

Insurance of Citrus Fruit Crops in Nepal: Status, Prospects, Problems, and Recommendations

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ABSTRACT

This study assesses the status, challenges, and prospects of citrus fruit crop insurance in Nepal, focusing on Junar (Sweet Orange) cultivation in Sindhuli and another hilly district. Despite a decade of agricultural insurance programs, citrus crop insurance remains underdeveloped. In fiscal year 2079/80, only 241 citrus insurance policies were issued nationally, with just 5 for Junar—far below potential, given Sindhuli's 1,045 hectares of Junar cultivation valued at NPR 2.04 billion. Key barriers include low farmer awareness, outdated insurance provisions, shortage of trained technical personnel, delayed subsidy disbursement, and limited engagement of insurance companies. To unlock the potential of citrus crop insurance, the study recommends: Expanding awareness campaigns, revising insurance policies regularly, deploying technical experts at the local level, prioritizing crop insurance in local government budgets, streamlining subsidy disbursement, and strengthening insurance company participation and regulatory oversight. Expanding Junar crop insurance presents a major opportunity to strengthen agricultural resilience and economic security in Nepal's citrus-growing regions.

Keywords: Insurance, citrus, participation, barrier, economic security, agricultural resilience, potential opportunities, indigenous species

Genetic and DNA-based studies suggest that citrus fruits originated in the southeastern Himalayan region. According to research published in *Nature*, modern citrus species are believed to have evolved from the eastern part of Assam, northern Myanmar, and the western Yunnan region (Wu et al., 2018). The citrus group encompasses a diverse range of fruits, including mandarins, tangerines, junar (sweet orange), lemons, sweet oranges, limes, pomelos, grapefruits, citrons, and others. Among these, the mandarin orange (*Citrus reticulata*) is considered an indigenous species of Nepal.

Although citrus fruits are predominantly classified as subtropical crops, several varieties have been developed that can thrive under tropical climatic conditions. In Nepal, a wide variety of citrus crops are cultivated across the mid-hill regions, and species such as lemons, citrons, and pomelos are commonly grown in the Terai plains as well.

Commercial cultivation of citrus fruits is concentrated primarily in 42 mid-hill and Himalayan districts. Currently, citrus farming is practiced in 65 out of Nepal's 77 districts. The optimal elevation for cultivating fresh citrus fruits such as mandarins and junar ranges between 900 and

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Received: January 01, 2025; Revision Received: March 05, 2024; Accepted: March 31, 2025

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1,400 meters above sea level. In contrast, citrus varieties primarily valued for their sour flavor, such as lemons and limes, are generally grown at elevations ranging from 300 to 1,200 meters.

Objectives of the Study

General Objective

The general objective of this study is to evaluate the status, prospects, challenges, and potential for citrus fruit crop insurance in Nepal, with a particular focus on junar (sweet orange) cultivation in Sindhuli District.

Specific Objectives: The specific objectives of the study are:

- To assess the current status and potential opportunities for citrus fruit crop insurance in Nepal.
- To evaluate the present condition of junar cultivation in Sindhuli District, and to identify the prospects, challenges, and potential recommendations related to junar crop insurance.
- To present the key findings and policy recommendations for enhancing citrus and junar crop insurance programs.

RESEARCH METHODOLOGY

Research Design

This study employs a descriptive research design to assess the current status, prospects, challenges, and opportunities related to citrus fruit (specifically junar) crop insurance in Nepal, with a focus on Sindhuli District. The research also involves the analysis of data collected from secondary sources and key informants to gain insights into the feasibility of insurance for citrus fruit crops, particularly junar.

Data Collection Methods

Data for this study were collected through secondary sources and primary sources, including expert interviews and reports. The data collection methods are as follows:

Primary Data:

- Interviews and discussions with officials from sectoral offices engaged in citrus farming promotion in key citrus-producing districts, such as Sindhuli. These interviews provided valuable insights into the ground realities of junar cultivation, the challenges faced by farmers, and the perceived potential for crop insurance in the region.
- Field surveys and discussions with local farmers involved in citrus farming, which helped to gather data on their awareness of insurance, the challenges they face, and their willingness to adopt crop insurance programs.

Secondary Data:

- Official statistics and reports related to citrus fruit cultivation published by the Ministry of Agriculture and Livestock Development (MoALD) and its subordinate departments, which provide a detailed overview of the citrus farming landscape in Nepal.

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- Data published by regional agricultural offices and district-level offices under federal programs aimed at promoting citrus fruit cultivation across various districts, particularly those in the mid-hill and Terai regions of Nepal.
- Published research articles, technical books, government publications, and institutional reports on the current state of citrus fruit cultivation and insurance practices in Nepal.

Data Analysis

Data collected from both secondary and primary sources were analyzed using qualitative analysis methods. The following approaches were employed:

Qualitative Analysis:

- Content analysis of secondary data, including government reports and published research, to identify trends in citrus fruit cultivation and the existing landscape of agricultural insurance in Nepal.
- Thematic analysis of interview and survey responses from officials and farmers to identify common challenges, opportunities, and the overall feasibility of introducing insurance programs for citrus crops, particularly junar.

Limitations

While this study provides valuable insights into the potential for citrus crop insurance in Nepal, the data collection process was constrained by the availability and accessibility of relevant data from some districts. Additionally, the study is limited to the scope of the citrus fruits (specifically junar) and may not fully account for the broader agricultural insurance context across other crop categories.

MAJOR CITRUS FRUIT VARIETIES IN NEPAL

Various types of citrus fruits are cultivated in Nepal. The primary citrus varieties cultivated in the country include mandarins (suntala), junar, sour varieties, pomelos (bhogate), tangerines (muntala), and tripartite group citrus fruits, as shown in Table 1. According to the classification in Table 1, not all the varieties within each group are grown commercially in Nepal.

For example, under the mandarin group, the main species cultivated is *Citrus reticulata* (Blanco), while other varieties such as *Citrus unshii* (Unshu mandarin) and *Citrus reticulata* hybridized with King and Willow Leaf Mandarin (a hybrid variety) are also found. Similarly, within the junar group, *Citrus sinensis* Osbeck (sweet orange) is the primary variety, while *Citrus aurantium* (bitter orange) is also cultivated.

In the sour citrus group, varieties such as lime (*Citrus aurantiifolia*), lemon (*Citrus limon*), and *Citrus reticulata* (Bimiro) are grown. In the pomelo group, varieties like Bhogate and Sankhatra are cultivated, while in the tangerine group, Muntala varieties are primarily grown. Finally, the tripartite citrus group includes tripartite mandarins.

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Table 1. Major Citrus Fruit Varieties Under Citrus Fruit Crops.

S.N	Nepali name	English Name	Botanical Name
A	सुन्तला समुह	Mandarin	
1	सुन्तला	Mandarin Orange	<i>Citrus reticulata Blanco</i>
2	किंग सुन्तला	King Mandarin	<i>Citrus nobilis</i>
3	उन्सु	Sanatsuwa Mandarin	<i>Citrus unshii</i>
4	विलो लिफ सुन्तला	Willow Leaf Mandarin	<i>Citrus deliciosa</i>
5	किनो सुन्तला	Kinnow Mandarin	Hybrid of King*Willow Leaf Mandarin
B	जुनार समुह	Orange Group	
1.	जुनार	Sweet Orange	<i>Citrus sinensis osbeck</i>
2	काली ज्यामिर	Sour Orange	<i>Citrus aurantium</i>
C	अमिलोजात समुह	Acid Group	
1	कागती	Acid Lime	<i>Citrus aurantifolia Swingle</i>
2	निबुवा	Hill lemon	<i>Citrus limon Burma C. pseudolimon Tan</i>
3	बिमिरो	Citron	<i>Citrus medica L.</i>
4	रंगपुर लाइम	Rangpur Lime	<i>Citrus limonia</i>
5	काठे ज्यामिर	Rough lemon	<i>Citrus jambhiri Lush.</i>
D	भोगटे समूह	Pummelo Group	
1	भोगटे	Pummelo	<i>Citrus grandis Osbeck.</i>
2	संखत्र	Grapefruit	<i>Citrus paradisi Macfad.</i>
3	चाक्सी	Sweet lime	<i>Citrus limettoides Tan.</i>
E	मुन्तला समूह	Kumquat Group	
1	मुन्तला	Kumquat	<i>Fortunella margarita, Swingle (oval type)</i> <i>Fortunella japonica Swingle (round type)</i>
F	तीनपाते समूह	Trifoliate Group	
1	तीनपाते	Trifoliate orange	<i>Citrus trifoliata or Poncirus trifoliata</i>

Source: Technical Handbook on Citrus Fruit Cultivation, National Fruit Development Centre, Kirtipur, 2019.

A diverse range of citrus fruit varieties from various groups are cultivated across Nepal. The predominant varieties of crops within the mandarin, sweet orange (junar), and lime groups are presented in Table 2 below.

Table 2. Main Varieties of Citrus Fruits Under Citrus Crops Found in Nepal.

Fruit Crop	Variety Name
Mandarin (Suntala)	Dhankuta (Khoku) Local, Okitsuwase, Miyagawa Wase, Marakat, Yoshida Ponkan, Ota Ponkan, Kino
Sweet Orange (Junar)	Nepali Junar, Washington Navel, Valencia Late, Blood Malta, Yoshida Nemal
Lime (Kagati)	Tehrathum Local, Sunkagati 1, Sunkagati 2, Eureka Lemon, Seedless Lemon

Source: Technical Handbook on Citrus Fruit Cultivation, National Fruit Development Centre, Kirtipur, 2019.

Citrus crops, including mandarin, sweet orange (junar), and lime, are cultivated commercially in Nepal. As shown in Table 2, under the mandarin group, the main varieties include Dhankuta (Khoku) Local, Okitsuwase, Miyagawa Wase, Marakat, Yoshida Ponkan, Ota Ponkan, and

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Kino. Similarly, in the sweet orange group, the primary varieties cultivated are Nepali Junar, Washington Navel, Valencia Late, Blood Malta, and Yoshida Nemal. In the lime group, the predominant varieties are Tehrathum Local, Sunkagati-1, Sunkagati-2, Eureka Lemon, and Seedless Lemon.

Table 3. Classification of Citrus Fruits Cultivated in Nepal Based on Agricultural Ecological Zones.

S.N.	Geographical Area	Altitude	Citrus Fruits
1	High Hill Region	1400 to 2000 meters	Unshu Mandarin, Lime, Jamir, Nibuwa
2	Middle Hill Region	1000 to 1400 meters	Mandarin, Junar, Lime, Nibuwa, Muntala, Bhogate, Grapefruit, Bimiro
3	Low Hill Region	600 to 1000 meters	Lime, Bhogate, Kino Mandarin, Nepali Mandarin, Nibuwa, Bimiro
4	Terai's Upper Terrain and Other Areas from Chure Region to Inner Madhesh	200 to 500 meters	Lime, Bhogate, Eureka Lime, Kino Mandarin, Nagpuri Mandarin

Source: Technical Handbook on Citrus Fruit Cultivation, National Fruit Development Centre, Kirtipur, 2019.

An analysis of the 10-year data on the area, production, and productivity of citrus fruit crops in Nepal (Table 4) reveals a significant expansion in the area under cultivation, as well as an increase in both production and productivity over the past few years. According to the data for the fiscal year 2078-2079 (Table 4), the total area under citrus fruit cultivation, the area covered by productive trees, production, and productivity were recorded as 50,235 hectares, 32,188 hectares, 311,188 metric tons, and 9.67 metric tons per hectare, respectively. Of the total area under citrus cultivation, 32,188 hectares were covered by productive trees.

The main factors contributing to the expansion of citrus fruit cultivation include the implementation of agricultural development strategies, the Prime Minister's Agriculture Modernization Project, the establishment of citrus production and productivity enhancement units in various districts under the program, the growing demand for high-quality Nepali mandarins and junar in international markets, the promotion of industrial and cash crops, and agreements with the Chinese government regarding the export of high-quality Nepali mandarins and junar.

Table 4. Area Covered, Production, and Productivity Status of Citrus Fruit Crops in Nepal

Year	Total area covered by citrus fruits(Ha)	Area covered by productive trees (Ha)	Production (Mt)	Productivity (Mt/Ha)
2012/13	36,975	23,645	216,188	9.14
2013/14	38,988	25,497	224,357	8.80
2014/15	39,035	25,261	222,789	8.82
2015/16	40,554	24,854	218,447	8.79
2016/17	46,328	26,759	239,773	8.96
2017/18	44,424	25,964	245,176	9.44
2018/19	46,392	28,411	272,620	9.60
2019/20	46,715	27,339	274,140	10.03
2020/21	50,235	32,188	311,188	9.67

Source: Annual Statistical Yearbook, Ministry of Agriculture and Livestock Development, 2080.

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The mandarin orange (*Citrus reticulata*) is a native fruit of Nepal. Ancient mandarin trees, some of which are centuries old, can still be found in the country. While mandarins are typically subtropical fruits, varieties suited to tropical climates have also been developed. The cultivation of all varieties of mandarin oranges is feasible in the mid-hill regions of Nepal (Pande, Shanta Karki, 2076). Additionally, various varieties of citrus fruits such as lime, lemon, and grapefruit are commonly grown in the Terai region. Commercial cultivation of citrus fruits, including mandarins, is practiced in a total of 42 districts across the mid-hill and Himalayan regions of Nepal. The major districts producing mandarins and junar (sweet oranges) across Nepal's provinces are listed in Table 5. According to Table 5, there is significant potential for the commercial cultivation of mandarins and junar in all six provinces.

Table 5. Major Districts Producing Mandarins and Junar in Nepal

Province Name	District Names
Koshi Province	Taplejung, Panchthar, Tehrathum, Dhankuta, Bhojpur, Khotang, Udaypur, Sankhuwasabha, Solukhumbu
Bagmati Province	Ramechhap, Sindhuli, Kavrepalanchok, Dhading, Chitwan
Gandaki Province	Gorkha, Lamjung, Magdi, Tanahun, Kaski, Parbat, Baglung, Syangja, Nawalparasi
Lumbini Province	Palpa, Gulmi, Arghakhanchi, Rukum, Pyuthan, Rolpa
Karnali Province	Rukum, Salyan, Daillekh, Jajarkot
Sudurpashchim Province	Kailali, Dadeldhura, Doti, Baitadi, Achham

Source: National Fruit Development Center, Kirtipur, Nepal, 2076.

AREA AND PRODUCTION OF CITRUS FRUITS:

Citrus fruit cultivation is found in all provinces of Nepal, except for Madhesh Province (where only limited cultivation of lime is practiced). Specifically, the cultivation of mandarin oranges (*Citrus reticulata*), sweet oranges (*Citrus sinensis*), and acid limes (*Citrus aurantiifolia*) is predominant. In Gandaki Province, mandarin orange cultivation spans an area of 76,655 hectares, as shown in Table 6. This area exceeds that of all other provinces in Nepal and is also the leading province in terms of productivity (11.66 metric tons per hectare). Similarly, sweet orange cultivation in Nepal covers an area of 6,813 hectares, with Bagmati Province leading the country with an area of 2,905 hectares and a productivity of 13.18 metric tons per hectare, surpassing other provinces. According to Table 6, acid lime (*Citrus aurantiifolia*) is cultivated in an area of 8,833 hectares across Nepal. In Koshi Province, 3,474 hectares are dedicated to lime cultivation, resulting in a production of 21,897 metric tons. This makes Koshi Province the leading region for acid lime production.

Table 6. Area and Production of Citrus Fruits

Province	Mandarin Orange (<i>Citrus reticulata</i>)	Sweet Orange (<i>Citrus sinensis</i>)	Acid Lime (<i>Citrus aurantiifolia</i>)
	Area (Ha)	Productive Area (Ha)	Production (Metric Tons)
Koshi	6,771	4,680	46,625
Madhesh	-	-	-
Bagmati	4,466	2,942	29,964
Gandaki	7,655	5,141	59,942
Lumbini	3,015	2,079	24,195
Karnali	3,542	2,491	27,826
Sudurpashchim	1,554	1,036	9,854
Nepal	27,002	18,369	198,406

Source: Annual Statistical Yearbook of the Ministry of Agriculture and Livestock Development, 2080.

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6. Current Status and Potential of Citrus Fruit Insurance in Nepal

The insurance policies for citrus fruits, implemented by life insurance companies under the supervision of the Nepal Insurance Authority, are based on both the cost of the crops and the production. This means that for citrus trees planted in orchards that have not yet reached fruit-bearing age, insurance is provided based on the cost of the trees as specified in the insurance policy. For trees that are already yielding fruit, the insurance is based on the production.

6.1. Status of Citrus Fruit Insurance:

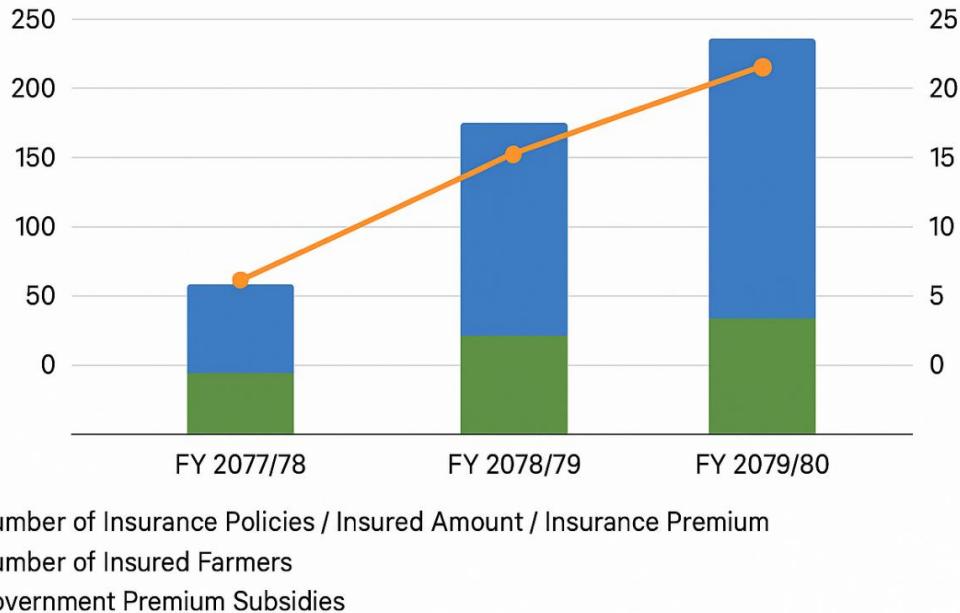
It has been a decade since the formal implementation of agricultural insurance in Nepal. Under the law, insurance can be provided for all agricultural crops, livestock, and herbs, except for those crops and plants prohibited by law. After the Nepal Insurance Authority (formerly the Insurance Committee) issued the insurance policy for citrus fruits, including mandarin, sweet orange, and lime, the implementation of the insurance for these crops began. However, the insurance coverage for citrus fruits has not been satisfactory. Since the issuance of insurance policies in 2015, there is no substantial evidence of citrus fruit insurance being adequately carried out by insurance companies. The insurance coverage for citrus fruits remains significantly lower compared to other crops. According to data from the Ministry of Agriculture, for the fiscal year 2077/78, 59 insurance policies were issued, covering a total insured amount of NPR 40.6 million. Over the next two fiscal years, the number of insurance policies for citrus fruits, including mandarin, sweet orange, and lime, gradually increased. By the fiscal year 2079/80, 241 policies were issued, covering a total insured amount of NPR 172.5 million. However, the number of policies issued for these crops remains very low in comparison to the area covered by citrus crops in Nepal (as shown in Table 7).

Comparative Table (7) : Citrus Fruits Insurance Status Over Three Fiscal Years

Fiscal Year	Number of Policies	Insured Amount (NPR)	Insurance Premium (NPR)	Premium Subsidy (80%) (NPR)
2077/78 (2020/21)	59	40,606,410.88	2,054,922.50	1,521,504.38
2078/79 (2021/22)	165	185,289,911.70	9,264,495.58	6,945,393.86
2079/80 (2022/23)	241	172,515,290.90	8,628,586.12	6,902,948.88

Source: Department of Agriculture, 2080.

Trend Analysis of Citrus Fruits Insurance Status Over Three Fiscal Years



Trend Analysis of citrus fruits insurance status over three fiscal years

- Over the past three fiscal years, there has been a **consistent growth** in the number of insurance policies issued for citrus fruits.
- From 59 policies in FY 2077/78, the number increased significantly to **165 policies** in 2078/79 and further to **241 policies** in 2079/80.
- The **insured amount** grew sharply from **NPR 40.6 million** in 2077/78 to **NPR 185.3 million** in 2078/79, showing strong interest in agricultural risk management.
- Although the insured amount slightly declined to **NPR 172.5 million** in 2079/80, the number of insured farmers continued to rise, indicating wider participation but possibly with slightly smaller insured sums per policy.
- The **insurance premium collected** and the **government premium subsidies** also show a steady increase, demonstrating the growing reliance on insurance to mitigate production risks among citrus farmers.
- Despite these improvements, considering the total citrus cultivation area in Nepal, the overall insurance coverage rate remains **relatively low**, highlighting a major potential area for expansion.

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6.2 Potential for Citrus Fruit Insurance in Nepal

According to data from the Ministry of Agriculture and Livestock Development (refer to Table 4), citrus fruits are cultivated across approximately 50,235 hectares of land in Nepal. Among these, 32,188 hectares are covered by productive trees, contributing to an annual production of around 311,188 metric tons, with an average productivity of 9.67 metric tons per hectare.

The primary commercially grown citrus fruits in Nepal include:

Mandarin orange (*Citrus reticulata*),

Sweet orange (*Citrus sinensis*), and

Acid lime (*Citrus aurantiifolia*).

An analysis of available data (refer to Table 8) demonstrates significant potential for citrus fruit insurance in Nepal.

Current Status of Citrus Cultivation and Insurance Potential :

Mandarin Orange:

Productive area: **18,369 hectares**

Estimated potential insured value: **NPR 30.38 billion**

Sweet Orange:

Productive area: **4,333 hectares**

Estimated potential insured value: **NPR 8.08 billion**

Acid Lime:

Productive area: **5,715 hectares**

Estimated potential insured value: **NPR 10.87 billion**

Pre-Production Stage (Trees under Five Years Old) :

In addition, citrus plantations at the pre-productive stage (trees less than five years old) present the following insurance potential:

Mandarin Orange:

Estimated insured value: **NPR 2.36 billion**

Sweet Orange:

Estimated insured value: **NPR 697.1 million**

Acid Lime:

Estimated insured value: **NPR 854.9 million**

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SUMMARY OF TOTAL INSURANCE POTENTIAL

- Based on the combined data for productive and pre-productive trees, the total potential insured value for citrus fruits in Nepal is estimated as follows:
- Mandarin Orange: NPR 32.74 billion
- Sweet Orange: NPR 8.78 billion
- Acid Lime: NPR 11.73 billion

Challenges in the Implementation of Citrus Fruit Insurance

Since the introduction of agricultural, livestock, and herbal crop insurance in Nepal, the issuance of citrus fruit insurance policies has remained significantly lower compared to other crops. Several challenges have been observed in the implementation process, spanning policy-related, institutional, awareness, and technical capacity issues. These challenges are outlined as follows:

- Lack of Public Awareness:** There is a general lack of awareness among farmers and stakeholders regarding citrus fruit insurance and agricultural insurance in general.
- Need for Timely Revision of Insurance Policies:** The existing citrus fruit insurance policy documents require timely amendments to address emerging needs and challenges more effectively.
- Shortage of Trained Technical Personnel at the Local Level:** There is an inadequate availability of trained technical human resources in local governments to support and promote agricultural insurance activities.
- Low Priority of Crop Insurance in Local Government Programs:** Crop insurance, including citrus fruit insurance, is not sufficiently prioritized in local-level development programs and initiatives.
- Delays in Disbursement of Subsidized Premium Amounts:** Insurance companies often experience delays in receiving the government-subsidized portion of insurance premiums, which affects their operational efficiency.
- Limited Engagement of Insurance Companies:** Insurance companies have shown limited proactive involvement in promoting and implementing agricultural and citrus fruit insurance schemes.

Recommended Improvements for the Sustainable Implementation of Citrus Fruit Insurance

To ensure the sustainable and effective implementation of citrus fruit insurance in Nepal, the following corrective measures are necessary:

- Conduct Awareness Campaigns at the Community Level:** Awareness programs should be actively conducted to educate citizens on the importance of citrus fruit insurance.
- Immediate Revision of Existing Policy Provisions:** Certain provisions in the current citrus fruit insurance policy documents must be promptly revised to address practical challenges.

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3. **Deployment of Trained Technical Personnel at the Local Level:** Local governments should ensure the availability of trained technical personnel specialized in agricultural insurance.
4. **Prioritization of Agricultural Insurance in Local Government Programs:** Local governments should prioritize agricultural insurance programs, including citrus fruit insurance, in their planning and budgeting processes.
5. **Timely Disbursement Mechanism for Subsidized Premiums:** A robust mechanism should be developed to ensure that insurance companies receive government-subsidized premium amounts on time.
6. **Enhanced Engagement of Insurance Companies:** Insurance companies should actively collaborate with local governments, entering into formal agreements to expand insurance coverage and improve service delivery.
7. **Timely Updates to Guidelines and Policy Documents by the Nepal Insurance Authority:** The Nepal Insurance Authority should periodically revise directives and policy documents and conduct regular field monitoring to strengthen the implementation of citrus fruit insurance programs.

CONCLUSION AND RECOMMENDATIONS

The number of issued insurance policies and the insured amount for Junar (Sweet Orange) cultivation in Nepal remains relatively low. In fiscal year 2077/78, only 1 Junar insurance policy was issued, followed by 8 policies in 2078/79, and 5 policies in 2079/80. Sindhuli District, recognized as the leading area for Junar cultivation, has approximately 1,045 hectares under Junar production. Based on the existing citrus crop insurance policy provisions issued by the Nepal Insurance Authority, Sindhuli has around 750 hectares of productive orchards and 295 hectares of pre-productive (young) orchards. These correspond to an estimated insured value of NPR 1.24 billion and NPR 806 million, respectively, totaling approximately NPR 2.04 billion in potential insured value.

Therefore, Junar crop insurance presents a significant opportunity for insurance companies to expand their agricultural insurance portfolio, particularly in Sindhuli and other hilly District. By carefully considering the recommendations outlined in Section 8, effective implementation and promotion of Junar insurance can be successfully achieved.

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Acknowledgments

The author(s) appreciates all those who participated in the study and helped to facilitate the research process.

Conflict of Interest

The author declared no conflict of interest.

How to cite this article: Kharel. B. P (2025). Insurance of Citrus Fruit Crops in Nepal: Status, Prospects, Problems, and Recommendations. *International Journal of Social Impact*, 10(1), 235-246. DIP: 18.02.21/20251001, DOI: 10.25215/2455/100121