a portfolio usually consisting of a blend of permanent crops, row crops and fresh produce<sup>28</sup>.

Notwithstanding these observations, scholars like S. Ouma are sceptical of the relevance of describing them under the – in their view, fuzzy – label of ‘financialisation’. Rather, Ouma suggests using the concept of ‘assetisation’, which he claims better captures the process through which something is transformed into a property that yields an income stream, and which allows the development of “*the material, legal, organizational and technological conditions [allowing] that future income can be effectively capitalized in a space of comparability.*”<sup>29</sup>

## Risk/return profile of a series of asset classes



## Evolution of the NCREIF Farmland Index (1991-2017)



Beyond farmland, the other major element that has received the most attention is speculative investments on food commodities, and even more commodity index funds (CIFs) – merging the value of different agricultural commodities into a single instrument that would be sold as information for investors<sup>30</sup>. Other forms of financial innovation can be seen in the development of Exchange Traded Funds (ETFs), which “enabled institutional and retail investors to add commodities to their portfolios, thereby transforming commodities to a new asset class.”<sup>31</sup>

Other dimensions of the ‘financialisation’ of food and agriculture involve the increasing financial role of agri-food companies (even though quantitative data on their investments are hard to come by, partly because a substantial part of them is not public), including the emergence of finance divisions in major agri-food firms<sup>32</sup>, “the increasing leveraging of corporations through debt and other hybrid financial instruments”<sup>33</sup>, and the increasing prioritisation of shareholder value<sup>34</sup>.

## b. Financial actors and processes in agri-food value chains

While the financial sector has usually been reluctant to invest in farmland and agricultural (F&A) production, since the late 1970s onwards, private financial investors have increasingly engaged in the food and agriculture sector, to gain exposure to profits in commodity markets and benefit from appreciated farmland values. This trend has accelerated considerably over the last two decades.

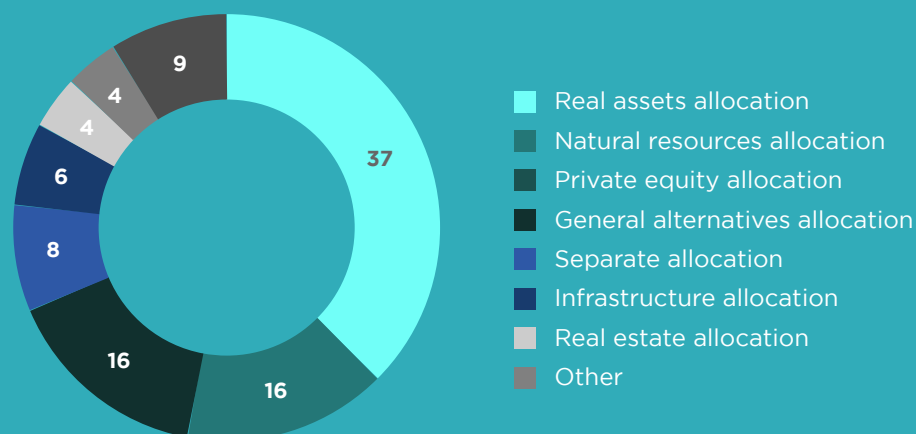
Among the financial actors gaining visibility in the F&A realm, there is a broad consensus in the literature to identify institutional investors as the main protagonists<sup>35</sup>, followed by banks, Sovereign Wealth Funds and transnational agribusiness

companies<sup>36</sup>. The major category of F&A institutional investors appears to be pension funds, whereas funding seems to be primarily channelled through real assets allocation and natural resources allocation (cf. Fig.5 below).

Institutional investors target a wide variety of assets (both physical assets and derivatives such as CITs<sup>37</sup> and REITs<sup>38</sup>) throughout the whole agricultural value chain. Among physical assets, pension funds seem to primarily target farmland<sup>39</sup>, grain and oilseed<sup>40</sup>, row crops and permanent crops<sup>41</sup>, while other investors are more active in the water market<sup>42</sup>.

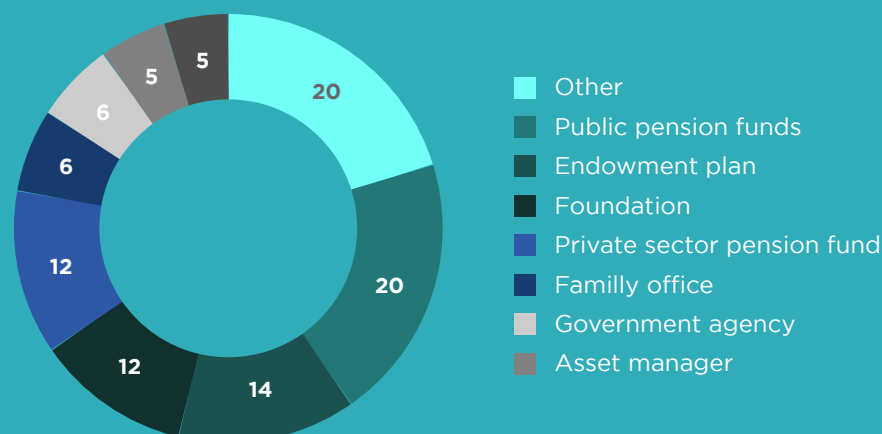
### Percentage of institutional investors in agriculture/farmland by source of allocation

Source: PreQin, 2016



### Percentage of institutional investors in agriculture/farmland by type

Source: PreQin, 2016



## Private equity and venture capital

Alongside institutional and retail investors, the role of private equity in the agri-food sector has also been on the rise, displaying the fastest growth in the F&A investment landscape. In 2018, there were 105 PE funds specialised in agriculture and food, totalling \$23 billion in AuM<sup>52</sup>.

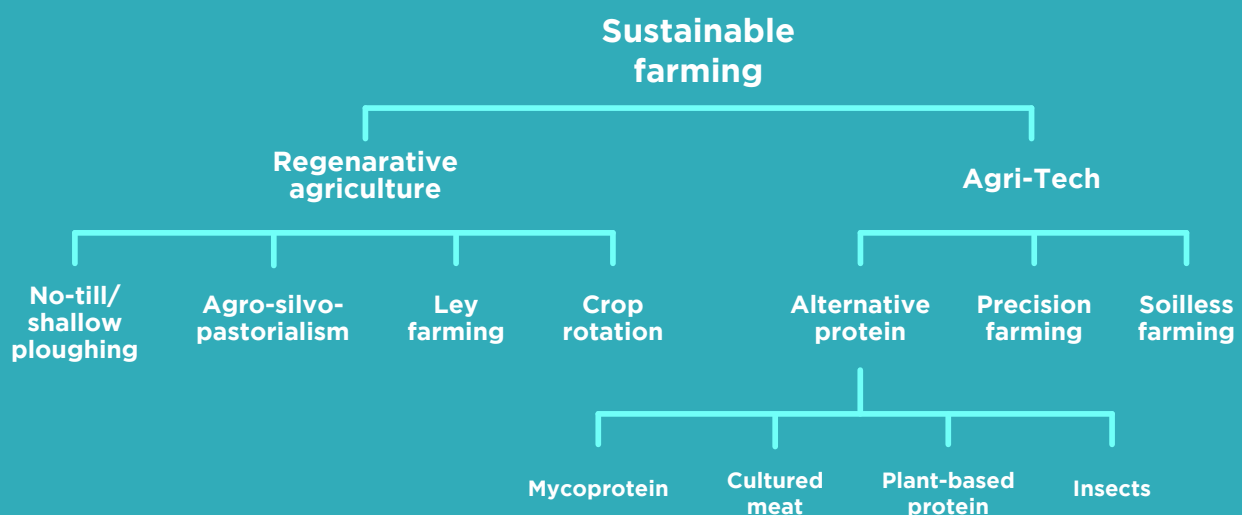
As for Venture Capital investments in F&A, noticeable discrepancies exist regarding their value. In 2020, VC investments in Agri-Tech were estimated at around \$4.4–5 billion<sup>53</sup>. In the latest AgFunder report for 2021, this value amounts to \$15.8 billion<sup>54</sup>; the obvious discrepancy with Bloomberg and Pitchbook data probably arises from the (very) wide definition of ‘agri-food tech’ here, which includes agribusiness marketplaces, bioenergy and biomaterials, farm robotics, etc. Including both upstream and downstream activities, VC investments in AgriTech are estimated at around \$30 billion.

An increasingly fancied and growing category among such agri-tech investments is alternative protein. The specific contribution of VC to alternative protein is however difficult to isolate. According to the Good Food Institute, \$3.1 billion was invested in alternative protein in 2020<sup>55</sup>.

Yet, these investments include “*accelerator or incubator funding, angel funding, seed funding, equity or product crowdfunding, early-stage venture capital, late-stage venture capital, private equity growth/expansion, capitalization, corporate venture, joint venture, convertible debt, and general debt (but excludes mergers, acquisitions, reverse-mergers, buyouts, and leveraged buyouts, IPOs, subsequent share offerings, and private investment in public equity).*” VC investments from alternative protein focused on fermentation (mycoprotein and plant-based protein only, excluding insects and cultured meat) were worth \$0.71 billion from January 2019 to September 2020. Assuming a similar amount of money was invested in insects and cultured meat over the same period, we end up concluding that annualised VC investments in alternative protein amount to some \$0.8 billion, or some 26 per cent of total alternative protein investments<sup>56</sup>.

While VC capital is largely centred on AgTech, it is nevertheless worth mentioning that a recent study has identified 70 investable strategies (in the US only) with global assets of \$47.5 billion, \$6.9 billion of which comes from Venture Capital or Private Equity<sup>57</sup>.

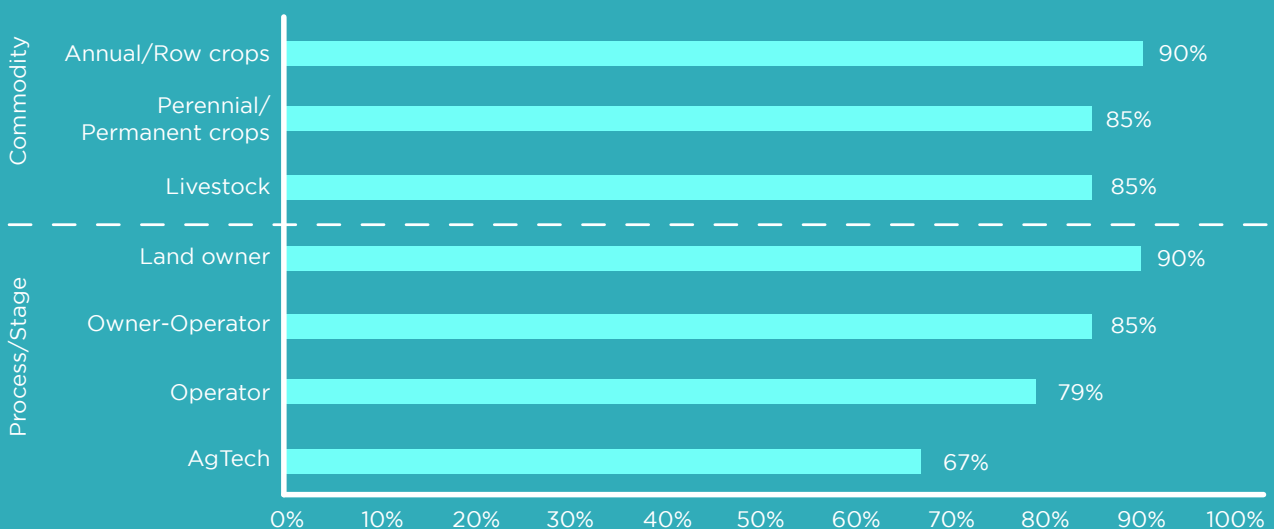
## Landscape of the main sustainable farming practices



In terms of production type, a majority of institutional investors direct their capital towards row crops, permanent crops and livestock<sup>43</sup>. While institutional investors appear to finance activities in all forms of land tenure, a larger proportion of them invests in land ownership only (cf. Fig.7).

### Proportion of institutional investors in Agriculture/Farmland by investor preferences in process/stage & commodity

Source: PreQin, 2016



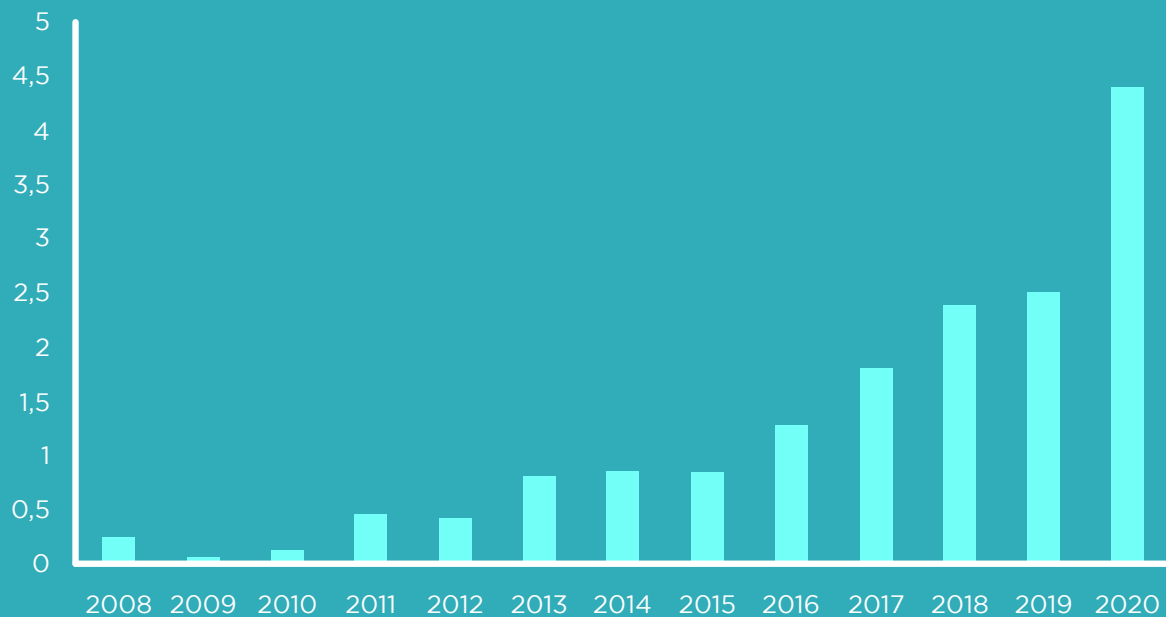
The growing private capital investments in the food and agriculture sector since the 1990s also concerns retail investors<sup>44</sup>. Having long been limited to investing in farmland indirectly by buying stocks in landowning public companies, retail investors have increasingly engaged in Commodity Index Products<sup>45</sup> and Exchange Traded Funds since the 2000s<sup>46</sup>. They have also invested in listed equities of agricultural companies<sup>47</sup> and appear to play a significant role in financing agricultural cooperatives<sup>48</sup>. Overall, however, the magnitude of such investment remains modest, with the notable exception of some High Net Worth Individuals (hereafter HNWI) able to perform investment at a scale closer to institutional investors<sup>49</sup> – HNWI being among the five main categories of financial actors in food and agriculture<sup>50</sup>.

In addition to that, foreign direct investment (FDI) through sovereign wealth funds (SWF) have also been on the rise, and reached \$100 billion since 2008<sup>51</sup> covering some 230 million hectares of agricultural land.



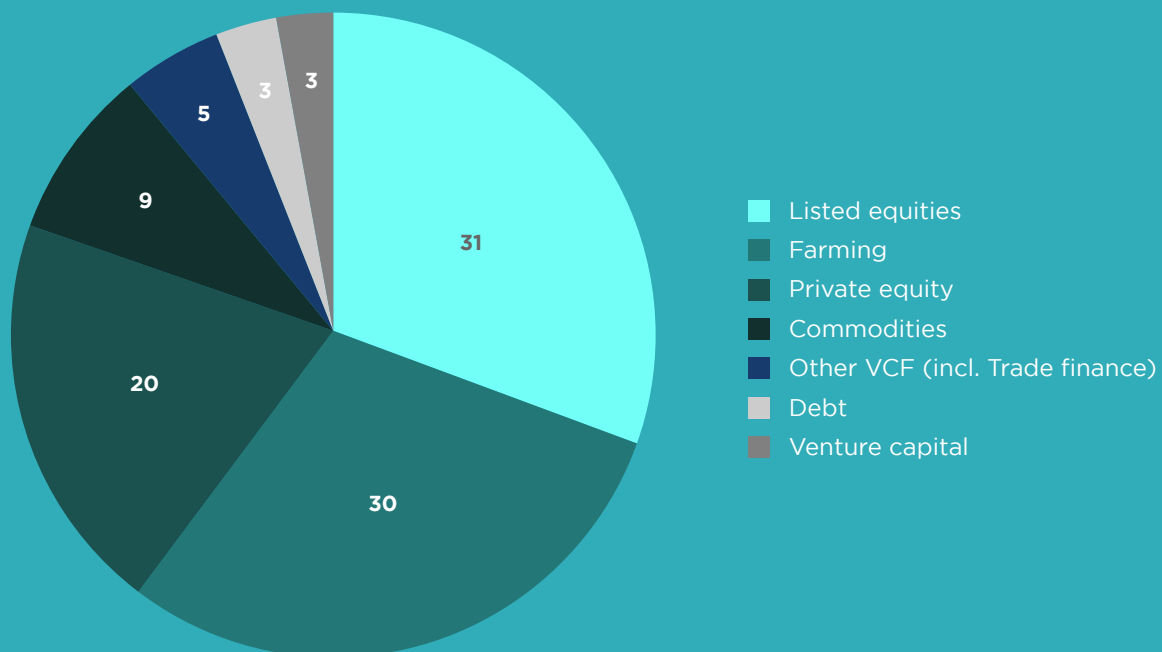
## Annual Venture Capital investments in AgriTech (2008-2020)

Source: Bloomberg, 2020



## Share of the main investment channels in the F&A sector

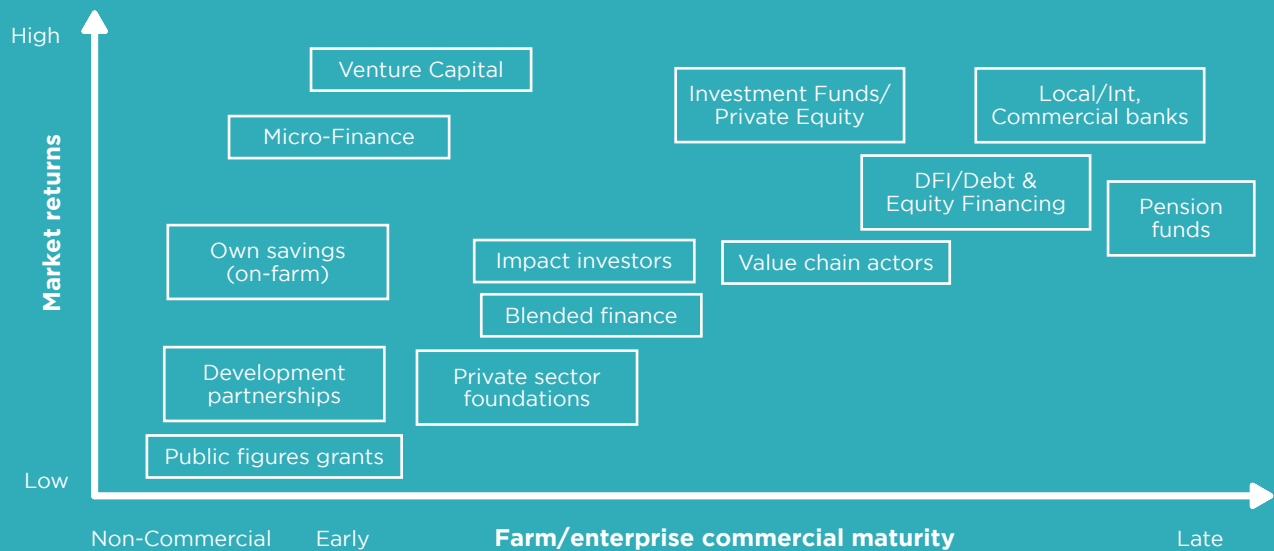
Source: Bloomberg, 2020



Recent network analysis of the food system also emphasises the growing importance of asset managers<sup>58</sup>, particularly in mid-stream actors of the agricultural value chain: in 2019, the five major asset managing firms together held between 10% and 33% of shares in the major agri-food companies<sup>59</sup>.

## Landscape of financing sources for private sector in agricultural value chains

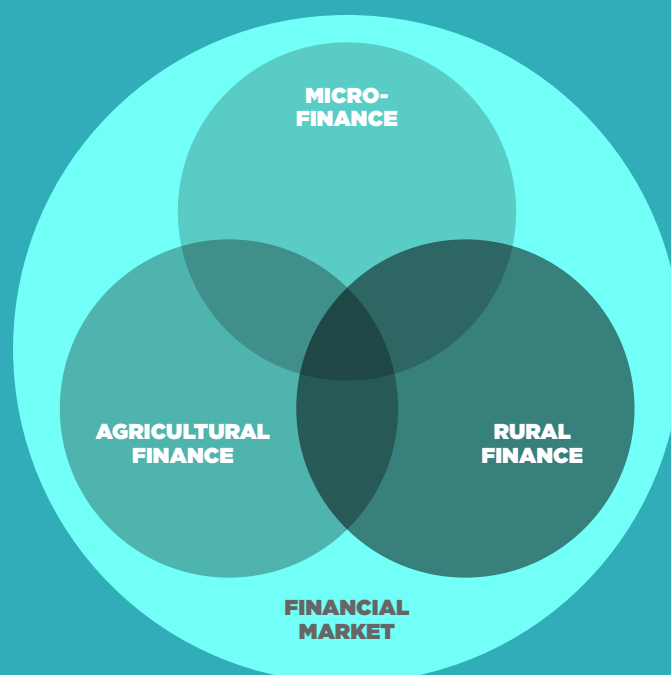
Source: World Bank, Townsend et al. (2018), p.11



Moreover, although numbers are difficult to come by on this aspect, there are signals of a diversification and increase of the financing of upstream segments of the agri-food value chain, specifically in smallholder agriculture, through agricultural and development finance (Micro-Finance Institutions (MFI) and Development Finance Institutions (DFI)<sup>60</sup>).

## Types of finance in the agri-food system (upstream and midstream segments)

Source: IFAD, 2010; cf. WB, 2011, p.2



In the meantime, alongside trade liberalisation, expanding trade finance<sup>61</sup> – targeting mostly processing and exporting costs<sup>62</sup>, that is, downstream segments of the agri-food value chain – is shown to have accompanied the growth of agricultural trade (as a percentage of production) since the 1960s<sup>63</sup>. Institutional and academic literature broadly agree that agri-food related trade finance followed a steady increase and diversification<sup>64</sup> over the last two decades with increasing value-chain integration<sup>65</sup>; but extant trade finance gaps have been significantly aggravated by the Covid-19 pandemic – a gap now amounting to \$3.4 trillion<sup>66</sup> – particularly in developing countries<sup>67</sup>, where food security issues are being intensified.

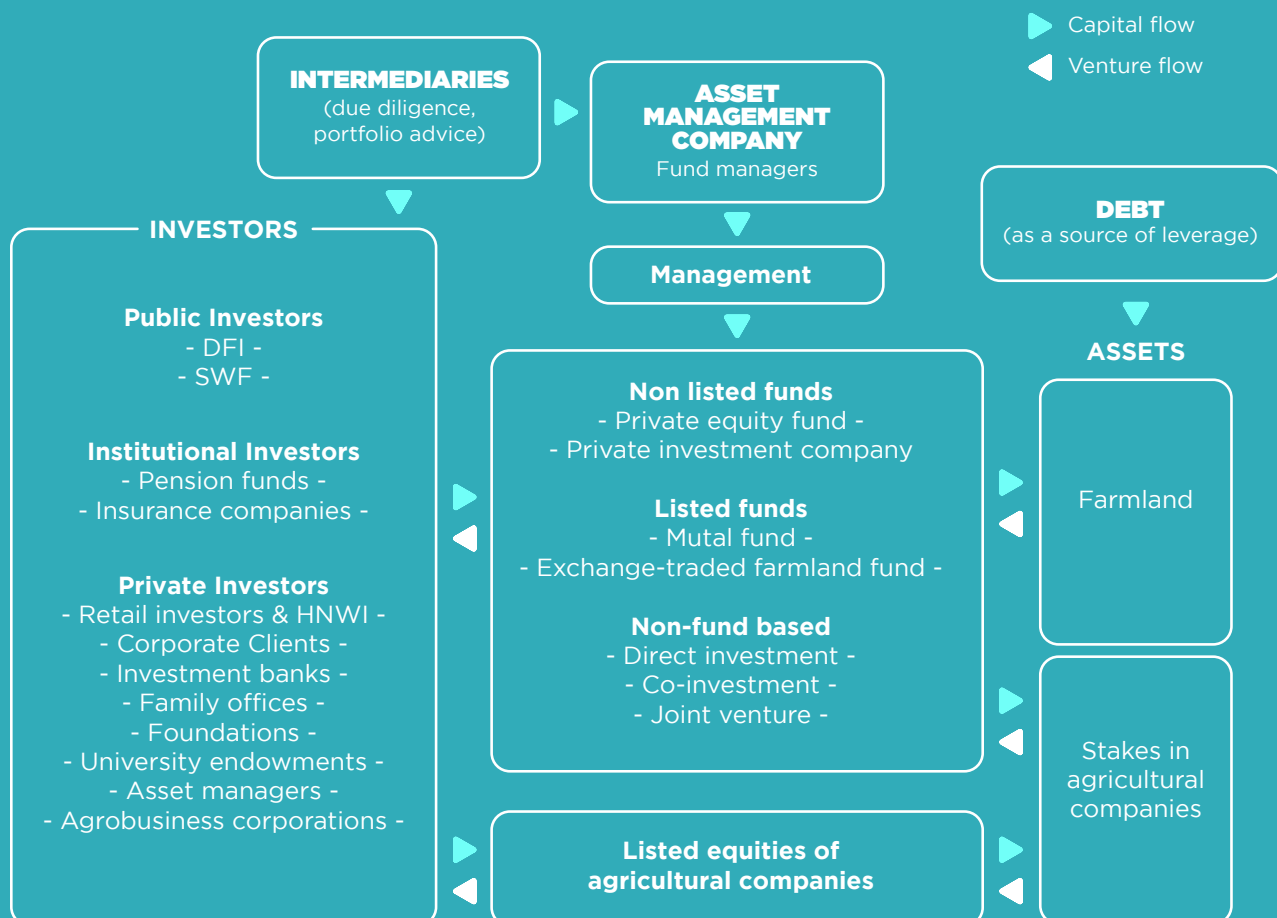
In quantitative terms, however, the share of food and agriculture in the global trade finance gap is difficult to estimate, and so is the share of trade finance in global agri-food trade (worth \$1.6 trillion in 2019, or some 10 per cent of international trade<sup>68</sup>); the present review did not yield a substantiated assessment of it.

As far as governmental financing schemes are concerned, agricultural subsidies followed contrasted trends in the past 20 years – growing nearly 10-fold in China, increasing by 50 per cent in the US, but stagnating or decreasing in the EU<sup>69</sup> – reaching \$700 billion in 2020<sup>70</sup>.

Finally, illicit financial flows are also increasingly investigated, particularly in specific contexts such as agriculture-related illegal deforestation in Brazil, but quantitative estimates are currently out of reach. Overall illicit trade is estimated at \$1-3 trillion<sup>71</sup> (but what share of this value is linked to food and agriculture, we do not know), whereas the cost of agri-food illegal activities is estimated at \$30-40 billion annually<sup>72</sup>.

## The ‘flesh-and-blood institutions behind finance-gone farming (simplified version)

Reproduced from Ouma (2018), pg.90



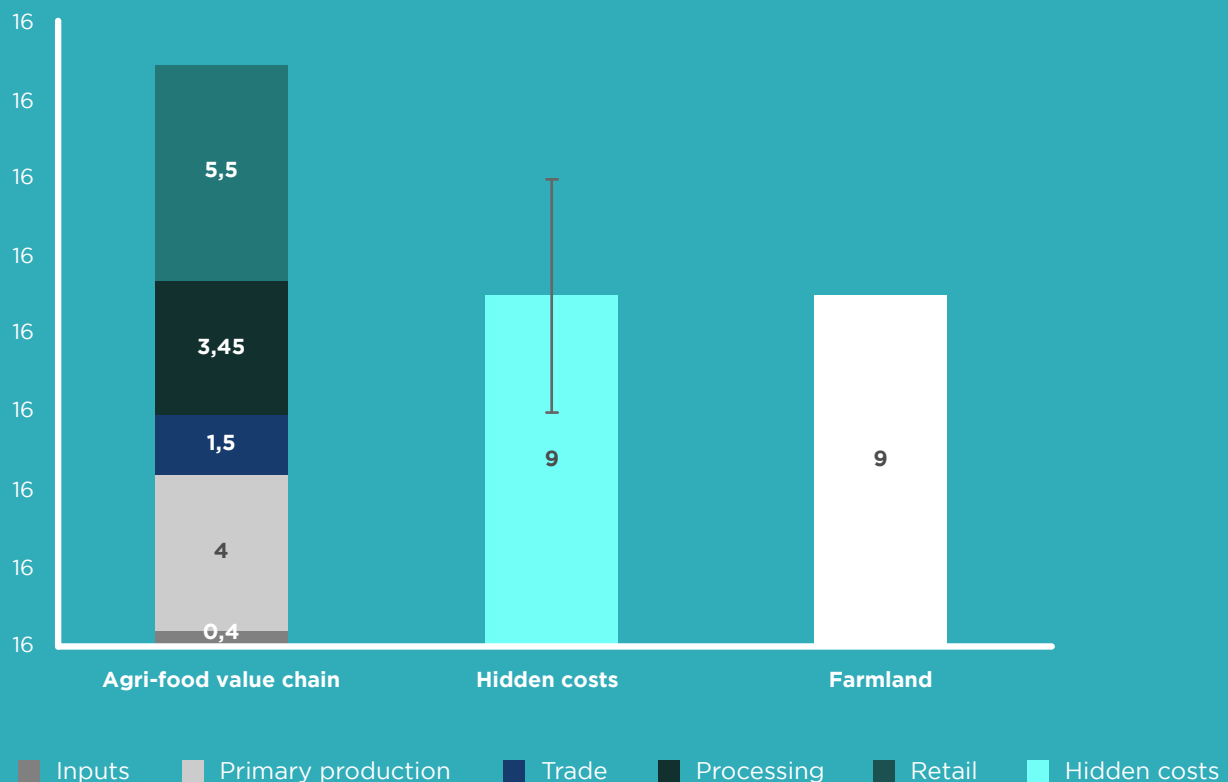
## c. Aggregate quantitative assessment

Quantitative estimates of the value of the global food system are very hard to come by. Relying on a FAO estimate of the gross value of world primary agriculture at \$5 trillion, the World Bank has estimated the size of the global food system at around \$8 trillion<sup>73</sup>. This value is well in line with another estimate of the global food and agricultural industry at \$8.7 trillion<sup>74</sup>. Looking at yet other datasets, however, these numbers might actually be underestimating the value of the global agri-food system. The 2019 FOLU report estimated the market value of the global food system at \$10 trillion<sup>75</sup>, whereas a still higher count can be reached using KPMG data on market sizes, reckoning with an intermediate value of primary production (between KPMG's \$3 trillion and FAO's \$5 trillion), which yields an estimate of some \$13.8 trillion. To this estimate, one should also add the \$9 trillion of farmland market (cf. Fig 13) – even though part of this value could already be hidden in primary production.

On top of this assessment, it is also of crucial importance to take into account the hidden costs of the global food system. These hidden costs have been estimated by the World Bank at \$6 trillion<sup>76</sup>, whereas the latest FOLU report comes up with a value of \$12 trillion<sup>77</sup>. Depending on whether the low count or the high count is closer to the truth, the global food system understood extensively would account for 28.7 – 43.5 per cent of the world economy (~ \$80 trillion).

### Estimated value of the global agri-food system

Source: FAO, 2018; KPMG, 2019; FOLU, 2019; Research & Markets 2021



In terms of annual investments, data are even more difficult to obtain, partly because of undisclosed operations, unpublished evidence, difference in aggregation levels among available data, overlapping label etc. At an aggregate level, the bulk of agri-food related investments seems to be accounted for by FDI, credit and subsidies<sup>78</sup>.

### Summary of retrieved data on agri-food related annual investment flows<sup>79</sup>

| INVESTMENT                     | ANNUAL INV.<br>(BILLIONS \$) | YEAR | SOURCE   | LIMITATIONS               |
|--------------------------------|------------------------------|------|--|---------------------------|
| FDI                            | 1151.6 - 1302                | 2018 | FAO  | Potential double counting |
| ODA                            | 10.2                         | 2020 | Ceres2030                                      |                           |
| Foreign remittances            | 436                          | 2014 | FAO  | Underestimate             |
| <b>Government expenditures</b> |                              |      |  |                           |
| Subsidies                      | 700                          | 2020 | OECD   |                           |
| Public procurement             | ? - - - - -                  |      |  | Data not found            |
| Credit                         | 1066.8                       | 2018 | GRAIN (2020)                                   | Potential double counting |
| <b>Equity</b>                  |                              |      |  |                           |
| Private                        | 8.4                          | 2019 | Bloomberg (2020)                               |                           |
| Listed                         | ? - - - - -                  |      |  | Data not found            |
| Venture Capital                | 4 - 5                        | 2020 | Wheaton & Kiernan (2012); Isakson (2014), p765 |                           |
| Institutional Investors        | 35                           | 2012 |  |                           |
| <b>TOTAL</b>                   | <b>3412 - 3563.4</b>         |      |  |                           |



## 4

# Financial determinants of agri-food system components

The purpose of this section is to summarise the results of relevant publications on the actual, concrete influence of finance on the agri-food system. This does not reduce to the ‘consequences of financialisation’ – certainly an important part –, but also relates more broadly to how finance *sensu largo* shapes the agri-food system in different segments of the value chain: the section opens with the impact of finance and financialisation on the upstream segments, mostly farmland and farming conditions and practices, follows up on the transformations of the midstream segments, and closes with the trends in consumption patterns.

## a. Agricultural production and infrastructures

### Farmland value, distribution and management

Farmland is probably the topic that has been most researched with respect to impacts of finance and financialisation on the agri-food system. The already discussed ‘assetisation’ of farmland and the growing investments it attracted from the financial sector is involved in a chain of consequences that is scrutinised by various studies.

To begin with, studies have investigated the link between the increased and sustained investments in farmland by institutional investors and other financial actors and the observed increase in farmland prices over the last three to four decades – both in the US, Canada, Australia, and several countries of the EU<sup>80</sup>. Acknowledging that this is a self-enforcing process, a debate exists as to which factor – farmland inflation or investments – is the *primum mobile*.

Whatever its main drivers are, rising farmland prices, together with technological changes and – in the EU at least – acreage-dependent subsidies, contributed to the considerable concentration of farmland<sup>81</sup> on which there is a broad agreement in the scientific literature<sup>82</sup>: during the second half of the 20th century, the number of farms has been shrinking while average farm size increased proportionally. Currently, 1 per cent of farms/farming businesses control 65 per cent of farmland<sup>83</sup>,

whereas small farms (accounting for 84 per cent of farms worldwide), operate 12 per cent of agricultural land<sup>84</sup>. This consolidation is marked by a persistent ambiguity between the notions of *control* and *ownership*: the data we possess mostly concern the control of operations, since worldwide aggregate data on farmland ownership has yet to be systematically compiled.

On top of these dynamics, the literature also highlights that SWF and other actors have also been involved in aggressive takeover of pieces of land, sometimes through illegal operations. Data on such land grabbing dynamics have been compiled in the GRAIN database – available online since 2012 – recording over 400 land-related transactions<sup>85</sup>. Whether licit or illicit, large-scale acquisition of farmland by various types of investors has raised concern about the potential effects of jeopardising subsistence of local peasants, and leading to poorly sustainable agricultural models<sup>86</sup>.

## Financial constraints and supports for farmers

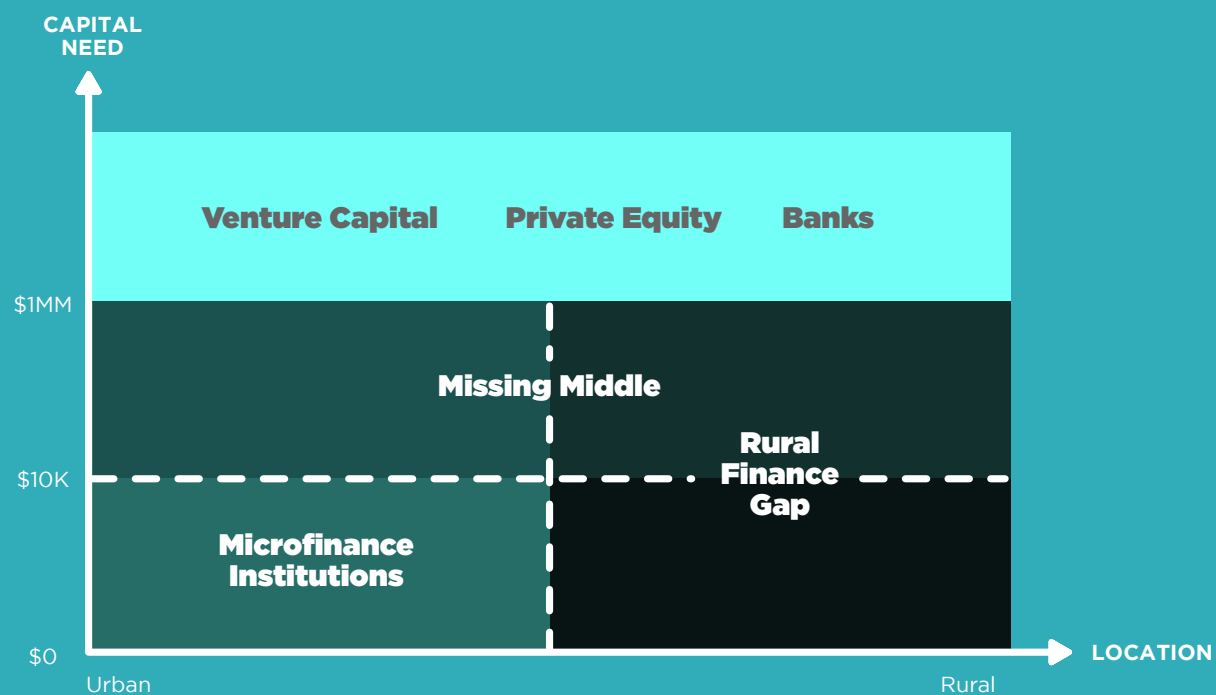
Such restructuring of farmland control and ownership happens to have profound impacts, particularly for smallholder agriculture. Agriculture remains the backbone of the economy of several developing countries, in which some 450-500 million are considered smallholders<sup>87</sup>. In order to address prevailing undernourishment and hunger (SDG n°2) and tackle poverty, smallholder agriculture – together with agricultural small- and medium-sized enterprises (SMEs) – is thus one major field of action<sup>88</sup> in the broad realm of agricultural and development finance.

One way of improving living standards is through productivity gains (better use of inputs, new technology etc). This, however, requires facilitated

access to financial intermediation, as a large consensus in the academic and institutional literature points to a structural lack of credit and other sources of funds by smallholders<sup>89</sup> – which tends to generate a vicious cycle of low use of appropriate inputs, insufficient productivity, low income and inability to access funding...hence rendering the acquisition of inputs more difficult<sup>90</sup>. The development of Micro-Finance Institutions (MFI) have been seen as a partial solution to this, but several authors point out their urban bias, and draw attention to the significant category of farmers that is too big to receive funds by MFI and too small/fragile to benefit from private equity/venture capital investments or bank loans - what has come to be known as 'the missing middle'.

## Capital requirements vs. main targets of rural & agricultural finance instruments

Source: World Bank



Among the many reasons that have been listed as obstacles for smallholders to access mainstream financial instruments, one of the most important is the lack of collateral, obviously aggravated by the increasing difficulty for smallholder to access landownership. Other reasons involve high risks, lack of reliable financial information, insufficient financial literacy, high transaction costs, lack of flexibility, imperfect information about the loan applicant's propensity to default<sup>91</sup> etc.

This lack of access to proper financial sources often pushes farmers towards less secure forms of credit with usury and unstable interest rates, whereas the combined impact of agri-business companies and export subsidies from the global North pushed sales prices down. As summarised by Sarkar (2018), "as debts keep mounting coupled with inability to repayment from farm proceeds, because of exorbitant interest rates and low sales prices, the farmers are caught in a vortex of spiralling debts"<sup>92</sup>, such as the one leading to the well documented wave of suicides in India<sup>93</sup>.

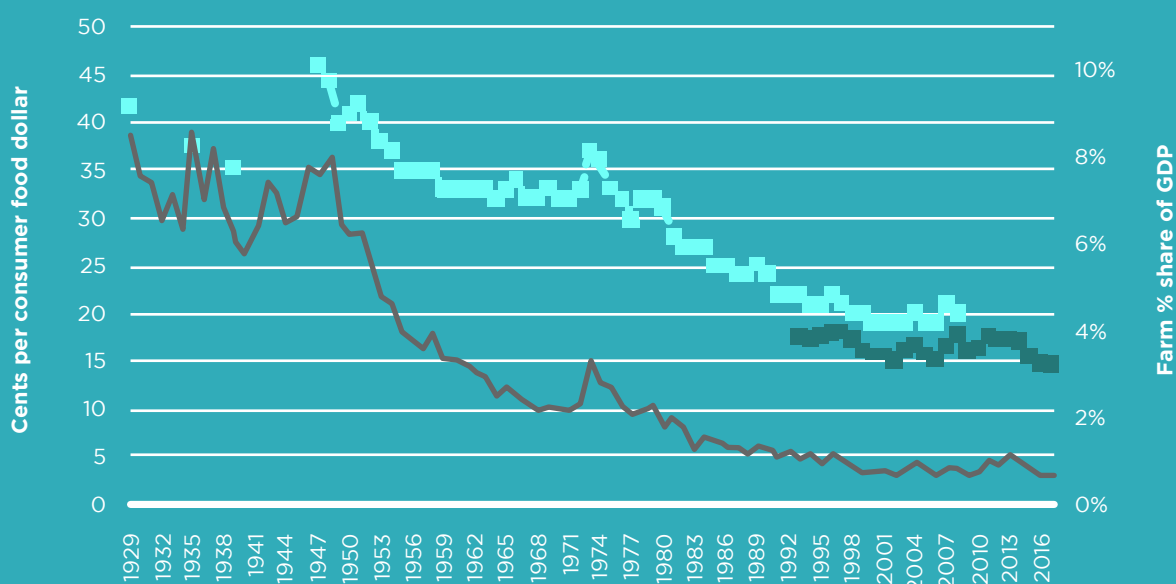
The abovementioned dynamic contributed to bringing agricultural subsidies under heavy fire by experts in recent years. In particular, US and EU farm subsidies benefiting farmers in the global North have been seen as a major culprit in damaging agricultural incomes in the developing world<sup>94</sup>. Moreover, agricultural subsidies are also claimed to induce market distortions evicting private capital<sup>95</sup>. Other studies point towards the effects of farm subsidies on increased farm-size growth and farmland consolidation<sup>96</sup>. In addition to recurring cases of fraud<sup>97</sup>, it is also argued that agricultural subsidies benefit mostly to large farm corporations and landowners, and generate subsidy-dependence of agricultural policies<sup>98</sup>.

Another picture also emerges from the literature. First, in spite of some counter-examples<sup>99</sup>, agricultural subsidies by EDC have often proven efficient in increasing farmers' income, cushioning risks<sup>100</sup>, lowering poverty rates, stimulating production, and enhancing productivity<sup>101</sup>. Second, several studies emphasise that reducing or cutting subsidies in industrialised economies is likely to bring only a much smaller effect on developing countries' farmers' income than acting on tariffs and market access barriers<sup>102</sup> or tackling overproduction of key crops<sup>103</sup>.

In terms of benefits within northern countries, some studies also contradict the widespread claim of subsidy capture by landowners, showing that, despite increased rental rates, the major part of the subsidy bulk benefits to tenant farmers<sup>104</sup>. Other scholars go even further, arguing that agricultural subsidies act as a compensation for the reaping of value added by downstream actors of the agricultural value chain (retailers, consumers)<sup>105</sup>, or for the structural imperfect competition with virtually all enterprises vertically related to agriculture, which would "*function as monopsonists in markets for farm produce and as monopolists in retail markets.*"<sup>106</sup> This view turns the critique of subsidies as market distortions upside down, by considering them instead as responses to extant structural market imperfections or surplus extraction mechanisms that have come to be particularly stringent during the second half of the 20th century. It is indeed widely shown, notably in the data from the US, that the farm share of consumer food expenditure has been following a steady decline, from about 40-45 per cent in 1950 to less than 15 per cent in 2016<sup>107</sup>.

## Evolution of the farm share of consumer prices i the US (1929 - 2017)

Source: USDA ERS, BEA; reproduced from Barret et al. 2020, p.5



## Farming practices and agricultural outcomes

While the effect of finance and financialisation on land prices as well as on the operating conditions of farming households and agricultural businesses is mostly direct, *inter alia* through the conditions of credit (interest rate on loans, criteria for assessing creditworthiness etc), its impact on the actual on-farm agricultural practices are mostly indirect, and therefore much more difficult to unveil.

These indirect consequences are mostly mediated by consolidation and forms of land tenure. Indeed, a converging body of scholarly literature identifies financialisation as playing a significant role in farmland concentration<sup>108</sup>. As far as farming practices are concerned, this partly finance-led concentration of farmland and changing modes of land tenure might have profound implications. Indeed, a considerable number of studies analysing data from various regions have shown that forms of land tenure significantly influence agricultural practices: overall, renters appear to be less likely to apply conservation practices (crop rotation, reduced till etc.)<sup>109</sup> and use fewer organic inputs than owner-operators<sup>110</sup>; the use of more sustainable practices is also linked more broadly with the secured nature of land tenure<sup>111</sup>. Some studies nuance these observations by emphasising that the difference between share-renters or cash-renters and owner-operators mostly regards medium- to long-term conservation measures<sup>112</sup>, while others – mostly US-focused – simply find no correlation between forms of tenure and adoption of conservation farming practices<sup>113</sup>. Finally, Wang et al. indicate that farming activities practiced via cooperatives appear to use more organic and fewer synthetic inputs<sup>114</sup>. In any case, Rotz (2019) claims that the abovementioned relations between farmers and landowners are making it increasingly difficult to adopt agroecological on-farm practices, regardless of whether or not they would be eager to do so<sup>115</sup>.

Apart from the mode of land tenure, farm size also influences the form and sustainability of conducted farming practices, although studies are not in agreement on the outcome of this correlation: while some studies indicate that larger farms use on average fewer inputs per unit of land<sup>116</sup>, others reach the exact opposite conclusion<sup>117</sup>.

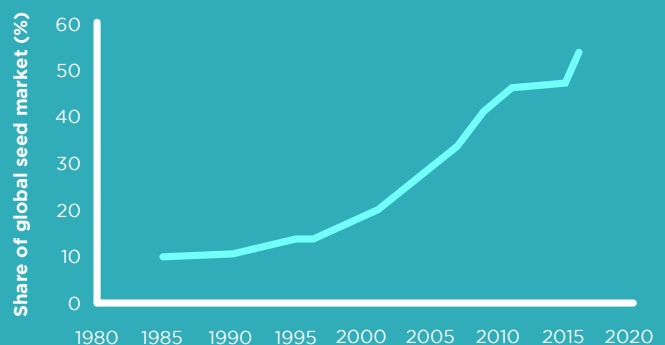
## Agri-food value chain consolidation

While it is still a matter of debate, scholars have suggested that financialisation could also be a driver of consolidation, not only in farmland, but also in the agri-food industry<sup>118</sup>, notably through the encouraging of mergers by institutional investors and asset management firms<sup>119</sup>. This consolidation of the agri-food industry is emphasised by several studies, notably in agricultural input companies (seeds, pesticides, fertilisers). The global seed market has indeed been increasingly consolidated over the last four decades<sup>120</sup>, in particular around companies such as Bayer-Monsanto, Dow-Dupont, Syngenta and Limagrain. After the mergers and acquisitions of 2015-2016, the four biggest seed companies have come to account for 51 per cent of the global seed market<sup>121</sup> (cf. Fig 16 below). Such consolidation fuels intense debate between advocates of the necessity of the funding power of large agro-chemical companies in developing crops that produce higher yields and are better adapted to climate change and soil depletion, and those who fear that such concentration will generate higher input prices, lower seed diversity (leading to a reduced cultivated biodiversity), and imbalance between corporate and public interests<sup>122</sup> at the expense of the latter.

Scholars widely point towards similar consolidation trends in food processing<sup>123</sup> and retail<sup>124</sup>, as well as in commodity trading, where four agribusiness companies – the so called ABCD (ADM, Bunge, Cargill and Louis-Dreyfus) – control 90 per cent of the global grain trade<sup>125</sup>.

### Concentration trend in the seed industry represented by the market share of C1 - C5 companies (1985 - 2016)

Source: Bonny (2017)



## b. Food distribution and market dynamics

### Transforming midstream segments: processing, wholesale, retail and trade

Following or accompanying the consolidation trends outlined above, several publications point out that the midstream segments of the agri-food value chain underwent a series of transformations that are at least partly associated with financialisation:

**(a)** a quantitative change, i.e. the growing size of the processing, wholesale and retail sectors<sup>126</sup>, as well as trade<sup>127</sup>, entailed by longer supply chains; and

**(b)** a series of qualitative changes, namely the rise of private standards, the diffusion of the Opco/Propco model, and the emergence of 'super middlemen'<sup>128</sup>.

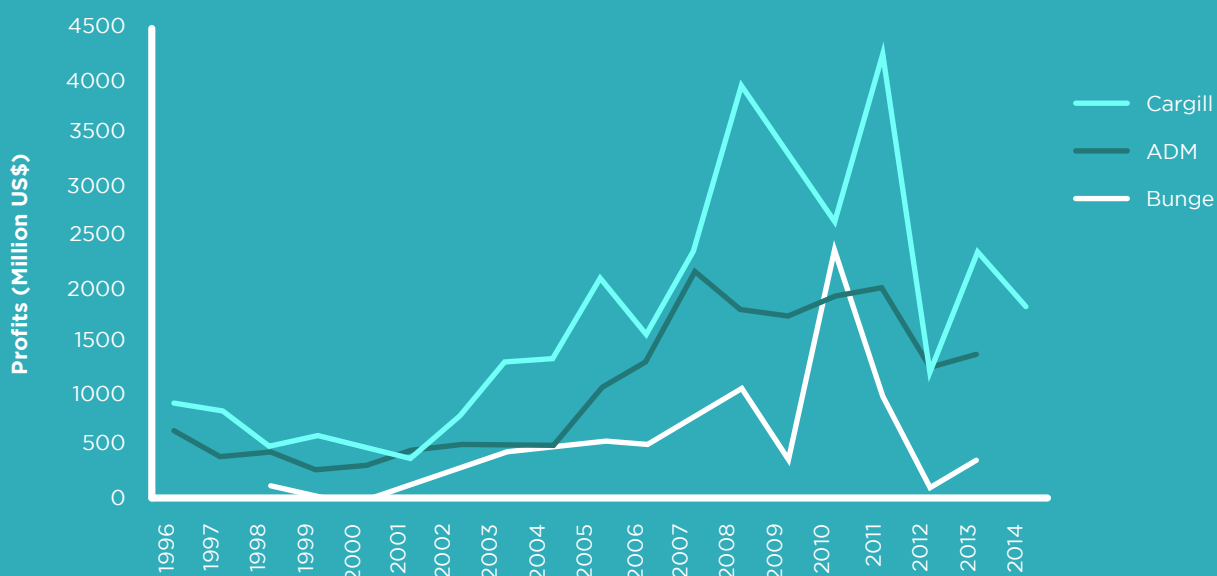
It is not the purpose of this review to examine in detail each of these changes, but it is worth mentioning that they partly proceed from the prioritisation of shareholder value which constitutes an essential feature of the financialisation of the agri-food system. In their study on the takeover of Somerfield – one of UK's leading supermarket companies – by private equity, for example, Burch

& Lawrence identify the adoption of Opco/Propco arrangements as one major way of obtaining higher returns – together with the reduction of the number of employees with an increased workload, the narrowing of the retailer's product line and the reduction of the number of suppliers<sup>129</sup>.

Similarly, longer food supply chains with corporate actors capturing an increasing share of value added are consistent with the lowering of production costs through a process crafted by D. Harvey as a 'spatial fix'<sup>130</sup>. Furthermore, beyond their role in the pursuit of quality and safety of foodstuffs, the rise of private standards has also contributed to the increase of profits by facilitated differentiation of products, thereby providing "*incentives to suppliers to make asset-specific investments and to consumers to satisfy their desire for product diversity.*"<sup>131</sup> These dynamics may have partly contributed to the significant increase in the profits of some major transnational agri-food corporations observed since 2000 (cf. Fig.17 below).

### Evolution of the profit of ABC companies (1996 - 2014)

Reproduced from Murphy et al. (2012), p.23 & Clapp (2015), p.127





## Food commodity markets: liquidity, volatility and availability

Beyond farmland speculation and consolidation, and growing share of value-added captured by intermediaries, the other element that in the eyes of some scholars crystallises the possibly detrimental effects of financialisation, is speculation on food commodities and derivatives such as commodity index funds (CIFs). Two separate questions arise with respect to this general issue:

**(a)** whether financialisation of food commodities involving “*excessive co-movement between commodity and equity markets is observed due to increasing participation of financial investors in commodities*” has a significant impact on food prices and/or volatility; and

**(b)** if yes, in what is the nature of this impact (positive or negative)?

Whereas several scholars have argued that the increase in co-movements around 2008 is due to common business cycles, a reassessment of this question concluded that such co-movements are explained by a combination of business cycles and financialisation<sup>132</sup>. The same study refines this conclusion by showing that “*the explanatory power of CITs is highly dependent upon the cash availability in the market*”: as CIT tend to return to their sphere of competence in a context of scarce liquidity, their role of connecting commodity markets and traditional financial assets weakens. Therefore, in the authors’ view, financialisation of the agri-food sector is mediated by the level of liquidity<sup>133</sup>.

As for the impact of financialisation on price levels and fluctuations, while acknowledging that some derivatives like commodity futures are an essential hedging tool for actors of the agri-food sector, it has been claimed by scholars that the tenfold increase in agricultural commodities investments between 2000 and 2011<sup>134</sup>, and the 25-fold increase in CIF-related investments between 2003 and 2008<sup>135</sup> were a major cause of the price spikes<sup>136</sup> and price volatility observed during the few years before and after the GFC<sup>137</sup>.

On a basis of a meta-analysis, however, other scholars refute the impact of financial speculation on price levels or price volatility, as the majority of the studies they rely on find either no correlation, or a negative correlation between volatility and speculative investments<sup>138</sup>. Hence, they say, blaming speculation for the observed volatility and price spikes proceeds from a confusion between correlation and causation: the volatility in commodity prices being, in that interpretation, the result of endogenous market mechanisms. These scholars also claim that speculative investments in fact allow an increase of global traded food commodity volumes due to better market information and diversified hedging options<sup>139</sup>. Yet, this study relies on 10 peer-reviewed papers – of which six are written by just two authors – whereas seminal papers on the subject (e.g. Wahl, 2009), the important IATP report of 2008 as well as the UN special rapporteur’s briefing note on food commodities speculation and food prices all go unmentioned – all of them being in sharp contrast with the conclusions of the study, and arguing that the observed volatility cannot be explained by fundamental market dynamics alone<sup>140</sup> – leaving a taste of cherry-picking.

## c. Consumption patterns

The current impact of global finance or financialisation over consumption patterns is probably one of the less researched areas of the food-finance nexus. The possible financial strategies through which orientating consumption towards more sustainable food products will be discussed in section V. One important aspect on which some evidence is available is, however, the long-term trends in food prices – beyond the short-term impacts of speculation outlined in the previous section – and their consequences on consumption.

Insofar as we acknowledge that the increasing involvement of financial actors has contributed to shaping the global agri-food system as it is, then the observable trends in various parts of the food value chain (most particularly food consumption, since it is the focus of this section) can also be attributable – but to what extent, it remains to be determined – to agri-food related financial dynamics.

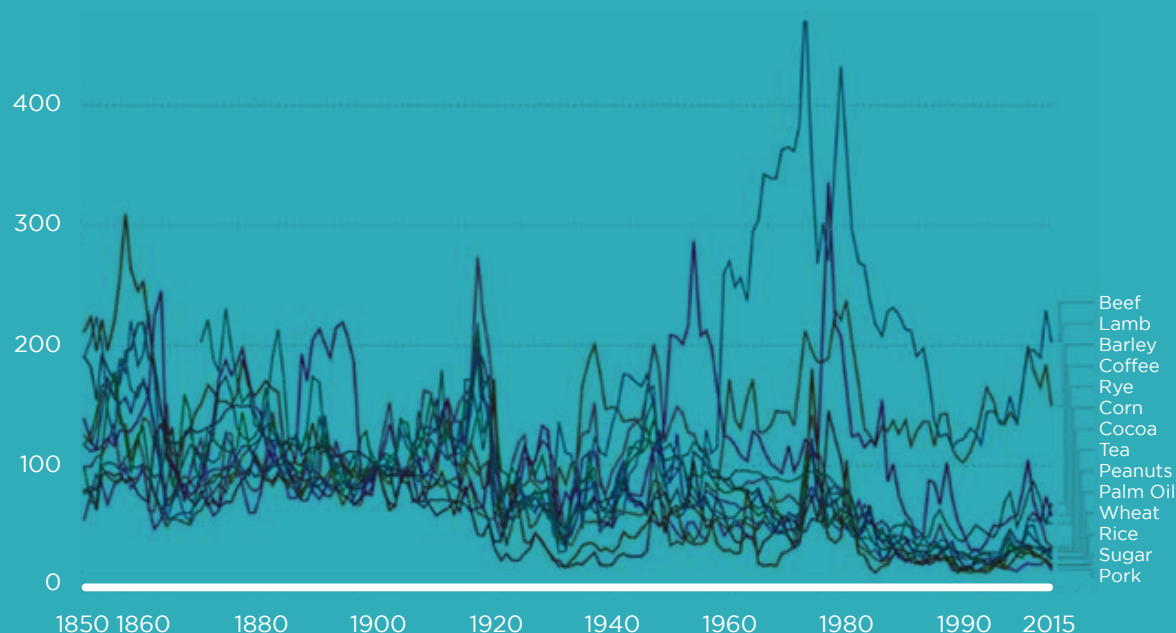
A central topic in this respect is the advent of the ‘cheap food era’: with the industrialisation of the food system, the past 150 years have witnessed a clear downward trend in real food prices, contributing to a significant increase in access to food, reducing global hunger and malnourishment<sup>141</sup>, and allowing dietary improvement in middle- to high-income economies.

However, following the more recent transformation of the midstream segments of the agri-food chain outlined in the previous sections, however, studies increasingly point towards an opposite trend, namely the combination of a downward pressure on farm gate prices with an upward pressure on consumer prices<sup>142</sup>. According to several authors, this could be partly due to “a *weakening of competition that can translate into higher prices and more market power for firms.*”<sup>143</sup> This mechanism seems confirmed by the analysis of Food Price Indexes that show an upward trend in real terms since the late 1990s<sup>144</sup>.

Moreover, as a result of the development of the processing industry, studies also indicate increases in the share of processed foods in various regions, in developed and developing economies alike<sup>145</sup>. In the meantime, however, demographic growth and rising incomes in EDC are fostering a Giversification of diets<sup>146</sup> together with increased demand for animal protein – with developing countries accounting for 87 per cent of the increase in global meat production<sup>147</sup> – whereas changing habits and increased willingness to tackle environmental issues through diet are fuelling a growing demand for alternative sources of protein in Europe and North America<sup>148</sup>.

### Long-term real prices of food commodities (1850 - 2015 | P(1900) = 100)

OurWorldInData



# Finance-related strategies to improve nutrition outcomes

## a. Introductory word: debating sustainability to secure financial shifts

The main avatars of agri-food financialisation, and its main determinants and impacts having now been emphasised, this chapter will be devoted to outlining the state of the literature on the various financial strategies that have been suggested in order to trigger or support the necessary changes that would be conducive to a more healthy, efficient, affordable, inclusive and sustainable food system.

Although it is not the scope of the current literature review to detail this question, it is nevertheless necessary to make clear what is meant by such labels as ‘healthy, inclusive and sustainable’, since without a commonly shared and sufficiently well-defined objective, any recommendation remains moot. While there is a broad agreement in the literature concerning the criteria on which to assess the healthiness or inclusiveness of the food system and its components, there are significantly diverging views on the criteria that should be prioritised to evaluate sustainability and, consequently, on the level of sustainability of different agricultural practices.

While this might seem like a minor point, it is actually an essential element to consider as far as the food-finance nexus is concerned, for at least two reasons:

**(a)** because it influences the qualitative and quantitative – including financial – diagnosis of the global food system and its externalities, and hence the sectors or practices that should be inflected in priority; and

**(b)** because financial investments towards seemingly more sustainable practices according to one framework might well turn out to be poorly sustainable – or at the very least a sub-optimal solution – according to another, possibly more complete framework; as a result, the disregard for sustainability criteria might well end up supporting a rush in capital flows towards deceptive solution at the expense of more robust alternatives.

Eventually, should policymakers later adjust the attribution of green labels to investments on the basis of a renewed set of criteria that would take into account a more multidimensional approach of sustainability, investors could face much lower returns than expected, and perhaps also considerable losses.

Such discussion on sustainability criteria also matters for another reason: the diversity, vagueness and lack of uniformity of the terms pertaining to sustainable practices. Indeed, concepts like ‘sustainable agriculture’, ‘(climate)-smart agriculture’, ‘regenerative agriculture’, ‘agroecological farming’ or ‘organic farming’ can be found alternatively and often interchangeably, encompassing very different realities<sup>149</sup>. Only recently did initiatives such as the green taxonomy of the EU Technical Expert Group (TEG) emerge as an attempt to harmonise the metrics of sustainable finance<sup>150</sup>. On top of this, so-called ‘organic’ labels are of little help to navigate the maze of agri-food sustainability, since organic products may well be produced in poorly sustainable ways, whereas highly sustainable products are often excluded from the organic space<sup>151</sup>.

The following sub-section (b) will briefly outline the main concepts and financial sources that are relevant to understand sustainable finance in support of the agri-food system transition. In sub-section (c), we will concisely describe the main financial instruments, regulations or measures that have been proposed in the literature to actually implement a sustainable agri-food transition, while also briefly outlining their potential benefits and drawbacks when necessary.

## b. Financial sources for the agri-food transition

### Main financial strategies

It is estimated that transitioning to more sustainable food and agricultural practices may require \$300-350 billion per year until 2030<sup>152</sup>. As always, such challenges prompt the question of the relative share of public vs private funds. In quantitative terms, private funds are expected to do the heavy lifting. There is, however, still a lack of incentives for a considerable proportion of private investors to address environmental externalities or to invest in regions where governance and institutional frameworks jeopardise or undermine potential benefits<sup>153</sup>. While private funding is larger, it is only available for activities that can exhibit appropriate risk/return profiles, which can turn out problematic in the case of the agri-food transition. As shown by McKinsey in an important report 'Net-Zero Europe', 60 per cent of the investment to be made until 2030 to transition to a decarbonised economy would not have a business case<sup>154</sup>.

In order to overcome this situation where '*public funds can't*' and '*private funds won't*', several approaches have been developed to foster interaction between public and private funds. As far as the agri-food transition is concerned, three forms of finance/approaches to investment should be looked at with more scrutiny<sup>155</sup>:

- **Blended finance**, defined as the strategic use of development and other public funds to attract private capital by de-risking investments in projects contributing to sustainable development<sup>156</sup>. As stated by Haavemann, "*Sustainable agriculture is a particularly relevant target for blended finance given its significant GDP contribution in many countries, and the need to overcome barriers such as the remote location of counterparties, lack of information, and high opportunity costs*"<sup>157</sup>;

- **(Social) impact investing**, referring to investments made with the intention to generate positive social and/or environmental outcomes, and targeting below market to market level returns<sup>158</sup>. Such impact investing – or more precisely social finance approaches – have recently been suggested as promising, yet still too limited, candidates to support regenerative agriculture<sup>159</sup>;

- **Mission-oriented finance**. Partly linked to impact investing, albeit on a much wider level, 'mission-oriented' finance is a concept crafted by M. Mazzucato in her book *Mission-Oriented Finance for Innovation: New Ideas For Investment-Led Growth* (2015). While also geared towards the achievement of objectives of public interest, mission-oriented finance focuses on "*problem-specific societal challenges, which many different sectors interact to solve. On the financial side, this comes with a rethinking of the role of government and public policy in the economy and their interaction with private actors at many level of the value chain.*" To this end, mission-oriented finance does not just pool private and public resources to fund socially responsible and environmentally friendly (agricultural) practices, but also sketches a programme for sectoral and technological innovations<sup>160</sup>. Usually applied to tackling climate-change, developing industrial policy or public-health mission-oriented finance could actually find an additional application in the transition towards an inclusive, healthy and sustainable agri-food system, with its three main 'missions' being: enhancing environmental sustainability, ensuring nutrition-related health, and allowing producers to make a decent living from their labour.

In relation to these missions, even though not using this terminology, several studies concentrate on the different concrete ways in which one (or more) of the desirable transformations of the agri-food system can be implemented or mainstreamed (whether AgriTech, regenerative agriculture, support to smallholder farmers etc)<sup>161</sup>.

### Public sources

- **State Investment Banks and Public Development Banks** that can act as strategic enablers of investments, notably in de-risking investments in activities of smallholders and SMEs. They can offer concessional debt financing to support larger capital investments, provide first loss capital and credit guarantees, and thereby crowd-in commercial capital<sup>162</sup>;

- **(Public) Micro-Finance Institutions** providing agricultural lending (implying inter alia flexible products, diversified risk management tactics etc)<sup>163</sup>;

- **Grants and subsidies** usually funding unprofitable or poorly profitable activities for public good purpose;

## Private sources

• **Nature markets** are “markets for products, services and attributes which relate to nature’s integrity”<sup>164</sup>, in the form of carbon markets, payment for ecosystem services or biodiversity offsetting mechanisms, and is one of the major strategies to internalise negative environmental externalities.

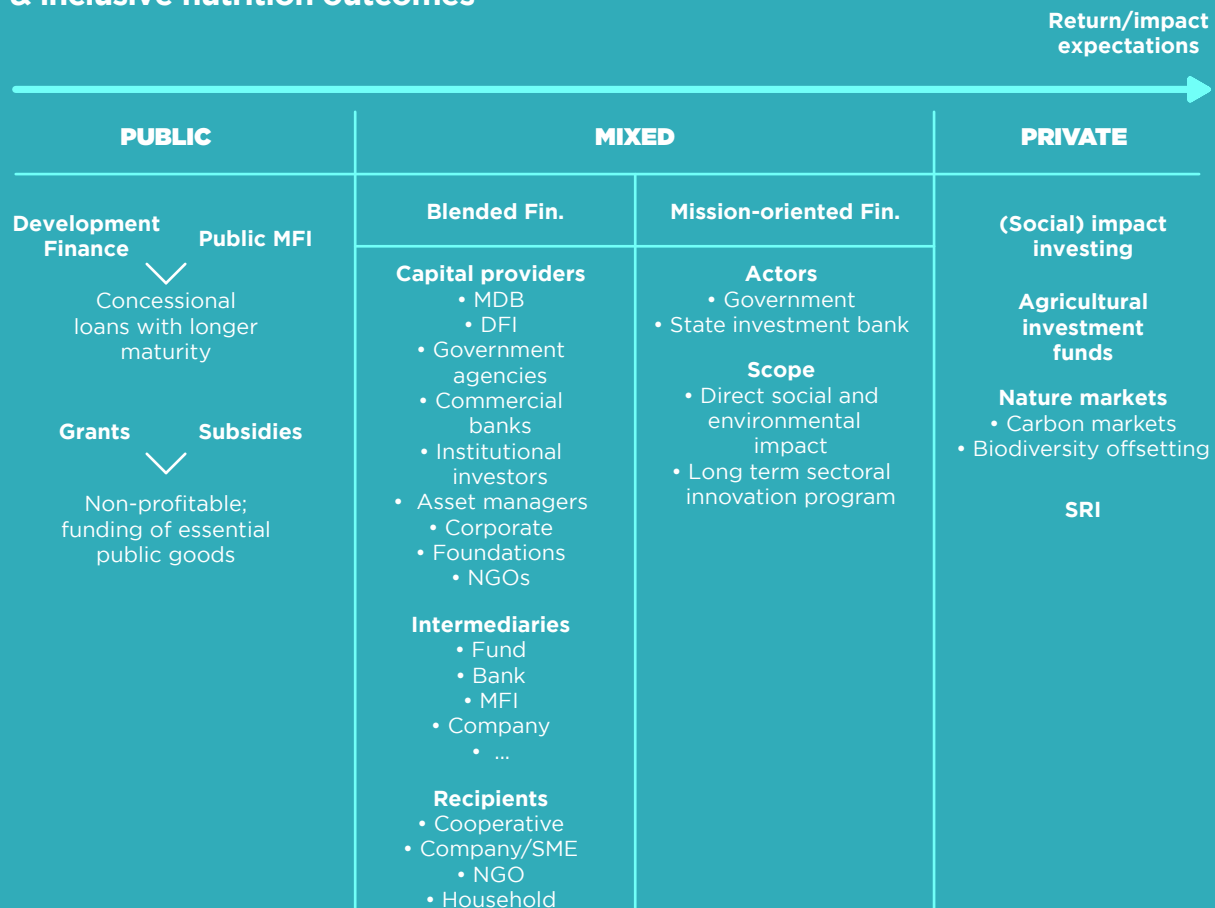
A vast literature exists on this approach which has been outlined elsewhere with all the necessary details<sup>165</sup>. It is, however, worth noting that non-negligible criticisms have also emerged regarding this approach. These criticisms involve the following arguments: disregard for the non-substitutability of compensated elements of nature, non-reversibility of the damages, ‘crowding out’ of the motivation to take care of ecosystems in the first place, privileging the commodification of nature over the management of ecosystems as public environmental goods etc.<sup>166</sup> In the specific case of the food system, despite representing a potentially large pool of capital, Toensmeier highlights that only a small fraction (about 2.5% per cent) of the \$331 billion of carbon finance financial resources spent since 2013 have targeted agriculture<sup>167</sup>.

None of these arguments invalidates the practice of carbon markets or biodiversity offsetting, but merely invites considering them as one element of a much wider toolbox rather than as the major lever towards enhanced sustainability.

• **Agricultural investment funds** that pool capital from different types of investors to finance agricultural stakeholders (farms, agribusinesses). Such funds usually allow invest-ing with reduced risk by diversifying investments via collective investment schemes;

• **Other sustainable investing** such as Socially Responsible Investing or ESG investing<sup>168</sup>.

## Typology of financial strategies to promote nature-positive & inclusive nutrition outcomes



## c. Financial instruments and regulations to impact agri-food transition missions

### Central Banking

Over the last decade, central banks have increasingly been pushed to intervene on sustainability-related issues, particularly in mitigating the effects of climate change. Even though in most cases such issues are not explicitly part of their mandate, the fact that environmental disruption is likely to generate liability, physical and transition risks, thereby jeopardising financial and price stability, has justified central banks taking action on ecological breakdown.

The most meaningful example of such action lies probably in the NGFS guidelines inviting central banks to *“integrate climate risks into their risk analysis, that underpins the purchase of securities and their use as collateral in monetary policy operations.”*<sup>169</sup> A complementary lever relates to asset purchase programmes, an illustrative example being the ECB corporate sector purchase program, which is the subject of claims and recommendations to exclude bonds that would not be compliant with the EU green taxonomy.

For some other central banks, however, such as the Bangladesh Bank, the Banco Central do Brazil, and the People’s Bank of China, sustainability is explicitly included in their mandate<sup>170</sup>. Similarly, the Reserve Bank of India’s programme on Priority Sector Lending explicitly targets farmers and SMEs (an important part of which are agricultural businesses)<sup>171</sup>.

### ESG disclosure

A second strategy that supports the transition of the agri-food system is the integration of ESG ratings in the operations of investors and lenders. To be more precise, we should actually talk about a *chain of ESG information*, rather than simply ESG ratings, because this process concerns various levels of the global financial system. Indeed, the first condition for efficient ESG metrics is transparent reporting by companies, as prescribed, for example, in the EU Non-Financial Reporting Directive (NFRD), whose scope is extended in the recent proposal for a Corporate Sustainability Reporting Directive (CSRD). The second level refers to ESG disclosure by financial actors and regulation authorities, in order to allow investment decisions to be informed of the environmental sustainability of the funded activities and financial products.

While such requirements might be seen as an important constraint at first sight, it has also been pointed out that *“a positive correlation among a high corporate ESG rating, strong market performance, and a lower cost of capital points to the benefits that accrue to companies capable of delivering on both financial and non-financial metrics. Businesses that can detect and respond to agrobiodiversity-related risks and opportunities will be better positioned in a context of increasing environmental volatility and expectations for risk disclosure.”*<sup>172</sup> ESG disclosure could be a powerful tool to help support more sustainable agri-food practices all along the food value chain (from on-farm agribusiness to retailers, seed industry corporations etc), and is a precondition for environment-related crop insurance programmes and green securitisation (cf. next two subsections), but only to the extent that a clear and harmonised taxonomy exists to deliver Ecolabels, and harmonise the certification of economic activities as ‘green’. In the absence of these conditions, not only is comparability jeopardised, but substantial room is left to the use of ESG rhetoric for greenwashing<sup>173</sup>.



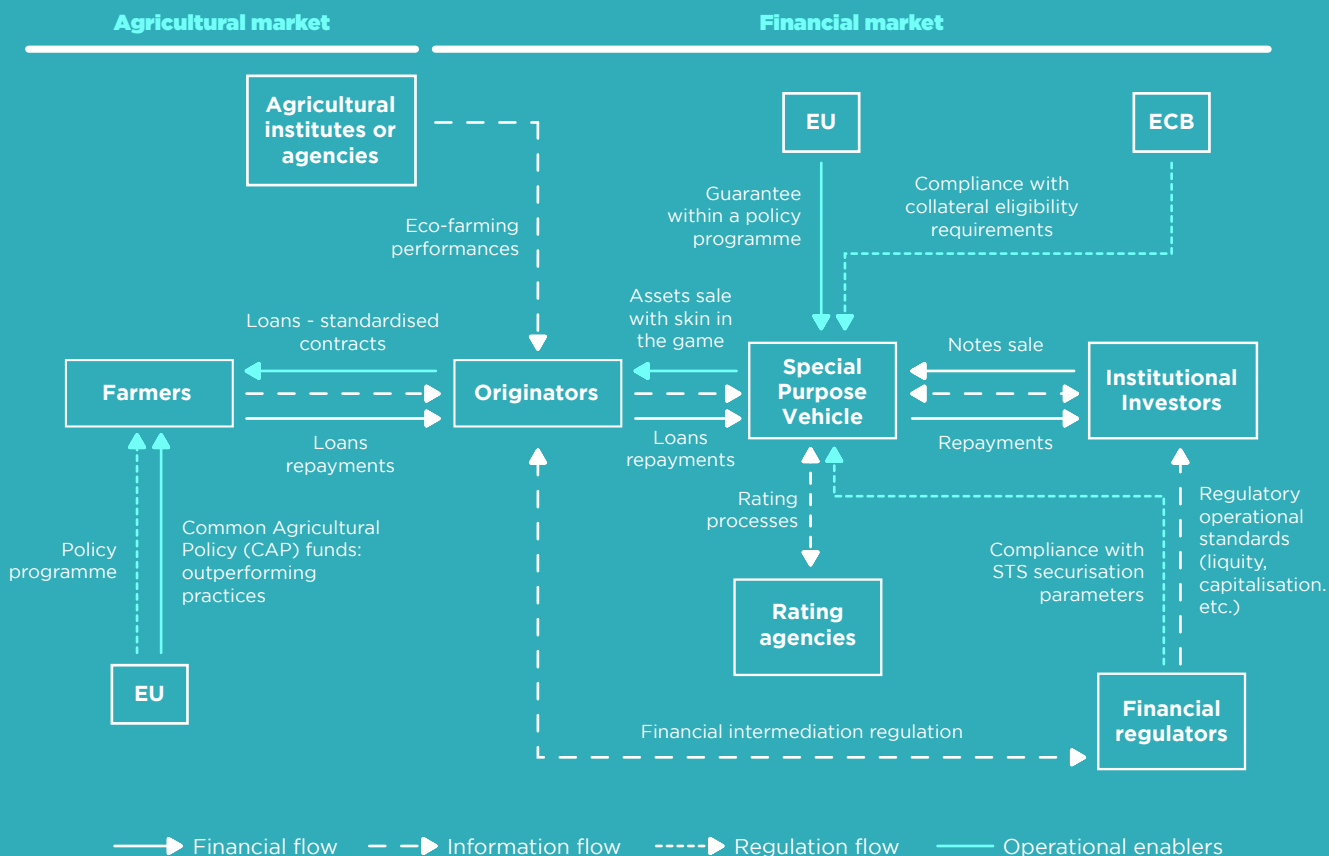
## Crop insurance programs

In addition to subsidies, direct loans and microfinance schemes, authors also point towards the importance of introducing or incentivising national crop insurance programmes at a more attractive rate than private insurances, particularly in a context of conversion to organic farming bearing greater initial risks. As stated by Battini (2019), *"publicly-sponsored insurance programs should promote conservation by linking premium subsidies to stewardship practices that protect land, water and health."*<sup>174</sup>

## Innovative securitisation

Relying too much on incentivising banks to increase lending through public guarantees or resorting to subsidies (cf. next sub-section) to support an environmentally friendly agri-food transition tends, according to some authors, to downplay the role of market-based mechanisms and to end up with a sub-optimal allocation of funds. Therefore, Migliorelli & Desertine (2015) suggest using an innovative originate-and-distribute securitisation mechanism *"based on a combination of support provided through the CAP grants and fully-fledged market instruments."* This scheme is designed so as to fix the main frictions of standard securitisation such as misalignment of incentives, information asymmetries, possible market failures etc. (cf. figure below)<sup>175</sup>. Securitisation is sometimes also praised for financing agri-food allowing it to unlock investment in support of agri-food technological innovations<sup>176</sup>. Several publications also point to the dangers of green securitisation, however, namely: the reliance on otherwise high-carbon assets, the potential increase of systemic financial risks, and heterogeneous definition<sup>177</sup>.

### Example of a proposed scheme of agri-food related green securitization



## Subsidies

While representing an important source of public funds, subsidies also have the potential to qualitatively impact the agri-food system. The mixed effect of subsidies on the working conditions of smallholder farmers in EDC/LDC countries as well as on consolidation of farmland has already been outlined in section IV. In addition to the already outlined nuances to the widespread picture on the role of agricultural subsidies in terms of farmer's livelihood, their environmental effect also needs to be discussed in the landscape of potential financial strategies for a more inclusive and sustainable food system.

Indeed, agricultural subsidies have often been blamed for substantial environmental damages, e.g. due to overuse of fertilisers and other inputs<sup>178</sup>. Yet, other studies show that, while subsidy-induced environmental damages do exist, this mostly concerns coupled subsidies - varying with the scale of production, and which have already been substantially reduced in the CAP since 2006<sup>179</sup> - rather than decoupled subsidies (direct payments)<sup>180</sup> inviting to refine the argument depending on the concerned category of subsidies. Finally, on a more optimistic note, studies also point towards the crucial importance of redirecting agricultural subsidies in encouraging the transition towards more sustainable forms of farming<sup>181</sup>.

## Behavioural nudging

Along a similar leveraging approach, behavioural nudging has also been pointed out as a powerful tool to curb producer and consumer behaviours with regard to agriculture and food, and mainstream more sustainable practices in the global food system. According to the latest and most comprehensive literature review on this subject, green nudging has proved very efficient in the vast majority of studies, on both the attitudes of consumers (food waste and supermarket purchases) and farmers (management of resources, use of pesticides and subscription to pro-environmental schemes)<sup>182</sup>. The systematic implementation of such tools remains marginal, however, partly because hot debates surround their more controversial ethical aspects<sup>183</sup>.

## Public food procurement

Despite a lack of available quantitative estimate, several studies highlight the crucial role of Green Public Procurement to drive local and regional agri-food markets along a more sustainable trajectory, to support small farmers and promote healthier diets<sup>184</sup>. While potentially more limited in size, public food procurement is one of the few mechanisms at our disposal that is able to address the three main missions of the agri-food transition.

## Promoting alternative business models

As explained in section 4a, the form of land tenure happens to have a significant impact on the sustainability of the agricultural exploitations. More particularly, studies have revealed that membership of agricultural **cooperatives and community-supported agriculture** (CSA) tends to incentivise farmers to use organic rather than synthetic fertilisers<sup>185</sup> and bring other positive social and ecological impacts that are able to reverse consolidation trends<sup>186</sup>. Promoting CSA and cooperatives through adequate public policy is therefore a necessary part of the agri-food transition, even more since such cooperatives are still currently too marginal and often cannot yield sufficient livelihood to farmers.

### Summary of the main financial strategies and their purpose

|  | Health-related | Financing farmers | Sustainability |
|--|----------------|-------------------|----------------|
| Nature markets                           |                |                   | ✓              |
| ESG disclosure                           |                |                   | ✓              |
| Central banking                          | ✓              | ✓                 | ✓              |
| DFI & Agriculture financial tools        |                | ✓                 | ✓              |
| Crop insurance                           |                | ✓                 |                |
| Innovative securization                  |                |                   | ✓              |
| Environmental subsidies                  |                |                   | ✓              |
| Behavioral nudging                       | ✓              |                   | ✓              |
| Public endorsement                       | ✓              | ✓                 | ✓              |
| Promotion of alternative business models |                | ✓                 | ✓              |



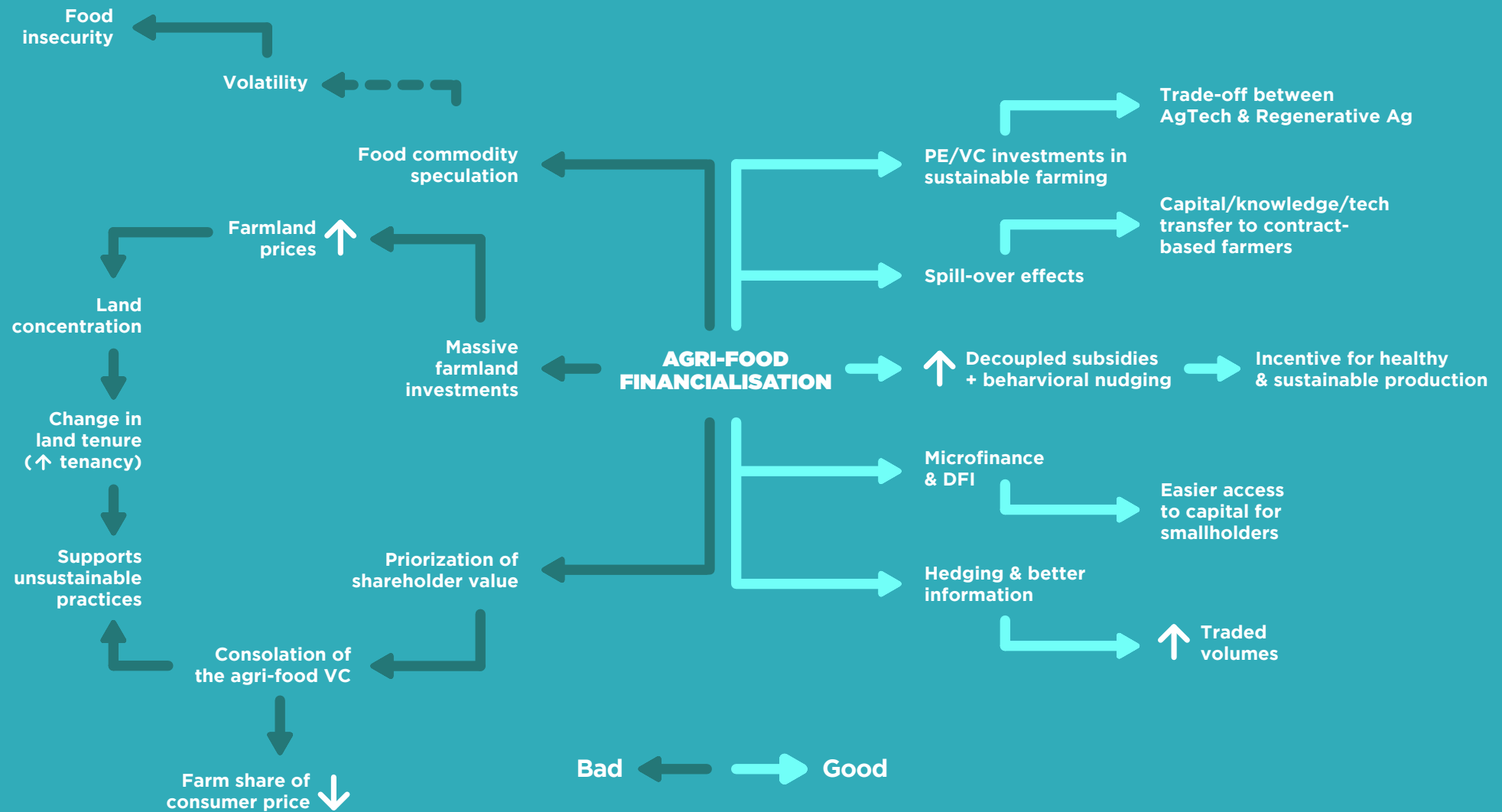
# Conclusion and perspectives

Beyond the key findings summarised in the beginning of the document, a major conclusion yielded by the present literature review is the articulation of the positive vs. negative impacts of agri-food financialisation, including some of the financial instruments that can be mobilised to support a more inclusive, healthy, and sustainable food system. The figure provides a non-exhaustive scheme of the main causal relations arising from agri-food financialisation.

In terms of policy-making rather than impacts, however, a major conclusion emerging from the literature is the necessity for public authorities to come up with a combination of several complementary strategies, rather than advocating for interventions focusing on a very restricted sample of measures considered as a panacea. Not only because, as shown in the previous section, different strategies often have different levels of relevance depending on their target (sustainability, nutrition-related health or inclusiveness), but also because, even when targeting the same aspect of the agri-food transition, they will often reveal different strengths and limitations. For example, while social impact investing can be highly effective in supporting the right changes to the agri-food system in terms on sustainable practices, it remains quantitatively very limited; on the other hand, carbon markets have the potential to redirect much larger amounts of money to support the agri-food transition, but with a lower level of accuracy and effectiveness in terms of sustainability. The existing landscape of finance-based strategies to support a sustainable agri-food transition therefore pleads for a pluralistic, diverse mix of complementary approaches.



## Bad vs. Good Financialisation



# Endnotes

- <sup>1</sup> FAO (2018)
- <sup>2</sup> Public Health Service of England – CBD (2013)
- <sup>3</sup> FAO, 2018
- <sup>4</sup> Larder et al., 2015, p.592
- <sup>5</sup> Gunnoe, 2014, p.479
- <sup>6</sup> Sommerville et Magnan, 2015, p.119
- <sup>7</sup> Burch and Lawrence, 2009
- <sup>8</sup> Epstein, 2005, p.3; followed by : Hartmann et al., 2021, p.123 ; Clapp 2014, 798-799 ; Brooks 2016, p.772, ...
- <sup>9</sup> Krippner, 2011, p.4 ; followed by Fairbairn, 2014
- <sup>10</sup> Williams, 2014, p.403
- <sup>11</sup> Ouma, 2016, p. 83
- <sup>12</sup> This period could be slightly underrepresented in the corpus because the research and collection of sources has prioritised the most recent publications.
- <sup>13</sup> Erdkamp (2005), pp. 16-17 ; De Martino (1991), p.276 ; Temin (2002), pp.18-19
- <sup>14</sup> Chayanov (1927), p. 53sq.
- <sup>15</sup> Gertel & Sippel (2016), pp. 215-219
- <sup>16</sup> Martin & Clapp (2015), pp. 549-559 ; Ouma (2018), pp.88-89
- <sup>17</sup> Serrano (2019), p. 601
- <sup>18</sup> Ouma (2020) , p. 67
- <sup>19</sup> Lapérouse (2016), p.2
- <sup>20</sup> Baker et al. (2014)
- <sup>21</sup> Fairbairn 2014, p. 778; Serrano 2019, 601
- <sup>22</sup> Fairbarin (2014)
- <sup>23</sup> Faribairn (2014), p. 790 ; for a general description, history and analysis of F-REITS, see : Serrano (2018).
- <sup>24</sup> Gunnoe (2014), pp. 495-496 ; Brumback, 2013
- <sup>25</sup> Isakson, 2014, p. 765 & 767 ; cf. Li (2012)
- <sup>26</sup> Clapp & Isakson (2018), p.441 ; Ouma (2014), p.163; see also : HighQuest (2010)
- <sup>27</sup> Serrano (2018), p. 605
- <sup>28</sup> Valoral Advisors (2018), p.18
- <sup>29</sup> Ouma (2018), p.89
- <sup>30</sup> Cf. Clapp (2019) ; Clapp & Isakson (2018)
- <sup>31</sup> Lianos et al (2020), p. 155
- <sup>32</sup> Williams, 2014, p.403
- <sup>33</sup> Lianos et al, 2020, p.153. The authors pursue: “This, in turn, has led to corporations becoming more dependent on the investments of some institutional investors, which increasingly own shares in publicly listed companies, instead of physical persons”
- <sup>34</sup> Burch & Lawrence (2013); the impacts of such prioritization will be discussed in section IV.
- <sup>35</sup> Isakson 2014, pp. 750sq; Williams 2014, p. 404; Clapp 2019, p. 604sq; Ouma, 2018a, p. 85sq
- <sup>36</sup> Ouma, 2018a, p. 85sq
- <sup>37</sup> Ghosh 2010, p. 8 ; Clapp & Isakson, 2018, p. 440
- <sup>38</sup> Isakson 2014, p.765
- <sup>39</sup> Larder et al, 2018, p. 410; Gillam, 2009; McMichael 2012, p. 690
- <sup>40</sup> Magnan 2015 p. 6
- <sup>41</sup> PreQin 2016 ; Valoral Advisors (2018), p.5 ; <https://farmfolio.net/articles/institutional-investors-permanent-crops/>
- <sup>42</sup> Larder et al, 2018, p. 410
- <sup>43</sup> PreQin, 2016 ; Valoral Advisors, 2020, p.12
- <sup>44</sup> Larder et al. 2018, p. 407
- <sup>45</sup> Clapp & Helleiner 2012, p. 188 ; Demeris, 2017, p. 14
- <sup>46</sup> Fairbairn, 2014, p. 789
- <sup>47</sup> Ouma 2016, p. 88
- <sup>48</sup> Warlow & Kasabov, 2014, p. 269
- <sup>49</sup> Larder et al 2017, p. 413
- <sup>50</sup> Ouma 2018a, p. 85 sq

- <sup>51</sup> Daniel (2012) ; Lawrence et al. (2015), pp. 317 sqq.
- <sup>52</sup> Valoral Advisors, 2018, p.33
- <sup>53</sup> [Pitchbook] <https://www.dtnpf.com/agriculture/web/ag/blogs/minding-ags-business/blog-post/2021/05/05/global-investment-agtech-startup-5> ; <https://www.bloomberg.com/news/articles/2020-11-20/venture-capital-targets-food-revolution-as-virus-raises-stakes>
- <sup>54</sup> <https://research.agfunder.com/2021/2021-agfunder-global-report.pdf>
- <sup>55</sup> [GFI] : <https://gfi.org/press/record-3-1-billion-invested-in-alt-proteins-in-2020-3x-the-capital-invested-in-2019/>
- <sup>56</sup> [GFI] : 'Fermentation companies focused on alternative proteins have raised more than \$837 million in venture capital funding, starting with the first GFI-tracked investment in 2013. Eighty-five percent of this funding was raised in 2019 and in the first seven months of 2020 alone.' :  $0.85 \times 837 = 711$  million.
- <sup>57</sup> Electris et al. (2019), p.v
- <sup>58</sup> Lianos et al. (2020), p. 196
- <sup>59</sup> Clapp (2019), p. 613-614.
- <sup>60</sup> See section IV.a below
- <sup>61</sup> For a general perspective on trade finance in agricultural value chains, see : Miller & Jones, 2010, pp. 67-69. According to Wenner (2006), trade finance stands among the main modalities of value-chain financing, alongside with secured transactions, risk management and financial enhancement instruments. (cf. Miller & Jones, 2010, p. 55).
- <sup>62</sup> Winn et al, 2009, p.7; Valoral Advisors, 2018, p.9
- <sup>63</sup> Brooks & Place, 2019, p. 69
- <sup>64</sup> Trade finance sources are diverse: in EDC countries, for example, sources of grain trade financing appear to be mostly commercial banks, followed by internal borrowing (firm or family) and informal credit (cf. Sitco et al. 2017, p.9).
- <sup>65</sup> Miller & Jones, 2010, p.71; Valoral advisors 2018, p.3; Finance in Common, 2020, p. 3
- <sup>66</sup> <https://www.sc.com/en/feature/global-trade-now-faces-a-us3-4-trillion-financing-gap/>
- <sup>67</sup> Vickers et al, 2020, p. 11 ; Valoral Advisors 2020, p. 20
- <sup>68</sup> UNCTAD, 2021 p.13
- <sup>69</sup> OECD, 2019
- <sup>70</sup> OECD, 2020
- <sup>71</sup> Heine & Thakur (2011), p.5
- <sup>72</sup> TRACIT, 2019, p.15
- <sup>73</sup> Do the costs of the global food system outweigh its monetary value? (worldbank.org)
- <sup>74</sup> Plunkett Research, 2018
- <sup>75</sup> FOLU 2019, p.24
- <sup>76</sup> <https://blogs.worldbank.org/voices/do-costs-global-food-system-outweigh-its-monetary-value>
- <sup>77</sup> FOLU 2019, p.24
- <sup>78</sup> Worth noticing from a dynamic point of view is the decrease of the share of agriculture-related ODA since 2014 (despite a 152% increase in overall ODA since 2002) : cf. Ceres2030, p.2
- <sup>79</sup> Most of this investment typology is taken from FAO (2014), COAG/2014/7.
- <sup>80</sup> Knight Frank (2011)
- <sup>81</sup> <https://www.ft.com/content/148a282e-914b-11e6-8df8-d3778b55a923>
- <sup>82</sup> Lowder et al. (2016) ; Lowder et al. (2021)
- <sup>83</sup> Gladek et al. (2017), pp. 77sqq.
- <sup>84</sup> Lowder et al.(2021), p. 10
- <sup>85</sup> GRAIN (2016) ; cf. [www.grain.org](http://www.grain.org)
- <sup>86</sup> De Schutter (2011)
- <sup>87</sup> Townsend et al. (2018), World Bank, p.7 ; Access to Finance for Smallholder Farmers Learning from the Experiences of Microfinance Institutions in Latin America, IFC, 2014, p.5 ; 1.5 billion : Miller et al. (2018), Agricultural investment funds for development, FAO, p. 3.
- <sup>88</sup> Jones & Eljeta (2016) ; Fadeyi (2018)
- <sup>89</sup> Op.cit., IFC, 2014, p. III & p.1; Miller & Jones, 2010, p.1 ; Miller et al. (2010), FAO, 2010, p.15
- <sup>90</sup> Langyintuo (2020), p. 134
- <sup>91</sup> Blackman, 2001
- <sup>92</sup> Sarkar (2018), p. 51
- <sup>93</sup> For a deeper analysis of the determinants of farmers' indebtedness in India, see : Ramprasad (2019)
- <sup>94</sup> Godfrey, 2002 (EU); Peterson, 2006 ; Wise, 2011 (US)
- <sup>95</sup> Meyer, 2011, p. 25

- <sup>96</sup> Key & Roberts 2006 ; Kirwan & Roberts, 2016, p. 111
- <sup>97</sup> Charles, 2011
- <sup>98</sup> Meyer, 2011, p.25
- <sup>99</sup> Scott, 2009 : Mexico
- <sup>100</sup> <https://www.thebalance.com/farm-subsidies-4173885>
- <sup>101</sup> <https://www.weforum.org/agenda/2015/09/how-effective-are-farming-subsidies/>; Kaur & Sharma, 2012, p.46.
- <sup>102</sup> Hoekman et al., 2004 ; Wise, 2004a, pp. 27sq ; Anderson et al., 2006
- <sup>103</sup> Wise, 2004b
- <sup>104</sup> Kirwan, 2009
- <sup>105</sup> Bourdon, 1982
- <sup>106</sup> Lence et al., 2007; Daniel & Kilkenny, 2009, p. 523
- <sup>107</sup> Barrett et al. (2020), p. 5 ; Rotz et al. (2019), p. 153 for other regions, see : Singh (2007); Ganeshkumar (2017), p.86
- <sup>108</sup> Cuffaro et al. (2013), p. 24
- <sup>109</sup> Varble et al. (2015), pp. 325-326 (Iowa) ; Abdulai et al. (2010), p. 11 ; Richardson (2016), p. 803
- <sup>110</sup> Abdulai et al. (2010), p. 11. The overall level of inputs seems however higher for owner-operators (Akram et al. (2019), p. 6).
- <sup>111</sup> Abdulai et al. (2010), p. 11 ; Richardson (2016), p. 823
- <sup>112</sup> Soule (2000), p.1003
- <sup>113</sup> Rahm & Huffman (Iowa); Norris & Batie (Virginia); Fuglie & Klotz (Pennsylvania & Maryland); cf. Soule (2000), pp. 994-995.
- <sup>114</sup> Wang et al. (2018), p.888
- <sup>115</sup> Rotz et al. (2019), p. 157
- <sup>116</sup> Ren (2019)
- <sup>117</sup> Van Der Meulen (2014) ; Ricciardi et al (2021)
- <sup>118</sup> Reardon & Timmer (2012), 14.11-14.13 ; Clapp (2015), pp. 129-130; Clapp (2019) ; Lianos et al. (2020), pp.154 sqq & pp. 187sq.
- <sup>119</sup> IPES Food, 2017, quoted in Clapp & Isakson (2018), p. 446.
- <sup>120</sup> Howard (2009) ; Bonny (2017)
- <sup>121</sup> Bonny (2017), p.16
- <sup>122</sup> Bonny (2017)
- <sup>123</sup> Howard (2009)
- <sup>124</sup> Hendrickson et al (2001)
- <sup>125</sup> Gladek et al. (2017), p. 77 ; see also : Clapp (2012)
- <sup>126</sup> Reardon & Timmer (2012), p. 14.18
- <sup>127</sup> While no quantitative data could be found on the evolution of trade finance, studies show that the impact of shocks to demand and to the liquidity of trading partners is shaped by the way trade is financed (Antràs & Foley, 2015, p. 857).
- <sup>128</sup> Hingley (2015)
- <sup>129</sup> Isakson, 2014, 753 ; Burch & Lawrence, 2013, pp. 247-258 ; Burch & Lawrence, 2009
- <sup>130</sup> Kalfagianni & Skordili, 2015, p.4 ; McMichael (2012), p.684 ; cf. Harvey (2001)
- <sup>131</sup> Reardon et al. (2008), p.61. On private standards as requiring increased threshold investments by farmers, see Nguyen (2009), p.1719.
- <sup>132</sup> Ordu et al. (2018), p.94
- <sup>133</sup> Ordu et al. (2018), p.94
- <sup>134</sup> Isakson, 2014, pp.757.
- <sup>135</sup> Ibid., p. 758.
- <sup>136</sup> Ghosh et al., 2012
- <sup>137</sup> Clapp, 2019, pp. 604-605 ; Brooks, 2016, p. 772 ; Lawrence et al., 2015, p. 316 ; Clapp & Isakson, 2018, p. 440; Wahl, 2009; IATP, 2008
- <sup>138</sup> Will et al., 2016, p. 89.
- <sup>139</sup> Ibid.
- <sup>140</sup> De Schutter, 2010, p.8 ; Wright & Bobenrieth, 2010.
- <sup>141</sup> FAO, 2017 ; Oliver et al., 2018 ;
- <sup>142</sup> Moore (2010), p.241 ; Domina & Taylor (2010), p.62
- <sup>143</sup> Clapp, 2019, p.615 ; see also : Azar et al., 2018; Elhauge, 2016; Fichtner et al., 2017; OECD, 2017
- <sup>144</sup> HLPE (2011), p.21 ; FAO, 2018 : <http://www.fao.org/worldfoodsituation/page-storage/foodpricesindex/fr/>
- <sup>145</sup> Matos et al. (2021) ; Reardon & Timmer (2012), pp. 14.17-14.18

- <sup>146</sup> McCullough et al. (2008), pp. 5-7
- <sup>147</sup> FAO Agricultural Outlook, 2020
- <sup>148</sup> Fasolin et al. (2019)
- <sup>149</sup> For a clarification of the differences between climate-smart and regenerative agriculture, cf. Codour & Watson (2018).
- <sup>150</sup> Puschmann et al. (2020), p. 24
- <sup>151</sup> Suttor-Sorel (2019), p. 28
- <sup>152</sup> FOLU, 2019 ; Finance in Common, 2020, p. 4
- <sup>153</sup> Barrett et al. (2020), p. 57
- <sup>154</sup> McKinsey (2020), p.172
- <sup>155</sup> Cf. Havemann, 2020, p.1283 sqq.
- <sup>156</sup> OECD ; WB (2018), p.13
- <sup>157</sup> Haavemann (2020), p.1289
- <sup>158</sup> On the frequent confusion between impact investing and social finance : see Weber (2012)
- <sup>159</sup> Stephens & Clapp (2021), pp. 218-231 ;
- <sup>160</sup> Mazzucato, 2017, p.8.
- <sup>161</sup> Swinton & De Boer (2001) ; Gosnell et al. (2019) ; Rose & Chilvers (2018) ; Burgess et al. (2019), p. 30 sqq ; Vijay Shinde (2016),...
- <sup>162</sup> WWF, 2021 ; Finance in Common, 2020
- <sup>163</sup> IFC, 2014, p.2 sqq.
- <sup>164</sup> F4B Initiative (2021) [ <https://www.f4b-initiative.net/post/catalyzing-nature-markets-a-new-programme-of-f4b> ]
- <sup>165</sup> Seeberg-Elverfeld, 2010, p.5 ; Toensmeier, 2016, pp. 338 sqq.
- <sup>166</sup> A good summary of these arguments can be found here : Björnberg, 2020 : Suttor-Sorel, 2020, pp. 74 sqq. See also : Van Veelen, 2021.
- <sup>167</sup> Toensmeier (2016), 340 sqq.
- <sup>168</sup> Cf. Suttor-Sorel (2020), p.38
- <sup>169</sup> <https://www.cepweb.org/central-banks-and-climate-change/>; see also : Battini (2019), p.35
- <sup>170</sup> Dikau & Ryan-Collins, 2017
- <sup>171</sup> <https://www.rbi.org.in/scripts/FAQView.aspx?Id=87>
- <sup>172</sup> Negra, 2017, p.4
- <sup>173</sup> On the implementation of ESG criteria, see : Suttor-Sorel, 2020, pp. 47 sqq & Schramade, 2019, pp. 187 sqq.
- <sup>175</sup> Battini (2019), p. 34
- <sup>176</sup> Miglioreli & Dessertine (2015), p. 15
- <sup>177</sup> Feeding future generations, EC & EIB, 2019, p.12
- <sup>178</sup> Petit & Schlosser (2020) ; <https://positivemoney.org/2019/09/securitisation-is-back-and-green-finance-must-stray-far-away/>
- <sup>179</sup> Borders & Burnett, 2006
- <sup>180</sup> DG Agri, 2020
- <sup>181</sup> Pearce, 2005, OECD, p.11
- <sup>182</sup> Inkoom, 2017 ; Future Food Systems, 2020, p.89
- <sup>183</sup> Ferrari et al. (2019), p. 191
- <sup>184</sup> Galli (2020), p.8
- <sup>185</sup> Among a large body of publications : Swensson & Tartanac (2020) ; Simon-Rojo et al. (2020) ; Pagliarino et al. (2021) ; Miranda (2018), FAO ;
- <sup>186</sup> Wan et al. (2018)
- <sup>187</sup> Whittman et al. (2017)

# Bibliography

- Adams Inkoom, S. (2017). *Encouraging Organic Agriculture : The Effects of Conversion Subsidies* [Thesis submitted in partial fulfillment of requirement for the Master of Science & Major in Economics]. South Dakota State University.
- Akram Loodhi, H. A. (2012). Contextualising land grabbing : Contemporary land deals, the global subsistence crisis and the world food system. *Canadian Journal of Development Studies/Revue canadienne d'études du développement*, 33(2), 119142.
- Akram, N. et al. (2011). Does Land Tenure Systems Affect Sustainable Agricultural Development? *Sustainability*, 11(14), 115.
- Anderson, K., Martin, W., & Valenzuela, E. (2006). The relative importance of global agricultural subsidies and market access. *World Trade Review*, 5(3), 357376. <https://doi.org/10.1017/S1474745606002916>
- Antràs, P., & Folley, F. (s. d.). Poultry in Motion : A Study of International Trade Finance Practices. *Journal of Political Economy*, 123(4), 853901.
- Anunobi, C. P. et al. (2020). Relationship between Rural Finance Institution Services and Standard of Living of Rural Farming Households in Anambra State, Nigeria. *Asian Journal of Agricultural Extension, Economics & Sociology*, 38(3), 102109.
- Awudu, A. et al. (2011). Land tenure differences and investment in land improvement measures : Theoretical and empirical analyses. *Journal of Development Economics*, 96(1), 6678.
- Baker, T. G. et al. (2014). Farmland : Is it currently priced as an attractive investment. *Amer. J. Agr. Econ*, 96(5), 13211333.
- Barrett, C. (2020). Agri-food Value Chain Revolutions in Low-and Middle-Income Countries. *Journal of Economic Literature*, forthcoming, 169.
- Basu, P. (2006). *Improving Access to Finance for India's Rural Poor* (Directions in Development). World Bank.
- Batini, N. (2019). Transforming agri-food sectors to mitigate climate change : The role of green finance. *Vierteljahrshefte Zur Wirtschaftsforschung*, 88(3), 743.
- Behrendt , K., & Paparas, D. (2020). *Proceedings of the 3rd INFER Symposium on Agri-Tech Economics for Sustainable Futures, 21st – 22nd September 2020, Harper Adams University, Newport*.
- Bellemare, M. F. (2014). Rising food prices, food price volatility and social unrest. *Amer. J. Agr. Econ.*, 97(1), 121.
- Benton, T. G., & Bailey, R. (2019). The paradox of productivity : Agricultural productivity promotes food system inefficiency. *Global Sustainability*, 2(6), 18.
- Berchin, I. I. (2019). The contributions of public policies for strengthening family farming and increasing food security : The case of Brazil. *Land Use Policy*, 82, 573584.
- Bhatt, V. V. (1970). Bank Finance to Agriculture, Small Industry : Proposal for a Scheme of Approved Dealers. *Economic and Political Weekly*, 5(47), 18961900.
- Bilal Basha, M. et al. (2015). Consumers Attitude Towards Organic Food. *Procedia Economics and Finance*, 31, 444452.
- Bjørkhaug, H., Magnan, A., & Lawrence, G. (2020). *The financialization of agri-food systems : Contested transformations*. Routledge.
- Blackman, A. (2001). Why don't lenders finance high-return technological change in developing-country agriculture ? *Amer. J. Agr. Econ.*, 84(3), 10241035.
- Borsellino, V. (2020). Agri-Food Markets towards Sustainable Patterns. *Sustainability*, 12(6), 135.
- Brooks , K., & Place, F. (2019). Global food systems : Can foresight learn from hindsight? *Global Food Security*, 20, 6671.
- Brooks, S. (2016). Inducing food insecurity : Financialisation and development in the post-2015 era. *Third World Quarterly*, 37(5), 768780.

- Brown, R. M. (2013). « They Come, but They Don't Spend as Much Money » : *Livelihoods, Dietary Diversity, Food Security, and Nutritional Status in Two Roatan Communities in the Wake of Global Crises in Food Prices and Finance* [A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy]. University of South Florida.
- Brzezina, N., Kopainsky, B., & Mathijs, E. (2016). Can organic farming reduce vulnerabilities and enhance the resilience of the European food system? A critical assessment using system dynamics structural thinking tools. *Sustainability*, 8(10), 971. <https://doi.org/10.3390/su8100971>
- Burch, D., & Lawrence, G. (2009). Towards a third food regime : Behind the transformation. *Agric. Hum. Values*, 26, 267279.
- Burch, D., & Lawrence, G. (2013). Financialization in agri-food supply chains : Private equity and the transformation of the retail sector. *Agriculture and Human Values*, 30(2), 247258. <https://doi.org/10.1007/s10460-012-9413-7>
- Burgess, P. J. et al. (2019). *Regenerative Agriculture Identifying the impact; enabling the potential*. SYSTEMIQ - Cranfield University.
- Ciaian, P. et al. (2010). *EU Land Markets and the Common Agricultural Policy*. Centre for European Policy Studies.
- Clapp, J. (2014). Financialization, distance and global food politics. *The Journal of Peasant Studies*, 41(5), 797814. <https://doi.org/10.1080/03066150.2013.875536>
- Clapp, J. (2015). ABCD and beyond : From grain merchants to agricultural value chain managers. *Canadian Food Studies*, 2(2), 126135.
- Clapp, J. (2019). The rise of financial investment and common ownership in global agrifood firms. *Review of International Political Economy*, 26(4), 604629. <https://doi.org/10.1080/09692290.2019.1597755>
- Clapp, J., & Helleiner, E. (2012). Troubled futures ? The global food crisis and the politics of agricultural derivatives regulation. *Review of International Political Economy*, 19(2), 181207.
- Clapp, J., & Isakson, S. R. (2018). Risky returns : The implications of financialization in the food system: debate: financialization in the food system. *Development and Change*, 49(2), 437460. <https://doi.org/10.1111/dech.12376>
- Codour, A.-M., & Watson, J. (2018). *Climate smart or regenerative agriculture ? Defining climate policies based on soil health* [Climate Policy Brief, n°9]. Global Development And Environment Institute, Tufts University.
- Coleman, W. D., & Wyn, G. P. (1998). Policy convergence and policy feedback : Agricultural finance policies in a globalizing era. *European Journal of Political Research*, 34, 225247.
- Cordier, J., & Phélippé-Guinvarc'h, M. (2001). *Assurance et finance agricoles : Une approche descriptive et comparative* [Rapport de recherche]. Unknown.
- Csaski, C., & Jambor, A. (2013). Impacts of EU enlargement on the new member states agriculture. *Acta Oeconomica et Informatica*, 16(1), 3550.
- Cuffaro, N. et al. (2013). Large scale foreign acquisitions of land in developing countries. Risks, opportunities and new actors. *QA Rivista dell Associazione Rossi-Doria*, 2, 936.
- Daniel, K., & Kilkenny, M. (2009). Agricultural subsidies and rural development. *Journal of Agricultural Economics*, 60(3), 504529. <https://doi.org/10.1111/j.1477-9552.2009.00214.x>
- Davis, J. R., & Gaburici, A. (1999). Rural Finance and Private Farming in Romania. *Europe-Asia Studies*, 51(5), 843869.
- De Schutter, O. (2011). How not to think of land-grabbing : Three critiques of large-scale investments in farmland. *The Journal of Peasant Studies*, 38(2), 249279.
- de Klerk, T. (2008). *Paysage de la finance rurale : Guide à l'intention des acteurs sur le terrain* (Agrodok n°49). Fondation Agromisa & CTA.
- Defrance de Tersant, G. (2019). *Challenges Facing Agriculture : Evaluation of the Impact of AgTech, Recommendations, and Opportunity Identification in Food Waste Reduction* [Submitted to the Integrated Design and Management Program and the Department of Mechanical Engineering in Partial Fulfillment of the Requirements for the Degrees of Masters of Science in Engineering and Management and Masters of Science in Mechanical Engineering]. Massachusetts Institute of Technology.



- Demeris, E. (2017). *The Financialization Of Food : Why Dinner Last Night Became So Political* [Plan II Honors Theses]. Texas University.
- Denac, K., & Kmecl, P. (2021). Land consolidation negatively affects farmland bird diversity and conservation value. *Journal for Nature Conservation*, 59, online only. <https://doi.org/https://doi.org/10.1016/j.jnc.2020.125934>
- Dixon, M. (2014). The land grab, finance capital, and food regime restructuring : The case of Egypt. *Review of African Political Economy*, 41(140), 232248.
- Domina, D., & Taylor, R. (2010). The Debilitating Effects of Concentration Markets Affecting Agriculture. *Drake Journal of Agricultural Law*, 15(1), 61108.
- Dougherty, B. (2019). *Regenerative Agriculture : The Path to Healing Agroecosystems and Feeding the World in the 21st Century*. Nuffield International Farming Scholars.
- Ducastel, A., & Anseeuw, W. (2017). Agriculture as an asset class : Reshaping the South African farming sector. *Agriculture and Human Values*, 34(1), 199209. <https://doi.org/10.1007/s10460-016-9683-6>
- Duong, P. B., & Izumida, Y. (2002). Rural Development Finance in Vietnam : A Microeconometric Analysis of Household Surveys. *World Development*, 30(2), 319335.
- Electris, C. (2019). *Soil Wealth. Investing in Regenerative Agriculture across Asset Classes*. Croatian Institute - Delta Institute - Organic Agriculture Revitalization Strategy.
- Fadeyi, O. A. (2018). Smallholder agricultural finance in Nigeria : The research gap. *Journal of Development and Agricultural Economics*, 10(11), 367376. <https://doi.org/10.5897/JDAE2018.0976>
- Fairbairn, M. (2014). 'Like gold with yield' : Evolving intersections between farmland and finance. *The Journal of Peasant Studies*, 41(5), 777795. <https://doi.org/10.1080/03066150.2013.873977>
- Fairhead, J., Leach, M., & Scoones, I. (2012). Green Grabbing : A new appropriation of nature? *Journal of Peasant Studies*, 39(2), 237261. <https://doi.org/10.1080/03066150.2012.671770>
- Famogbiele, A. (2013). The Challenges of Agricultural Finance in Nigeria : Constraints to Sustainable Agricultural and Economic Revival. *International Journal of Business and Social Research*, 3(5), online only. <https://doi.org/https://doi.org/10.18533/ijbsrv.3i5.22>
- Faribairn, M. (2014). 'Like gold with yield' : Evolving intersections between farmland and finance. *The Journal of Peasant Studies*, 41(5), 777795.
- Fearnside, P. M. (2005). Deforestation in brazilian amazonia : History, rates, and consequences. *Conservation Biology*, 19(3), 680688. <https://doi.org/10.1111/j.1523-1739.2005.00697.x>
- Fearnside, P. M. (2008). The roles and movements of actors in the deforestation of brazilian amazonia. *Ecology and Society*, 13(1), art23. <https://doi.org/10.5751/ES-02451-130123>
- Frimann Bügel, P. C. (2020). *Sustainability in agriculture : A qualitative study of how agtech startups in Norway contribute* [Master Thesis]. Norwegian University of Life Sciences .
- Fuchs, D., Meyer-Eppler, R., & Hamenstädt, U. (2013). Food for thought : The politics of financialization in the agrifood system. *Competition & Change*, 17(3), 219233. <https://doi.org/10.1179/1024529413Z.000000000034>
- Fulponi, L. (2006). Private voluntary standards in the food system : The perspective of major food retailers in OECD countries. *Food Policy* 31, 31, 113.
- Ganeshkumar, C., Pachayappan, M., & Madanmohan, G. (2017). Agri-food supply chain management : Literature review. *Intelligent Information Management*, 09(02), 6896. <https://doi.org/10.4236/iim.2017.92004>
- Garrett, R., & Rueda, X. (2019). Telecoupling and consumption in agri-food systems. In *Telecoupling : Exploring Land-Use Change in a Globalised World*. Palgrave Macmillan.
- Gashayie, A., & Singh, M. (2015). Agricultural Finance Constraints and Innovative Models Experience for Ethiopia : Emprical Evidance from Developing Countries. *Research Journal of Finance and Accounting*, 6(7), 3950.

- Gautam, M. (2015). Agricultural subsidies : Resurging interest in a perennial debate. *Ind. Jn. of Agri. Econ*, 70(1), online only. <https://doi.org/10.22004/AG.ECON.229968>
- Ghosh, J. (2010a). The Unnatural Coupling : Food and Global Finance. *Journal of Agrarian Change*, 10(1), 7286.
- Ghosh, J. (2010b). The unnatural coupling : Food and global finance. *Journal of Agrarian Change*, 10(1), 7286. <https://doi.org/10.1111/j.1471-0366.2009.00249.x>
- Girardi, D. (2015). Financialization of food. Modelling the time-varying relation between agricultural prices and stock market dynamics. *International Review of Applied Economics*, 29(4), 482505.
- Godfray, C. et al. (2010). The future of the global food system. *Phil. Trans. R. Soc. B*, 365, 27692777.
- Gosnell, H. et al. (2019). Transformational adaptation on the farm : Processes of change and persistence in transitions to 'climate-smart' regenerative agriculture. *Global Environmental Change*, 59, online only. <https://doi.org/https://doi.org/10.1016/j.gloenvcha.2019.101965>
- Gottschalk, T. K., Diekötter, T., Ekschmitt, K., Weinmann, B., Kuhlmann, F., Purtauf, T., Dauber, J., & Wolters, V. (2007). Impact of agricultural subsidies on biodiversity at the landscape level. *Landscape Ecology*, 22(5), 643656. <https://doi.org/10.1007/s10980-006-9060-8>
- Gunnoe, A. (2014). The Political Economy of Institutional Landownership : Neorentier Society and the Financialization of Land. *Rural Sociology*, 79(4), 478504.
- Hanson, James. C. et al. (1990). The Profitability of Sustainable Agriculture on a Representative Grain Farm in the Mid-Atlantic Region, 1981-89. *NJARE*, 19(2), 9198.
- Harris, J. M. (2009). *The Debt Finance Landscape for U.S. Farming and Farm Businesses* [AIS 87]. USDA.
- Hartmann, G., Mwaka, I., & Dannenberg, P. (2021). Large investments, small farmers : A financialisation perspective on value chains in a development corridor. *Development Southern Africa*, 38(1), 122138.
- Havemann, T., Negra, C., & Werneck, F. (2020). Blended finance for agriculture : Exploring the constraints and possibilities of combining financial instruments for sustainable transitions. *Agriculture and Human Values*, 37(4), 12811292. <https://doi.org/10.1007/s10460-020-10131-8>
- Heine, J., & Thakur, R. (2011). Introduction : Globalization and transnational uncivil society. In *The Dark Side of Globalization* (p. 116). United Nations University Press.
- Henry, M., & Prince, R. (2018a). Agriculturalizing finance ? Data assemblages and derivatives markets in small-town New Zealand. *Environment and Planning A: Economy and Space*, 50(5), 9891007.
- Henry, M., & Prince, R. (2018b). Agriculturalizing finance? Data assemblages and derivatives markets in small-town New Zealand. *Environment and Planning A: Economy and Space*, 50(5), 9891007. <https://doi.org/10.1177/0308518X18774047>
- Hingley, M. K. (2005). Power imbalance in uk agri-food supply channels : Learning to live with the supermarkets? *Journal of Marketing Management*, 21(12), 6388. <https://doi.org/10.1362/0267257053166758>
- Hoekman, B. (2004). Agricultural tariffs or subsidies : Which are more important for developing economies? *The World Bank Economic Review*, 18(2), 175204. <https://doi.org/10.1093/wber/lhh037>
- Höllinger , F., & Rutten, L. (2009). *The Use of Warehouse Receipt Finance in Agriculture in ECA Countries* [Technical background paper]. FAO - European Bank for Reconstruction & Development.
- Howard, P. (2009). Visualizing Consolidation in the Global Seed Industry : 1996–2008. *Sustainability*, 1, 12661287.
- Hu, L.-X. et al. (2019). Farm size and fertilizer sustainable use : An empirical study in Jiangsu, China. *Journal of Integrative Agriculture*, 18(12), 28982909.
- Huang, J., Wang, X., & Rozelle, S. (2013). The subsidization of farming households in China's agriculture. *Food Policy*, 41, 124132. <https://doi.org/10.1016/j.foodpol.2013.04.011>
- Isaga, N. (2018). Access to bank credit by smallholder farmers in Tanzania : A case study. *Afrika Focus*, 31(1), 241256.

- Isakson, S. R. (2014). Food and finance : The financial transformation of agro-food supply chains. *The Journal of Peasant Studies*, 41(5), 749775. <https://doi.org/10.1080/03066150.2013.874340>
- Jacquet, P., Pachauri, R., & Tubiana, L. (2012). *Towards Agricultural Change*. (A Planet for Life). Alternative française pour le développement - IDDRI - TERI.
- Jordaan-Marais, J., & Eiselen, R. (2015). Organic agriculture : The trade-off between financial and non-financial benefits. *Journal of Economic and Financial Sciences*, 8(3). <https://doi.org/10.4102/jef.v8i3.127>
- Kaur, R. (2012). Agricultural subsidies in india boon or curse. *IOSR Journal of Humanities and Social Science*, 2(4), 4046. <https://doi.org/10.9790/0837-0244046>
- Kelly, S. et al. (2019). *Water scarcity risks for Australian farms & implications for the financial sector*. Institute for Sustainable Futures - University of Technology Sydney.
- Kendo, S. (2012). Développement du secteur financier et financement de l'activité agricole dans un contexte de crise alimentaire : Quelle place pour la micro-finance ? *Développement durable et territoires*, Vol. 3, n° 3. <https://doi.org/10.4000/developpementdurable.9433>
- Key, N., & Runsten, D. (1999). Contract farming, smallholders, and rural development in latin america : The organization of agroprocessing firms and the scale of outgrower production. *World Development*, 27(2), 381401. [https://doi.org/10.1016/S0305-750X\(98\)00144-2](https://doi.org/10.1016/S0305-750X(98)00144-2)
- Kibaara, B., & Nyoro, J. (2007a). *Expanding the Agricultural Finance Frontier : A Kenyan Case*.
- Kibaara, B., & Nyoro, J. (2007b). Expanding the Agricultural Finance Frontier : A Kenyan Case. *AAAE Conference Proceedings*, 287290.
- Kirner, L., & Kratochvil, R. (2006). The Role of Farm Size in the Sustainability of Dairy Farming in Austria : An Empirical Approach Based on Farm Accounting Data. *Journal of Sustainable Agriculture*, 28(4), 105124.
- Kirwan, B. E. (2009). The incidence of US agricultural subsidies on farmland rental rates. *Journal of Political Economy*, 117(1), 138164. <https://doi.org/10.1086/598688>
- Kirwan, B. E., & Roberts, M. J. (2016). Who really benefits from agricultural subsidies? Evidence from field-level data. *American Journal of Agricultural Economics*, 98(4), 10951113. <https://doi.org/10.1093/ajae/aaw022>
- Koerner, J. et al. (2020). *Investing in impacts to transform food systems in a changing climate A design challenge for scaling sustainable finance in climate-smart agriculture*. CGIAR - CCAFS.
- Kumar, M. et al. (2011). Micro finance – an anti poverty vaccine for rural india. *Journal of Management and Science*, 1(2), 8894. <https://doi.org/10.26524/jms.2011.11>
- Larder, N., Sippel, S. R., & Argent, N. (2018). The redefined role of finance in Australian agriculture. *Australian Geographer*, 49(3), 397418. <https://doi.org/10.1080/00049182.2017.1388555>
- Larder, N., Sippel, S. R., & Lawrence, G. (2015). Finance capital, food security narratives and australian agricultural land : Capital, food security and australian agricultural land. *Journal of Agrarian Change*, 15(4), 592603. <https://doi.org/10.1111/joac.12108>
- Lardner, M. et al. (2017). *Small-Scale Diversified Regenerative Farming (SSDRF)* [Project Work]. Institute for Technology in the Tropics (ITT) - FFA Farming GbR.
- Le Heron, R. (1991). New Zealand agriculture and changes in the agriculture-finance relation during the 1980s. *Environment and Planning A*, 23, 16531671.
- Lerman, Z. (2008). *Farm Debt in Transition : The Problem and Possible Solutions* (Policy Studies on Rural Transition N° 2008-2). FAO Regional Office for Europe and Central Asia.
- Li, J., Wu, Y., & Xiao, J. J. (2020). The impact of digital finance on household consumption : Evidence from China. *Economic Modelling*, 86, 317326. <https://doi.org/10.1016/j.econmod.2019.09.027>
- Lianos, I. et al. (2020). Financialization of the food value chain, common ownership and competition law. *European Competition Journal*, 16(1), 149220.
- Loewenberg-De Boer, J., & Boehlje, M. (1986). The Impact of Farmland Price Changes on Farm Size and Financial Structure. *American Journal of Agricultural Economics*, 68(4), 838848.
- Magnan, A. (2015). The financialization of agri-food in Canada and Australia : Corporate farmland and farm ownership in the grains and oilseed sector. *Journal of Rural Studies*, 41, 112.

<https://doi.org/10.1016/j.jrurstud.2015.06.007>

- Marodon, R. (2020). *Can Development Banks Step Up to the Challenge of Sustainable Development* [Working paper n°14]. International Research Initiative on PDBs and DFIs Working Groups.
- Marsden, T., Moragues Faus, A., & Sonnino, R. (2019). Reproducing vulnerabilities in agri-food systems : Tracing the links between governance, financialization, and vulnerability in Europe post 2007-2008. *Journal of Agrarian Change*, 19(1), 82100. <https://doi.org/10.1111/joac.12267>
- Martin, S. J., & Clapp, J. (2015). Finance for agriculture or agriculture for finance? : Finance for agriculture or agriculture for finance? *Journal of Agrarian Change*, 15(4), 549559. <https://doi.org/10.1111/joac.12110>
- Mârza, B. et al. (2015). Agricultural Insurances and Food Security. The New Climate Change Challenges. *Procedia Economics and Finance*, 27, 594599.
- McDonald, J. (2017). Consolidation, Concentration, and Competition in the Food System. *Economic Review (Kansas City)* , 102, 85105.
- McMichael, P. (2012). The land grab and corporate food regime restructuring. *The Journal of Peasant Studies*, 39(34), 681701.
- Meyer, R. L. (2011). *Subsidies as an instrument in agricultural finance : A review* (Joint Discussion Paper). World Bank -BMYZ - FAO- Giz - IFAD - UNCDF.
- Migliorelli, M., & Dessertine, P. (2018). Time for new financing instruments? A market-oriented framework to finance environmentally friendly practices in EU agriculture. *Journal of Sustainable Finance & Investment*, 8(1), 125. <https://doi.org/10.1080/20430795.2017.1376270>
- Mikhailov, A. (2019). *Agriculture 4.0 : Innovative and absorptive capacity AgTechs* [Dissertation Thesis submitted to Graduate Program in Business Administration]. Universidade Federal do Rio Grande do Sul.
- Moore, J. (2010). Cheap Food & Bad Money : Food, Frontiers, and Financialization in the Rise and Demise of Neoliberalism. *Review (Fernand Braudel Center)*, 33(2/3), 225261.
- Murphy, S., Burch, D., & Clapp, J. (2012). *Cereal secrets : The World's Largest Grain Traders and Global Agriculture* (Oxfam Research Report). Oxfam.
- Negra, C., Remans, R., Attwood, S., Jones, S., Werneck, F., & Smith, A. (2020). Sustainable agri-food investments require multi-sector co-development of decision tools. *Ecological Indicators*, 110, 105851. <https://doi.org/10.1016/j.ecolind.2019.105851>
- Nicholson, C. (2019). *Setting priorities to address the research gaps between agricultural systems analysis and food security outcomes in low- and middle-income countries* [Working paper n°255]. CGIAR-CCAFS.
- Notta, O., & Vlachvei, A. (2014). The impact of Financial Crisis on firm performance in case of Greek food manufacturing firms. *Procedia Economics and Finance*, 14, 454460.
- O'Malley, M. (2019). Securing the future of AgTech. *Network & Security*, 8, 1214.
- Ordu, B. M. et al. (2018). Is food financialized ? Yes, but only when liquidity is abundant. *Journal of Banking and Finance*, 95, 8296.
- Ouma, S. (2014a). Situating global finance in the Land Rush Debate : A critical review. *Geoforum*, 57, 162166.
- Ouma, S. (2014b). Situating global finance in the Land Rush Debate : A critical review. *Geoforum*, 57, 162166. <https://doi.org/10.1016/j.geoforum.2014.09.006>
- Ouma, S. (2016). From financialization to operations of capital : Historicizing and disentangling the finance-farmland-nexus. *Geoforum*, 72, 8293.
- Ouma, S. (2018). This can('t) be an asset class : The world of money management, "society", and the contested morality of farmland investments. *EPA: Economy and Space*, 52(1), 6687.
- Painter, M. (2010). The Portfolio Diversification Impact Of A Farmland Real Estate Investment Trust. *International Business & Economics Research Journal*, 9(5), 115124.
- Pannell, D. J. (1999). Social and economic challenges in the development of complex farming systems. *Agroforestry Systems*, 45, 393409.

- Paul, M. (2019). Community-supported agriculture in the United States : Social, ecological, and economic benefits to farming. *Journal of Agrarian Change*, 19(1), 162180. <https://doi.org/10.1111/joac.12280>
- Pearson, C. (2007). Regenerative, Semiclosed Systems : A Priority for Twenty- First-Century Agriculture. *BioScience*, 57(5), 409418.
- Peterson, E. W. F. (2009). *A billion dollars a day : The economics and politics of agricultural subsidies*. Wiley-Blackwell.
- Pizarro Munoz, E. F. et al. (2021). Agri-Food Markets towards Agroecology : Tensions and Compromises Faced by Small-Scale Farmers in Brazil and Chile. *Sustainability*, 13, online only. <https://doi.org/https://doi.org/10.3390/su13063096>
- Poczta-Wajda, A. (2015). Mechanisms and effects of agricultural subsidies – a theoretical depiction. In *Subsidies versus economics, finances and income of farms* (p. 931). IERiGŻ-PIB.
- Pretty, J., & Hine, R. (2001). *Reducing Food Poverty with Sustainable Agriculture : A Summary of New Evidence* [Final Report from “the SAFE-World” Research Project]. University of Essex - UK Department for International Development.
- Prima Dania, W. A., Xing, K., & Amer, Y. (2016). Collaboration and sustainable agri-food supply chain : A literature review. *MATEC Web of Conferences*, 58, 02004. <https://doi.org/10.1051/mateconf/20165802004>
- Prizzon, A. (2020). *External finance for rural development. Country case study : Bangladesh*. Overseas Development Institute.
- Purcell, T. (2018). ‘Hot chocolate’ : Financialized global value chains and cocoa production in Ecuador. *The Journal of Peasant Studies*, 45(56), 904926.
- Puschmann, T., Hoffmann, C. H., & Khmarskyi, V. (2020). How green fintech can alleviate the impact of climate change—The case of Switzerland. *Sustainability*, 12(24), 10691. <https://doi.org/10.3390/su122410691>
- Ramprasad, V. (2019). Debt and vulnerability : Indebtedness, institutions and smallholder agriculture in South India. *The Journal of Peasant Studies*, 46(6), 12861307.
- Reardon, T. (2015). The hidden middle : The quiet revolution in the midstream of agrifood value chains in developing countries. *Oxford Review of Economic Policy*, 31(1), 4563. <https://doi.org/10.1093/oxrep/grv011>
- Reardon, T. et al. (2012). *The Quiet Revolution in Staple Food Value Chains : Enter the Dragon, the Elephant, and the Tiger*. Asian Development Bank - IFPRI.
- Reardon, T., & Timmer, C. P. (2012). The economics of the food system revolution. *Annual Review of Resource Economics*, 4(1), 225264. <https://doi.org/10.1146/annurev.resource.050708.144147>
- Reardon, T., Barrett, C. B., Berdegue, J. A., & Swinnen, J. F. M. (2009). Agrifood industry transformation and small farmers in developing countries. *World Development*, 37(11), 17171727. <https://doi.org/10.1016/j.worlddev.2008.08.023>
- Ren, C. et al. (2019). The impact of farm size on agricultural sustainability. *Journal of Cleaner Production*, 220, 357367.
- Ricciardi, V. et al. (2021). Higher yields and more biodiversity on smaller farms. *Nature Sustainability*, 4(7), 17.
- Richardson, J. (2016). Land tenure and sustainable agriculture. *Texas A&M Law Review*, 3, 799826.
- Robinson, G., & Carson, D. A. (2015). *Handbook on the globalisation of agriculture*. Edward Elgar Publishing. <https://doi.org/10.4337/9780857939838>
- Rode, J., Pinzon, A., Stabile, M. C. C., Pirker, J., Bauch, S., Iribarrem, A., Sammon, P., Llerena, C. A., Muniz Alves, L., Orihuela, C. E., & Wittmer, H. (2019). Why ‘blended finance’ could help transitions to sustainable landscapes : Lessons from the Unlocking Forest Finance project. *Ecosystem Services*, 37, 100917. <https://doi.org/10.1016/j.ecoser.2019.100917>
- Rose, D. C., & Chilvers, J. (2018). Agriculture 4.0 : Broadening Responsible Innovation in an Era of Smart Farming. *Frontiers in Sustainable Food Systems*, 2(87), 1221.
- Rotz, S. et al. (2019). Situating tenure, capital and finance in farmland relations : Implications for stewardship and agroecological health in Ontario, Canada. *The Journal of Peasant Studies*, 46(1), 142164.



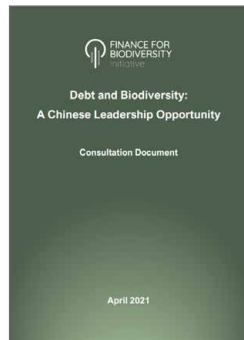
- Saqib, L. et al. (2017). The Role of Informal Agricultural Finance in the Development of Local Farming in Khyber Pakhtunkhwa (Pakistan) : A Critical Analysis. *Pakistan Journal of Social Sciences*, 37(2), 420434.
- Schoonhoven-Speijer, M., & Vellema, S. (2020). How institutions governing the economic middle in food provisioning are reinforced : The case of an agri-food cluster in northern Uganda. *Journal of Rural Studies*, 80, 3444. <https://doi.org/10.1016/j.jrurstud.2020.06.035>
- Scott-Andretta, J. (2010). *The incidence of agricultural subsidies in Mexico* [Working papers DTE 473]. CIDE - Division de Economia.
- Scown, M. W., Brady, M. V., & Nicholas, K. A. (2020). Billions in misspent eu agricultural subsidies could support the sustainable development goals. *One Earth*, 3(2), 237250. <https://doi.org/10.1016/j.oneear.2020.07.011>
- Sebatta, C. et al. (2014). Determinants of Smallholder Farmers' Access to Agricultural Finance in Zambia. *Journal of Agricultural Science*, 6(11), 6373.
- Serrano, A. (2019). Making a financial market : The economization and topology of Farmland REITs. *Journal of Political Ecology*, 26, 599613.
- Sharma, V. P. et al. (2009). *Determinants of Small-Scale Farmer inclusion in Emerging Modern Agrifood Markets : A Study of the Dairy Industry in India* (Research & Publications) [Working Paper n° 2009-02-01]. Indian institute of Management.
- Singh, S. (2010). Micro finance for agriculture in asia : Can it deliver? *Millennial Asia*, 1(2), 241269. <https://doi.org/10.1177/097639961000100205>
- Sippel, S. R. et al. (2017). Grounding the financialization of farmland : Perspectives on financial actors as new land owners in rural Australia. *Agric. Hum. Values*, 34, 251265.
- Sitko, N. et al. (2017). *Food System Transformation and Market Evolutions : An Analysis of the Rise of Large-Scale Grain Trading in Sub-Saharan Africa* (MSU International Development Working Paper n°153). Department of Agricultural, Food, and Resource Economics Department of Economics - Michigan State University.
- Slade, A. (2020). *Digital Agriculture : Farming in the Digital Age* [Nuffield Australia Project n°1804]. Nuffield Australia Farming Scholars.
- Sommerville, M., & Magnan, A. (2015). 'Pinstripes on the prairies' : Examining the financialization of farming systems in the Canadian prairie provinces. *The Journal of Peasant Studies*, 42(1), 119144. <https://doi.org/10.1080/03066150.2014.990894>
- Son, V. N., Schinckus, C., & Chong, F. (2017). A post-Marxist approach in development finance : PMF or production mutualisation fund model applied to agriculture. *Research in International Business and Finance*, 40, 94104. <https://doi.org/10.1016/j.ribaf.2016.12.008>
- Soule, M. J. et al. (2000). Land tenure and the adoption of conservation practices. *Amer. J. Agr. Econ*, 82(4), 9931005.
- Spaargaren, G. (2012). Sustainability Transitions in Food Consumption, Retail and Production. In *Food Practices in Transition : Changing Food Consumption, Retail and Production in the Age of Reflexive Modernity* (p. 132). Routledge.
- Spielman, K. (2007). *Food Supply Chains and Food-Miles : An Analysis for Selected Conventional, Non-local Organic and Other-Alternative Foods Sold in Missoula, Montana* [Thesis presented in partial fulfillment of the requirements for degree of Master of Arts in Geography ; Student Theses, Dissertations, & Professional Papers. 458.]. The University of Montana.
- Stephens, P., & Clapp, J. (2021). Financing food system regeneration ? The potential of social finance in the agrifood sector. In *Routledge Handbook of Sustainable and Regenerative Food Systems* (p. 20182231). Routledge.
- Stus, V. et al. (2019). Cost efficiency of applying trade finance for agricultural supply chains. *Management Theory and Studies for Rural Business and Infrastructure Development*, 41(1), 6273.
- Swinton, S. M., & Loewenberg-Deboer, J. (2001). *Global Adoption of Precision Agriculture Technologies : Who, When and Why*. Third European Conference on Precision Agriculture.

- Tell, J. et al. (2016). Business model innovation in the agri-food sector : A literature review. *British Food Journal*, 118(6), 14621476.
- Teng, P. (2017). Knowledge Intensive Agriculture : The New Disruptor in World Food? *RSIS Commentary*, 124.
- Thinking CAP : Supporting agricultural jobs and incomes in the EU. (2017). International Bank for Reconstruction and Development / World bank.
- Toensmeier, E. (2016). *The carbon farming solution : A global toolkit of perennial crops and regenerative agriculture practices for climate change mitigation and food security*. Chelsea Green Publishing.
- Trebbin, A. (2014). Linking small farmers to modern retail through producer organizations – Experiences with producer companies in India. *Food Policy*, 45, 3544.
- Tripoli, M., & Schmidhuber, J. (2018). *Emerging Opportunities for the Application of Blockchain in the Agri-food Industry* [Issue paper]. FAO - ICTSD.
- Trzeciak-Duval, A. (2003). Agricultural finance and credit infrastructures : Conditions, policies and channels. *Agric. Econ. Czech*, 49(3), 106112.
- van Beers, C., & van den Bergh, J. C. J. M. (2001). Perseverance of perverse subsidies and their impact on trade and environment. *Ecological Economics*, 36(3), 475486.  
[https://doi.org/10.1016/S0921-8009\(00\)00245-7](https://doi.org/10.1016/S0921-8009(00)00245-7)
- van Veelen, B. (2021). Cash cows? Assembling low-carbon agriculture through green finance. *Geoforum*, 118, 130139. <https://doi.org/10.1016/j.geoforum.2020.12.008>
- Varble, S. et al. (2016). An Examination of Growing Trends in Land Tenure and Conservation Practice Adoption : Results from a Farmer Survey in Iowa. *Environmental Management*, 57, 318330.
- Vickers , B. et al. (2020). *Impacts of the COVID-19 Pandemic on Food Trade in the Commonwealth* (International Trade Working Paper). Food and Agriculture Organization - The Commonwealth.
- Vijay Shinde, K. (2016). Microfinance and Organic Farming. *BVISMR's Journal of Management Research*, 8(2), 129136.
- Visser, O., Clapp, J., & Isakson, S. R. (2015). Introduction to a symposium on global finance and the agri-food sector : Risk and regulation: symposium on global finance and the agrifood sector. *Journal of Agrarian Change*, 15(4), 541548. <https://doi.org/10.1111/joac.12123>
- Von Pischke, J. D., & House, John. (1983). Selected successful experiences in agricultural credit and rural finance in Africa. *Savings and Development*, 7(1), 2144.
- Wahl, P. (2009). *Food Speculation The Main Factor of the Price Bubble in 2008*. World Economy, Ecology & Development.
- Wang, Y. et al. (2018). What could promote farmers to replace chemical fertilizers with organic fertilizers? *Journal of Cleaner Production*, 199, 882890.
- Wangwe, S., & Lwakatare, M. (2004). *Innovations in rural finance in Tanzania*. The Third Annual Conference on Microfinance, 15-17 March 2004, AICC, Arusha, Arusha.
- Warlow, A., & Kasabov, E. (2014). Re-thinking Rural Conflict, Cooperation Difficulties, and Failure : The Case of Rural Cooperatives. In *Rural Cooperation in Europe : In Search of the 'Relational Rurals'* (p. 266282). Palgrave - MacMillan.
- Watts, N. A. (2017). *Investing for Impact : Finance and Farming in the Southern Highlands of Tanzania* [A dissertation submitted for the degree of Doctor of Philosophy.]. St Catharine's College, Cambridge University.
- Weatherspoon, D. D., & Reardon, T. (2003). The rise of supermarkets in africa : Implications for agrifood systems and the rural poor: the rise of supermarkets in africa. *Development Policy Review*, 21(3), 333355.  
<https://doi.org/10.1111/1467-7679.00214>
- Wenner, M. D. (2010). *External finance for rural development Country case study : Bangladesh* (Innovations in Rural and Agricultural Finance) [Focus 18 / Brief 10]. IFPRI - World Bank.
- Will, M. G., Prehn, S., Pies, I., & Glauben, T. (2015). Is financial speculation with agricultural commodities harmful or helpful? : A literature review of empirical research. *The Journal of Alternative Investments*, 18(3), 84102. <https://doi.org/10.3905/jai.2016.18.3.084>

- Williams, J. W. (2014). Feeding finance : A critical account of the shifting relationships between finance, food and farming. *Economy and Society*, 43(3), 401-431. <https://doi.org/10.1080/03085147.2014.892797>
- Win, N. (2013). *Experiences of Myanmar Agricultural Development Bank Program on Value Chain Finance on Agriculture : Country Report of Myanmar*. Myanmar Agricultural Development Bank.
- Winn, M., Miller, C., & Gegenbauer, I. (2009). *The Use of Structured Finance Instruments in Agriculture in Eastern Europe and Central Asia* (Agricultural management, marketing and finance working document n°26). FAO.
- Winsten, J. R., Gorman, E., & Gravitz, A. (2020). Coordinating a “basket of incentives” to facilitate resilience in the dairy sector. *Journal of Soil and Water Conservation*, 75(6), 144A-149A. <https://doi.org/10.2489/jswc.2020.1005A>
- Winter, G., & Pereg, L. (2019). A review on the relation between soil and mycotoxins : Effect of aflatoxin on field, food and finance. *European Journal of Soil Science*, 70, 882-897.
- Wise, T. (2004a). Barking Up the Wrong Tree : Agricultural Subsidies, Dumping and Policy Reform. *Bridges*, 5, 35.
- Wise, T. (2004b). *The Paradox of Agricultural Subsidies : Measurement Issues, Agricultural Dumping, and Policy Reform* [Working paper n° 04-02]. Global Development and Environment Institute - Tufts University.
- Wittman, H., Dennis, J., & Pritchard, H. (2017). Beyond the market? New agrarianism and cooperative farmland access in North America. *Journal of Rural Studies*, 53, 303-316. <https://doi.org/10.1016/j.jrurstud.2017.03.007>
- Xu, X., Chen, X., Jia, F., Brown, S., Gong, Y., & Xu, Y. (2018). Supply chain finance : A systematic literature review and bibliometric analysis. *International Journal of Production Economics*, 204, 160-173. <https://doi.org/10.1016/j.ijpe.2018.08.003>
- Yadav, P., & Sharma, A. K. (2015). Agriculture credit in developing economies : A review of relevant literature. *International Journal of Economics and Finance*, 7(12), 219. <https://doi.org/10.5539/ijef.v7n12p219>
- Yoon, C. (2020). *Adoption of Agricultural Innovations through Non- Traditional Financial Services* [Final Technical Report]. Mennonite Economic Development Associates of Canada (MEDA).
- Zeller, M., & Sharma, M. (2000). Many borrow, more save, and all insure : Implications for food and micro-finance policy. *Food Policy*, 25(2), 143-167. [https://doi.org/10.1016/S0306-9192\(99\)00065-2](https://doi.org/10.1016/S0306-9192(99)00065-2)



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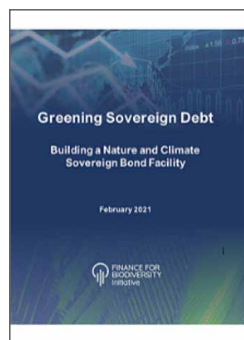
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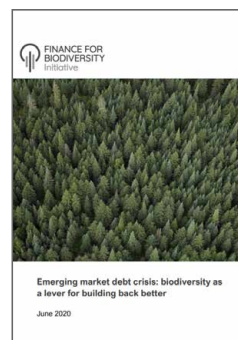
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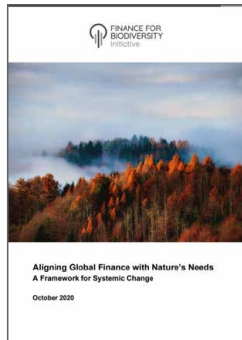
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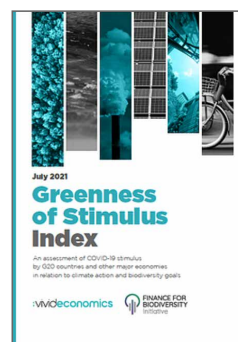
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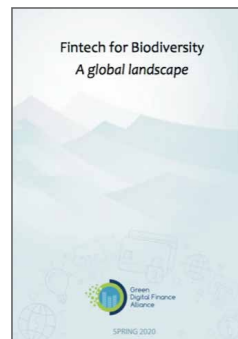
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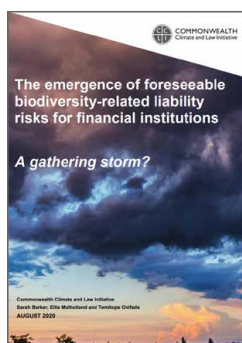
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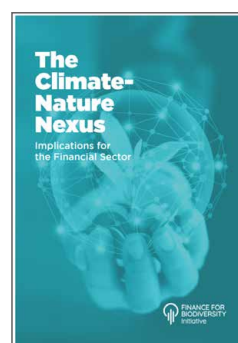
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