Value Chain of Potato Commodity (Solanum tuberosum) Upland Farmers in Modoinding District, South Minahasa Regency

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Abstract: The research problem is commodity prices, especially at harvest time. The Upland project aims to increase potato production and quality as well as improve access to markets and better selling prices. This study aims to identify the value chain and its stakeholders, create a graphic design of the value chain in the form of potato marketing channels and analyze the margins in each marketing channel. The research was conducted in Modoinding District, South Minahasa Regency. Sampling using snow ball sampling method, data collection using interview, observation and documentation methods. The results showed that there are 3 levels of marketing channels, including: (1) marketing channel level 0 (farmers - consumers); (2). marketing channel level 2 (farmers - village intermediary traders - inter-island traders - consumers; and there are also farmers - village intermediary traders - large retailers in Modoinding - consumers); and (3) marketing channel level 3 (farmers - village intermediary traders - large traders - inter-island traders - consumers). The results of the margin analysis showed that the farmer's acceptance value was 100% and the value at the consumer level increased due to the difference in margins with df stakeholders in the marketing channel. The value chain of potato commodities in the South Minahasa Upland Project has the highest margins when farmers sell directly to consumers, and in channels where there is a role of inter-island traders, the highest margin value compared to village intermediaries and large traders.

Keywords: Marketing Channel; Marketing Margin; Potato; Value Chain.

Introduction

The sustainable agricultural development system leads to an agricultural system that is not destructive, harmonious, in harmony and balanced with the environment, which can be implemented with four systems, namely 1) organic farming system, 2) integrated farming system, 3) low external input farming system, and 4) integrated pest control system (Salikin, 2011; Mukhlis et al., 2023; Kaunang et al., 2024).

Integrated farming system (IFS) as a concept of farming system that combines two or more farms (Channabasavanna et al., 2009; Jayanthi et al., 2009; Ugwumba et al., 2010; Massinai, 2012; Walia & Kaur, 2013; Jaishankar et al., 2014) where there are input-output linkages between commodities and biological recycling processes (Prajitno, 2009; Changkid, 2013; Massinai, 2012; Thorat et al., 2015), which use low external inputs (Devendra, 2011; Nurcholis & Supangkat, 2011; Hilimire, 2011) and utilise resources efficiently (Bosede, 2010; Balemi, 2012 and Soputan,

2012), and apply various techniques so as to increase production, productivity and income of farmers and sustainably (Gupta et al., 2012; (Manjunatha et al., 2014; Thorat et al., 2015; Mukhlis et al., 2024; Rasyid et al., 2024). The development of Integrated Farming Systems in Upland Areas is one of the efforts to improve the economic capacity of farmers.

Potato (Solanum tuberosum) is a leading horticultural commodity in Indonesia. Potatoes are bulbous plants that originated in the United States. Potatoes have been cultivated for a long time and are one type of food crop that is a staple food source.

As an important horticultural crop and very suitable for development in the highlands, Potato is a leading commodity. Potato was selected as the commodity to be developed in the Upland project. The Upland Project in North Sulawesi Province has started since 2021 with a focus on developing Potato commodities in Modoinding District in South Minahasa Regency. The Upland Project aims to increase the production and quality of potatoes as well as improve access to markets and better selling prices. The implementation of the Upland Project involves local farmers and farmer groups. The Upland Project also provides technical assistance and funding to improve the production and quality of potatoes.

South Minahasa Regency in Modoinding Sub-district, as one of the highlands and the location of the Upland Project for potato commodities in North Sulawesi Province, has cultivated potato crops and become a regional superior commodity. However, potato farmers in Modoinding sub-district still encounter various problems in potato cultivation, including low selling prices, dependence on imported seeds and lack of market access.

One of the aspects identified as influencing the occurrence of these problems is the aspect of the Potato Commodity Value Chain. The Value Chain according to Dariah, 2013, describes a system that shows the relationship between the stages of input providers, production processes, sales to end consumers and supporting activities. The concept of agribusiness development that shows the technical linkages between inputs and outputs in a series of interrelated and continuous processes from upstream to downstream activities. Stakeholders or business actors that will be identified start from input providers, production activities by farmers, distribution activities by distributors or traders and user markets or consumers. Based on these existing conditions, it is interesting and important to analyze the Potato Commodity Value Chain in an effort to increase the income of Potato farmers in South Minahasa Regency.

The objectives of this study are 1). Identify and create value chain mapping based on the roles and benefits of stakeholders in the Potato commodity value chain; and 2). Analyzing Marketing Margins based on Marketing Channel Levels in the Potato Commodity Value Chain.

Method

Location and Research Time

This research uses descriptive qualitative research methods, this research uses descriptive research methods. According to Wirartha, (2006), descriptive research is research that describes and summarises various conditions, situations or various variables. Then, analyse and present facts systematically so that they are easier to understand and conclude. The research was conducted in South Minahasa Regency. The selection of the research area was carried out by purposive method or deliberately Sugiono, (2013). Selected Modoinding District, on the basis of considerations: 1) The selected District is an area where a lot of potato; 2) The selected District has never been held the same research. This research was conducted for a duration of 4 months.

Sampling Method

The sampling method used is the snowball sampling method. This sampling method can be used if population data does not exist, making it impossible to make a sampling frame. With this method, the researcher first looks for respondents who match the predetermined criteria, then the respondent will invite his other friends to be used as respondents, and so on until the sample size is representative enough to fulfil the analysis. Therefore, the sample size for this research cannot be determined at the beginning of the research (Rianse & Abdi, 2013; Lyons & Doueck, 2010).

The snowball sampling method can be used when researchers have difficulty finding or identifying the population and the number cannot be determined accurately (Nurdiani, 2014). The snowball sampling method is a survey research method used if the sample is obtained through a rotation process from one respondent to another (Neuman, 2014).

Data Collection Method

The types of data collected in this research include both primary field with survey including observation and interview and secondary data with documentation with various studies from agencies and previous studies. a) Primary data is obtained from respondent farmer groups participating in the Upland project and business actors in the value chain through the interview method based on a list of questions that have been prepared in advance; b) Secondary data obtained from various agencies that have to do with this research, in addition to information from various parties.

Data Analysis Method

Data analysis in this study was carried out in the following stages: 1, Conducting value chain mapping. This Descriptive Analysis aims to identify the Marketing Channels and stakeholders involved. Identify roles and contributions based on Marketing Channel levels. Also identified are the roles of stakeholders and the distribution of benefits; 2) Quantitative Analysis is conducted by calculating the Marketing Margin based on the Marketing Channels in the potato value chain in Modoinding District, South Minahasa Regency. The calculation of Marketing Margin is one of the important analytical tools in Value Chain analysis. The calculation of Marketing Margin which is the difference between the selling price of the commodity and the production cost of the commodity will show the calculation of the margin value added at each stage of the value chain and show the distribution of financing and income distributed by each stakeholder in the Value Chain.

Result and Discussion

Value Chain Mapping and Benefit Distribution in Value Chain Stakeholders

The value chain mapping of potato commodities in Modoinding Sub-district, South Minahasa Regency, is illustrated by the marketing channel which is a series of interdependent stakeholders involved in the process of shaping the product to be ready for consumption. The survey results show that there are 3 (four) potato marketing channels formed.

The first channel is: (1) level 0 marketing channel, where potato farmers directly sell potato commodities to end consumers, usually consumers will come to the farmer's house and directly conduct transactions; (2) The second marketing channel is a level 2 marketing channel where there are two stakeholders between the farmer and the end consumer. Potato farmers, after harvesting, usually bring the harvest home to be weighed and packed in mesh sacks. Usually, village collectors will contact the farmers to buy potatoes at the farmer's house. Some village collectors sell to inter-island traders and some sell to retailers in Modoinding Market; (3) Level 3 marketing channels have 3 stakeholders between farmers and consumers, namely collecting traders, wholesalers, and inter-island traders. In level 3 marketing channels, farmers sell to village intermediary traders, then village intermediary traders sell to large traders. Large traders in Modoinding sell to inter-island traders. This is the longest potato marketing channel in Modoinding sub-district. Figure 1 presents a picture of the Potato Marketing Channel.

Figure 1. Potato Marketing Channel in Modoinding District, South Minahasa Regency

The Marketing Channel is graphically depicted as follows. The Value Chain in this activity, shows the change in value of potatoes at each link of the chain.
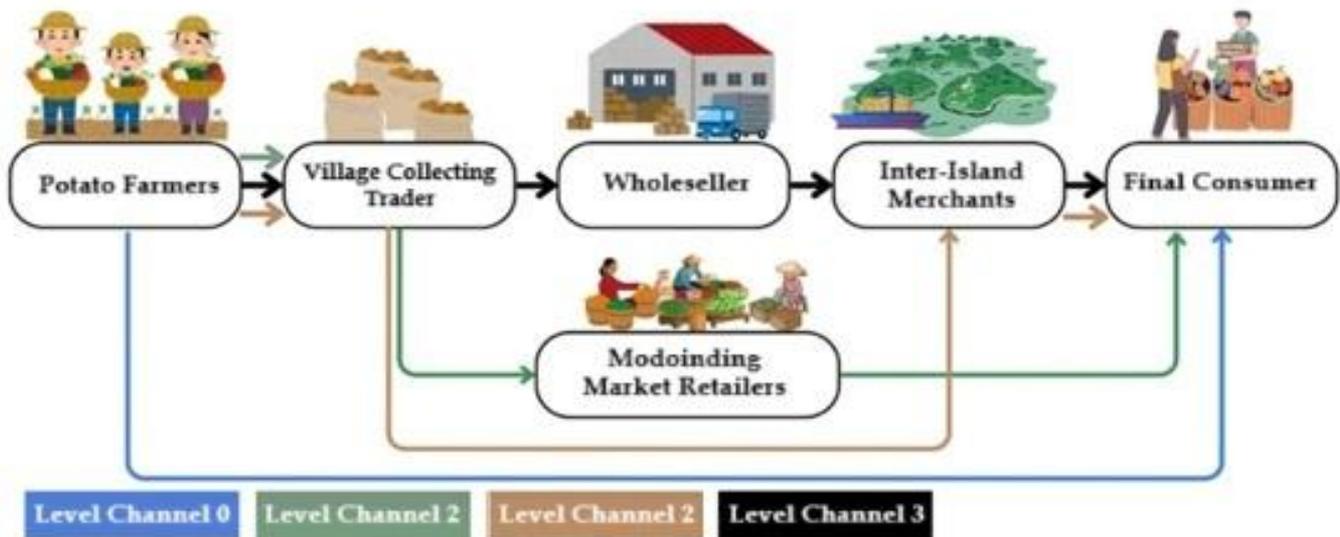
Figure 2. Mapping of Potato Commodity Value Chain in South Minahasa

Potato farmers in the value chain start potato farming activities by planting potatoes using seedlings from Pengalengan, West Java. Granola Potato seedlings suitable for the Upland Project, prepared for planting by Upland member farmers, have been verified and validated. Potato cultivation on suitable land can result in potato production of 16 tons per ha for farmers participating in the Upland Project. The harvested produce is put in mesh sacks and brought to the farmer's house for weighing and sorting activities. The sorted harvest is sold to village traders. Village Collecting Traders usually pick up the Potatoes at the farmer's house and weigh them directly at the farmer's house as a basis for payment.

Village Collecting Traders may sell the products to Wholesalers and some are taken to Motoling Market and surrounding areas. Wholesalers sell Potatoes directly to Inter-Island Traders who have entered into contracts and cooperation with Inter-Island Traders. Destination to Markets in Morowali, Soroako and in Weda.

Distribution Value Chain Analysis based on Stakeholder Benefits The Potato Value Chain in Modoinding Sub-district, Minahasa Regency is identified as follows, presented based on stakeholder roles, and distribution of benefits:

Farmers

Play a role in potato production as the main actor in the early stage, including land management, seeds, fertilizers, and labor to produce the product. In this value chain system, from their role, farmers will receive benefits in the form of income from the sale of fresh potatoes, and low profit margins, often only 20-30% of the final price, due to high input prices and limited market access.

Village Collectors

It have the role of buying potatoes directly from potato farmers, and sorting and packaging them for distribution to markets or processing industries. In the value chain, local collectors benefit from profit margins of 10-15% of the purchase price, and increased margins if there is a direct relationship with large traders. Limited storage and transportation facilities are usually the challenge for these village collectors.

Wholesalers

Wholesalers in the value chain will fulfill their role as distributors of potatoes from village collectors to retailers in front of houses, traditional markets, supermarkets, and also to inter-island traders/exporters. In addition, they also play a role in logistical arrangements and temporary storage. The benefits received by this party are profit margins ranging from 6-7%, depending on distribution efficiency, and a higher bargaining position than farmers or collectors. However, due to their primary role as distributors, high logistics costs, especially for areas with poor infrastructure, are often a challenge faced by distributors in the value chain.

Traditional Market

Retailers have a role in selling potatoes or processed potato products from the industry to end consumers. Retailers in the value chain benefit from a profit margin of around 5-6%, depending on market location and product type. As a retailer, the most common challenges

faced are price competition with other retailers, as well as changes in consumer trends.

Final Consumers

End consumers are the last stakeholder in the value chain, and have the main role of consuming potatoes for their household or industry and business needs. In the potato value chain, the end consumer will receive the benefits of fresh or processed products as needed at an affordable price. Then, the challenges faced are price changes due to inflation or production seasons that affect purchasing power.

Analysis of Marketing Margin in the Value Chain

The results of the analysis of Marketing Margin in the Value Chain of potato commodities in Modoinding Sub-district, South Minahasa Regency are presented respectively in Table 1.

Table 1. Marketing Margin Channel 1 Level 0

Margin Details	Price	Marketing Margin	Share
	(IDR/Kg)	IDR	%
Farmers			
Selling Price	10000		100
Consumer			
Buying Pruce	10000		100
Margin		0	

Table 1. shows that the marketing margin which is the difference between the selling price of potato commodities and the cost of potato production. In Channel 1, Marketing Margin Level 0, the price difference received by farmers is 0 so farmers receive 100% of the selling price of potatoes at the farm level.

Table 2. Marketing Margin Channel 2 Level II

Margin Detail	Price	Marketing Margin	Share
	(IDR/Kg)	IDR	%
Farmers			
Selling Price	10000		50
Village Collecting Trader		3000	30%
Buying Price	10000		50
Loading and Unloading	832		4,16
Selling Price	13000		65
Margin	2.168		10,84
Inter-Island Merchants		7000	70%
Buying Price	13.000		75
Loading and Unloading	416		2,08
Transportation	670		3,35
Others	50		0,25
Selling Price	20000		100
Margin	5.864		29,32
Consumer			
Buying Price	20000		100%
Margin		10000	

Table 2 shows that the Marketing Margin at Level 2 consists of 2 buyers between farmers and consumers, namely village traders and inter-island traders. In Channel 2, namely Level 2 Marketing Margin, the price difference received by farmers is 100%, Village Traders 30% and Inter-Island Traders 70%. The price at the consumer level is IDR 20,000/Kg.

Table 3. Marketing Margin Channel 3 Level II

Margin Detail	Price	Marketing Margin	Share
	(IDR/Kg)	IDR	%
Farmers			
Selling Price	10000		66,7
Village Collecting Trader		3000	30%
Buying Price	10000		66,7
Loading and Unloading	832		5,55
Selling Price	13000		86,67
Margin	2.168		14,45
Inter-Island Merchants		2000	20%
Buying Price	13.000		14,45
Loading and Unloading	416		2,77
Transportation	670		4,47
Others	50		0,33
Selling Price	15000		100
Margin	864		5,76
Consumer			
Buying Price	15000		50%
Margin		5000	

Table 3. Shows the Marketing Margin at Level 2 which consists of 2 buyers between farmers and consumers, namely village collectors and Retailers at Modoiunding Market. In Channel 3, namely Level 2 Marketing Margin, the price difference received by farmers is 100%, Village Traders 30% and Inter-Island Traders 20%. The price at the consumer level is IDR 15,000/Kg.

Table 4. Marketing Margin Channel 4 Level III

Margin Detail	Price (IDR/Kg)	Marketing Margin	Share	Margin Detail
		IDR	%	%
1.	Farmers			
	Selling Price	10000		50
2.	Village Collecting Trader		3000	
	Buying Price	10000		50
	Loading and Unloading	832		4,16
	Selling Price	13000		65
	Margin	2.168		10,84
3.	Wholesaler		2000	

Margin Detail	Price (IDR/Kg)	Marketing Margin	Share	Margin Detail
		IDR	%	%
	Buying Price	13000		65
	Gudang	50		0,25
	Loading and Unloading	416		2,08
	Transportation	208		1,04
	Selling Price	15.000		75
	Margin	1.326		6,63
4.	Inter-Island Merchants		5000	
	Buying Price	15.000		75
	Loading and Unloading	416		2,08
	Transportation	670		3,35
	Others	50		0,25
	Selling Price	20000		100
	Margin	3.864		19,32
5.	Consumer			
	Buying Price	20000		100
	Margin		10000	

Table 4. Shows the Marketing Margin at the Level consisting of 3 buyers between farmers and consumers, namely village traders, wholesalers and inter-island traders. In the 4th Channel, namely Level 3 Marketing Margin, the price difference received by farmers is 100%, Village Traders 30% and Large Traders 20% and Inter-Island Traders 50%. The price at the consumer level is IDR 20,000/Kg.

Conclusion

Potato Value Chain Analysis based on Stakeholder Benefits in Modoinding District, Minahasa Regency increases the value of Farmers, Village Collecting Traders, Wholesalers, Retailers and Inter-Island Traders, and Final Consumers. The Potato Commodity Value Chain in the South Minahasa Upland Project has the highest margin when farmers sell directly to consumers, and in channels where there is a role of inter-island traders, the highest margin value compared to village collectors and large traders.

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