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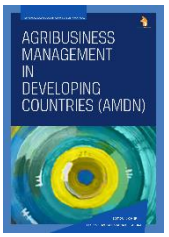

REVIEW ARTICLE

ECONOMIC VIABILITY OF KIWI CULTIVATION IN NEPAL: A COMPREHENSIVE REVIEW

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ABSTRACT

Kiwifruit farming in Nepal has grown significantly in recent years due to its nutritional value, adaptability to local weather conditions, and growing demand in the market. This review examines the economic feasibility of growing kiwifruit in Nepal by looking at its production patterns, costs, imports and exports, as well as the challenges and opportunities involved. By analyzing existing data sources and statistical records, the study reveals that kiwifruit farming has been steadily expanding, especially in areas with high potential for cultivation. Ilam is the leading district in kiwifruit production in Nepal with the production of 1500 metric tons. Although there are obstacles such as the need for large initial investments, limited resources, the effects of climate change, infrastructure problems, and difficulties in accessing markets, kiwifruit production still presents promising prospects for creating jobs, exporting goods, and meeting local needs. The study underscores the need for infrastructure development, technological advancements, and improved market access to sustain and enhance the growth of kiwifruit farming in Nepal. Strengthening market channels, mechanization, and fostering international partnerships are recommended strategies for promoting the long-term sustainability and competitiveness of the kiwifruit sector in Nepal.

KEYWORDS

Kiwifruit, Production, Market, Challenges, Opportunities

1. INTRODUCTION

Kiwifruit, originating from China, is a deciduous vine introduced to the global market from New Zealand in the 1950s (Barboni et al., 2010). It is renowned as 'miracle fruit of China' and 'the horticultural wonder of New Zealand' (Thapa et al., 2023). It belongs to the Actinidia genus, comprising over 70 species. Among these species *A. deliciosa* and *A. chinensis* stands out as commercially important species (Ferguson and Huang, 2007). Kiwifruit has become a prominent high-value crop globally due to its exceptional flavor, broad adaptability to various climates, and rich nutritional and medicinal properties, leading to its widespread popularity in recent years (Sharma et al., 2020). Kiwifruit is recognized as a top source of antioxidants, containing essential nutrients like amino acids, sugars, proteins, minerals, and vitamins crucial for human health. Its rich nutritional profile and potent antioxidant properties have increased interest in crop production in recent years. Notably, kiwifruit boasts exceptional levels of vitamin C, surpassing those found in oranges, pears, and apples. Due to its remarkable vitamin C content, kiwifruit is often described as the "King of Fruits" (Xu and Zhang 2003). As a result, kiwifruit has become a popular fruit enjoyed by people of all ages (Huang et al. 2000; Ferguson and Huang 2007). In addition to being enjoyed fruit after fresh, kiwifruit holds significant potential for creating processed value-added items. Kiwifruits lend themselves to various processed forms such as jams, jellies, candies, marmalades, wines, juices, and more (SM et al., 2017). Considering the advantages of kiwifruit, its cultivation has been widely expanded across the globe, notably in countries such as China, Italy, New Zealand, Turkey, Chile, USA, Japan, Greece, France, Portugal, and more.

In the context of Nepal, kiwifruit has been observed to thrive most effectively within altitudes ranging from 1200 to 2500 meters above sea level. Nepal adopted commercial kiwifruit farming in Ilam since 2007, expanding to Kavre, with initial introduction dating back nearly 40 years. The Nepalese climate offers ideal conditions for cultivating kiwifruit. It flourishes in regions where altitudes exceed those suitable for growing oranges yet fall below the elevations conducive to apple cultivation. Locally, kiwifruit is commonly known as "theki fal" in Nepal (Thapa and Karki, 2020). Due to its high fruiting habit and more economic importance, area and production increases every year and plays important role for the substitution of fruit import in Nepal. It seems best alternatives for fruit growers in the hilly region of Nepal. Both province and local government prioritize to cultivate and support for kiwifruit. There is high demand of kiwifruit sapling for commercial kiwifruit production (Atreya et al., 2020). Kiwi fruit contribute 0.01% in agricultural GDP of Nepal (MoALD, 2021). Despite the considerable potential for kiwifruit farming in Nepal, its development has been hindered by the lack of suitable production and marketing practices for the fruit(S. Thapa et al., 2023). Research on the economic advantages and profitability of kiwi enterprises in Nepal has also made poor and marginal farmers in the country less likely to engage in kiwi farming (Tiwari and Bhandari, 2020). This review critically evaluates the economic viability of kiwi cultivation in Nepal, aiming to shed light on its production trends, cost, import-export situation, challenges, and opportunities.

2. METHODOLOGY

The study extensively examined the production and marketing dynamics of kiwifruit in Nepal, aiming to identify opportunities and potential consequences. The study was carried out by means of a thorough review

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and synthesis of secondary data that was mainly obtained from publications published by agencies like the Ministry of Agriculture Development (MoAD), the Trade and Export Promotion Center (TEPC), and the Food and Agriculture Organization (FAO), in addition to a number of other relevant statistical records. A large number of peer-reviewed, open-access national and international research articles, reports, blogs, and websites were examined; data was compiled using Microsoft Excel and presented as graphs.

3. Results of Review

3.1 Status of kiwi fruit production in Nepal

In the 1980s, Kiwifruit was introduced in Nepal through a Swiss project spearheaded by engineer J. F. Messy, which was introduced in Charikot and Jiri of Dolakha district. However, despite this early introduction, commercial Kiwifruit farming in Nepal has a relatively brief history, with only 15-20 years of active cultivation (Gotame et al., 2016). During the 1990s, ICIMOD played a pivotal role in promoting Kiwifruit cultivation by establishing a demonstration/production plot in Godawari, Lalitpur, where saplings were imported from India to initiate the process (Gautam & Gotame, 2020). As a result, farmers were introduced to the fruit, leading to the commencement of commercial-scale cultivation. In recent times, Kiwifruit has gained widespread popularity among Nepalese farmers, resulting in a significant increase in the kiwi cultivation (Sharma et al., 2020).

If we look back at 2014/15 , Kiwi was grown in 283 hectare of land with total productive area of 52.5 hectares with production 368.1 metric tons and productivity 7 metric tons per hectare (MoALD, 2014). Although the area under cultivation is incresing rapidly but the productivity is very low and constantly decreasing upto 2019/20. The total productivity reached 7.59 metric tons per hectare in 2021/22 (MoALD, 2021). Overall, table 1 suggests that Kiwifruit cultivation in Nepal has experienced steady growth and improvement in productivity over the years, with periodic fluctuations likely influenced by various factors impacting agricultural production.Over the years, the expansion of kiwifruit cultivation can be attributed to growing public awareness of its nutritional and medicinal benefits, as well as its ability to command high prices in the market (Sharma et al., 2020).

Out of seven provinces of Nepal, Koshi province ranks at the highest position in kiwi production with the production of 3547 metric tons and a yield of 7.50 metric tons per hectare. Madhesh province has no area under kiwi cultivation. Sudurpaschim is the lowest kiwi producer among kiwi producing provinces producing 40 metric tons with the yield of 4 metric tons per hectare. Further, Koshi province tops the list in kiwi production in terms of area with 1278hectares of land. Bagmati ranks second with 761 hectare under kiwi cultivation (MoALD, 2022).

Various kiwifruit cultivars including Hayward, Bruno, Monte, Allison, and Tomori were grown in horticulture farms in Kirtipur and Daman starting from the year 2000. At Surya Kiwifarm in Patlekhet, Kavre, cultivars such as Red Kiwi, Hayward (both round and oblong), Bruno, Monte, Abbolt, Allisan, and ICIMOD Oblong were planted in 2005. Similarly, six cultivars including Hayward, Monte, Abott, Bruno, Allison, and Red Kiwi were planted in 2012 at Agriculture Research Station (ARS) in Pakhribas, Dhankuta, for the purpose of characterization and evaluation by the Horticulture Research Division (Gautam and Gotame, 2020). Recognizing the significant potential of kiwi farming in Nepal, the Government of Nepal has set up a Kiwi farm in Boach, Dolakah, known as the Temperate Fruit Rootstock Development Center. Additionally, as part of the Prime Minister Agriculture Modernization Project, three districts (Illam, Dolakha, and Solukhumbu) have been designated as Kiwi zones to facilitate the commercial-scale promotion of kiwi farming. Presently, kiwifruit cultivation is prevalent across many mountainous and hilly regions of eastern Nepal (Sharma et al., 2020). Ilam is the leading district in kiwi production with the production of 1500 metric tons (MoALD, 2021).

Table 1: Area, Production and Productivity of kiwifruit in Nepal during fiscal year 2014/15 to 2021/22.

SN	Year	Area (hectare)	Productive area (hectare)	Production (Metric tons)	Productivity (metric tons per hectare)
1.	2014/15	283	52.5	368.1	7
2.	2015/16	298	58	378	6.6
3.	2016/17	551	186	719	3.86
4.	2017/18	949	322	2188	6.8
5.	2018/19	1362	492	3372	6.86
6.	2019/2020	2116	1167	4254	3.65
7.	2020/2021	2450	859	6482	7.55
8.	2021/2022	2599	1014	7698	7.59

(Source: MoALD 2014-2021)

Table 2: Total area, production and yield of kiwifruit in different provinces of Nepal

S.N	Province	Total area	Productive area	Production	Yield
1	Koshi	1278	473	3547	7.5
2	Madhesh	0	0	0	0
3	Bagmati	761	312	2447	7.84
4	Gandaki	267	136	852	6.25
5	Lumbini	168	52	429	8.24
6	Karnali	106	31	384	12.39
7	Sudurpaschim	19	10	40	4

Source:(MoALD, 2022)

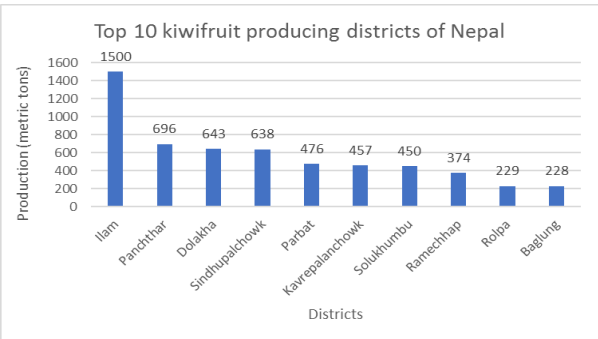

Figure 1: Top 10 kiwifruit producing districts of Nepal

3.2 Production cost and profitability

Kiwifruit farming in Nepal is seen as costly as it requires a large initial investment for vines, trellises and a permanent irrigation system. In addition, the start of commercial fruit production takes around three to four years (Khanal et al. 2022). As per insights from kiwifruit specialist Mr. Chandra Man Shrestha, the estimated minimum production cost of kiwifruit per ropani stands at 50,000 Nepalese rupees. Within one ropani of land, it is possible to cultivate 12 kiwifruit plants, comprising 8 female and 4 male plants. Assuming all female plants are in good health, they have the potential to yield a maximum of 640 kilograms of fruit collectively, averaging 80 kilograms per plant. With a selling price of Rs. 300 per kilogram, the total gross sales amount to Rs. 192,000. Deducting production and marketing costs amounting to Rs. 42,000, the net profit per ropani is calculated at Rs. 100,000. This signifies a commendable profit margin (Elie,2019).

Table 3: Production cost of kiwifruit cultivation in Ilam district of Nepal						
	Description		**1st year**			**2nd year**
S.N	**Particulars**	**Unit**	**Quantity**	**Rate**	**Total NRs.**	**Total NRs.**
1	Variable cost				165670.4	107721.6
a.	Human labor	Day	70	500	35000	17500
b.	Bullock labor	Day	4	1000	4000	2000
c.	Tracror/Tiller	hour	6	425	2550	0
d.	Pump set,water pond	hour	25	250	6250	6300
e.	Layout	day	5	1500	7500	0
f.	Sapling	number	300	150	45000	4500
g.	Manure	kg	6000	2.6	15600	22100
h.	Fertilizer					
	Urea	kg	20	25	500	750
	DAP	kg	20	50	1000	1650
	Potash	kg	20	36	720	1080
i.	Plant protection chemicals	rs			4000	4500
j.	Bordeaux mixture and micro nutrient	Lum			5000	5500
k.	Training and Pruning					7500
l.	Others/netting cost	rs			4000	6000
m.	Management cost	Month	12	1400	16800	16800
n.	Interest on variable cost				17750.4	11541.6
2	Fixed cost				1250700	47700
a.	land tax	Rs			800	800
b.	water tax	Rs			400	400
c.	Depreciation cost of farm equipments	rs			2000	2000
d.	Repair and maintenance of farm equipments	rs			1500	1500
e.	Land lease value	rs/year			40000	40000
f.	Fencing	Lum			120000	0
g.	Irrigation management (pond,pipe,sprinkler)	Lum			150000	0
h.	equipments	Lum			18000	0
i.	Thankra (iron pillar)	Number	600	1400	840000	0
j.	GI wire	kg	300	250	75000	0
k.	Insurance Premium	rs			3000	3000
3	Total cost	rs			1416370	155421.6

Source: (Fruit book,2021)

The production cost of kiwi varies across different districts of Nepal. In Ilam district, the total production cost of kiwi is NRs 1416370 including both fixed and variable cost in 1st year while for 2nd year its cost is NRs.155421.6 including both fixed and variable cost (Table 3). The producer will start gaining profit in 4th year of kiwi cultivation. The profit in 4th year will be NRs. 403539.86 which will increase every year upto certain years. (Fruit book, 2021). Likewise, production cost of kiwi in Dolakha, Solukhumbu, Gulmi and Dadeldhura districts according to fruit book (2021) was NRs. 1442189.6, NRs. 1474467.2, NRs.1367844 and NRs. 1298257.2 during the first year and NRs. 157976.8, 169109.6, NRs. 151100.8 and NRs. 139597.2 in second year respectively.

Table 4: Benefit -Cost ratio of kiwifruit in Ilam district of Nepal										
Year	Investment phase	2	3	4	5	6	7	8	9	10
Production (kg/plant)			4	16	28	36	45	50	55	60
Production (kg/ha)			1020	4080	7140	9180	11475	12750	14025	15300
Total income (NRs)			**147900**	**591600**	**1035300**	**1331100**	**1663875**	**1848750**	**2033625**	**2218500**
Variable cost (NRs)	165670.4	107721.6	118493.76	130343.14	143377.45	157715.19	17348671	190835.39	209918.92	230910.82
Fixed Cost (NRs)	1250700	47700	52470	57717	63488.7	69837.57	76821.33	84503.46	92953.81	102249.19
Total cost	1416370.4	155421.6	170963.76	188060.14	206866.15	227552.76	250308.04	275338.85	302872.73	333160.01
Profit/loss	-1416370.4	-155421.6	-23063.76	403539.86	828433.85	1103547.24	1413566.96	1573411.15	1730752.27	1885339.99
B/C ratio				**3.15**	**5**	**5.85**	**6.65**	**6.71**	**6.71**	**6.66**
Cost/kg			167.61	46.09	28.97	24.79	21.81	21.6	21.6	21.78

Source:(Fruit book,2021)

3.3 Marketing and Import-Export situation of kiwi in Nepal

Kiwifruits are relatively new to both producers and consumers in Nepal. However, they are gaining popularity in the market, with major department stores and supermarkets in major cities now offering these fruits. In the year 2014/15 AD, the market price of kiwifruit was high, making it inaccessible for many local consumers, as most of the produce was directed towards larger cities like Kathmandu, Pokhara, Biratnagar,

etc., targeting specific consumers. However, over the following years, the price of kiwifruit gradually declined due to increased production and supply (Atreya et al., 2020). Findings from the Kalimati Fruits and Vegetables Market Development Board (KFVMDB), revealed that farmers were able to sell fresh kiwifruit for prices reaching up to NRs 500 per kilogram, which was Rs 1200/kg during the fiscal year 2015/16 (KFVMDB, 2021).

Unlike many other fruits, the trade of kiwifruit in Nepal has been inconsistent. According to the Trade and Export Promotion Centre (TEPC), Nepal has been importing kiwifruit from neighboring countries like India and China in recent years. The growing awareness among consumers regarding the nutritional and medicinal benefits of kiwifruit has led to an increase in demand. However, domestic production is unable to meet this demand during the off-season due to the absence of adequate storage facilities. Consequently, kiwifruit is imported into Nepal and sold at significantly higher prices to satisfy consumer demand (Sharma et al., 2020). According to data from MoALD in 2013, Nepal imported a total of 10 kilograms of kiwifruit, valued at NRs. 1705 which reached 2955kg with value NRs. 49800 in the year 2014/15. In fiscal year 2021/22 , the total amount of fresh kiwi fruit import was 336450kg worth NRs.62670000 (MoALD, 2021).

Although the export of kiwifruit from Nepal is not substantial, efforts have been made to promote the kiwifruit industry, resulting in small-scale exports. The data related to kiwifruit export have not found well reported. For instance, in 2016, Nepal exported 1325 kilograms of kiwifruit to destinations including India, Bhutan, and Pakistan (TEPC, 2016). Similarly, in 2017, a smaller quantity of kiwifruit (65 kilograms) was exported to Bhutan (TEPC, 2017).

Nepal holds significant potential for kiwifruit exports to neighboring countries. However, meeting quality standards is imperative for global market entry. Currently, kiwifruit produced in Nepal faces quality issues such as lack of uniform size, inconsistency in variety, and small fruit size. Therefore, there is a pressing need to prioritize quality improvement practices to enhance competitiveness in the global market(Sharma et al., 2020).

Table 5: Import trend of kiwifruit in Nepal

Year	Import	
	Quantity (kg)	Value (Rs)
2012/13	-	-
2013/14	10	1705
2014/15	2955	49800
2015/16	1200	57000
2016/17	2918	84000
2017/18	4562	1368000
2018/19	86646	3754144
2019/20	63123	28255000
2020/21	173817	53872000
2021/22	336450	62670000

Source: (MoALD 2012-21)

3.4 Opportunities of kiwi fruit production in Nepal

3.4.1 Suitable topography, climate and soil

Nepal has the right topography, climate, and soil conditions that are suitable for profitable kiwifruit production (Sharma et al., 2020). The country's mountainous and hilly regions provide the ideal altitude range of 1,200 to 2,500 meters above sea level for kiwifruit cultivation (Malla et al., 2022).

3.4.2 Nutritive and medicinal values

The kiwifruit is renowned for its significant nutritional and medicinal values, offering numerous health advantages. These include its ability to act as a natural laxative, its potential in managing diabetes, its anti-inflammatory effects, its role in protecting cardiovascular health, and its antimicrobial properties against harmful human pathogens (Lan et al., 2019). A single kiwi fruit provides approximately the same amount of vitamin C as six ounces of orange juice (Rice et al., 2017). Additionally, kiwis offer more potassium than bananas. They are rich in dietary fiber, which aids in lowering LDL cholesterol, and are abundant in folate and zinc. Kiwifruits contain phytonutrients like lutein, crucial for eye health and potentially protective against cellular damage (Malla et al., 2022). The growing awareness among consumers regarding the nutritional and medicinal benefits of kiwifruit has led to an increase in demand (Sharma et al., 2020).

Table 6: Nutrient content in Kiwifruit

Nutrients	% Dailyvalue
Vitamin A	1.2
Calcium	2.3
Folate	4.3
Zinc	0.7
Vitamin C	106.7
Phosphorous	2.3
Pentothenic acid	1.3

Source:(Malla et al., 2022)

3.4.3 Diversified products potential

Kiwifruit is a versatile fruit that can be processed into a variety of products beyond just fresh consumption. Some kiwifruits are turned into distilled spirits, purees, sweets, frozen, dried, and lyophilized goods, as well as juices and fortified beverages. preserved kiwifruit in syrup(Cassano et al., 2007). For fruits that fall below the quality standards necessary for the fresh fruit market, processing offers a solution to enhance their value. Small quantities of these fruits, which fail to meet grade requirements, are redirected towards the production of cosmetics or nutraceuticals. Kiwifruits lend themselves to various processed forms such as jams, jellies, candies, marmalades, wines, juices, and more (SM et al., 2017)

3.4.4 Employment opportunities

The migration of manpower abroad is a consequence of the unemployment crisis within the country. Presently, over 3,000,000 young individuals seek employment overseas. However, the production, processing, and marketing of kiwifruit offer a viable solution by creating employment prospects for both rural and urban youths. Through the commercialization of kiwifruit and value addition processes, significant income streams are generated for the populace(Bahadur Thapa & Dhimal, 2017).

3.4.5 Export opportunities

Nepal has high potential to export kiwifruit to neighboring countries like India, Bhutan, and Pakistan, as their domestic production is unable to meet the full demand. India imports around 75% of its kiwifruit requirement, presenting a major export opportunity for Nepal (Sharma et al., 2020).

3.4.6 Government support

The Nepalese government has recognized the potential of kiwifruit and has taken steps to promote it, such as establishing a Temperate Fruit Rootstock Development Center and identifying kiwifruit production zones(Sharma et al., 2020).

3.4.7 Challenges of kiwi production in Nepal

3.4.7.1 High initial investment

Small-scale farmers require institutional and financial assistance due to the high initial investment, which can amount to more than Rs. 100,000 per ropani for kiwifruit cultivation (Atreya et al., 2020)

3.4.7.2 Input constraints

Unavailability of inputs in time, use of FYM prepared by traditional methods, unavailability of quality saplings, lack of cemented support system, climate change are some of the input related problem faced by kiwifruit growers of eastern hills(Giri et al., 2021).

3.4.7.3 Climate change

In recent times, Nepal has been witnessing noticeable effects of climate change across various sectors, including agriculture, biodiversity, health, tourism, infrastructure, and water resources (Atreya and Kaphle, 2020).

The established commercial varieties of kiwifruits have demonstrated inconsistent performance due to unpredictable climate aberrations (Datta, 2013).

The substantial climate change occurring globally and at the national level is undoubtedly influencing both the production and quality of our fruits. Changes in temperature, humidity, and rainfall can lead to modifications in various quality attributes of fruits, including coloration, spotting, texture, and taste. (Sthapit and Scherr, 2012).

3.4.7.4 Infrastructure limitations

Limited access to roads in remote areas poses a major obstacle to horticultural production. Kiwi fruits are seasonal, with production concentrated in remote areas of mid-hill region of Nepal and occurring within specific timeframes. The challenge arises from the bulk production of seasonal crops, leading to lower market prices due to inadequate storage and processing facilities. Moreover, the absence of proper cleaning, grading, sorting, and packing infrastructure reduces the export quality of horticultural products. Consequently, lower-quality fruits are often processed into items like juices, jams, and beverages(Bahadur Thapa and Dhimal, 2017).

3.4.7.5 Market access

In Nepal, the marketing system poses a significant challenge. Farmers are encouraged to cultivate vegetables, fruits, and high-value crops without access to a sustainable market or marketing infrastructure. The absence of a reliable market for their produce often leaves growers in awkward situations and discourages further production efforts (Bahadur Thapa and Dhimal, 2017).

3.4.7.6 Technological constraints

In our context, kiwi is a relatively new fruit crop, resulting in a scarcity of commodity-specific technology. The development of suitable cultivars and management techniques is still in progress, which may result in lower yields and returns (Atreya et al., 2020). Various technological constraints hinder kiwifruit cultivation in Nepal, including the inadequate management of male and female plants, insufficient understanding of varietal selection based on altitude, lack of expertise in quality sapling production, absence of technical support services, and limited training on pruning techniques (Thapa and Karki, 2020).

4. Conclusion

Although the commercial kiwifruit farming is recently introduced in Nepal, the area occupied and total production of kiwifruit in Nepal are steadily increasing over the years. However, the pace of this expansion has been somewhat hindered by persistent challenges, such as inadequate scientific research, infrastructure limitations, and market access issues. The high initial costs associated with establishing kiwifruit orchards have also posed a barrier to wider adoption by farmers. Despite these challenges, kiwifruit production offers avenues for employment generation, export potential, and meeting domestic demand. The review emphasizes the importance of addressing these challenges through enhanced infrastructure, technology, and market access to foster sustainable growth and development in Nepal's agricultural sector and rural economy.

Additionally, Nepal needs to establish strong market channels at both local and international levels to build long-term partnerships with international market agents. Mechanizing the kiwi subsector through the introduction of innovative and advanced technologies, tools, and equipment can be recommended strategies to boost production and attract more farmers to the sector, ultimately enhancing its competitiveness in the international market.

Author's Declaration and Contribution

The authors declare no conflicts of interest. The literature review and manuscript preparation were done by the first author while the second author provided supervision and guidance in all stages of the manuscript preparation.

References

Atreya, P. N., and Kaphle, M., 2020. Visible evidence of climate change and its impact on fruit production in Nepal. International Journal of Agriculture Environment and Food Sciences, 4 (2), Pp. 200–208. https://doi.org/10.31015/jaefs.2020.2.10

Atreya, P., Shrestha, C., Suvedi, B., and Pandey, S., 2020. Emerging Fruits of Nepal: Pomegranate, Kiwifruit, Avocado, Dragon Fruit and Grape; Opportunities, Challenges and Ways Forward. Proceeding of !!Th National Horticulture Seminar 2020, June, Pp. 45–54.

Bahadur Thapa, M., and Dhimal, S., 2017. Horticulture Development in Nepal: Prospects, Challenges and Strategies. Universal Journal of Agricultural Research, 5(3), Pp. 177–189. https://doi.org/10.13189/ujar.2017.050301

Barboni, T., Cannac, M., and Chiaramonti, N., 2010. Effect of cold storage and ozone treatment on physicochemical parameters, soluble sugars and organic acids in Actinidia deliciosa. Food Chemistry, 121(4), Pp. 946–951. https://doi.org/10.1016/j.foodchem.2010.01.024

Cassano, A., Donato, L., and Drioli, E., 2007. Ultrafiltration of kiwifruit juice: Operating parameters, juice quality and membrane fouling. Journal of Food Engineering, 79(2), Pp. 613–621. https://doi.org/10.1016/j.jfoodeng.2006.02.020

Datta, S., 2013. Impact of Climate Change in Indian Horticulture - a Review. International Journal of Science, Environment and Technology, 2(4), Pp. 661–671.

Ferguson, R. A., and Huang, H., 2007. Genetic Resources of Kiwifruit: Domestication and Breeding. In Horticultural Review, 33 (MARCH 2007). https://doi.org/10.1002/9780470168011.ch1

Fruit Book, 2021. Center for Agricultural Infrastructure Development and Mechanization Promotion, Hariharbhawan, Lalitpur

Gautam, I. P., and Gotame, T. P., 2020. Diversity of Native and Exotic Fruit Genetic Resources in Nepal. Journal of Nepal Agricultural Research Council, 6 (March), Pp. 44–55. https://doi.org/10.3126/jnarc.v6i0.28114

Giri, M., Rawat, G., and Sharma, A., 2021. Constraints Faced by the Kiwi Fruit Farmers in Ilam Municipality and Sandakpur Rural Municipality of Ilam District. Food & Agribusiness Management, 2(2), Pp. 54–61. https://doi.org/10.26480/fabm.02.2021.54.61

Gotame, T. P., Gautam, I. P., Subedi, G. D., and Dhakal, M., 2016. lsjLkmn v] tL k | ljlw. July.

Khanal, A., Timilsina, S., Poudel, N., Rijal, A. and Khanal, S., 2022. Evaluation of Different Grafting Methods in Promising Kiwifruit Varieties at Lumle, Kaski, Nepal. Journal of Agriculture and Environment, 23, Pp. 98-107.

Lan, T., Geng, T., Ju, Y., Cheng, G., Que, Z., and Sun, X., 2019. Nutritional properties and biological activities of kiwifruit. 1(October 2018), Pp. 1–17.

Malla, S., Bista, L., and Sapkota, R., 2022. Prospects of Kiwi Production and Marketing in the Advancement of Household Economy in Dolakha District. Turkish Journal of Agriculture - Food Science and Technology, 10(10), Pp. 2039–2044. https://doi.org/10.24925/turjaf.v10i10.2039-2044.5219

MoALD, 2014.Statistical Information on Nepalese Agriculture (2070/71). Publicatons of the Nepal in Data Portal, 73, Pp. 274. https://nepalindata.com/resource/statistical-information-nepalese-agriculture-207071-201415/

MoALD, 2015. Statistical Information on Nepalese Agriculture (2071/72). Publicatons of the Nepal in Data Portal, 73, Pp. 274. https://nepalindata.com/resource/statistical-information-nepalese-agriculture-207172-201516/

MoALD, 2016. Statistical Information on Nepalese Agriculture (2072/73). Publicatons of the Nepal in Data Portal, 73, Pp. 274. https://nepalindata.com/resource/statistical-information-nepalese-agriculture-207273-201617/

MoALD, 2017. Statistical Information on Nepalese Agriculture (2073/74). Publicatons of the Nepal in Data Portal, 73, Pp. 274. https://nepalindata.com/resource/statistical-information-nepalese-agriculture-207374-201718/

MoALD, 2018. Statistical Information on Nepalese Agriculture (2074/75). Publicatons of the Nepal in Data Portal, 73, Pp. 274.

https://nepalindata.com/resource/statistical-information-nepalese-agriculture-207475-201819/

MoALD, 2019. Statistical Information on Nepalese Agriculture (2075/76). Publicatons of the Nepal in Data Portal, 73, Pp. 274. https://nepalindata.com/resource/statistical-information-nepalese-agriculture-207576-201920/

MoALD, 2020.Statistical Information on Nepalese Agriculture (2076/77). Publicatons of the Nepal in Data Portal, 73, Pp. 274. https://nepalindata.com/resource/statistical-information-nepalese-agriculture-207677-202021/

MoALD, 2021. Statistical Information on Nepalese Agriculture (2077/78). Publicatons of the Nepal in Data Portal, 73, Pp. 274. https://nepalindata.com/resource/statistical-information-nepalese-agriculture-207778-202122/

MoALD, 2022. Statistical Information on Nepalese Agriculture (2078/79). Publicatons of the Nepal in Data Portal, 73, Pp. 274. https://nepalindata.com/resource/statistical-information-nepalese-agriculture-207879-202223/

Rice, C. S., Honghua, X., Na, Y., Jia, Z., and Jiahui, Y., 2017. The Wondrous Kiwifruit--Origin, Cultivation and Utilization. International Journal of Horticulture, 15, Pp. 1–6. https://doi.org/10.5376/ijh.2017.07.0001

Sharma, A., Thapa, S., and Khatiwada, M. P., 2020. Production, Marketing and Future Prospects of Kiwifruit in Nepal. International Journal of Applied Sciences and Biotechnology, 8(2), Pp. 179–186. https://doi.org/10.3126/ijasbt.v8i2.29083

Guroo, I., Wani, S. A., Wani, S. M., Ahmad, M., Mir, S. A., and Masoodi, F. A., 2017. A Review of Production and Processing of Kiwifruit. Journal of Food Processing & Technology, 8(10). https://doi.org/10.4172/2157-7110.1000699

Sthapit, S. R., and Scherr, S. J., 2012. Tropical Fruit Tree Species and Climate Change. In Tropical Fruit Tree Species and Climate Change. http://ecoagriculture.org/documents/files/doc_420.pdf

Thapa, D. B., and Karki, S., 2020. Kiwifal kheti prawidhi pustika (Kiwifruit farming technology hand-book). https://ncfd.gov.np/sites/default/files/2020-08/Kibi book-cover.pdf

Thapa, S., Devkota, D., Sharma, A., and Joshi, B., 2023. Value Chain Analysis of Kiwifruit (Actinidia Spp.) in Dolakha District, Nepal. Food and Agri Economics Review, 3(2), Pp. 46–50. https://doi.org/10.26480/faer.02. 2023.46.50

Tiwari, A., and Bhandari, T., 2020. Study on Capital Investment and Marketing of Kiwi Fruit in Ilam, Nepal. Acta Scientific Agriculture, 4(6), Pp. 13–20. https://doi.org/10.31080/asag.2020.04.0844