Journal of Applied Horticulture, 26(2): 141-147, 2024
https://doi.org/10.37855/jah.2024.v26i02.27
Journal of Applied Horticulture
ISSN: 0972-1045

An analytical study on value chain finance to tomato and mango as a component of high value agriculture in the Eastern Uttar Pradesh of India

S. Kumar*

Department of Agricultural Economics, Shri Durga Ji Post Graduate College, Chandeshwar, Azamgarh (U.P.)-276 128.
**E-mail: sarvesh6126@gmail.com*

Abstract

The study conducted an extensive field survey utilizing pre-tested interview schedules with tomato and mango growers and chain actors. A multi-stage purposive-cum-stratified random sampling method was employed to select sample units. The findings of this study highlight the cost orientation of tomato and mango production, indicating a greater need for consequential credit. The research revealed that growers of both commodities within fragmented value chains had a higher proportionate share in the value addition (price) than growers in integrated chains, primarily due to direct sales of produce to consumers. Additionally, downstream actors such as commission agents, wholesalers, and retailers received a comparatively higher proportionate share in the value additions (price) compared to upward actors, indicating that producers could not effectively compete with increased demand in the marketplace. Observations within the chain indicated that finance for tomato and mango production circulated through a product commitment relationship established between chain participants. Downstream actors provided financing to upstream actors from either their surplus funds or external finance received from financial institutions. The study suggests developing a producer-driven chain financing model as an alternative to the buyer-driven financing model for tomato and mango production. This could be achieved by promoting farmers' organizations as long-term financing strategies for financing institutions.

Key words: High value agriculture, tomato, mango, value, chain, finance, marketing

Introduction

High Value Crops (HVCs) refer to those crops that yield significantly higher value productivity or net income per unit of resources utilized for production, as outlined by NABARD (2020). According to Sharma and Jain (2011), the diminishing share of traditional commodities in production, consumption, and trade emphasizes the importance of high-value agricultural crops for potential income growth in rural areas. NITI Ayog (2018) estimates that the growth potential within the crop sector primarily lies in horticulture and other high-value commodities rather than traditional food grains.

Agricultural value chains (AVCs) encompass a series of value-adding activities, extending from production to consumption through backward and forward linkages in processing and marketing. Agricultural producers rely not only on what they produce but also on their access to resources such as fertilizers, seeds, and other inputs upstream in the value chain, as well as markets to sell their surplus produce downstream, including wholesaling, processing, logistics, and retailing.

Value chain financing (VCF) is an approach aimed at identifying financing needs and gaps throughout the chain, as well as finance providers and methods to enhance access to financing. Unlike traditional finance, which is often asset-based and uniform, the value chain approach primarily relies on cash flow and contracts, leveraging risks associated with farming among various players in the value chain (Setiya, 2018). Consequently, value chain finance enhances efficiency and strengthens or consolidates linkages among participants in value chains (Soundarrajan and Nagrajan, 2015; Das and Aquino, 2013). Additionally, economies of scale in product and financial markets reduce lending costs and risks (Miller and Linda, 2010; Miller, 2012).

The gap between the supply and demand for credit in agriculture is widening due to the emphasis on market-oriented agriculture and higher-quality production for lucrative markets within established value chains. Agricultural value chains in India suffer from high fragmentation and intermediation, leading to significant losses in quantity and quality of produce, limited processing capacities, and high price volatility. Furthermore, mango orchards are often contracted to mitigate marketing and price risks (IFRI, 2013). Financial institutions could utilize the value chain as an entry point to improve their outreach to chain actors, as observed by Miller and Linda (2010). Therefore, addressing these deficiencies through value chain finance is crucial to overcoming barriers in diversifying towards high-value agriculture.

This study aims to assess the pattern and performance of value chains for tomato and mango concerning their potential for within-chain finance. Unlike previous studies, this research evaluates the efficiency and potential of within-chain finance in both fragmented and integrated value chains.

Materials and methods

The research methodology employed in this study involved an extensive field survey conducted using a pre-tested interview schedule from March to June 2022. To ensure a representative sample, a multi-stage purposive-cum-stratified random sampling

design was adopted. Specifically, Jaunpur district was chosen for tomato cultivation, and Varanasi district was selected for mango cultivation due to their substantial area (0.257ha and 1044ha, respectively) and production (8.456MT and 17299MT, respectively) of the respective commodities (UP Horti. Dept., 2022).

Within each selected district, two blocks were randomly chosen. Subsequently, five villages were randomly selected from each block, with each village representing 10 farmers. Thus, the study comprised a total of 200 farmers from 20 villages across four blocks in both districts. Farmers were categorized based on their landholding size: small & marginal (< 1ha.), medium (1-2ha), and large (> 2ha), with proportions matching the sample population of the respective villages. Additionally, 46 chain actors for tomato and 54 chain actors for mango were selected from the markets in the respective districts.

To assess constraints faced by growers and chain actors, Likert scales (1932) ranging from 5 to 1 were employed. Chain actors were asked to rate their constraints as "Strongly agree," "Agree," "Neutral," "Disagree," or "Strongly disagree." A variable mean score of 3 was utilized to determine the significance of each constraint. Data collection involved administering the survey items to a total of 444 respondents.

For evaluating value additions within the marketing nodes, the formula "Value addition = Selling price of the product minus Cost of the total inputs" suggested by Kohls and Uhls (1967) was utilized. Marketing costs were calculated by aggregating expenditures incurred for performing marketing functions at each stage. Net marketing margins were computed by deducting the sum of purchase price and marketing costs from the selling price, following the methodology outlined by Acharya and Agarwal (2007).

Results and discussion

Costs and returns in the cultivation of tomato and mango: The analysis of costs and returns is a pivotal aspect affecting the efficiency of the entire value chain. Consequently, the costs and returns associated with cultivating tomato and mango across different farm sizes were examined and summarized in Tables 1 and 2.

Table 1 illustrates that the average operating costs for tomato cultivation were ₹27,704, ₹34,111, and ₹43,802 per acre for marginal & small, medium, and large farms, respectively. Furthermore, the breakdown of cost components revealed that Labour charges and expenditure on manure & fertilizers were the predominant costs across all three farm size categories in mango cultivation. Labour charges accounted for 63%, 60%, and 48% of the total variable costs for marginal & small, medium, and large farms, respectively. Similarly, the cost incurred on manure & fertilizers constituted 16%, 17%, and 20% of the total variable costs for marginal & small, medium, and large farms, respectively.

Observations revealed a decrease in costs related to field preparation, seed expenses, and Labour charges with an increase in farm size during tomato cultivation. Conversely, expenses for plant protection and manure & fertilizers exhibited a positive correlation with farm size. Charges for irrigation and miscellaneous items remained relatively consistent across all farm categories. Considering the rental value of land, the average costs were ₹38,370, ₹44,777, and ₹54,568 per acre for marginal & small, medium, and large farms, respectively. The benefit-cost ratio was highest for large farms at 2.31, followed by 2.08 for medium farms and 1.82 for marginal & small farms, indicating a positive association with farm size.

Table 1. Costs and returns in cultivation of tomato

S. No.	Particulars	Small & marginal	Medium	Large
1.	No. of sample farmers	59	27	14
2.	Items of the expenditure	Cost ₹/acre	Cost ₹/acre	Cost ₹/acre
i)	Field preparation	1018 (3.6)	1214 (3.5)	1429 (3)
ii)	Seed cost	2357 (8.5)	3035 (9)	3613 (8)
iii)	FYM & fertilisers	4366 (16)	5688 (17)	8753 (20)
iv)	Irrigation	758 (2.7)	938 (2.7)	1231 (2.8)
v)	Staking	--	--	4322 (9)
vi)	Plant protection materials	445 (1.5)	723 (2)	1181 (2.6)
vii)	Labour charges	17380 (63)	20760 (60)	21045 (48)
viii)	Miscellaneous	1380 (5)	1753 (5)	2228 (5)
3.	Total variables cost	27704 (100)	34111 (100)	43802 (100)
4.	Rental value of land	10666	10666	10666
5.	Total Cost with rental value of land	38370	44777	54568
6.	Yield (q/acre)	64	89	125
7.	Market price (₹/q)	800	800	800
8.	Gross Income	51200	71200	99200
9.	B:C ratio on variable cost	1.84	2.08	2.31

**Figures in the parentheses indicate percentages to row total. Source: Primary survey 2021-22

In contrast, the average operating costs for mango cultivation were ₹45,989, ₹58,275, and ₹72,620 per acre for marginal & small, medium, and large mango farms, respectively. Labour charges, manure & fertilizers, and miscellaneous charges constituted a major proportion of the operating costs for all three categories of mango farms. Labour charges remained consistent across all categories of mango growers, accounting for 56-57% of total variable costs, while costs incurred for manure & fertilizers represented 16%, 16.7%, and 17% of the total variable costs for marginal & small, medium, and large mango farms, respectively. It was observed that all components of variable costs either remained proportionately similar or decreased with an increase in mango farm size, primarily attributed to the nature of management practices adopted by different farm categories.

Considering the rental value of land, costs varied to ₹77,989, ₹90,275, and ₹104,620 for marginal & small, medium, and large mango farms, respectively. The benefit-cost ratio for mango cultivation was highest for large mango growers at 4.95, followed by 3.34 for medium farms and 2.95 for marginal and small farms, respectively. These benefit-cost ratios were positively correlated with farm size due to differences in costs arising from distinct management practices adopted by different mango farms, thereby resulting in proportionately increased yields.

Table 2. Costs and returns in cultivation of mango

S. No.	Particulars	Small and marginal	Medium	Large
1.	No. of sample farmers	67	21	12
2.	Items of the expenditure	Cost ₹/ acre	Cost ₹/ acre	Cost ₹/ acre
i)	Labour charges	26387 (57)	32698 (56)	41600 (57)
ii)	FYM & fertilisers	7302 (16)	9734 (16.7)	12600 (17)
iii)	Irrigation charges	2890 (6)	3373 (5.7)	3750 (5)
iv)	Plant protection materials	1580 (3.4)	1930 (3.3)	2570 (3.5)
v)	Miscellaneous	7830 (17)	10540 (18)	12100 (16.6)
3.	Total variables cost	45989 (100)	58275 (100)	72620 (100)
4.	Rental value of land	32000	32000	32000
5.	Total Cost with rental value of land	77989	90275	104620
6.	Yield (q/acre)	113	162	300
7.	Average market price (₹/q)	1200	1200	1200
8.	Gross Income	135600	194900	360000
9.	B:C ratio on variable cost	2.95	3.34	4.95

**Figures in the parentheses indicate percentages to row total. Source: Primary survey 2021-22

Value chains of tomato and mango: The value chains of tomato and mango were mapped through illustrative way of recording the process, activities, actors and the value created in a commodity with the reformative changes in space-time-form continuum as suggested by FAO, 2014. The value-chain actors who were involved in value-addition (price) of tomato and mango with their specific roles in the value chain were identified and presented in Table 3. The table reveals that the inputs suppliers/agro-dealers, growers, pre-harvest contractors (mango), commission agents and various type of retailers were engaged as actors in value chains of tomato and mango in the study area.

At the same time, the fragmented and integrated value chains for disposal of tomato and mango were prevalent in the study area is depicted in Figs. 1 and 2. It confirms the map of the overall chains, the segments, associations and their interdependencies. The tomatoes were disposed through three value chains *viz.*, (I) Input suppliers/Agro-dealers – Tomato growers – Household consumers (fragmented value chain); (II) Tomato growers – Cold storages – Wholesalers – Retailers – Consumers (integrated value chain) and (III) Tomato growers –Commission agents – Wholesalers – Retailers – Consumers (integrated value chain) and were accounted about 14 per cent, 6 per cent and 80 per cent flow, by volume, of the tomato respectively.

Similarly, mangoes were disposed through four value chains *viz.*, (I) Input suppliers/Agro-dealers – Mango growers – Household consumers (fragmented value chain); (II) Input suppliers/Agro-dealers – Mango growers – Pre-harvest contractors – Consumers (integrated value chain) (III) Input suppliers/Agro-dealers – Mango growers – Commission agents – Retailers – Consumers (integrated value chain) and (IV) Input suppliers/Agro-dealers – Mango growers – Commission agents – Wholesalers – Retailers – Consumers (integrated value chain) and were accounted about10 per cent, 4 per cent, 2 per cent and 84 per cent flow, by volume of the mangoes respectively.

Table 3. Value chain actors and their roles in value chains of tomato and mango

Value chain actors		Position in the chains	Role/functions
Tomato	Mango		
Inputs suppliers/ Agro-dealers	Inputs suppliers/ Agro-dealers	Upward	Supply of inputs
Growers	Growers	Upward	Production of tomato
--	Pre harvest contractors	Upward	The pre-harvest contractors were contracted the orchard at flowering or fruiting stage for a period ranging from one to three years
Commission agents	Commission agents	Downward	Provided the link between growers and wholesalers in distant markets. In case of mango, they were involved in providing the finances to pre-harvest contractors, who obliged to dispose of the produce.
Wholesalers	Wholesalers	Downward	Purchase and collection of fresh tomatoes and mangoes from the commission agents and distributed to retailers
Primary/ Secondary / organised retailers	Retailers (Traditional, cart vendor, juice vendor, mall)	Downward	Purchase from wholesalers and sale to consumers
Consumers	Consumers	--	Consumption

Source: Primary survey 2021-22

Economic performance of value chains: The anticipated marketing costs, net margins, and value-added (price) for both the fragmented and integrated tomato and mango value chains is depicted in Table 4. According to Igwenagu *et al.*, 2020, the value contributed of an actor in the chain was calculated as the price differential of the value-added product sold to the subsequent actor.

Table 4 shows that the highest marketing charges were ₹188 per quintal for tomato growers, followed by ₹145, ₹88, and ₹70 for wholesalers, commission agents, and retailers in integrated chains (chains II and III). Tomato growers in the fragmented value chain (chain-I) had a marketing cost of ₹125, which is 44% lower than those in integrated chains. Wholesalers had the largest value addition (price) of ₹625 per quintal, followed by tomato growers and retailers at ₹200 each and commission agents at ₹175 in integrated tomato chains. In the fragmented chain (Chain I), tomato producers and retailers received a greater value addition (price) of ₹400. Table 4 also showed that the highest share of value added was 76 percent at the wholesaler level, followed by 65 percent, 49 percent, and 6 percent at the retailers, commission agents, and tomato growers levels, respectively, in the integrated value chain, indicating that marketers or downward actors received a comparatively higher proportionate share. The net margin of tomato producers as merchants under fragmented chains was found to be 69%, which was proportionally greater

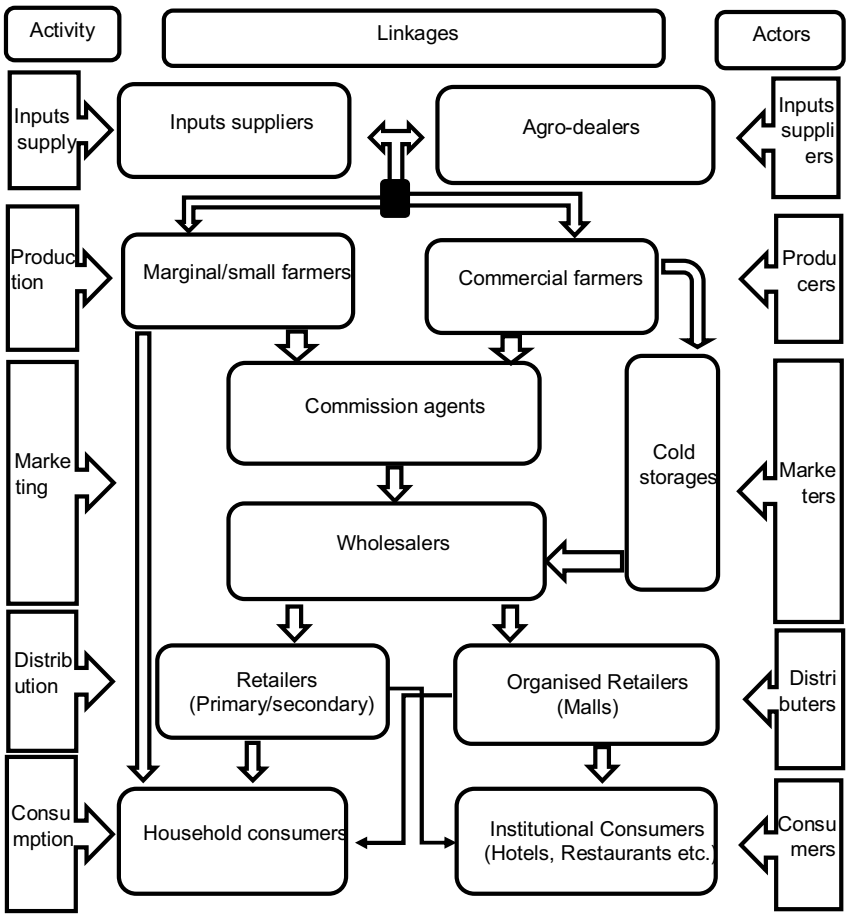

Fig 1. Value chains of tomatoes in Jaunpur district of the Eastern Uttar Pradesh

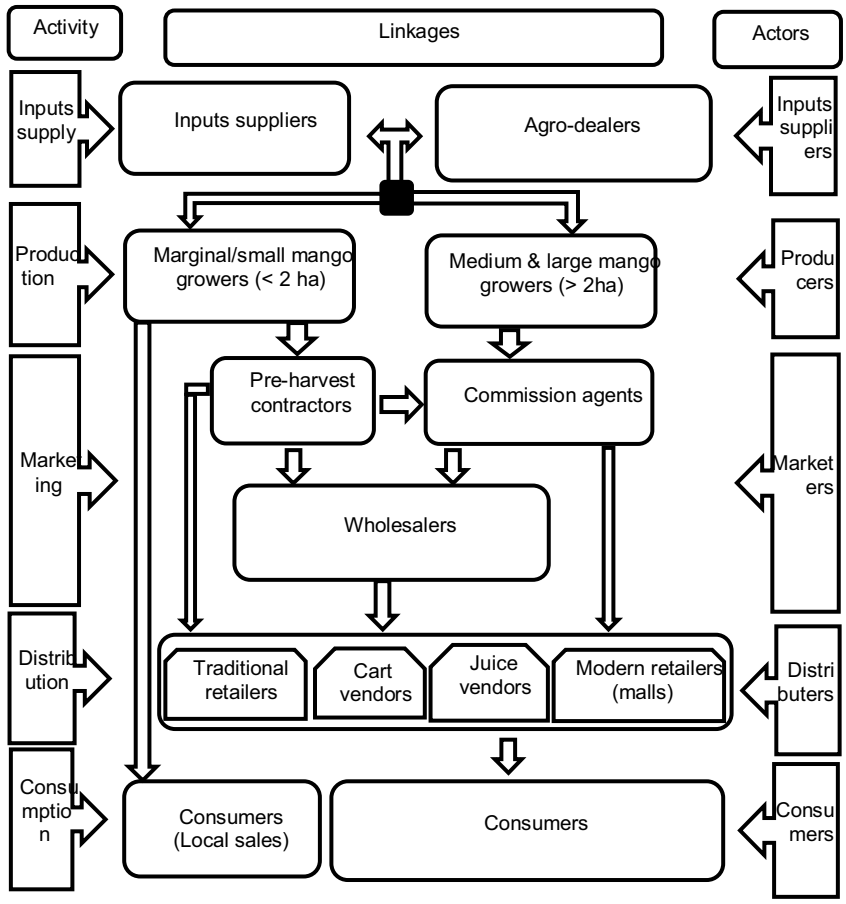

Fig. 2. Value chains of mangoes in the Varanasi district of the Eastern Uttar Pradesh

(6%) than the grower under integrated value chains, indicating the importance of direct chains.

Table 5 reveals that the greatest marketing expenses were ₹261 per quintal at wholesalers' level, followed by ₹206, ₹184, ₹180, and ₹152 at commission agents, pre-harvest contractors, retailers, and mango producers' level, respectively in the integrated chain (chains II, III, and IV). Marketing expenses for mango producers as merchants in the fragmented value chain (chain-I) were ₹84, which was 45% lower than costs incurred at the grower level in the integrated chain. Wholesalers had the highest value addition (price) at ₹900 per quintal, followed by commission agents and retailers at ₹700, pre-harvest contractors at ₹400, and mango growers at ₹200 in integrated value chains. Retailers had the biggest percentage of value added (74%), followed by wholesalers (71%), commission agents (70%), pre-harvest contractors (54%), and mango growers (24%), in integrated chains II, III, and IV. Mango growers under the fragmented chain had a net margin of 83%, which was 24% more than mango growers within the integrated network.

Value chain financing: Fig. 3 clearly shows that the value chains of tomato and mango were financed through "direct informal" within the value chain finance, comparable to the "buyer-driven financial model" proposed by Rutten and Boto (2014). Under this mechanism, value chain actors (input suppliers, traders, commission agents, and wholesalers) provided farmers/growers with financing facilities such as input financing, trade credit, warehouse receipts, and factoring in order to secure the buyer's interest in procuring a flow of products.

In the research area, input providers extended loans to growers in exchange for the farmer's promise of cash or kind for one to two months in order to improve their business portfolio and profit margin. Traders, commission agents, and pre-harvest contractors also provided trade credit to producers in a similar fashion in exchange for the farmer's guarantee to deliver items under predefined terms. The wholesalers also provided finance to tomato growers based on warehouse receipts and tomato supply. Pre-harvest contractors, traders, or commission agents provided trade credit to growers through either their surplus fund or wholesalers, who were responsible as third parties for ensuring that the pre-harvest contractors, traders, or commission agents repaid the individual bank loans. As a result, wholesalers served as anchor (creditworthy) players for banks seeking access to "indirect formal"-outside the value chain funding (Fig 4). The anchor actors, with their established relationships with the other actors in the value chain, were held accountable

Table 4. Marketing costs, net margins and value addition in disposal of tomato (₹/Qntl.)

S. No.	Particulars/ Performance indicators	Fragmented value chain (Value chain-I)		Integrated value chain (Value chain-II & III)			
		Tomato growers (n=27)	Tomato growers as retailers	Tomato growers (n=100)	Commission agents	Wholesalers	Retailers
1.	Farm gate price	800	--	800	--	--	--
2.	Purchase price	--	800	--	1000	1175	1800
3.	Selling price	--	1200	1000	1175	1800	2000
4.	Marketing Costs	--	125	188	88	145	70
i)	Cleaning	--	12	12	--	6	
ii)	Packing materials	--	46	54	--	8	
iii)	Transportation, loading & unloading	--	32	50	--	5	50
iv)	Mandi charges @6% of sale value	--	--	72	70	108	--
v)	Local charges	--	--			--	15
vi)	Grading & boxing	--	--	--	--	12	--
vii)	Weighing and others	--	12	--	--	3	--
viii)	Miscellaneous charges	--	23	--	18	3	5
5.	Value addition (Price)	-	400	200	175	625	200
6.	Net Margins	--	275	12	87	480	130
7.	Net margins (as Percentage of value added)	--	69	6	49	76	65

Table 5. Marketing costs, margins and value addition for disposal of mango (₹/Qntl.)

S. No.	Particulars/ Performance indicators	Fragmented value chain (Value chain-I)		Integrated value chain (Value chain-II, III & IV)				
		Mango growers (n=32)	Mango growers as retailers	Mango growers	Pre-harvest Contractors	Commission agents	Wholesalers	Retailers
1.	Farm gate price	1000	--	1000				
2.	Purchase price	--	1000	--	800	1200	1900	2800
3.	Selling price	---	1500	1200	1200	1900	2800	3500
4.	Marketing Costs	--	84	152	184	206	261	180
i)	Harvesting charges	--	26	--	10	--	--	--
ii)	Cleaning & grading	--	3	--	6	--	4	--
iii)	Cushion materials	--	3	3	4	--	12	--
iv)	Use of plastic box	--		--	25	25	25	--
v)	Transportation charge	--	35	50	35	--	--	50
vi)	Storage charges	--	--	--	--	15	12	
vii)	Loading and unloading	--	10	10	10	10	--	8
viii)	Mandi charges @7% of sale value	--	--	84	84	133	196	87
ix)	Weighing and others	--	2	--	2	8	4	
x)	Miscellaneous charges	--	5	5	8	15	8	35
5.	Value addition (Price)	--	500	200	400	700	900	700
6.	Net Margins	--	416	48	216	494	639	520
7.	Net margins (as Percentage of value added)	--	83	24	54	70	71	74

for ensuring that the individual loans were repaid to the financing institution, lowering the bank's costs in analyzing each borrower's credit risk and monitoring individual loans.

Furthermore, growers in fragmented value chains were linked to integrated chains because they met their credit and non-credit needs in integrated value networks. This means that growers' commercial interactions with their subsequent value chain actors were found to protect their credit and secure markets by allowing chain participants to distribute extra funds to those in need of financial assistance. However, the growers of fragmented value chains relied solely on external finance.

Access of finance under direct informal (within the value chain) mechanism: The input financing, trade credit and factoring under direct informal 'within the value chain' finance were offered as financial instruments by value chain actors. It is obvious (Table 7 & 8) that input financing by input suppliers and preharvest contractors (for mango) positively varied with size of farms and accounted 18-37 per cent to operating cost of tomato and 13-39 per cent for mango. Trade credit was made available only to the medium and large tomato growers while it was availed by all categories of mango growers. Further, trade credit was accessed comparatively larger proportion of credit at marginal & small and medium mango growers signifying its suitability for these category of mango growers. Apart from this, 36 per cent of large tomato growers had obtained credit trough warehouse receipts which was about 13 per cent to total operating cost of tomato. It may conclude that there was positive relationship between size of farm business and level of access of the direct informal 'within the value chain' finance to both tomato and mango (Table 6 & 7).

Constraints in financing of value chains: Barriers limiting the financial opportunities of various actors in the value chain were

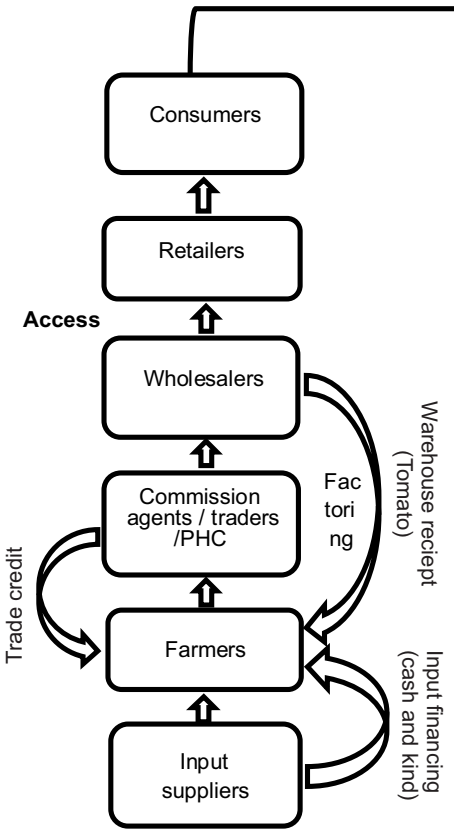

Fig 3. Direct informal "within the value chain" finance

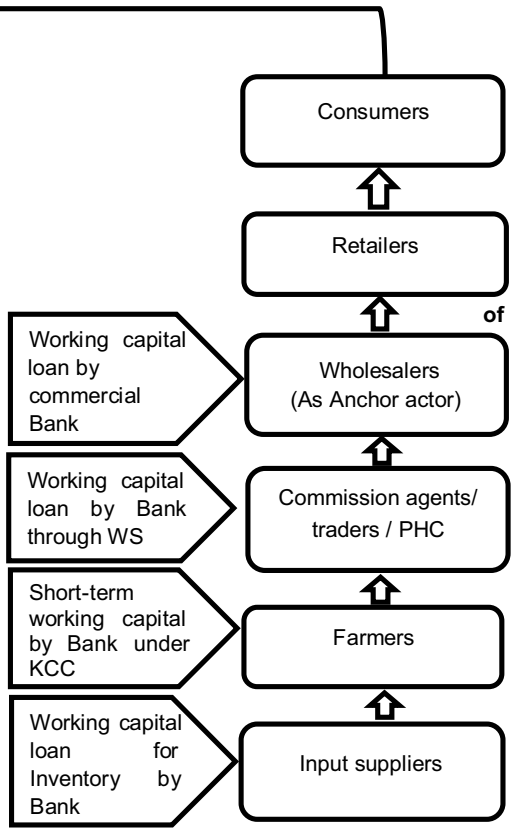

Fig 4. Indirect formal "outside the value chain" finance

Table 6. Access of finance under direct informal mechanism to tomato growers

Financing instruments /transactions	Marginal & small growers			Medium growers			Large growers		
	No of farmers availed the credit	Average quantum of credit (₹)	% to TVC / acre	No of farmers availed the credit	Average quantum of credit (₹)	% to TVC / acre	No of farmers availed the credit	Average quantum of credit (₹)	% to TVC / acre
Input financing by input suppliers	14 (24)	5000	18	17 (63)	9200	27	9 (64)	16200	37
Trade credit by WS / traders	--	--	--	2 (12)	6480	19	3 (21)	9630	22
Warehouse receipts	--	--	--	--	--	--	5 (36)	5690	13

**Figures in the parentheses indicate percentages to total. Source: primary survey 2021-22

Table 7. Access of finance under direct informal mechanism to mango growers

Value chain financing instruments / transactions	Marginal & small farmers/growers			Medium farmers/growers			Large farmers/growers		
	No of farmers availed the credit	Average quantum of credit (₹)	% to TVC / acre	No of farmers availed the credit	Average quantum of credit (₹)	% to TVC / acre	No of farmers availed the credit	Average quantum of credit (₹)	% to TVC / acre
Input financing by input suppliers/PHC	39 (58)	6000	13	14 (67)	16300	28	9 (75)	28300	39
Trade credit by WS/ CA	17 (25)	11000	24	6 (29)	18060	31	2 (17)	19600	27

**Figures in the parentheses indicate percentages to total. Source: Primary survey 2021-22

identified and analysed on Likert scale (Table 8). It is obvious that unpredictable cash-flows resulting from delays in financial transactions, complexity arises in recovery of loan given due to prevalence of "Soft" collateral such as guarantees, co-signing etc. in value chain financing, value chain loans marely met out the only seasonal requirements, warehouse receipts systems are usually not available to the individual small producer, no risk mitigation instruments like insurance available, low prices at peak periods of harvest/production and lack of adequate marketing facilities were the influential constraints as mean score was > 3. Study revealed that tomato and mango growing cost a lot per unit and it was capital-intensive. Labour was expensive in tomato and mango farming. Farm mechanization and new technologies can lower Labour costs, but financial institutions must improve access to innovate. Marketers on each stage of value addition in tomato and mango value chains obtained a higher proportionate share of net margin than farmers. This suggests that tomato and mango farmers did not compete with rising market demand. Thus, farmers must be structured to compete in a tougher market. To capture demand along value chains, the government

Table 8. Constraints in value chain financing to high value agriculture

Item No.	Constraints	Agreement					Total Score	Mean Score	Remarks
		SA (5)	A (4)	N (3)	DA (2)	SDA (1)			
1.	Unpredictable cash-flows resulting from delays in financial transactions	17.57	33.33	16.22	21.85	11.04	1441	3.25	Influential
2.	Insufficient collateral securities	18.47	22.75	16.22	22.52	20.05	1319	2.97	Not-influential
3.	Complexity arises in recovery of loan given due to prevalent of "Soft" collateral such as guarantees, co-signing etc. in value chain financing,	20.05	22.07	26.13	18.69	13.06	1409	3.17	Influential
4.	Lack of information about potential borrowers which makes screen for reliability, evaluate profitability and risk of default	9.68	20.05	28.60	29.95	11.71	1270	2.86	Not-influential
5.	Value chain loans mare met out the only seasonal requirements	23.65	27.48	18.69	18.24	11.94	1477	3.33	Influential
6.	Value chain actors as a lender acted as profit maker rather enabler of the financial opportunities	11.94	22.97	16.89	30.63	17.57	1248	2.81	Not-influential
7.	Trader credit is venerable to side-selling	9.46	14.41	10.81	44.37	20.95	1097	2.47	Not-influential
8.	Warehouse receipts systems are usually not available to the individual small producer	21.62	31.31	19.14	17.34	10.59	1492	3.36	Influential
9.	No risk mitigation instruments like insurance available	23.42	32.21	11.04	17.34	15.99	1464	3.30	Influential
10.	Low prices at peak periods of harvest/ production	15.32	30.86	16.44	20.72	16.67	1365	3.07	Influential
11.	lack of adequate marketing facilities	19.59	23.42	22.07	22.52	12.39	1400	3.15	Influential
12.	Fluctuating production and uncontrolled price risk	17.79	22.30	17.12	27.25	15.54	1330	3.00	Not-influential
13.	Market structure at the farm level is monopolistic (traders / wholesalers control market access)	11.71	22.07	25.68	20.95	19.59	1267	2.85	Not-influential
	Overall Mean Score							39.59	Influential

Source: Primary survey 2021-22

should support cooperative institutions and farmers-producers organizations in the research area. The government should promote the producer-driven value chain financing model through cooperatives, producer unions, and self-help groups to gain access to remunerative or niche markets, reduce marketing costs, and improve bargaining power for tomato and mango value chains. Financing agencies should be recognized as value chain anchor entities to pin up the financial dose and ensure financial depth.

Acknowledgements

This study was carried out with financial support of Department of Economic Analysis & Research (DEAR), National Bank for Agriculture & Rural Development (NABARD), Mumbai under research study entitled "An analytical study on value chain financing to high value agriculture in Eastern Uttar Pradesh".

References

Acharya, S.S. and N.L. Agarwal, 2007. *Agricultural Marketing in India*, Fifth Edition. Oxford and IBH Publishing Co. Pvt. Ltd., New Delhi.

Das, P. K. and M. U. Aquino, 2013. Value chain financing in agriculture: case studies from India. *APRACA FinServAccess,6.* Asia-Pacific Rural and Agricultural Credit Association (APRACA), Thailand.

FAO, 2014. Agricultural value chain development: threat or opportunity for women's employment? Gender and Rural Employment, *Policy Brief*, 4. FAO, Rome.

IFRI, 2013, <*https://southasia.ifpri.info/2013/10/22/mangoes-understanding-its-value-chain/*>

Igwenagu, M. O., D.O. Ohajianya, I.U.O. Nwaiwu, A.O. Gbolagun and N.C. Ehirim, 2020. Value chain mapping and actors' value-added share in the catfish value chain in IMO state, Nigeria. *J. Agric. Food Sci.,*18(2):120-134.

Kohls, R.L. and J.N. Uhls, 1967. *Marketing of Agricultural Products*. First Edition. Macmillan Publ. Co., US.

Likert, R. 1932. A technique for measurement of attitudes. *Archives Psychology*, 22(140), 1-55.

Miller, C. 2012. *Agricultural value chain finance strategy and design*. Technical Note, 8-12. International Fund for Agricultural Development (IFAD), Rome.

Miller, C. and J. Linda, 2010. *Agricultural value chain finance. tools and lessons*. FAO and Practical Action Publishing. Warwickshire, UK.

NABARD, 2020. Agriculture value chain financing: opportunities ahead/lack of access to affordable credit. *Sustaining the agriculture sector through Collectives, Cooperatives & FPOS post covid-19*'. NABARD, Mumbai.

NITI Ayog, 2018. *Demand and Supply Projections Towards 2033*. NITI Ayog, New Delhi.

Rutten, L. and I. Boto, 2014. Revolutionising Finance for Agri-Value Chains. *Brussels Rural Development Briefings*, 35. CTA, Brussels.

Setiya, P. 2018. 10 Features of Agriculture Value Chain Financing. RBI, Mumbai.

Sharma, V. P. and D. Jain, 2011. *High-value agriculture in India: past trends and future prospect*. Working Paper (W.P. No. 2011-07-02), IIM Ahmedabad.

Soundarrajan, P. and V. Nagrajan, 2015. A study on the agricultural value chain financing in India. *Agricultural Economics (AGRICECON)*, 61(1):31-38.

Stein, C. and J. Barron, 2017. *Mapping actors along value chains: integrating visual network research and participatory statistics into value chain analysis*. International Water Management Institute (IWMI) Colombo, Sri Lanka.

UP Horti. Dept. 2022. *District Horticulture Reports for 2022*. Dept. of Horticulture, Jaunpur & Varanasi.

Received: February, 2024; Revised: February, 2024; Accepted: April, 2024