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## Estimate the post-harvest losses of potato in different transaction points at farm & market level

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### Abstract

Potato is a major vegetable crop widely consumed throughout Tamil Nadu but grown only in the hilly regions of Dindigul, Nilgiris, Krishnagiri and Erode districts.

The post-harvest activities for potato have not picked up commensurate with the level of production. This study primarily focuses on i) to identify the different marketing channels ii) to estimate the post-harvest losses of potato in different transaction points (farm level and market level). Among the 32 districts of Tamil Nadu, Dindigul and Nilgiris districts are the major potato producing districts with large area under potato during 2016-17. Considering the area, production and productivity indicators, Dindigul and Nilgiris districts were selected purposively. Multistage purposive sampling was adopted for this study. A total of 120 sample farmers from 12 villages and 155 market functionaries were selected for collecting field level information.

The results of the study are majority of the farmers (60 per cent) had the practice of selling the produce through institutional markets. The Identified the marketing channels from Kodaikanal had two marketing channels and Ooty had seven marketing channels. In Kodaikanal, the total post-harvest losses were 88.06 kg and 27.94 kg per tonnes in marketing channels I and II, respectively. In Ooty, the total post-harvest losses were high in marketing channel VII it accounted for 152.83kg per tonnes. The policy implications of this study are institutions should come forward to promote farm level post-production management system should be created to minimise losses in the different transaction points.

**Keywords:** Post harvest losses, Marketing channels, Transaction points, Potato, Constraints.

### Introduction

Potato (*Solanum tuberosum* L.) popularly known as 'The king of vegetables', has emerged as fourth most important food crop in India after rice, wheat and maize. It is believed that potato was a native of Andes in South America and gradually spread throughout the world. Losses of horticulture produce are a major problem in the post-harvest chain. They can be caused by a wide variety of reasons, growing conditions to handling at market level. During the process of distribution and marketing, substantial losses are incurred which range from a slight loss of quality to total spoilage. The causes of losses are many physical damage during handling and transport. Due to perishable nature, certain quantity of produce is lost at different levels of marketing as well as on the farm. The reduction of post-harvest losses of vegetables is a complimentary means for increasing production. From the stand point of economy and food safety for the population of the country there is a need to reduce such losses. There is present study to estimate the dimensions of losses occurs during the post-harvest stages of potato with the following objectives.

- To identify the different marketing channels
- To estimate the post-harvest losses of potato in different transaction points (farm level and market level).

### Methodology

In Tamil Nadu, potato is cultivated in large area in Dindigul district of Kodaikanal block and Nilgiris districts of Ooty block. Hence these two districts were purposively selected to conduct the study based on area and production. Among the 32 districts of Tamil Nadu, Dindigul and Nilgiris districts are the major potato producing districts with large area under potato. The area and production of potato in Nilgiris constituted for 1384.70 ha and 33252 tonnes respectively during 2016-17. Considering the area, production and productivity indicators, Dindigul and Nilgiris districts were selected purposively. Multistage purposive sampling was adopted for this study. A total of 120 sample farmers from 12 villages and 155 market functionaries were selected for collecting field level information. In Kodaikanal block in the dindigul district, area and production constituted for 2757 ha and 30857 tonnes respectively during 2016.17.

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2016.17.

Sample intermediaries were drawn from the marketing channel, tracing from the origin (i.e.) the farmers. For the survey, 10 local traders, 10 commission agents, 10 wholesalers and 10 retailers were contacted. Potato processors are important actors in the market channel and hence 10 potato processing units functioning in the western parts of Tamil Nadu were selected for this study. Five large traders dealing with the export of potato in the Nilgiris district. For the study, 60 consumers were also chosen randomly in Dindigul and Coimbatore at the rate of 30 from each location for the study. The paucity of time and resource constraints made the researcher to restrict the sample districts to only two. The major findings of the study are briefly stated below for a comprehensive review and to draw specific and meaningful conclusions.

The descriptive statistics was used to study the general

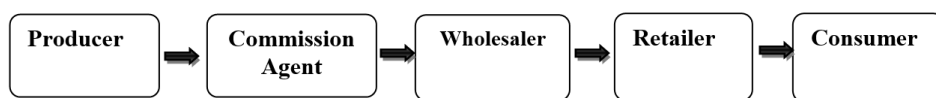
characteristics of the producers, market intermediaries and consumers which included age, education, gender, income, occupation and family size. Mapping an entire market channels entails clear understanding of the series of activities with main actors and relationships involved. It provided tools and examples on how to capture the different dimensions of a transaction points.

**Results and Discussion**

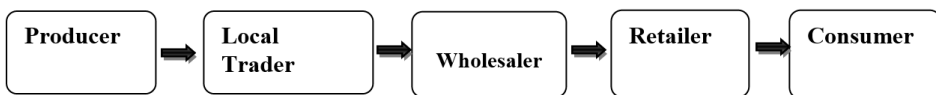
**Marketing Channel - Dindigul district of Kodaikanal Block**

The analysis of price spread in different channels of potato across different grades are presented below. The results reveal that for the grades like Grade1 (*Thala*), Grade 2 (*Rasi*) and Grade 3 (*Podi*) the following marketing channels were in existence in Kodaikanal block.

**Marketing Channel - I (Through Regulated Market)**



**Marketing Channel - II (Through Conventional Market)**

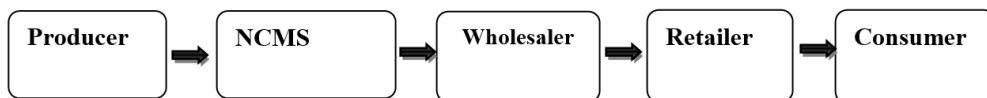


**Marketing Channel - Nilgiris District of Ooty Block**

The analysis of price spread in different channels of potato across different grades are presented below. The results reveal

that for the grades like Grade I (*Thala*), Grade II (*Rasi*) and Grade III (*Podi*) the following marketing channels were adopted in the Nilgiris.

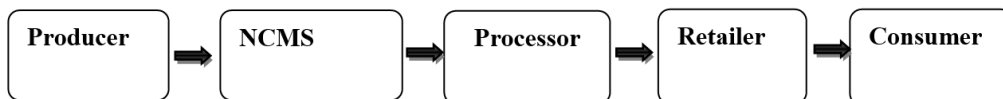
**Marketing Channel - I (Through Cooperative Marketing Society)**



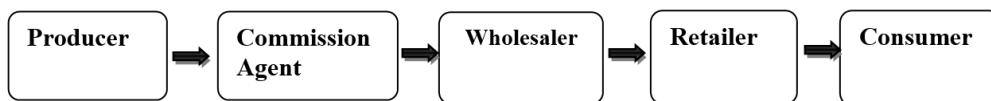
**Marketing Channel - II (Through Cooperative Marketing Society) \***



**Marketing Channel - III (Through Cooperative Marketing Society)**

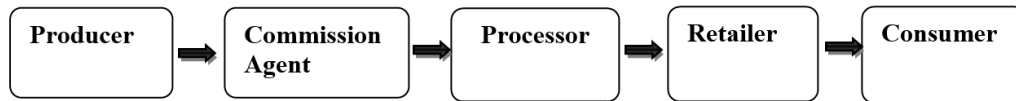
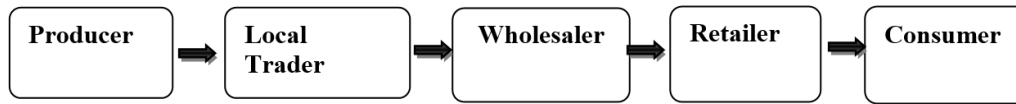


**Marketing Channel - IV (Through Private Traders)**



**Marketing Channel - V (Through Private Traders) \***



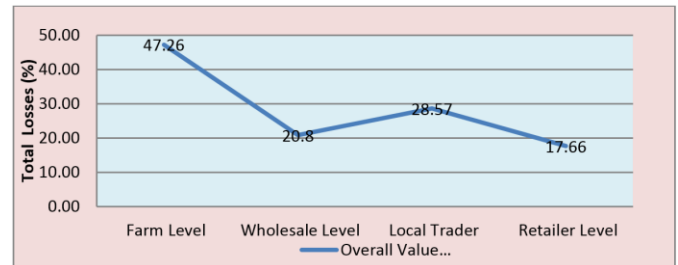
**Marketing Channel - VI (Through Private Traders)****Marketing Channel - VII (Through Private Traders)**

\* Note- ○ -Transaction Point Not Traced

**Post-Harvest Losses of Potato in Kodaikanal**

Post production losses in potato is reported to be very high due to improper handling, storage, transport and use of inefficient packaging materials. Hence it was planned to estimate the post-harvest losses of potato from farm to consumer level. The various attributes leading to the losses in various stages of transaction in the marketing channel were studied and losses was estimated by quantitatively.

The result revealed that post production losses were 49.73 kg and 52.35 kg per tonne at farm level for value chains I and II, respectively. It was mainly due to fungal infestation and harvest and transit injuries. Losses were maximum due to presence of grade 3 tubers, which were small in size and having maximum harvest injury. In case of losses at wholesaler's level, it was about 19 kg and 25 kg per tonne for value chains I and II, respectively. The losses during transportation were due to loading and unloading and nature of packaging material used. There were no storage losses at farm level because farmers had no storage facility and used to sell the produce immediately after harvest to intermediaries.

**Post-Harvest Losses of Potato in Kodaikanal**

The total post-harvest losses were minimum at the retailer's level due to minimum handling and selling the produce to consumers immediately. Post-harvest losses were high in marketing channel II and it accounted for 127.94 kg per tonne. It was due to improper harvesting method, direct loading of produce without any packaging material during transportation.

**Table 1:** Post-Harvest Losses of Potato in Kodaikanal

S. No.	Stages	Marketing Channel I		Marketing Channel II		Overall (%)
		Loss (Kg/T)	Loss (%)	Loss (Kg/T)	Loss (%)	
<b>I</b>	<b>Farm Level Losses</b>					
	i. Harvest Injury	21.03	23.88	22.35	17.47	20.08
	ii. Fungal, Bacterial and Insects infestation	18.45	20.95	21.50	16.80	18.50
	iii. Transit Injury	10.25	11.64	8.50	6.64	8.68
	Total Losses at Farm Level	49.73	56.47	52.35	40.92	47.26
<b>II</b>	<b>Wholesale Level Losses</b>					
	i. Storage	12.85	14.59	17.23	13.47	13.93
	ii. Transit Injury	6.63	7.53	8.21	6.42	6.87
	Total Losses at Wholesale Level	19.48	22.12	25.44	19.88	20.80
<b>III</b>	<b>Local Trader</b>					
	i. Storage	-	-	13.21	10.33	12.23
	ii. Transit Injury	-	-	17.65	13.80	16.34
	Total Losses at Local Trader	-	-	30.86	24.12	28.57
<b>IV</b>	<b>Retailer Level Losses</b>					
	i. Transit Injury	11.30	12.83	8.26	6.46	9.06
	ii. Fungal Infestation	7.55	8.57	11.03	8.62	8.60
	Total Losses at Retailer Level	18.85	21.41	19.29	15.08	17.66
	<b>Total Post-Harvest Losses</b>	88.06	100.00	127.94	100.00	100.00

**Post-Harvest Losses of Potato in Ooty**

The post-harvest losses of potatoes were estimated at different stages and are presented in Table 2. The result revealed that post production losses were estimated at farm level for value chains I, III, IV, VI and VII respectively, mainly due to fungal infestation, harvest and transit injuries. Losses were high in value chain VII since local traders did not follow grading owing to small size. Also, harvest injury, loading and

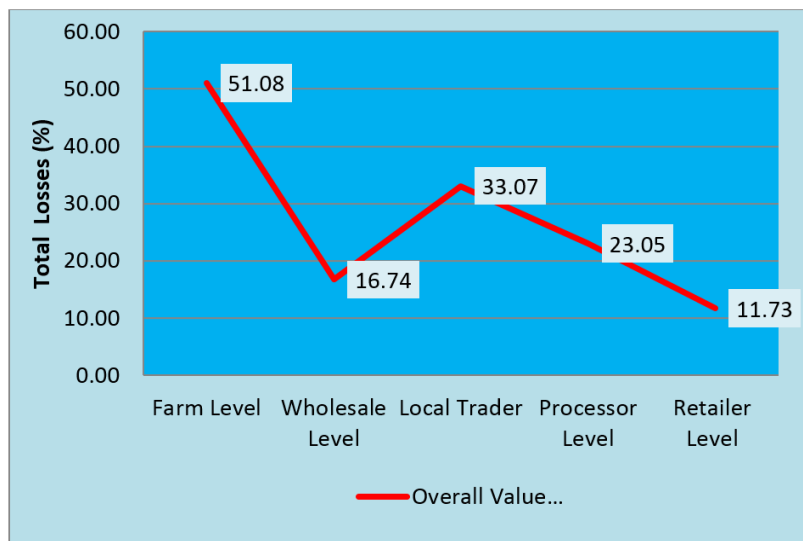
unloading, improper packaging material additionally increased the losses. There were no storage losses at farm level because farmers had no storage facility and used to market the produce immediately after harvest to intermediaries.

The processor level losses were high in value chain III due to improper method of peeling of potato skin and poor storage. It accounted for 26.80 per cent. The total post-harvest losses

were minimum at the retailers' level due to limited handling and immediate sale of produce to consumers.

In Ooty, the post-harvest losses were maximum in value chain

III and it was 152.83 kg per tonne due to improper harvesting, direct loading of produce, poor roads and improper packaging.



**Post-Harvest Losses of Potato in Ooty**

**Table 2:** Post-Harvest Losses of Potato in Ooty

S. No.	Stages	Market Channel I		Market Channel III		Market Channel IV		Market Channel VI		Market Channel VII		Overall (%)
		Loss (Kg/T)	Loss (%)	Loss (Kg/T)	Loss (%)	Loss (Kg/T)	Loss (%)	Loss (Kg/T)	Loss (%)	Loss (Kg/T)	Loss (%)	
I	<b>Farm Level</b>											
	Harvest Injury	18.37	16.40	21.54	17.83	18.33	18.90	23	19.17	28.33	18.54	18.18
	Fungal, Bacterial and Insects Infestation	23.6	21.07	27.89	23.08	22.41	23.11	28	23.33	32.41	21.21	22.29
	Transit Injury	12.15	10.85	10.46	8.66	14.68	15.14	12	10.00	14.68	9.61	10.61
	Total Losses	54.12	48.32	59.89	49.56	55.42	57.14	63	52.50	75.42	49.35	51.08
II	<b>Wholesale Level</b>											
	Storage	11.2	10.00	8.32	6.89	10.43	10.75	12	10.00	15.43	10.10	9.52
	Transit Injury	5.63	5.03	7.21	5.97	11.33	11.68	8	6.67	11.33	7.41	7.22
	Total Losses	16.83	15.03	15.53	12.85	21.76	22.44	20	16.67	26.76	17.51	16.74
III	<b>Local Trader</b>											
	Storage	-	-	-	-	-	-	-	-	17.21	11.26	14.28
	Transit Injury	-	-	-	-	-	-	-	-	22.65	14.82	18.79
	Total Losses	-	-	-	-	-	-	-	-	39.86	26.08	33.07
III	<b>Processor Level</b>											
	Storage	11.65	10.40	15.74	13.03	-	-	9	7.50	-	-	10.06
	Peeling	18.32	16.36	16.65	13.78	-	-	12	10.00	-	-	12.99
	Total Losses at Processor Level	29.97	26.76	32.39	26.80	-	-	21	17.50	-	-	23.05
IV	<b>Retailer Level</b>											
	Transit injury	4.3	3.84	5.71	4.73	10.36	10.68	7	5.83	4.73	3.09	5.33
	Fungal infestation	6.78	6.05	7.32	6.06	9.45	9.74	9	7.50	6.06	3.97	6.41
	Total Losses	11.08	9.89	13.03	10.78	19.81	20.42	16	13.33	10.79	7.06	11.73
V	<b>Total Post-Harvest Losses</b>	112	100.00	120.84	100.00	96.99	100.00	120	100.00	152.83	100.00	100.00

Note: Marketing Channel II & V --- Transaction points not traced

### Conclusion

Post-harvest losses were reported to be high in the study areas. It was due to improper harvesting method and direct loading of produce without any packaging material during transportation. The post-harvest losses were minimum at the retailer's level due to minimum period of handling and selling the produce to consumers immediately. Institutions should come forward to promote farm level post-production management system to increase the shelf life and keeping

quality of the potato; so that farmers can store the produce in the event of market glut and get premium price by selling produce in the market during the time of scarcity in the market. To reduce post production losses, packaging material like corrugated box with proper ventilation should be designed and cold storage unit, refrigerated truck for transport etc., should be created to minimise losses in the value chain.

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