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Financing the Food Value Chain

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Access to finance is always a top concern for enterprises because just as a car cannot run without oil, a business cannot develop and grow without financing. Sufficient funds allow companies to upgrade their machineries, adopt new technologies and hire top talents, which in turn increase productivity and profitability. In agriculture in particular, the need for financing is even more dire because of the inherent seasonality of its cash flows, and compounded if farmers have small landholdings and financial systems are primitive. Availability of finance and a robust financial system are important for the food value chain and, in general, for all businesses.

This policy brief seeks to better understand the role that financial services play in the food value chain. As in the previous policy brief on services[1], the paper starts with the description of a value chain example and identifies where and what types of financing are typically needed. Next, it discusses various financing instruments or financing structures that are used by financial services suppliers (i.e. lenders) to grant financing. Finance structures usually vary depending on the risks they are trying to mitigate. The following section reviews the challenges of getting finance, followed by discussion on risks and insurance in the food value chain. Finally, policy implications are discussed.

I. Demand for finance varies in various stages of the food value chain

At each stage of the value chain, different actors require different types of financing and reasons for seeking it. The suppliers of finance likewise change at each stage, and financing tools become usually more sophisticated towards the end of the chain, particularly if the product is for export. Using a coffee value chain as an example, Figure 1 illustrates the typical credit providers and those seeking finance, types of finance and the reasons for financing in the different stages of the value chain.

In the production stage, farmers, producers and cooperatives typically need credit for land preparation, purchase of inputs like seeds, fertilizers, pesticides, machinery, farm operation and harvest activities. At this stage, the borrowers are a mix of small or medium sized farms, as well as large plantations or factories. The amount of loan they seek may be relatively small, for example for purchase of seeds or fertilizers; or large and long term especially if it is meant for investment on machinery or upscaling their business. Various lenders involved can be banks, credit unions, microfinance institutions as well as informal lenders like private moneylenders and input suppliers.[2]

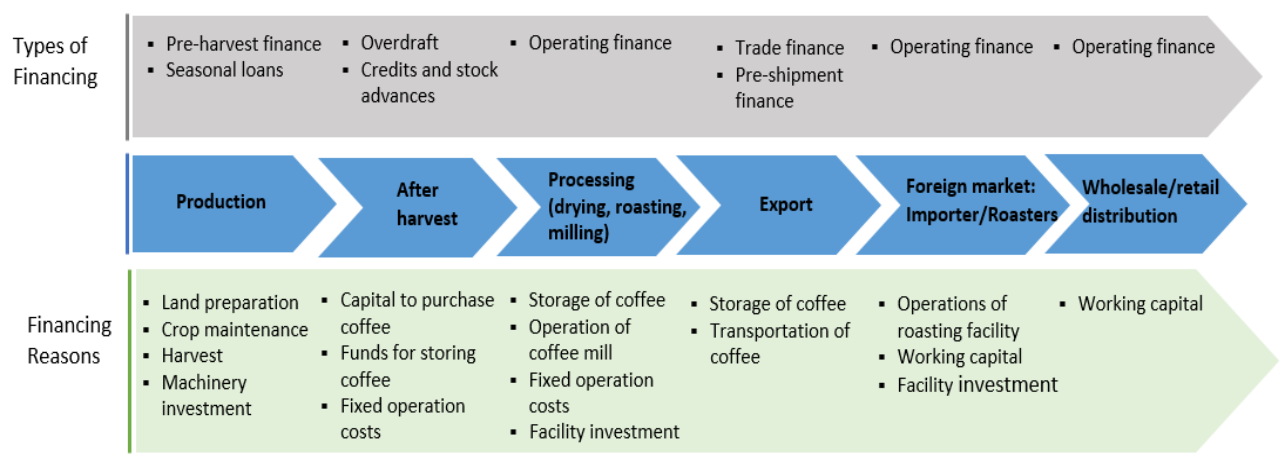
After harvest, traders, middlemen, exporters or cooperatives purchase or collect the coffee beans from independent farmers and producers, before transporting them in bulk to subsequent buyers. Integrated coffee farms will harvest and collect their own coffee themselves and store them for processing. In this stage, coffee purchasers may need financing to buy coffee beans and pay for expenditures related to storage and transport. Exporters can also get involved in granting finance from this point forward.

The chain then moves to processing (drying, roasting, and even milling). Sometimes, the coffee beans – either dried and/or roasted – are exported directly and milled in the overseas market. The need of financing at this stage is for purchase, storage and transport of the coffee beans as well as other operational costs. For processing factories, they may need financing for investment in facilities and equipment. Credit providers at these phases are typically formal financial institutions (FIs) like banks and credit unions, as well as large coffee exporters, multinational buyers and importers. The credit seekers tend to be also larger in size and possess more financial resources, compared to the independent farmers in the production stage.

[1] PSU Policy Brief No. 21 (2018). Services and the Food System. Accessed from: https://www.apec.org/Publications/2018/05/Services-and-the-Food-System

[2] World Bank (2015). Risk and Finance in the Coffee Sector. Accessed from: http://documents.worldbank.org/curated/en/742751467997014983/Risk-and-finance-in-the-coffee-sector-a-compendium-of-case-studies-related-to-improving-risk-management-and-access-to-finance-in-the-coffee-sector

Figure 1: Examples of Financing Activities Along Coffee Value Chain



Source: Authors based on World Bank (2015)

The domestic value chain may end with the export of coffee (either unmilled or milled). If unmilled beans are exported, the chain continues in the foreign market with either roasting or milling, then packaging and sale to either retailers or wholesalers. In this stage, the financing demanders (as well as suppliers) are relatively large and more sophisticated in the use of financing structures, including different types of trade financing. In some cases, they are very capable of financing their own operations.

II. Variety of available financing instruments depends on regulatory landscape and market sophistication

The availability of financing tools differs across the different stages in a food value chain, and their level of sophistication vary depending on the maturity of the market and the existing regulatory landscape. Credit demanders at the later stages (e.g. storage, processing and distribution) of the value chain often find it easier to get funds compared to finance seekers in the early stages, especially the production stage. Partly, this is because of lack of bankable collateral, particularly when talking about independent coffee farmers. While for players in the latter stages, the harvested coffee beans are already usable as collateral thus bringing down the risk for credit suppliers. This section takes a look at the various financing tools that are typically used in the food value chain.

Direct finance, or the conventional idea of getting loans from banks, is the most common and straightforward finance model. When approached for a loan application, banks and other FIs approve the loan based on its assessment of the financing risk, usually considering the applicant's risk profile (e.g. credit history), its balance sheet (if it exists), repayment probability based on projected cash flows, collateral values, etc. A desirable and qualified applicant for such direct finance normally would have diversified income sources in terms of commodities and/or activities, a sound cash flow status, basic ability to withstand risks and uncertainties, strong market demand for the products and proper collateral which allows the FI to reduce loss in the event of default.[3] A problem in many developing economies is that, besides the fact that the geographic location of banks is usually far from where the farmers live, farmers themselves may be anything but 'desirable and qualified' bank clients. Hence, often farmers use alternative sources of funding, including from informal lenders.

Along with direct finance, there are other financing models that are available at different stages of the value chain. These alternative models provide funds for buying inputs and financing operation relying on securities such as receivables or invoices, rather than on traditional physical collateral (for example land or equipment). They also focus not so much on traditional non-movable collateral but on the performance and viability of the whole transaction that is being funded.[4] Figure 2 below lists the common finance instruments applicable to each stage of a food value chain. We discuss four of them below.

[3] IFC (2015). Agriculture Lending: A How-To Guide. Accessed from https://www.ifc.org/wps/wcm/connect/88d4a7004a42ef7c800fbb10cc70d6a1/Agricultural+Lending-A+How+To+Guide.pdf?MOD=AJPERES

[4] FAO (2009). The Use of Structured Finance Instruments in Agriculture in Eastern Europe and Central Asia. Accessed from http://www.fao.org/docrep/016/ap294e/ap294e.pdf

Figure 2: Variety of Finance Instruments Along the Food Value Chain

Source: Authors based on FAO (2009)

Contract farming is an agreement between the farmers and buyers (usually large food processing companies or traders), for the buyers to take an agreed quantity of the product, say kilos of coffee, at a set price at the time of harvest. The contract can also require the buyers to provide specific inputs (seeds, fertilizers, etc) and financial assistance to the farmers and set quality standards for the products. This model improves efficiency and reduces risks for both parties, as it helps the buyers to secure their supply while also solving the input supply and financing problems of the farmers.

Warehouse receipts financing provides financing to a commodity owner based on an independent warehouse system's receipt. The FI extends credit to the commodity owner based on the valuation of goods, say coffee, that are deposited with an authorized warehouse. The issued warehouse receipt becomes a form of security and is used as a collateral for financing. The warehouse management is accountable for the safety, quality and quantity of the goods deposited. The FI gets its money back with interest, either directly from the buyer or from the original commodity owner, after the goods are sold. Once paid, the FI instructs the warehouse management to release the deposited goods to the buyer. However, if the loan were to default, the FI can use the receipt to gain control over the goods and sell them off to recover the amount it loaned to the original owner.[5]

Trade finance consists of a variety of short-term financing instruments that facilitate import and export. They can take the form of letters of credit (LCs), credit guarantees, factoring or other export/ import finance. The problem with some of these instruments is the length of time for shipment to take place and the possible conflicts that can arise from minimal discrepancies in export documents like LCs. Conflicts like this can lengthen the payment process to the detriment of small producers. Box 1 shows how the use of blockchain technology is paving the way for future streamlining of trade processes, thereby also lessening the risk of non-payment arising from document conflicts.

Box 1. Blockchain and trade finance

In May 2018, the world's first trade finance transaction using a single blockchain platform was claimed to have been completed by HSBC and ING Bank NV, backing a shipment of soybeans transported from Argentina to Malaysia. Originally, the exchange of paperwork and the issue of letters of credit (LCs) could take five to ten days, while with this single blockchain platform, which keeps all parties updated and connected in real time and removes steps of paper reconciliation, the exchange was completed in 24 hours.[6]

The adoption of blockchain technology[7] in the financial industry has many advantages, including real-time access and review of financial documents for different parties; reduced risk of fraud in LCs; decentralized contract execution, which means once the contract term has been met, the status will be updated in real time in the system without the need for human resources to monitor the delivery.[8]

Factoring is a financial transaction in which a commodity owner sells its accounts receivables or invoices at a discount to a third party (called the factor). It can sell with or without 'recourse' depending on whether the factor would take the loss from non-payment or inadequate payment of the invoice or not.

The examples of the four finance instruments illustrate how finance can be obtained from various sources with the involvement of FIs and different value chain players. There are many more variations of financing models that can be designed as Figure 2 illustrates, depending on the commodity, the situation or the risks involved in the transaction as well as the regulatory regimes in the financial system. For example, in some jurisdictions, warehouse receipts may not be

[5] Ibid; PSU (2015). Guidebook on Trade and Supply Chain Finance. Accessed from https://www.apec.org/-/media/APEC/Publications/2015/11/Guidebook-on-Trade-and-Supply-Chain-Finance/APEC-book-web.pdf

[6] For details see https://www.bloomberg.com/news/articles/2018-05-14/hsbc-says-trade-deal-shows-blockchain-viable-for-trade-finance

[7] Blockchain technology is based on the concept of a decentralized, distributed and public ledger which allows all parties to see relevant transactions. Records in the blockchain are, in principle, secured and thus difficult to forge.

[8] Deloitte (n.d.). Accessed from https://www2.deloitte.com/content/dam/Deloitte/global/Documents/grid/trade-finance-placemat.pdf

acceptable as collateral; therefore, it is not possible to offer warehouse receipts financing. In others, accounts receivables are not allowed to be sold or used as collateral.

III. Challenges of getting finance

Are farmers and those in agriculture underserved when it comes to receiving credit? This seems evident from the observed low value of credit to agriculture, forestry and fishing. In APEC economies, the highest percentage of agriculture credit to total credit is in New Zealand (15 percent) which means that 85 percent of credit in New Zealand are extended somewhere else in the economy. In Thailand and the United States, the percentage is less than one percent. Viet Nam's ratio is 10 percent while it is 7 percent in Australia.[9] While the ratio can also indicate that the industrial sector in some economies is just too large and thus absorbs most of the financing, it may also point to some existing challenges in getting agriculture credit in some economies. Below are some of the challenges found particularly in APEC developing economies.

1) Inadequate financial infrastructure

A sound financial system consists of good regulatory and legal mechanism, as well as the availability of institutions and infrastructure that support its smooth functioning. Credit bureaus and credit registries are examples of support institutions that facilitate obtaining of credit, while best-practice bankruptcy and insolvency laws balance the interests of credit providers with the needs of enterprises to be given temporary respite especially during business downturns.

Table 1 shows the diversity of financial infrastructure in APEC. For example, the percentage of population with bank account ranges from a low of 30 percent of the adult population to a perfect score of 100 percent. The same goes for credit and debit card ownership showing significant variation. In some economies, automated teller machines (ATMs) can be found all over, especially in city centers, while in some APEC economies 100,000 people share only eight ATMs.

The accessibility of financial infrastructure also requires convenient and efficient transportation and communication infrastructure. Especially in some remote or rural areas where physical financial branches are not available, transport and communications infrastructure are vital as they enable connections between the rural farms and financial services providers. Long distances, inadequate infrastructure, low population density, high operational cost together imply that the financial products available to the disconnected areas would be expensive.

Table 1: Financial Infrastructure in APEC Economies, 2017

	Lowest Value	Highest Value
Automated teller machines (ATMs) (per 100,000 adults)	8	276 (Korea)
Financial institution account (% age 15+)	30	100 (Australia, Canada)
Financial institution account, rural (% age 15+)	25	100 (Canada)
Debit card ownership (% age 15+)	21	97 (Canada)
Debit card ownership, rural (% age 15+)	14	97 (Canada)
Used a mobile phone or the internet to access a financial institution account in the past year (% age 15+)	4	74 (New Zealand)
Credit card ownership (% age 15+)	2	83 (Canada)
Credit card ownership, rural (% age 15+)	1	78 (Canada)

Source: World Bank Database;[10] World Bank Global Findex Database (2017)[11]
Note: ATM indicator does not include Chinese Taipei. Except for ATM indicator, other indicators do not include Brunei Darussalam and Papua New Guinea. Singapore is not included for all rural indicators since there is no rural population.

2) Information asymmetry and lack of credit reporting system

A flourishing financial market relies on a comprehensive and reliable credit reporting and information sharing system. To be able to evaluate the risk profile of borrowers, credit providers need the clients' credit history and other credentials. The credit market is prone to adverse selection risk which can be exacerbated by a non-transparent system. To minimize risk, FIs must spend time and effort collecting information and conducting background checks, which increase the cost of the transaction and delay loan disbursement. An interesting case study is how digital information can help address the lack of transparency in the credit market and create financing especially for SMEs (see Box 2).

[9] FAOSTAT, accessed 23 April 2018 from http://www.fao.org/faostat/en/#data/IC
[10] World Bank Database, accessed 28 June 2018 from https://data.worldbank.org/
[11] World Bank Global Findex Database (2017). Accessed 5 May 2018 from https://globalfindex.worldbank.org/node

Box 2. Transparency using digital information

In 2015, Ant Financial, China's e-commerce giant Alibaba's financial arm, launched its social credit score system, Sesame Credit, which is a credit score scheme for individuals and small and micro enterprises. This system was based on cloud computing and data analytics, using the data collected by Alibaba through its e-commerce platform as well as other information provided by the user. With Sesame Credit, Ant Financial invented a "310" credit model for its users: 3 minutes to apply for credit, 1 second to approve, and 0 people involved in the decision. Loans can be granted quickly and without human intervention because of the 'transparency' derived from the wealth of data collected.[12]

The Sesame Credit and this "310" credit model shows how technology can improve the efficiency of the loan approval process. However, this model has its own limitations. Sesame Credit is based on a credit calculation algorithm created by Alibaba, but how Alibaba gathers the information and how the credit score is created is non-transparent. Moreover, this service is only available to Alibaba users on whom the platform has some information on previous transaction history. Nonetheless, the use of such digital information to create credit scores for financing purpose is an alternative tool, especially in places where there is no credible credit bureau which can provide the needed transparency for making loan decisions. In economies where credit information system is developed, credit information from private e-commerce platforms can be utilized as a complementary measure when granting loans.

An effective credit reporting system can provide FIs access to accurate and complete credit information on individuals and firms, which can significantly reduce information asymmetries, lower transaction cost and minimize risks. Generally, there are two types of credit reporting agencies: credit bureau and credit registry. A credit bureau is an entity that retains a database about the creditworthiness of individuals or firms and enables the exchange of credit information between creditors. A credit registry, on the other hand, is a depository record of mortgaged collaterals with the corresponding security interests or liens. They facilitate the granting of loans on the basis of whether the offered collateral is unencumbered or not as recorded in the credit registry. Amongst APEC economies, several developed economies have established their credit bureaus with full coverage, i.e. covering 100% of the adult population, while other economies are still in their early development phase or have none of either.

3) Limited collateral management and warehousing capacity

For new financing structures to be available, a strong system has to be in place. For example, for warehouse receipts financing to become a financing vehicle in more economies, there is a need to have trustworthy warehouse operators and collateral managers and a legal system that preferably recognizes warehouse receipts as an asset or a document of title. However, in many economies, good warehouse operators are either not available or inadequately competent for the task. Besides the lack of collateral management capability, there are also few warehousing facilities in developing economies and lack of clear government regulations on standards of grading commodities. Overall, warehousing or collateral management is still a nascent industry in APEC.[13]

4) Underdeveloped financial market and limited financial products

In developing economies where the financial market remains underdeveloped, the financial products available in the market are typically limited and lacking in variety. When options are scarce, credit seekers are likely to find financing costly and not always suitable for their financial needs. An enabling business environment and regulatory system are both critical in developing more diversified financial products.

IV. Risks in the food value chain

Financial institutions are no strangers to risk. For every simple loan they make, they face the risk of debtor's default due to various factors. Risks associated with the food value chain are a major consideration when deciding on agriculture investment and the biggest consideration for FIs in offering financial services. Generally, the risks can be categorized into production risks, market risks, risks associated with assets, risks from natural causes and risks from the regulatory environment (see Figure 3).

Production risks: Such risks include situations where the production input becomes unavailable or extremely expensive that it interrupts the production process or renders production unprofitable. Likewise, pests and diseases could cause unexpected losses. Moreover, technical and

[12] Pasadilla, G., A. Wirjo & J. Liu (2017). Promoting E-commerce to Globalize MSMEs. Accessed from https://www.apec.org/Publications/2017/11/Promoting-E-commerce-to-Globalize-MSMEs

[13] Pasadilla, G. (2014). Regulatory Issues Affecting Trade and Supply Chain Finance. Accessed from https://www.apec.org/Publications/2014/11/Regulatory-Issues-Affecting-Trade-and-Supply-Chain-Finance

managerial ability directly decides the quality and smooth operation of all production processes. Limited capability or human error could lead to great loss in harvest.

Climate and natural disaster: Asia and the Pacific region is highly exposed to natural disasters such as typhoons, floods, droughts, earthquakes, volcanic eruptions and tsunamis. [14] The high exposure to disasters places the food system in a vulnerable position. Deadly disasters not only devastate the food production stage, but also break down the logistics and distribution chains.

Business and regulatory risks: Favorable environment such as facilitating regulations and friendly business environment promote the development of the food value chain. Restrictions of market access or non-tariff measures create unpredictability particularly for agriculture products that tend to be used as bargaining chips in trade disputes. Regulatory risks are out of the control of food chain players and cause great uncertainties.

Market risks: These include the fluctuations of commodity price, exchange rate, interest rates and other risks at the market level. Situations of new market entrants and unfair competition or surge of imports are potential risks for the value chain.

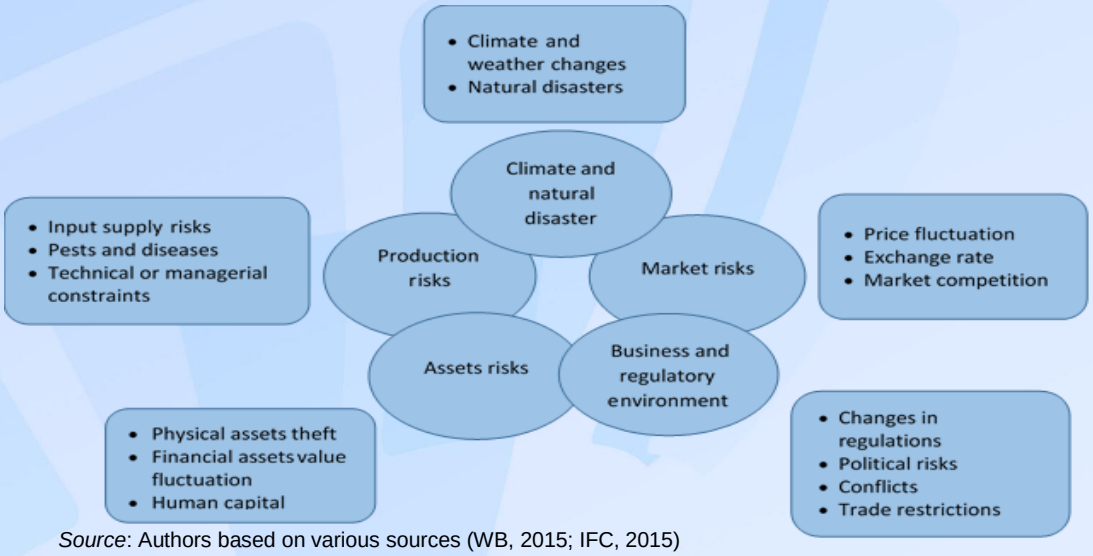
Assets risks: Machineries and products can be lost, damaged, or stolen. Financial investment value can fluctuate. Health problems or accidents can happen to farmers or company managers and affect the operation of the farms, warehouses or mills.

Risks in the food value chain are inherently interconnected as one risk would easily cause other risks and affect the whole value chain. For example, a devastating natural disaster could result in loss or damage of physical assets, accidents or death of key personnel and extreme fluctuation of market price. Vulnerability is high in the production stage because it is highly subject to the vagaries of the external environment and may be mostly comprised of small farms or companies which have weak ability to withstand risks. The high risk in the production stage also explains the fact that financing is more difficult to obtain at this stage, while it is more available further down the value chain (processing, export, distribution).[15]

V. Insurance services help mitigate risks but there are challenges

Since risks exist in the entire food value chain, insurance services are, in principle, needed at each stage. Arguably, the greatest risk falls in the production stage because weather and calamities are not within anyone's control. Over the last few decades, the insurance sector has seen rapid growth as public awareness of risks increases. An estimate by Swiss Re in 2013 showed that the global agriculture insurance premiums increased from around USD 8 billion in 2005 to USD 23.5 billion in 2011. [16] Among APEC members, Australia, Japan and New Zealand have a long

Figure 3: Risks in the Food Value Chain



Source: Authors based on various sources (WB, 2015; IFC, 2015)

[14] FAO (2011). Agriculture Insurance in Asia and the Pacific Region. Accessed from http://www.fao.org/docrep/015/i2344e/i2344e00.htm

[15] Ibid.

[16] For details see http://www.swissre.com/media/news_releases/nr_20130116_improving_food_security.html

tradition of agriculture insurance, while in other economies, the idea of agriculture insurance is relatively new.[17]

Various insurance products have been developed to mitigate and manage different risks faced by individuals or companies. Insurance policies on stolen, lost and damaged equipment, for example, provide a shield over costly physical assets and allow companies to claim their losses and revert to normal operation quickly. Health and life insurance, on the other hand, try to mitigate the loss from human capital and can be very important to those family-run farms or SMEs.

For the agriculture sector, insurance products fall into two major types: indemnity-based insurance and index-based insurance. The difference between the two types of insurance lies in how the claims will be calculated. In the case of indemnity-based insurance, the claim payment will be calculated based on the actual damage caused by certain perils (e.g. hail, rainfall, frost) covered in the policy, and therefore requires a loss assessment at the firm level. [18] In contrast, for index-based insurance, the claim payment is based on the value of a chosen index (e.g. the average area yield, the amount of rainfall) in a specific area (e.g. domestic economy, district), which means no firm-level assessment is needed. Index-based insurance is less administratively costly than indemnity-based insurance.[19] However, its main limitation is that the claim payment might differ significantly from the actual loss suffered by policyholders.

The potential function of mitigating risks and smoothing income can be realized if insurance services are accessible and affordable. However, as with other financial services previously discussed, challenges exist in accessing insurance services. First, inadequate infrastructure and technology prevent access to insurance especially from less urban areas. Advanced technologies such as remote sensing and satellite are important to record real-time data, assess the risk, and monitor weather and climate. Lacking such technology or technical talents limit the availability of many insurance choices.

Second, high premium is another reason why many smallholders and firms are uninsured. In areas where the exposure to risks is high, the premium for insurance products will accordingly increase for the insurance providers to attain profit unless government subsidy is available. At the same time, if premium is reduced, insurance companies compensate by imposing more deductibles thus often making the insurance product unattractive to farmers.[20]

Third, when claim procedures are complex and lengthy, they deter many people from acquiring insurance. Policyholders may opt to give up on the claims if they require preparation of tons of documents and other time-consuming procedures. Once farmers lose confidence in the claim process, they are less likely to ever get insurance again.

Finally, in many developing economies, especially in rural areas, farmers and firms still lack awareness of risk management and understanding of insurance's benefits.

VI. Summary

The availability and affordability of financial services are important for the smooth operation of the food value chain, ensuring productivity and promoting food security. Various financing tools have been used by different actors to meet their financial needs. Digital technologies, like e-commerce and blockchain, are starting to fill some financing gaps that traditional banks have not managed to address. However, risks are prevalent across all stages of the food value chain. Challenges such as insufficient infrastructure, information asymmetry and underdeveloped financial market contribute to the difficulties of getting financial services for different players in the food value chain.

There are a number of ways governments and policymakers can facilitate greater finance flows to the food value chain. First, to the extent that credit providers are encouraged to lend if the regulatory environment is such that they are able to mitigate their risks, then governments must look closely at how to improve their financial regulations and laws to encourage the use of asset-based lending.

Second, financial services now rely on modern telecommunications and internet connectivity to reach out to new clients and expand services coverage especially outside urban centers. Progress can still be made in many APEC economies to upgrade their telecommunications and finance infrastructure to promote better connectivity and financial inclusion.

Third, fostering competition in financial services by, for example, removing restrictions for foreign creditors to operate can benefit the demanders of

[17] FAO (2011).
[18] ADB (2017). Agriculture Insurance. Accessed from https://www.adb.org/publications/agriculture-insurance
[19] FAO (2011); ADB (2017).
[20] ADB (2017).

finance through availability of more options and cheaper financing alternatives.

Last but not the least, governments share the responsibility of raising the public's financial awareness and knowledge. Businesses and public sectors can cooperate in organizing public campaigns and courses for individuals and SMEs, particularly in rural and remote areas where awareness and knowledge of financial services are still scant. In APEC, the Finance Ministers' Process since the launch of 2015 Cebu Action Plan, has been making efforts in areas such as expanding financial literacy and inclusion and promoting an enabling financing environment for SMEs including alternative financing mechanisms.

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