Agri-Value Chain Financing (AVCF)

A Case Analysis: Agri value chain financing (AVCF) of paddy cluster in Deoria District (U.P.)

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BANKERS INSTITUTE OF RURAL DEVELOPMENT

(Designated Nodal Training Institution at Central Level by
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FOREWORD

Rural agricultural producers/farmers are the focal points for most of the value chains. Facilitating them to capture market opportunities, get fair deals and produce higher-quality products go a long way in improving the efficiency of the value chains. Closer business links between the primary agricultural producers, agro-processors, exporters, traders and retailers provide significant potential for improved and increased employment and economic returns for rural producers.

Small producers face multiple obstacles in entering local value chains, from high transaction costs, to insufficient access to financial and other assets such as storage facilities and infrastructure. Development of inclusive and efficient agri-value chains can help smallholder farmers to transit out of subsistence farming and reap just and equitable gains that well-functioning value chains offer. Developments through integrating agricultural activities in value chains have emerged as a sustainable mode of financing.

Agricultural value chain financing (AVCF) mode is still in the development stage in India. According to different sources of funds, agricultural value chain financing can be divided into internal financing and external financing. Practice has proved that the financing mode of agricultural value chain plays a positive role in reducing credit cost and business risk and it improves agricultural financing environment.

The present financial issues in institutional credit for the Indian agriculture is the efficiency of credit system, inclusiveness and sustainability. These attributes are directly related with the effectiveness and efficiency of the agri-value chains. Fragmented agri value chains in India especially in grain, oilseed and horticulture sectors create barriers for accessing formal credit to meet internal and external financing for smooth functioning of the agri value chains.

In this backdrop, BIRD, Lucknow conducted a quick case analysis for agri-value chain financing in paddy cluster in Deoria District (Uttar Pradesh) for assessment of enabling environment, barriers and opportunities for harnessing the Agricultural value chain financing (AVCF).

My deep appreciation to Shri Prafulla Ranjan Jha and Shri Rajesh Yadav, Faculty Members of BIRD, Luckonow for bringing this case analysis, which will be immensely useful for stakeholders involved in AVCF.

Shankar A Pande
Director
BIRD, Lucknow
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EXECUTIVE SUMMARY

Despite the overwhelming growth of the agricultural credit in India due to the various landmark policy decisions undertaken by Government of India, creation of innovative institutional development models and technology infusion in rural financial sector there are still challenging issues of inclusive credit outreach, credit efficiency, credit delivery mechanism and optimization of the financial instruments.

As per the NAFIS Report 2016-17, the average loan taken by agricultural households indicated that 72 per cent of the credit requirement was met through institutional sources and 28 per cent from non-institutional sources. Further, in the absence of a proper legal framework and lack of records relating to their agricultural activity, tenant farmers/ share croppers/ oral lessees/ landless labourers face difficulty in accessing institutional credit. As per PSA Annual return (2015-16), only 41 per cent of small and marginal farmers could be covered by public and private sector banks. Besides these problems and challenges of accessibility in credit, the share of credit to allied activities i.e., livestock, forestry and fisheries was sub-optimal compared to its contribution to agricultural output.

Some of the states are getting much higher share, as high as 10 per cent of total agricultural credit compared to other states getting as low as 0.5 per cent. Also, in some states, viz., Bihar, Chhattisgarh, Jharkhand, West Bengal, etc., bank credit was not proportionate to their share in agricultural output.

Inclusive outreach of agriculture credit and its accessibility especially for 86% of small and marginal farmers in conjugation with diminishing profitability of the agri-farm on account of the fragmentation of the land resources and cost of means of production along with fragmentation of the economic rent are the major challenges.

RBI has also made policy advocacy for adopting aggressive efforts to improve institutional credit delivery through technology driven solutions to reduce the extent of financial exclusion of agricultural households. Banks should explore collaborations with agri-tech companies/start-ups so as to provide access to credit in an integrated, timely and efficient manner to the farmers.

However, some of the new generation hybrid cooperatives (FPOs) have started creating ***tight value chains*** because of value chain integration by replacing one or combination of the value chain actors, strategic partnering with public and financial institutions, integration of input management, credit, technology transfer, collective marketing and risk mitigation measures; in their business operations. These are the essential enabling environment for success and harnessing "***agri value chain financing".***

To explore and validate the characteristic transformation in prevailing agri and allied agri-value chains on account of promotion and development of FPOs, a quick study on "***Agri value chain financing (AVCF) of paddy cluster in Deoria District (U.P.)"*** has been conducted by BIRD, Lucknow.

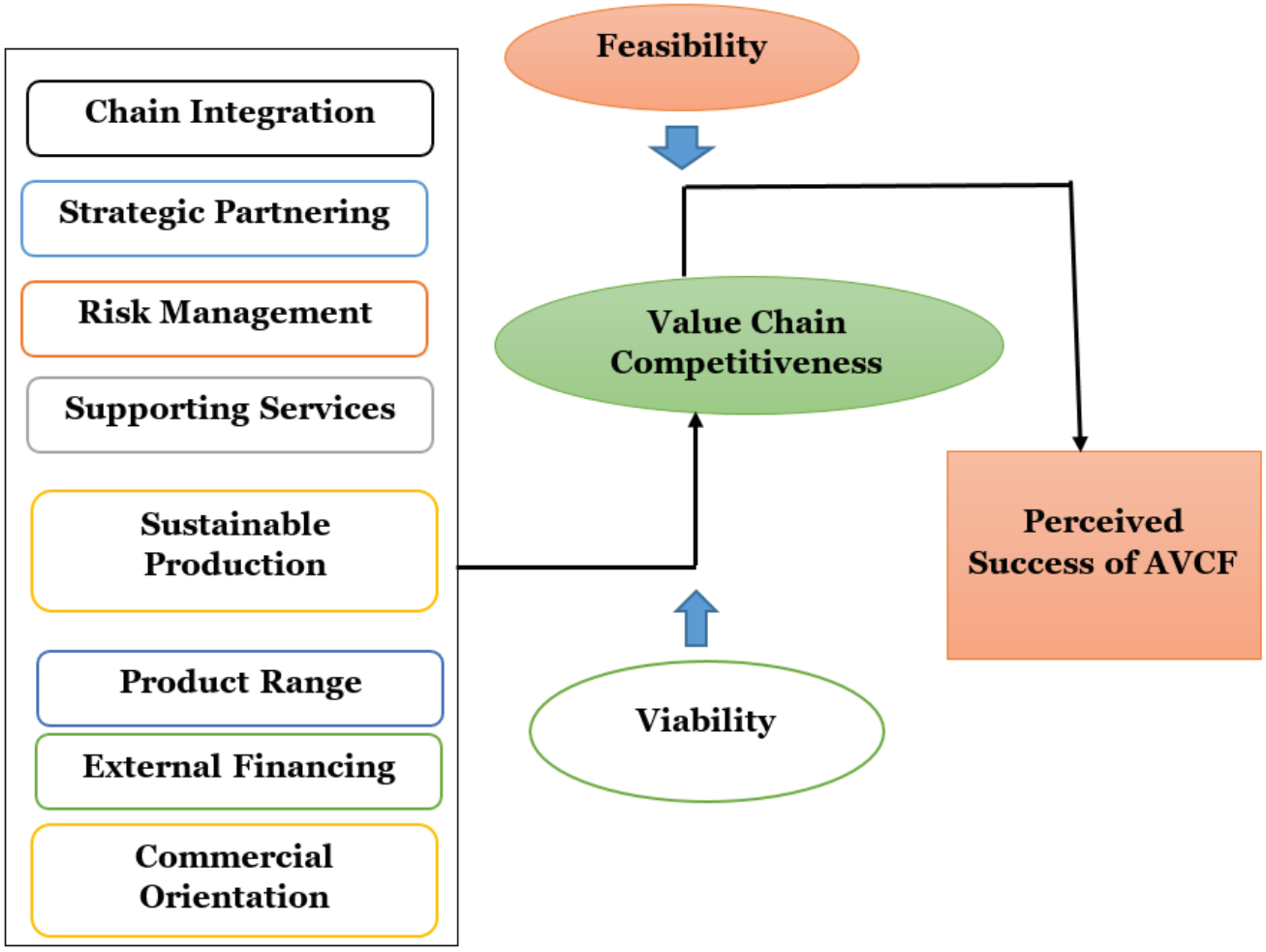
It is observed that *alternative tight agri-value chain* of paddy crops through FPO as an anchor value chain actor is found suitable institutional model by integrating agri-value chain actors (Input supplier cum trader cum wholesaler (paddy) cum Rice Miller cum Wholesaler-Rice) for AVCF opportunities and enhancing external credit. Extending the group mode of repeated finance (receivable finance) and receivable finance/investment credit by IDBI, DCCB, Sammunati Finance Ltd. and SBI, respectively, has validated the success of the AVCF model.

Introduction

Apart from input management, technology transfer, marketing and risk mitigation measures, credit outreach is one of the vital pillar for the growth of agriculture and allied agriculture activities. However, isolated and value chain finance have their own positive and negative aspects and their success depends upon the various dependent and independent variables. For examples, in loose agriculture value chains isolated finance is generally working smoothly while in case of agri-value chain finance tight value chain is prerequisite for the success of AVCF. For modeling of any AVCF model for a particular ecosystem comprising various independent variables, needs to be analyzing to find out critical gaps in each node of the agri-value chains and its possible solution through the feasibility and assessment of economic viability to make more competitive agriculture value chains.

Theoretical Model of the AVCF

Independent Variables	Intervening Variables	Dependent Variables



Effect of independent variables on AVCs

Chain Integration : The interdependent business relationships which develop as a result of increased levels of chain integration ultimately have the ability to improve the creditworthiness of agricultural producers (Sudha and Kruijssen, 2011).

Strategic partnering : From an operational and credit risk perspective, specialized, nonfinancial chain actors are ideal strategic partners for financial institutions that want to broaden the distribution of financing services to agricultural producers (Gowa, 2013).

Risk management : Secondary agribusinesses are ideally suited to assist producers in managing risk. Their role in risk management models that have the ability to reach large numbers of rurally based small-scale producers is widely acknowledged, with authors such as Konig et al (2013).

Supporting services : Agricultural producers need a range of sector-specific supporting services which include technical expertise, reliable market information and ongoing access to production inputs. As a result of the declining role and capacity of the state, the competitiveness of agricultural producers is currently limited by restricted access to these types of supporting services (McMahon, 2012), which according to Konig et al (2013) is especially relevant with regard to small-scale producers.

Sustainable production. For the agricultural sector to sustain food production at increased levels it is important to adopt productive, competitive and efficient practices, while protecting and improving the environment and the global ecosystem as well as the socioeconomic conditions of local communities (which include the agricultural producer) in line with human dignity (Häni, 2006).

Product Range : The lack of penetration of commercial bank lending, especially in developing countries, is due to an array of structural factors, which according to Konig et al (2013) include a lack of financing products tailored to the specific risks and cash flow patterns of agricultural enterprises. Financing needs do change with financial, economic and institutional developments (Miller and Jones, 2010).

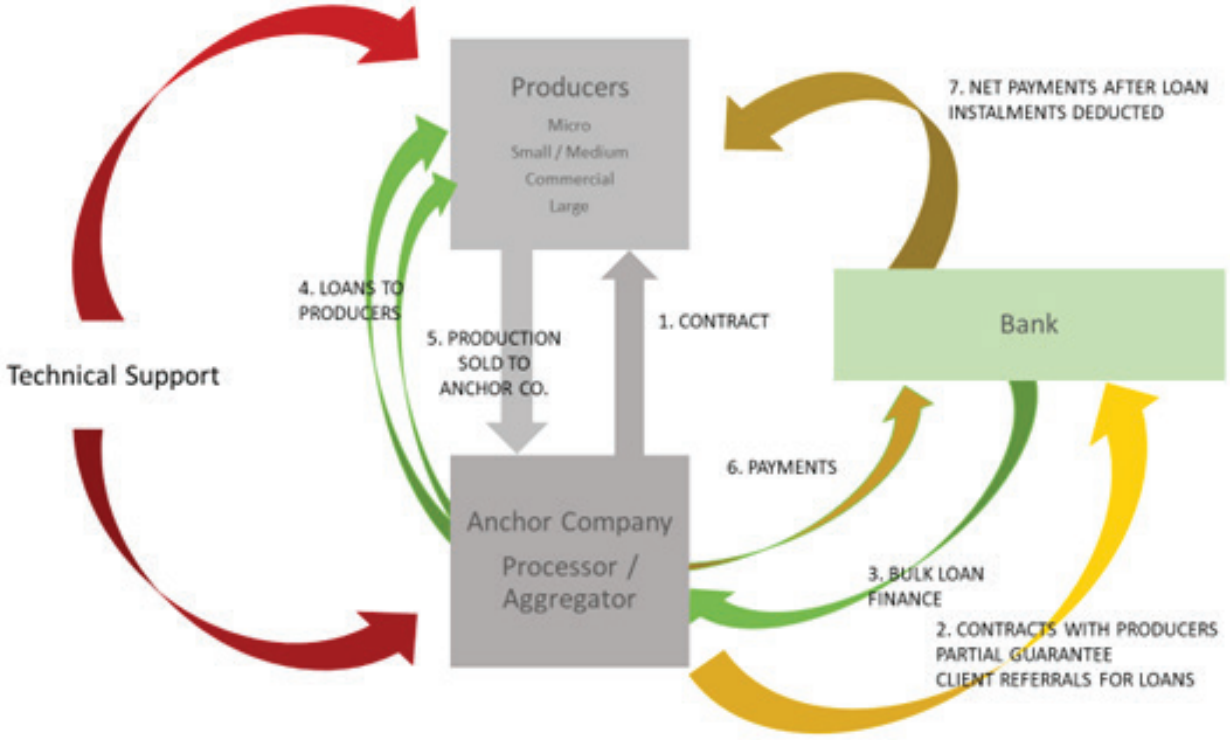
External financing : Although downstream companies such as secondary agribusinesses are already playing a notable role in agricultural lending, the level of financing is limited to the amount that these agribusinesses can borrow on the strength of their own underlying financial position (Miller and Jones, 2010).

Illustrative models of AVCF

Model #1

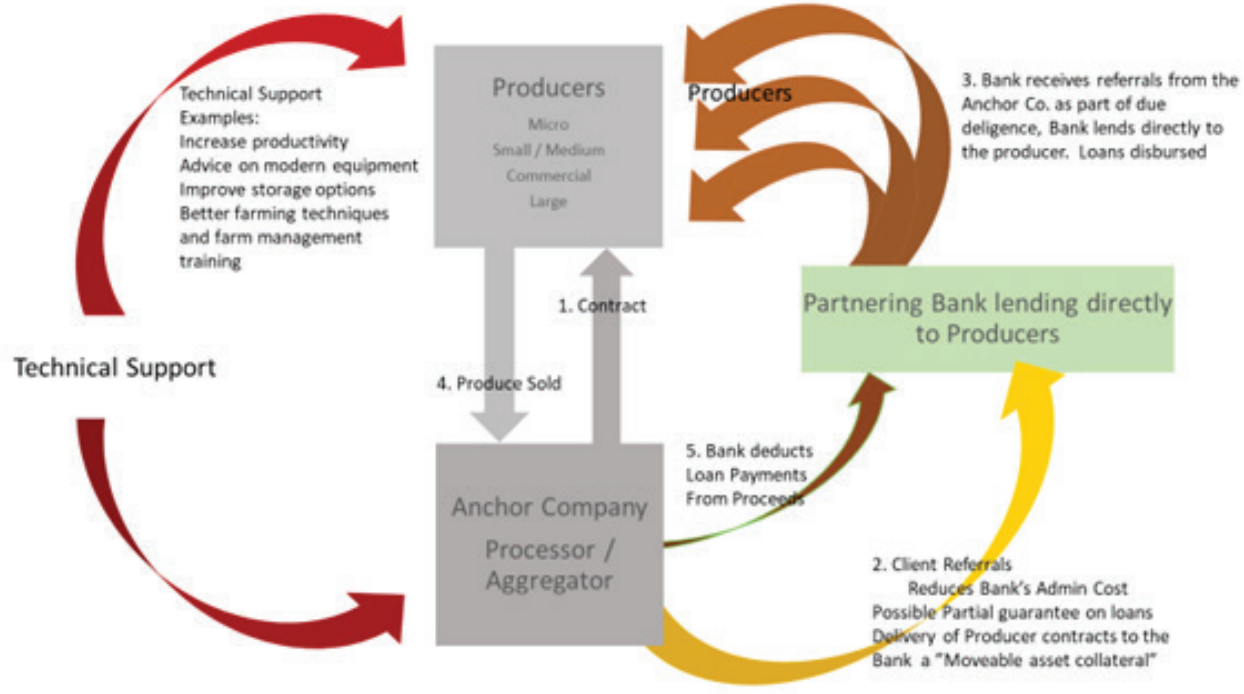
Bank's full engagement with a processor/aggregator. Bulk loan to an anchor company who then lends to producers/suppliers in their supply chain. Producers sell raw material to the anchor company with proceeds from sales, minus loan payments, deposited into a producer's bank account

1. Anchor Company and producers enter into contract
2. Contracts are shared with the partnering financial institution (Bank)
3. A bulk loan is made to the Anchor Company who will manage the loan
4. The Anchor Company offers financing, on-lending to producers in the supply chain
5. Production is sold to the Anchor Company
6. The Anchor Company makes payments into Producer accounts with the partnering bank minus agreed upon finance payments
7. The residual funds are available to the producer in their bank accounts
8. *In additional usually technical assistance is needed at the beginning to support both the Anchor Company and producers in the supply chain.*



Model #2

A Bank partial engagement with the Anchor Company. Partnering bank issues loans directly to the producers in the value chain based upon Anchor Company contracts and due diligence. Proceeds from sale of goods to Anchor company are deposited into Producer bank accounts.



1. Anchor Company and producers enter into contract
2. Contracts are shared with the partnering financial institution (Bank) referrals
3. Using the Anchor Company contracts with the producers as collateral (Moveable asset) and referral, due diligence, the Bank issues a loan to the producer
4. The Producer delivers goods as per the contract
5. Proceeds from the sales of goods are deposited into the Producer's bank account. The Bank and Producer agree upon the loan payment amount and the residual is available to the Producer

Additional Bank services are available to producer, ex: savings, transaction accounts other credit products

Producers

Benefits

- Increased access to finance
- Loan payments made with delivery of production to Anchor Company
- Enables growth in assets and income
- Alternative collateral, "Moveable asset" contract with Anchor Company
- Improved relationship with Anchor Company
- Training integrated to upskill producer
- Flexible finance terms, interest rates more competitive

Obligations

- Formal supply contract with Anchor Company
- Formalize business transactions, payments through a bank account
- Increased monitoring and transparency

Anchor Company

Benefits

- AVCF is expected to boost production volumes, stronger supply chain
- Quality controls added
- Loans structured to smooth out seasonality issues and boost production
- The facility will strengthen relationships and loyalty
- Training integrated to upskill producer

Obligations

- Sign an agreement with the bank, may include Risk Underwrite
- Enter into formal agreement with the producer

- Make recommendations (due diligence) on suitable producers for financing
- Assist control of loan disbursements and ongoing monitoring of performance
- Agree to make payments on delivery thru bank account
- Provide technical support, training to producer

Banks

Benefits

- The agreement with Anchor Company and risk underwrite enable a much wider range of finance applicants
- The Bank has a greatly improved information flow on the borrower with effectively monitoring thru sales
- Uses crops and supply relationships as collateral “Moveable assets”
- Improved relationships with the Anchor Company
- Increase new bank accounts numbers and opportunities to cross sell services

Obligations

- Sign agreement with Anchor Company
- Process loan applications in partnership with the Anchor Company
- Document loans and manage loan pay-outs
- Establish bank accounts for applicants
- Manage loans and liaise with the Anchor Co.

Agricultural Financing models can greatly improve relationships in the Value Chain increase productivity, effectively manage risk and increase access to finance for participants in the chain.

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A case analysis to formulate AVCF model for wheat, paddy and Poultry cluster in Deoria District

Considering the importance, implication and effect of independent variables for assessment of intervening variables (feasibility and viability) to achieve perceived success of AVCF model, a cluster of wheat and paddy growing area in Deoria District (UP) has been selected.

1. Independent Variables

Chain Integration	Integration of economic activities pertaining to input supplier, commission agent, trader, wholesaler and processor through business participation of the producer through institution development (formation of FPO) in prevailing agri-value chains. Resulting producer are allowed to share high value market.
Strategic Partnership	Partnership with Civil Supply Department and FCI for accessing end market and financial arrangements with the financial institutions to scale up the business.
Risk Management	Optimization of price volatility especially just after post- harvest seasons and developed a mechanism of utilising by products through re-processing for production of animal feeds.
Supporting Services	Capacity building, formulation of the project report, technology transfer, input facility, storage facility, input credit are the supportive service are being extended by FPO.
Sustainable Production	Producer are adopting productive, competitive and efficient practices. Apart from that, FPO has started seed production in producer field, which would be procured through by back arrangement, processed, stored and marketed in coming seasons with the help of installed seed processing unit.
Product Range	Though FIs extending KCCs to producer, cash credit and investment credit to FPO but there is need to improved modified tailor made KCC product.
External Financing	IDBI, DCCB, Sammunati and SBI are the FIs extending value chain finance for scaling up the FPO business.
Commercial Orientation	Feed business, procurement, processing and collective marketing of wheat, paddy, rice, broken rice, husk, bran, raw material of the animal feed leads to commercial orientation of the FPO. FPO has started supply of processed products in local market on small scale and would be scale up in due course.

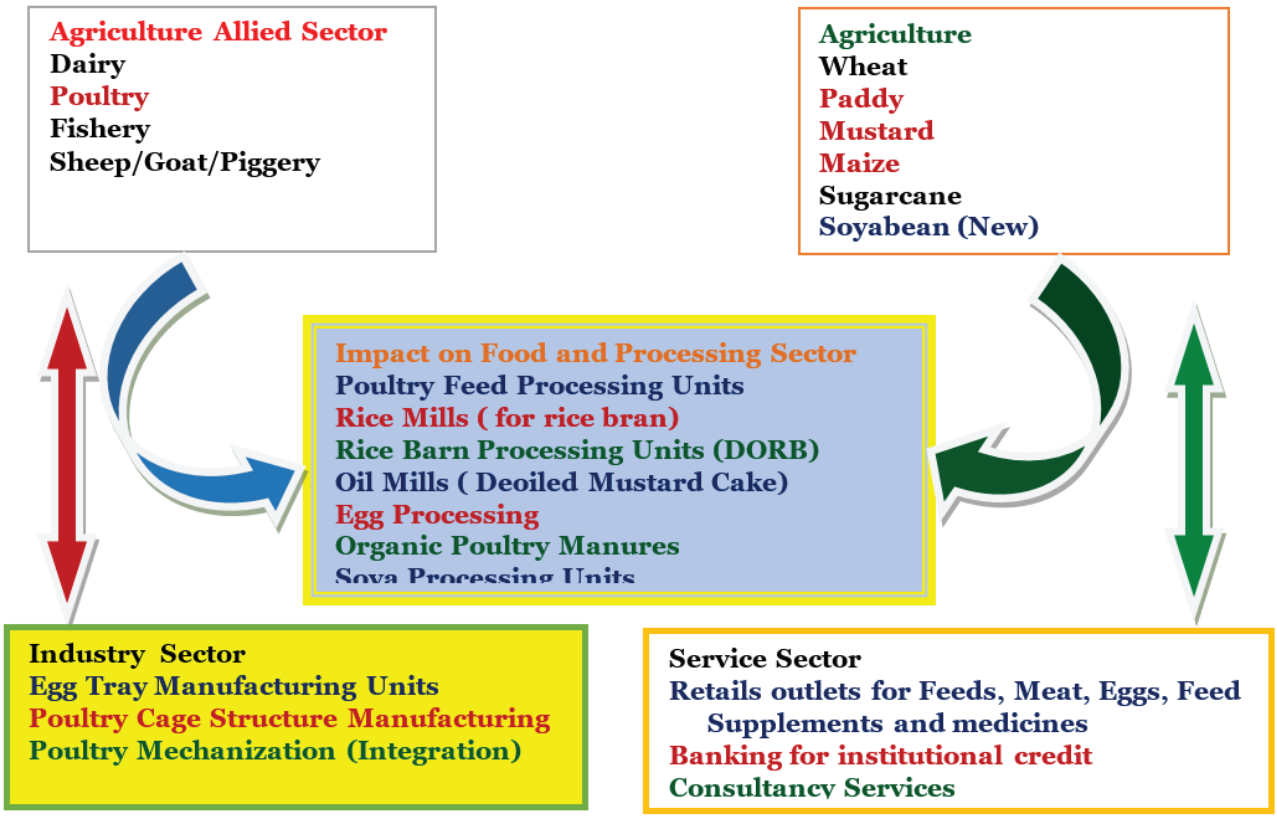
II Intervening variables

A) Feasibility

Economic size of the poultry industry of district Deoria, UP

Particulars	Unit	2011	2016	2018	2019
Poultry Layer Units	NO	10	150	200	250
Poultry Layer Birds	NO	53530	1000000	1500000	2000000
Poultry Broiler Units	NO	340	1200	1000	1000
Poultry Broiler Birds	NO	172052	1200000	1000000	1000000
DOC Business	Rs. in Lakh	225.29	2352.78	1725.00	1900.00
Poultry Feed Business	Rs. in Lakh	1121.95	11351.91	12628.67	15983.81
Poultry Meet Business	Rs. in Lakh	1083.93	8640.00	7200.00	7200.00
Poultry Eggs Business	Rs. in Lakh	485.38	8402.60	14235.00	18980.00
Poultry Support Services	Rs. in Lakh	86.03	600.00	500.00	500.00
Total Poultry Business*		**3002.58**	**31347.29**	**36288.67**	**44563.81**

Ecosystem of the industry



Business Opportunities for wheat, paddy, maize producer in district

Out of Rs.126.28 crore poultry feed business,

- Rs.50.18 crore pertains to maize,
- Rs.6.79 crore to de-oiled mustard cake,
- Rs.9.09 crore to de-oiled rice bran,
- Rs.1.71 crore to rice bran and
- Rs. 0.45 crore to broken rice,

- *All are essential and major raw ingredients of poultry and animal feeds*.
- Now initiatives can be started to undertake vertical integration of poultry sector with agriculture and Non-Farm Sector in tandem for enhancement of farmers' income.

B) Viability

Viability of Poultry Value Chain

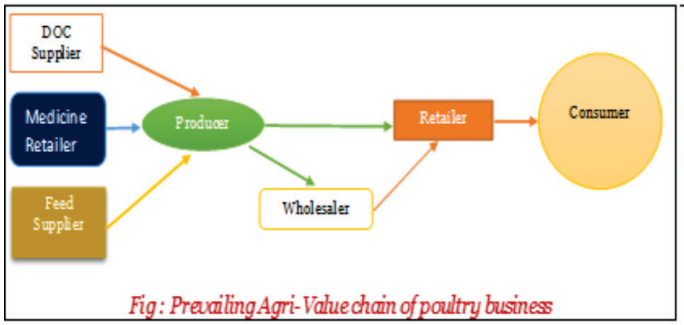


Fig : Prevailing Agri-Value chain of poultry business

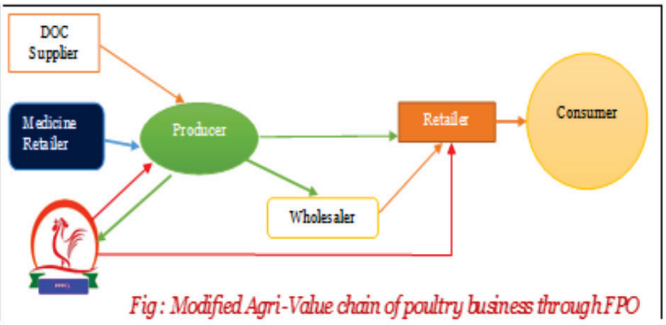
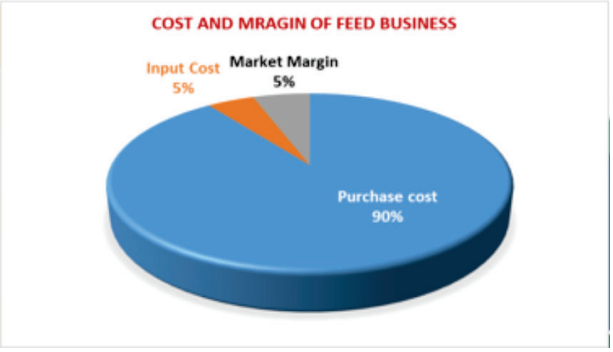


Fig : Modified Agri-Value chain of poultry business through FPO

S. No.	Particulars	2016-17	2017-18	2018-19	2019-20
1	Purchase cost of raw material (Rs/kg)	18.48	16.99	17.86	22.00
2	Input Cost	0.73	0.75	0.80	1.50
3	Market Margin	1.46	0.96	1.00	1.18
4	Sale Price	20.67	18.70	19.66	24.68
5	Market Margin (%)	7.06	5.13	5.09	4.78



Viability of Wheat Value Chain

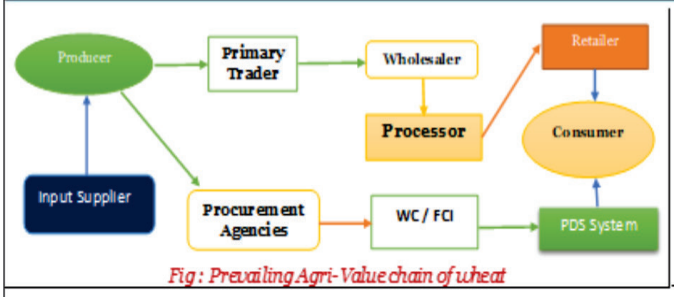


Fig : Prevailing Agri-Value chain of wheat

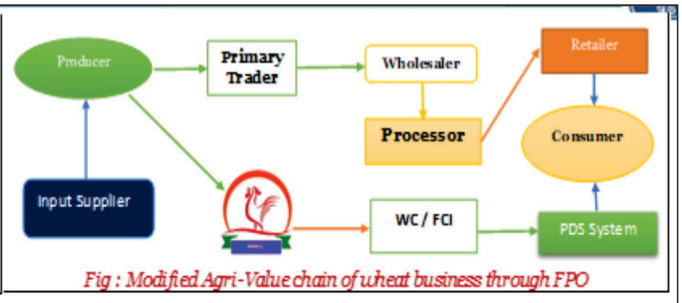
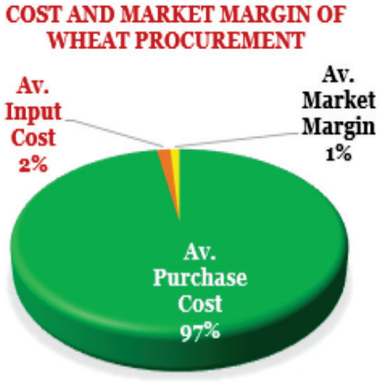


Fig : Modified Agri-Value chain of wheat business through FPO

S. No.	Particular	Unit	Unit Rate of Civil Supply (Rs./q)	Actual Cost of FPO (Rs./q)	Difference in reimbursement
A	Purchase Cost (MSP)	Rs./q	1843.33	1843.33	0
B	Input Cost				
i	Transport and other	Rs./q	16.44	19.25	-2.81
ii	Loading / Unloading	Rs./q	6.25	10	-3.75
iii	Interest on WC/ Miscell Expenses		0	1.83	-1.83
iv	Commission for FPO	Rs./q	28		28
C	Sub Total of Input Cost		50.69	31.08	19.61
D	Market Margin			19.61	
E	Cost of Sale		1894.02	1894.02	19.61



Viability of Paddy Value Chain

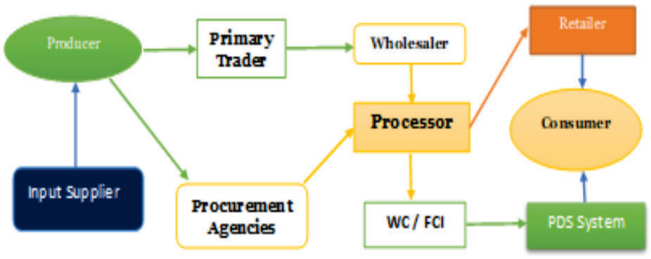


Fig : Prevailing Agri-Value chain of paddy

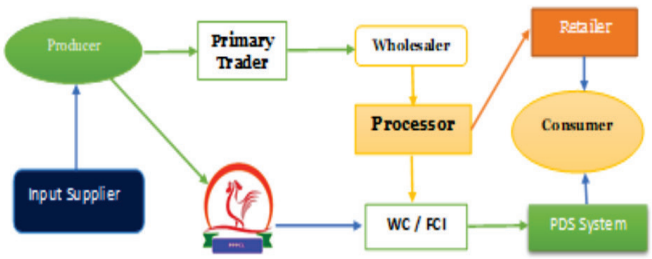
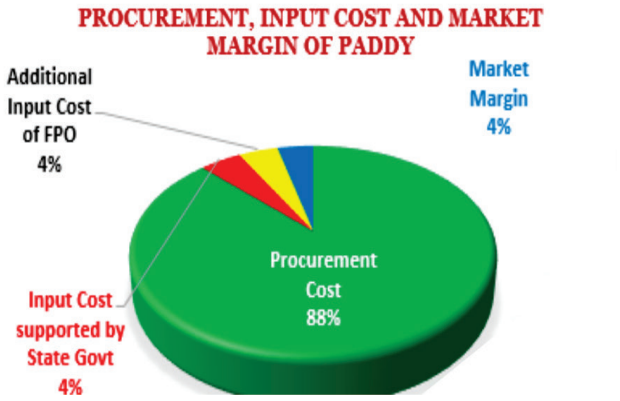


Fig : Modified Agri-Value chain of paddy business through FPO

Purchase Cost (Rs/q)	1836.53
Input Cost supported by SG	92.21
Net Input Cost of FPO	87.19
Market Margin	80.05
Sale Price	2095.98



C) Competitiveness

Market margins enhanced due to following economic rent enhancer :

- Reduction of input cost on account of aggregation
- Reduction of multiple loading and unloading charges due to value chain integration
- Reduction of distress selling
- Retention of the re-processing margins of by-products of wheat and paddy for formulation and production of animal feed
- Payment to producer on time because of value chain finances from FIs
- Adequate dose of **receivable financing (Trade receivable finance is key instrument of AVCF) has enhanced** turnover of the FPO up to **Rs.479 Lakh** during the year 2021-22 and helped in diversifications of the business portfolio.
- Reduction of cost of value addition because of increase in scale of economy
- Reduction of under weighing
- Reduction in trader default

Addressing procurement issue of MSP

Under prevailing agri value chains, 60-80% of the produce on MSP are bring procured through intermediaries on market price, which are generally far below the MSPs. The differential of market prices and MSP of wheat and paddy during peak season of harvesting are fall in the range of **Rs.270 to 280 per quintal** except during a few years (Ex. wheat marketing season of 2022).

While there is negligible pilferage of procurement has been seen by supply chain management of FPOs for aggregation, processing and collective marketing.

However, FPOs are unable to undertake above business operations due to the lack of "receivable finance (trade receivables finance)" as they are getting remittance from the FCI on *reimbursement basis* as per the procurement policy of the Government of Uttar Pradesh. Further, reimbursement is very cumbersome process and average delay is 15 days to 1 months. This is also affects the rotations of the working capital. Hence, FPOs need adequate and timely "***Receivable Finance***" as well as ***finance for installation and operation*** of upgraded rice mill with transit storage facility, cleaning, sorting, grading and policing accessories.

To address these issues, ***Sammunati Finance*** and ***State Bank of India*** come forward as a supporting agri-value chain actors (financers) and made it possible to address these issues resulting, FPO could able to modified prevailing agri value chains, enhanced business participation in down-stream of the agri-value chains and increased economic rent of the producers. Summary of impact of the intervening variables are as under :

Year	Produce	Procur. (quintal)	MSP (Rs/q)	Average Market Price (R/q)	Sale Value (Rs. in Lakh)	Gross Margin (Rs.)	Expen. (Rs. in Lakh)	Net Margin : FPO Income (Rs.)	Increase Farm Gate Price (Rs.in Lakh)
2018-19	Wheat	2862.5	1745	1483.25	49.95	145128	98614	46514	7.49
2019-20	Wheat	3405.02	1860	1581	63.33	172633	88275	84358	9.50
2020-21	Wheat	2340	1925	1636.25	45.05	118638	80613	38025	6.76
2021-22	Wheat	9934.01	1975	1678.75	196.2	503654	342227	161427	29.43
Sub Total (Wheat)		**18541.53**			**354.53**	**940053**	**609729**	**330324**	**53.18**
2018-19	Paddy	1876.2	1770	1504.5	33.21	549045	512895	36150	4.98
2019-20	Paddy	2577.44	1835	1559.75	47.3	554394	426176	128218	7.09
2020-21	Paddy	4090.465	1868	1587.8	76.41	1113345	593740	519605	11.46
Sub Total (Paddy)		**8544.105**			156.92	2216784	1532811	683973	23.53
Grand Total		**27085.635**			**511.45**	**3156837**	**2142540**	**1014297**	**76.71**

Outcome : These value chain enhancer given opportunities to FPO as a competitive value chain actor in prevailing agri-value chains. There is **direct benefits of Rs.76.71 lakh** during the last four years of procurement operation to the producer against inefficient prevailing agri-value chains. Apart from that, there is **net market margin of Rs.10.14 lakh** accrued to FPO. FPO could able to retained ***by-products of paddy (Broken rice and rice bran)*** at ***cheaper rates*** and used as raw materials for production of poultry feed ***without incurring any additional transportation cost***.

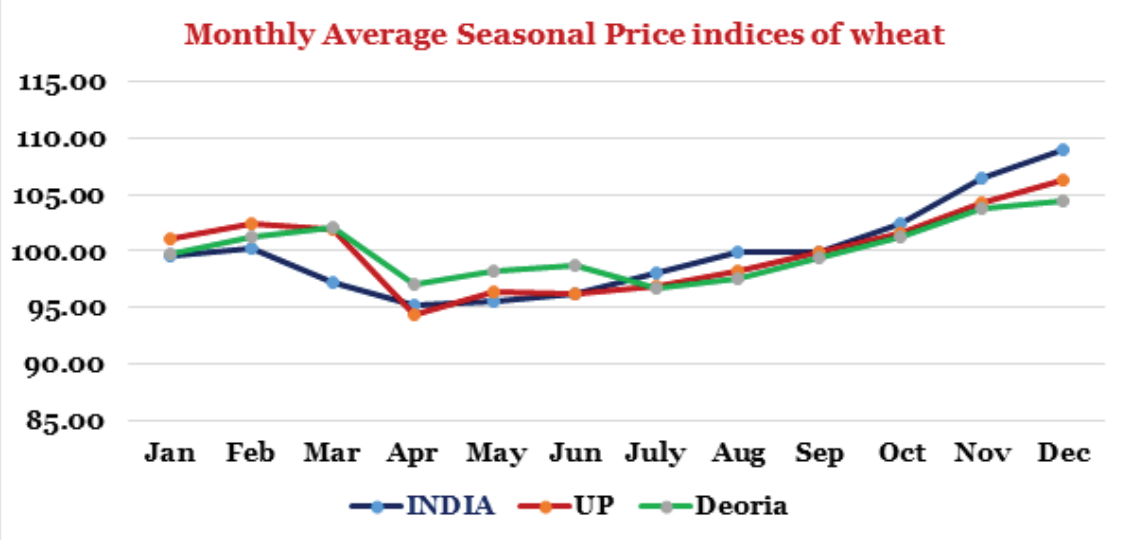
Another issue : Viability of producer level storage system vrs alternative value chains for supply chains management

It is observed that MSP support is limited to 20-30% of the total production in selected cluster and there is no other options for the producers other than sale in open market. But the commodity prices is generally low during peak harvest season and 4-6 month after post-harvest season. We have analysed the opportunities price of the producer to the produce in case they stored in warehouses till the enhancement of the commodity price

of wheat. We have taken "average *monthly seasonal price indices of wheat at National, State and district level",* which are as under :

Month	INDIA	UP	Deoria
Jan	99.58	101.03	99.72
Feb	100.22	102.52	101.32
Mar	97.27	101.91	102.02
Apr	**95.15**	**94.37**	**97.03**
May	95.59	96.38	98.16
Jun	96.13	96.29	98.69
July	98.03	96.87	96.77
Aug	99.89	98.26	97.52
Sep	99.99	99.95	99.33
Oct	102.41	101.57	101.23
Nov	106.45	104.34	103.74
Dec	109.02	106.35	104.46
Max difference	**13.87**	**11.98**	**7.43**

Monthly Seasonal Price indices of wheat has been analysed and it observed that maximum difference of the seasonal price during peak harvesting season (April) and after 8 months of peak harvesting (December) is varies up the extent of 7.43%, 11.98% and 13.87% only at District, State and National level, respectively. This would not be sufficient to meet depreciation cost, operational and maintenance cost, financial cost of storage at the level



producer as well as FPO. Therefore, alternative supply chains need to be explored for optimization of market margins and full utilization of the marketable surplus of the producer.

Other Viable options for the producers and FPOs

- Integration of the value chain actor at FPO level to capture market margins on downstream sides of the agri-value chain after post-harvest.

- Undertaking processing, packaging, branding and collective marketing will facilitates delayed supply of produced and by-products to match demand and supply and absorb price fluctuation shocks to the producer.
- Segment of the marketable surplus stored in accredited warehouses till the better price and part of it through forward contract.

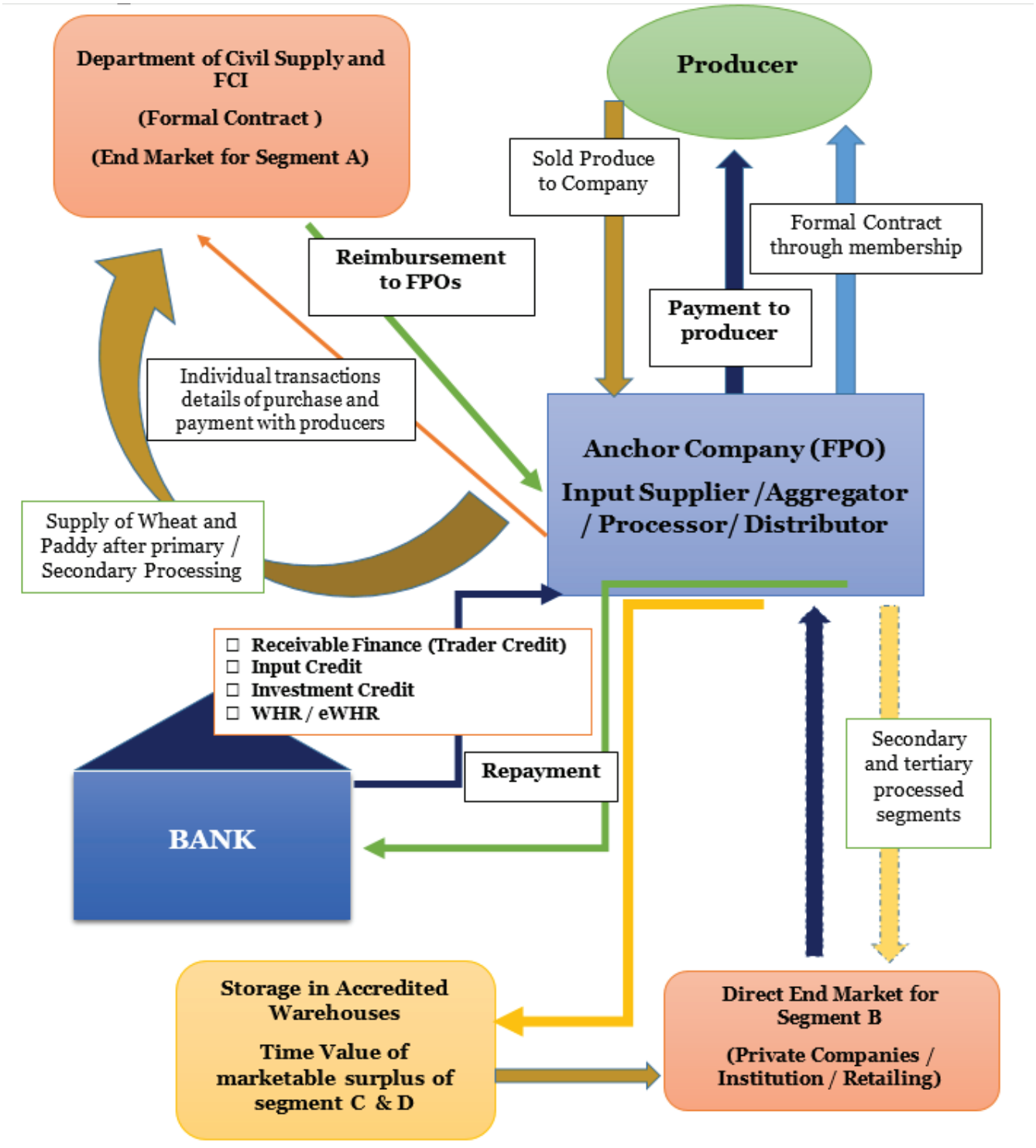
Segmentation and marketing strategy of the marketable surplus

Segmentation	Marketing strategy
Part A	Part of the marketable surplus aggregated and marketed on MSP up to the extent of permissible limit fixed by the Government.
Part B	Part of the marketable surplus aggregated, storing, gradual processing and marketed after packaging and branding as per the extent of business participation of FPOs in downstream of the value chains and generated demand.
Part C	Part of the marketable surplus stored after post-harvest for time period till the opportunity of remunerative price.
Part D	Part of the marketable surplus may be hedged through forward contract in commodity exchange.

Requirements of agri-value chain finance (AVCF)

Segmentation	Category and Name of requisite financial instrument
Part A	Receivable Finance (Trade Receivables Finance)
Part B	Production Finance (Trader Credit)
Part C	Physical Asset Collateralization (Warehouse Receipt Finance)
Part D	Risk Mitigation Product (Insurance / Forward Contract /Future)

AVCF MODEL


Department of Civil Supply and FCI
(Formal Contract)
(End Market for Segment A)
Producer
Sold Produce to Company
Formal Contract through membership
Reimbursement to FPOs
Payment to producer
Individual transactions details of purchase and payment with producers
Anchor Company (FPO)
Input Supplier /Aggregator / Processor/ Distributor
Supply of Wheat and Paddy after primary / Secondary Processing
Receivable Finance (Trader Credit)
Input Credit
Investment Credit
WHR / eWHR
Repayment
BANK
Secondary and tertiary processed segments
Storage in Accredited Warehouses
Time Value of marketable surplus of segment C & D
Direct End Market for Segment B
(Private Companies / Institution / Retailing)

Requisite modification in production credit delivery system

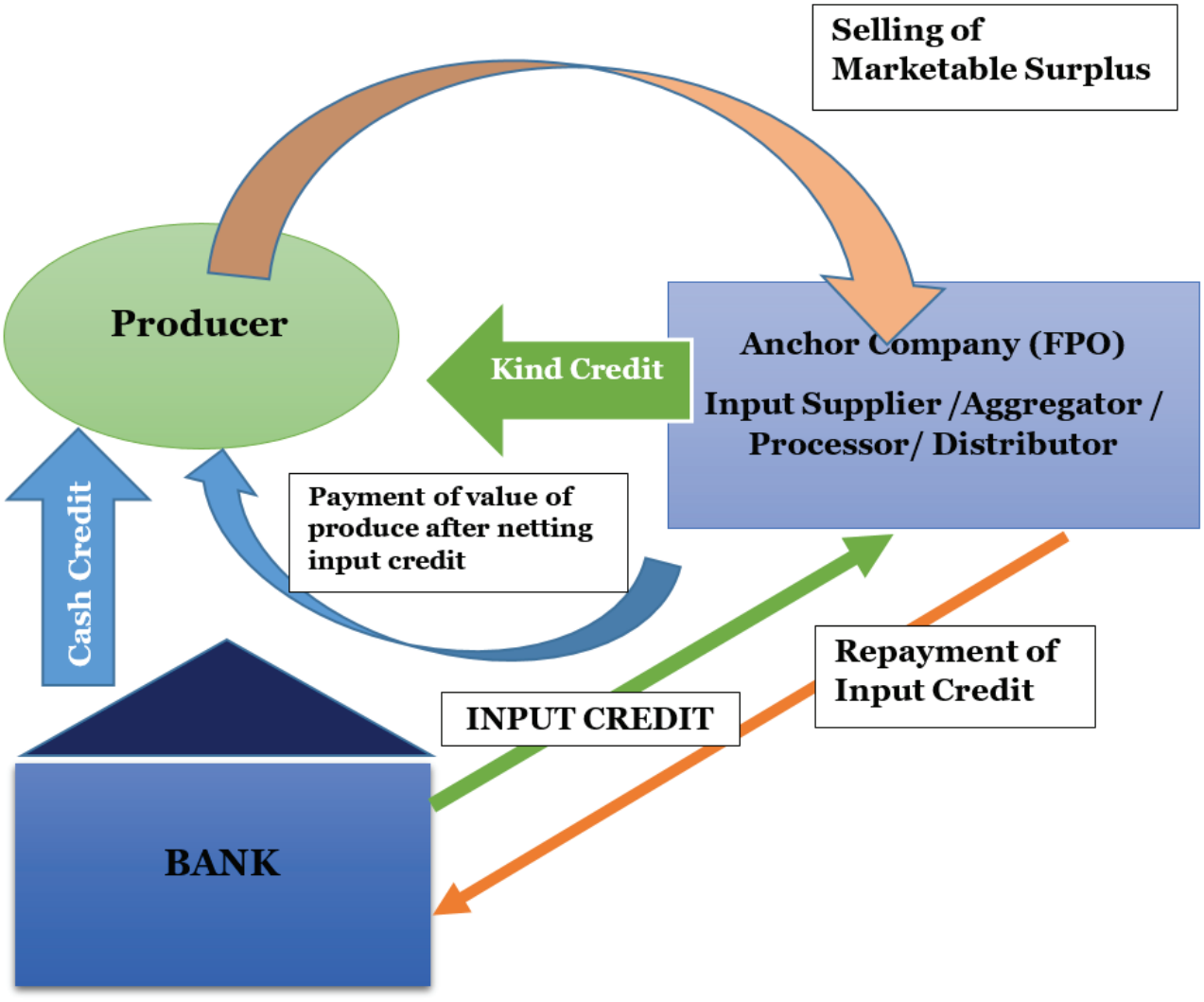
Issues of timely, qualitative, adequate and cheaper inputs is always in questions in every research papers and studies.

Secondly, effectiveness and efficiency of the physical inputs is highly dependent upon the technical inputs, hence both are works in tandem. Input supplier always tries to increase supply of inputs irrespective of optimum requirements.

Third, source of energy inputs (animate energy, mechanical energy and electrical energy) is now become very costly especially animate energy because of inflation and mechanical energy because of dependency of fossil fuel. This can be aggregated through movable solar energy unit for irrigation, plant protection, top dressing of the fertilizers, drying and winnowing operations.

Forth, individual farm machinery units (except self-propelled combine harvestor etc.) are now becoming economically not viable because of decreasing land holdings size and actual operation hours, resulting increase in fixed cost.

To address these issues aggregatable inputs like seeds, fertilizers, micronutrients, farm mechanization and energy inputs need to converted in aggregated input credits and extended to producers through FPOs only. This will reduce the cost of inputs (at least 2-5%) and enable better repayment ecosystem for FIs.



Validation of the AVCF Model

A field visit by a team comprising Shri P R Jha and Shri Rajesh Yadav was conducted on September 9 and 10, 2022, to validate the formulated model. A mapping exercise was undertaken in respect of the paddy value chains in the Deoria district of Uttar Pradesh. The team visited and interacted with the following value chain actors:

1. Input supplier
2. Producers
3. Trader / Wholesalers (paddy)
4. Trader cum Rice Miller
5. Private Rice Milers
6. APMC Mandi, Tarkulawa
7. FPO : Input supplier cum trader cum wholesaler (paddy) cum Rice Miller cum Wholesaler (Rice) – PPPCL, Deoria

The visiting team tried to understand the ecosystem of the paddy value chains, i.e., dependent variables (chain integration, strategic partnering, risk management, supporting services, sustainable production, product range, external financing, and commercial orientation), which affect the entire value chain in terms of feasibility and viability for the AVCF opportunities.

Predominantly, three value chains are working in districts along with one alternative value chain involving FPO as a value chain actor, which are as under :

Input Supplier – Producer – Procurement Agencies – Miller- FCI- PDS- Consumer

(Procurement Agencies are : PACS / NAFED / PCF / Others)

Input Supplier – Producer – Trader / Wholesaler – Miller- FCI- PDS- Consumer

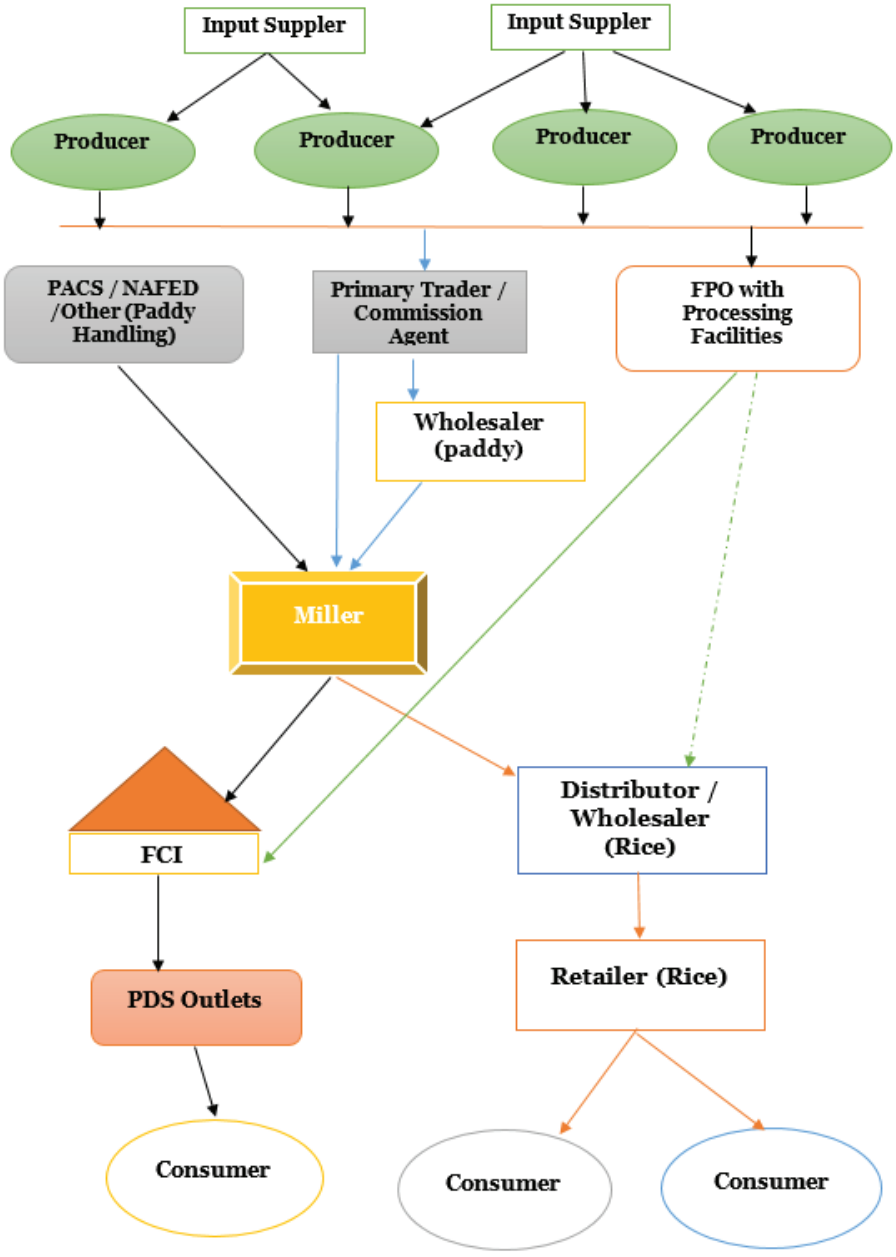


Figure : Paddy Value Chains in Deoria district of Uttar Pradesh

Input Supplier – Producer – Trader / Wholesaler – Miller- Wholesaler (rice)-Retailer - Consumer

Input Supplier – Producer – FPO (Partly input supplier also) - FCI- PDS- Consumer

Characteristics of the paddy value chain in Deoria district

- Farmers are free to obtain inputs from any input supplier.
- Producers are free to sell their market surplus through any of the three predominant routes, i.e., 1) through procurement agencies (PACS/NAFED/Others), 2) through commission agents/traders/wholesalers (paddy) and 3) through FPO.
- Farmers' first preference is to sell their marketable surplus immediately after harvest through procurement agencies on MSP due to the higher opportunity rate, generally Rs. 250 to Rs. 300 per quintal, higher compared to the market price.
- The average selling price of fine varietal paddy is less than the coarse varietals to the extent of about 10 %. It is observed that some of the factors effecting this price difference are due to lower milling yield (less than 60%) in fine verities and, hence, lower opportunities price under procurement on MSP and distant end market forced traders/wholesalers (paddy)/millers to purchase fine verities at a lower price.
- Farmers are not willing to store paddy after post-harvest on account of storage loss (weight loss to the extent of 5-10 kg per quintal within 6 months after post-harvest) and not getting a remunerative price after storage. Almost all the farmers sold their marketable surplus within three months of the harvest.
- This data was also validated by the APMC Mandi, Tarkulwa from 6R (sale processed receipt generated by APMC Mandi). It is observed that the sale price of paddy on 04 April 2022, 19 April 2022, and 29 April 2022 (after five months of post-harvest) was Rs.1750/-, Rs.1950/1700/-, and Rs.1700/-per quintal of paddy, respectively. The sale price during the month of June 2022 (i.e. after six months of post-harvest) was found in the range of Rs. 1650 to 1750 per quintal (sold to Raj Tarder, Tarkulwa).
- Hence, the market price of the paddy was found to be Rs. 250–300 per quintal lower than the MSP in general. This opportunity price validates the decision of not storing paddy by the farmers after post-harvest and having to sell within 3 months of the post-harvest.
- Course varieties of paddy take a supply route through procurement agencies on account of higher milling yield (yield of rice), which was found in the range of 60 to 67% of paddy weight. Since FCI is purchasing 67% rice per 100 kg of paddy, either procurement agencies are unwilling to procure fine varieties or farmers have to give additional weight of paddy free of cost to compensate for the lesser rice yield, which is generally 5.68 kg of additional paddy per 100 kg of procurement against the actual milling yield of 63.5% on an average basis. However, it may vary according to the grade of 100 kg of paddy as per the below estimated value.

Paddy Category	Actual Milling %	Total Paddy Sold by Farmer (Kg)	MSP (Rs./q)	Actual Price Realised (Rs./q)	Actual Price Realised (%)
A	67	100.00	1940	1940	100.00
B	66	101.60	1940	1909	98.40
C	65	103.10	1940	1882	97.01
D	64	104.70	1940	1853	95.52
E	63	106.40	1940	1823	93.97
F	62	108.10	1940	1795	92.53
G	61	109.90	1940	1765	90.98
H	60	111.65	1940	1738	89.59
Average	**63.5**	**105.68**	**1940**	**1838.13**	**94.75**

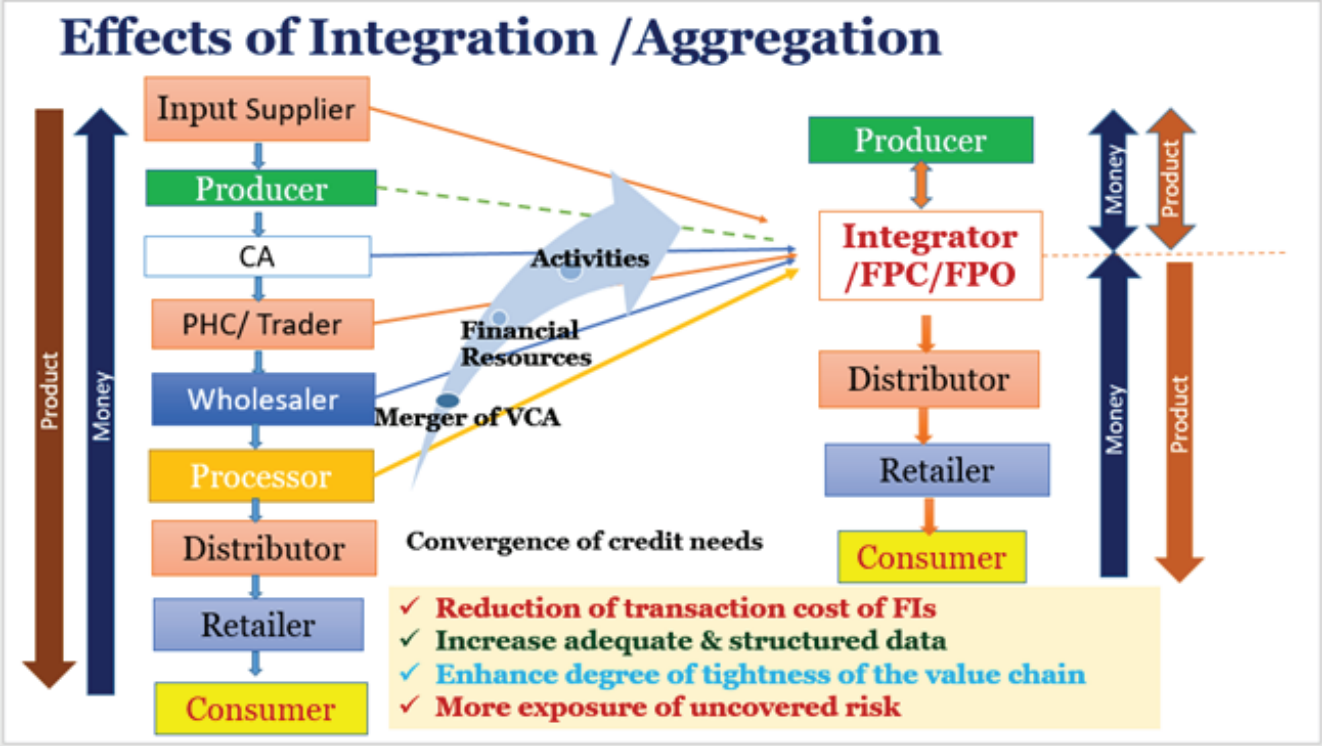
- As per the above table details, it is observed that this is the real reason behind the lesser price offered to the producer and the lower price of the paddy procurement. However, the real difference between the 67% and 60% milling yields is limited to a maximum of Rs.202 per quintal, even less after netting of the cost of by-products. But producers are forced to distress selling up to the extent of Rs.250/-to Rs.300/-per quintal of paddy.
- Because of the lesser rice yield, most of the fine varieties of paddy are sold through trader/commission agents, go to private millers, and then reach the end market through the outside wholesalers of Nepal, West Bengal, and other states.
- Most of the procurement agencies do not have processing facilities, so they have to send their procured paddy to private millers and then it goes to FCI warehouses after processing. Hence, these agencies, mostly PACs, are not able to retain market margins on account of the added value of bran, broken rice, and husk.
- It is also observed that most of the paddy procurement (exactly not known but almost 60–70%) was undertaken through traders/wholesaler/millers instead of authorised procurement agencies. As a result, framers have to sell their marketable surplus for Rs.250 to Rs.300/-less compared to MSP.
- The course verities' price is higher than the fine verities' due to procurement on MSP and the lower price of fine verities' due to lack of end market. In fact, this situation should be reversed.
- These issues can be sorted out through the integration of the value chain actors through suitable institutional models.
    - Strengthening of PACS : PACS is not a miller's only procurement agency and is dependent upon private millers, which increases the cost of transportation, loading and unloading expenses, and loses market margins of by products retained by private millers.
    - Integration of value chain actors (input supplier cum trader cum wholesaler (paddy) cum Rice Miller cum Wholesaler-rice) through FPOs
    - Formation of a federation of SHGs
    - This will generate enhanced credit needs under AVCF and reduce leakage of the farmer's opportunity price to the extent of Rs. 250/300 per quintal of paddy.
- The entire existing paddy value chain is found in a loose form, and value chain actors are free to sell or buy according to their preferences or opportunities.
- However, the institutional development model of FPO (PPPCL, Deoria) has definitely paved the way for the integration of 5 value chain actors (Input Supplier : Commission Agents : Trader : Wholesaler : Processor) and created a tight value chain on the upstream side of the paddy value chain. FPO's future business plan is to procure fine varieties and collectively market rice with forward linkages to the end market.
- But the issue of FPOs is that they have to pay their producers first and then make reimbursement claims from FCI through the Civil Supply Department and GoUP (Nodal Agency for Procurement), which is very cumbersome and causes delays in payment and hindrances in the form of the line department officials. while other procurement agencies like NAFED, PCF, and other agencies are paying the amount (MSP) directly to the farmer's accounts. Resulting FPOs are not able to utilise their full capacity due to delays in credit cycle and the additional burden of interest cost.
- On account of the formation of an alternative and tight value chain by PPPCL, Deoria, FPO was able to mobilise receivable finance (trader credit) several times from Sammunati Finance and also from SBI, Deoria, not only for receivable finance (trader credit) but also availed of invest credit for the installation of a modern rice mill with a total financial outlay of Rs.96.00 lakh and bank credit of Rs.75.00 lakh. This is a partial mode of agri-value chain finance (AVCF).
- PACS also have opportunities for mobilising AVCF for this type of procurement and processing system for

their members, and they can revive their business. Similarly, DCCBs also have equal financing opportunities in the form of AVCF to PACS.

- **This feature validates that FPOs are the breeding ground for making tight value chains, especially in grain and horticulture, which is a prerequisite characteristic of dependent variables for the success of agri-value chain finance (AVCF).**

Conclusion and Recommendations

1. Prevailing paddy agri-value chains in Deoria and other districts in the state of Uttar Pradesh are not found suitable for the perceived success of agri-value chain finance due to a lack of integration (tight value chains).
2. Alternative tight agri-value chain of paddy through FPO as an anchor value chain actor is found suitable institutional model by integrating agri-value chain actors (Input supplier cum trader cum wholesaler (paddy) cum Rice Miller cum Wholesaler-Rice) for AVCF opportunities and enhancing external credit. Extending the group mode of repeated finance (receivable finance) and receivable finance/investment credit by Sammunati Finance Ltd. and SBI, respectively, has validated the success of the AVCF model.



3. The alternative agri-value chain of paddy through FPO is providing an enabling environment by making effective and efficient paddy value chains, resulting in the enhancement of economic rent of producers through the reduction of leakages to the extent of Rs.250 to Rs.300 per quintal of paddy and the retention of marketing margins, which are generated through the selling of by-products of paddy (Broken rice, Bran, and Husk).
4. Since PACs are working as traders/wholesalers in paddy agri-value chains, they are losing profit margins in terms of added value of paddy by-products (broken rice, bran, and husk). PACs can also work as processors in prevailing value chain actors for their business sustainability, and DCCBs will get agri-value chain financing (AVCF) opportunities for enhancing credit.
5. On a similar pattern, SHG federations can also work as an anchor value chain actor in alternative tight agri-value chains of paddy for their sustainability.

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