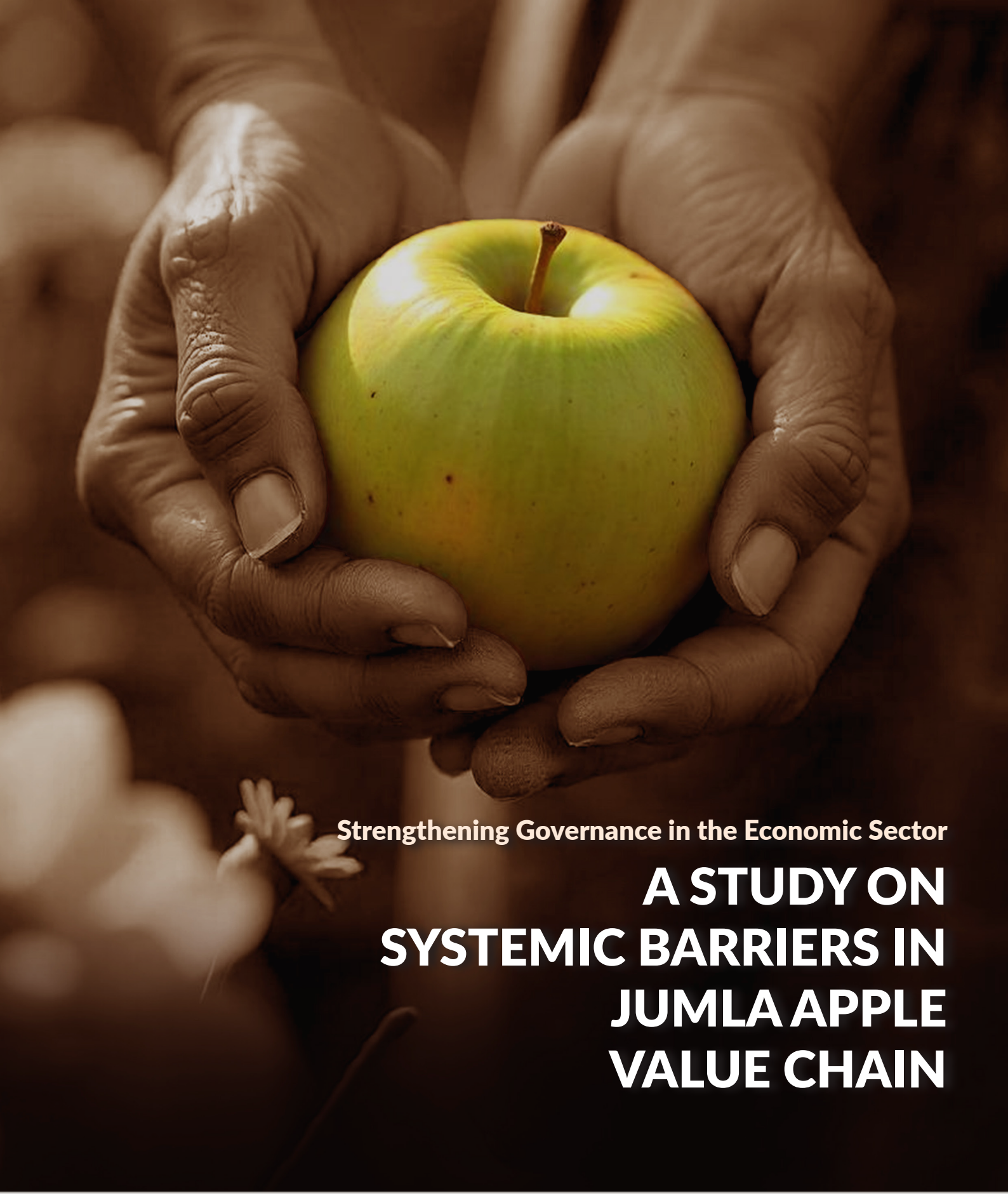

Strengthening Governance in the Economic Sector

A STUDY ON SYSTEMIC BARRIERS IN JUMLA APPLE VALUE CHAIN

स्थानीय सरकार सबलीकरण

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TOWARDS PROSPEROUS KARNALI

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Hriti Foundation

2024

Published by:

Hriti Foundation

December 2024

Birendranagar-08, Surkhet, Karnali Province Nepal

Tel.: (+977)-083521564

E-mail: info@hriti.org

website: www.hriti.org

This publication is published with the support of the Subnational Governance Program implemented under a strategic partnership of the Australian Government Department of Foreign Affairs and Trade and The Asia Foundation. The views expressed in this publication do not necessarily represent the views of the Australian Government or The Asia Foundation.

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Executive Summary

This paper presents a comprehensive study on the market assessment of Jumla Apple, intending to identify the root causes of the existing issues and constraints within the sector. Despite the popularity of Jumla as an 'organic district' and the seasonal market dominance of Jumla apple, challenges in post-harvest handling and storage of the apples produced have been limiting the potential growth of the sector.

The paper outlines a strategic approach to formulating interventions to address the problems at the grassroots level. The market system assessment highlights the key challenges along the value chain of Jumla apples. The limited practice of grading/sorting Jumla apples, along with traditional packaging and handling methods are the major challenges identified through the constraint analysis. These challenges affect the quality control of Jumla apple causing the inability to increase the post-harvest shelf life of Jumla apple. Additionally, the lack of adoption of improved agricultural practices happens to be another challenge, which has limited the production of better-quality apples in the first place.

Moreover, the study outlines the strategies to incentivise the key actors of the value chain to adopt improved post-harvest handling, modern agricultural practices, and storage facilities, to reduce wastage and improve the overall quality of the apples. The analysis identifies the need and scope of the apple processing industry in Jumla, in creating a market for low-graded Jumla apples. Also, this would create market diversification with the variety of products from the Jumla apple. These measures are essential for enhancing market access and maximizing profitability to ensure the sustainable expansion of the Jumla apple.

Further, this study emphasises the need to introduce the relevant processing industry for the utilization of low-graded Jumla apples, minimizing the wastage of apples during the season. The processing industry would also create a diversification in the market with a variety of Apple products.

Hence, through collaborative efforts from government entities, private sectors, and local communities, the Jumla apple industry has the potential to drive economic empowerment, ensure the long-term growth of the sector, and increase the province's Gross domestic product.

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1 Introduction

Of various deciduous fruits grown in high mountain regions of Nepal, the apple is the major source of income generation for local farmers. Commercial farming of Apple in Nepal began in Marpha, Mustang in 2020s BS, after the establishment of the Horticulture Centre in the area.[1]Today, it has expanded to multiple districts of Karnali province, given its revenue potential. Jumla, Mugu, Kalikot, Humla and Dolpa are major apple-producing districts of the province. They account for 41.2 per cent of total apple production in the country.[2] The revenue potential and the capacity that Karnali hold in apple production are a result of various factors including but not limited to efforts made by the Government of Nepal.

The government introduced apple farming in Jumla, in the early 2030s BS. The first horticulture farm in Jumla was inaugurated in 2024 BS The farm introduced apple saplings from Kashmir, India.[3] When the first phase of apple plantation began, the panchayat system was prevalent. The ownership of the orchards thus was limited to the high-profile individuals in Jumla. Despite production, the scope for income generation was limited given the lack of connectivity to the market. Apple farming did not gain popularity among farmers till the 2050s BS when the second phase began. With the increase in several apple orchards in Jumla, there was a significant rise in the production of apples leading to the establishment of the Jumla apple supply chain.

Market access to the Jumla apple improved significantly with the construction of the Karnali highway in 2064/65 BS.[4] The highway eased transportation of apples consequently every household started the plantation of apples. Later in 2066-67 BS, Jumla was declared an organic district which led to increased popularity of Jumla apple at the national level. In 2072-73 BS the district became an Apple Super Zone as part of the Prime Minister's Agriculture Modernization Project.[5] Consequently, the production and national recognition of Jumla apple have increased significantly over the last decade. Nevertheless, value chain challenges such as post-harvest handling of the Jumla apple have limited market growth and its contribution to the economic growth of Karnali province. Furthermore, inadequate storage facilities compound post-harvest losses

So far, a comprehensive analysis of value chain gaps and price differences between the farm gate and the market price of the apple has not been undertaken. Although various studies highlight the income potential of apple farming in Jumla, post-harvest handling and income losses during transportation have received less attention. This paper is centred on the need to undertake a comprehensive study of apple farming in Nepal from the lens of problems that exist in its value chain. Further, the study identifies the causes of a significant gap between the farmgate and the market price of apples.

1 Lohani. P. C. (2022.07.21). जुम्लाको स्याउको पीडा. Ekantipur. Retrieved January 15, 2025, from https://ekantipur.com/opinion/2022/07/21/165837055068975503.html

2 Baralgroup. (2022.10.01). Apple farming can help in Karnali's poverty reduction: Are stakeholders ready? Baralgroup. Retrieved December 28, 2024, from https://baralgroup.com.np/2022/10/01/apple-farming-can-help-in-karnalis-poverty-reduction-are-stakeholders-ready/

3 Budha. G. (2023.04.11). जुम्लाका बगैंचामा स्याउ फुलेर सेताम्मे. Nagariknews.Retrived December 20,2024, from https://nagariknews.nagariknetwork.com/economy/1155361-1682396055.html

4 Key informant interview

5 NepalNews.2022.02.18. 'Apple Super zone' program implemented in Jumla. NepalNews. Retrieved January 10, 2025, from https://nepalnews.com/s/business/jumla-s-apple-superzone-program

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2
Methodology

The study utilises the Market System Development approach, for mapping the core constraints limiting the economic growth of Jumla apple through analysis of the information collected. The information included in the study was gathered through desk research, stakeholder consultation meetings and key informant interviews (KIIs). The process follows the identification of the core constraint in the system, followed by the identification of the root cause of the problem. Thereafter, the study uses a strategic framework in the MSD approach to identify the necessary system-level changes.

The primary source of information collected for the study was key informant interviews (KIIs) including stakeholder consultation meetings. Multiple interviews and consultations were conducted with the collaboration among multiple actors involved in the value chain of Jumla Apple. These actors included:

- *Apple farmers*
- *Local traders*
- *Wholesale traders*
- *Province and Local government*
- *Financial institutes*
- *Transporters*
- *Co-operatives.*

The key informant interviews (KIIs) and consultation meetings with the stakeholders centred on the sector's challenges and risks, the effectiveness of government policies and subsidies initiated to grow the sector, and the loans and finances involved. Further, the discussions also focused on the quality control of Jumla apple, along with the scope and needs of the processing industry.

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3
Limitations of the Study

Due to the limitations in the availability of the relevant data, the study primarily relies on qualitative analysis of the information collected from the individual stakeholders. Despite the efforts made to collect data from various news articles and other sources, the accuracy of some information provided could be subject to limitations. Additionally, the is the possibility that some information provided by the stakeholders during KIIs may be influenced by personal biases.

The lack of sufficient time and resources for field visits to Jumla limited the ability to conduct dialogue and observation with the farmers and local authorities. Hence, there is a possibility that the provided information may not fully reflect the current state of apple farms and storage facilities in Jumla. Similarly, the study lacks information regarding customer preferences and demand in distant markets, as the KIIs were centred towards the customers in Surkhet.

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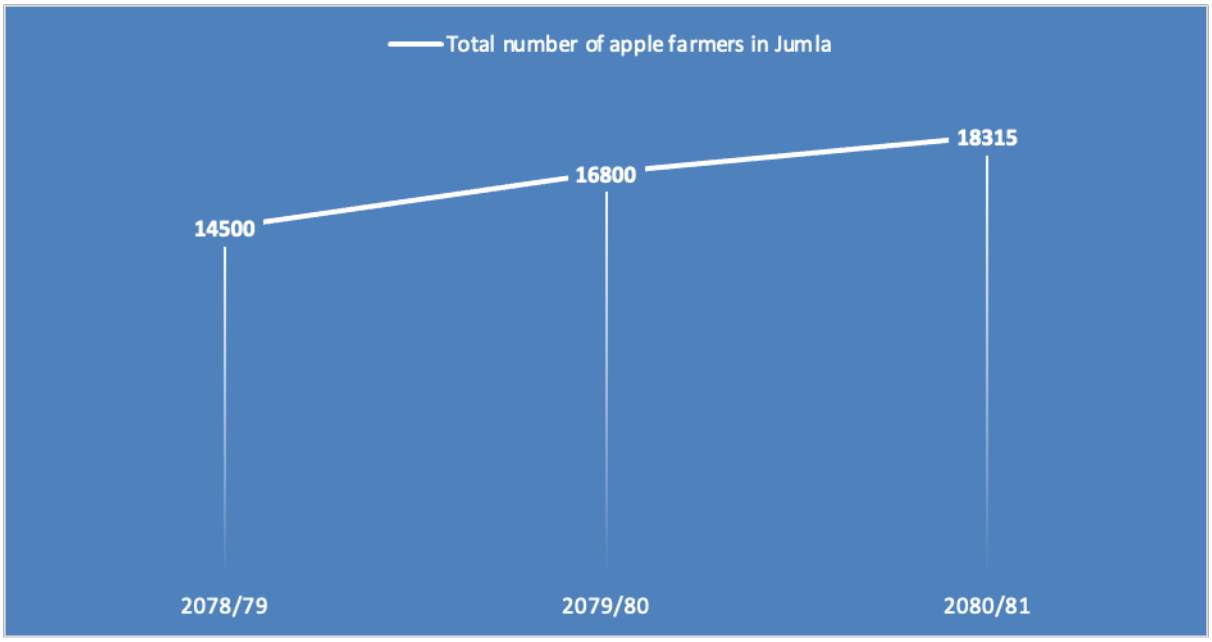
4
Current Status

In the year 2081, the total production of apples, grown in 4250 hectares of land in Jumla reached 20511 metric tons. Around 9400 metric tons from the total production of apples were exported to various markets by the suppliers. During the season, all the eight local levels of the district supplied apples worth 614.1 million NPR in total.[6]

Between 2078/79 to 2080/81, the total number of Apple farmers in Jumla increased from 14,500 to 18,315—a substantial growth rate of 26.31%. This shows the increasing interest of locals towards apple farming, which could be due to improved market access, government projects and policies or various subsidies towards the growth of the sector. As a result of which, apple production in Jumla has nearly doubled.

Figure 1: Increase in the Total Number of Apple Farmers in Jumla



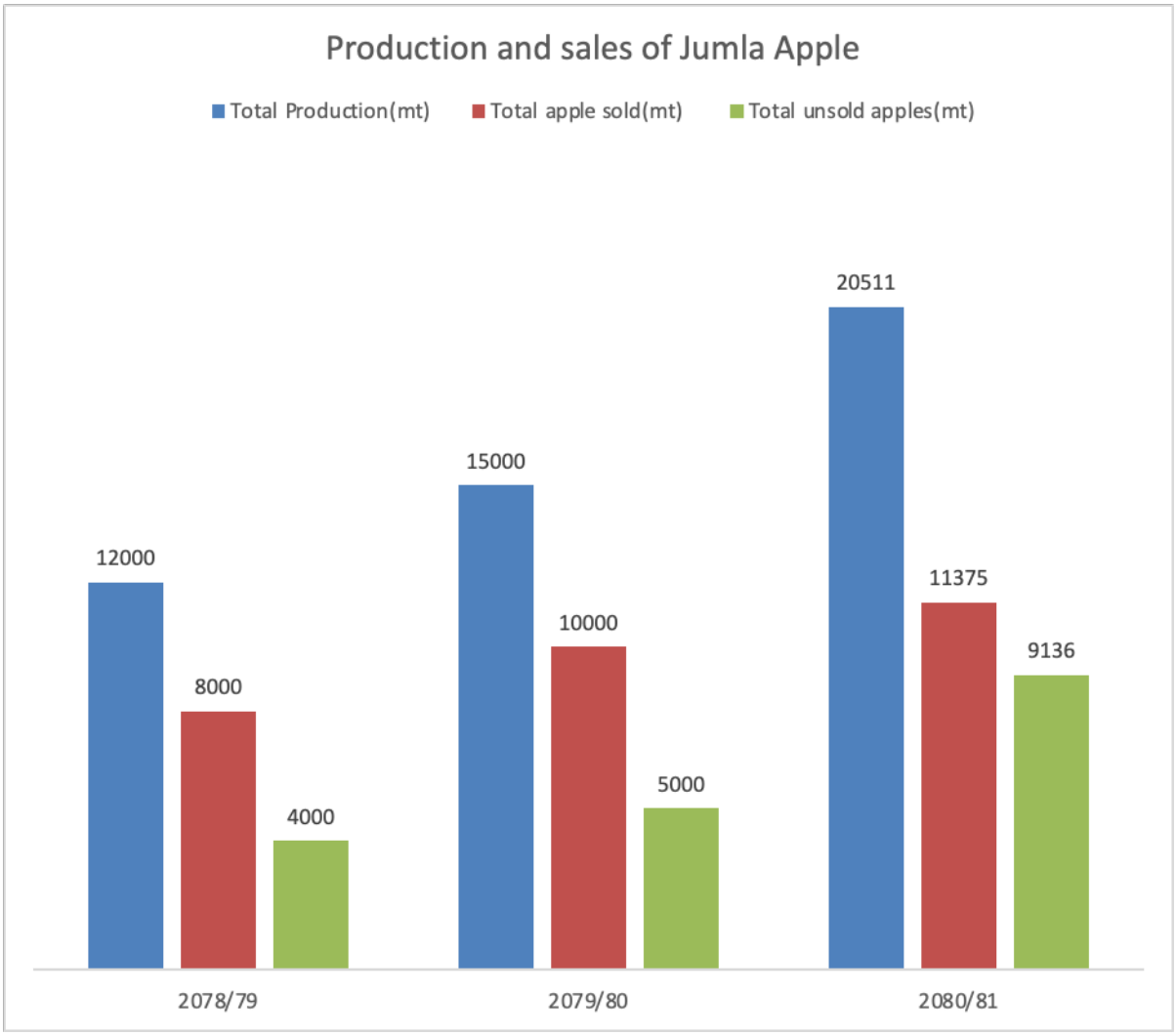
Source: Agriculture Modernization Project, Apple Super Zone, Jumla[7]

In fiscal year 2078/79 Jumla produced 12000 metric tons, by 2080/81 production had increased to 20,511.43. Consequently, the quantity of apples sold has increased by 42.19%. The sales volume increased from 12,000 metric tons in 2078/79 to 20,511.43 metric tons in 2080/81, resulting in average sales of 9791.67 metric tons per year.

6 The Rising Nepal. (2024.11.01). Jumla supplies apples worth 614 million. The Rising Nepal. Retrieved January 16, 2025, from https://risingnepaldaily.com/news/51263

7 Agriculture Modernization Project, Apple Super Zone, Jumla had provided us this data through email.

Figure 2: Production and Sales of Jumla Apple

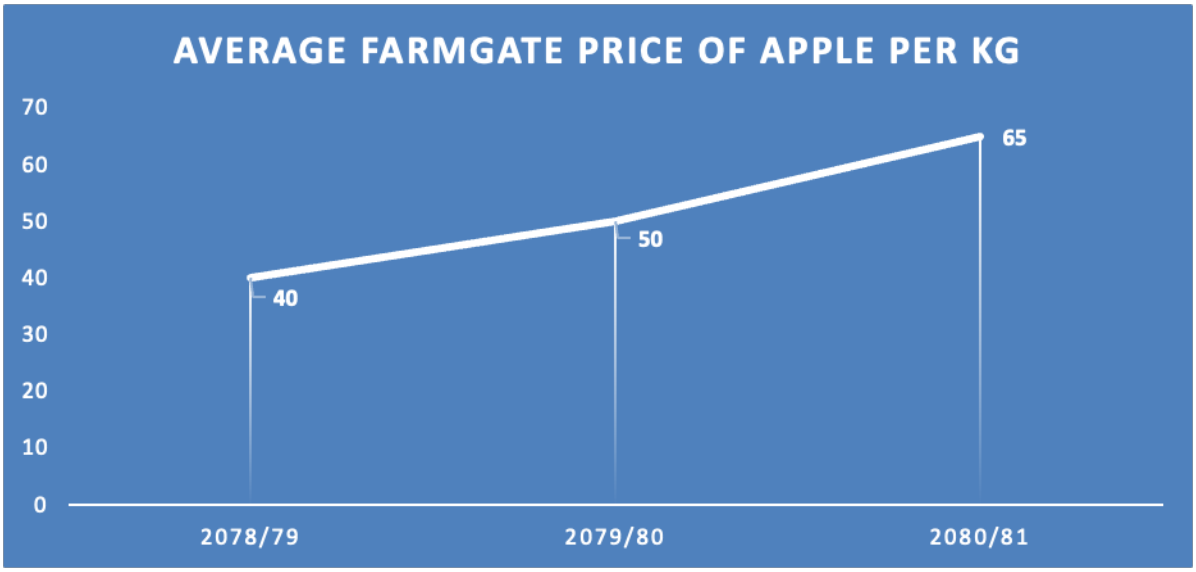


Source: Agriculture Modernization Project, Apple Super Zone, Jumla[8]

At the same time the volume of unsold apple has also sharply increased. In 2080/81 9,136.43 metric tons of apples were unsold compared to 4,000 metric tons in 2078/79. Strategies to boost the demand for apples are evidently needed along with storage facilities to reduce loss of income. The local government in Jumla determines the price of apples on a weekly basis. The aim is to ensure returns for apple farmers. In the year 2081 BS, Sija Rural Municipality, Jumla had set the minimum price of apple at 50 NPR per kg during the initial harvests, raises it to 80 and towards the end of the season set the price at NPR 100. The price regulation initiatives by the local government stabilizes the local apple market, however it becomes challenging because local farmers cannot negotiate due to inadequate infrastructures and limited market access. According to the data provided from apple super zone in Jumla, local apple collectors bought apples at an average price of 40 NPR per kg at the farmgate and sold it to the traders at 600 NPR per kg in 2078/79. This year (2080/81), however, average farmgate price reached 65 NPR per kg whereas wholesale price of apples was around 90-100 NPR in the market. Additionally, farmers in some area received up to 120 per kg on the sale of apple towards the end of the season. The gradual rise in the farmgate price of apples is a promising sign. The adoption of standard grading and sorting of apples before sale could further increase farmgate prices.

8 Agriculture Modernization Project, Apple Super Zone, Jumla had provided us this data through email.

Figure 3: Increase in farmgate price of Jumla apple



Source: Agriculture Modernization Project, Apple Super Zone, Jumla[9]

On average, cutting, packaging and loading onto a truck takes 6 days for 4 to 5 metric tons of apple in Jumla. This means it takes around one and a half days for cutting, packaging and loading of 1 metric ton apple. They are generally sold to local traders/collectors within 7 days of picking. Furthermore, it takes an average of 36 hours to supply the apples to the nearest market i.e. Surkhet or Nepalgunj. This delayed process of apples reaching the market increases the chances of loss due to degradation in quality and loss of weight of the apples. Consequently, an average of 10 KG per quintal of apples is lost during transportation. Interventions targeted towards improving packaging and better handling of the apples while supplying them to the market could potentially decrease the loss of apples.

The ratio of average loss of apple by the time it reaches the final consumer from Farmgate was 10:8 in 2078/79, which has decreased to 9:7 this year (2081 BS). Moreover, the ratio of average loss of apples at the wholesale market incurred due to spoilage or spread of disease is 10:1. Moreover, a 4% loss occurs initially, due to a decrease in weight and quality degradation of the apples, which is borne by the traders. Thus, minimizing the loss of apples along the value chain and decreasing in volume of unsold apples is to be focused on for the growth of the sector.

Currently, there are two types of cold stores operating in Jumla. One of the cold storage in Jumla is the Kailash cold store, which has a 100 metric-ton storage capacity. The cold store charges 4 NPR per kg for the storage of apples or other fresh produce for one month. Besides that, there are 10 prefab cold stores with a storage capacity of 10 metric tons each.

9 Agriculture Modernization Project, Apple Super Zone, Jumla had provided us this data through email.

Table 1. List of policies and programs for Jumla apple

Program/Policies	Description
Prime Minister Agriculture Modernization Project (PMAMP) - Apple superzone program (2073/74 BS)	Apple super zone program is a part of the **Prime Minister's agriculture modernisation project** in Jumla. The program is primarily focused on providing subsidized high-quality apple saplings, fertilizers, pesticides, and improved irrigation systems in Jumla. The program has significantly contributed to the growth of apple farming in Jumla, uplifting the living standard of local farmers.
Horticulture Promotion Policy (2071 BS)	Under the Ministry of Agriculture and livestock development, the government introduced the policy to promote the production, productivity and commercialization of horticultural crops like apples. The policy targets smallholder farmers, agricultural cooperatives, and private sector actors, providing support for improved agricultural practices and inputs like tools, seeds, fertilizers etc.
Apple transportation subsidy – USAID initiative (2047-2057 BS)	The program provided subsidies on air transportation of Apples from Jumla to Kathmandu and other distant markets. The program led to decreased cost of transportation of apple allowing the farmers to receive higher prices, along with improving the market access of Jumla apple.
High Mountain Agribusiness and Livelihood Improvement Project (HIMALI) – Funded by Asian Development Bank (2065 BS)	The program focused on providing training to local apple farmers in Jumla on orchard management, irrigation system and post-harvest management of apples. This also facilitated the improved road and market access, specifically, for the Jumla apple.
Irrigation for apple orchards (PMAMP)	Under the prime minister's agriculture modernization project, the irrigation system for apple orchards in Jumla is an ongoing work. The ongoing work for the installation of drip irrigation system and water harvesting technique under government funding helps mitigate water shortage in apple farms in Jumla, especially during dry season.

Sources: [10], [11], [12]

10 Jha R.N. (2023). Evaluation of Agricultural Mechanization Policies and Need of Agricultural Machineries Testing Centre in Nepal.

11 Prime Minister Agriculture Modernization Project. (N.D). Ministry of Agriculture and Livestock Development. Retrieved from https://pmamp.gov.np/. (2025.01.17)

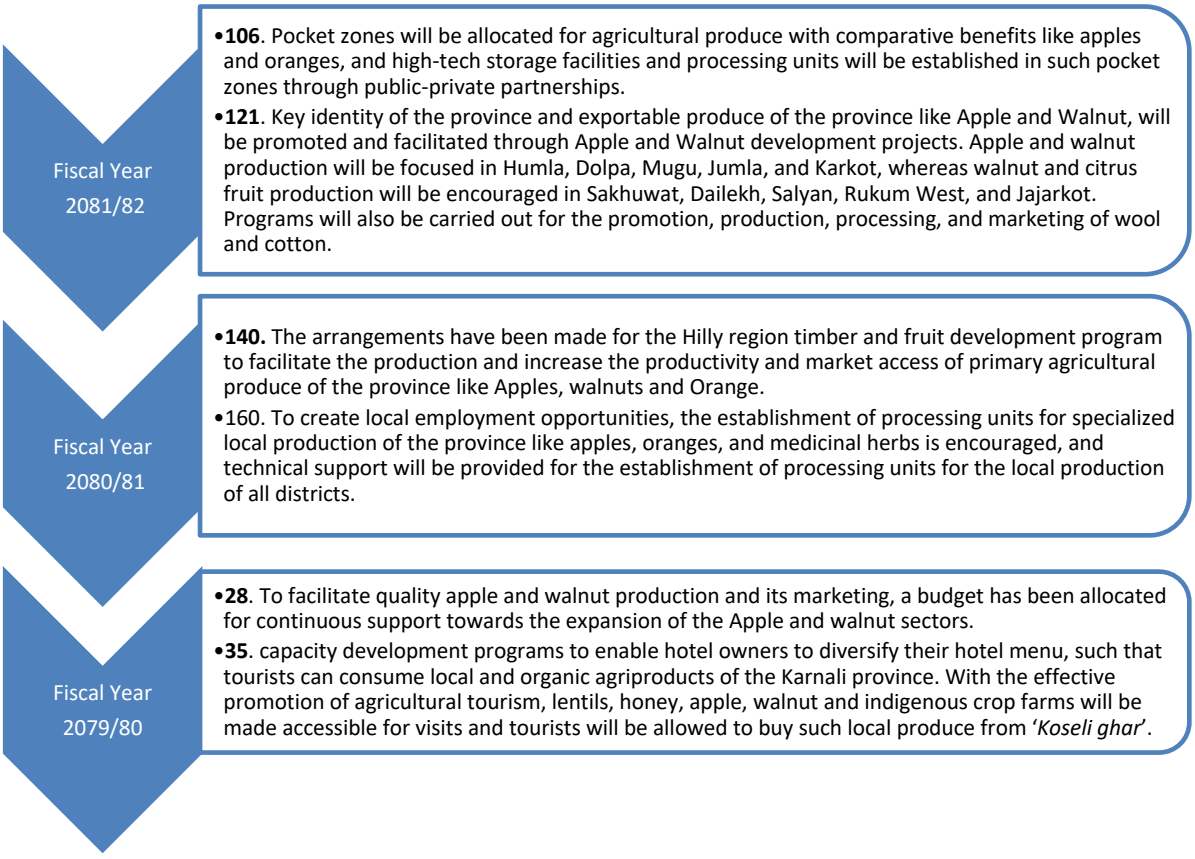
12 High Value Agriculture Project. (n.d.). *Value chain analysis of apples from Jumla*. Government of Nepal. Retrieved January 20, 2025, from https://hvap.asdp.gov.np/downloadfile/Value%20Chain%20Analysis%20of%20Apples%20from%20Jumla_1377153352.pdf

The government seems to have introduced various policies and programs regarding Jumla apples. Prime Minister Agriculture Modernization Project (PMAMP) - Apple superzone program is important. It was established by the federal government in 2073 BS.[13] The program is primarily focused on providing subsidized high-quality apple saplings, fertilizers, pesticides, and improved irrigation systems in Jumla. The program has significantly contributed to the growth of apple farming in Jumla, uplifting the living standard of local farmers. Various policies and programs related to Jumla apples are mentioned in the above table.

Initiations by the Karnali Province Government

Even in the state government's budget statement, Jumla's Apple seems to be given priority. In all three fiscal years from 2079/80 to 081/82, apples from Jumla appear to have been included in the Karnali Province Government's budget statement. It seems to include everything from the marketing of apples to cold stores and subsidies to farmers.

Figure 4: Jumla Apples in the Karnali Province Government's Budget Speech



Sources: Budget Speeches, Karnali Province Government (2079/80 to 2081/82)[14]

13 Prime Minister Agriculture Modernization Project. (n.d.). *Introducing Apple Superzone: Jumla*. Retrieved January 20, 2025, from https://piujumla.pmamp.gov.np/document/introducing-apple-superzone-jumla?language=en

14 Ministry of Economic Affairs and Planning, Karnali Province Government. (2079–2082 B.S.). *Budget speeches: Fiscal years 2079/80 to 2081/82*. Karnali Province Government. (The things mentioned in the provincial government's budget have been translated into English.)

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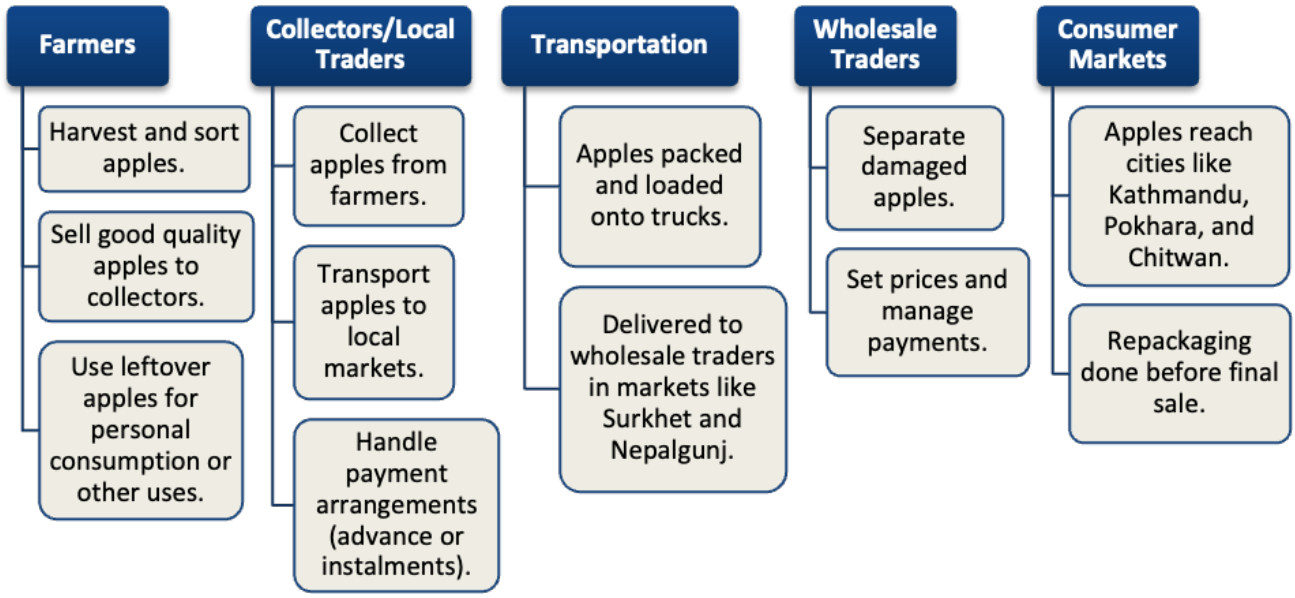
5
Market System Assessment

Figure 5: Market System of Jumla Apples



Source: Stakeholder Consultation and Key informant Interviews

In case of Jumla apples, there is no direct connection between the farmers and traders. Farmers harvest the apples and middleman collect apples from the farmers within few days. Even with lack of standard grading facility, apple farmers are aware that they will receive better prices for graded apples. Therefore, farmers often provide good quality apple to the collectors after careful segregation, while keeping the remaining apple for personal consumption or feeding the livestock or making alcohol. The collectors/local traders gather apples from multiple orchards in the area and transport them to the local market. While transporting the apples from farm to the local market through tractor or carriers, the cost of transport is either paid by transporter or the farmer depending on the mutual agreement. Similarly, the payment of the apples varies depending on the mutual understanding. Farmers might receive their money immediately at farm or in instalments. Generally, local traders make the advance payment in apple farms and remaining amount is paid later, when the collector receives payment from wholesale traders in distant market.

From the local market apples are loaded on trucks and supplied to the wholesale traders in nearest markets (Surkhet, Nepalgunj, Ghangadi) via Karnali highway. But, before loading the apples for transportation, packaging of apples is done. Local traders often hire manpower for packaging and loading of apples.

Generally, the cost of transportation of Apples from Jumla to Surkhet ranges from 5 to 10 NPR per kg. However, the cost may be higher during the season due to increased demand of transportation. Additionally, if the traders could contact the vehicle transporting goods from Surkhet or other markets to Jumla, they might have to pay lesser transportation cost as the vehicle would otherwise be returning empty. Nevertheless, along with transportation cost, any loss of apples during transportation is borne by the transporter.

While unloading the apples, the wholesale traders separate the damaged apples from the batch, as they are not willing to pay for the apples spoiled during transit. Thereafter, wholesale traders allocate the price by themselves depending on the quality of the apples and proceed with the payment methods. The payment is often made in instalments depending on the business relations and mutual understanding between the two parties (wholesale traders and transporters/collectors). In some cases, though, payment is done immediately with cheque or bank transfer.

In recent years, consumer preference for Jumla apples has increased as they are organic and delicious. Imported apples does not enter the market in season as Jumla apple take the market. Even the improved varieties of like Fuji, Gala apples are also supplied from Jumla, as the farmers have started planning these high-density varieties. As, long as Jumla apple is available in the market consumers prefer it over other imported apples, for being organic and comparatively cheaper.[15]

Nowadays, Jumla Apple is supplied to Kathmandu, Pokhara, Butwal, Chitwan, Dharan, Mahendranagar, Dhangadi from Surkhet. While suppling Jumla apples from Surkhet to the distant markets, repackaging of the apples is done, yet there is a noticeable difference between Jumla apple and Mustang apple in terms of quality, packaging and price.[16] Despite its better quality and taste Mustang apple is not sold in Surkhet because of the higher price. This is because of the availability of Jumla apple at lower price.

Table 2. Key Actors and Roles

Actors	Role in Value Chain	Key Challenges
Farmers	Production of apples	• *Limited incentive for adoption of improved agricultural practices.* • *Limited market access* • *Lack of direct linkage to the processing industry resulting in no demand of low graded apples.*
Collectors/ local traders & transporter	A middleman between the farmers and the market	• *Lack of a well-established collection center with standard grading and packaging facilities.* • *Unavailability of proper packaging materials.* • *Higher cost of transportation of apples from Jumla to Surkhet or other markets.* • *Risk of loss during transit* • *Challenging road conditions and availability of vehicle for transportation.*
Local and Province government	Policy formulation and subsidy programs	• *Limited budget for the implementation of programs and policies.*

15 Key informant interview
16 Key informant interview

Traders and Wholesalers	Distribution and marketing	• *Consumer preferences and market price volatility* • *Inability to extend the shelf life of Jumla apple* • *Loss of unsold apples due to lack of storage facility.*
Consumers	Buying or consumption of Jumla apple	• *Differing prices of Jumla apple* • *Unavailability of Jumla apple during off season.*

Source: Stakeholder Consultation and Study

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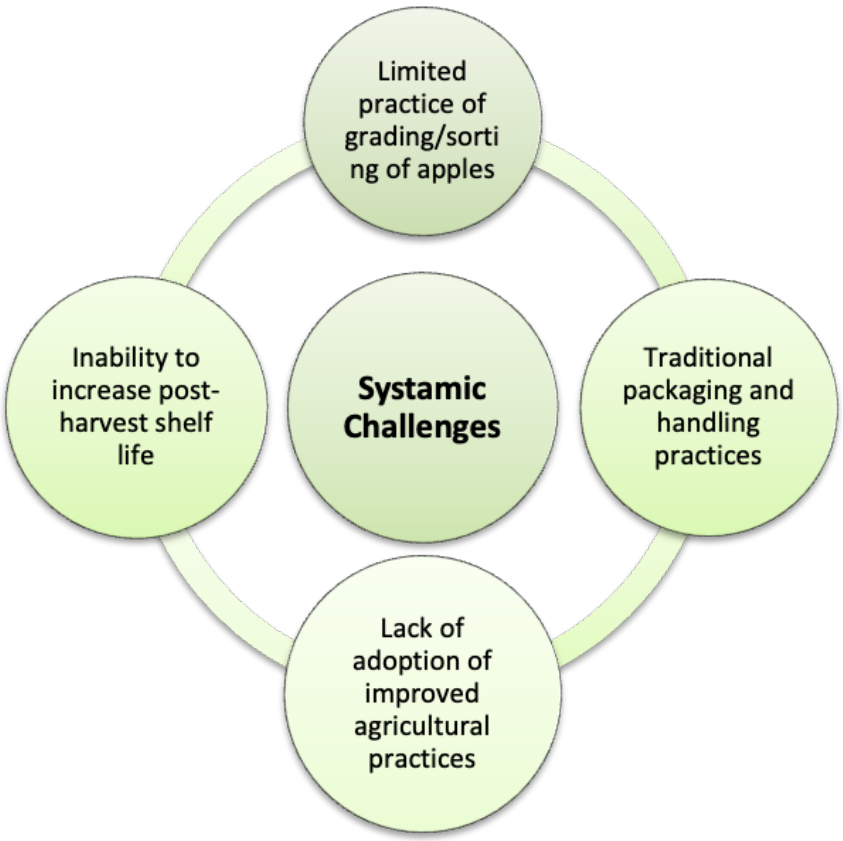
6
Systemic Challenges

Jumla apple is unique in its authentic taste, crispiness and nutritional content. Moreover, being of high-altitude origin and Jumla district being announced as an 'Organic district', Jumla apple has become popular for its organic properties.[17] Despite these qualities, the apples continue to be primarily marketed based on their cheaper prices. This focus on affordability has led to compromise in quality control along the value chain due to which it is difficult for the Jumla apple to stand out in the distant market where they are primarily seen as a price-competitive option.[18] Consequently, Jumla Apple struggles to compete in the market in terms of quality and price. At the same time, the seasonal availability of the apples poses a challenge for consistent market supply.

Figure 6: Systemic Challenges of Jumla Apples



Source: Analysis of the information gathered through KIIs and Stakeholder Consultation

17 Key informant interview
18 Conclusion derived from the constraint analysis done using information gathered through KII

However, effective promotion and re-branding of Jumla apple could allow it to successfully compete in the market at higher rate. Nevertheless, successful re-branding of the product relies on the product differentiation and value addition. This requires quality improvements through grading, packaging and post-harvest handling. By addressing these barriers, Jumla apple can outgrow their image as low-price options and gain market recognition as organic apples with exotic taste, crispiness and rich in nutrients, allowing the market penetration of Jumla apple as high value product. If necessary, changes are made, Jumla apple has the potential to sale in the market at higher price and yet result in increased demand.

Limited practice of grading/sorting of apples

The grading and sorting of apples is important because it helps maintain the quality and maximize market value. Grading segregates the apples in different categories based on their quality, appearance and sizes, whereas sorting allows the separation of diseased or damaged apples from the healthy produce. The standardised grading and sorting of apples at the farmgate allows farmers to differentiate the price of apples, with premium quality apples marked for higher price. Moreover, separating low grade or diseased apples minimises the spread of diseases during transportation, significantly reducing the loss and increasing the shelf life of apples.

In case of Jumla, however, grading and sorting at the farmgate is not yet in practice. Moreover, farmers themselves don't agree on grading and sorting of apples at the farm gate, specifically when the harvest falls short on their expectations. Instead of higher price for A-grade apples, local farmers are more concerned about the volume of low graded apples that would remain unsold if separated during grading. This fear rises due to the lack of market for low graded apples leading farmers to reject grading and sorting of the Jumla apple.[19] Hence, reliable market channel for low graded apples is essential to address the existing circumstance in the region. Development of local processing industry for by-products of apple could be an effective initiative to provide value to the low-grade apples. Additionally, this would also diversify the apple market.

Currently, the loss incurred during the transportation are borne by the transporter as the traders refuse to pay for the damaged goods. Although in some areas, manual grading of apple is done by the worker, the method is often ineffective, as a single diseased apple missed during the manual grading could spoil the entire batch. Thus, at the initial phase small, manually operated machines for grading is necessary to ensure standard and consistent quality control of the Jumla apples.

Traditional packaging and handling practices

The Karnali highway, stretching over 232 Km, is a congested road with sharp turnings throughout the journey. Moreover, the frequent occurrence of landslides during the rainy season makes it treacherous, leaving the hurdles and puddles along the way throughout the year. Hence, the highway happens to be a rough and bumpy route. The poor road conditions cause substantial handling challenges leading to risk of damage to the apples. Thus, resulting in bruising and spoilage of apples by the time they are supplied to the market. This makes it crucial to invest on improved packaging and transportation method to protect the apples by minimizing loss during transit.

Despite being engaged in apple farming for generations, local farmers and traders in Jumla lack technical knowledge about standard packaging and handling practices. Currently, apple harvest in done by shaking the tree instead of plucking the fruits, leading to bruising as apples fall down the tree. Though apple farmers are aware of this method, they are short on the financial and human resources required to implement plucking method for the harvest of apples. And they are unwilling to invest in time or tools to facilitate efficient harvesting of the apples as they are not confident about being able to pay back the loan. Moreover, most local farmers in Jumla are often depended on government subsidies rather than investing on required facilities or inputs by themselves. Thus, this leads to further damage of apples during transportation from

19 Key informant interview

farm to the local market on tractors.

At present, transporters or collectors use second-hand cartoon for packaging the apples. These cartoons, originally used for imported Chinese apples are bought from the collector in Butwal, Nepalgunj, Dang at 32 to 35 per cartoon. While those cartoons reach the farmgate the transportation cost of 21 to 25 per piece adds up, making the process inefficient. Moreover, using second-hand packaging materials poses a risk, as the residues of diseases or fungi remaining on the cartoon from the previous batch of apples could potentially spoil the next batch during transport.

Figure 7: Cost of second-hand packaging of Jumla apple

Source: Key Informant Interview

Table 3. Cost Breakdown Of Second-Hand Packaging Of Jumla Apple

S. N	Particulars	Amount (NPR)
1	Cost of second-hand cartoon (per piece)	33
2	Transportation cost i. *Transportation from supplier to Surkhet* 6 ii. *From Surkhet to Jumla* 12 iii. *From Jumla to Apple farm* 5	23
	Total cost per cartoon	**56**

Source: Key Informant Interview

Though the government provided a subsidy on unused cartoons, in 2080/81, they still cost 60 to 65 per piece and the payment was to be done in cash. Additionally, the quality of the cartoons provided by the government were inferior compared to the second-hand cartoons being used which is not ideal as per the conditions of the Karnali highway.[20] Despite having a standard parameter regarding the quality of packaging material, government fails to provide sufficient support that meets the standard. Furthermore, there is a significant gap in commercial/practical research regarding the packaging and handling of apple that would fit in specifically in context of Nepal. Neither government nor private sector is willing to address this gap, as they lack incentives to invest in such research and implementations. This leaves a critical need of proper handling and transportation to the market, with reduced loss and spoilage of the apples.

20 Key informant interview

Lack of Adoption of Improved Agricultural Practices

For as long as apple farming has been introduced in Jumla, the traditional farming approach has been practiced. Even today apple farming is done with the traditional approach. Although very few of the local farmers started adopting improved agricultural practices since mid-2070s BS, many still show minimal willingness to adopt technical advancement or invest in modern equipment. However, local farmers are attracted towards improved, high-density varieties of apple like *Fuji* and *Gala* for it bears fruit within 1 to 3 years of plantation, most farming processes remain rooted in traditional methods. This explains the lack of equipment and expert guidance in the region for essential process such as grafting.

The reluctance among the farmers to adopt modern practices and pay for the production inputs and extension services is significant barrier to advanced apple farming in Jumla. Local farmers often expect the government to provide all the necessary facilities, while at the same time they are unwilling to pay for any production inputs and extension services. This has become a challenge for government, which cannot support all 18,315 apple farmers in Jumla. The government, however, attempts to assist by distributing small equipment like scissors, spray machines among certain groups and co-operatives along with the trainings. Yet, careful handling and maintenance of these tools and equipment is not followed due to lack of ownership and accountability as they are provided to groups rather than individuals. Furthermore, private companies are reluctant to provide agricultural services in Jumla as local farmers in the region are often unwilling to hire experts for advice. Such practice of farmers discourages the private sector from investing. However, over the years, the availability of agro-based service providers in Jumla has improved. Nowadays, local farmers have access to expert help in managing diseases and pests. In the past, farmers would use copper sulphate for all apple tree diseases, even though it wasn't always the right treatment, whereas today, farmers are able to diagnose and treat specific issues with better access to experts and the right medicines.

Currently, many farmers are reluctant to grade their apples, as the majority of produce tends to fall into low-grade category rather than the A-grade. Hence, it is crucial for farmers to realize that they can significantly increase the yield of A-grade apples with improved agricultural practices, leading to consistent, high-quality harvest. They need to be encouraged in taking the ownership of the farming processes and invest in enhancing their skills, acknowledging the potential of the sector and long-term benefits of the modern techniques and equipment. Therefore, the shift in mindset of the local farmers is essential for true advancement of apple farming in Jumla.

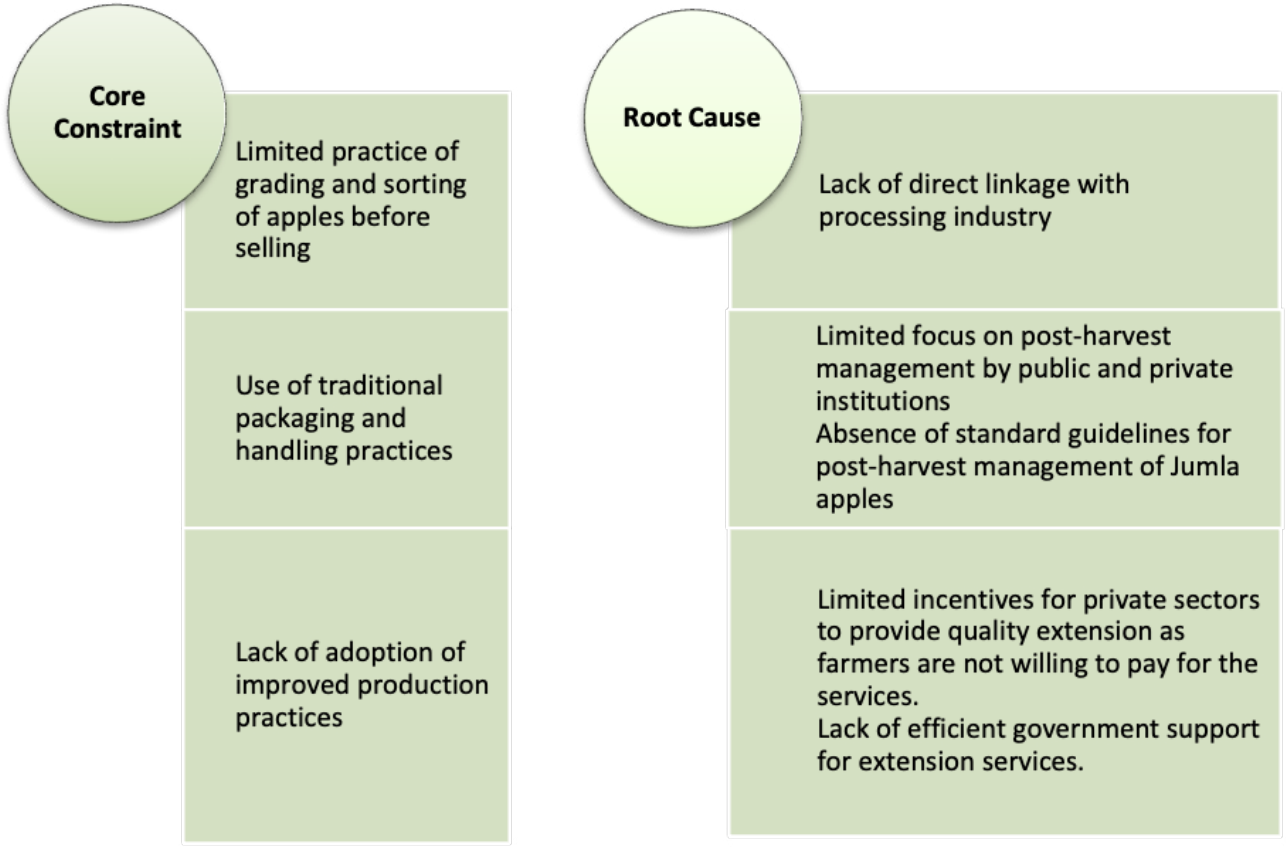
Inability to increase post-harvest shelf life

The quality and taste of Jumla apple by the time it reaches distant market, often becomes non-competitive, because of poor post-harvest handling and inadequate storage facility. These limitations prevent the Jumla apple from retaining the freshness of the apple for more than a month of harvest. Consequently, farmers are forced to sell their apples at lower prices rather than feeding them to the cattle. This causes the oversupply of apples in the market during the harvest season.

Despite excessive supply, Jumla apple is only sold in the market for a maximum of three months during the season. Thereafter, the volume of unsold apples often goes to waste due to quality degradation and spoilage. For the rest nine months, the market depends heavily on the apple imported from China. This highlights the seasonal limitation and inability to increase the shelf life of the Jumla apples.

Thus, proper packaging, improved transportation methods and better handling processes are crucial factors to be considered for preserving the quality of Jumla apple and extending its shelf life. These challenges need to be focused upon to strengthen the value chain of apples and make it marketable. Though Jumla apple holds the capacity to uplift the GDP of the province, it seeks collaborative efforts and initiatives from the government as well as the private sector, specifically in improving post-harvest handling situations.

Figure 7. Constraint Analysis: Jumla apple value chain



Source: Analysis of the information gathered through KIIs and Stakeholder Consultation

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7
Strategic Action Plan

Adoption of better practices to reduce losses and increase shelf life of apple

Considering the volume of damaged apples during transit, apple farmers and transporters should adopt improved post-harvest handling and storage facility to maintain the minimal wastage. However, ensuring better handling and extended shelf life of apples requires investment on improved packaging, better transportation methods and storage facilities. At present, seller lack the incentive to invest in post-harvest management of Jumla apple. Thus, the buyers need to incentivise sellers in making necessary investment, assuring them the return on their investment. This can be achieved through increase market demand and stable market growth of Jumla apple. Further, as these costs add up to increase in price of Jumla apple in the market, sellers need to be assured that market can absorb the product despite of increase in price.

Demand of low graded apples in the processing industry

Apple farmers in Jumla are often unwilling to grade their apples due to their concern regarding lack of market for low grade apples. At current situation, traders only buy A or B grade apples, while the remaining low-grade apples are left for personal consumption or fed to the castles, generating no income for farmers. To address this scenario and encourage local farmers for grading, processing industry is essential. Government and private sector partnerships could promote small-scale processing units at the local level; however, it is necessary to ensure quality output for the industry to sustain in the market for the long run. The introduction of processing industry will create demand for low graded apple lowering the volume of apple going to wastage.

Additionally, products like apple juice, cider, jam or alcohol will lead to diversified market for Jumla apple. Farmers will have the incentive to encourage them for grading their apples, given they receive higher rate for A- grade apples and still have the market for remaining low grade apples. This will result in better quality apples being sold in the market, with minimal loss of apple during transit.

Production input and post-harvest extension services provided by private sector

The apple farmers in Jumla need on-time agro-experts' input and extension services, to tackle the disease spread or pest attacks effectively. By adopting modern agricultural practices and proper harvest techniques, farmers could increase the yield of A-grade apple at the production level. However, there are limited companies providing such services in Jumla, as they lack the incentive to extent their services. It is not profitable for private sectors as local farmers are unwilling to pay for the extension services. The government, along with NGOs and private sector players, should focus on disseminating knowledge about

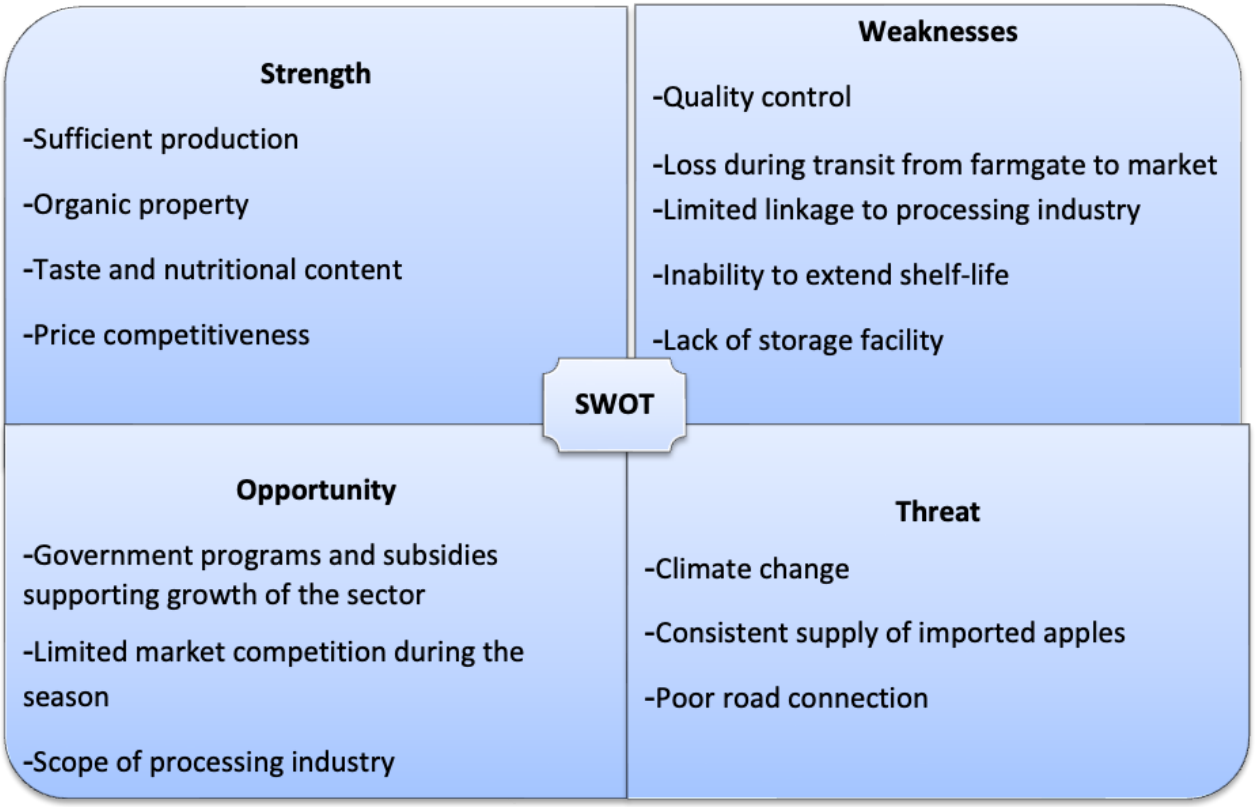
modern farming techniques, pest management, and proper use of tools and equipment. It is essential to change the mindset of farmers in perceiving the cost of those services as investment rather than expense. Such that, Private sector involvement in providing extension services will be incentivized to fill the gaps in technical support.

Market for high priced apples of premium quality

The marketing of Jumla apples has traditionally been focused on their affordability rather than their unique qualities, such as their organic nature and nutritional value, which limits their potential to command premium prices in distant markets. Customer preference for Jumla apple has increased significantly during the season because of its competitive price. Hence, it is perceived that current market of Jumla apple is driven by the price sensitive consumers. In the contrary, during the absence of Jumla apple in off season customers willingly buy Chinese apples at higher price. This shows that the consumers have the ability to pay higher price, given they are provided better quality. Therefore, farmers and traders need to focus on significant improvement in the quality of Jumla apples, which would provide the reason for costumers to pay higher prices.

Besides improved post-harvest management, proper marketing and branding of the Jumla apple is equally important for value addition to the product. Moreover, effective marketing along with improved quality, could pay an essential role in diverting the consumers' preference towards Jumla apples over imported apples though they are sold at equal prices.

Figure 8. SWOT Analysis of the Jumla Value Chain



Source: Key Informant Interviews and stakeholder consultations

8 Conclusion

This study concludes that the significant market growth of the Jumla apple in the past decade has majorly contributed to growth of local economy and providing employment opportunities in the region. However, due to systemic challenges along the value chain, the sector is unable to grow to its true potential. One of the major challenges limiting the growth of the sector lies in the inefficient post-harvest management of apple. Despite consistent focus on the production quantity of the apple, there is pressing need to focus on proper post-harvest handling of apples, particularly to minimize the loss during transportation.

Investment in post-harvest handling is essential for addressing the gap between farmgate price and retail price of the apple. Though cost increases resulted from post-harvest handling expenses leads to higher price of apples along the value chain, maintaining quality at the farmgate will inevitably result in higher pricing for farmers. As consumers are willing to pay more for apples of superior quality, it is imperative that key actors along the value chain are incentivized to invest in quality control of the Jumla apple.

Hence, the study suggests that stakeholders concentrate on quality control and value addition in order to fully realize the potential of Jumla apples. Through strategic government and private sector interventions, Jumla apple industry can establish itself as a high-value product both domestically and internationally, improving local farmers' livelihoods and making a greater contribution to Karnali Province's economic growth.

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9 Recommendations

Based on the strategic action plan addressing the challenges along the value chain of Apple, a few of the recommendations and interventions could be listed below:

- ***Collection Centres:*** *Local government or co-operatives in partnership with local traders could establish collection centres in the respective areas, with necessary equipment and types of machinery for standard grading and sorting of the apples collected from the orchards. Farmers could bring their harvest to the collection centres for grading and sell them to the traders. As grading is to be done at the collection centre farmers would be careful on handling to their harvest from the farm to the collection centre.*

- ***Packaging and Transportation****: The government should partner with the private sector to introduce and enforce the use of standardized, high-quality packaging materials to prevent damage during transit. The government provides subsidies to offer incentives for the packaging industry who provide best technologies for proper packaging to minimize spoilage. This would make the services available at lower prices, encouraging transporters to adopt effective packaging.*

- ***Local Processing Units****: Establishment of small-scale processing facilities for products like apple juice, cider, jam, and dried apple slices with public private partnership, would ensure market demand of low-grade apples and reducing wastage. Additionally, processed apple products diversify the apple market, ensuring farmers receive income for all grades of apples and boosting local employment.*

- ***National level branding and marketing Campaign****: Province government could launch a nationwide marketing campaign emphasizing on the organic, delicious and nutritional properties of Jumla apples. Creating a distinctive logo for packaging and branding of Jumla apple for product differentiation, making them unique from other varieties would position them as high value product compatible for distant markets.*

- ***Training Programs****: The province or local government in collaboration with NGOs could conduct extensive training programs for apple farmers focusing on modern farming techniques, pest management, and efficient harvesting methods. The collaboration with NGOs and private sectors will help disseminate knowledge and increase the adoption of high-density apple varieties like Fuji and Gala, along with improved agricultural practices.*

- ***Private Sector Support****: Government should engage private sectors in the value chain for providing required production inputs and extension services. The cost-sharing mechanisms with the help of government support would ensure farmers willingness to take necessary advantage of the facilities provided.*

- ***Establish an Authoritative Apple Development Board:*** *The Karnali Province Government should establish an authoritative Apple Development Board to lead apple cultivation, policy formulation, and industry growth in Karnali Province, including Jumla.*

Annex I: List of KII

S. N	Name	Field/Role
1	Atma Ram Acharya	Apple Farmer/ Local Leader (Jumla)
2	Bhakta Bahadur Budha	Apple Farmer
3	Prabal Shahi	Trader (Babu and Shahi)
4	Pooja Singh	Trader (Pooja Mandi)
5	Madhav Chaulagain	Activist/Consumer
6	Kamal Dhital	Co-operative (Chandannath)
7	Madan Neupane	Middleman/Transporter
8	Bishnu Nepali	Middleman/Transporter
9	Suman Rijal	Financial Institution (Agriculture Development Bank)
10	Purna Dhital	Local Government (Sija Rural Municipality)

Annex II: List of Stakeholders Consulted

S. N	Name	Designation
1	Karishma Chaudhari	Program officer, Radio Nepal
2	Bhakta Bahadur Budha	Teacher, Kalika Secondary School (Apple farmer)
3	Suresh Bahadur Rokaya	Teacher, Kalika Secondary School (Apple farmer)
4	Dipa Pyakurel	Statistics officer, Ministry of Land Management, Agriculture and Co-operatives
5	Tika Shahi	Chandannath Multipurpose Co-operative
6	Pooja Singh	Proprietor, Pooja Sabji Mandi
7	Prabal Shahi	Proprietor, Babu and Shahi Mandi
8	Kamala Tiwari	Asst. Lecturer, Mid-western University
9	Topendra Jung Shahi	Proprietor, Shahi Tarkari Tatha Falful Pasal
10	Dhan Bahadur Kathayat	Spokesperson/officer, Ministry of Land Management, Agriculture and Co-operatives
11	Atma Ram Acharya	Local Politician, Jumla

HRITI FOUNDATION

TOWARDS PROSPEROUS KARNALI

Hriti Foundation, a policy think tank in Karnali Province, conducts research, advocacy, and policy recommendations to foster a prosperous Karnali. It organizes the Karnali Utsav Kuda Karnalika policy festival and promotes individual rights and economic freedom.

Hriti monitors government policies, parliamentary actions, and budgets to ensure accountability. It supports provincial and local governments through research, discussions, and workshops, providing policy recommendations based on evidence.

With the shift to federalism, Hriti helps sub-national governments shape policies by bridging policymakers and civil society. It evolved from Tanneri Voice, a youth-led initiative focused on policy solutions, to become a structured think tank.

Birendranagar, Surkhet 083521564, 9858034426 info@hriti.org www.hriti.org