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Value Chain Analysis of Pork in East Khasi Hills District of Meghalaya

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ABSTRACT

A study was conducted in Meghalaya to identify the marketing channels, stakeholders, value additions and to estimate the compliance costs involved in the pork value chain. Out of the eleven districts of Meghalaya, East Khasi Hills district was selected purposively as it reported the highest pig population and pork production. From the blocks of East Khasi Hills district two blocks namely; Mylliem and Mawphlang were chosen purposively as these blocks were having highest number of pigs. A sample of 66 pig farming households were identified for the collection of primary data. Laitlyngkot and Shillong markets were identified and wholesalers, local traders, retailers and processors were selected to study the pork value chain actors. Three major marketing channels were identified and the greater share of the pork (60.47%) was observed to be distributed through the marketing channel-I (Producer → Wholesaler → Consumer). Among the marketing channels for live pig, channel-I was found to be most preferred among the pig farmers, where farmers received the highest net price. Among the marketing channels for pork, Channel-I was the most preferred one by the consumers owing to its easy accessibility. The net benefit available was estimated to be higher in the case of value-added products when compared to the fresh pork.

1. Introduction

India has one of the largest population of livestock in the world. There were about 300 million bovines, 74.26 million sheep, 135.17 million goats and 10.29 million pigs being reared in the country as per the Livestock Census, 2019. The state having the highest percentage of pig population is Assam (23.18%) followed by Jharkhand (14.10%) and Meghalaya (7.80%) (Livestock Census, 2019). In the North Eastern region, consumption and expenditure on pork meat is 2-3 folds higher than the average national estimates (Kadirvel *et al.*, 2018). Meghalaya is considered as one of the most prominent state in the production of pork and its consumption among the North Eastern states. The monthly average consumption of meat (mainly pork) per individual in rural and urban zones of Meghalaya is 0.856 kg and 0.892 kg which is very high compared to the national average of 0.468 kg (Govindasamy *et al.*, 2018). Pig farming plays a pivotal role in the social and economic upliftment of the region by providing food, employment and income. Around 63.85 per cent of the households of Meghalaya are involved in pig rearing (GoM, 2019a). Shadap *et al.* (2016) in their studies conducted in Meghalaya found that people of the community engage in pig rearing for purposes like recycling waste food, additional income, resilience and returns in short time.

In 2019 total pig population in Meghalaya was 7,06,364 and total pork production was 14.93 thousand metric tonnes (MT) (GoM, 2019b). Pork contributes 11.25 per cent of the meat being consumed in Meghalaya (GoM, 2020). The demand for pork is increasing, hence the region has to draw supplies from other states regularly to meet the requirements (Mandal, 2011). In 2019, East Khasi Hills district recorded the highest pig population (1,54,787) and pork production (7545 MT) in Meghalaya. (GoM, 2019b). The pork market of the state is highly unregulated where the market norms and standards are fixed by the traders (Kumar, 2014). Keeping in view the potentiality of an efficient marketing system, the present research has been framed to map the different actors in pork value chain of Meghalaya and estimate the compliance cost incurred by each actor involved in pork value chain.

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2. Materials and Methods

The study was carried out in the East Khasi Hills district of Meghalaya. A sample of 66 pig farming households were drawn through proportionate technique for the collection of primary data from two blocks of the district namely, Mylliem and Mawphlang. Further, two villages *viz*, Mawpynthih and Mawbynna from the block of Mylliem and two more villages *viz*, Laitjem and Sadew from the block of Mawphlang were selected. A list of pig rearers from each of the selected villages was prepared. Laitlyngkot and Shillong markets were identified and wholesalers (4), local traders (4), retailers (4) and processors (4) were selected to study the pork value chain actors. Primary household data were collected using well-structured interview schedule through personal interview method. The disposal pattern of pork, marketing costs, marketing margins of intermediaries, producers share in consumer's rupee and value addition in pork were applied for analysis of data for logical inferences.

3. Results

Marketing Channels of Pig and Pork

It was observed that 69.70 per cent of the pig farmers sold their live pigs to the wholesalers, 19.70 per cent of the pig farmers sold it to the retailers and the remaining pig farmers (10.60%) sold it to the local traders. The respondent pig farmers were found to sell 67.14 per cent of their live pigs to the wholesalers, 25.45 per cent to the retailers and the remaining 7.41 per cent of the farmers sold it to the local traders (Table 1). The major marketing channels involved in the disposal of live pig in the study area were identified and listed down below. Similar results were also shown by Suchiang *et al.* (2017).

i. Channel-I: Producer ⟶ Wholesaler (67.14%)
ii. Channel-II: Producer ⟶ Retailer (25.45%)
iii. Channel-III: Producer ⟶ Local trader ⟶ Wholesaler (7.41%)

It was identified from the Table 2 that 67.88 per cent of the total pork was sold in the district's retail centres by the wholesalers directly and 6.67 per cent of the total pork was sold by the wholesalers to the processors who ultimately sold it to the consumers in value-added forms like smoked pork and pork sausage. Around 25.45 per cent of pork was found to be disposed of to the consumers through the retailers. The major marketing channels involved in the disposal of pork in the study area were identified and listed down below. NEDFI. (2018) also showed results similar to this.

i. Channel-I: Wholesaler ⟶ Consumer (67.88%)
ii. Channel-II: Retailer ⟶ Consumer (25.54%)
iii. Channel-III: Wholesaler ⟶ Processor ⟶ Consumer (6.67%)

Table 1. Disposal of live pig through various agencies **(kg/ annum)**

Marketing agency	Wholesaler	Retailer	Local trader	Quantity of live pig sold
Producer	5435	2060	600	8095
	(67.14)	(25.45)	(7.41)	(100)
Local trader	600			600
	(7.41)			(7.41)

Note: Figures given in parentheses depict percentages to total.

Table 2. Disposal of pork through various agencies **(kg/ annum)**

Marketing agency	Processor	Consumer	Quantity of pork sold
Wholesaler	540	5495	6035
	(6.67)	(67.88)	(74.55)
Retailer		2060	2060
		(25.45)	(25.45)
Total			8095
			(100)

Note: Figures given in parentheses depict percentages to total.

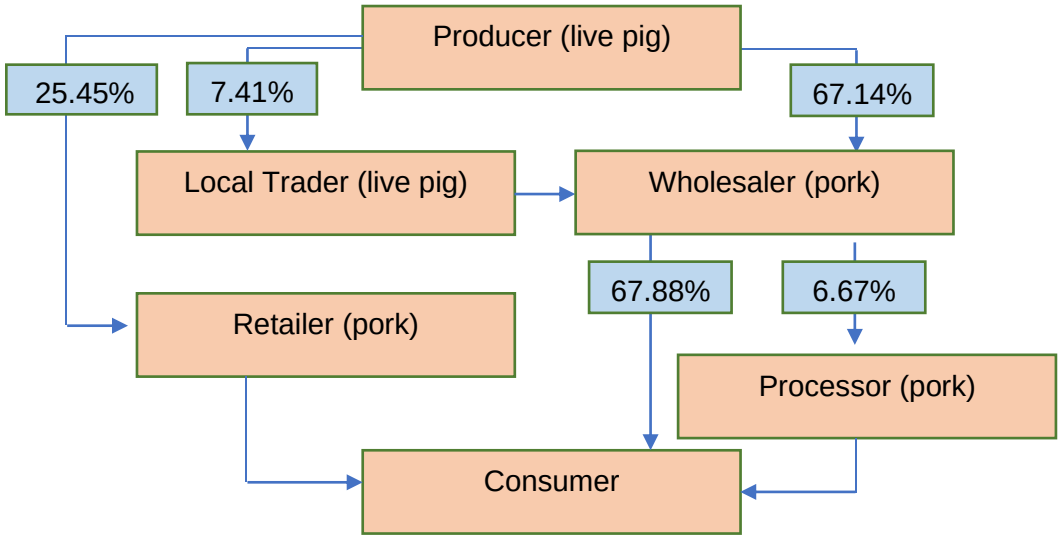

Fig 1. Value chain map of pork in East Khasi Hills district of Meghalaya

Marketing cost, marketing margin and price spread

Marketing involves different margins and costs at various steps of the process. It allows us to get a better grasp of the efficiency of the existing marketing system and helps in the selection of appropriate marketing channel. Thus, this section tries to identify the marketing costs, marketing margins and price spread of the different marketing channels of pork value chain observed in the study area.

The average net price available to the pig farmers was ₹30587 per q under channel-I and channel-III. The least net price gained was in channel-II (₹29738.5 per q). Marketing cost incurred was highest in the channel-III (₹5190 per q) where cost of value addition of pork was also included, followed by ₹2375 per q in channel-I and ₹2318 per q in channel-II. Marketing margin was realised to be highest in the channel-III (₹6723 per q), followed by ₹5943.5 per q in channel-II and ₹5038 per q in channel-I. The marketing cost paid by the processors (₹3085 per q) was observed to be highest among all the intermediaries involved followed by the wholesaler (₹2375 per q) and ₹2318 per q for retailer. The major activities that contributed towards the marketing cost were processing cost (₹1200 per q), slaughtering charges (₹700 per q for wholesalers and ₹800 per q for retailers).

Table 3. Marketing costs and margins incurred by wholesaler (₹/q)

Particulars	Channel-I	Channel-II	Channel-III
Net price available to producers	30587	29738.5	30587
	(80.49)	(78.26)	(71.97)
Cost incurred by wholesalers			
a) Loading and unloading	200		200
b) Packing	40		
c) Slaughtering	700		700
d) Weighing	500		500
e) Market fee	200		200
f) Commission	200		
g) Damage/Spoilage	60		30
h) Transportation	475		475
Total (a to h)	2375		2105
Wholesaler's margin	5038		1308
Wholesaler's sale price	38000		34000
Cost incurred by retailers			
a) Loading and unloading		200	
b) Packing		40	
c) Slaughtering		800	

d) Weighing		400	
e) Market fee		223	
f) Commission		300	
g) Damage/Spoilage		55	
h) Transportation		300	
Total (a to h)		2318	
Retailer's margin		5943.5	
Retailer's sale price		38000	
Cost incurred by processors			
a) Loading and unloading			200
b) Packing			80
c) Weighing			500
d) Market fee			200
e) Commission			200
f) Processing			1200
g) Transportation			600
h) Damage/Spoilage			70
i) Storage			35
Total (a to i)			3085
Processor's margin			5415
Processor's sale price			42500
Price paid by the consumers	38000	38000	42500
	(100)	(100)	(100)

Note: Figures given in parentheses depict percentages to consumer's rupee.

Price spread of pork

The price spread of pork in the region under the study for different marketing channels was analysed and listed in the Table 4. Price spread was found to be highest in the channel-III (₹11913 per q) due of the higher selling price of value-added pork products. Price spread was second highest in the channel-II (₹8261.5 per q) followed by channel-I (₹7413 per q). The selling price of fresh pork was the same throughout the state as per government regulation (₹38000 per q) and the average selling price of the value-added pork products was estimated to be ₹42500 per q.

Value addition in pork

The total cost, selling price and net price available to the producers for fresh pork, pork sausage and smoked pork was given in Table 5. The net benefit available to the producer was estimated to be higher for smoked pork (₹18005 per q) followed by pork sausage (₹12825 per q) and fresh pork (₹11625 per q). From the preceding discussions, it can be deduced that the net benefit available to the producers would be higher if sale of value-added products were taken up by them.

Table 4. Price spread of pork in East Khasi Hills district of Meghalaya **(₹/q)**

particulars	Channel-I	Channel-II	Channel-IV
Net price available to pig farmers	30587	29738.5	30587
	(80.49)	(78.26)	(71.97)
Marketing costs	2375	2318	5190
	(6.25)	(6.10)	(12.21)
Marketing margins	5038	5943.5	6723
	(13.26)	(15.64)	(15.82)
Price spread	7413	8261.5	11913
	(19.51)	(21.74)	(28.03)
Consumer's price	38000	38000	42500
	(100)	(100)	(100)

Note: Figures given in parentheses depict percentages to consumer's rupee.

Table 5. Value addition in pork **(₹/q)**

Type of pork	Cost	Selling price	Net benefit
Fresh pork	26375	38000	11625
Pork sausage	27175	40000	12825
Smoked pork	26995	45000	18005

The overall costs incurred in processing pork was represented in Table 6. The two major value products identified to be prepared in the study area was pork sausage and smoked pork. The different costs involved in the preparation of pork sausage were labour charges of ₹500 per q followed by other costs such ₹140 per q for fuel, ₹380 per q for oil, salt, chilli and other ingredients, ₹250 per q for the utensils and tools, ₹30 per q for storage, ₹65 per q for damage and spoilage and ₹30 per q for other miscellaneous purposes. The selling price of pork sausage was realised to be of ₹40000 per q. The net profit received by the processor after selling of pork sausages was accounted to be of ₹2825 per q. The different costs incurred for the preparation of smoked pork were labour charges of ₹400 per q followed by other costs such as ₹40 per q for fuel, ₹450 per q for wood, ₹200 per q for the wire maze and other tools, ₹40 per q for storage, ₹75 per q for damage and spoilage and ₹10 per q for other miscellaneous purposes. The selling price for pork sausage was realised to be of ₹45000 per q. The net profit received by the processor selling smoked pork was accounted to be of ₹8005 per q.

4. Conclusion

The value chain analysis of pork gave an understanding of the existing marketing structure, intermediaries, compliance costs and value additions involved in pork value chain. Channel-I was found to be most preferred among the marketing channels for live pig by the pig farmers because of the high price availability. Among the marketing channels for pork, Channel-I was preferred by the consumers owing to its easy accessibility. The net benefit available to the producer was estimated to be higher in value-added products when compared to the fresh pork. Hence, channel-I should be made more strengthened for pork marketing. The awareness for value addition in pork should be reinforced at every stage of pork marketing. Government interventions such as scientific assembling/ collection, transportation, categorisation, electronic weighing, packing and labelling are required to be made to develop the pork value addition industry of the state.

Table 6. Costs involved in value addition of pork (₹/q)

Particulars	Pork sausage	Smoked pork
a) Purchasing price of pork for processors	34000	34000
b) Labour charge	500	400
c) Fuel	140	40
d) Oil, salt, chilli and other ingredients	380	
e) wood		450
f) Wire maze, utensils and other tools	250	200
g) Other cost	30	10
h) Total cost of processing (b+c+d+e+f+g)	1300	1100
	(3.25)	(2.44)
i) Storage	30	40
j) Damage/Spoilage	65	75
Total costs involved in value addition (h+i+j)	1395	1215
k) Total marketing cost of processor	3175	2995
l) Selling price after value addition	40000	45000
Net profit after value addition (l-k-a)	2825	8005

Note: Figures given in parentheses depict percentages to total.

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Annexures

Annexure 1: State-wise pig population in India of 2019

State	Pig population	Percentage
Assam	2099000	26.30
Jharkhand	1276973	16.00
Meghalaya	706364	8.85
West Bengal	540356	6.77
Chattisgarh	526901	6.60
Uttar Pradesh	408678	5.12
Nagaland	404695	5.07
Bihar	343434	4.30
Karnataka	323836	4.05
Mizoram	292465	3.66
Arunachal Pradesh	271463	3.40

Manipur	235255	2.94

State	Pig population	Percentage
Tripura	206035	2.58
Telangana	177992	2.23
Madhya Pradesh	164616	2.06

(Source: GoI, 2019)

Annexure 2: District-wise pig population and pork production of 2019 in Meghalaya

Name of District	Pig population,		Pork production (MT)
	Numbers	Percentage	
East Khasi Hills	154787	21.91	7545
Ri – Bhoi	53679	7.59	1283
West Khasi Hills	66016	9.34	1085
South West Khasi Hills	27097	3.83	369
East Jaintia Hills	23102	3.27	561
West Jaintia Hills	60890	8.62	1670
North Garo Hills	58558	8.29	147
East Garo Hills	54654	7.73	223
West Garo Hills	117679	16.65	1034
South West Garo Hills	36149	5.11	163
South Garo Hills	53753	7.60	846
Meghalaya	706364		14926

(Source: GoI, 2019 and GoM, 2019)

Annexure 3:

Marketing cost

$C = CF + Cm1 + Cm2 + Cm3 + \ldots + Cmi$

$C = CF + \Sigma Cmi$

C = Total cost of marketing of the commodity

CF = Cost paid by the producer at the time the produce leaves the farm till he sold it

Cmi = Cost incurred by the ith middleman in the process of buying and selling the product

Marketing margin of middlemen

$Ami = Pri - (Ppi + Cmi)$

Ami = Absolute marketing margin of ith middlemen

Pri = Total value of receipts per unit (sale price)

Ppi = Purchased value per unit (purchased price)

Cmi = Cost incurred on marketing per unit

Percentage margin of middleman

$Pmi = [PRi - (Ppi + Cmi)] \div Ppi \times 100$

Pmi = Percentage margin of middleman

PRi = Total value of receipts per unit of produce (sale price)

Ppi = Purchase value of goods per unit of produce (purchase price)

Cmi = Cost incurred in marketing per unit

Producer's share in consumer's rupee

$Ps = (Pf \div Pr) \times 100$

Ps = Producer's share in the consumer rupee

Pf = Price received by the farmer per unit of output

Pr = Retail price per unit of output

Price spread

PS = Pc – Pf

Pc = price paid by consumer

Pf = price received by the producer

Value addition

Value addition = Selling price of the product – Cost of total inputs (Kohls and Uhls, 1967)