

TRENDS IN AGRICULTURAL VALUE CHAINS

VERTICAL INTEGRATION AND INDUSTRY CONSOLIDATION

To respond to consumer demand, agricultural value chains are evolving. This paper summarizes the findings of a survey carried out in 2017, interviewing 31 experts from small and large companies operating in the agriculture sector that provided insights on the trends shaping agricultural value chains (AVCs) in emerging markets.¹ It focuses on vertical integration and consolidation,² their key drivers and their impact. responsAbility capitalizes on this knowledge to target good investment opportunities along value chains.

Key take-aways

- **Current trends generate new investment opportunities:** As vertical integration and consolidation are set to continue in emerging markets, investors like responsAbility have increasing opportunities to finance mid-size companies involved in agricultural production and processing and in need of large investments. Such companies need mostly mid-term investments to finance their growth and their effective integration into value chains.
- **Understanding these trends reduces risk:** By understanding the interaction between different actors operating along AVCs, investors can better target which ones allow to mitigate financial risks. For instance, export value chains tend to be more integrated in order to secure the access to foreign markets. By investing in export value chains, responsAbility and other investors target structured AVCs that have a secure access not only to traceable, high-quality products but also to well-paying markets.
- **These trends allow to maximize development impact:** While vertical integration is well advanced in developed countries, it is still ongoing in developing countries. responsAbility, via its agriculture debt and equity investments, can strengthen this process and thereby enhance the efficiency of AVCs to the benefit of all stakeholders. In integrated chains, the financing of downstream players can benefit upstream actors. For instance, responsAbility's financing of processors or traders can allow these actors to provide financing, technical support and access to stable and high-value markets to their smallholder suppliers, thereby improving farmers' livelihoods.

¹ See the annex for further details on the methodology.

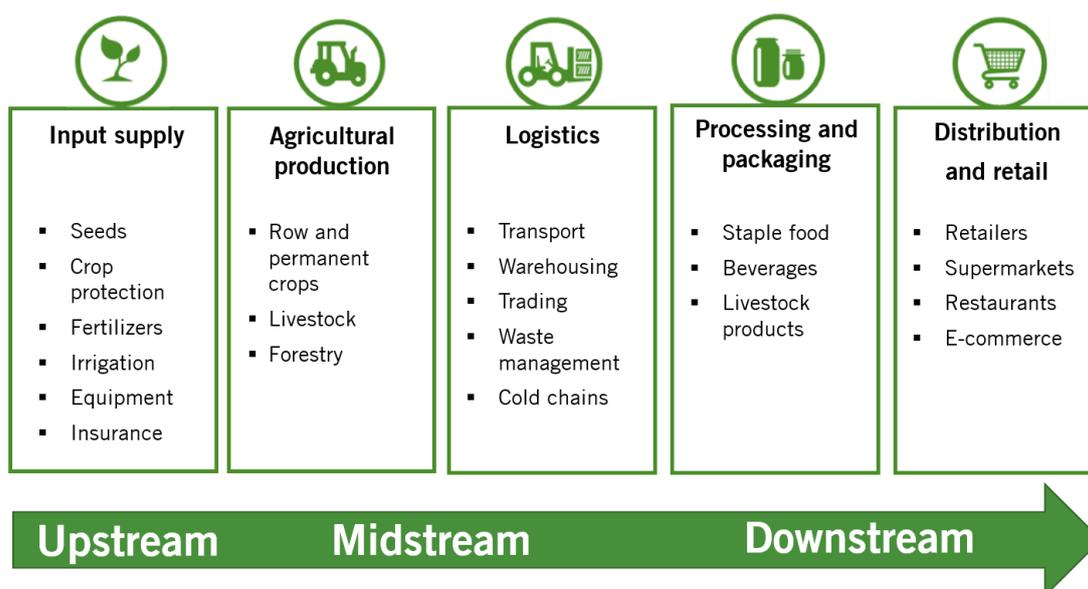
² Vertical integration refers to the process whereby actors operating at different stages of an AVC become increasingly connected, e.g. a processing company gaining control over agricultural production by buying shares in a producers' organization, or a retailer signing long-term contracts with producers and supplying them with agricultural inputs. In contrast, consolidation, i.e. horizontal integration, refers to the reduction of the number of actors involved in one specific segment of an AVC, e.g. the merger between two seed companies.

1. BACKGROUND – FINANCING AGRICULTURAL VALUE CHAINS

Understanding the structure of AVCs reduces the risk of investors: Having a deep understanding of AVCs is essential to select and apply the relevant financing instruments. Investors can lend to the strongest chain actor to reduce risks and delegate further internal value chain lending decisions based on its first-hand knowledge of other actors. The literature on value chains, developed by the Food and Agriculture Organization of the United Nations (FAO), the World Bank and the Organization for Economic Co-operation and Development (OECD),³ defines and describes value chains, highlighting the trends in agricultural value chains and their implications for financial actors. This study complements their findings by shedding light on how financial actors can benefit from these trends.

What are value chains? Value chains include all the activities that firms undertake to bring a product or a service from its conception to its end use by final consumers. AVCs cover all agricultural upstream, midstream and downstream sectors from the supply of agricultural inputs to the production, handling, transportation, processing, and retailing of agri-food products. Within such chains, relationships between the seller and the buyer can take various forms: spot market,⁴ long-term informal relationship, capital investment by the buyer to the benefit of the producer, or full vertical integration.

STRUCTURE OF AGRICULTURAL VALUE CHAINS



Source: responsAbility Research.

Value chains are driven by producers or buyers: Producer-driven chains are led by capital and technology intensive firms that control the design of products and most of the assembly. Buyer-driven chains characterize labor intensive industries predominantly led by large retailers and branded marketers that source products from independent suppliers. They rely on little capital and few skilled workers.⁵ In agriculture, contract farming which involves contractual agreements between farmers and buyers is the most common buyer-driven value chain model.⁶ Financiers often finance buyer-driven chains as they are more structured and integrated which reduces financial risks.

³ FAO (2010), Agricultural value chain finance – Tools and Lessons; World Bank (2018), Future of Food: Maximizing Finance for Development in Agricultural Value Chains; OECD (2017), How policies shape global food and agriculture value chains, OECD Food, Agriculture and Fisheries Papers.

⁴ The spot market is where assets are sold for cash or delivered immediately. It is also called the cash market or the physical market.

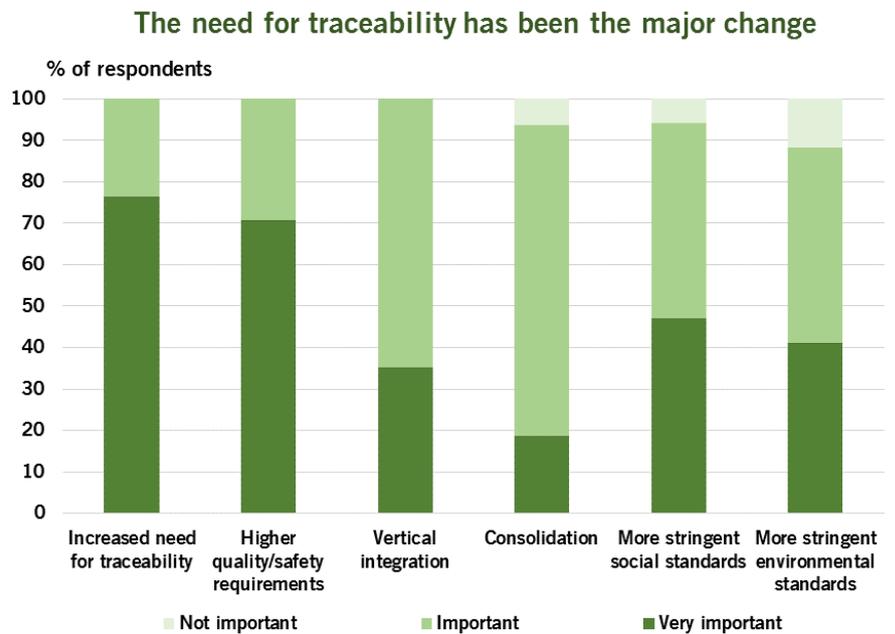
⁵ OECD (2013), Interconnected economies: Benefiting from global value chains.

⁶ FAO (2010), Agricultural value chain finance – Tools and Lessons.

2. VERTICAL INTEGRATION AND CONSOLIDATION TRENDS IN AVCs

I. Key findings of the survey

For respondents, *the increased need for traceability⁷ and food quality/safety* has been the most important change in AVCs over the last five years. Almost half of them also mentioned increasingly stringent social and environmental standards as important changes. They see vertical integration and consolidation occurring in some AVCs and countries but not as a broad global trend. For instance, over the last decade, vertical integration and consolidation have been very important in Eastern Europe in AVCs supplying the EU market to meet traceability, food quality and environmental, social and governance (ESG) requirements. In contrast, in Northern Africa, such processes are hardly starting and ESG standards remain secondary.



Vertical integration: why, how and which impact?

- Vertical integration has been driven by the need for traceability and food safety/quality. It has also been boosted by the need for downstream players to reduce their ESG risks and to secure their supply of raw commodities.
- Vertical integration is expected to continue mostly between production and processing and through long-term engagement with suppliers rather than mergers and acquisitions. The commodities that tend to be vertically integrated are mainly those destined to export, whose supply is limited, that present significant ESG or food safety risks, that require large investments or for which existing AVCs are highly informal and inefficient. Downstream actors tend to control agricultural production for commodities that are easy to produce, perishable or require quick processing.
- While vertical integration is prominent in developed countries, it is still progressing in developing countries, especially in countries with fragmented AVCs, a lack of infrastructure and weak regulatory environment, as vertical integration can help overcome these constraints.
- In terms of impact, successful integration can strengthen value chains and make them more effective, which benefits both upstream and downstream actors. It can improve farmers' livelihoods by securing their access to reliable, high-paying markets as well as to credit, inputs and technology. However, it can also lead to the marginalization of small-scale producers or the loss of their independency.

⁷ Traceability is the ability to follow the movement of food through the various stages of the value chain.

Consolidation: why, how and which impact?

- Consolidation is set to accelerate, mostly through acquisitions, driven by the need for companies to improve their positioning against competitors. Different segments of the AVCs are undergoing consolidation in developing versus developed countries: production and processing in the former and input supply and retailing in the latter.
- Consolidation occurs mainly for commodities that benefit from economies of scale in production or which require significant investments - such as bananas, pineapples, palm oil, or swine production.
- In terms of impact, consolidation can foster the sustainable production of a wide range of products, as well as the production of marginal products that would otherwise not be profitable for one small company. It can also enhance product quality, especially for animal products that require strict food safety and quality controls. However, it can result in large farms with significant negative environmental impacts.

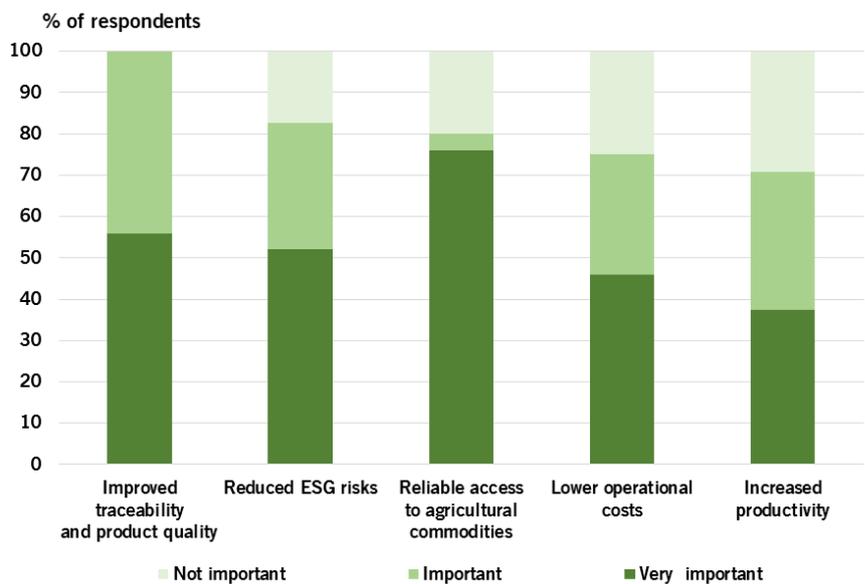
II. Vertical integration

Vertical integration is expected to continue. Most respondents expect some vertical integration in the coming years and a third of them expect strong vertical integration. In the last two decades, value chains have increasingly spread over different countries. Production has become more fragmented as trade costs have decreased and improved information and communication technologies have allowed the co-ordination of activities at large distances. In such context, large multinational companies tend to integrate vertically to better control their global supply chains.

It is driven mainly by the demand for traceability and product quality

but also by the need to reduce ESG risks and to secure the access to agricultural commodities. Such integration can also be driven by: the aim to secure food supply and access to natural resources (e.g. for China and Saudi Arabia); the need for maintaining margins in more competitive markets (e.g. rice, coffee, cocoa); the increasing size of retailers that are able to integrate upstream actors; the limited access to finance that vertical integration can help overcome by allowing downstream actors to finance upstream actors; the willingness to differentiate from others through direct sourcing; and the use of agricultural by-products, for instance to generate energy, that incentivizes the control of raw materials.

Traceability and quality drive vertical integration



It is more prominent in developed countries and ongoing in developing countries where AVCs are still fragmented and where it allows to overcome the lack of infrastructure and a weak regulatory environment. As such, vertical integration is more widespread in Latin America than in Africa and Asia. However, the presence of strong cooperatives in Latin America compared to Africa and Asia results in a vertical integration that excludes production, as downstream players can secure their supply of raw materials from cooperatives more easily.

It is more common in certain AVCs:

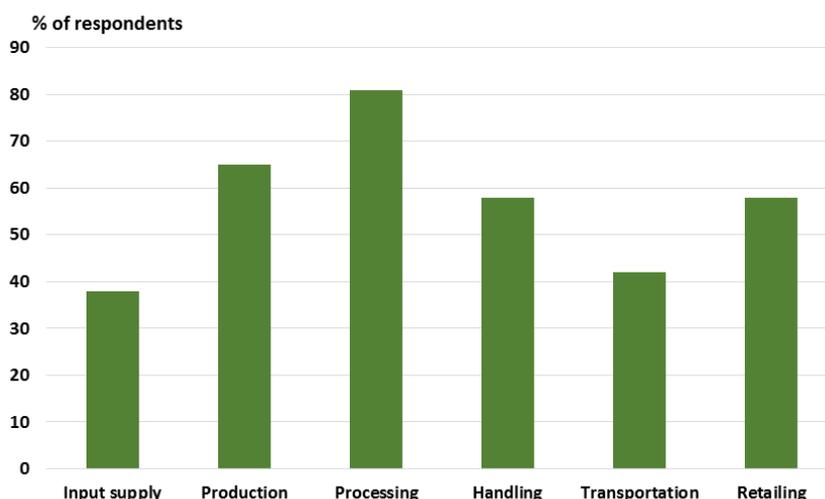
- **Export commodities** for which there is no domestic market and an export market should be secured.
- **High-value commodities** as a high value-to-weight ratio tends to be associated with greater risks in marketing and a more specialized clientele.
- **Limited supply** of the commodity as this incentivizes downstream actors to integrate backwards to secure their supply. If processors face difficulties securing a reliable supply of raw materials, they tend to expand into agricultural production. Similarly, integration can help secure the supply of inputs in new AVCs. For instance, aquaculture producers in Vietnam and Africa tend to integrate upwards into feed production as securing feed is often a challenge for this new industry.
- **High food safety and ESG risks:** Coffee, cocoa, horticulture, floriculture, meat and dairy tend to be integrated as they present significant food safety or ESG risks, for instance due to their perishability. Floriculture and meat are also well integrated because they require large investments.

It occurs mostly between production and processing.

The segments of the AVCs being vertically integrated are mostly production and processing, followed by handling and retailing. Downstream actors tend to integrate agricultural production when: land is available; commodity prices are high and stocks are low; returns to extension/farm/research linkages are high; input or output markets are either missing or dysfunctional; and for commodities that are easy to produce, perishable or require limited labor or quick processing, such as sugarcane and palm oil.

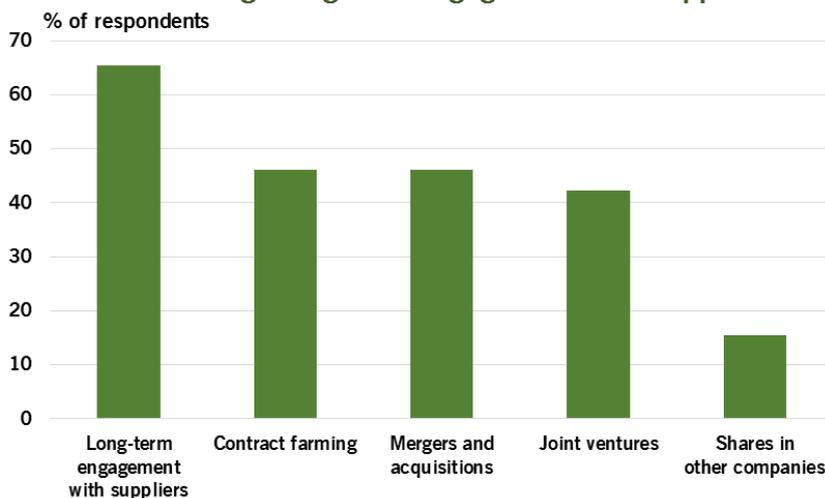
However, many respondents highlighted that large companies, including exporters, tend to integrate vertically excluding agricultural production due to the large investments and technical knowledge required to integrate production. For instance, milk producers and processors are often linked only through a contract – except in the case of a few fully integrated mega-farms such as those in Vietnam (TH Milk with 45,000 cows) or Saudi Arabia (Alsafia with 75,000 cows).

Integration occurs mostly in production and processing



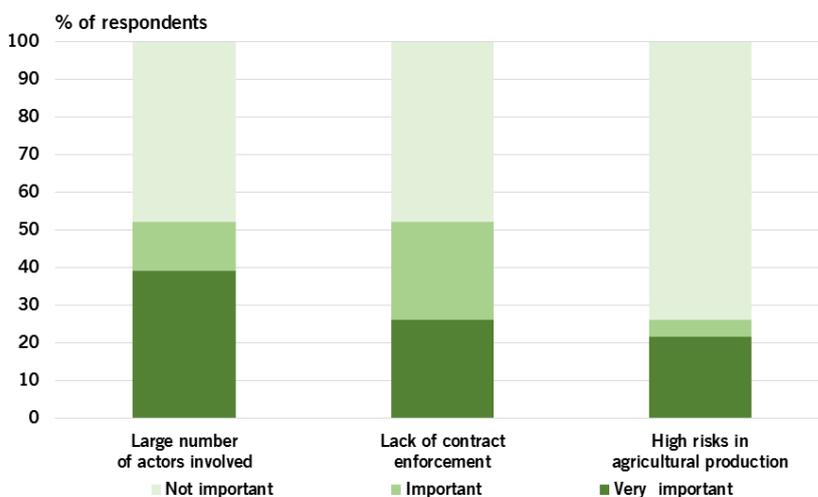
The preferred mechanisms for integration are flexible contractual arrangements, such as long-term engagement with suppliers that do not require significant investments, followed by contract farming⁸ and mergers and acquisitions. As underlined by respondents, contract farming can work only if it benefits producers (if they receive higher returns than in other markets) and if competition is low (to be able to enforce contracts). Contract agreements are most often annual. Mergers and acquisitions is the second most cited mechanism for vertical integration. Joint ventures and buying shares in other companies are less common, although some successful joint ventures have been established recently between importers or exporters and retailers.

Integration happens mostly through long-term engagement with suppliers



The main challenges to vertical integration are also its drivers. The large number of actors involved in AVCs and the lack of contract enforcement are clearly impediments to integration. Around 40% of the respondents mentioned that the large number of smallholder farmers, together with their geographical spread, hindered integration. Challenges to integrate agricultural production include a difficult access to land - unclear land rights, the limited size of available land or the weak enforcement of lease rights – as well as a lack of financing as investment in production requires significant capital and provides no immediate return. Administrative and trade-related barriers across countries, as well as the lack of access to long-term financing and of expertise in managing other AVC segments, have also been cited as limiting vertical integration. The risks related to agricultural production were not considered as strong impediments.

Numerous actors and the lack of contract enforcement are the main impediments to integration



Interestingly, these various challenges are also seen as incentives for vertical integration that can help reduce their importance. For instance, the lack of contract enforcement incentivizes a strong integration that goes beyond simple contractual arrangements. Similarly, the high risks of agricultural production can incentivize integration in order to minimize such risks, for example by providing relevant inputs and trainings.

⁸ Contract farming refers to contractual arrangements between producers and buyers. These contracts can be formal or informal. Coordination can range from tight vertically integrated operations with full ownership and control by a single company to more fragmented informal arrangements.

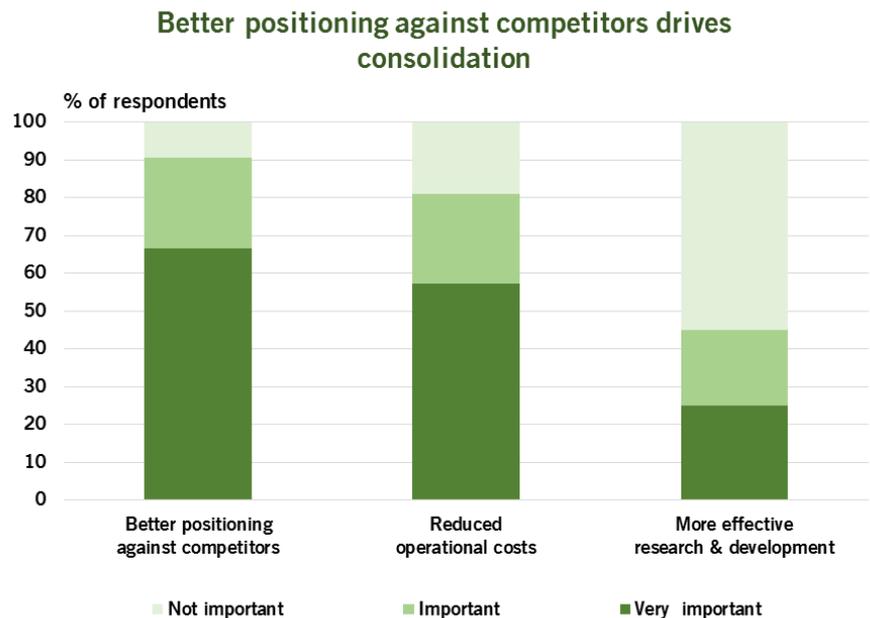
III. Consolidation

Consolidation is set to accelerate, mostly through acquisitions. More than 80% of the respondents expect some consolidation in the coming years and cited acquisitions as the main mechanism for consolidation, followed by mergers and joint ventures.

By order of importance, it is expected to occur mostly in processing, retailing and input supply. More consolidation in processing and retailing can be explained by an easier access to finance and the presence of more professional companies in these AVC segments than in production. At the trading stage, large traders have already consolidated with ADM, Bunge, Cargill and Dupont accounting for around 70% of the world agricultural trade.⁹ Some important consolidation is also occurring in agricultural technology, i.e. big data, drones or technologies to better use fertilizers and pesticides.

It is driven by the need to improve firms' positioning against competitors, according to around 70% of respondents, followed by the need to lower operational costs.

Interestingly, more effective research and development is not considered as a driver by most respondents, although this has usually been the argument put forward by multinational input companies undertaking mergers and acquisitions or joint ventures. The other key drivers of consolidation mentioned were the need for maintaining margins in an environment of low commodity prices; for increasing bargaining power (e.g. against retailers); or for acquiring a new technology, such as seeds. Consolidation can only be undertaken by relatively large companies that have access to large markets and to the necessary capital to cover the costs of consolidation.

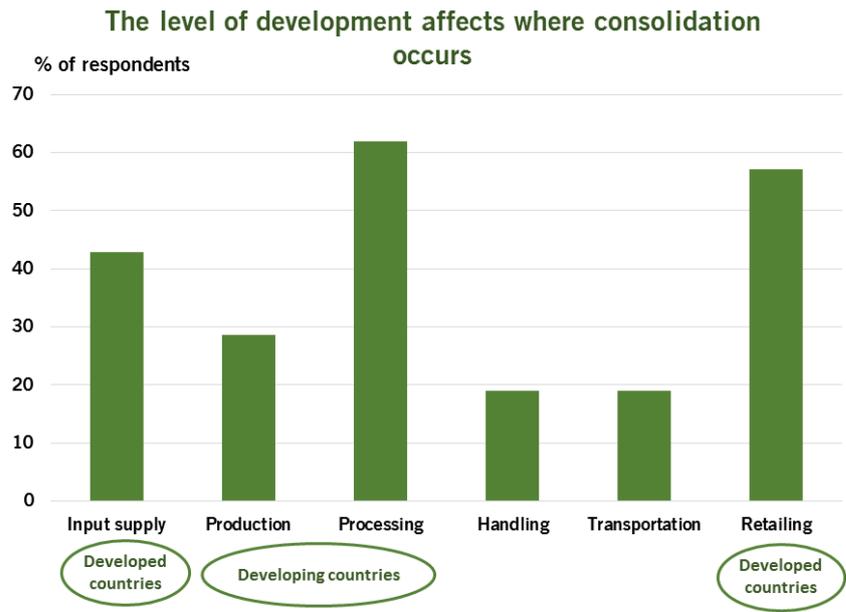


It tends to happen for certain commodities, including those that can be produced in large quantities, for which there are economies of scale and the required investments are significant (such as bananas, pineapples, palm oil, swine production), that require strict food safety controls, or that are considered as strategic, such as wheat and some oilseeds.

⁹ Agrifood Atlas (2017).

It occurs in different AVC segments in developing versus developed countries:

production and processing in the former and input supply and retailing in the latter. This can be explained by the more advanced stage of AVCs in developed economies. The most critical stages of AVCs, i.e. production and processing, tend to be the first ones to develop and strengthen, and thus the first ones to undergo consolidation. More advanced economies have already undergone some consolidation at these two stages. Thus consolidation tends to occur at the start and end of AVCs, i.e. input supply and retailing. Among emerging and developing economies, Latin America - particularly Brazil, Argentina, Paraguay and Uruguay - is at the forefront of consolidation, compared to Africa or Asia, as it is most often a costly process.



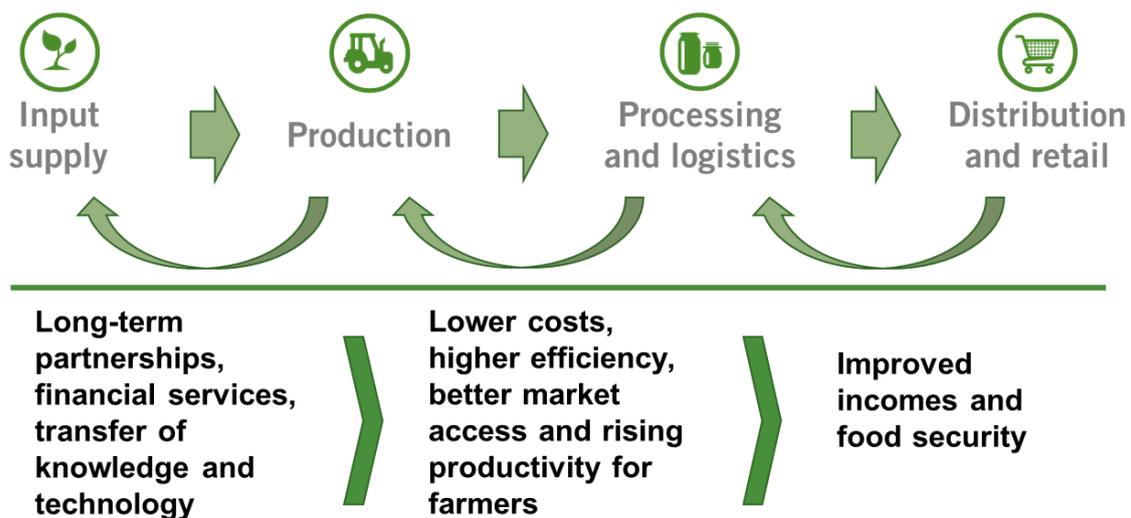
3. DEVELOPMENT IMPACT

responsAbility's agricultural debt financing contributes to 7 out of the 17 United Nations' Sustainable Development Goals (SDGs), as shown below. To better reflect the impact of its investments, responsAbility has defined six impact themes drawing from the SDGs: basic needs; well-being; decent work; healthy ecosystems and resource security; climate stability; and markets and infrastructure. Out of these six themes, responsAbility's agricultural debt financing focuses on three primary objectives in development impact: improving smallholder farmers' livelihoods, promoting sustainable agriculture and strengthening agricultural value chains.



Vertical integration can benefit both upstream and downstream actors and thereby allow responsAbility and other investors to better meet these three objectives. It can improve farmers' livelihoods and strengthen value chains by helping small firms increase their efficiency, develop inter-firm linkages that reduce transaction costs, and upgrade along the value chain. It can promote sustainable agriculture by facilitating the access of producers to training and certification.

Integration improves farmers' livelihoods and strengthens value chains



Source: responsAbility Research.

Let us provide an example. Vertical integration between producers and buyers through contract farming can improve farmers' livelihoods by securing their access to reliable, high-paying markets and to credit, inputs and marketing services, by stimulating technology and skill transfer, and by helping them meet sustainability and food safety standards. Buyers can provide technical assistance to farmers to train them on sustainability practices and be certified accordingly, thereby contributing to sustainable agriculture. Buyers can benefit from contract farming in various ways: increased reliability of supply quantity and quality while off-loading the production risk onto farmers; greater control over the production process and crop attributes; reduced co-ordination costs; and economies of scale in procurement.

Terrafertil, a successful model of vertical integration

Terrafertil provides a great example of the positive impact of vertical integration. responsAbility's financing has allowed the company to grow tremendously by more than tripling its turnover from 2014 to 2018. Terrafertil is recognized for its natural and mostly organic products. It is the world's largest buyer of goldenberries, an Andean superfood rich in vitamins and antioxidants. It was founded in 2005 in Ecuador and quickly expanded to Mexico, Colombia, Peru, Chile, and the United Kingdom. In 2017, it entered the US market. It sells its numerous products to large global retailers, such as Jumbo, Starbucks and Walmart.

- **Improving farmers' livelihoods:** Every year, Terrafertil buys 4,000 tons of goldenberries from 1,800 farmers in Ecuador and Colombia. The income of these farmers has increased by 70% as they replaced potatoes and corn whose prices are volatile and that are harvested only once a year by goldenberries that can be harvested throughout the year and are sold in premium markets. Goldenberries are sustainably produced as they are certified as Organic, Global GAP or Fair Trade. Five agronomists employed by Terrafertil regularly visit farmers to train them on organic production.
- **Building a strong agricultural value chain:** Terrafertil has built from scratch a fully integrated supply chain from producers to consumers for goldenberries and accounts for 90% of the world market of goldenberries. It has a long-term engagement with producers and benefits from a reliable access to export markets. It also contributes to the local economy through the four local factories it has built in Chile, Colombia, Ecuador and Mexico.

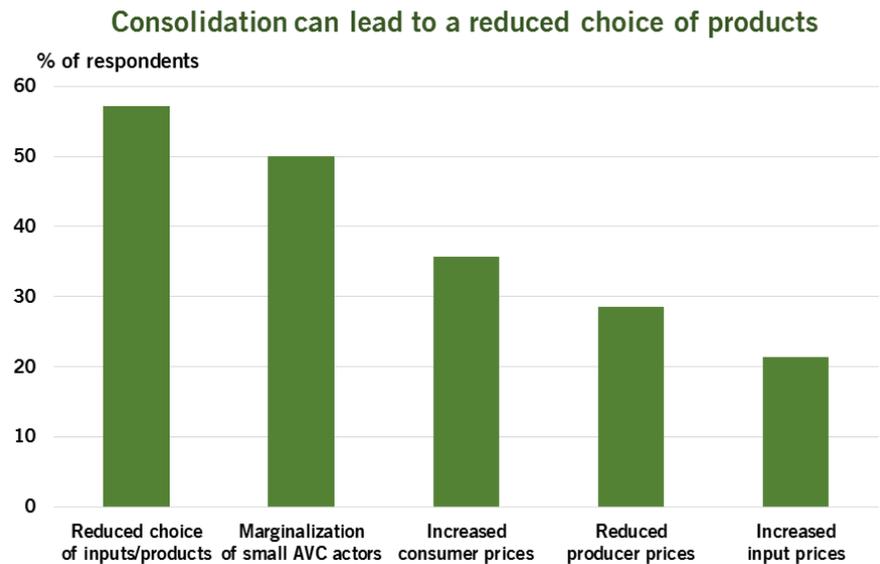
Source: responsAbility (2017), Goldenberries from Ecuador and Colombia.

Consolidation can also strengthen value chains. It can increase the efficiency of AVCs, thereby reducing consumer prices. Scale can favor a more sustainable production of a wider range of products and the production of marginal products that would not have been profitable for one small company. Finally, consolidation can guarantee a higher quality of products, especially of animal products that require strict food safety and quality controls.

Still, vertical integration and consolidation may have some negative impacts:

- **Vertical integration:** In some cases, it can lead to the marginalization of small producers or to the loss of their independency if the production of the commodity at hand is prone to full integration by downstream actors, e.g. if it is easy to produce at large scale or if it presents high food safety risks that need to be mitigated through integration. In addition, producer prices can be reduced if primary production is left out of a vertically integrated AVC; or else, they should rather increase.

- Consolidation:** It can lead to a reduced choice of inputs/products, as highlighted by almost 60% of the respondents. Half of respondents also cited the marginalization of small AVC actors as an important negative impact. The impact of consolidation on input, producer and consumer prices is not considered as significant. Consolidation between global companies may not lead to increased consumer prices as they operate in global markets while consolidation among national or regional players may increase consumer prices. Finally, consolidation may have a negative environmental impact if it results in large farms using intensive production practices with high environmental impacts. For instance, some dairy companies consolidated into mega farms leading to large-scale soil and water pollution.



operate in global markets while consolidation among national or regional players may increase consumer prices. Finally, consolidation may have a negative environmental impact if it results in large farms using intensive production practices with high environmental impacts. For instance, some dairy companies consolidated into mega farms leading to large-scale soil and water pollution.

4. IMPLICATIONS AND OPPORTUNITIES

I. For agricultural value chain actors

The success of vertical integration relies on several conditions. It should benefit all actors involved and rely on strong corporate governance, trust, transparency, a committed management team, and good financials. If agricultural production is integrated, support to producers should be provided in the form of extension services or improved access to inputs and markets. Producers should not be pushed into specialization. When integrating production, relying on cooperatives is more successful than asymmetric relationships with individual farmers in order to promote sustainable cooperation. When managing farms in new areas, hiring local qualified employees is critical.

Consolidation can be successful if it occurs between companies that share the same values and expectations. A practical roadmap should be developed to leverage the synergies between the two companies and avoid losing their knowledge and know-how. In the case of an acquisition, the company that is bought should have the right incentives to contribute to the success of the acquisition. The acquisition of a company of a smaller size is more likely to be successful.

II. For impact investors

Vertical integration and consolidation provide new opportunities for long-term and large investments in structured value chains that provide traceable quality products. They increase the financing needs of well-established mid-size downstream companies that look for growth and better integration. Agriculture debt funds, such as those managed by responsAbility, have a key role to play as often such financing needs cannot be met by local financial institutions. Vertical integration also leads to better organized farmers' organizations that benefit from a more secure access to market and are increasingly professional, thereby becoming investable for responsAbility.

These trends also provide an opportunity to maximize impact. Through its financing, responsAbility can strengthen the ongoing process of vertical integration in developing countries and thereby enhance the efficiency and the resilience of value chains. Structured value chains are more resilient as they comprise larger firms that often have more diversified activities and bring higher value-added. In integrated value chains, responsAbility can finance downstream players which can improve the livelihoods of smallholder farmers upstream.

5. ANNEX - METHODOLOGY

The analysis is based on the interviews of 31 experts from small and large companies operating along AVCs - including producers, processors, traders and providers of agricultural inputs, processing equipment and packaging solutions - as well as from research centers, development finance institutions, investment funds and banks. The interviewees comprised some responsAbility's clients. The full list is detailed below.

Each interview was conducted over the phone by a research analyst from responsAbility based on two standardized questionnaires – one for companies and one for experts and development finance institutions – that included multiple choice and open-ended questions. Each interview lasted around one hour.

List of respondents:

1. **Jean-Claude Baur**, General Director – East Africa, Bühler AG
2. **Hans Bogaard**, Head of Agribusiness Advisory, Rabo Development
3. **Iride Ceccacci**, Principal Economist - Agribusiness, EBRD
4. **Amar Dani**, Chief Executive Officer, Dani Foods
5. **Reinier Douqué**, Head Agribusiness, Food and Water, FMO
6. **Guillaume Duteurtre**, Researcher in agricultural economics, economics and livestock policies, CIRAD
7. **Hatem El Ezzawy**, Managing Director, PICO - Modern Agricultural Company
8. **Elin Ersdal**, Investment Director - Agribusiness, Norfund
9. **Mella Frewen**, Director General, Food Drink Europe
10. **Michael Hamp**, Lead Technical Specialist, Inclusive Rural Financial Services, IFAD
11. **David Imbert**, Sustainability Analyst and Controller, Barry Callebaut
12. **Hanuman Jain**, CEO, Ecotact - Aarshivad International
13. **Ran Kadosh**, Head of Agro-Division, Amiran Kenya
14. **Max Kruse**, Vice President Agribusiness, IFU Denmark
15. **Prem Maan**, Executive Chairman, Southern Pastures
16. **Clément Marchand**, Senior Investment Officer – Manufacturing, Agri-business and Services (MAS), Proparco – AFD Group
17. **Jari Matero**, Senior Investment Officer, Agribusiness and Renewable Energy, FINNFUND
18. **Chrystel Monthean**, Value Chain Director - Crop Nutrition Segment, Yara International
19. **Paule Moustier**, Director of the joint research unit 'Markets, Organizations, Institutions and Stakeholder Strategies', CIRAD
20. **Stephen Mugisha**, Credit Support Manager, ACE Global Uganda
21. **Ulrike Nitsch**, Sector Expert - Agribusiness, Forestry and Food, DEG
22. **Alegria Sandoval**, Chief Financial Officer, Terra Fertil - Nature's Heart
23. **Juan Carlos Andrade**, General Manager Ecuador, Terra Fertil - Nature's Heart
24. **Sandra Yamile**, General Manager Colombia, Terra Fertil - Nature's Heart
25. **Vladimir Savic**, Senior Banker, European Bank for Reconstruction and Development
26. **Bernd Schanzenbaecher**, Managing Partner, EBG Capital
27. **Detlef Schoen**, Director, Aquila Capital Farms
28. **Adam Struve**, Investment Professional, International Finance Corporation
29. **Ronald van Marlen**, Director, TOPPAS
30. **Carl Wulfrank**, Head of Strategic Sales, Fair Fruit
31. **Matthew Yorke Smith**, Chief Operations Director, Coffee Planet

THE AUTHOR

Coralie David, Senior Agriculture Research Analyst



Coralie joined responsAbility in September 2016 as a Senior Research Analyst. She is responsible for assessing commodity risk, supporting portfolio allocation and origination strategy, and monitoring the development impact of responsAbility's investments in agriculture. She is an agro-economist with over ten years of experience. Before joining responsAbility, she managed agricultural development projects in several developing countries, after which she worked at the OECD where she developed standards of responsible business conduct in agricultural supply chains and led six reviews of agricultural investment policy in emerging markets. Coralie holds a master's degree of agro-economist from the National Institute of Agronomy of Paris, and a master in public administration and international development from the Harvard Kennedy School of Government.

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ABOUT RESPONSABILITY

Development investments – Investing for inclusive growth

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