Agriculture Value Chain Financing: An Analysis of India

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Abstract

Agriculture continues to be the mainstay of developing economies and is the predominant source of livelihood for people in the developing world, including Asia. However, the share of agriculture in the overall GDP seems to be slipping, and for developing countries like India, this calls for action. Value chain financing for agriculture as an approach is increasingly applied by the financial institutions and by those involved in value chains. Agriculture value chain covers the activities involved in moving the products from the farmers' fields to the consumers' tables. The paper is based on the premise that the role of funding is paramount to achieve growth in the agriculture sector, thus helping in poverty alleviation in India. I have highlighted the key value chain activities in context of agricultural products and have discussed the importance of value chain financing which requires due attention from national and regional level financing corporations.

Keywords: **value chain, value chain financing, agriculture value chain financing (AVCF), agriculture, credit, financial assistance**
JEL Classification : G20, O16

Value chain finance for agriculture has become a topic of interest for development agencies, and is an approach that is being increasingly applied by financial institutions, and by those involved in value chains. Value chain in agriculture is better explained by Miller (2012) as a supply chain in agriculture that can be thought of as a "farm to fork" process – from the inputs to production to processing, marketing, and the consumer. The value chain consists of a series of activities and relationships that add value to a final product, beginning with the production, continuing with the processing or elaborating the final product, and ending with the marketing and sale to the consumer or end user. The interdependent linkages of the chain and the security of a market-driven demand of the final product provide the producers and processors with an assured market for their products. This reduces risk, thus making it easier to obtain financing at a lower cost from banks and other financiers. The linkages also allow financing to flow up and down the chain. This is the convergence and inter-linking of agriculture business and finance. The flows of funds to and among the various links within a value chain comprise of what is known as the value chain finance. Stated another way, it is any or all of the financial services, products, and support services flowing to and/or through a value chain to address the needs and constraints of those involved in that chain, be it a need for finance, a need to secure sales, procure products, reduce risk and/or improve efficiency within the chain. It refers to both internal and external forms of finance:

i) Internal Value Chain Finance is that which takes place within the value chain such as when an input supplier provides credit to a farmer, or when a lead firm advances funds to a market intermediary.

ii) External Value Chain Finance is that which is made possible by value chain relationships and mechanisms: for example, a bank issues a loan to farmers based on a contract with a trusted buyer or a warehouse receipt from a recognized storage facility.

This definition of value chain finance does not include conventional agricultural financing from financial institutions, such as banks and credit unions, to actors in a chain unless there is a direct correlation to the value chain as noted above.

❖ **Value Chain :** The set of actors (private, public, and including service providers) and the sequence of value-adding activities involved in bringing a product from production to the final consumer. In agriculture, they can be thought of as a "farm to fork" set of inputs, processes, and flows (Miller & Da Silva, 2007).

❖ **Value Chain Analysis :** Is the assessment of the actors and factors influencing the performance of an industry, and relationships among participants to identify the main constraints to increased efficiency, productivity, and

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competitiveness of an industry and how these constraints can be overcome (Fries, 2007).

❖ **Value Chain Finance :** Financial services and products flowing to and/or through value chain participants to address and alleviate driving constraints to growth (Fries, 2007).

Value chain finance contributes to meeting the growing need for agriculture finance and investment in response to greater consumer demands for more processed or value-added products. From a development perspective, governments and support agencies must ensure that the financial systems in their countries are able to meet these demands arising from the growth of modern agro-food value chains.

Overview of the Indian Agricultural Sector

With 52% of the landmass as cultivatable land, variety of climate conditions and sunshine round the year, India has all necessary natural ingredients for becoming a leader in agriculture. India has 168 million hectares of arable land (second largest after USA), of which 60 million hectares is under irrigation, supported by well-established agricultural research system and a huge rural population. India decisively moved from food insecurity to a food surplus country that exports significant quantities of food. About 60% of the Indian population is estimated to be dependent on agriculture to a significant extent for its sustenance.

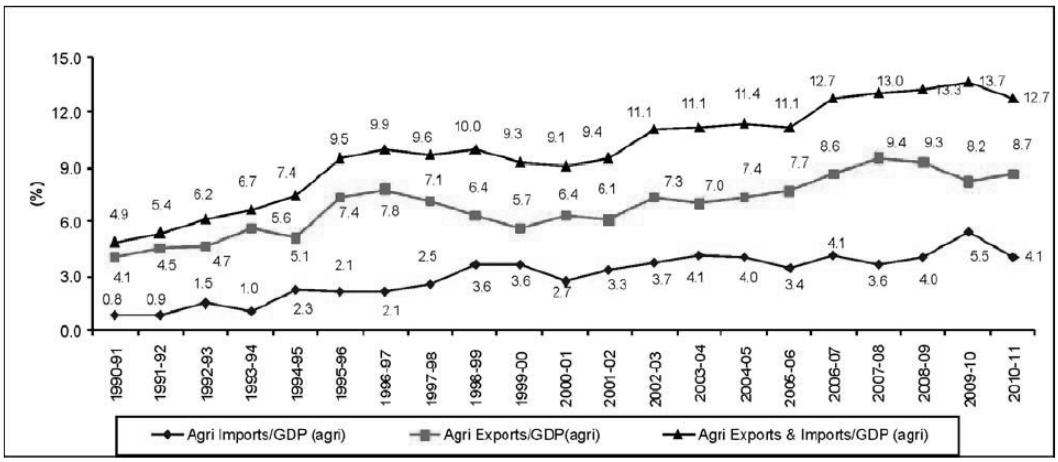
Table 1 : Overall Production of Agricultural Products in India

Crop↓ Country Rank (%age share of production)↓	Paddy	Wheat	Maize	Sugarcane	Groundnut
No. 1	China (29)	China (16)	USA (41)	Brazil (40)	China (40)
No. 2	India (20)	India (12)	China (20)	India (15)	India (15)
No. 3	Indonesia (9)	Russia (9)	Brazil (6)	Nigeria (8)	Nigeria (8)
No. 4	Bangladesh (7)	USA (9)	Mexico (3)	USA (5)	USA (5)
No. 5	Vietnam (6)	France (6)	Indonesia (2)	Myanmar (4)	Myanmar (4)

Source: indiastat.com

The Table 1 depicts the amount of production in agricultural products of India. It can be observed that India is the second largest producer of four out of five primary agricultural products. Also, the Indian agriculture sector has been increasingly exposed to global markets, with the ratio of agriculture exports and imports rising from 4.9% of agriculture GDP in 1990-91 to 12.7% in 2010-11. The growth and exposure to global markets can be identified from the following Figure 1.

Figure: 1 : Exposure of Indian Agriculture to Global Markets



Source: Srinivasan (2012)

Table 2 : Decreasing Share of Agriculture in Indian GDP	
Year	**Share of Agriculture (GDP%)**
1950-51	56.5
1970-71	45.9
1990-91	34.0
2000-01	24.7
2006-07	19.55
2007-08	18.51
2008-09	16.4
2009-10	15.7
Source: General Knowledge Today (n.d.) Retrieved from http://www.gktoday.in/gk/primary-sector-indian-economy/	

The Figure 1 depicts the exposure of Indian agriculture to global markets, and it can be observed that the share of agricultural exports rose from 4.1% in 1990-91 to 8.7% in 2010-11. But the rise has not been very steep, and corresponding imports have also increased. Although agriculture accounts for about 58% of the employment generated in the country, but this work force contributes only 15.7% of the GDP. This can be observed from the Table 2. The Table 2 has depicted the decreasing share of agriculture workforce to GDP of India. The share has declined continuously after 1950-51. The decline was observed due to fall in the production of agricultural crops such as oilseeds, cotton, jute, and sugarcane. Apart from the other factors, lack of access to affordable, quality, and full range of financial services translate into higher costs of poor producers in agriculture value chains. Agricultural finance is more than just finance; financial services need to be linked or integrated with other services, including input supply, post harvest and storage, processing, marketing, research and technology, training and extension, among others. Value chains in agriculture play a vital role as an approach to minimizing costs and risks of financing the agriculture sector. Thus, value chain finance is a potent tool for banks and financial institutions to design tailor-made financial services needed by the agricultural sector. There is a need to formulate new financial instruments to cater to the need of agriculture (Nagarajan, 2003 ; Nagarajan & Meyer , 2005).

The benefits of value chain financing approach to expand access to finance to the agriculture sector are - reduced transaction costs, improved product quality and delivery, safer, longer lasting relationships between players, and provision of a general framework to facilitate communication, problem solving, efficiency, and improved market competitiveness. Value chain finance offers an opportunity to expand the financing space for agriculture, improve efficiency, ensure repayments, and consolidate value chain linkages among participants in the chain. The specific opportunities that financing can create within and to a value chain are driven by the business model and the relative roles of each participant in the chain.

Literature Review

Rappaport (1986) advocated for value based management to create value in a business. Koller, Goedhart, and Wessels, (2010) also argued about transforming an entire organization into a value maximizing one using value based management (VBM). Value based management is an approach to management whereby the company's overall aspirations, analytical techniques, and management processes are all aligned to help the company to maximize its value by focusing management decision making on the key drivers of value. Value chain analysis approach has also been applied to agribusiness, and many studies have laid emphasis on the creation of value in agriculture with the help of providing development finance. Abrol (2000) in his paper summarized the status of agriculture in India. In this study, it has been observed that to increase the growth of this sector, there is need to push out yield frontiers, utilize inputs more efficiently and diversify to more sustainable and higher value cropping patterns. On the one hand, agricultural research will increasingly be required to address location-specific problems facing the communities and on the other hand, the systems will have to position themselves in an increasingly competitive environment to generate and adopt cutting-edge technologies to bear upon the solutions facing a vast majority of resource poor farmers.

Miller (2012) in his study focused on flexible value chain strategies for agriculture and the management of major

risks incorporating value chain finance viz. production, price, supply, climate, and marketing risks etc. He suggested capacity building for small producers and agreeing on key performance indicators before providing finance to the borrowers. The study also discusses the principles for development agencies like diversification, availability of infrastructure, supportive legislation, and understanding the limitations of the value chain. Srinivasan (2012) in his study analyzed the factors responsible for the slippage of share of agriculture in the overall GDP and the role of financing for sustainable development of agriculture with a focus on disadvantaged farmers and MSMEs, agriculture value chain finance, and its benefits for small holders. The study laid thrust on the role of mobile money in agricultural value chains and the need of financial innovation in continents like Asia and Africa.

Agriculture Value Chain Finance

❖ **Agricultural Finance :** Agricultural finance can be understood as a study that deals with finance at both the micro and macro level in the agricultural sector. The latter deals with aspects relating to the total credit needs of the agricultural sector, the terms and conditions under which credit is available, and the method of use of total credit for the development of agriculture, while the former refers to the financial management of individual farm business. AVCF, with its linkages and relationships among value chain participants, can contribute to credit worthiness and ,therefore, support the development goals of financial access and inclusiveness. It may start with embedded finance and develop a track record of responsibility and competitiveness to open more opportunities for external financing.

AVCF is an approach to financing. It uses an understanding of production, value added and marketing processes to determine financial needs and how best to provide financing to those involved. Many diverse and innovative financial instruments may be applied or adapted to fit the specific financial needs, and the commodities and cash flow projections can be used to secure financing and reduce risk. The various financial instruments which are often used in AVCF can be classified according to five categories depicted in the Table 3.

Table 3 : AVCF Financial Instruments

	Category	Instrument
A.	Product Financing	• Trader Credit
		• Input Supplier Financing
		• Marketing and Wholesale company finance
		• Lead Firm Financing
B.	Receivables financing	• Trade receivables finance
		• Factoring
		• Forfaiting
C.	Physical Asset Collateralization	• Warehouse receipts finance
		• Repurchase Agreements (Repos)
		• Financial Leasing (Lease-purchase)
D.	Risk Mitigation Products	• Insurance
		• Forward Contracts
		• Futures
E.	Financial Enhancements	• Securitization Instruments
		• Loan Guarantees
		• Joint Venture Finance

Source: Food and Agriculture Organization of the UN, 2008

The Table 3 lists 16 AVCF financial instruments grouped according to the nature of the instruments. These instruments have been designed to meet the specific demands of the clients as per their requirement.

❖ **Types of Value Chain Finance :** Value chain finance can be of three types:

i) Self-finance Value Chain Finance : Self-finance value chain finance is the financing mechanism wherein the farmers/producers finance the production by themselves. Under this financing mechanism, they usually utilize the retained earnings or savings and/or borrow from friends and family to finance the production. In most such mechanisms, the exploitation of producers by intermediaries and other players in the value chain is minimized; however, due to the limited amount of financing available, the producers' potential to realize full production and value from the production process is also minimized.

ii) Direct Informal "Within Chain" Value Chain Finance : Direct value chain or within chain finance refers to the financing arrangement whereby actors of the value chain finance the activities of the chain. In such a financing mechanism, the input suppliers extend credit support to the producers in kind such as seeds, fertilizers, equipment, etc. The producer, in turn, repays to the input suppliers either in kind (grains, agricultural produce) or in cash (obtained from the sale of the produce) at the time of the harvest. In many cases, this kind of financing mechanism can be intricately complex in nature where the aggregators and processors extend credit support to the input supplier who further extends credit support to the producers. The direct value chain finance consists of short term loans to ensure a smooth flow of products and to keep the activities going and the value chain functioning. This arrangement largely rests on the trust between the input suppliers and the producers.

iii) Indirect Formal Financial Services "from Outside the Chain" Value Chain Finance : Indirect formal financial services "from outside the chain" is a financing arrangement whereby financial institutions, non-actors in a value chain, finance the chain. The financial institutions become supporters of the chain in one-to-one relationships with players in the chain. In such a financing arrangement, as external formal financial institutions are involved in financing the value chain, it is called "outside the chain" finance or formal finance. The indirect finance may take various forms such as loans, savings, insurance and/or remittances. The key benefit of such a mechanism is that the financing is transparent in nature and risks of exploitation are considerably less. However, there are limitations in this mode of finance such as: high transaction costs, lack of information of creditworthiness of different players, lack of flexibility in designing tailor made solutions, and inadequacy of formal finance.

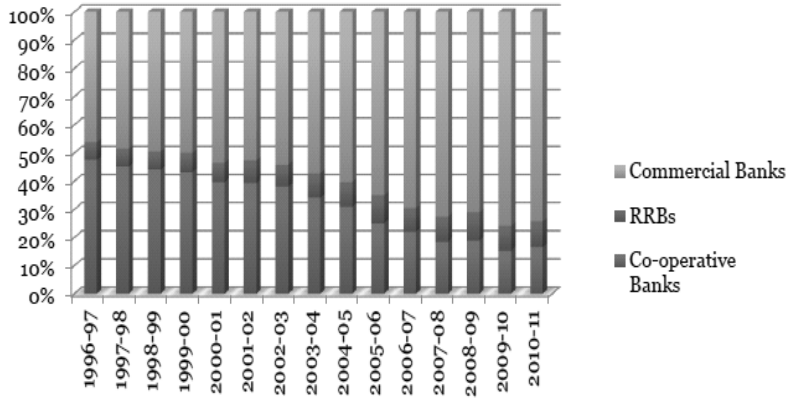
❖ **Agriculture Finance in India :** Finance for agriculture has been part of the priority sector to which banks are mandated to lend in India. Banks should provide at least 18% of their net credit to agriculture. With a major part of

Table 4 : Amount of Agriculture Credit Flows in India

Year	2002-03	2003-04	2004-05	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11
Credit Flow (Rs. Billion)	695.6	869.8	1253.1	1804.9	2294	2546.6	3019.1	3845.1	4682.9
Growth Rate (%)	12.1	25.0	44.1	44.0	27.1	11.0	18.6	27.4	21.8

Source: Srinivasan (2012)

Figure 2 : Share of Indian Banking Segments in Providing Agriculture Credit



Source: Srinivasan (2012)

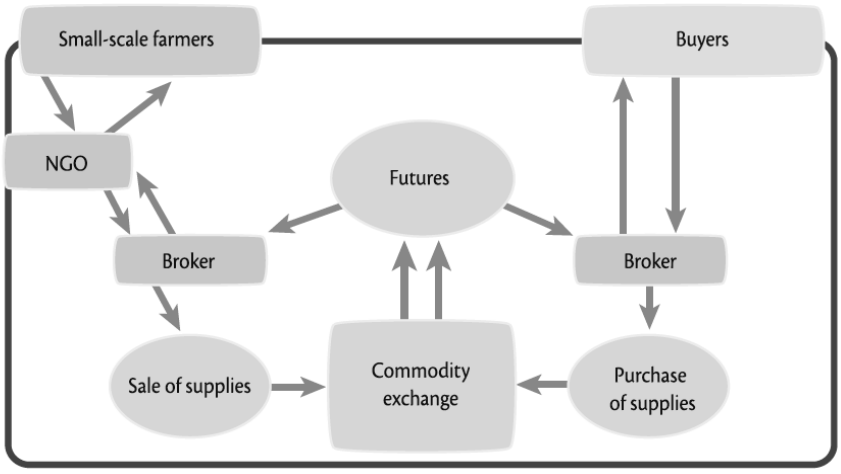
banking being in public sector ownership and a policy that has directed credit towards agriculture, credit flow has been reasonably good. In the last seven years, on account of special programmes, credit flow to agriculture witnessed high growth rates. The agriculture credit flows in India can be seen from the Table 4. It can be observed from the Table 4 that large amount of funds have been provided to the Indian agriculture sector, but the growth rate declined after 2006. Different segments of the banking system support agriculture through credit. The cooperative banks, which typically attend to small and marginal farmers, have been losing market share over a long period of time. The commercial banks, with their large resource base, have been expanding credit to agriculture. However, the Figure 2 depicts the share of various segments of Indian banking in providing agricultural credit.

The Figure 2 depicts the declining share of co-operative banks in providing agricultural credit and the dominant role of commercial banks in dealing with the policies relating to rural finance. RRBs have increased their contribution since 1996-97 with a small margin. Around 75 percent of the dealings are contributed by the commercial banks, and around 15 percent by the co-operative banks as per the 2010-11 data. Retention of value created in the chain at the farmer's level is possible only when their holding capacity is enhanced through finance. Banks have an important role to play in introducing such a product that would mitigate the losses. Ghai (2012) has highlighted the role of value chain financing in improving the growth of agriculture in India. However, the growth of value chain financing is in its nascent stages in our country.

❖ Status of AVCF in India:

1) In India, BASIX applies a price risk mitigation model. BASIX is an organization which offers training, finance and market access and has close links with many chains and agricultural commodity exchanges. Small farmers, many of them with properties of only half or one hectare, can make future sales through service kiosks. These are integrated sales in which farmers use purchase contracts to obtain credit.

Figure 3: Payment Flow of Agriculture Value Chain Financing



Source: Miller and Jones (2010)

The Figure 3 depicts the structure of agriculture value chain financing in India through the regulated commodity exchange. It can be inferred that the chain is lengthy, involving the pivotal role of the broker in arranging the sale and purchase of supplies along with entering into futures contract (used for hedging); which provides buyers to offset price risk of forward purchases with counterbalancing of futures sales.

2) Another interesting scheme is of the Yes Bank in India, with its agri-centers for small farmers. It has the largest agricultural portfolio in all of India, with the exception of the National Bank for Agriculture and, furthermore, is the best bank in India, according to one assessment. It uses a distinctly chain-based approach in which small farmers apply a commercial agro-industrial model. The idea is to find ways of grouping small producers into organizations, using the most efficient system, according to the economic activity involved. In the case of the dairy industry, for example, small

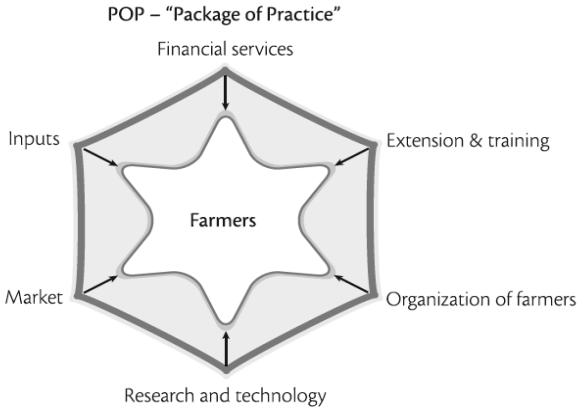
farming families usually have no more than one or two cows and it is not at all efficient to work with them directly or to guarantee the quality of their product. Therefore, these farmers form groups and become stockholders within an organization that will receive finance, and through it, they will also receive technical assistance to help guarantee the necessary quality. A lot of work is also being done using other models, both with small and large-scale producers (NABARD, 2012).

3) A different example is the e-Choupal initiative in India, an electronic platform that offers farmers information, supplies, and services to boost their productivity. Farmers can also make futures sales and use the contract as a loan guarantee, with automatic repayments.

4) Another interesting case of positive linkages between value chains and agricultural commodity exchanges in India is the National Commodity and Derivatives Exchange Limited (NCDEX), which helps to reduce the risk for all small stakeholders in the chains.

5) Finally, the POP model, or "package of practice," is a set of financial services for small-scale farmers that includes insurance, technical assistance, technology, and marketing. This model includes everything - it is a package of services. There are other examples of this model along similar lines, with electronic platforms linked to agricultural commodity exchanges, where everything is done electronically.

Figure 4 : Package of Practice Model of Financing



Source: Miller (2007, 2009, 2010)

As depicted in the Figure 4; the POP model offers versatile services to the farmers apart from providing finance to them.

❖ **Potential Role of Agriculture Finance :** The development of agriculture is very important for an economy like India, and providing finance for the agricultural sector will enhance the growth. Finance provided to agribusiness may play an important role in its upliftment as mentioned below :

(a) Productivity Enhancement: It plays a catalytic role in strengthening farm businesses and augmenting the productivity of scarce resources. When newly developed high-potential seeds are combined with inputs like fertilizers and plant protection chemicals in appropriate / requisite proportions, higher productivity is a natural outcome. Consequently, one can say that new technological inputs purchased through farm finance helps to increase agricultural productivity. In India, green-revolution technologies, involving high-yielding varieties, application of chemical fertilizers and modern pest control methods, coupled with increased capital investments on farms and in institutional infrastructure, have fueled structural transformation of rural areas. New technologies expanded agricultural production and induced demand for fertilizers, chemicals, and other purchased inputs. The rise in marketable surpluses led to increased marketing of agricultural inputs and outputs. More importantly, decisions about product choice and input use evolved from subsistence to a profit maximization orientation.

(b) Enhanced Farmers' Income: Creation of farm assets and farm supporting infrastructure by large scale financial

investment activities results in increased farm income levels leading to increased standard of living of rural masses.

(c) Balanced Regional Development : Farm finance can also reduce the regional economic imbalances and is equally good at reducing the inter-farm assets and wealth variations. Farm finance is like a lever with both forward and backward linkages to the economic development at the micro and macro level.

(d) An Enabler of Inclusive Growth and Poverty Reduction : As agriculture is still traditional and subsistence in nature, in many countries, agricultural finance is needed to create the supporting infrastructure for adoption of new technology building major and minor irrigation projects, rural electrification, installation of fertilizer and pesticide plants, execution of agricultural promotional programs, and poverty alleviation programs.

❖ **Business Model for Supply of Agriculture Finance :** Vast amounts of financial resources from governments and donors were poured into agricultural development banks and agricultural credit projects. These programs served as conduits for the provision of subsidized credit to small farmers, often for specific production purposes. It was argued that enhanced access to credit would accelerate technological change, stimulate national agricultural production through increased farm output, and improve rural income distribution. Paradoxically, in the directed agricultural credit approach, small farm holders were neglected by commercial banks due to high operation cost, information asymmetry, and the lack of tangible collateral (Srinivasan, 2012). As per a study conducted by ICICI Bank in India, for a loan size of ₹ 25,000, the transaction cost for the bank comes to 8.62%; whereas for loan of ₹ 10,000, it is higher at 21.56%. The causes of financial exclusion in the agricultural sector are summarized in the Table 5.

Table 5 : Causes of Financial Exclusion in the Agriculture Sector of India

Demand-side	Supply-side
• Stagnating productivity, decline in cropping intensity and yield	• No branches or limited network in rural areas
• Fragmented base of producers	• High covariant risk correlation when lending to farms: All borrowers are affected by the same risk, such as low market prices and reduced yield due to weather
• Disguised unemployment and low labour productivity	• Underdeveloped communication and transportation infrastructure
• Lack of irrigation potential	• Small sized average farms, low population density, higher loan servicing costs due to limited volumes and high information costs
• Inadequacy of post-harvest management practices leading to wastage of commodities	• Lack of collateral or adequate security
• Lack of considerable investment in infrastructure	• Lack of technical knowledge at the bank level to evaluate and analyze the creditworthiness
• Insufficient cash flow information and poor record keeping by producer and poor financial management	• No specialized product offered by the financial intermediaries to better meet the financing need of the agricultural sector
• Seasonality in businesses leading to suitability of non-standard and irregular repayment schedules	• High transaction costs due to wide client dispersion and less developed infrastructure
• Lack of collateral due to lack of or poor quality of farm assets and non-enforceability of security due to lack of land and property rights	
• Volatility in prices of commodities and poor market opportunities for crops	
• Inadequate or lack of access to extension, seed, irrigation, fertilizers, etc.	
• Inability of clients to prepare viable project proposals	

Source: Retrieved from http://www.rbi.org.in/scripts/BS_SpeechesView.aspx?Id=342

As reported in the Table 5, both supply and demand sides are responsible for financial exclusion in India. Where it is required to reduce the volatility in prices and act as a solution to irrigational problems on the demand side, financial inclusion is required to work at a fast pace to reach rural India. Apart from this, more financial innovations have to be

identified to meet specific demands of the farmers.

Analysis of Agriculture Finance

Agriculture finance suffers from various limitations on the part of the suppliers and the users (farmers). The limitations and hurdles can be summarized as follows :

Limitations faced by the Borrowers

1) Small sizes and unregistered formats, very little documentation, accounts not properly audited, incomes are suppressed to evade tax and a general state of records that will not give bankers the comfort to lend.

2) Weak organizational capacity, geographical isolation, and lack of basic business skills such as strategic planning, record-keeping for financial reporting and analysis, human resource management, and marketing for agro-based enterprises.

3) Complexity of businesses – agro-based MSMEs are complex to assess and appraise as they fall out of the pack of traditional businesses financed by banks.

Limitations faced by the Financiers

1) Agriculture is perceived as a low-margin business by financiers.

2) Lack of availability of products that meet the needs of appropriate, adequate, and timely credit.

3) Lack of a robust business model, and flexible products and delivery processes which support agro-based enterprise financing.

4) Lack of appropriate risk-mitigation measures and mechanisms.

5) Lack of infrastructure such as bank branches at the 'last-mile'.

6) High cost of credit coupled with lack of collateral and collateral substitutes.

7) Limited access to equity capital – venture financing in traditional agro-based MSMEs industries is non-existent, and availability of risk capital is very difficult despite a plethora of government-supported schemes.

Conclusion

During the 1990s, microfinance emerged as another popular business model to provide financial services to low income households in all the developing countries. However, since this model was primarily designed to take care of very small loan requirements of rural households, the chronic gap between the demand and supply of agricultural credit continued. By design, microfinance cannot become a sustainable business model to provide financial services to small farmers. Microfinance rests on frequent repayments, whereas most of the agricultural activities show seasonality in the operations, and are by their very nature, for a longer term. From the foregoing discussion, it is clear that the banks should :

1) Finance groups of women, farmers, etc. with a view to reduce their transaction and risk costs and increase banking outreach to a larger number of customers.

2) Identify crops and activities that need long term loans and prepare farm models to establish the viability of such activities.

3) Introduce cash credit type of rollover credit facilities to effectively support multi-activity farms.

4) Introduce credit product to support post-harvest holding of crops at farms and handling of crops at aggregators' levels.

5) Re-examine their policy on loan collateral and actively pursue collateral substitutes in its own interest.

6) Finance marketing infrastructure that is commercial such as warehouses, cold stores, transport vehicles, cool chains, etc. to link producers and traders with the broader market.

7) Across all the foregoing, financing within identified value chains that have good backward and forward linkages

will reduce risks of banks and improve incomes of value chain participants.

Research Implications

Value chain financing has emerged as another business model to provide financial services to different players in the agriculture sector in general, and to small farmers, in particular. This model deviates from the individual lending model as decisions about financing are based on the health of the entire value chain including market demand, and not just on the credibility of the individual borrower. This model has potential to overcome the deficiencies of the individual lending model adopted earlier in most of developing countries.

The key factors for improving the agriculture value chains have been identified as : Continuous market-based information on the chain is important for all partnerships based on mutual trust with interrelated systems that reduce risks, reduce transaction costs, finance within or outside the chain, structuring of financial products appropriate to the chain.

Scope for Future Research

Many previous studies have examined the role and importance of value chain financing in the development of agriculture. But in the context of the present study, extensive study is required to solve the issues involved in rural and agriculture finance in India, and the changes required in the regulatory framework to support financial institutions serving the rural areas. As envisioned by Pischke (1991), new ideas should be developed for extending the financial frontier and creating a product and institutional design carefully based on theoretical and empirical studies.

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