ASIAN DEVELOPMENT BANK

TA-9689 REG: Analysis of Fruit and Vegetable Value Chains in Pakistan (52239-001)




November 23 , 2022

University of Agriculture, Faisalabad

OUTLINE OF THE PRESENTATION

- **Project brief**
- **Objectives of the Study**
- **Methodology**
    - Selection and prioritization of value chains
    - Sampling and data collection
    - Value chain mapping, margins and post-harvest losses analysis
    - Constraints in data collection
- **Findings of Value Chain Analysis**
    - Apple
    - Potato
    - Chilies (Green and Red)
- **Issues and Potential Interventions**

PROJECT BRIEF

Duration:	One year (2020-2021)
Project Funding:	89,925 USD
Commodities:	Apple, Potato and Chilies (Green and Red)
Project Team:	
	Dr. Abdul Ghafoor (International Lead)
	Dr. Mubashir Mehdi (National Expert)
	Dr. Hammad Badar (National Expert)

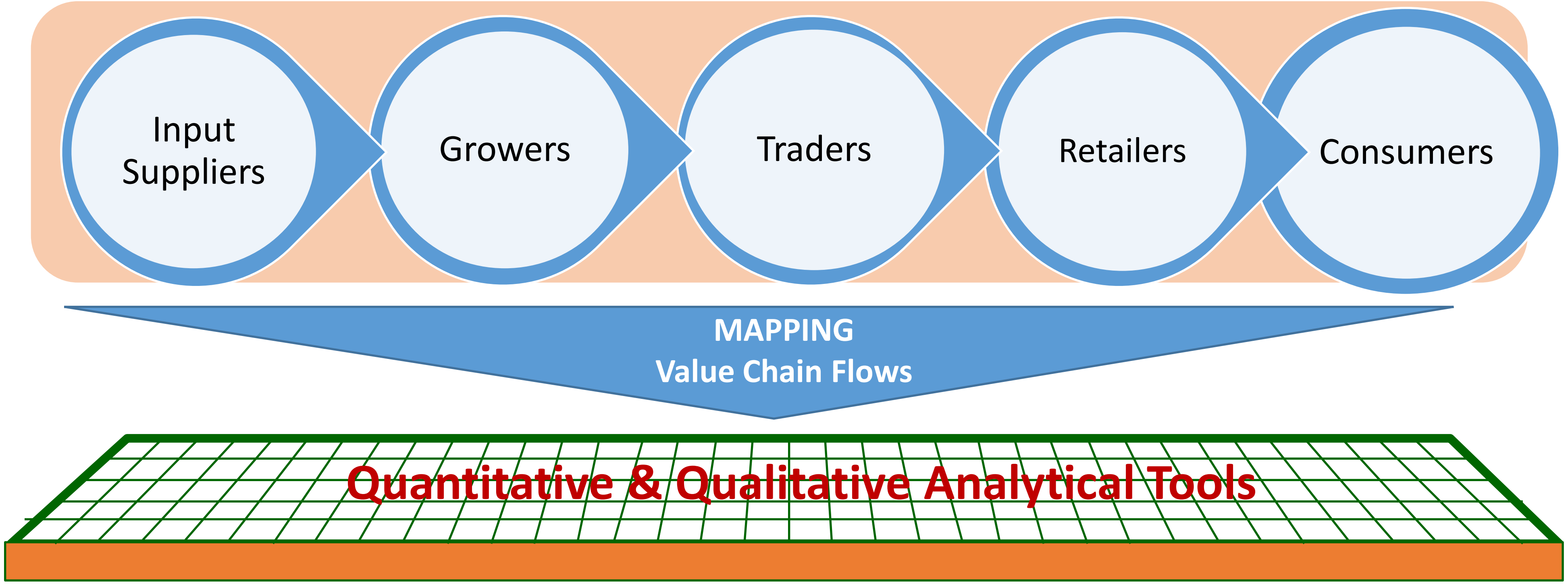
OBJECTIVES OF THE STUDY

The study conducts a thorough analysis of the value chains of selected fruits and vegetables with the following objectives;

1. To estimate post-harvest losses occurring in different segments of the value chains like harvesting, field-stacking, cleaning, packaging, storage, transportation and loading and unloading;
2. To calculate profitability (of farmers) in production of fruits and vegetables;
3. To study the role of middlemen and its impact on price and supply; and
4. To estimate availability and quality of cold storage facilities, transportation, packaging, etc.

METHODOLOGY

Value Chain Approach (VCA)



SELECTION & PRIORITIZATION OF COMMODITIES

- Identification of top five fruits and vegetables (area under cultivation)
- Commodity ranking based on multi-criteria index included;
  - Value chain size
  - Need for post-harvest loss management.
  - Growth potential
  - Need for infrastructural support
  - Govt. priority
- Inception workshop and final selection of commodities

Need for Infrastructural Support (relative weight 15%)

Ranking Criteria	
Level	Score
Very Low	1
Low	2
Medium	3
High	4

Size of the VC (relative weight 25%)

Ranking Criteria	
Net value (M USD)	Score
Less than 100	1
100-500	2
501 – 1000	3
>1000	4

Need for Post harvest Loss Management (relative weight 20%)

Ranking Criteria	
Level	Score
Very Low	1
Low	2
Medium	3
High	4

Growth Potential (relative weight 20%)

Ranking Criteria	
Prospective Value (M USD)	Score
Less than 100	1
100-500	2
501 – 1000	3
>1000	4

Govt. Priority (relative weight 20%)

Ranking Criteria	
Level	Score
Very Low	1
Low	2
Medium	3
High	4

DATA COLLECTION

Review of secondary data

Development of questionnaire

Pre-testing of questionnaire

Finalization of questionnaire

PRIMARY DATA COLLECTION

Consumers
Karachi, Lahore, Faisalabad and Islamabad

Chain intermediaries
From retailers backwards through pre-harvest contractor, commission agents, wholesalers to growers and input suppliers

Growers & Input suppliers
Apple: Dist. Qila Saifullah and Dist. Ziarat
Chilies: Dist. Tando Allah Yar, Dist. Umerkot (Kunri, Somaro), Dist. Mirpurkhas
Potatoes: Dist. Okara and Dist. Sahiwal

STUDY SAMPLE

Actors	Commodities				Total
	Apple	Potato	Green Chilies	Red Chilies	
Input Suppliers	5	5	5	5	20
Growers	30	30	30	30	120
Contractors/Collectors	12	12	12	12	48
Commission Agents	12	12	12	12	48
Wholesalers	12	12	12	12	48
Retailers	28	28	28	28	112
Exporters	3	3	-	3	9
Consumers	100	100	100	100	400
Service providers	3	3	3	3	12
Public stakeholders	2	2	2	2	8
Total	**207**	**207**	**204**	**207**	**825**

Snowball sampling: tracing of chain members,
Separate questionnaires were prepared for different chain actors
Proportionate sampling: to gain exhaustive information with in a time constraint scenario

FIELD SURVEYS

ADB
ASIAN DEVELOPMENT BANK

Growers’ survey

Qila Saifullah

Okara

Kunri

Market survey

Faisalabad

Lahore

Karachi

Consumers’ survey

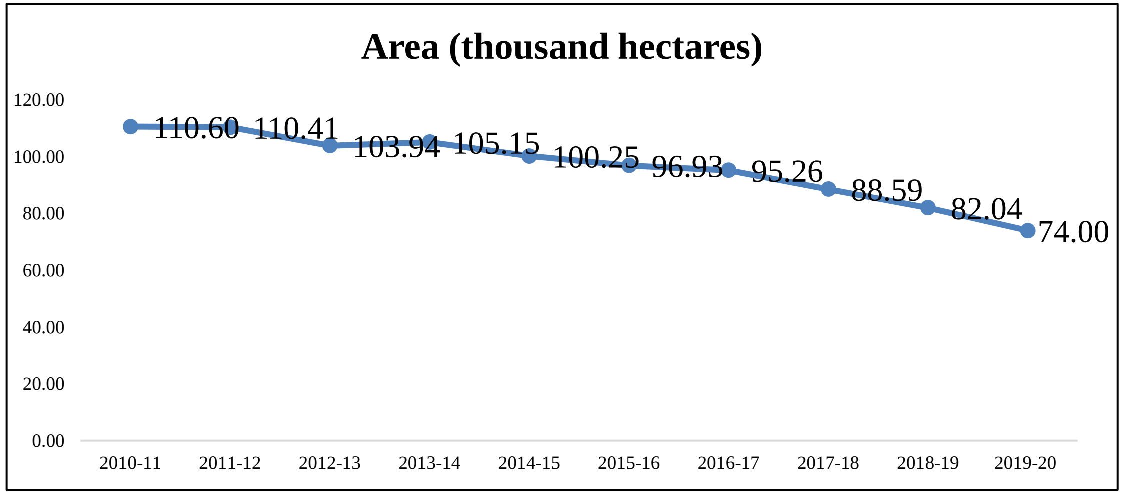
Faisalabad

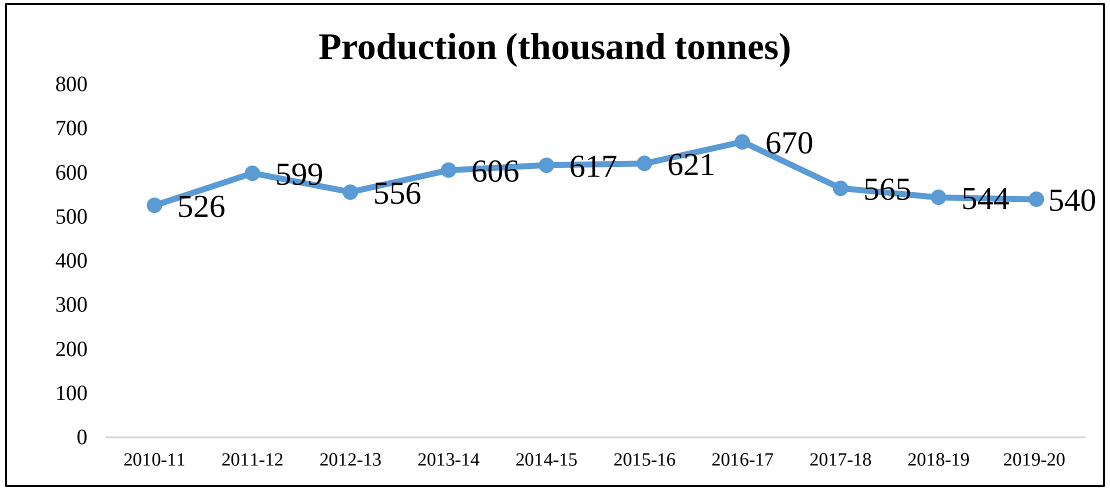
Lahore

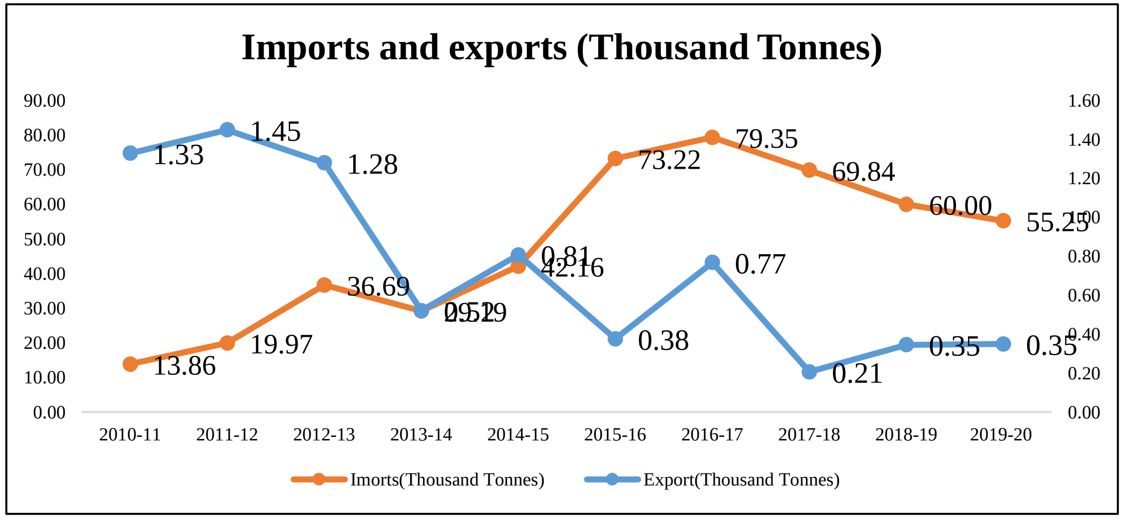
Islamabad

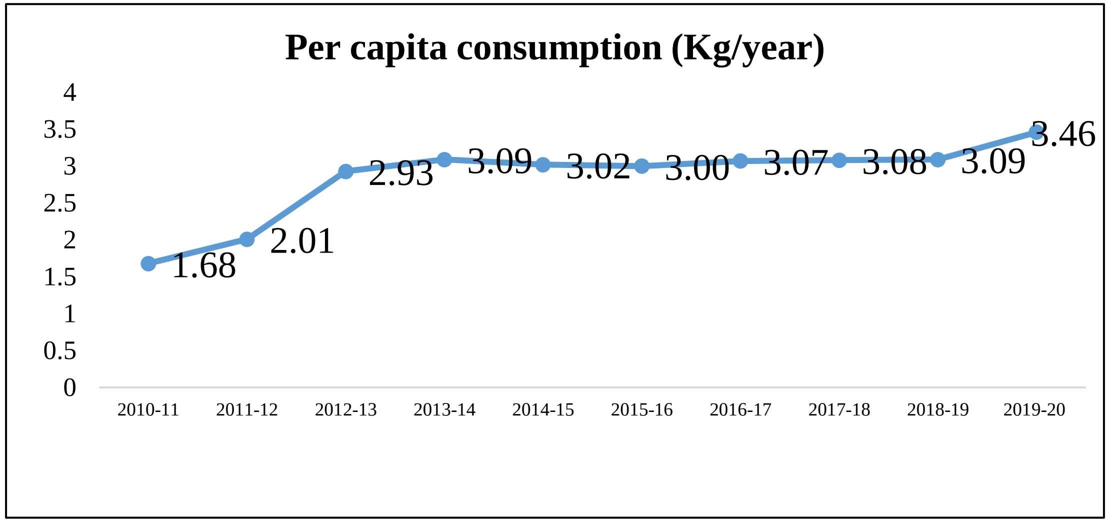
APPLE

MARKET ANALYSIS - APPLE



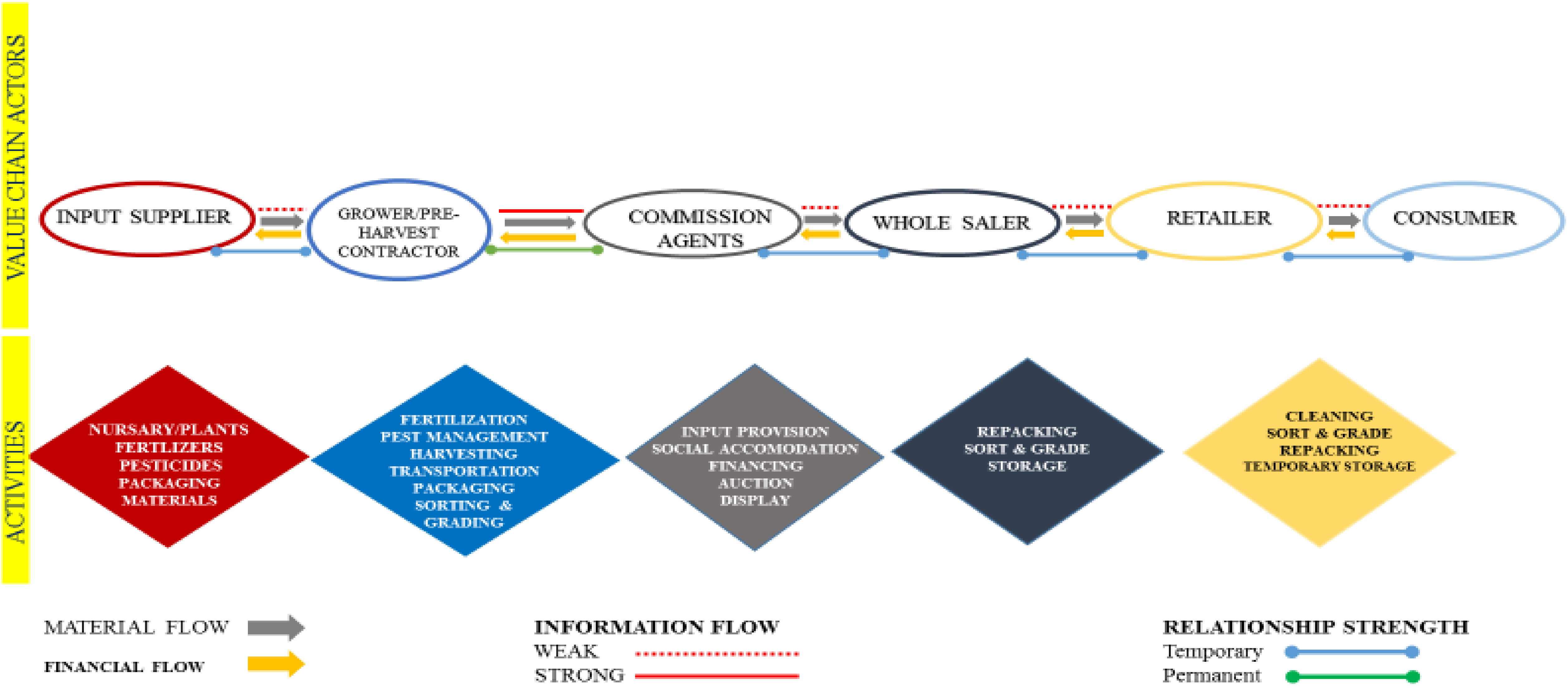






Source: (GOP, 2020-21)

VALUE CHAIN MAP - APPLE



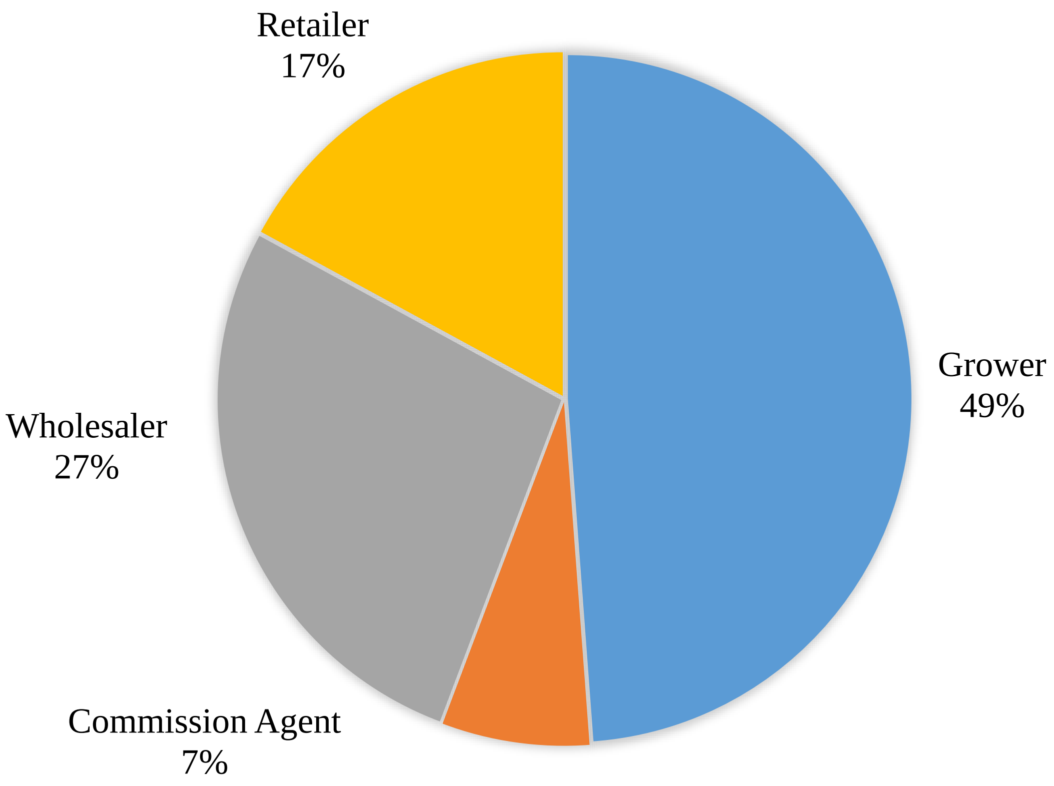
PROFIT AND MARGIN DISTRIBUTION (PER KG)
KALA KULU APPLE

	Costs			Revenues	Profits		Margins	
Chain actor	Unit total cost	Added cost	% Added cost	Unit price	Unit profit	% Total profits	Unit margins	% Retail price
Grower	42	42	88.24	**62.63**	20.63	28.11	62.63	51.76
Commission agent	62.75	0.12	0.25	72.11	9.36	12.75	9.48	7.84
Wholesaler	74.38	2.27	4.77	93	18.62	25.37	20.89	17.26
Retailer	96.21	3.21	6.74	**121**	24.79	33.77	28.00	23.14
Total	-	**47.6**	**100**	-	**73.40**	**100**	**121.00**	**100**

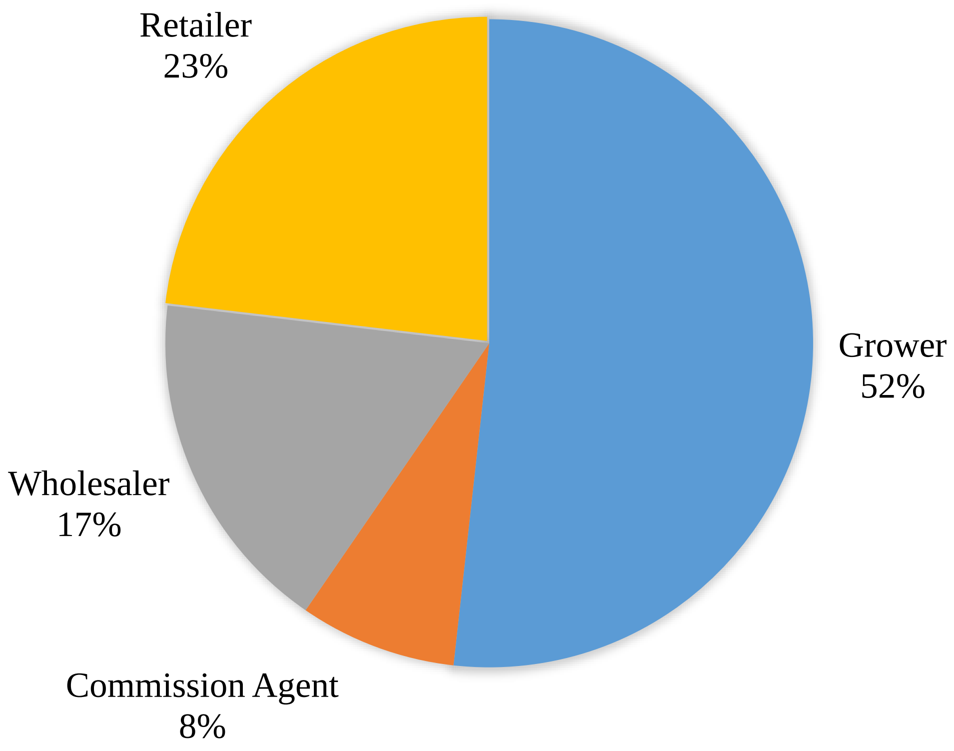
PROFIT AND MARGIN DISTRIBUTION (PER KG) GACHA APPLE

Chain actor	Costs			Revenues	Profits		Margins	
	Unit total cost	Added cost	% Added cost	Unit price	Unit profit	% total profits	Unit margins	% Retail price
Grower	42.00	42.00	88.24	**60.04**	18.04	23.93	60.04	48.81
Commission agent	60.16	0.12	0.25	68.57	8.41	11.15	8.53	6.94
Wholesaler	70.84	2.27	4.77	102.0	31.16	41.33	33.43	27.18
Retailer	105.21	3.21	6.74	**123.0**	17.79	23.59	21.00	17.07
Total	-	**47.60**	**100**	-	**75.40**	**100**	**123.00**	**100**

SHARE (%) IN CONSUMER RUPEES - APPLE



Gacha variety



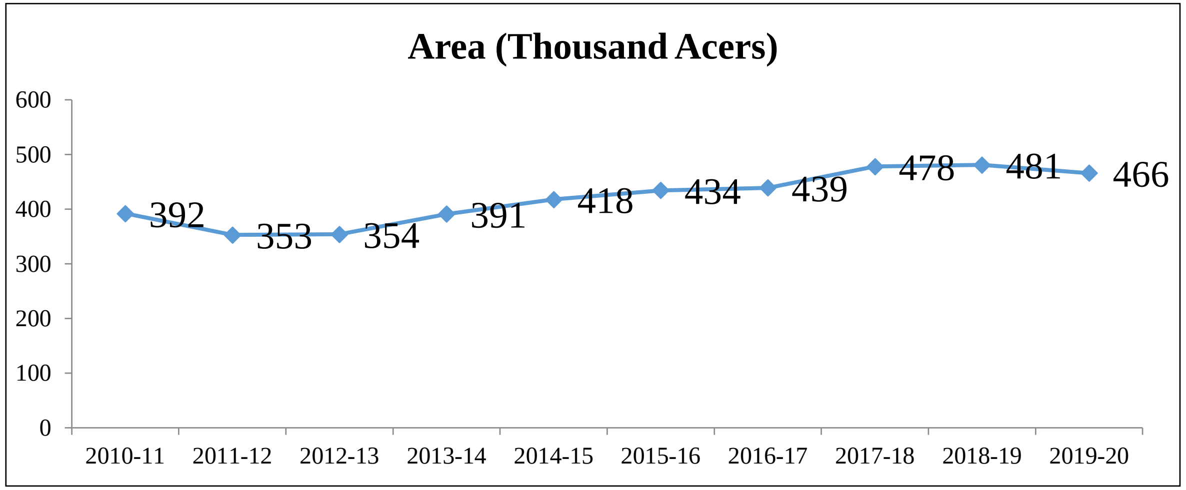
Kala Kulu variety

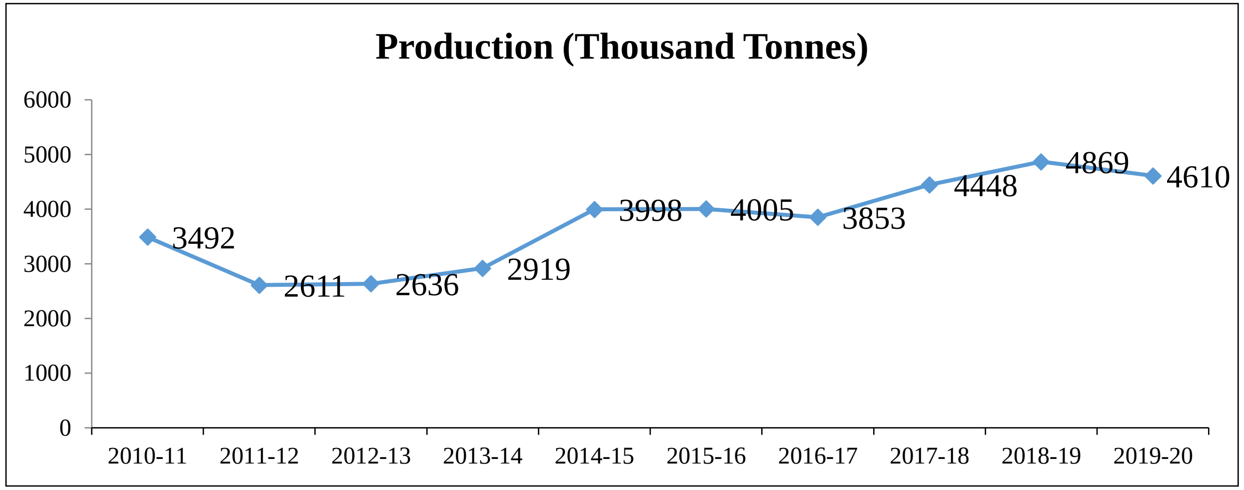
POST-HARVEST LOSSES ANALYSIS- APPLE

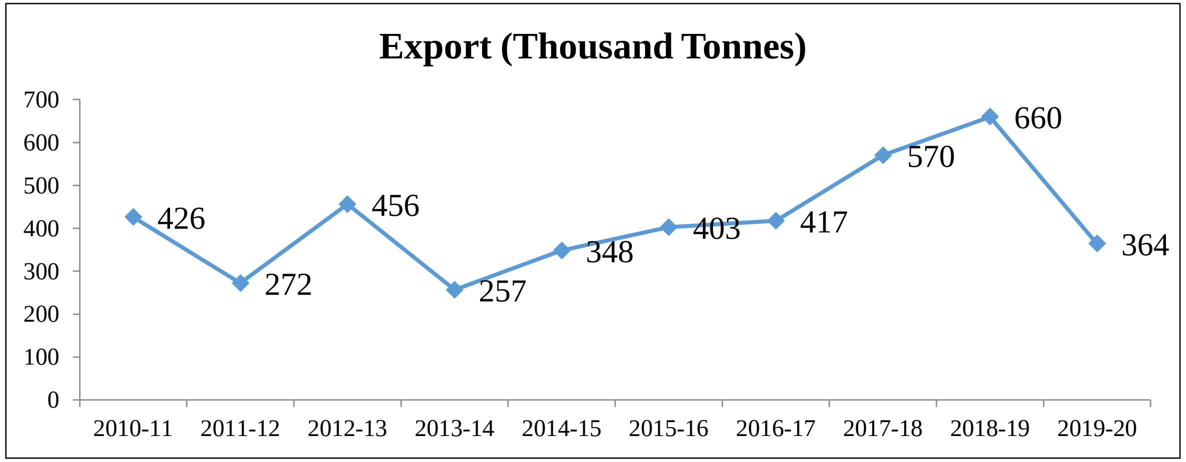
Levels	Gacha (26%)				Kala Kulu (25%)			
	Quantity Handled		Postharvest Losses		Quantity Handled		Postharvest Losses	
	Volume (Kg) A	Value (PKR)	Volume (Kg)	Values (PKR)	Volume (Kg) B	Value (PKR)	Volume (Kg)	Values (PKR)
Farm	11364.5	682324.6	1591.0 (14% of A)	95525.4	15548.6	973811.3	2021.3 (13% of B)	126595.5
Market	9773.5	807972.8	527.8 (5% of A)	43630.5	13527.3	1127231.3	730.5 (5% of B)	60870.5
Retail	9245.7	952307.4	554.7 (6% of A)	57138.4	12796.8	1254090.4	767.8 (6% of B)	75245.4
Consumer	8691.0	1068988.1	86.9 (1% of A)	10689.9	12029.0	1455512.7	120.3 (1% of B)	14555.1
Total	-	**3511592.9**	**2760.4**	**206984.3**	-	**4810645.7**	**3639.9**	**277266.5**

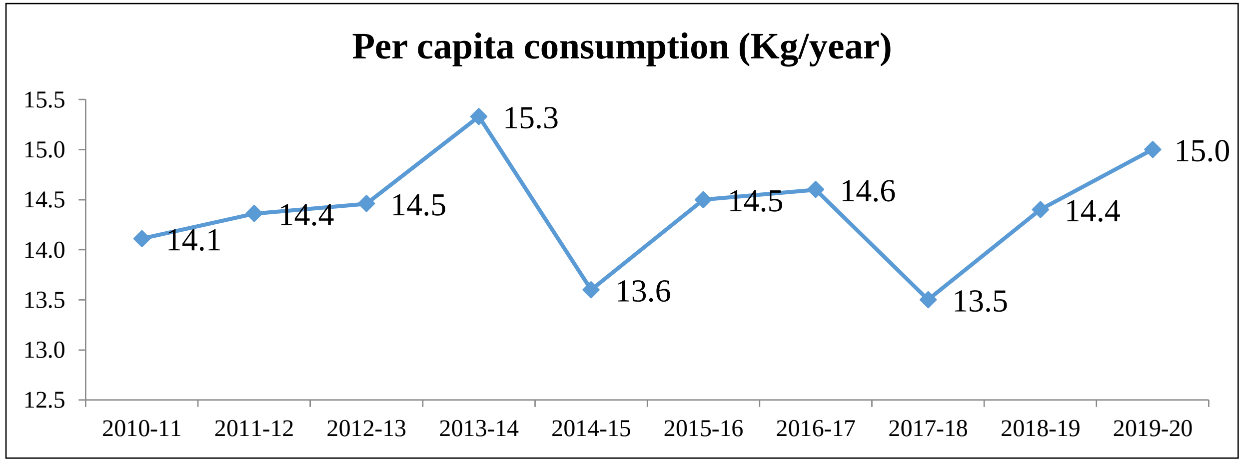
POTATO

MARKET ANALYSIS - POTATOES



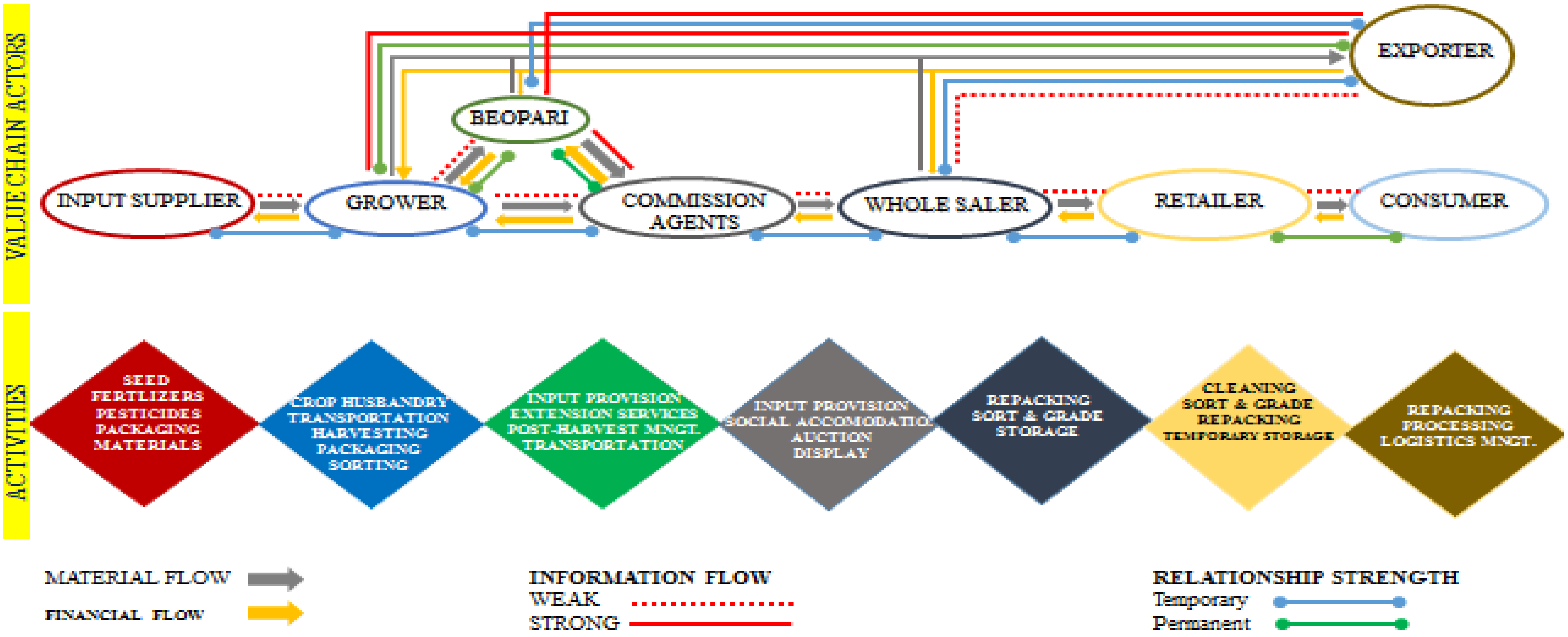






Source: (GOP, 2020-21)

VALUE CHAIN MAP - POTATO



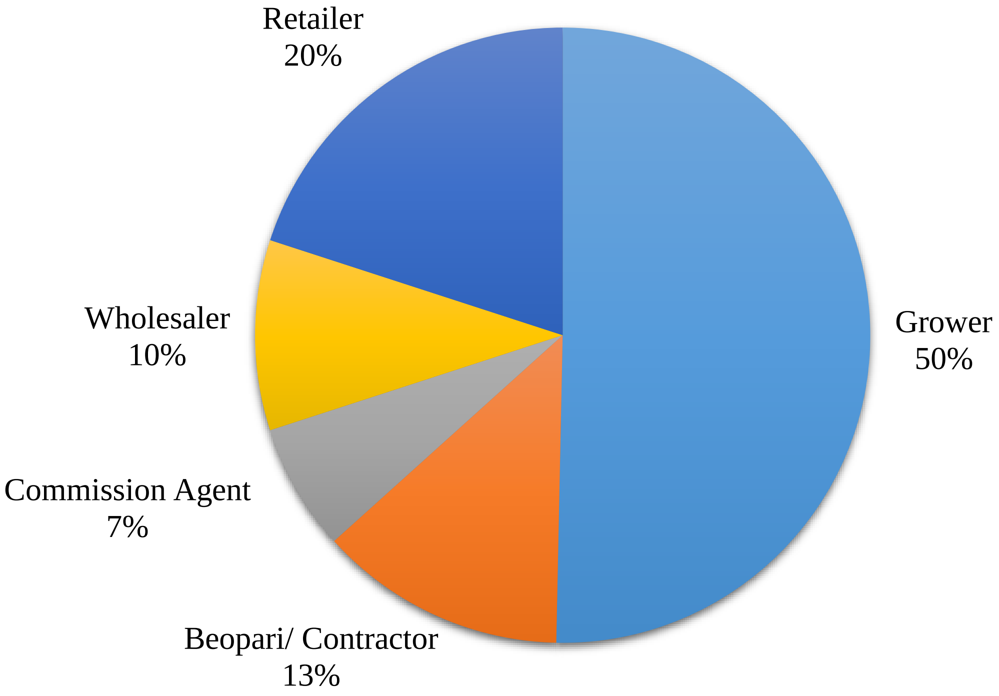
PROFIT & MARGIN DISTRIBUTION (PER KG) RED SKIN POTATO

Chain actor	Costs			Revenues	Profits		Margins	
	Unit total cost	Added cost	% Added cost	Unit Price	Unit Profit	% Total Profits	Unit Margins	% Retail Price
Grower	17.0	17.0	53.3	**30.2**	13.2	47.0	30.2	50.3
Beopari/ Contractor	34.1	3.9	12.2	38.0	3.9	13.9	7.8	13.0
Commission agent	40.0	2.0	6.3	42.0	2.0	7.1	4.0	6.7
Wholesaler	45.0	3.0	9.4	48.0	3.0	10.7	6.0	10.0
Retailer	54.0	6.0	18.8	**60.0**	6.0	21.4	12.0	20.0
Total	**-**	**31.9**	**100**	**-**	**28.1**	**100**	**60.0**	**100**

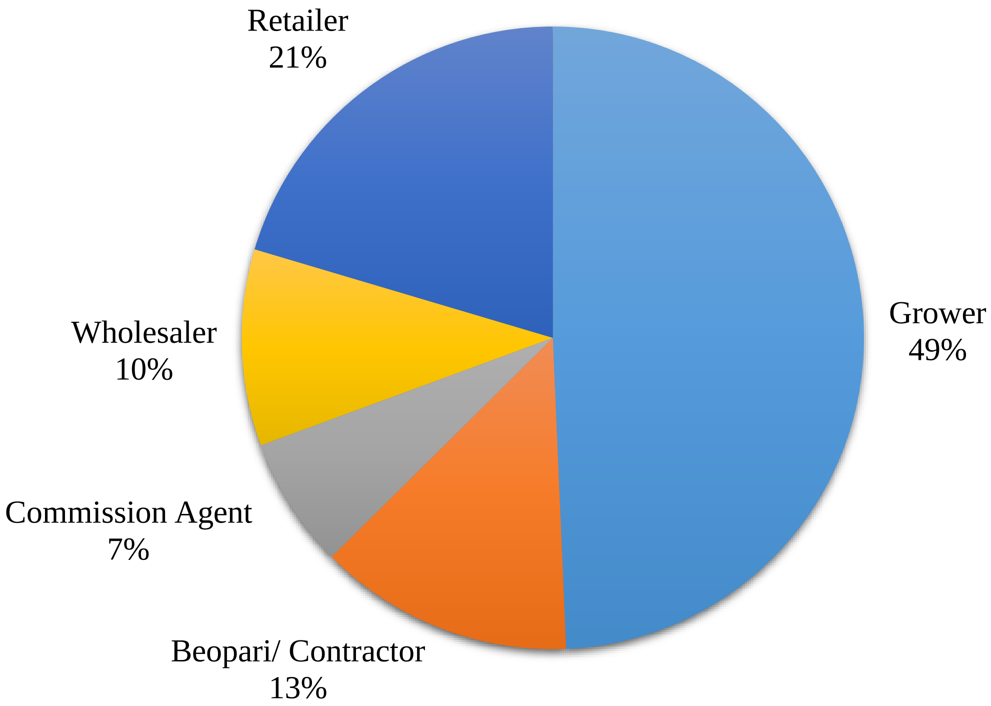
PROFIT & MARGIN DISTRIBUTION (PER KG) WHITE SKIN POTATO

Chain actor	Costs			Revenues	Profits		Margins	
	Unit total cost	Added cost	% Added cost	Unit Price	Unit Profit	%Total Profit	Unit Margins	% Retail Price
Grower	17.5	17.5	54.0	**29.0**	11.5	43.6	29.0	49.3
Beopari/ Contractor	32.9	3.9	12.0	36.8	3.9	14.8	7.8	13.3
Commission agent	38.8	2.0	6.2	40.8	2.0	7.6	4.0	6.8
Wholesaler	43.8	3.0	9.3	46.8	3.0	11.3	6.0	10.2
Retailer	52.8	6.0	18.5	**58.8**	6.0	22.7	12.0	20.4
Total	-	**32.4**	**100**	-	**26.4**	**100**	**58.8**	**100**

SHARE (%) IN CONSUMER RUPEES - POTATO



Red Skin variety



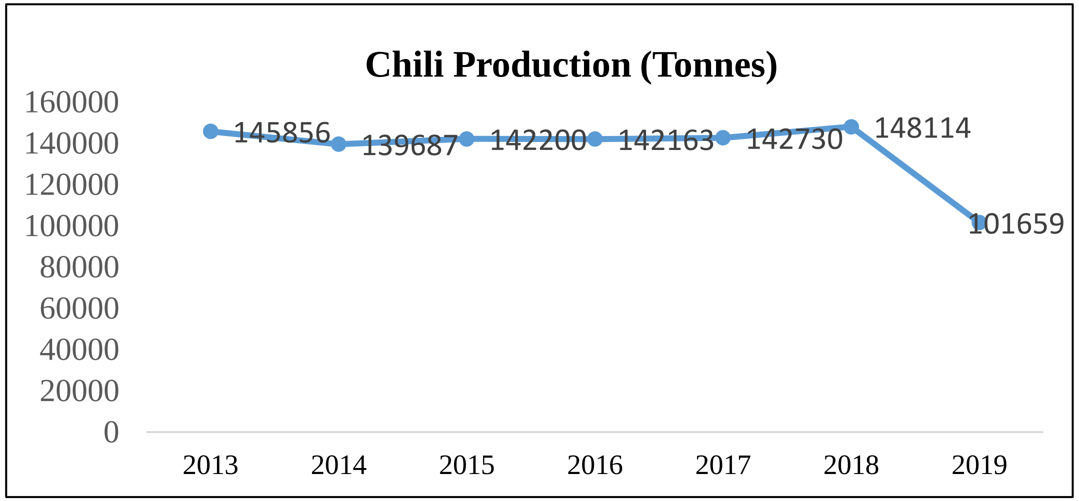
White Skin variety

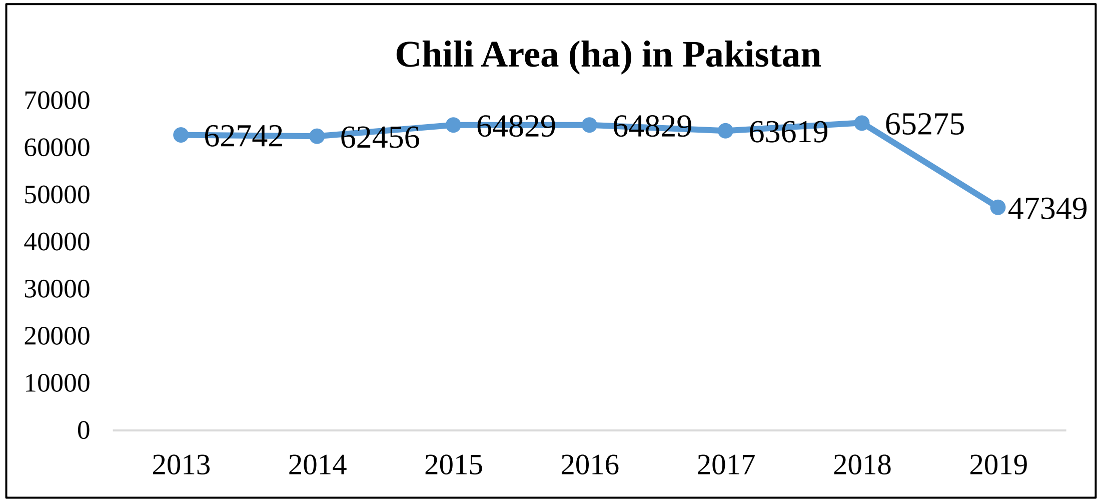
POST-HARVEST LOSSES ANALYSIS- POTATO

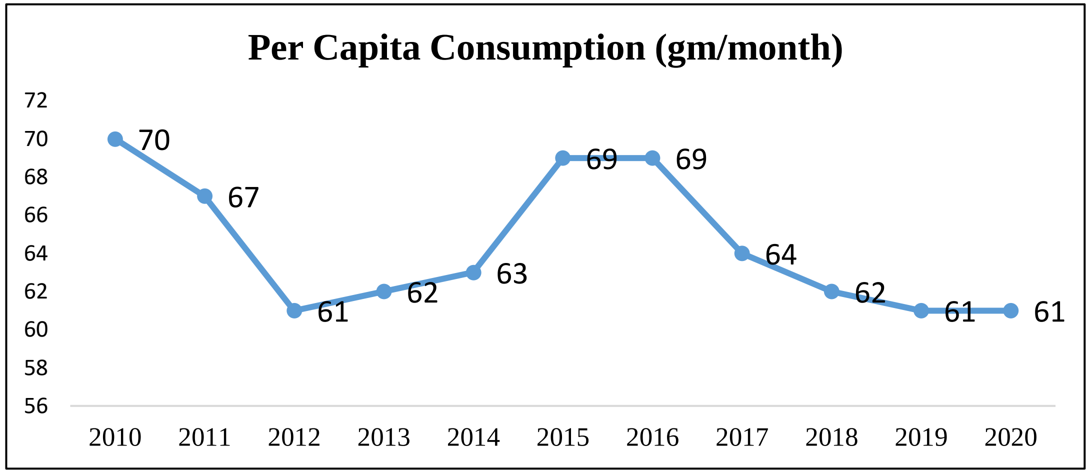
Levels	Red Skin variety (19.17%)				White Skin variety (20.19%)			
	Quantity Handled		Postharvest Losses		Quantity Handled		Postharvest Losses	
	Volume (Kg) A	Value (PKR)	Volume (Kg)	Values (PKR)	Volume (Kg) B	Value (PKR)	Volume (Kg)	Values (PKR)
Farm	10800	368280	864.0 (8% of A)	29462	12000	394800	1080 (9% of B)	35532
Market	9936	447120	794.9 (8% of A)	35770	10920	478296	873.6 (8% of B)	38264
Retail	9141	548467	274.2 (3% of A)	16454	10046	582691.2	301.4 (3% of B)	17481
Consumer	8867	691617	15.1 (0.17% of A)	1176	9745	584700	18.5 (0.19% of B)	1111
Total	-	**2055484**	**1948.2**	**82862**	-	**2040488**	**2273.5**	**92387**

GREEN CHILIES

MARKET ANALYSIS – GREEN CHILIES

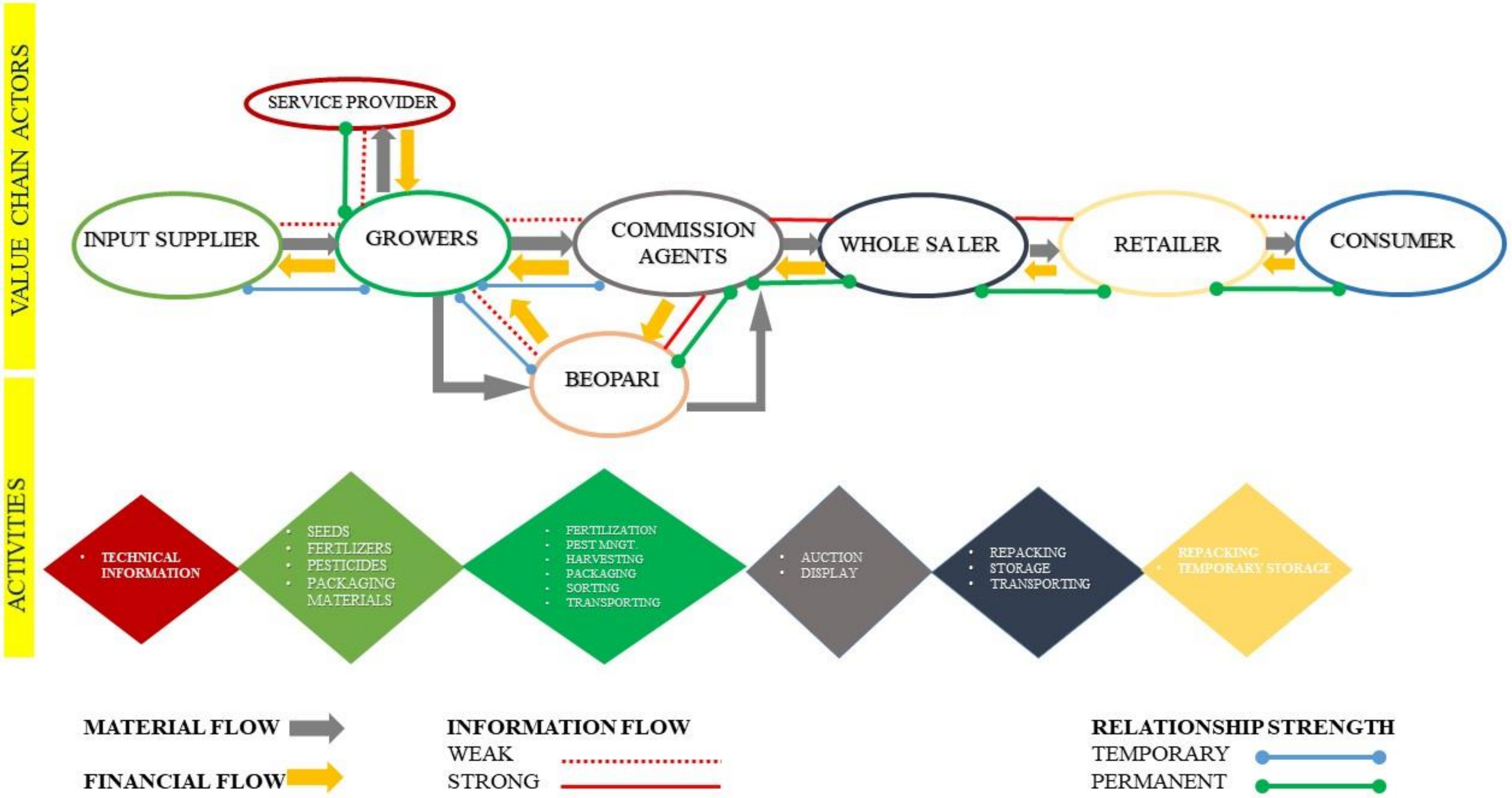






Source: (GOP, 2020-21)

VALUE CHAIN MAP – GREEN CHILIES



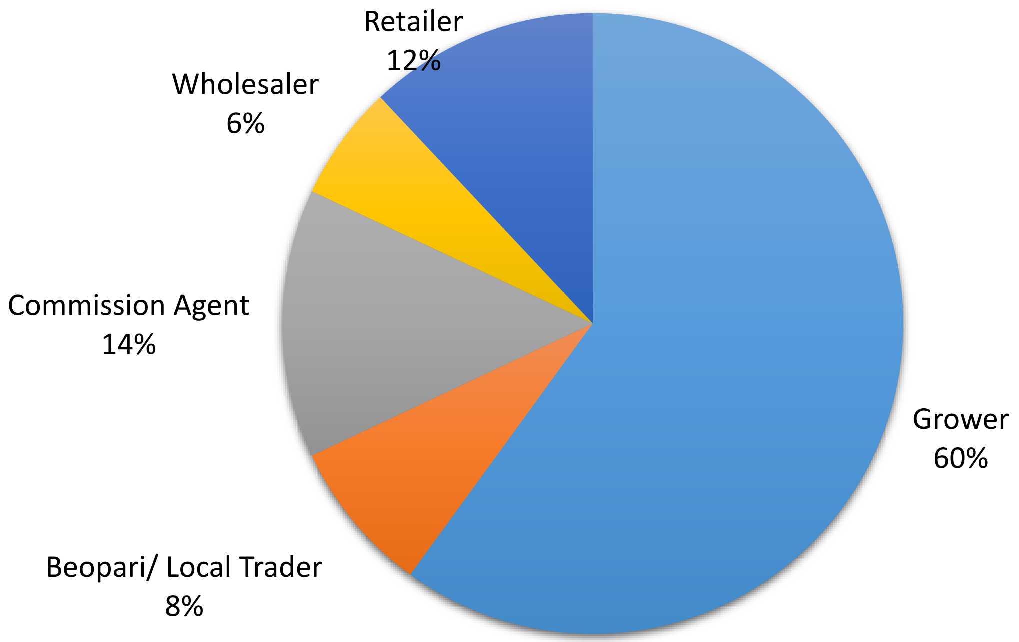
PROFIT & MARGIN DISTRIBUTION (PER KG) LOCAL VARIETIES

Chain Actor	Costs			Revenues	Profits		Margins	
	Unit total cost	Added cost	% Added cost	Unit price	Unit profit	% Total profits	Unit margins	% Retail price
Grower	45	45	71.43	**60**	15	40.54	60	60.00
Beopari/ Local Trader	63	3	4.76	68	5	13.51	8	8.00
Commission Agent	75	7	11.11	82	7	18.92	14	14.00
Wholesaler	86	4	6.35	88	2	5.41	6	6.00
Retailer	92	4	6.35	**100**	8	21.62	12	12.00
Total	-	**63**	**100**	-	**37**	**100**	**100**	**100**

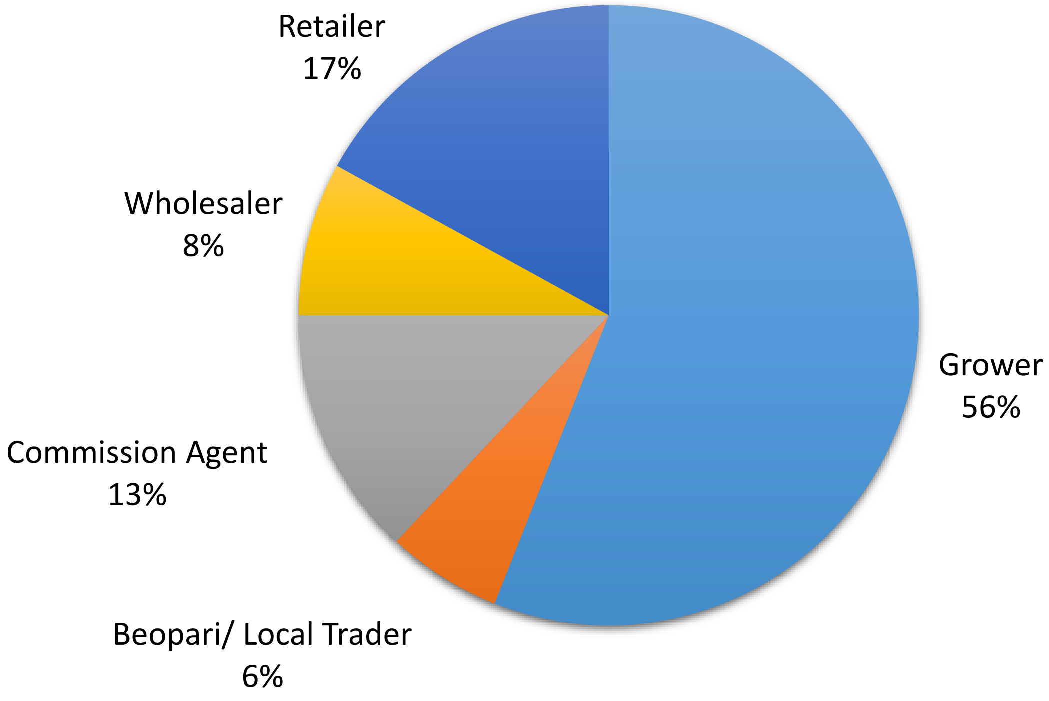
PROFIT & MARGIN DISTRIBUTION (PER KG) HYBRID VARIETY GREEN CHILIES

Chain Actor	Costs			Revenues	Profits		Margins	
	Unit total cost	Added cost	% Added cost	Unit price	Unit profit	% Total profits	Unit margins	% Retail price
Grower	38	38	64.41	**53**	15	41.67	53	55.79
Beopari/ Local Trader	56	3	5.08	59	3	8.33	6	6.32
Commission Agent	65	6	10.17	71	6	16.67	12	12.63
Wholesaler	75	4	6.78	79	4	11.11	8	8.42
Retailer	87	8	13.56	**95**	8	22.22	16	16.84
Total	-	**59**	**100**	-	**36**	**100**	**95**	**100**

SHARE (%) IN CONSUMER RUPEES – GREEN CHILIES



Local variety



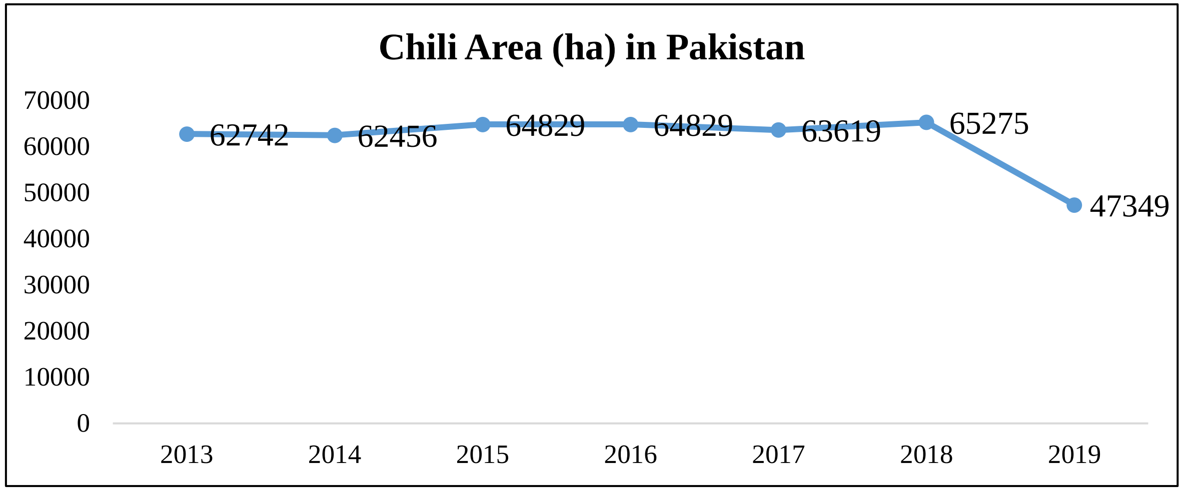
Hybrid variety

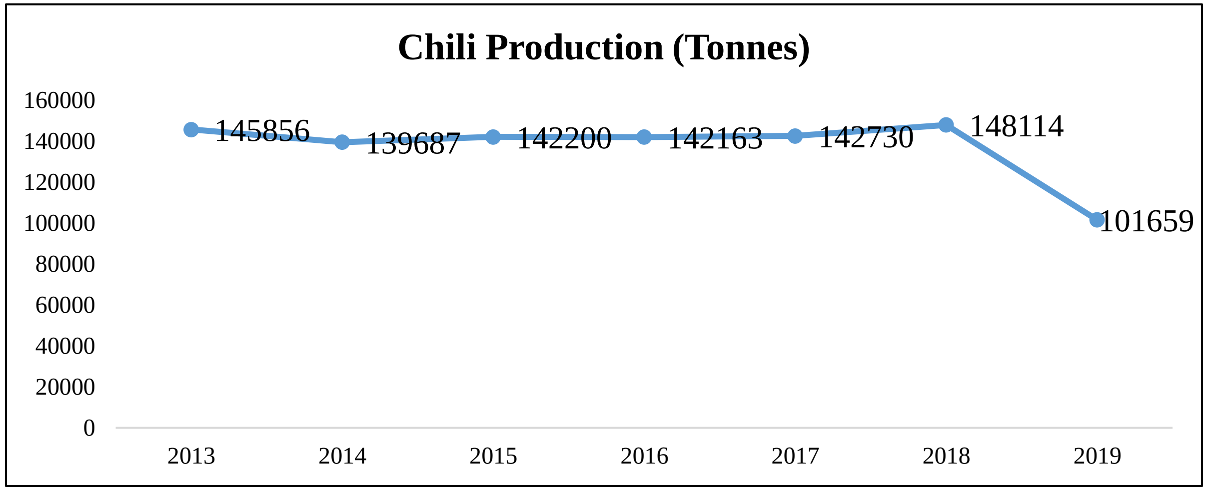
POST-HARVEST LOSSES ANALYSIS– GREEN CHILIES

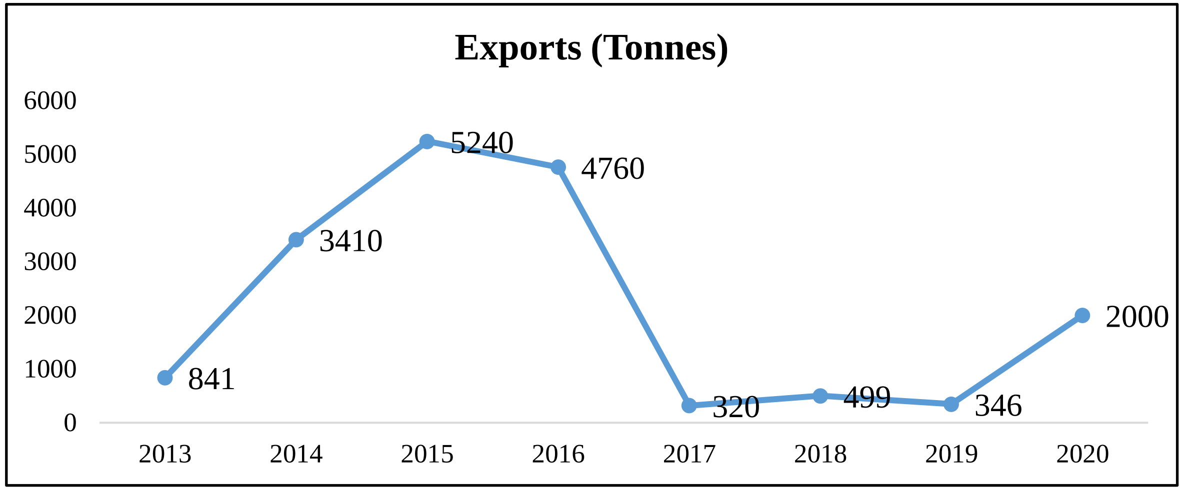
Levels	Local variety (15%)				Hybrid variety (15%)			
	Quantity Handled		Postharvest Losses		Quantity Handled		Postharvest Losses	
	Volume (Kg) A	Value (PKR)	Volume (Kg)	Values (PKR)	Volume (Kg) B	Value (PKR)	Volume (Kg)	Values (PKR)
Farm	1960	117600	118.0 (6% of A)	5880	2160	114480	130 (6% of B)	6869
Market	1842	143676	55.0 (3% of A)	4310	2030	138040	81.0 (4% of B)	5522
Retail	1787	160830	71.0 (4% of A)	5575	1949	165665	58.0 (3% of B)	4970
Consumer	1716	171600	34.0 (2% of A)	3432	1891	179645	38.0 (2% of B)	3593
Total	--	**593791**	**278**	**19197**	--	**597830**	**307**	**20954**

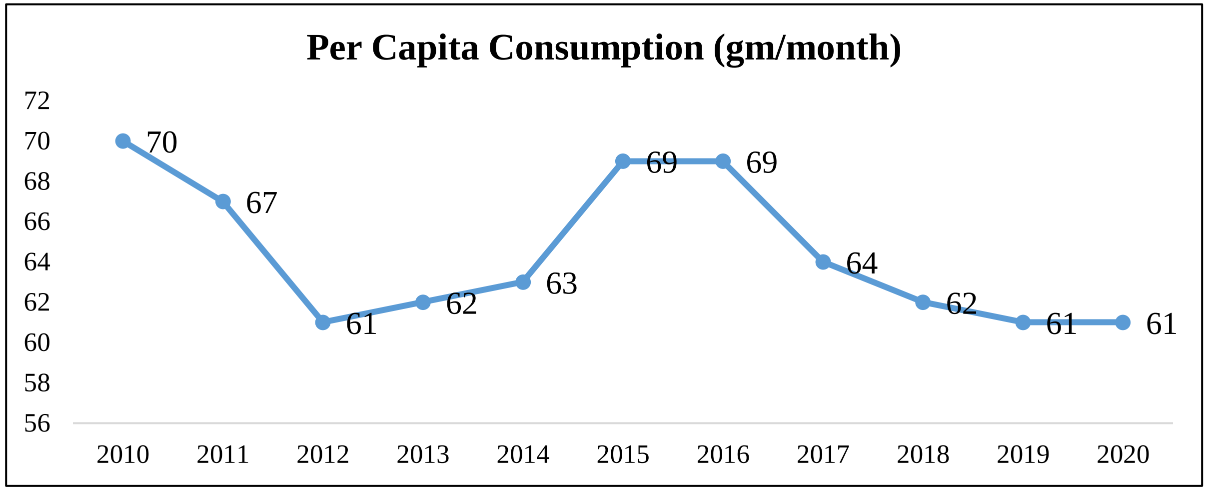
RED CHILIES

MARKET ANALYSIS – RED CHILIES



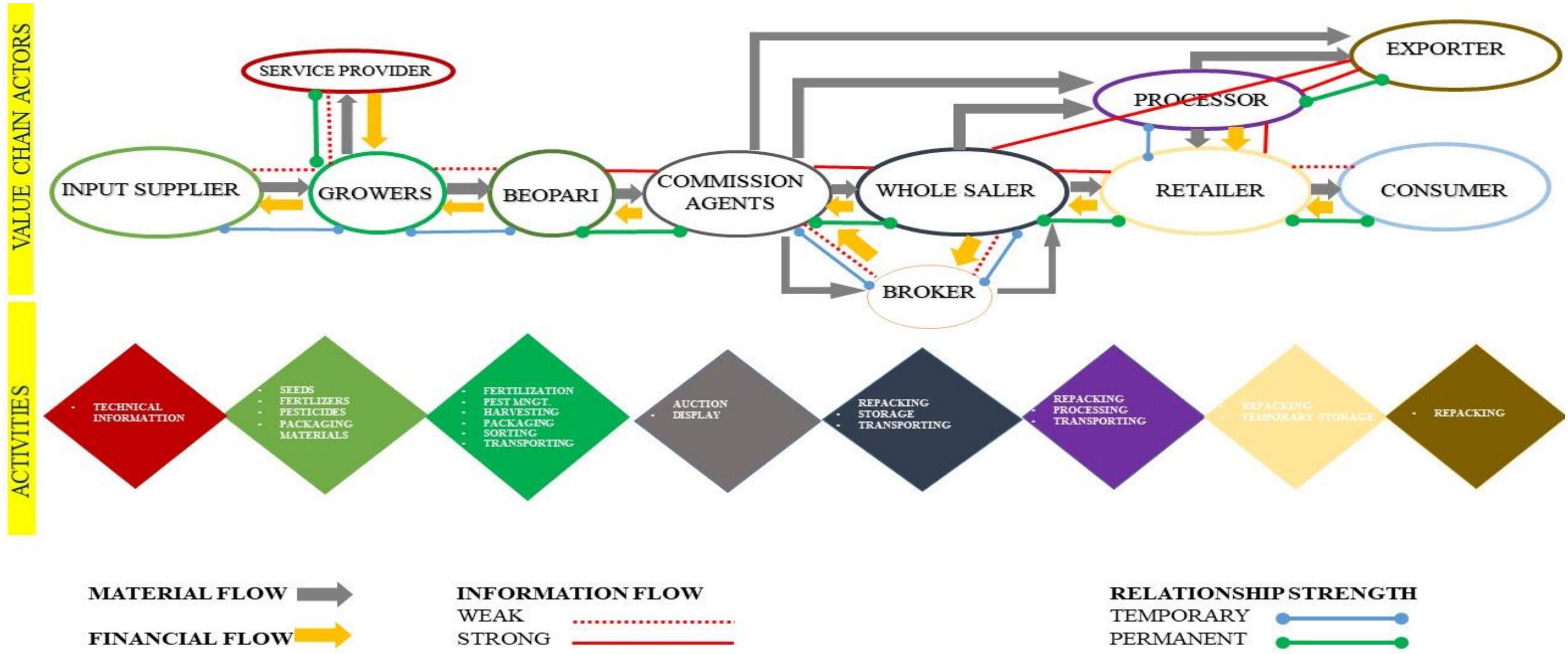






Source: (GOP, 2020-21)

VALUE CHAIN MAP – RED CHILIES



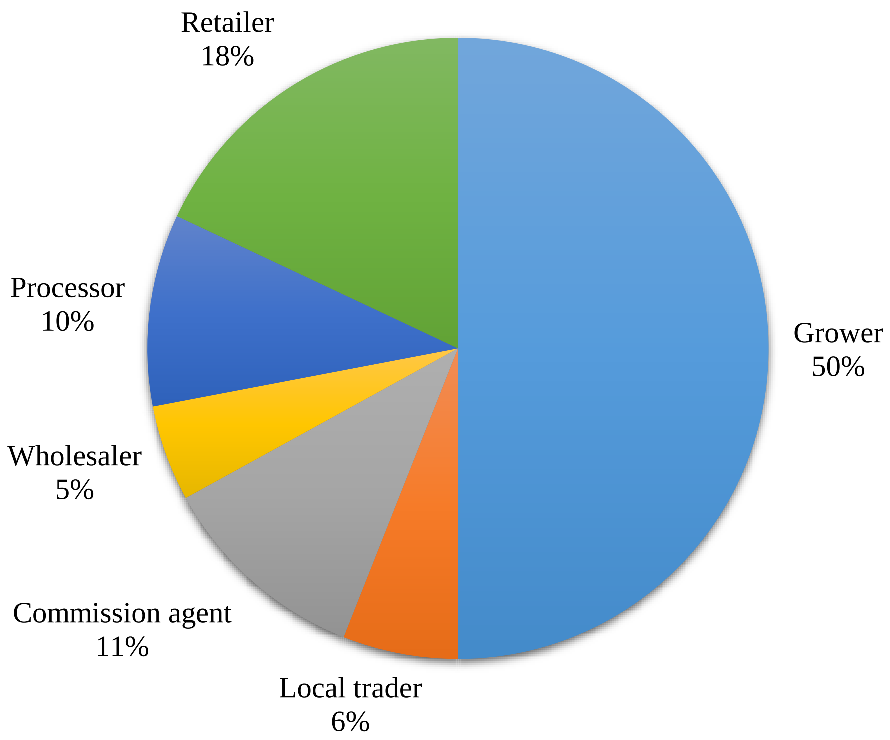
PROFIT & MARGIN DISTRIBUTION (PER KG) LOCAL VARIETY RED CHILIES

Chain actor	Costs			Revenues	Profits		Margins	
	Unit total cost	Added cost	% Added cost	Unit Price	Unit Profit	% Total Profits	Unit Margins	% Retail Price
Grower	450	450	65.6	**500**	50	15.9	500	52
Beopari/ Contractor	541	41	6	584	43	13.7	84	6
Commission agent	642	58	8.4	700	58	18.4	116	12
Wholesaler	720	20	2.9	750	30	9.6	50	5
Processor	803	53	7.7	856	53	16.9	106	11
Retailer	920	64	9.3	**1000**	80	25.4	144	14
Total	-	**686**	**100**	-	**314**	**100**	**1000**	**100**

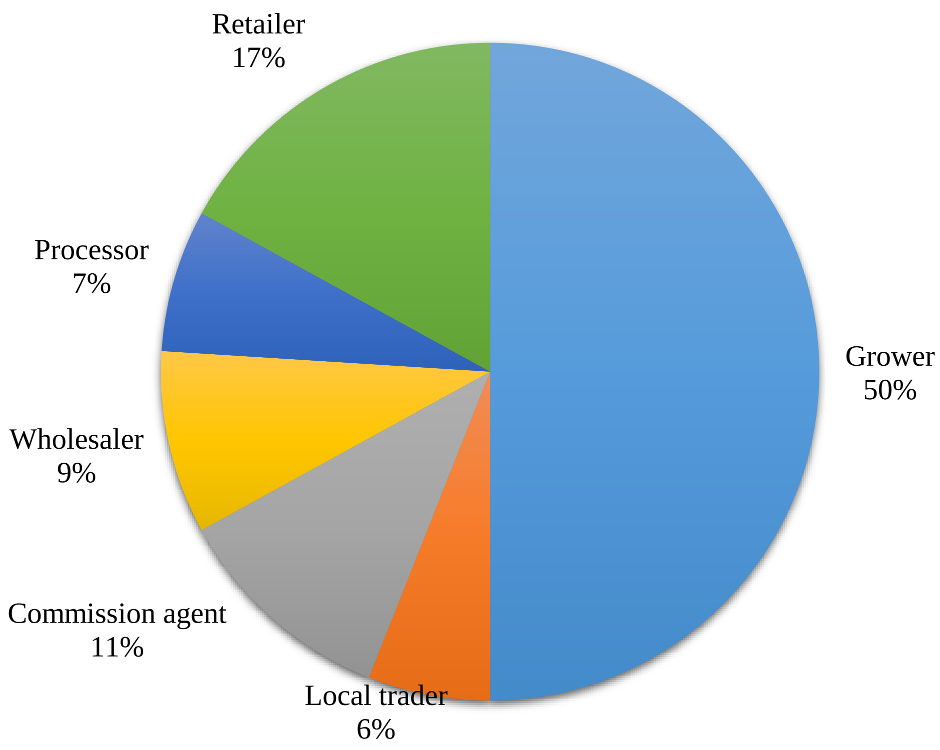
PROFIT & MARGIN DISTRIBUTION (PER KG) HYBRID VARIETY RED CHILIES

Chain actor	Costs			Revenues	Profits		Margins	
	Unit total cost	Added cost	% Added cost	Unit Price	Unit Profit	%Total Profit	Unit Margins	% Retail Price
Grower	400	400	49.4	**400**	50	17	400	49
Beopari/ Contractor	477	77	9.5	504	27	9.2	94	6
Commission agent	564	87	10.7	610	46	15.6	106	12
Wholesaler	659	95	11.7	710	51	17.3	100	11
Processor	760	101	12.5	790	30	10.2	90	10
Retailer	810	50	6.2	**900**	90	30.6	110	12
Total	-	**810**	**100**	-	**294**	**100**	**910**	**100**

SHARE (%) IN CONSUMER RUPEES – RED CHILIES



Local variety



Hybrid variety

POST-HARVEST LOSSES ANALYSIS– RED CHILIES

Levels	Local variety (17%)				Hybrid Variety (17%)			
	Quantity Handled		Postharvest Losses		Quantity Handled		Postharvest Losses	
	Volume (Kg) A	Value (PKR)	Volume (Kg)	Values (PKR)	Volume (Kg) B	Value (PKR)	Volume (Kg)	Values (PKR)
Farm	1120	582400	78.0 (7% of A)	40768	2000	900000	140.0 (7% of B)	63000
Market	1042	750240	52.0 (5% of A)	37440	1860	1302000	93.0 (5% of B)	65100
Retail	990	841500	30.0 (3% of A)	25245	1767	1413600	56.0 (3% of B)	92700
Consumer	960	960000	19.0 (2% of A)	19000	1711	1625450	34.0 (2% of B)	32300
Total	-	**3134140**	**179**	**122453**	-	**5241050**	**323**	**253100**

COMMON ISSUES IDENTIFIED ALONG THE CHAINS

STAGES	ISSUES
Production	• Unavailability of certified seeds / nursery plants • High cost of inputs / Production • Traditional crop management • Lack of access to formal sources of credit
Post-harvest management	• Manual harvesting • Lack of skilled and trained labor • Packing size, material and practices • Transportation (poor farm-to-market roads and vehicles) • Limited modern storage facilities • Lack of mechanical logistics
Marketing	• Inadequate market infrastructure • Lack of collaborative/integrated relationships among chain actors • Price fluctuations • Lack of standardization and branding • Wholesale market management issues • Traditional retailing practices

Issues and Interventions-Apples

STAGES	Issues	Interventions	Responsibility
Production	• Uncertified nursery plants	• At least one certified nursery in each district	• Dept. of Agriculture should facilitate, train and supervise private sector
	• Shortage of irrigation water	• Development of rainfall water storage facilities (Mini Dams)	• Relevant Govt. agencies
		• Subsidized solar energy equipment/tube wells	• Relevant Govt. agencies and private sector
	• Inappropriate soil and water testing facilities	• At least one lab/mobile lab in each district	• Dept. of Agriculture
Post-harvest management	• No cold storage facility in production areas	• Establishment of cold storage facilities in dist. Qila Saifullah and Ziarat	• Private sector should be encouraged and incentivized
	• Traditional packing material and practices (wooden box)	• Promotion of corrugated packaging (8-12 kg)	• Relevant Govt. agencies and private sector
	• Manual practices/untrained labour	• Capacity building of local labour	• Extension dept. and development agencies

Issues and Interventions-Apples

STAGES	Issues	Interventions	Responsibility
Marketing	• Inadequate marketing infrastructure • Lack of standards, grades and branding	• Development of modern markets in the production areas • Development and enforcement of grades and standards	• Provincial government and private sector engagement • Relevant Govt. agencies and private sector

Issues and Interventions-Potatoes

STAGES	Issues	Interventions	Responsibility
Production	• Reliance on imported seed	• Local variety development and commercialization with regularization of seed import	• Provincial/Federal department and seed importers
Post-harvest management	• Poor harvesting equipment and practices • Non standardized packaging size and material	• Advancement of local farm equipment industry and training of labour • Strengthening of packaging industry and promotion of uniform packaging size (50-55kg)	• Private sector and vocational training institutes • Private sector and PAMRA
Marketing	• Non-existence of quality grades and standards • Poor market facilities in production areas	• Development and enforcement of grades and standards • Upgradation/improvement of Dist. Okara and Sahiwal wholesale markets	• PAMRA in Punjab • Govt. of Punjab and market stakeholders

Issues and Interventions-Chilies

STAGES	Issues	Interventions	Responsibility
Production	• Poor quality seed/nursery • Shortage of irrigation water • Decreasing productivity potential	• At least one certified nursery in each district • Promotion of water saving technologies • High yielding varieties	• Private sector with public sector facilitation • Sindh agriculture department • Federal and provincial research institutes
Post-harvest management	• Traditional drying practices • Improper storage and lack of cold chain facility	• Provision of solar dryers /color sorters • Controlled temperature storage and transportation facilities	• Private sector with support of public sector • Private sector
Marketing	• Quality mixing and adulteration • Unstandardized packaging	• Establishment of grades and standards • 25 kg net bags	• Sindh agriculture department • Public private facilitation

Conclusions and Learnings

1. **Integration of stakeholders**
   - Value chains developments to avoid scattered/ isolated business efforts
2. **Maximizing and sharing returns**
   - Resources interventions to enhance production, reducing PHL, ensuring fair returns through efficient marketing, value addition and infrastructure
3. **Providing enabling environment**
   - Value chains governance and financing
   - private sector led growth in infrastructure
   - Use of ICT in production, marketing etc.

Conclusions and Learnings

4. **Sustainability of interventions**

- Making agriculture attractive and profitable with good social living standards
- PHL has its own discouraging faces like social and psychological distresses in addition to economic losses
- ICT is an effect way to coordinate, monitor, control, feedback and hence can make value chains livelier and more efficient

THANK YOU