Independent assessment of the AGRI3 Fund proposal

seo amsterdam economics

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Additionality assessment & Cost-benefit analysis

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Executive summary

SEO Amsterdam Economics has carried out an independent assessment of the AGRI3 Fund proposal. We conclude that the fund is additional to the market, has significant potential demonstration effects, and has realistically projected social benefits that outweigh the total expected costs.

At the request of the Inclusive Green Growth Department (IGG) of the Ministry of Foreign Affairs (MFA), SEO has conducted an independent assessment of the request for funding related to the AGRI3 Fund Grant Proposal submitted by Mirova Natural Capital (MNC) and its partners. This assessment consists of two parts: (1) an assessment of the additionality of the fund; and (2) a cost-benefit analysis.

The main conclusions with regard to additionality are as follows:

1. **The input additionality of AGRI3 relative to the market is high**. The input additionality for smallholder farmers, mostly based in Africa and Asia, derives from the ability of AGRI3 to offer more affordable financing to farmers than available in the market, via de-risking (first loss guarantees or pari passu instruments). The input additionality for larger commercial farmers, mostly based in Latin America, mainly derives from the ability of AGRI3 to offer longer term funding than available in the market, via tenor extensions or maturity subordination.
2. **The input additionality of AGRI3 relative to other funds is mixed, and mostly originates from its partnership with Rabobank.** AGRI3 is not the only fund to offer a form of 'blended finance', but it appears to be the only fund in which a commercial bank is providing senior debt and a client network, with the explicit aim of achieving major sustainability impact, in countries such as Brazil where few other such funds are active and where the potential impact is significant.
3. **The development additionality of AGRI3 relative to the market is high.** In particular, the 'seal of approval' from the Dutch government has the potential to increase the chances that Rabobank will, in the longer term, truly change its business model in a way that no longer depends on particular individuals for support.
4. **The development additionality of AGRI3 relative to other funds is lower in some respects, but broader in others.** In particular, AGRI3 has a combination of environmental and social impact targets. While these targets are in some cases more conservative than the targets of other funds, this makes them also more realistic. Moreover, AGRI3 has a potentially larger systemic impact because it can potentially affect the business model of large commercial banks and their large corporate clients.
5. **Potential demonstration effects of AGRI3 are high at the fund and commercial bank levels.** Since this particular fund construction is quite novel, particularly for the Dutch government and other potential bilateral donors, it has by definition a high potential demonstration effect at the fund level. Similarly, since it is quite a novel construction for commercial banks such as Rabobank, the potential demonstration effect at this level is high as well.

6. **Potential demonstration effects are lower at the level of corporates and smallholder farmers.** This is because there are thus far few other funds that could offer similar access to finance as AGRI3. Once other such funds emerge or other commercial banks join in, the potential for 'crowding in' other corporates and smallholders increases as swell.

The conclusions with respect to the cost-benefit analysis are as follows:

7. **The impact of the AGRI3 fund as calculated in the Grant Proposal can be considered to be realistic.**
   - The six business cases that underpinned the calculations are considered to be both credible on their own and representative for the fund as a whole. The pipeline suggests that more deals will be forthcoming, making it plausible that AGRI3 is able to build up a portfolio of guarantees. However, the average tenor of the current cases is about 8.5 years, which is shorter than the average of ten years the fund aims for. In light of the finding that tenor extensions are an important source of input additionality, it would be beneficial to prioritize these types of deals going forward (at least for larger farmers).
   - The financial extrapolation is also considered to be realistic. Given the current high demand for sustainable investments, it likely that commercial parties are willing to invest in AGRI3 type projects.
8. **The overall benefits of AGRI3 outweigh the overall costs.** Based on our cost-benefit analysis (CBA), we find an overall positive net present value of at least US$130 million. This is about 10 times higher than the total net cost for MFA, which in net present value terms is US$13.3 million. Moreover, this estimate does not yet include a number of other benefits that are difficult to quantify, including the impact on 'improved rural livelihoods' which is currently not well defined.
9. **The world as a whole is the most important benefactor.** Around three quarters of the total net benefits result from total CO_2 benefits worth at least US$90 million. Other net benefactors are the borrowers receiving loans and the commercial banks supplying loans. Junior equity providers as well as senior debt providers incur more costs than benefits (expressed in net present value terms). This is because they receive a return on investment that is lower than the 3 percent discount rate that is required to be used in Social Cost Benefit Analysis conducted for the Dutch government. Senior equity providers can expect a small return on top of this discount rate. The MFA grant of US$4.9 million will not be repaid but yields benefits of at least US$4.9 million for farmers and companies receiving training and technical assistance.

Table of contents

1 Introduction

At the request of the Ministry of Foreign Affairs (MFA), SEO Amsterdam Economics (SEO) has conducted an independent assessment of the AGRI3 Fund Grant Proposal. This is a request for funding related to a proposal submitted by Mirova Natural Capital (MNC) in relation to the AGRI3 Fund.

The goal of the AGRI3 Fund is to 'de-risk' sustainable agri-investments which currently are not financed by commercial banks due to the risk profile. Using Rabobank 'senior debt', MFA junior equity, and other debt and equity holders, the AGRI3 Fund aims to raise internal funding of US$ 144 million. The internal funding is subsequently used for the provision of guarantees (e.g. ' first loss' loans and tenor extensions) of up to US$ 306 million. This, in turn, is expected to unlock commercial lending for sustainable agri-investments amounting to approximately US$1 billion.

The intended investments aim at protecting forests, foster sustainable land and improving farmers' livelihoods. We understand that a number of projects have already been selected in Brazil, Indonesia and India, and include investments in soy, sugarcane and mixed crop-livestock farming.

During its first 5 years the AGRI3 Fund expects to reach the following targets:

- Avoid 6 million tonnes of CO_2-equivalent emissions;
- Convert 700,000 ha of farm area to sustainable land;
- Avoid 41,000 ha of deforested area;
- Help 65,000 farm households in benefitting from the investments;
- Train 300,000 farmers;
- Involve 45 companies;

Following a tender procedure, the Inclusive Green Growth Department (IGG) of the MFA selected SEO as its independent party to conduct a 'pre-feasibility study' and ' cost-benefit analysis' of the AGRI3 Fund proposal. The main goal was to obtain an independent assessment on the desirability for the Dutch government to support this AGRI3 fund. The study was carried out by a team of economic and finance experts from SEO, supported by a sustainability expert from KIT Royal Tropical Institute.

The study consist of two parts:

- **The additionality assessment** (a term we prefer to 'pre-feasibility study') provides a second opinion on the problem statement, the additionality of the instrument proposed (relative to the market and relative to other instruments), and the need for a (public) grant.
- **The cost-benefit analysis** identifies, quantifies and monetizes the private and social benefits and costs of the proposed AGRI3 Fund, compared to a business-as-usual scenario. It also provides insights into the actors who gain or lose from the proposal.

Our main conclusions are the following:

- **The input additionality of AGRI3 is (a) high** relative to the market, but (b) **mixed** relative to other funds.
- **The development additionality of AGRI3 is (a) high** relative to the market, but (b) **lower** relative to other funds.
- **Potential demonstration effects of AGRI3 are (a) high** at the fund and commercial bank levels, but (b) **lower** at the level of corporates and smallholder farmers (in the short run).
- **The impact of the AGRI3 fund as calculated in the Grant Proposal can be considered to be realistic.** The six business cases that underpinned the calculations are considered to be both credible on their own and representative for the fund as a whole. The financial extrapolation is also considered to be realistic.
- **The overall benefits of AGRI3 outweigh the overall costs.** The CBA has an overall positive net present value of at least US$ 130 million. This is about 10 times higher than the total net cost for MFA, which in net present value terms is US$ 13.3 million. Moreover, this estimate does not yet include a number of other benefits that are difficult to quantify.

2 Additionality assessment

This section contains the additionality assessment of the AGRI3 fund. We conclude that the fund is relevant, has high additionality to the market, lower additionality to other funds, and strong potential demonstration effects.

2.1 The problem to be solved: agricultural food systems are unsustainable

There is ample evidence that current agricultural food systems are unsustainable and lead to deforestation and land degradation. Some of the striking facts are as follows:

- **FAO estimated that the world's forest area decreased considerably between 1990 and 2015.**[1] The decrease during this period was estimated at 1 percent of global land area on average (from 31.6 percent to 30.6 percent) between 1990 and 2015, but the pace of loss has slowed in recent years. The major areas with rapid deforestation are found in the tropics.
- **UNCCD estimates that the share of agricultural land already well exceeds the share of forested land.**[2] Agricultural land occupies 50 percent of Earth's habitable land (51 million km^2), while forested land covers 37 percent of Earth's habitable land (39 million km^2).
- **At least a quarter and possibly a third of all agricultural land is already degraded.** The IPCC estimates that a quarter of the planet's ice-free land area is subject to degradation.[3] FAO estimates that 33 percent of all agricultural land (which may be slightly less than ice-free land) is seriously or moderately degraded.[4] Estimates from the IPBES concerning the total degraded area vary from less than 1 billion ha to over 6 billion ha.[5]
- **Land degradation is a major cause of biodiversity loss.**[6] IPBES reports that land degradation has resulted in a 38 percent decline of the average population size of wild terrestrial vertebrate species between 1970 and 2012.
- **Biodiversity loss in turn reduces agricultural yields.** The reduction of genetic diversity of domesticated plants and animals is known to lower the resilience and adaptability of agricultural systems. Overall, it is believed to cause a five percent reduction in total global

1 The State of the World's Forests 2018 - Forest pathways to sustainable development. Rome. Available at: http://www.fao.org/3/I9535EN/i9535en.pdf

2 Land in numbers 2019. Risks and opportunities. United Nations Convention to Combat Desertification. http://catalogue.unccd.int/1202-Land%20in%20numbers_2%20new-web.pdf

3 IPCC 2019. Climate change and land. An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. Intergovernmental Panel on Climate Change. https://www.ipcc.ch/site/assets/uploads/2019/08/Edited-SPM_Approved_Microsite_FINAL.pdf

4 http://www.fao.org/3/a-i5199e.pdf

5 IPBES 2018. The assessment report on land degradation and restoration; summary for policy makers. Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services. https://www.ipbes.net/system/tdf/spm_3bi_ldr_digital.pdf?file=1&type=node&id=28335

6 Other drivers of biodiversity loss include land use change (conversion from natural habitats to agriculture or forestry), physical modification of rivers and seabeds, climate change, invasive alien species, overexploitation and pollution.

net primary productivity. According to IPBES,[7] the combined effect of land degradation and climate change is predicted to reduce crop yields by an average of ten percent globally, and up to fifty percent in certain regions, by 2050.[8]

It is obvious from the literature that the global agricultural sector is widely considered as one of the major causes of the ongoing process of deforestation and land degradation. Both the ongoing expansion of agricultural land (for both crop and livestock production) and the dominance of unsustainable agricultural and forestry practices are generally considered major causes.[9] In tropical forest areas, this includes high levels of wood extraction (overexploitation) and the expansion of infrastructure into forested areas.

- **According to FAO, the agricultural sector is responsible for eighty percent of deforestation worldwide**.[10] FAO estimated that tropical countries lost 7 million hectares of forests, and gained 6 million hectares of agricultural land, on an annual basis between 2000 and 2007. Similarly, the Global Forest Atlas reported that agriculture (in particular the production of soy and oil palm, and cattle ranching) was accountable for eighty percent of deforestation that took place between 2000 and 2010.[11]
- **The impact of agriculture on deforestation is much larger in Latin America than in sub-Saharan Africa**. In Latin America, commercial large-scale farming is estimated by FAO to be responsible for 70 percent of deforestation. In sub-Saharan Africa this is 'only' 33 percent, as most deforestation there is the result of small-scale agriculture due to population growth.
- **Agriculture is also a main cause of land degradation and biodiversity loss.** IPBES reports that the biodiversity loss is caused by human transformation of natural ecosystems, predominantly for the purpose of food production. Biodiversity loss is projected to reach 38 percent to 46 percent by 2050, mainly due to agriculture. Other reasons include infrastructure, urban encroachment and climate change.
- **In addition to its impact on deforestation and land degradation, the agricultural sector is a major user of energy and a major source of CO_2 emissions.** FAO reports that the agricultural sector accounts for thirty percent of global energy consumption and emits ten GT of CO_2 equivalents on an annual basis.

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7 IPBES 2018. The assessment report on land degradation and restoration; summary for policy makers. Intergovernmental Science-Policy Platform for Biodiversity and Ecosystem Services. https://www.ipbes.net/system/tdf/spm_3bi_ldr_digital.pdf?file=1&type=node&id=28335

8 This is important to take into account when designing economic development programmes aimed at income generation (that can alleviate poverty and hunger, and enhance health). Such programmes are likely to have negative impacts on biodiversity and therefore agricultural yields if the impact on biodiversity is not factored in. See Millennium Ecosystem Assessment, 2015. Ecosystems and Human Well-being: Biodiversity Synthesis. World Resources Institute, Washington, DC. https://www.millenniumassessment.org/documents/document.354.aspx.pdf

9 Other factors include changes in global consumption patterns, climate change, urbanization, infrastructure development, and extractive industries (Gichuki et al., 2019). https://portals.iucn.org/library/sites/library/files/documents/2019-028-En.pdf

10 FAO (2017). The State of Food and Agriculture 2017. Leveraging food systems for inclusive rural transformation. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-i7658e.pdf

11 https://globalforestatlas.yale.edu/land-use/industrial-agriculture

The unsustainable pace of agricultural expansion is generally seen as resulting from both demographic factors and economic factors.[12] On the one hand, population growth implies that there are simply more mouths to feed. On the other hand, income growth has been shown to result in a change in global diets, with increasing demands for animal protein, vegetable oils, sugar and processed foods.[13] The annual growth of global food consumption was estimated at 2.5 percent for the period 2009-2013, whereas global population growth was only 1.2 percent. The annual growth of food consumption per capita was estimated at 0.8 percent (1.0 percent in developing countries) for the same period, whereas the growth in protein consumption per capita is estimated to be nearly 0.9 percent (1.3 percent in developing countries). The increase in consumption per capita is correlated with an annual growth rate of 2.0 percent in national income per capita (5.2 percent in developing countries. Though the annual growth rates of population and food demand are expected to slow down in the coming future, the dietary patterns in developing countries are expected to shift further to vegetable oils and animal protein at the expense of cereals.[14]

The combined effect of population growth and changing diets is estimated to require a fifty percent increase in global food production in 2050, compared to 2012 under a business-as-usual scenario. Predictions for future demand assume that the world population will reach 9.3 billion in 2050, while per capita income is assumed to increase 1.8 fold. As a result, the share of people consuming more than 3,000 kcal per person per day may increase from the current 28 percent to 52 percent in 2050.[15] According to the IPCC, this combination of global population growth and changes in per capita consumption is resulting in expansion of areas under commercial agricultural and forestry production, contributing to a loss of biodiversity and natural ecosystems while increasing greenhouse gas (GHG) emissions.[16]

2.2 Market failures

As with all requests for government intervention, it is important to assess where the market failures lie that require such intervention. Market failures arise when free markets fail to achieve an efficient allocation of resources. The Stern Review (2006) called climate change the greatest market failure ever seen; mitigation of climate change (by reducing CO_2 emissions) must be viewed as an investment now to avoid severe consequences in the future.[17]

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12 In addition, there are other factors that put additional pressures on agricultural land use. For example, due to the US-China trade war, China is no longer importing soy from U.S. farmers but has increased its soy imports from Brazil. Combined with increased demand for beef from Brazil, this is directly and indirectly putting pressure on the Amazone.

13 FAO (2018). The future of food and agriculture. Alternative pathways to 2050. http://www.fao.org/3/I8429EN/i8429en.pdf

14 FAO (2015): World food consumption patterns –trends and drivers. EU Agricultural Markets Briefs no 6. June 2015. https://ec.europa.eu/agriculture/sites/agriculture/files/markets-and-prices/market-briefs/pdf/06_en.pdf

15 https://ec.europa.eu/agriculture/sites/agriculture/files/markets-and-prices/market-briefs/pdf/06_en.pdf

16 IPCC 2019. Climate change and land. An IPCC Special Report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems. Intergovernmental Panel on Climate Change. https://www.ipcc.ch/site/assets/uploads/2019/08/Edited-SPM_Approved_Microsite_FINAL.pdf

17 https://webarchive.nationalarchives.gov.uk/20100407172811/http://www.hm-treasury.gov.uk/stern_review_report.htm

Economists agree that there are generally four sources of market failure:[18]

1. **Externalities:** Market failure that occurs when parties other than buyers and sellers are affected by market transactions but do not participate in negotiating the transaction
2. **Incomplete information**: Market failure caused by poor seller or buyer decisions, due to a lack of sufficient information or understanding about the product or service
3. **Market power:** Market failure caused by seller or buyer concentration
4. **Public goods:** Market failure that occurs because an actual market will not emerge or cannot sustain operation due to the presence of free riders who benefit from, but do not bear the full costs of, market exchanges

The two most relevant sources of market failure that AGRI3 claims to address are (1) externalities and (2) incomplete information. The arguments for both types of market failure are discussed below. A third source of market failure is the 'public good' aspect of a clean environment, but this is closely related to the concept of externalities.[19] Market power is a fourth source of market failure, but this is a less relevant type of market failure here.

Externalities

One of the key reasons why agricultural practices continue to be unsustainable is the market failure of the financial system to 'price in' the social (total) costs of deforestation and unsustainable land use. By its very nature, the financial sector is usually not well suited to price in environmental costs that do not have a market price. If these costs are not (fully) priced in by the market, they are considered 'negative externalities' that are not (fully) taken into account by market parties when making economic decisions.[20] The negative CO_2 impact resulting from deforestation is a clear example of such a negative externality. Other examples of such externalities include degradation of natural resources, greenhouse gas emissions, pollution, or biodiversity loss.

The costs of such externalities are generally not borne by the companies or individuals clearing the land for agricultural production or logging the timber.[21] These costs typically

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18 For example, this breakdown was taken from the textbook "Managerial Economics Principles" (v. 1.0): https://2012books.lardbucket.org/books/managerial-economics-principles/ , Section 8.3.

19 Environmental benefits such as clean air, healthy soils, biodiversity and climate change mitigation can be considered as public goods, as they are non-exclusive, non-rival in use and non-transferrable. This means that markets typically fail to provide these goods; instead, collective action is required to preserve these public goods. Though natural resources such as land and forest are not necessarily public goods in themselves, the associated environmental and societal benefits (or costs in case of misuse) are. Economic decisions on land use are mostly based on the economic value of those goods and services that have well-defined property rights (e.g. agricultural commodities such as timber, soya or oil palm), and ignoring or undervaluing other public services, resulting in externalities.

20 The concept of externality is not specific to environmental issues: it is used to define situations where the activities of one (or more than one) economic agent(s) have consequences on the economic well-being of other agents, without any kind of exchange or transaction occurring between them (Papandreou 1994). When these indirect consequences increase well-being, externalities are qualified as positive; otherwise, they are qualified as negative.

21 Degradation of agricultural land is only partially a negative externality because it would partially be reflected in lower prices for this agricultural land, but these prices do not fully reflect the negative long-term CO_2 impact.

fall on society, current and future generations.[22] To the extent that here are no sanctions for those causing deforestation and (long-term) degradation of agricultural land, externalities imply that the market fails to achieve an efficient allocation of resources.[23]

The social costs of deforestation and unsustainable land use are difficult to quantify, but they are generally considered a multiple of the market value they deliver in terms of timber and agricultural production. For example:

- Sutton et al. (2016) estimated that the economic value of ecosystem services lost due to land degradation equals to US$ 6.3 trillion per year.[24] Taking into account that the agricultural sector contributes 2.8 percent to global GDP, its economic value is estimated at US$ 1.7 trillion per year. This would mean that the (social) costs of environmental damage are almost four times the value of the marketed goods and services of agriculture.
- The economic value of non-market (social and environmental) forest services (e.g. global carbon cycle, hydrological cycle, watershed protection, biodiversity, cultural and spiritual value) is generally considered to exceed the market value of timber extracted from these forests.[25] For example, de Groot et al. (2012)[26] estimated that the economic value of raw materials (e.g. timber) of tropical forests was US$ 84 per hectare per year.[27] The value of medicinal resources was estimated at US$ 1,504 per hectare per year. Accounting for all ecosystem services of tropical forests, these researchers estimated that the total (non-market) value of tropical forests amounts to US$ 5,264 per hectare per year, of which US$ 2,044 was attributed to climate regulation. However, these values are rarely taken into account in forest management decisions.

Incomplete information

Another potential market failure that could, in theory, explain the lack of sustainability, is the lack of sufficient information with regard to the investments needed to make the sustainability transition. Even if all costs were priced in by the market (which is a big if), it is still plausible that businesses and farmers take insufficient measures to ensure sustainability, simply because of lack of knowledge and expertise on how to do so. Such information gaps could potentially exist at the level of (a) smallholder farmers, (b) agro-food companies; and (c) financial institutions. If this were indeed a market failure, then there could be a role for the government to

22 TEEB (2010). The Economics of Ecosystems and Biodiversity: Mainstreaming the economics of nature, a synthesis of the approach, conclusions and recommendations of TEEB. http://doc.teebweb.org/wp-content/uploads/Study%20and%20Reports/Reports/Synthesis%20report/TEEB%20Synthesis%20Report%202010.pdf

23 In fact, when externalities are present, private and social costs diverge, so that profit maximizing decisions are socially inefficient because prices do not carry all the relevant information. We speak then of negative externalities if the social cost of an activity is higher than its private cost.

24 Sutton PC, Anderson SJ, Costanza R, & Kubiszewski I. (2016). The ecological economics of land degradation: impacts on ecosystem service values. *Ecological Economics* 129: 182-192

25 Millennium Ecosystem Assessment. 2005. Current State & Trends Assessment. Chapter 21 Forest Systems. https://www.millenniumassessment.org/documents/document.290.aspx.pdf

26 De Groot, R. et al. 2012. Global estimates of the value of ecosystems and their services in monetary units. *Ecosystem services* 1(1): 50-61. https://www.sciencedirect.com/science/article/pii/S2212041612000101

27 Values are given in international US$, 2007 price levels.

provide this information, or to provide subsidies to value chain actors that could help them to acquire the necessary information.[28]

In our assessment, information gaps among value chain actors are not the key reason for government intervention in this area. The reasoning here is that, if acquiring and using such information were profitable (and available), there would be an incentive for firms to purchase such information in the market, and there would be an incentive for experts to supply this information to the market. The main problem is that, due to the externalities discussed above, acquiring and using this information is currently not profitable. If it were, then there would be a market for this information. That is, *if* all actors knew that they would need to acquire certain information or expertise to make agricultural production sustainable, and *if* the benefits of doing so were all priced in by the market (which are two big ifs), then there would naturally be a market for purchasing such information.

One indication that a lack of information is not the key market failure is that a market for sustainability expertise and information already exists to some extent. For example, large multinational food producers already hire consultants or staff to advise them about more sustainable agronomical practices (driven by concerns about their reputation or CSR considerations). At the level of financial institutions, there are commercial banks such as Rabobank or Credit Agricole that have such knowledge in-house. It is perhaps only at the level of smallholder farmers that a market failure can be considered to exist with respect to information, in that famers in many countries face a lack of access to finance with which to acquire the information and expertise to start producing sustainably. But if using sustainable agricultural practices were profitable for companies, these companies would simply start paying more for farmers using such practices, in which case farmers would have an incentive to start doing so.

One possible market failure that has to do with information gaps is that commercial banks may perceive the risks attached to sustainable investments to be higher than they are in practice. Multiple AGRI3 partners noted that Rabobank is better able than other commercial banks to estimate the true risks, because of its extensive food and agro expertise (for example, unlike most other banks, Rabobank has a special research department for food and agro). Rabobank itself claims that they have access to better information about the underlying credit risk for such investments (and therefore have better risk management practices), as a result of which they are better able than other commercial banks to serve this market. While this sounds plausible, it is technically not a market failure, because there is at least one commercial bank that estimates the risks correctly. If this were the *only* issue, then Rabobank could profitably exploit this advantage and would not need AGRI3 to de-risk such investments. So why are banks like Rabobank not able to provide sufficient finance, even if they correctly estimate the risks? This is discussed further in Section 2.3 below.

[28] Note that this still assumes that the information is obtainable in principle. In practice, obtaining the correct information on actual environmental effects of agricultural practices is difficult, even for researchers, because of (a) variable time lags between practice, the environmental effects, and subsequent impact on society; (b) spatial distribution of environmental effects (the negative effects may become apparent in different places than where the benefits are accrued). This may still imply a role for government in this area.

Conclusion on market failures

In our assessment, the key market failure that justifies government intervention is not the lack of information or the overestimation of risks, but the 'failure' of financial markets to provide finance to make long-term investments in becoming more sustainable. At present, sustainable practices are often simply not profitable in the short run. Providing value chain actors with information and expertise, or with access to finance to acquire such information and expertise, is therefore not sufficient. What is needed are substantial investments that can make sustainable practices profitable in the long run. One of the reasons why value chain actors are currently not able to make such long-term investments is the lack of access to finance for such investments.

2.3 Additionality of AGRI3 relative to the market

When assessing the additionality of publicly funded private sector development programmes, it is international best practice to differentiate between " input additionality" and "development additionality." [29]

- **Input additionality** occurs when "the public input resources are additional to what might anyway be invested or done by the applicant/partner company and other parties, as well as the timing of it".
- **Development additionality** is the extent to which public resources contribute to changes in development-relevant results that would not have materialised without them.[30]

2.3.1 Input additionality

AGRI3 makes two key claims to input additionality. Both are summarised in Table 2.1 below, and are discussed in more detail below. They amount to:

1. Improving access to (affordable) finance to otherwise unserved smallholder farmers, mainly in Africa and Asia
2. Offering longer funding required for 'turnaround investments', mainly in Latin America[31]

Financing gaps for smallholders in Africa and Asia

With respect to finance for smallholder farmers in Africa and Asia, we estimate that the input additionality of AGRI3 is high relative to what the market would provide. This additionality mainly derives from the ability of AGRI3 to enable smallholders to make more sustainable investments in their farms. The fund provides smallholders with access to finance at more favorable terms than available in the market, via de-risking (first loss guarantees or pari passu instruments). The other instruments offered by AGRI3 (tenor extensions and maturity

[29] DCED (2014), "Demonstrating Additionality in Private Sector Development Initiatives", Donor Committee For Enterprise Development.

[30] In the case of AGRI3, the development additionality of the Dutch government can also be indirect, through the mobilisation of other public partners, which in turn may have additional development additionality.

[31] According to Rabo representatives: "For Latin America, additionality translates into the ability to provide financing for longer tenors."

subordination) are more relevant for larger farmers in Latin America, as described in the next section.

The reasons why smallholder (but commercially oriented) farms and agrifood SMEs have limited access to finance are well-documented.[32] According to IFAD, they include the following:[33]

- Informal legal status of smallholders and SMEs and of their associations.
- Limited or non-existent asset base to use as collateral for loans (often due to weak entitlements over land, especially when farms or businesses are operated by women)
- Poverty – the most important factor mentioned as an obstacle to access to formal financial services by African respondents to a survey quoted in the Africa Progress Report 2014.
- Weak property rights regimes and lack of collateral registries.
- Lack of a credit history, making it costly for financial institutions to assess borrower creditworthiness.
- Geographic dispersion or remoteness from bank branches, and in some cases (especially for rural women) limited mobility of the potential clients to visit branches.
- Low human capital of operators (e.g. lack of business training or financial literacy).
- Small actual or projected size of business and related returns, and limited opportunities for economies of scale (notably in weakly organized value chains).
- Irregular income flow and preference for cash flow-based repayment schedules.
- Limited capacity of financial institutions to develop products suited to the needs of small operators in agriculture in terms of product size, interest rates, repayment schedules or packaging of complementary services (e.g. technical assistance, savings and insurance, etc.).

All of these factors are reasons why smallholder farmers have very limited access to finance from commercial sources. Typically, only trade finance is available at very short durations. If longer-term investment finance is available at all, it would be at very high interest rates that are typically unaffordable for smallholder farmers.[34] While Rabobank would be more likely than other commercial banks to make agricultural loans, Rabobank representatives explained that they typically only do so for larger farmers, ideally family-owned businesses of a certain minimum size. They would never directly finance smallholder farmers or cooperatives of smallholder farmers; only via Rabobank Foundation / Rabo Partnerships, which have a subsidy and capacity building component and often also involves first loss arrangements. Such investments, however, are typically small and could not be scaled up due to the limited grant funding available.

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32 E.g., Holle, N. (2017). Technical summary: Credit guarantee schemes for agricultural development. Agriculture Finance Support Facility (AgriFin) and World Bank Group; G20 Policy Report on Agricultural Finance for Small and Medium Sized Enterprises (2011); IFAD (2015).

33 IFAD (2015), "Finance for Food: Investing in Agriculture for a Sustainable Future".

34 This prohibitive pricing results in part from the regulatory framework. Another claim made by AGRI3 is that the required loan tenors are too high to comply with prudent and increasingly stringent banking regulations, or would lead to 'prohibitive pricing'. In particular, the regulatory framework for commercial banks (Basel 3/Basel4) implies that the risk of reliable risk data for such investees would come with significant capital allocation requirements. This is costly to banks and therefore leads to higher pricing. However, Rabo did confirm that, for the Agri3 investment pipeline, they are mostly looking at existing clients with a strong track record. ("We are now working with existing Rabo clients. Many of these clients have banked with us for a long time") They also confirmed that Basel III capital requirements can be lower if the client has a strong track record. The lack of credit risk data therefore does not appear to apply so much to the direct borrower, but to the indirect beneficiaries (e.g. smallholder famers) that the borrower lends to.

Given these major access to finance gaps, the input additionality of any fund that aims to increases access to finance for smallholder farmers is high. Note that AGRI3 would not finance smallholder farmers directly, but would use 'aggregators' such as cooperatives, agribusiness corporates, or local financial institutions. These aggregators typically have special relationships with smallholders and could therefore reduce some of the underlying credit risks. This potentially lowers the input additionality of AGRI3, as some aggregators may have been willing to provide financing to smallholders in the absence of AGRI3. Moreover, there may be other government-funded funds, facilities, and instruments that also provide access to finance via aggregators, and against which the input additionality of AGRI3 needs to be assessed. This is done in the subsequent section.

Financing gaps for larger agribusiness clients in Latin America

With respect to larger commercial farmers in Latin America, we estimate that the input additionality of AGRI3 is also high. This additionality mainly derives from the ability of AGRI3 to offer longer term funding than available in the market, via tenor extensions or maturity subordination.

The key reasons why commercial banks do not offer longer-term funding for AGRI3 type investments, even for larger clients in more developed markets, are well-known. Based on the FAO[35] and Kerste et al. (2011)[36], they include the following:

- **Project risks** specific to the selected project, e.g., lead time risk (i.e., estimating time and costs involved in the planning stage), construction risk, technological risk (i.e., will the technology work, be fit for the purpose, etc.), environmental risk, and operation and management risk;
- **Economic risks**: adverse changes in economic factors like interest rates, exchange rates and inflation;
- **Market risks**, related to unforeseen variations in the prices of goods and inputs, and to the uncertain availability of factors of production (raw materials, land, water, public services, skilled labour, fuel), and market adoption risks (i.e., the demand for a new product);
- **Legal risks,** derived from the lack of a mature legal system and other institutions that enable the design and enforcement of contracts to facilitate market transactions, including a solid basis for security over assets
- **Country and political risk**, in particular the shortcomings of the political and institutional environment in low-income countries; government (in)stability;
- **Policy and regulatory risk**, or uncertainty over potential policies and regulations that might be adopted by the authorities (supporting, repressing or distorting the performance of markets).
- **Nature-related risks** arise both from the impact of climate and pests on harvest results and livestock activities as well as from the damages inflicted by natural disaster, destruction of infrastructure, and soil degradation, with the accompanying reduction of future production capacity.

35 FAO (2017), Innovative risk management strategies in rural and agriculture finance: The Asian Experience. Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-i6940e.pdf

36 Kerste, M., N. Rosenboom, B.J. Sikken, J. Weda (2011) Financing Sustainability: Insights for Investors, Corporate Executives, and Policy Makers, VU University Press and SEO Economisch Onderzoek

In our assessment, the main source of input additionality for AGRI3 is its ability to offer longer term funding than available in the market (typically via tenor extensions or maturity subordination), at least for larger agribusiness clients in Latin America. The key claims here are that (a) long tenors (10-12 years) are needed for 'turnaround investments' in countries such as Brazil, Mexico and Indonesia; and (b) Rabobank's risk management framework as well as that of other commercial banks would not finance investments longer than 7 years.

The claim that, in the absence of a subsidy, neither local banks nor international commercial banks would be able to offer the required tenors seems plausible. For Brazil, the AGRI3 Position Paper provides various sources of evidence to support the claim that local banks in Brazil will not finance investments longer than 7 years, in part because funding gaps are based on local deposits. However, it appears that the Brazilian Development Bank (BNDES) does sometimes offer 10-year funding, albeit with government or partner bank support. We also obtained permission to see Rabobank's risk limits and were able to confirm additionality of AGRI3 transactions in terms of maximum allowed tenors. For international banks, their country risk for countries like Brazil, Mexico, Indonesia is most likely similar in that their country risk framework would not permit such long investments.

While the input additionality of AGRI3 seems clear for projects that involve major replanting or improvements of soil composition, the additionality is less clear in case of investments in machinery such as irrigation, which may not require a tenor extension. Rabobank claims that such investments typically require tenors of more than 5 years, but not as long as investments in sustainable land use. As Rabobank experts themselves mentioned, in case of machinery for irrigation, there are other ways to finance such investments: for example in India, there are suppliers that themselves offer a tenor extension. However, according to Rabobank this is not commercially viable on the large scale that they have in mind for AGRI3.

The fact that Rabobank already approved two AGRI3 deals is not necessarily evidence against input additionality. Rabobank's claim is that the first two AGRI3 investments they already approved were 'pilot projects' that Rabobank could finance on an exceptional basis, but would normally not have been approved based on the existing risk limits. In this case, Rabobank received special permission to approve the first two AGRI3 pilot projects. Without the junior equity provided by MFA, however, they claim that they would not finance such projects in the future, as these projects would be "above Rabobank's risk appetite" and would quickly exceed the existing risk limits.

Table 2.1 The input additionality of AGRI3 results from two major types of financing gaps

Financing gaps	Source of input additionality AGRI3 (relative to market)	Independent assessment SEO
Smallholder farmers are not able to access (affordable) investment finance in order to start producing sustainably. Banks other than Rabobank would be even less willing to lend to smallholders.	**Due to de-risking, AGRI3 is able to indirectly finance smallholder farmers.** This is because the de-risking options offered by AGRI3 (first loss guarantee or pari passu) can induce 'aggregators' (farmer cooperatives, large agribusiness corporates, or local banks) to provide finance to smallholder farmers indirectly Such options are not available in the market	Plausible that this is the key source of additionality for smallholders in Africa. To some extent, this could also be provided by Rabo Partnerships, e.g. via Arise, but not on the large scale AGRI3 is aiming for. The regulatory framework for commercial banks (Basel 3/Basel4) implies that the risk of reliable risk data for such investments would come with significant capital allocation requirements, leading to excessively high interest rates ('prohibitive pricing')
Larger farmers or cooperatives need long-term funding with tenors of 10-12 years to finance 'turn-around investments' (needed to battle deforestation and make food systems sustainable)	**Tenors of 10-12 years are not offered in the market** by commercial banks, because of the excessive (perceived) risks involved **AGRI3 is able to offer longer funding via tenor extensions and maturity subordination.** This makes AGRI3 additional to the market.	Plausible that this is the key source of additionality for larger farmers in Latin America, who may have access to finance but not at the required tenors. The need for long tenors seems most plausible for investments related to sustainable intensification of land use (replanting, improvements in soil composition) or sustainable timber production. Shorter tenors are possible in other cases (e.g. irrigation infrastructure investments) While Rabobank can in theory offer tenors above 7 years in a country like Brazil, this can be done only in exceptional cases and not at scale.

2.3.2 Development additionality

In our assessment, AGRI3 has two sources of development additionality . As noted above, development additionality is the extent to which public resources contribute to changes in development-relevant results that would not have materialised without them. These contributions to changes can take place at two levels:

1. AGRI3's potential to contribute to changes in the mainstream corporate client business model
2. AGRI3's potential to contribute to changes in the mainstream Rabobank business model

With respect to development impact at the level of corporate clients, our assessment is that the development additionality of AGRI3 is low in the short run, but could increase in the future. The initial pipeline of deals is all with long-standing corporate Rabobank clients, who themselves have a sustainability agenda and would likely have sufficient resources to purchase the information or expertise required to make a sustainability transition. The main reason they are currently not doing this is because it is simply not profitable. As discussed above, de-risking and tenor extensions could induce such corporates to contribute to the sustainability transition. But

this is development impact that results from input additionality, i.e., from the financial products provided by AGRI3 that are additional to the market. It is less likely that Rabobank is able to make a difference to the business models of corporate clients for non-financial reasons (in other words, this type of additionality should be called input additionality rather than development additionality).

With respect to development impact at the level of participating commercial banks (currently only Rabobank), our assessment is that the development additionality of AGRI3 is high. While certain stakeholders within Rabobank already have a strong interest in playing a lead role in the sustainability transition, not all stakeholders at Rabobank are convinced that this justifies the additional risks. They therefore have a strong interest in obtaining a 'seal of approval' from the Dutch government, alongside some de-risking. With this seal of approval, the chances increase that there will be a Rabobank-wide commitment to funding AGRI3 type transactions, and that Rabobank will move beyond making occasional exceptions to its risk management framework. This also increases the chances that Rabobank will, in the longer term, truly change its business model in a way that no longer depends on particular individuals for support.

2.3.3 Demonstration effects

In addition to having input and development additionality, AGRI3 also has substantial potential demonstration effects that should be taken into account when assessing its potential impact. As a result of these demonstration effects, AGRI3 could be argued to have the potential to encourage other banks, corporates, or farmers to make a similar systemic transition.

We estimate the (potential) demonstration effects of AGRI3 to be high at the fund and commercial bank levels. In general, potential demonstration effects are higher when something novel is being pursued, as being novel (and successful) makes it more likely that it would be copied by others. Since this particular fund construction is quite novel, particularly for the Dutch government and other potential bilateral donors, it has by definition a high potential demonstration effect at the fund level. Similarly, since it is quite a novel construction for commercial banks such as Rabobank, the potential demonstration effect at this level is high as well.

The potential demonstration effects of AGRI3 are likely somewhat lower at the level of corporates and smallholder farmers, at least in the short run. At the level of agribusiness corporates, there is not much potential for sustainable business models to be copied via demonstration effects in the short run, because other corporates do not yet have access to finance via similar funds as AGRI3. In the longer run, it is more likely that sustainable business models are copied, provided that these business models can be profitable (which depends on the demand from consumers) and that there is sufficient funding available from either AGRI3 or similar funds. The demonstration effect for smallholders will, in turn, depend on the extent to which business models are copied by corporates.

Table 2.2 AGRI3 has large potential demonstration effects at four levels

Level	Type of demonstration effect	Expected size of demonstration effect
Fund	Potential to serve as model for other similar funds in the future	**High** (active participation of commercial bank seems novel)
Commercial banks	Potential to affect other banks via demonstration effects at bank level	**High** (may generate interest from other banks to invest in AGRI3, or co-finance AGRI3 deals)
Corporates/aggregators	Potential to affect other corporates via demonstration effects at corporate level	**Medium** (may generate interest in more AGRI3 funding; outside AGRI3 little access to finance)
Smallholder farmers	Potential to affect other smallholder farmers via demonstration effects at farmer level	**Low** (lack of access to finance outside AGRI3, but could ask aggregators for similar deals)

2.4 Additionality relative to other funds

While we have already established that AGRI3 is additional to the market in some respects, it is important to also assess its input and development additionality relative to other existing funds. As agreed with MFA, we therefore compared AGRI3 with five alternative funds (or facilities) that appeared to be the most comparable and could potentially finance similar projects. These include:

- IDH Farmfit
- IDH &Green
- Dutch Fund for Climate and Development (DFCD)
- Global Agriculture & Food Security Program (GAFSP)
- Global Environment Facility (GEF)

Table 2.3 compares the key characteristics of AGRI3 with that of other funds. Table 2.4 provides more detail on the estimated social and environmental impact targets of each fund. It is important to note that these impact targets are not directly comparable, as one should take into account the differences in fund size and expected leveraged private investment, some of which is still uncertain. Moreover, our assessments of Farmfit, &Green and DFCD are largely based on their stated targets, because they are relatively new funds and do not have concrete results yet.

Following the overview tables, the similarities and differences with each fund are discussed separately. The final section draw conclusions with respect to input and development additionality.

Table 2.3 Comparison of AGRI3 and other funds

	AGRI3	Farmfit	&Green	DFCD	GAFSP	GEF
Environmental impact targets	✓		✓	✓		✓
# hectares of land converted/ restored to sustainable use	700,000	-	5 mln protected, conserved, or restored	200,000	-	120 mln
# hectares of deforestation avoided	41,000	-		-	-	-
# tons of CO_2 equivalent emissions mitigated / avoided	6 mln			40 mln	-	750 mln
Social impact targets	✓	✓	✓	✓	✓	
# of beneficiaries 'reached'	300,000 farmers 65,000 households	3-5 mln farmers	500,000 households	13.5 mln beneficia-ries *	12 million people across the value chain	-.
% increase in income among beneficiaries	-	50%	-	-	>0%	-
Funding by Dutch government	✓	✓		✓	✓	✓
Direct partnership with a commercial bank	✓					
Technical assistance	✓	✓	✓ **	✓	✓	✓
Main focus on agriculture	✓	✓	✓		✓	
Start date	Not yet	2018	2017	Not yet	2010	1994
Indicative fund size	$140m	€100m	$400m	€160m	$1.4b in portfolio	$4.2b active portfolio
Indicative private investment	$ 1b (+)	$ 1b	$ 2b	€500m-1b		
Country coverage ***						
• Brazil	✓	?	✓			✓
• Indonesia	✓	?	✓	✓		✓
• India	✓	?		✓		✓
• Mexico	✓	?		✓		✓
• Low-income countries	?	✓	✓	✓	✓	✓

Source: SEO Amsterdam Economics, based on information obtained from the respective funds.
* Of which 12.5 million people provided with drinking water
** Annual Report &Green 2018: "The Fund is also in process of setting up an integrated Technical Assistance ("TA") Facility specifically linked to the existing investment process ("IP")."
*** Farmfit will be active in Africa, Asia and Latin America, but it is not yet clear in which specific countries.

Table 2.4 AGRI3's social and environmental impact targets as compared to those of other funds

	Environmental impact targets	Social impact targets
AGRI3[37]	• Avoid 6 million tonnes of CO_2-equivalent emissions. • 700,000 ha of agricultural area under sustainable management. • Avoid 41,000 ha of deforested area.	• Reach 65,000 farm households directly • Train 300,000 farmers. •
Farmfit[38]		• Reach 3-5 million farmers, increasing their incomes by 50%.
&Green[39]	• 5 million hectares of tropical forest protected, conserved or restored. •	• 500,000 households benefitting from the Fund through enhanced yields and incomes, creation of jobs and/or other income-generating opportunities.
DFCD[40]	• DFCD aims at catalyzing between €500 and €1 billion in investments. • 100,000 ha Farmland sustainably managed. • 100,000 ha forest & wetland sustainably managed. • 40,000,000 tons of CO_2 reduced GHG emissions.	• 12.5 million people provided with drinking water. • 13.5m total beneficiaries.
GAFSP[41]	• Mitigate and adapt to changing climate.	• Reach 12 million people across the entire value chain by 2022. • Reduce poverty and hunger. • Encourage gender equality.
GEF[42]	• Improved management of landscapes and seascapes covering 300 million hectares. • 120 million hectares under sustainable land management. • Water-Food-Energy-Ecosystems security and conjunctive management of surface and groundwater in at least 10 freshwater basins. • 20% of globally over-exploited fisheries (by volume) moved to more sustainable levels. • 750 million tons of CO_2 equivalent mitigated. • Disposal of 80,000 tons of POPs (PCB, obsolete pesticides). • Reduction of 1,000 tons of Mercury. • Phase-out of 303.44 tons of ODP (HCFC).	

37 AGRI3 Grant Funding Request 13-06-2019
38 Assessment of proposal investment in Farmfit – Dalberg, May 2019
39 ` http://www.andgreen.fund/
40 https://www.fmo.nl/l/en/library/download/urn:uuid:58080e05-ba8a-444b-bfc8-cad3a8b21ac6/executive+summary+dfcd.pdf
41 https://www.gafspfund.org/sites/default/files/2018-02/GAFSP%20SDGs_Final-LR1.pdf
42 Summary of the Negotiations of the Sixth Replenishment of the GEF Trust Fund, p. 16

2.4.1 IDH &Green

The Sustainable Trade Initiative (*Initiatief Duurzame Handel,* or IDH for short) convenes companies, CSOs, governments and others in public-private partnerships. It is supported by multiple European governments, including the Dutch MFA (along with SECO and DANIDA) as institutional donor. IDH has two funds that operate in similar areas as AGRI3: (a) &Green; and (b) Farmfit (discussed in the next section)

The "&Green" fund was founded in 2017 by IDH and the Norwegian International Climate and Forests Initiative (NICFI). &Green aims to prove that financing inclusive sustainable and deforestation-free commodity production can be commercially viable. In addition, it aims to reach 500,000 households "benefitting from the Fund through enhanced yields and incomes, creation of jobs and/or other income-generating opportunities."

&Green focusses on projects with a large environmental impact in a limited number of jurisdictions that have been pre-approved by its Advisory Board. In 2018, only eight such jurisdictions had been pre-approved.[43] Jurisdictions are approved if all 5 Jurisdictional Eligibility Criteria are met.[44] These include a strong commitment from local authorities to reducing deforestation and protecting valuable ecosystems, and having a transparent system in place to monitor, measure, report and verify reductions in deforestation, forest and peat degradation.

At first sight, &Green is quite similar to AGRI3. Both funds focus on commercial projects that combat deforestation in countries with tropical forests. Also regarding the targets and selection criteria, AGRI3 and &Green have the most similarities (see Table 2.4). However, AGRI3 funding has less strict requirements and is not conditional on commitment from the local authorities, and therefore will be able to operate in more countries and jurisdictions. IDH agrees that its stricter selection criteria make it more difficult to find suitable projects for this fund.[45]

Main similarities with AGRI3:

- Focus on commercially viable projects
- Focus on reducing deforestation in countries with tropical forests all over the world
- Similar social impact targets

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43 Annual report &Green 2018

44 For jurisdictions to be eligible they need to meet 5 Jurisdictional Eligibility Criteria: http://www.andgreen.fund/#jurisdictional-eligibility-approach. These include:
   a. The amount and quality of forest and/or peatland potential of the jurisdiction is significant and highly relevant from a global perspective on conservation and climate change mitigation grounds.
   b. The local government has a clear quantitative target against historic rates of gross deforestation, which reflects or goes beyond established national targets. A feasible strategy for implementation with clear milestones is in place.
   c. Timely progress towards milestones indicated in the strategy of the jurisdiction can be shown; and there is measurable progress towards the target to reduce deforestation.
   d. A transparent system is operational to monitor, measure, report and verify reductions in deforestation, forest and peat degradation.
   e. In accordance with the Cancun Agreement, an appropriate framework is in place to mitigate social and environmental risk.

45 In the words of IDH representatives, "&Green focusses on 'dark green' projects and then tries to make these commercially viable," while "AGRI3 starts from the commercial perspective and tries to make them 'light green' by incorporating sustainability targets."

Main differences with AGRI3:

- &Green has a more ambitious environmental impact target: 5 million hectares of tropical forest protected, conserved or restored (see Table 2.3). However, several stakeholders noted that this target may not be realistic, given that &Green thus far has hardly been able to find suitable projects.
- &Green projects are currently only allowed in eight pre-approved jurisdictions (with strong local government commitment). This increases ownership and reduces the risk to the impact, but makes it harder to find suitable projects.
- &Green does not feature any direct collaboration with banks and does not make use of commercial bank networks for pipeline generation.

2.4.2 IDH Farmfit

In 2018, IDH launched Farmfit, which includes a Fund and a Business Support facility. Farmfit aims to analyse and innovate cost-efficient service delivery models that are "profitable to both farms and business" and make the accumulated insights accessible to everyone.

By improving business models, Farmfit aims to enable banks and business to invest in farms that were previously too risky. To accomplish this, Farmfit provides funding, business support and shares intelligence on key insights on how to make smallholder value chains more efficient and effective.

Main similarity with AGRI3:

- Aimed at similar beneficiaries: farmers, businesses, and banks.
- Offers both funding and technical assistance.

Main difference with AGRI3:

- Farmfit has no specific environmental impact targets.
- Farmfit has more ambitious social impact targets: with a similar fund size, it aims to reach 3-5 million farmers and increase their incomes by 50 percent, while AGRI3 aims to train 300,000 farmers and help 65,000 households "in benefitting from the investments."
- Farmfit does not feature any direct partnerships with commercial banks, which makes it potentially less financially sustainable than AGRI3.

2.4.3 Dutch Fund for Climate and Development (DFCD)

In May 2019, the Dutch government selected a consortium consisting of Dutch development bank FMO, SNV Netherlands Development Organisation (SNV), World Wide Fund for Nature (WWF-NL) and Climate Fund Managers (CFM) to manage the € 160 million Dutch Fund for Climate and Development (DFCD) on behalf of the Dutch MFA.

The DFCD allows for investments in projects aimed at climate adaptation and mitigation in developing countries in order to prevent the deterioration of social, economic and human development.

DFCD is not limited to agricultural sector and forestry projects, but can also fund other projects concerning climate adaptation and mitigation, including in the areas of climate-resilient water systems and restoration of ecosystems.

Since DFCD is managed by the Dutch development bank (FMO) it can only operate in countries that are eligible for FMO investments. This selection of countries is different from the target countries of AGRI3. In particular, DFCD is not able to fund projects in Brazil, as this is not an eligible country for FMO investments.[46]

Main similarity with AGRI3:

- Focus on both social and environmental impact targets.
- Both funds are able to fund the agri and forestry sectors.

Main differences with AGRI3:

- Not allowed to serve all countries targeted by AGRI3 (e.g. projects in Brazil are not eligible)
- Agri and forestry are not the main focus (much smaller scale for DFCD).
- DFCD maintains a different set of criteria for the selection or projects.

2.4.4 Global Agriculture & Food Security Program (GAFSP)

The Global Agriculture and Food Security Program (GAFSP) is a global programme originating as a result of the 2009 G8 Summit in L'Aquila and the subsequent G20 Summit Pittsburgh in 2009, where its creation was reaffirmed. Administered by the World Bank Group, the aim of GAFSP is to coordinate with national governments and ministries of agriculture to finance gaps in agricultural development assistance. It launched in 2009 with US$ 880 million in commitments from the United States, Canada, Spain, South Korea, and the Bill & Melinda Gates Foundation.

GAFSP focusses on the longer-term agenda to improve the income and food security of poor people in developing countries through more and better country-led public and private sector investment in raising agricultural productivity, linking farmers to markets, reducing risk and vulnerability, and improving non-farm rural livelihoods, and through technical assistance. GAFSP is funded by the public and private sector of several countries, including the Netherlands. It consists of two windows; a Private Sector Window (PrSW) and a Public Sector Window.

AGRI3 and GAFSP both focus on changes to the agricultural sector to have the desired effect. In the case of GAFSP this is focused on the social impact whereas the projects in AGRI3 also must have an environmental impact.

Main similarities with AGRI3:

- Focus on making high-risk projects more commercially viable
- Focus on agricultural sector and rural livelihoods

[46] According to one of the AGRI3 stakeholders we interviewed, this is because FMO considers its own input additionality to be low in countries like Brazil: for example, the Brazilian Development Bank (BNDES) is around 100 times the size of FMO. This is possibly also one of the reasons why FMO is not able to be an investor in AGRI3 alongside Rabobank.

Main differences with AGRI3:

- Less focus on environmental impact targets (in particular, no focus on sustainable land use)
- Less direct involvement from commercial banks

2.4.5 Global Environment Facility (GEF)

The Global Environment Facility (GEF) was established back in 1992 as a result of the Rio Earth Summit. Its main aim is to support developing countries and countries in transition with meeting the objectives of the international environmental conventions and agreements. Today, GEF is an international partnership of more than 180 countries, international institutions, civil society organisations, and the private sector. The World Bank serves as the GEF Trustee. GEF funds are available to developing countries and countries with economies in transition. The support is provided to government agencies, civil society organizations, private sector companies, research institutions, among the broad diversity of potential partners, to implement projects and programs in recipient countries.

Like DFCD, GEF finances projects in more sectors than only in the agricultural sector. Furthermore, the window for commercial borrowers is limited.

Main similarity with AGRI3:

- Focus on environmental impact (meeting the objectives of the international environmental conventions and agreements)

Main differences with AGRI3:

- No explicit social impact targets
- Less focus on commercial borrowers
- Focus not limited to the agricultural sector
- Much larger than AGRI3 (US$ 4.2 billion)

2.4.6 Conclusion

In summary, we would assess the additionality of AGRI3 compared to other funds as follows:

1. **The input additionality of AGRI3 relative to other funds is mixed, and mostly originates from its partnership with Rabobank:**
   - AGRI3 is not the only fund to offer a form of 'blended finance' within which public funding allows private partners to take more risk and/or longer tenors (e.g. GAFSP).
   - Certain investments envisaged by AGRI3 could potentially also be funded by some of the other funds.
   - However, AGRI3 is the only fund in which a commercial bank is providing senior debt and a client network.
   - AGRI3 is one of the few funds that offers blended finance options aimed at the agricultural sector in middle income countries. These include Brazil, Indonesia, India, and Mexico. It is able to do so because of the existing Rabobank client and retail network in these countries. Most other funds focus on low-income countries and only GEF is active in all AGRI3 focus countries. DFCD is likely to cover some middle-income countries as well, but not Brazil.

There are plans to expand the AGRI3 pipeline to South Africa or East Africa, but these plans are not yet concrete.

2. **The development additionality of AGRI3 relative to other funds is lower in some respects (due to more conservative targets), but broader in that AGRI3 has both environmental and social impact targets and can potentially affect the business model of large commercial banks and their large corporate clients.**
   - Compared to GEF, AGRI3 has more explicit social targets.
   - Compared to Farmfit and GAFSP, AGRI3 has more explicit environmental impact targets.
   - Compared to &Green, GEF, and DFCD, AGRI3 appears to have somewhat more conservative (but possibly more realistic) environmental impact targets.
   - However, the potential development impact on the business models of large corporate clients (and thereby the leverage effect) is arguably larger for AGRI3.
   - AGRI3 funding is not conditional on commitments from the local authorities, and therefore can cover more countries and jurisdictions.
     AGRI3 can draw on the existing client base of Rabobank (and possibly of more commercial banks in the future) to find suitable projects. This will likely enable the fund to find projects at a faster pace and at a larger scale.

3 Cost-benefit analysis

The benefits of AGRI3 outweigh the costs. The CBA has a positive net present value. Commercial parties, farmers and other value chain stakeholders stand to gain. Public parties investing in junior equity incur more costs than benefits. The biggest benefit comes from CO_2 emissions avoided.

3.1 Introduction

This section aims to accurately list all costs and benefits resulting from AGRI3 in a cost-benefit analysis (CBA). CBA is a powerful tool to systematically compare all social (including private) effects.[47] Benefits and costs are expressed in monetary terms and adjusted for the time value of money; all flows over time are discounted and expressed on a common basis in terms of their net present value (NPV). Based on the sum of these NPVs, the desirability of the Fund as a whole can be appraised. It should be noted that the current CBA only considers the costs and benefits that result from the first round of investments (that is; the first five years). Moreover, the CBA is truncated at ten years after the last investment has been made. In other words, no revolving character is assumed and any benefits that may arise after the 'cut-off' point are not considered. Both implying a conservative character of the analysis.

The CBA is based on three (sets of) documents:

- The AGRI3 grant proposal includes the overall fund's KPIs this CBA aims to quantify and monetize.
- Rabobank's *high-level model* of AGRI3 for all funding and lending related costs and benefits. These include the costs of debt and equity, interest rates, guarantee fees, the budget for technical assistance, management fees and non-performing loans.
- Six case studies and pipeline projects deemed to be representative for the fund as a whole. Development relevant benefits and CO_2 emissions avoided follow from (an extrapolation) of these cases studies.

Moreover, the above all are complemented by a series of interviews with MFA, FMO and the partners of the fund. Together they form a coherent business case for the AGRI3 fund. We follow the assumptions made in this business case as much as possible. Where we deviate or add additional assumptions we say so. In all other cases, the CBA follows the documents underlying the grant proposal.

The analysis is divided into two steps: a bottom-up approach in which six business cases are examined thoroughly and a top-down approach in which the estimated impacts are monetized and reflected against the investment costs in the concluding cost-benefit analysis.

Step 1: bottom-up approach

The impact as calculated in the fund's grant proposal is ultimately derived from six detailed business cases. Based on the average investment size of these business cases, AGRI3 partners have tried to

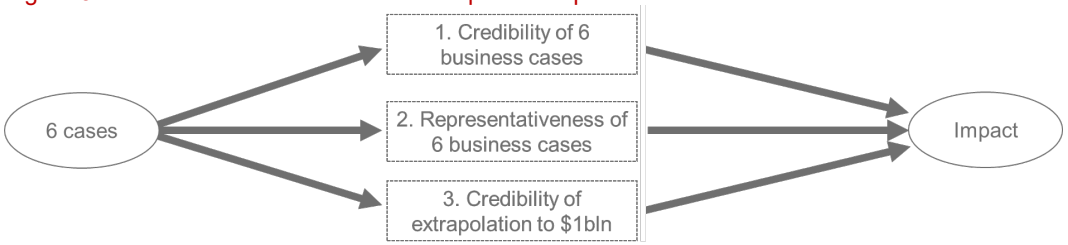
[47] See also CPB (2013), " Algemene leidraad voor maatschappelijke kosten-batenanalyses."

estimate the impact of a fund capable of investing US$ 1 billion. In order to 'test' whether the extrapolation from these cases towards the overall impact is reasonable, three separate requirements need to be fulfilled:

1. The calculated impact for each of the current six business cases needs to be *realistic*.
2. The six presented cases should be a *representative* for the fund as whole.
3. The fund should be *capable* of catalyzing US$ 1 billion worth of investments in the next five years.
   a) It should be *realistic* that the US$ 144 million of funding will be reached.
   b) It should be *realistic* that the fund can issue guarantees worth of US$ 306 million given the internal funding of US$ 144 million.
   c) It should be *realistic* that investments worth of US$ 984 million can be attracted by issuing US$ 306 million of guarantees.

See Figure 3.1 for a schematic overview of the extrapolation and the corresponding conditions. The bottom-up approach is discussed in Paragraph 3.2

Figure 3.1 Schematic overview of the impact extrapolation

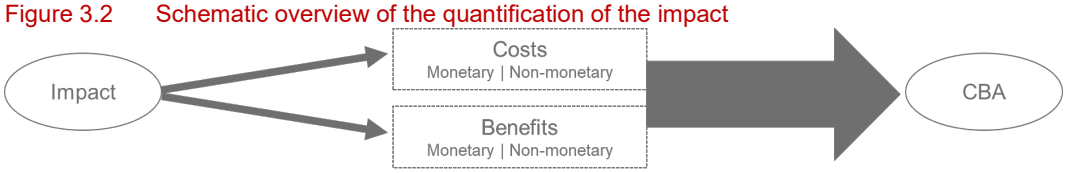


Source: SEO Amsterdam Economics

Step 2: top-down approach

Once the impact has been ascertained, the related costs and benefits can be considered in the cost-benefit analysis. All costs and benefits, both monetary and non-monetary, will be mapped and assigned to the respective stakeholder. This process is schematically shown in Figure 3.2. The top-down approach is discussed in Paragraph 3.3. The conclusion of both the bottom-up and the top-down approach is discussed in 3.4.

Figure 3.2 Schematic overview of the quantification of the impact



Source: SEO Amsterdam Economics

3.2 Bottom-up approach

3.2.1 Six business cases

The six business cases serve three purposes:

1. Indication on what type of projects can be expected from the fund, in terms of financial requirements, focus countries and thematic definition.
2. Indication on the impact of the fund as a whole on the three focus areas: forest protection & reforestation, sustainable agriculture, and improved rural livelihoods.
3. Indications on how the fund is linked to the Sustainable Development Goals (SDGs)

Each of the cases differs in the extent to which it targets the three focus areas and not all cases necessarily target all focus areas. However, one of the criteria of the fund is that any case *always* improve rural livelihoods and either touch on forest protection & reforestation or sustainable agriculture, or both.

These cases are based on 'real-life situations' within Rabobank's network and would in theory be good candidates for AGRI3. However, the pipeline is still developing. Over time, some of these cases might no longer be relevant, whereas new cases will arise.

Case 1: Rice in Indonesia

Introduction

Case 1 tries to stimulate rice production in Indonesia through the introduction of drip irrigation. More than ninety percent of the global rice cultivation is in the hands of smallholder farmers, which on average maintain a relatively low yield and therefore a relatively low income. However, these smallholders combined have a detrimental environmental impact. It is expected that by 2020 rice cultivation accounts for approximately 750 million metric tons of CO_2 equivalent methane emissions, the second largest emitter in agriculture after enteric fermentation. By introducing drip irrigation, the fund contributes to two of the three focus areas: sustainable agriculture and improved rural livelihoods.

Problem statement

Rice smallholders in Indonesia have a relatively high risk profile and financing these farmers is currently beyond the risk appetite of Rabobank (and other banks). Without available financing, these farmers will operate below optimal scale and GHG emission are expected to remain excessive.

Loan recipients

Rabobank and AGRI3 will fund an irrigation platform which is used by groups of farmers or farmer cooperatives through 7-year loans worth US$ 10 million. AGRI3 provides US$ 7.2 million de-risking, as well as US$ 0.8 million in technical assistance. The rice off-taker, who is directly linked to these farmers, is responsible for the repayment of the loan.

Case 2: Soy in Brazil (1)

Introduction

Case 2 tries to stimulate the soy production in Brazil by offering support to recover degraded land and convert pasture land into fertile agricultural land. A cooperation with a large soybean trading company wants to support its suppliers in producing soybeans sustainably. The current unsustainable production of soybeans results in increasing amounts of degraded area and deforestation.

Problem statement

The investment needed to accelerate adherence to the Brazilian Forest Code, recovery of degraded land and the conversion of pasture land into fertile agricultural land is difficult to obtain, because it does not directly generate additional cash flow. Therefore, commercial banks are reluctant to provide financial assistance.

Loan recipients

Rabobank provides short term working capital and a long term sustainability facility worth US$25 million to smallholder farmers.. Smallholder farmers meet their individual obligations through the delivery of soybeans. The off-taker will be a risk sharing participant repaying Rabobank with the proceeds from the soybeans delivered by the farmers. AGRI3 offers a 15 percent first loss guarantee to Rabobank.

Case 3: Replanting oil palms in Indonesia

Introduction

Case 3 tries to overcome the 'valley of death' by replanting oil palms in Indonesia. These idle pieces of land contain palm oil trees that are no longer productive, resulting in little to no income generation for smallholder farmers. This puts additional pressure on deforestation. Rabobank, AGRI3 and a larger plantation jointly design a financing and replanting scheme. The plantation will purchases the palm oil from the farmers. Replanting palm trees implies a transition period in which no income can be generated as the palm trees need to mature. In order to provide the smallholders with a source of income during this transition period, the loan element is complemented with a subsidy element. This is to ensure that farmers also do not deforest nearby forest during this transition period.

Problem statement

In the absence of the fund, commercial banks perceive these investments as too risky and the required loan tenor (13 years) does often not adhere to their internal policies. Both the risk and the desired loan tenor are strongly correlated with the fact that these kinds of investments are characterized by a period in which no income can be generated, because palm trees need to mature.

Loan recipients

Rabobank provides long-term financing worth of US$ 27 million to smallholder farmers clustered in cooperatives. Loans are a combination of finance for the replantation as well as a living allowance during the replanting period. The total financial package consists of US$ 14.7 million of commercial loans, US$ 6.9 million of AGRI3's de-risking facility (with the purpose of extending the tenor), and US$ 5.4 million of Technical Assistance for building cooperatives and providing the living allowance.

Case 4: Certified palm kernel oil in Indonesia

Introduction

Case 4 tries to increase the sustainability of palm (kernel) oil in Indonesia by making the producers adhere to the RSPO certification. Rabobank collaborates with independent mills who source from smallholder farmers in order to drive the NDPE agenda (no deforestation, no peat and no exploitation). The goal is to source hundred percent sustainable crude palm oil (CPO) by 2019 and hundred percent sustainable crude palm kernel oil (CPKO) by 2023. This goal is pursued by offering a combination of capital to the CPO mills and technical assistance to both the mills and the individual smallholders. The capital is used for investment in the mills (capital expenditures) as well as logistical infrastructure.

Problem statement

In the absence of the Fund, the required loan tenor does not adhere to commercial banks' internal policies and risk appetite.

Loan recipients

Commercial banks provide 5- to 7-year financing worth of US$ 103.3 million to the CPO mills. These mills source from collectors which are in turn in contact with the smallholder farmers. The total financial package consists of US$ 60 million of commercial loans, US$ 40 million of AGRI3 soft loans, and US$ 3.3 million of technical assistance. The technical assistance is aimed at improving the General Agricultural Practices (GAP) and is provided to both the smallholder farmers and the mills.

Case 5: Soy in Brazil (2)

Introduction

Case 5 tries to stimulate effective agricultural land use and the avoidance of degraded land by subsoiling, railing and fertilizing the agricultural land. A trading company acts as an aggregator. This case is already financed by Rabobank itself and currently in the implementation phase.

Problem statement

In the absence of the Fund, long-term financing is not available in the commercial market in Brazil. Both the loan tenor and the grace period are not aligned with the commercial banks' risk appetite. This results in below-optimal investments in agricultural land and subsequently to pressures on deforestation. This case covers all three focus areas.

Loan recipients

Commercial banks and the fund jointly provide 10-year loans worth of US $5 million to a trading company. Loans include a 3-year grace period to allow for a better transition. The fund is involved through a 'parri passu' arrangement, providing US$ 2.1 million of financing.

Case 6: Sugar in Brazil

Introduction

Case 6 tries to optimize sustainable sugarcane production in the state of Sao Paulo. Currently, the sugarcane production performs at a below-optimal level resulting in pressures on deforestation. This case is already financed by Rabobank and is currently in the implementation phase.

Problem statement

In the absence of the fund, long-term financing is not available in the commercial market in Brazil, as both the loan tenor and the grace period are not aligned with the commercial banks' internal policies risk appetite. This results in below-optimal investments in agricultural land and subsequently to pressures on deforestation. This case covers all three focus areas.

Loan recipients

Commercial banks provide 10-year loans, including a 3-year grace period, worth of 50 million *Brazilian Real*. The Fund is involved through a 'parri passu' arrangement, providing 21.5 million *Brazilian Real* of financing.

Estimated impact

Table 3.1 provides an overview of the estimated impacts of each business case. In order to 'test' the validity of these various impacts, the underlying calculations are presented and examined.

Table 3.1 Overview business cases

	Case 1	Case 2[48]	Case 3	Case 4	Case 5	Case 6	Total
Country	Indonesia	Brazil	Indonesia	Indonesia	Brazil	Brazil	
Crop	Rice	Soy	Palm Oil	Palm Oil	Soy	Sugar	
Investment	$10 mln	$25 mln	$27 mln	$103.3 mln	$5 mln	$13.6 mln	$183.9 mln
Loan tenor	7 years	5 years	13 years	5-7 years	10 years*	10 years *	-
Status	Theoretical	Theoretical	Theoretical	Theoretical	In execution	In execution	-
KPI 1: Forest protection and reforestation							
- Forest protected (ha)	-	3,500	1,800	-	2,300	-	7,300
- Forest replanted (ha)	-	3,500	-	-	-	90	3,590
- Avoided CO_2 emission per year	-	12,488	16,693	-	51,290		80,000
- Sequestered CO_2 emissions per year	-	28,259	-	-	-	727	29,000
KPI 2: Sustainable agriculture							
- Degraded land restored	-	13,000	5,000				18,000
- Land under sustainable management	1750	13,000	5,000	47,000	10,000	52,000	127,000
KPI 3: Improved rural livelihood							
- People trained	3,500 (households)	1,250	857	50,000	150	900	57,000
- Farmers included in supply chains	3,500 (households)	59	857	3,200	1,541	3,000	12,000

* including a three-year grace period
Source: AGRI3 Grant Proposal, AGRI3 Impact Proposal Table, and other fund-related documents.

Forest protected

The total area of forest protected for cases 2, 3 and 5 is determined by three factors:[49]

1. The number of farmers included per case;
2. The (average) acreage per farmer included per case;
3. Forest-related agreements made on the management of the given land per case.

The numbers with respect to the factors 1 and 2 are determined in cooperation with the recipient of the loan (e.g. the aggregator). The requirements with respect to the farmers' management of the given land are set within the loan agreements. Given that financing can be made contingent on

[48] It is included in the project plan that the project starts with a pilot farm in which five farmers are targeted and will later grow towards the final goal of fifty farmers.

[49] Note that cases 1, 4 and 6 did not include any forest protection (See also Table 3.1)

agreements related to forest protection Rabobank and AGRI3 expect such agreements to be honored. In addition, the Fund will actively monitor the extent to which these agreements are honored using satellite-assisted monitoring programmes as well as field-teams.

Forest replanted

The total area of forest replanted for cases 2 and 6 is determined by:[50]

1. The number of farmers included in the project
2. The (average) amount of forest that is replanted per farmer

The number of famers included in the project is determined in cooperation with the recipient of the loan (e.g. the aggregator). The agreements with respect to the amount of forest that is replanted by farmers are set within the loan agreements. As above the fund will monitor whether or not these agreements are met.

Avoided CO_2 emissions

The amount of CO_2 emissions avoided for cases 2, 3 and 5 is determined by two factors:[51]

1. The area of forests that has been "saved" from deforestation per case, and;
2. The amount of CO_2 sequestered in this area of forests.

In order to determine the area of forests that has been saved from deforestation, the situation at the end of the investment has to be compared with the hypothetical situation in which the investment has not been made. Because this alternative situation is not observable, assumptions have to be made. Two different approaches are used in the grant proposal to derive this hypothetical alternative. In the absence of detailed information, an often-used approach is to determine a trend, and assume that the trend in the years *before* the investment would have continued *after* the investment. For case 2 and 3, the grant Proposal defined the trend as the most recent deforestation rate at that time, namely 2017.

For case 3 in Indonesia, a yearly deforestation rate of 1.9 percent was assumed, accumulating to a 19 percent loss of deforestation during a period of ten years (the average tenor length). Historically speaking, the average annual deforestation rate of the last ten years was around 2.5[52] percent and accumulates to a 23 percent loss of forest. In this light, the calculations for case 3 in the grant proposal might be an underestimation of the actual future deforestation (in the absence of the Fund). However, this is different for the Brazilian case 2. The grant proposal uses the deforestation rate of 2017 of 1.9 percent per year. The average annual rate of the last decade is only just above 0.9 percent. The fact remains that the future deforestation rate is difficult to predict, but these differences might indicate an overestimation of the future deforestation rates in Brazil.

Overall, the calculations made for the grant proposal make sense with some possible underestimation for the Indonesian case and overestimation for the Brazilian case. Additionally, the rates in the grant proposal refer to the *average* deforestation, whereas the deforestation in *project-specific* areas are likely to be higher. The average deforestation rate refers to all forests in the project-

50 Note that cases 1, 3, 4 and 5 did not include the replanting of forests (See also Table 3.1
51 Note that the cases 1, 4 and 6 did not include any avoidance of CO_2 emissions (See also Table 3.1)
52 Based on Global Forest Watch: https://www.globalforestwatch.org/dashboards/country/

country, including low(er)-risk areas such as national parks and other actively protected areas. In other words, the pressure on deforestation outside these low-risk areas is likely to be higher than the average deforestation, making the estimates more conservative.[53]

A different approach is used in hypothesizing the alternative situation for case 5. Since this case is in a further stage of development, more detailed information with respect to the target areas is available. In its design, this case specifically targets the high(er)-risk areas. As part of the project "forest code offsets" are bought. These are certificates that are tied to land that could under the forest code of Brazil legally be cut. By buying these certificates this can be prevented. More specifically, the grant proposal assumes that, in the absence of the fund's intervention, the entire area that is legally allowed to be deforested will be deforested within ten years.. This estimate might be too opportunistic, as there is no evidence presented that all forest code offsets are always cut within a time period of ten years.

The total area saved from deforestation multiplied by its CO_2 sequestration capacity is equal to the amount of CO_2 emissions avoided during the length of the investment. Based on the United Nations Framework Convention for Climate Change (UNFCCC), the average CO_2 per hectare equals 223 tons for the Cerrado area (in which Mato Grosso is located and case 2 and 5 are implemented).[54] For the Jambi area, where case 3 is implemented, forests sequester 488 tons per hectare on average.[55]

Sequestered CO_2

The amount of CO_2 sequestered for cases 2 and 6 is determined by two factors:[56]

1. The area of forests that has been replanted per case and;
2. The CO_2 sequestration capacity of these forests.

In order to determine the additional CO_2 that has been sequestered, the total area of replanted forest is multiplied by its sequestration capacity. For this indicator, the assumption is that, in the absence of the fund, limited incentives for replanting forest would be in place and thus no forests would have been replanted. In order to determine the degree of carbon sequestration of the newly planted forests, data from the Intergovernmental Panel on Climate Change (IPCC) was used. The IPCC guidelines provides the levels of carbon sequestration per type of forest.[57] For the type of forest to be replanted in Mato Grosso (case 2 and 6), the CO_2 sequestration equals 7.34 tons per hectare per year. For each of the relevant cases, the amount of forest replanted is multiplied by its CO_2 sequestration capacity to derive the total amount of CO_2 sequestered.

Additionally, avoidance of CO_2 emissions is also expected to occur at the farm level due to improved agricultural practices. These are, however, not quantified in the grant proposal and yet to be determined around 12 months after the investment has been made. The grant proposal

53 More accurate estimates can be made as soon as a "deal" gets closer to the implementation phase.
54 https://redd.unfccc.int/files/brazil_frel-cerrado-en-20160106-final.pdf
55 https://redd.unfccc.int/files/frel_submission_by__indonesia_final.pdf
56 Note that the cases 1, 3, 4 and 5 did not include any sequestration of CO_2 (See also Table 3.1
57 https://www.ipcc-nggip.iges.or.jp/public/2019rf/index.html, Volume 4, Table 4.9

recommends to use the FAO Ex-Ante Carbon Balance Tool in order to determine the amount of CO_2 emissions avoided.[58]

Degraded land restored

The amount of degraded land restored for cases 2 and 3 is determined by two factors:[59]

1. The number of farmers included in the project, and;
2. The (average) amount of agricultural land that each farmer has at its disposal.

In order to determine the total area of degraded land restored, the total agricultural area within the boundaries of the project is calculated. The premise is that this entire area is degraded by definition, as the project only targets farmers that have a need for land restoration. There are no direct benefits calculated from this specific indicator. Nevertheless, restoration of degraded land is indirectly expected to contribute to higher yields and reduced pressure on deforestation.[60]

Land under sustainable management

The amount of land under sustainable management for cases 1, 2, 3, 5 and 6 is determined by two factors:[61]

1. The number of farmers included in the project, and;
2. The (average) amount of agricultural land that each farmer has at its disposal.

In order to determine the total area of agricultural land under sustainable management, the total agricultural area within the boundaries of the project is calculated. The premise is that this entire area is currently not managed sustainably by definition, as the project only targets farmers that are performing at a suboptimal level. There are no direct benefits attached to this specific indicator. Nevertheless, sustainable land management is indirectly expected to contribute to higher yields and reduced pressure on deforestation in the long run.

Improved rural livelihoods

For all cases, improved rural livelihoods is measured by the median household income distribution (in USD). However, no estimations with respect to this indicator are provided for any of the cases in the grant proposal. There are estimations with respect to the number of farmers included in the supply chain, and the number of farmers trained. The value of these metrics is difficult to assess and depends largely on the conditions under which these farmers are included or trained.

3.2.2 Representativeness of case studies

Currently there are six business cases of which:

- Two cases are in the implementation phase
- Four cases are not, but may still be implemented once AGRI3 is operational.

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58 http://www.fao.org/3/a-i6858e.pdf

59 Note that the cases 1, 4, 5 and 6 did not include any restoration of degraded land (See also Table 3.1)

60 There are various academic publications on the topic of potential carbon sequestration through land restoration. E.g.:
https://onlinelibrary.wiley.com/doi/abs/10.1002/ldr.562
https://onlinelibrary.wiley.com/doi/abs/10.1046/j.1365-2486.2000.00308.x
https://onlinelibrary.wiley.com/doi/abs/10.1002/ldr.696
https://onlinelibrary.wiley.com/doi/abs/10.1046/j.1354-1013.2002.00486.x
https://link.springer.com/chapter/10.1007/978-981-13-8570-4_1

61 Note that the case 4 did not include the sustainable management of agricultural land (See also Table 3.1)

Beyond these six business cases, there is a relatively extensive pipeline of projects that contain deals that might follow the first six business cases. In order to examine the representativeness of the current cases, two additional questions have to be answered:

1. Are the current six business cases representative for pipeline of possible new cases as presented by Rabobank?
2. Are the current cases and the eventual pipeline cases representative for all projects that will be executed under the auspices of the fund?

Rabobank's pipeline cases as presented to the research team are similar to the current six business cases. The pipeline cases discussed with the Rabobank team are similar in terms of the target country (mostly South-America and Indonesia[62]) and target crop (rice, soy and palm oil). Moreover, introducing irrigation systems is an often-recurring aspect and smallholder farmers are always the end-beneficiaries.

One of the reasons the pipeline cases are similar to the current six business cases is the fact that Rabobank mostly present cases from countries in which it has a retail network. In these cases currency risk is lower since the bank simultaneously attracts deposits in the local currency. Moreover, it is also easier for Rabobank to create "leads" in countries in which they have been working for some years and built up a (strong) network of clients.

The current six business cases and the pipeline cases are considered to be representative for all projects that will be executed under the auspices of the fund. With regard to Rabobank, the same reasons apply as mentioned above. With respect to future leads coming from other commercial banks, the argumentation is twofold. Future cases are expected to be similar to the current six cases, because Rabobank's pioneering efforts set the tone for other commercial parties. Especially in the first years of the fund, it is likely that Rabobank inspires other banks to invest in projects that are similar in terms of sector and size (demonstration effect).

However, future cases might differ from the current six cases, because other banks might have retail networks in different countries or different fields of expertise. For the same reason that future leads from Rabobank will arise in similar countries, other banks are also more likely to present leads in countries in which they have a retail network. Additionally, where Rabobank feels comfortable in the sectors of rice, soy and palm oil, other banks might have expertise in different sectors. Although these two factors do result in a lower representativeness of the current cases, they also contribute to a widened geographic and thematic scope of the fund in the long term. Moreover, all future cases that are presented through either channel have to follow the principles of the fund (that is, they need to correspond with the KPIs) and the largest deforestation pressures will remain to be attached to soy and palm oil related production in countries such as Brazil and Indonesia.

3.2.3 Credibility of financial extrapolation

In order to go from the current six business cases to a pipeline of 1 billion dollar in investments, two criteria need to be met:

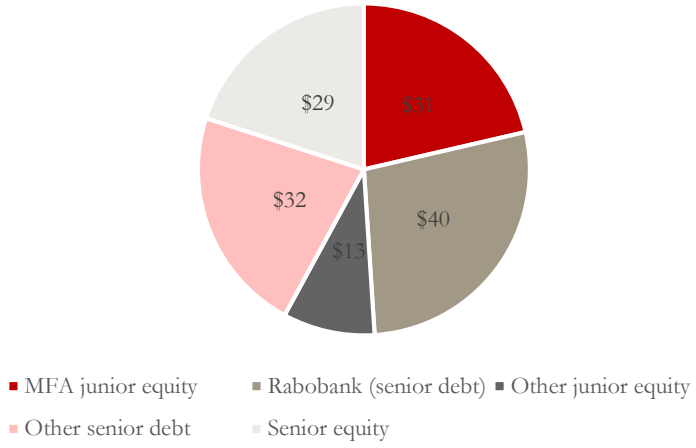
- The US$144 million fund has to be funded

[62] Although there are also pipeline projects in Tanzania and India

- The guarantees (total of US$ 306 million) will have to be enough to leverage US$ 1 billion worth of investments from commercial investors.

Whether or not the US$ 144 million funding can be raised is currently hard to determine. Rabobank has pledged US$ 40 million in senior debt and MFA is considering a US$ 35 million junior equity investment. There are talks with other investors but these are still in a more early stage. Rabobank and AGRI3 indicate there is plenty of interest. Finding an investor for the remainder of the senior debt should not be too hard. Senior debt providers may consequently offer lending deals to the fund which the fund will than assess. For the senior equity part an impact investor is sought. Finding another junior equity investor may be the most complicated. Junior equity yields zero percent return. On top of this AGRI3 still needs to find parties willing to grant about US$ 9.3 million for the TA-facility.[63]

Figure 3.3 Rabobank and MFA would in total cover about half of the funding needed



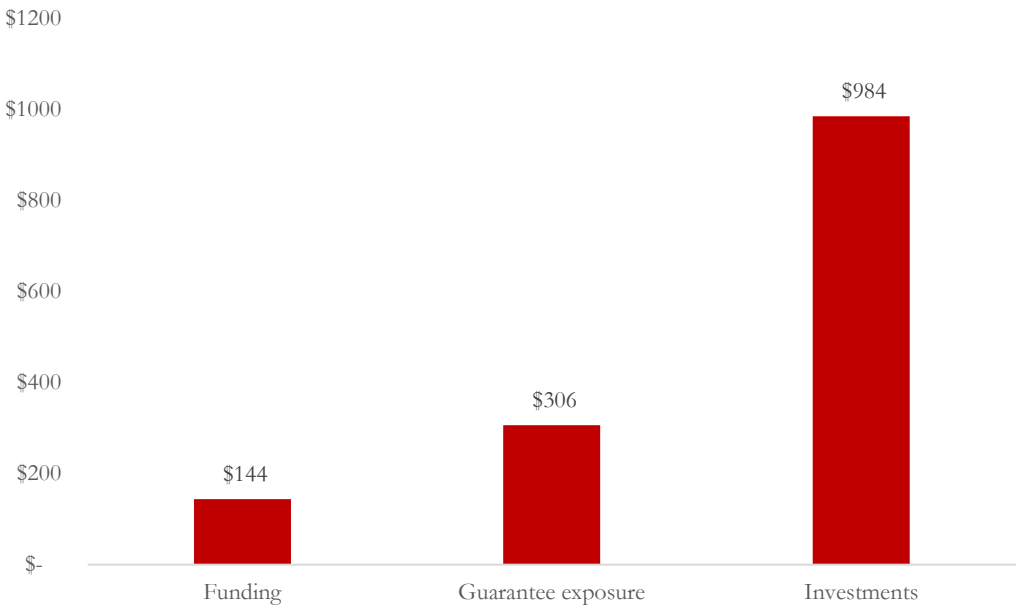
Source: SEO Amsterdam Economics, AGRI3 High-level model, in million dollars

Once the US$ 144 million has been funded, we believe leveraging 1 billion in investments is realistic:

- Using US$ 144 million to offer US$ 306 million in guarantees means that each dollar in the fund will 'cover' just over two dollars' worth of guarantees. This is relatively conservative. Various stakeholders informed us that, over time, this coverage ratio could increase to 1:4.
- Using US$ 306 million dollars in guarantees to lever US$ 984 million in investments means that a significant share of each investment can be guaranteed. This seems like an attractive incentive for financiers to want to invest, especially since the investments can be typified as 'green'.
- Moreover, Rabobank alone expects to invest in the order of magnitude of hundreds of millions alone using the fund for guarantees.

63 MFA might grant US$ 4.9 million out of a total of US$ 15.2 million. The grant proposal mentions US$ 15.6 million dollar whereas the high level model mentions US$ 15.2 million. We'll follow the high-level model to conserve consistency with the rest of the figures used.

Figure 3.4 A leverage effect of seven times the internal funding is expected



Source: SEO Amsterdam Economics, AGRI3 High-level model, in million US dollars

3.2.4 Bottom-up approach: summary and conclusions

The six current business cases differ in terms of their impact distribution over the three focus areas, but are very similar in terms of geographic coverage. All current cases contribute to improving rural livelihood and sustainable agriculture, while four cases contribute to reforestation or avoiding deforestation. All current cases will take place in either Brazil or Indonesia, with soy and palm (kernel) oil being prominent crops. Moreover, most cases have a loan tenor that exceeds the tenors typically offered on commercial terms. The average ticket size is approximately US$ 31 million, but varies greatly among the six cases.

The only effect that can directly be expressed in monetary terms is the amount of CO_2 emissions avoided and/or sequestered as a result of forest protection and reforestation. Other aspects within the first two focus areas either indirectly contribute to lower atmospheric CO_2 levels through reduced pressure on deforestation (or active replanting) or are simply not expressible in monetary terms. With respect to improving rural livelihoods, the fund has set targets in terms of number of farmers trained or number of farmers included in supply chains. However, these effects are difficult to express in monetary terms as these are very case-specific and can likely only be determined at a later stage during the implementing phase.

Based on the currently available information, the calculated impact for the current six business cases is considered to be realistic. The KPIs with respect to sustainable land use and forest protection can largely be translated to lower pressure on deforestation and therefore lower atmospheric CO_2 levels. A few assumptions may be opportunistic but these are compensated for by more conservative assumptions elsewhere. The KPIs with respect to 'improving rural livelihoods' are rather vague at this moment and cannot be quantified. Income levels are not available, and neither are projected increases in income. The farmers will benefit through loans, training given and more sustainable land use which is expected to have a positive effect on

smallholder yields and incomes in the long run. The effects are however not quantifiable at this point.

The six business cases are a realistic reflection of the type of projects that are to be financed by the Fund. Rabobank's pipeline cases as presented to the research team are similar to the current six business cases. The pipeline cases are similar in terms of the target country (mostly South-America and Indonesia) and target crop (rice, soy and palm oil). Moreover, introducing irrigation systems is an often-recurring aspect and smallholder farmers are always the end-beneficiaries. The cases that are presented by Rabobank beyond the pipeline are very likely to be similar to the current six cases and the current pipeline. The primary reason being the fact that Rabobank will mostly present cases from countries in which it has a strong retail network and in which it has a good network of existing clients. Business cases brought in by other commercial banks will likely differ from those at Rabobank. Representativeness here is lower but these cases do help the fund become more diversified in the future.

Based on the currently available information, it is likely that the Fund is capable of doing investments worth of US$1 billion within five years of its establishment. Approximately half of the US$ 144 million of internal funding will be brought together by Rabobank and the MFA. Since the idea of the Fund is that the commercial loan providing parties should also invest in the Fund itself, it is expected that the share of senior debt will be covered relatively easily. Although senior and junior equity are harder to raise, raising the total amount of US$ 144 million is within reach. Leveraging this amount into 1 billion dollar worth of investments is also deemed realistic, especially since Rabobank alone seems willing to invest in the order of magnitude of hundreds of millions using the fund.

In summary, the impact of the AGRI3 fund as calculated in the grant proposal is considered to be realistic. The current cases are considered to be both credible on their own and representative for the fund as a whole. As such, the financial extrapolation as shown in Table 3.2 is also considered to be realistic.

Table 3.2 Extrapolation

	Expected for six cases	Value per million dollars invested	Expected for the total Fund
Total investment	US$ 183.9 mln	US$ 1 mln	US$ 984 mln
Average loan tenor	8.5 years	-	10 years
CO_2 avoided/sequestered (tons)	110,000	600	600,000
Land under sustainable management (hectares)	127,000	690	690,000
Forest protected/replanted (hectares)	11,000	61	61,000
Farmers included in supply chains	12,000	65	65,000
Farmers trained	57,000	300	300,000

3.3 Top-down approach

In this section, all costs and benefits, both monetary and non-monetary, will be mapped and assigned to the respective stakeholders. The result of this exercise is a filled-out version of Figure 3.5. Green fields refer to costs/benefits that are applicable to the specific stakeholder.

Figure 3.5 Template of cost-benefit table.

	Funders of AGRI3				Lenders	Borrowers	Rest of the world		
Net present values (2019)	MFA (junior equity)	Others (junior equity)	Rabobank and others (Senior debt)	Senior equity (t.b.d.)	(Rabobank and others	Farmers/distributors/ aggregators	World	Project countries	TOTAL
Fund start-up costs									
Funding (for guarantees)									
Investments									
TA									
Repayments on loans (as agreed)									
Non-repayments on loans									
Interest payments on loans									
Guarantee fees to AGRI3									
Deposit fees to AGRI3									
TOTAL COSTS									
Benefits									
Return on funding (guarantees)									
Repayments on loans (as agreed)									
Non-repayments on loans									
Interest payments on loans									
Margin on deposit									
Loans received									
Companies receiving TA/farmers trained									
CO2 emissions avoided									
Private return on investment									
PM benefits									
Hectares of agri sustainable management									
Hectares of forrest active management									
Farmers included in value chain									
TOTAL BENEFITS									
TOTAL									

Our key finding is that the overall benefits of AGRI3 outweigh the costs. That is, the CBA has a positive net present value. AGRI3 will result in net benefits of US$ 130 million dollar for the world as a whole. Commercial parties, farmers and other value chain stakeholders all stand to gain. Public parties investing in junior equity incur more financial costs than benefits. The biggest benefit comes from CO_2 emissions avoided. These are benefits for the world as a whole.

3.3.1 Introduction and documentation used

This section aims to accurately list all costs and benefits resulting from AGRI3. Costs and benefits are monetized where possible, and are discounted to 2019 net preset values using a 3 percent discount rate.[64]

We consider this to be a conservative CBA for several reasons:

- The high-level model itself seems conservative. This CBA follows the high-level model in modelling only the first five years of investments and the (approximately) ten years after it takes to repay the loans. In this model the fund has no revolving character. No reinvestments are modelled. This yields an underestimation of the benefits a revolving fund may have.

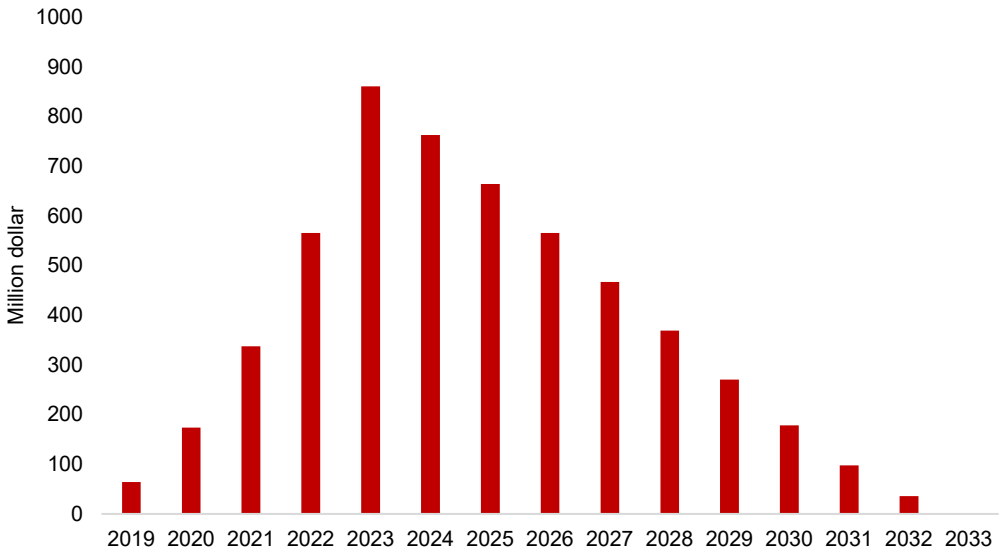
64 This is the discount rate that is required to be used in Social Cost Benefit Analysis conducted for the Dutch government. The discount rate is needed because costs and benefits refer to different years. To compare these in a meaningful way discounting to net present value is needed. See: Rapport werkgroep discontovoet 2015

- No costs or benefits are modelled after the loans have been repaid. Costs logically end at that point but one may expect certain benefits to stay. This seems especially relevant for CO_2 emissions. A replanted forest may continue to store additional CO_2 for decades after the loan has been repaid. This can however not be guaranteed by AGRI3 after the loan or guarantee agreement ends.[65] These benefits are therefore not part of this CBA.
- We use a conservative measure to monetize CO_2 emissions avoided. We opt for the 'low' scenario from CPB Netherlands Bureau for Economic Policy Analysis (hereafter: CPB).[66] This scenario corresponds to an efficient CO_2 price of just over US$ 15 per ton CO_2 in 2019 and about US$ 24 per ton in 2032, the final year for which we model CO_2 emissions prevented. The current EU Emission Trading System (hereafter: ETS) CO_2 price is about US$ 29. Other more ambitious scenarios in CPB (2015) yield efficient CO_2 prices of 80, 100 or even 500 euros per ton.

3.3.2 Portfolio build-up

Benefits and costs of the fund are largely dependent on the fund portfolio. A larger portfolio means larger benefits. In the first five years the fund aims to catalyse US$ 984 million dollar in investments, which (for modelling purposes) will be repaid in ten years. Figure 3.6 displays the resulting portfolio for all years.

Figure 3.6 The first five years are investment years. Investments are repaid in 10 years.



Source: AGRI3 high level model. Value of outstanding investments based on five years of investments.

The CBA uses this same portfolio to calculate costs and benefits. For example, the amount of interest paid by borrowers will be higher in 2024 than in 2029. We make an exception for CO_2 emissions, which are spread evenly over a ten year period. These do not depend on the actual amount still outstanding but only on the investments carried out.

65 However, an effort will be made. For example, by contacting or visiting the project once the loan has (almost) been repaid.

66 CPB (2016). WLO-klimaatscenario's en de waardering van CO_2-uitstoot in MKBA's.

3.3.3 Quantifiable costs and benefits

Fund startup costs

Rabobank has invested 3.5 million euros/3.9 million US dollars so far in fund startup costs. Other consortium partners will also have startup costs but these are assumed to be covered either by Rabobank or through the fund management fees later on.

AGRI3 funding

AGRI3 needs US$144 million in funding to get started. Three different kinds of funding can be distinguished:

- Senior debt (50 percent, US$ 72 million)
- Senior equity (20 percent, US$ 28.8 million)
- Junior equity (30 percent US$ 43.2 million).

On top of this, AGRI3 aims to set up a TA-facility which will need US$ 15.2 million in funds.

MFA is asked to supply part of the junior equity required (US$ 35 million) and on top of that US$ 4.9 million to cover for the TA-facility. Rabobank has pledged US$ 40 million senior debt. Other parties interested in contributing to the TA-facility or in investing in senior debt, senior equity or junior equity are still being sought.

Funding is registered as a cost in this CBA. These costs are spread out over the first five 'investment years' of the fund following the investment schedule outlined in the grant proposal. Resulting repayments and interest are benefits and are discussed below.

Repayment of AGRI3 funding

Both senior debt providers and senior equity providers will be repaid, with interest. The high-level model projects repayment in 12-13 years. Senior debt providers can expect annualized return of 2-4 percent. Senior equity providers are projected to receive a 3.9 percent rate of return.

Based on current projections, junior equity would in principle be repaid. As such the return on junior equity (including management costs) is projected at zero percent.

Commercial bank investments

Commercial banks can make use of AGRI3 guarantees. The bank will pay fee to the fund and provide a loan to the borrower. Ultimately the borrower will pay for both the interest on the loan and the guarantee needed to secure it.

AGRI3 will use the US$ 144 million in funding to give out US$ 306 million in guarantees which will ultimately yield US$ 984 in loans by commercial banks. These loans are registered as a 'cost' to the commercial banks and a 'benefit' to the borrowers. When the loan is repaid (with interest) it is registered as a cost to the borrower and a benefit to the commercial bank.

Interest on loans

The borrower will pay interest on the loan. Interest rates differ from 4.78 percent to 6.78 percent depending on whether the deal requires tenor extension, risk sharing or a first-loss guarantee. The high-level model includes interest rates for all four deal types. The weighted average interest rate for all deal types is 5.28 percent.

Following the grant proposal and case studies, we assume an average term of ten years after which the loan has been fully repaid. Interest is due on the outstanding amount only.

Guarantee fees

Depending on the deal type the guarantee fee (as modelled in the high level model) is 0.3 percent, 0.8 percent or 4.5 percent of the exposed (guaranteed) amount. Guarantee fees are ultimately paid by the borrower.

Deposit fees

AGRI3 will deposit the exposed (guaranteed) amount with the commercial bank. For example, a bank finances a US$ 10-million loan for a drip irrigation system. AGRI3 has agreed to a 20 percent first loss guarantee. In this case, AGRI3 will deposit US$ 2 million with the commercial bank. The commercial bank will pay a deposit fee of 3.62 percent over this amount to AGRI3.

The commercial bank is free to use the deposited amount. The commercial bank will thus pay this fee to AGRI3 but can simultaneously try and make a margin on the deposit itself. We conservatively estimate that a commercial bank will be able to at least get a 3.62 percent margin on the deposit.[67]

Non-performing loans

The high-level model 'expects' that 50 percent of the guarantee fees will be needed to cover losses in case a client is not able to repay his loan to the bank. These losses for the bank will be (partially) borne by the fund. The high-level model does not include the potential losses commercial banks will suffer as a result of non-repayments. Because AGRI3 takes on the biggest risks (through tenor extension and first loss) we assume that two third of the total losses on non-performing loans will be suffered by AGRI3. The other third will be covered by the commercial banks.

Non-performing loans are a cost for commercial banks but a 'benefit' for borrowers.[68]

Technical assistance and farmer training

AGRI3 will include a TA-facility which offers TA-services worth US$ 15.2 million in the first five years. This is a cost for the financiers of TA, among which MFA. At the same time TA is a benefit for benefactors of TA.

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67 For example, Rabobank return on invested capital (ROIC) in 2018 was 7,4 percent.

68 That does not mean that borrowers who can't repay will somehow benefit from this. In practice this will mean that their investment hasn't brought them what they expected meaning they suffer a loss.

45 companies will receive TA and 300,000 farmers will be trained in management practices in sustainable agriculture and forest protection. This knowledge transfer has value but is at the same time a necessary condition to realize the other goals of the project.

TA to companies is used for both pre-investment and post-investment support. Farmers may need practical training to manage and protect forests. Without forests there are no CO2 benefits. Similarly, training in agricultural practices may increase yield and income and make it easier to repay the loan. In this way part of the training given is quantified as CO2 emission avoided or private benefits to the farmer. Another part is not. However, we do not know how much additional value farmers may derive from these trainings.

At this point we do not know how valuable these services will be to the benefactors. This depends on the ways new knowledge can be applied. We therefore value training and TA given at cost price of US$ 15.2 million.

Management fees

This CBA does not register these costs separately as they are part of the fund itself and paid for using the funds income. These costs are thus included in the CBA but not registered separately to prevent double counting. Management costs of the fund are on average US$ 2.35 million per year.

CO2 emissions avoided

AGRI3 aims to reduce, avoid or sequester approximately 6 million tons of CO2 emissions between 2019 and 2032. Expressed in monetary terms, this represents a net present value (NPV) ranging from US$ 90 to US$ 360 million. The way to achieve this goal is threefold.

- First of all, 41,000 hectares of forest are brought under active management resulting in an avoidance of 4.3 million tons of CO2 emissions.
- Secondly, 19,000 hectares of forest are replanted resulting in an additional sequestration of 1.4 million tons of CO2.
- Finally, appropriate management practices at the farm level are expected to result in a reduction or a further sequestration of CO2 emissions. These are, however, not quantified in the grant proposal and yet to be determined around 12 months after the investment has been made.

We apply the methodology used by CPB (2016) to monetize CO2 emissions avoided. This methodology is based on two reference scenarios: a "low" and a "high" scenario in which targets are set with respect to the reduction of European CO_2 emissions of respectively 30 and 40 percent compared to 1990.[69] CPB calculates an efficient CO_2 price of 12 euro's per ton for the 'low' scenario and 48 euros per ton for the 'high' scenario'. Especially the 'low' scenario is conservative.[70] These efficient prices reflect the 'minimal marginal (prevention) costs'. Any deviation from this efficient price path would result in higher costs related to achieving the same emission targets. In addition, the CPB methodology advises to also consider the scenario in which the global warming

[69] These scenarios refer to the WLO Climate scenarios and relate to the European emission budgets. These are in line with the emission budgets that apply worldwide

[70] The current ETS CO_2 price is about US$28 (September 2019).

restrictions (limited to two degrees Celsius) as determined in the Paris Agreement is met. This scenario requires efficient prices varying from 60-300 euros (approximately 66-331 dollars) per ton of CO_2.[71]

We apply the 'low' scenario to the CO_2 emissions avoided. In this scenario CO_2 prices range from about US$ 15 in 2019 to US$ 24 in 2032. We consider this to be conservative. Both of these values are below the current market price of about US$ 28 per ton of CO_2. However, between 2012 and the beginning of 2018 CO_2 prices were as low as US$ 10 per ton.

Private return on investment

At this point we lack information to accurately predict the private return on investment for borrowers. This will likely differ from borrower to borrower and is not part of the six case studies worked out. Therefore we need to make an assumption. Our assumption is conservative, namely that the borrowers' private return on their investment is just enough to repay the loan, the interest, the guarantee fee. This is a lower bound estimate, i.e., the lowest possible return for a borrower to still wanting to take out the loan and make the investment (assuming that borrowers will only borrow money to invest if they themselves ultimately expect to benefit from the loan). In reality, the actual expected return is likely higher because it also needs to be sufficient to offset the time and costs that have gone into getting the loan in the first place.

3.3.4 Unquantifiable benefits

Not all benefits of AGRI3 could be (entirely) quantified. Below we list a number of benefits that we believe exist, without being able to fully monetize them. We estimate that the net benefits are positive even without taking into account these unquantifiable benefits. However, the unquantifiable benefits should still be added to the overall CBA result.

Agricultural land under sustainable management

AGRI3 aims to bring 690,000 hectares of agricultural land under sustainable management. Sustainable management of agricultural land may have CO_2 benefits but these are at this point uncertain and therefore not included, neither in the grant documentation or in this CBA. Other benefits may include a more sustainable food production, demonstration effects and health effects. These benefits could however not be accurately quantified as part of this study. Any economic value from sustainable management derived by farmers is part of the CBA in the form of the private return on investment.

Forest under active management

AGRI3 aims to bring 41,000 hectares of forest under active management. In doing so these forests are protected from deforestation. Additionally, AGRI3 aims to replant natural forest on just over 19,000 hectares of land, within the boundaries of funded projects themselves.

A significant portion of the value of these forests can (and has been) expressed in terms of tons of CO_2 emissions avoided or CO_2 sequestered by new forests. Forest does however have value other than the CO_2 it stores. Think of biodiversity, storage of nutrients, water management, recreation

[71] Dollar/Euro exchange rate used throughout this report is 1.1.

or even spiritual meaning. These benefits could however not be accurately quantified as part of this study.

Farmers included in value chain

AGRI3 aims to include 65,000 households in value chains of funded companies. The value of this metric is difficult to assess and depends largely on the conditions under which these households are included. If it means a steady contract with a good salary, it may be an improvement. The same goes for a distributor offering a farmer a fair and stable price. However, at this point we cannot know if the specific value chains supported by AGRI3 offers any benefits and if so, how large these are. For monitoring purposes, we would advise a more practical indicator, such as produce bought, prices offered, or jobs supported.

3.3.5 Summary and conclusions

The results of our Cost-Benefit Analysis are summarised in Table 3.3 below and show that the overall benefits of AGRI3 outweigh the costs. The CBA has an overall positive net present value of at least US$ 130 million. This is primarily the result of CO_2 benefits worth at least US$ 90 million dollar. It should be noted that this is a lower bound estimate and does not yet include a number of other benefits that are difficult to quantify.

Commercial parties, farmers and other value chain stakeholders stand to gain, while public parties investing in junior equity incur more financial costs than financial benefits. Both commercial banks supplying the loans and the borrowers are projected to be net benefactors of the fund. The parties funding the fund face a negative net present value. In part, this has to do with the three percent discount factor applied to the CBA. Senior debt investors will receive at least a two percent rate of return on their investment. Discounting this cash flow at three percent yields a negative net present value. The same is true for MFA as primary junior equity investor. The US$35 million will be repaid after about 15 years. This yields a nominal return of zero percent which will be discounted at three percent yielding a negative net present value for the junior equity investment. The grant meant for TA is non-refundable and is simply a transfer to companies receiving TA and farmers receiving training.

Table 3.3 The cost benefit analysis has a positive net present value of US$133 million

Net present values (2019)	MFA (junior equity)	Others (junior equity)	Rabobank and others (Senior debt)	Senior equity (t.b.d.)	Commercial banks (Rabobank and others)	Borrowers (farmers/distributors)	World	Project countries	TOTAL
Fund start-up costs			-3,9						-3,9
Funding (for guarantees)	-32,3	-7,6	-66,5	-26,6					-133,0
Investments					-907,8				-907,8
TA	-4,7	-9,4							-14,1
Repayments on loans (as agreed)						-774,4			-774,4
Non-repayments on loans					-6,5				-6,5
Interest payments on loans						-241,9			-241,9
Guarantee fees to AGRI3					-26,1				
Deposit fees to AGRI3					-71,6				
TOTAL COSTS	-37,1	-17,0	-70,4	-26,6	-1012,0	-1016,3	0,0	0,0	-2179,3
Benefits									
Return on funding (guarantees)	24,0	5,6	62,7	28,9					97,3
Repayments on loans (as agreed)					774,4				774,4
Non-repayments on loans						6,5			
Interest payments on loans					241,9				241,9
Margin on deposit					71,6				
Loans received						907,8			907,8
Companies receiving TA/farmers trained						14,1			14,1
CO2 emissions avoided							90,1		90,1
Private return on investment						108,5			PM
PM benefits									
Hectares of agri sustainable management								+	PM
Hectares of forrest active management								+	PM
Farmers included in value chain						+			PM
TOTAL BENEFITS	24,0	5,6	62,7	28,9	1087,9	1037,0	90,1	0,0	2312,2
TOTAL	**-13,1**	**-11,3**	**-7,6**	**2,4**	**75,9**	**20,7**	**90,1**	**0,0**	**132,9**

4 Conclusions

This report has provided an independent assessment of the AGRI3 proposal. The analysis consisted of two parts: (1) an assessment of AGRI3's additionality relative to the market and to other funds, and (2) a cost-benefit analysis.

The main conclusions with regard to additionality are as follows:

1. **The input additionality of AGRI3 relative to the market is high**. The input additionality for smallholder farmers, mostly based in Africa and Asia, derives from the ability of AGRI3 to offer more affordable financing to farmers than available in the market, via de-risking (first loss guarantees or pari passu instruments). The input additionality for larger commercial farmers, mostly based in Latin America, mainly derives from the ability of AGRI3 to offer longer term funding than available in the market, via tenor extensions or maturity subordination.
2. **The input additionality of AGRI3 relative to other funds is mixed, and mostly originates from its partnership with Rabobank.** AGRI3 is not the only fund to offer a form of 'blended finance', but it appears to be the only fund in which a commercial bank is providing senior debt and a client network, with the explicit aim of achieving major sustainability impact, in countries such as Brazil where few other such funds are active and where the potential impact is significant.
3. **The development additionality of AGRI3 relative to the market is high.** In particular, the 'seal of approval' from the Dutch government has the potential to increase the chances that Rabobank will, in the longer term, truly change its business model in a way that no longer depends on particular individuals for support.
4. **The development additionality of AGRI3 relative to other funds is lower in some respects, but broader in others.** In particular, AGRI3 has a combination of environmental and social impact targets. While these targets are in some cases more conservative than the targets of other funds, this makes them also more realistic. Moreover, AGRI3 has a potentially larger systemic impact because it can potentially affect the business model of large commercial banks and their large corporate clients.
5. **Potential demonstration effects of AGRI3 are high at the fund and commercial bank levels.** Since this particular fund construction is quite novel, particularly for the Dutch government and other potential bilateral donors, it has by definition a high potential demonstration effect at the fund level. Similarly, since it is quite a novel construction for commercial banks such as Rabobank, the potential demonstration effect at this level is high as well.
6. **Potential demonstration effects are lower at the level of corporates and smallholder farmers.** This is because there are thus far few other funds that could offer similar access to finance as AGRI3. Once other such funds emerge or other commercial banks join in, the potential for 'crowding in' other corporates and smallholders increases as swell.

Our conclusions with respect to the cost-benefit analysis are as follows:

7. The impact of the AGRI3 fund as calculated in the Grant Proposal can be considered to be realistic.
   - The six business cases that underpinned the calculations are considered to be both credible on their own and representative for the fund as a whole. The pipeline suggests that more deals will be forthcoming, making it plausible that AGRI3 is able to build up a portfolio of guarantees. However, the average tenor of the current cases is about 8.5 years, which is shorter than the average of ten years the fund aims for. In light of the finding that tenor extensions are an important source of input additionality, it would be beneficial to prioritize these types of deals going forward (at least for larger farmers).
   - The financial extrapolation is also considered to be realistic. Given the current high demand for sustainable investments, it is likely that commercial parties are willing to invest in AGRI3 type projects.
8. **The overall benefits of AGRI3 outweigh the overall costs.** Based on our cost-benefit analysis (CBA), we find an overall positive net present value of at least US$130 million. This is about 10 times higher than the total net cost for MFA, which in net present value terms is US$13.3 million. Moreover, this estimate does not yet include a number of other benefits that are difficult to quantify, including the impact on 'improved rural livelihoods' which is currently not well defined.
9. **The world as a whole is the most important benefactor.** Around three quarters of the total net benefits result from total CO_2 benefits worth at least US$90 million. Other net benefactors are the borrowers receiving loans and the commercial banks supplying loans. Junior equity providers as well as senior debt providers incur more costs than benefits (expressed in net present value terms). This is because they receive a return on investment that is lower than the 3 percent discount rate that is required to be used in Social Cost Benefit Analysis conducted for the Dutch government. Senior equity providers can expect a small return on top of this discount rate. The MFA grant of US$4.9 million will not be repaid but yields benefits of at least US$4.9 million for farmers and companies receiving training and technical assistance.

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