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A Study on Problems on Kiwi Cultivation and Marketing at Solukhumbu District, Nepal

Aavash Adhikari [1]*, Sovit Parajuli[1], Arjun Subedi[1], Purushottam Dhungana[1], Krishna Prasad Thapaliya[2]

[1]*Faculty of Agriculture, Agriculture and Forestry University, Chitwan, Nepal*

[2]*Center for Development Studies and Rural Sociology, Agriculture and Forestry University Rampur, Chitwan, Nepal*

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*Corresponding author: Aavash Adhikari
E-mail: aavash.adhikari117@gmail.com

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ABSTRACT

As a promising high-value fruit crop, Kiwi is getting popularity among the Nepalese farmers for having comparative advantage both in terms of climatic suitability and having export potential. A sound understanding of the problems faced by the Kiwi growers can help concerned authorities to devise further plans and programs to further potentiate the production and income from Kiwi cultivation. The research was conducted in Solududhkunda Municipality and Thulung Dudhkoshi, Nechasalyan Rural Municipality of Solukhumbu district of Nepal, with the objective of ranking the major problems of Kiwi cultivation and marketing in those areas. A survey research design was used for the study. Primary data for the household survey were collected using a semi-structured questionnaire as well as KII was also used. Household-level data from 90 households (30 households from each municipality) were sampled using a simple random sampling technique. Descriptive statistics were used for the analysis of data. The average area under Kiwi cultivation was found 23 ropani, the average plant per farmer was 198 and the average age of the Kiwi was 2.94 years. 26 % of the respondents have their family members involved in foreign employment and 76% of respondent's major occupation was found to be agriculture. 65% of the farmers haven't got any training on Kiwi cultivation and 67% of the farmer haven't done soil tests of the field. Lack of funds to build cemented T-bar pillar was found to be a major problem while lack of knowledge on cultivation practices, lack of quality saplings, marketing was ranked respectively. Similarly, problems on marketing were found to be: 1. lack of transportation facility, 2. lack of cold storage, 3. lack of knowledge on value addition and product diversification, 4. untimely payback of money

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respectively. Subsidy for T-bar pillar system, training on cultivation practices, and establishment of cold storage is of an immediate need to strengthen the Kiwi production in the area.

INTRODUCTION

Kiwi fruit is a new commodity to Nepalese farmers. It's been just a few years that farmers have adopted commercial Kiwi farming. Kiwi can be grown from 1200-2400 m asl. where fruits like peach, pear, and apricot can be grown. The hilly region of Nepal has great potential for Kiwi cultivation. More profitability than other crops, huge potential for the national and international market, medicinal and nutritional value and a good source of employment are the main reasons behind the motivation of farmers for Kiwi cultivation. Due to the emigration of youth for trekking businesses foreign employment, the labor shortage is the main problem for growing cereal crops (AKC Solukhumbu) and hence many hectares of fertile land are kept barren in the mid-hills. Farmers have started to cultivate Kiwi in such barren land and hence the demand for Kiwi sapling is increasing day by day.

Kiwi is one of the most traded fresh fruit with 104 exporting and 118 importing countries, where New Zealand is the largest exporter (Mani, Kundra, & Haque, 2018). The total area, productive area, production, and yield of Kiwifruit in Nepal are 551ha, 186ha, 719 mt, and 4 mt/ha, respectively (MOAD, 2016/17). Most of the high hills and mountainous regions are substantially potential for Kiwi cultivation, but its cultivation is limited to some districts. Solukhumbu is one of the districts having a high potential area for Kiwi production.

Nepal has adopted Kiwi farming commercially in Ilam since 2007 and in Kavre as well, but it was introduced in Nepal nearly 40 years ago (ICIMOD, 2013). ICIMOD (International Centre for Integrated Mountain Development) has been doing its research about Kiwi fruit in Godawari. Kiwi farming, especially in Ilam has spread so rapidly that 1400 Kiwi farmers from 36 VDCs are engaged in it. The government has developed 'Boach Horticultural Farm' in Dolakha district with its increasing popularity (Thapa, 2010). A pilot program called 'Commercial Kiwi Promotional Program' has been implemented by the government in five districts, namely Ilam, Dolakha, Lamjung, Parbat and Dadeldhura (Thapa, 2010). The Federation of Nepalese Chamber of Commerce and Industry (FNICC) has selected Makawanpur and Ilam for its One Village One Product (OVOP) program (Poudel, K. P. 2012).

We were talking about the worldwide scenario, in 2018, approx. 4.3M tones of Kiwi fruit were produced worldwide; increasing by 4.4% against the previous year (Trade, 2019). China constitutes the country with the largest quantity of Kiwi fruit production, accounting for about half of the total production. New Zealand (437K tonnes) ranked third in terms of total production with a 10% share (Trade, 2019).

The primary appeal of the Kiwifruit is its uniqueness, its distinctive fresh flavor which becomes more aromatic when it ripens. It is a rich source of minerals such as potassium, magnesium, calcium, phosphorous, along with crude fiber and, more importantly, dietary fiber, and is renowned for its strong laxative properties. Containing over 20 essential nutrients and a range of vitamins, the Kiwifruit comes near the top of fruits classed as superfoods (Latocha, 2017). It is one of the richest sources of vitamin C with up to 430 mg/100 g fresh weight (FW) and is

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considered the richest dietary source of myo-inositol (up to 982 mg/100 g FW) (Latocha, 2017). Further, containing up to about 1301.1 mg/100 g FW phenolics and significant amounts of essential minerals of potassium, calcium, and zinc; the Kiwifruit rates very highly as a 'Healthy Food'. Researches have pointed to Kiwifruit being a promising treatment for some cancers and health issues involving the gastrointestinal system, hypercholesterolemia and certain cancers. It is also renowned for having the benefits of maintaining healthy skin tone and texture, reducing blood pressure, and preventing heart diseases and stroke. Also, Kiwifruit is a good source of folate for pregnant women (Borah, 2018).

Table 1: Top 10 Kiwifruit producing countries (2018)

Rank	Country	Production (MT)
1	China	2035158
2	Italy	562188
3	New Zealand	414261
4	Iran (Islamic Republic of)	266319
5	Greece	265280
6	Chile	230267
7	France	61920
8	Turkey	53201
9	USA	34290
10	Portugal	34057

Source: (FAOSTAT, 2018)

Kiwifruit, previously known as Chinese gooseberry, is also described as "King of Fruits" due to its high vitamin C content (Xu & Zhang, 2003). It originated from China and was introduced to the world market from New Zealand. At present, the top 10 Kiwifruit-producing countries in the world are China, Italy, New Zealand, Chile, Greece, France, Turkey, Iran, Japan and the United States of America. The history of commercial farming of Kiwifruit in Nepal is not so long. It has been only 15-20 years of commercial farming in Nepal. It is believed to have been introduced in Nepal during the Swiss project in some lands of Charikot and Jiri of Dolakha district during the 1980s (Dhakal, 2018).

Due to the growing nutritional concern of the consumers and its potential national and international market, Kiwi cultivation has become a recent trend in the Solukumbu district. The government has recently established a Kiwi zone in the district comprising of 1 municipality and 2 rural municipalities under Prime Minister Agriculture Modernization Project (PMAMP). To increase the efficacy of the project, the programs launched by the project must address the prevailing problems of the farmer's field. This study aims to enlist and rank the problem as per their severity so that PMAMP and other concerned authorities can design effective programs to address it.

Kiwi being a care-intensive crop and Solukhumbu being a geographically difficult area formulating and launching programs for Kiwi cultivation in the area can be a cumbersome task. This study will help

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governmental, non-governmental, and other organizations who want to work in the field of Kiwi in Solukhumbu district as they will know the major constraints of the Kiwi production in the area after this study. The objective of the study was to enlist and rank the problem of Kiwi cultivation and marketing as per severity and intensity as well as to provide the report of farmers problems to related governmental, non-governmental bodies working for Kiwi and hence assist them in planning and implementation of programs for next fiscal year.

According to the project implementation unit office of Kiwi Zone (2020) under the Prime Minister Agriculture Modernization Program implemented by MoAD in Solukhumbu district, Hayward, Alison, and Montie are the wide cultivated varieties of Kiwi fruit. It is also known that all the Kiwi fruits are being consumed locally in Nepal due to their nutritional benefits. There are 81 registered Farmers groups/cooperatives/farms/companies involved in Kiwi cultivation in the Solukhumbu district.

Table 2. Farmers groups/cooperatives/farms/companies involved in Kiwi cultivation in Solukhumbu district

S.N	Firm name	Address
1	Dudhkunda Krishi Byabasaya Firm	Solu Du Na Pa
2	Himali Public Falfaul Nursury Firm	Solu Du Na Pa
3	Sherpa Bahuodesya Krishi Firm	Solu Du Na Pa
4	Didi Bahni Krishi Firm	Solu Du Na Pa
5	Kyamje Krishi Firm	Solu Du Na Pa
6	Lama Byabasaik Krishi Firm	Solu Du Na Pa
7	P T L Pashu Firm	Solu Du Na Pa
8	Sagarmatha Bahuodesya Krishi Firm	Solu Du Na Pa
9	Sekarshingh Krishi Firm	Solu Du Na Pa
10	Dudhkund Dudghda Ootoadak Krishi Firm	Solu Du Na Pa
11	Smart Poultry Firm Tatah Dana Ootpadan	Solu Du Na Pa
12	Himalai Jadibuti Odpadan Krishi Firm	Solu Du Na Pa
13	Everest Bahuodesya Krishi Firm	Solu Du Na Pa
14	Chinkpu Byabassaik Krishi Tatha Pashu Firm	Solu Du Na Pa
15	Jaleswari Bahuodesya Krishi Firm	Solu Du Na Pa
16	Sherpa Krishi Tahta Jadibuti Ekritik Krishi Firm	Solu Du Na Pa
17	Yamadin Byabasaya Krishi Tahta Pashu Firm	Solu Du Na Pa
18	Sherpa Agro Firm	Solu Du Na Pa
19	Sherpa Krishi Firm0	Solu Du Na Pa
20	Nima Hrt Firm	Solu Du Na Pa
21	Chinakpu Krishi Firm	Solu Du Na Pa
22	Laliguras Misrit Krishi Samuha	Solu Du Na Pa
23	Dudhkundsa Heude Krishi Falful Firm	Solu Du Na Pa
24	Suryamukhi Falful Tarkari Odpadan Krishak Amuha	Solu Du Na Pa
25	Bishal Himali Falful Firm	Solu Du Na Pa

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26	Surke Nahuodesya Krsihsi Firm	Solu Du Na Pa
27	K B Krishi Tatha Pashu Firm	Solu Du Na Pa
28	Syarkhumbu Krishi Firm	Solu Du Na Pa
29	Gorakhani Kiei Firm	Solu Du Na Pa
30	Tapting Ok Jadibitu Prasodhan Kendra0	Solu Du Na Pa
31	Grisma Bahuodesya Krishi Firm	Solu Du Na Pa
32	Iccha Bahuodesya Krishi Tatha Pashu Firm	Solu Du Na Pa
33	Ajambari Krishi Firm	Solu Du Na Pa
34	S S Jadibuti Firm	Solu Du Na Pa
35	DSP Krishi Firm	Solu Du Na Pa
36	Pk Pashupanxi Palan Tahtha Otpaadan Kendra	Solu Du Na Pa
37	Pinasa Bahuodesya Krishi Firm	Solu Du Na Pa
38	Arun Krishi Firm	Solu Du Na Pa
39	Sagarmatha Bahuodesya Krishi Firm	Solu Du Na Pa
40	Bishwas Adhunik Kishi Firm	Solu Du Na Pa
41	Matribhumi Yuba Organic Bahuodewsya Krishi Firm	Solu Du Na Pa
42	Sherpa Organic Kiwi Firm	Solu Du Na Pa
43	Jwalamai Agro Firm	Solu Du Na Pa
44	Menuka Bahuodesya Krishi Firm	Solu Du Na Pa
45	C G Krishi Firm	Solu Du Na Pa
46	Sujansashi Krishi Tatha Pashu Firm	Solu Du Na Pa
47	Salme Krishi Firm	Solu Du Na Pa
48	Organic Krishi Firm	Solu Du Na Pa
49	Falamkhani Bahuodesya Krishi Firm	Solu Du Na Pa
50	Everset Bhaisi Palan Tatha Krishi Firm	Solu Du Na Pa
51	Firms from Thulung dudhkoshi rural municipality	Address
52	Gaurab Bahuodesya Krishi Farm	Thulung Dudhkoshi
53	Deusa Krishi Ban Pra Li	Thulung Dudhkoshi
54	Jalim Krishi Farm	Thulung Dudhkoshi
55	Surja Masu Pasal Taha Kiwi Firm	Thulung Dudhkoshi
56	Highand Organic Krishi Firm	Thulung Dudhkoshi
57	Kangel Bahuudesya Krishi Firm	Thulung Dudhkoshi
58	Amrit Krishi Firm	Thulung Dudhkoshi
59	Thakumala Organic Krishi Firm	Thulung Dudhkoshi
60	Jaya Laxmi Bahuodesya Krishi Firm	Thulung Dudhkoshi
61	Dudhkoshi Krishi Firm	Thulung Dudhkoshi
62	Karma Sherpa Fancy Stores	Thulung Dudhkoshi
63	Nayabasti Krishi Firm	Thulung Dudhkoshi
64	Om Agroforestry Enterprise	Thulung Dudhkoshi
65	Himalayana Krishi Bikas Tatha Prasodhan	Thulung Dudhkoshi
66	Nawajyoti Krishak Samuha	Thulung Dudhkoshi
67	Firm Name from Nechasalyan rural municipality	Address
68	Sarobar Falful Tatha Tarkari Form	Nechasalyan Gapa 1

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69	Yadeemchyo Kiwi Fal Tatha Pasupalan Form	Nechasalyan Gapa 4
70	Jalapadevi Bahuudhesya Krishi Form	Nechasalyan Gapa 3
71	Aatmanirbhar Mahila Krishak Samuha	Nechasalyan Gapa 3
72	Gita Bahuudhesya Krishi Form	Nechasalyan Gapa 3
73	Bhandari Bahuidhesya Krishi Form	Nechasalyan Gapa 3
74	Chaur Gaun Kiwi From	Nechasalyan Gapa 1
75	Nawajyoti Mahila Tatha Purus Mishrit Krishak Samuha	Nechasalyan Gapa 5
76	Sunaulo Mahila Tatha Purus Mishrit Krishak Samuha	Nechasalyan Gapa 5
77	Chamlaboot Tarkari Krishak Samuha	Nechasalyan Gapa 4
78	Laliguras Krishak Samuha	Nechasalyan Gapa 1
79	Shree Himalayan Organic Krishi Tatha Pashupalan Form	Nechasalyan Gapa 5
80	Sagarmatha Krishi Tatha Falful Kendra	Nechasalyan Gapa 2
81	Chhatra Bahuudhesya Krishi Form	Nechasalyan Gapa 2

Bhandari N. B, & Aryal M, 2015; A study on the average cost of production and gross profit of fruit farming in Nepal during 2014/15, carried out by MoAD; Agribusiness Promotion and Marketing Development Directorate, Market Research, and Statistics Management Program, Hariharbhawan, Lailtpur, informs us that annual variable cost for Kiwi farming increases every year by 10%. The benefit-cost ratio of fruits ranges from 1 to 5. It means the profit is 5 times more than the total cost. Suppose there is a total cost of Rs 1,00,000 then, the profit will be Rs 5,00,000 for a 5 B/C ratio. It depends upon the fruit type and life span. In the study, it was found that Kiwi has a higher B/C ratio, followed by banana and papaya. Kiwi is new fruit for Nepal and has a higher farm-gate price per Kg. B/C ratio of the fruits crop varied from 1.86 to 3.66, showing their relatively higher level of profitability in terms of investment (Economic Aspects of Fruit and Vegetable Production, 1992).

METHODOLOGY

LEE Site and Sub-sector

The study was carried out in Solukhumbu district which is one of the high hilly districts of Province 1. The district is surrounded by Sankhuwasabha in the east, Bhojpur in the south-east, Khotang and Okhaldhunga in the south, Province No. 3 in the west and Tibet (China) in the north. The total land area of the district measures 3,312 km2 (331 200 hectares), with the highest elevation of the district being 8,848 meters (29,029 ft) (Mt. Everest) and the lowest elevation is 600 meters (2,000 ft) (Tuintar) above sea level.

Solukhumbu is divided into 8 local level units, 1 unit is urban and 7 are rural. They are further divided into wards. Solukhumbu is the single-seat constituency for the parliamentary constituency and a double seat for the provincial constituency. Under the Prime Minister Agriculture Modernization Project, Solukhumbu district has allocated 3 zones viz. Kiwi, Ginger/Turmeric, and Citrus zone. The study was mostly concentrated in the Kiwi zone covering 1 municipality and 2 rural municipalities comprising many wards.

The study was focused on the problems of Kiwi cultivation and marketing in the Solukhumbu district. Kiwi is the most important fruit crop in the district. Among the exported fruit crops from the district, Kiwi holds the first position. The total area under Kiwi in the fiscal year 2074/75 is 85 ha of the total 92000 ha cultivable land of Solukhumbu (AKC Profile).

Unit of Analysis

The primary unit of analysis was the household of the whole population of Kiwi

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growers in Solukhumbu district, only those residing on the Kiwi zone of PMAMP viz. Solududhkunda municipality, Nechasalyan and Thulung Dudhkoshi rural municipality were studied.

The population of the Case Study

Kiwi being the profitable fruit crop in the district, the population involved in the Kiwi sector is increasing day by day (PMAMP profile). The total population in the Kiwi sector is comprised of a large number of farmers. A complete enumeration of all the farmers was constrained by time factors, money and energy. Therefore, owing to constraints, a definite number of respondents are selected via simple random sampling which is representative of the whole population. The commercial Kiwi growers and the cooperatives involved in the Kiwi zone comprise the sampling frame. Among these, simple random sampling was conducted to select the farmers in the survey. As the Kiwi zone site comprises 1 Municipality and 2 Rural Municipality, at least 30 commercial growers from each of 3 Municipalities (Solududhkunda, Thulung Dudhkoshi and Nechasalyan) was surveyed. A total of 90 commercial growers were surveyed. The concerned authority from each municipality's area was interviewed for additional information.

Figure 1: Map showing the study area in Solukhumbu district

Research Design

A questionnaire was prepared and pretested with 5 farmers from each municipality. Problems faced by the farmers were enlisted down and necessary correction in the questionnaire was done. After Interviewing with key informants and analyzing the problems from the test survey, major 5 problems were selected and included in the new questionnaire to be ranked by the farmer.

The enlisted 5 major problems were given for farmers to rank them from1-5 as per their severity. After the problem was ranked by the farmer, it was allocated a certain number based upon its rank and the total sum of marks received by the problem was calculated to determine the final severity of the problem.

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Table 3. Problem rank given by farmers.

Rank of the problem as given by the farmers	Allocated Mark
5	1
4	0.8
3	0.6
2	0.4
1	0.2

Observation and Observation Methods

A total of 90 Kiwi growing farmers were observed via the following methods

Questionnaire survey

The actors (private firms, cooperatives, farmers groups, and concerned governmental authorities) involved in the survey were asked a series of open and close-ended questions that aided in the collection of some useful data regarding the various problems encountered in the production and marketing of the Kiwi fruit.

Key Informants' Interview

Key informants such as the coordinator of the Kiwi zone committee, local leaders, AKC, DDC, ASC, cooperative members, collectors, and traders were interviewed regarding the present scenario of Kiwi cultivation in the area, the major problem they are suffering, current production and price trend, etc.

Data Analysis Techniques

Data analysis involves making sense of the large volume of information collected from field research. Hence, reducing voluminous text by coding and classifying the related concepts is important for systematic recording and retrieval for later use. Data collected from the questionnaire survey; key informant interview was analyzed using statistical software like MS Excel.

RESULTS AND DISCUSSION

Sources of income

The major source of income of the respondents was found to be agriculture. 76% of the total respondent's state agriculture as their major occupation, whereas only 24% of respondent household income relies on non-agriculture-related fields. This data is higher than the national population involved in agriculture, i.e., 65.67% (CBS, 2011).

Status of foreign employment

The result shows that Out of 90 people, 24, i.e., 26.66%, people have their family members abroad for foreign employment, whereas 66 people, i.e., 73.33% people do not have any of their family members involved in foreign employment. It suggests that there is manpower available in the study area to work in agriculture.

Availability of electricity

Being geographically challenging district some places of Solukhumbu are still out of access to electricity. Of the total respondent, 34% lacks electricity in their field and only 66% have access to electricity. This hinders the operation of electrical equipment like water pumps, electric sprayers, mills, etc.

Soil testing

The result shows that very few farmers (33%) regularly test their soil whereas, the majority of farmers (67%) do not perform regular soil testing.

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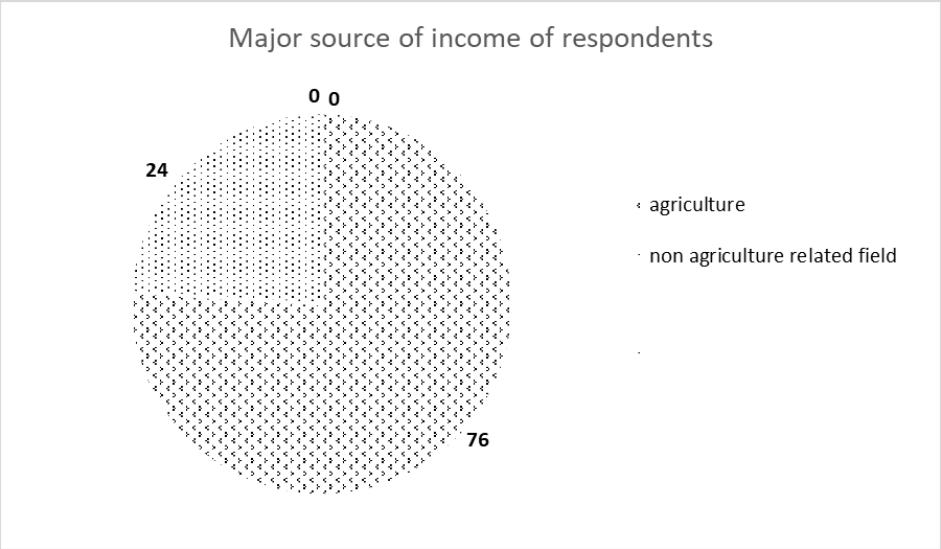

Figure 2: Major source of income of respondents

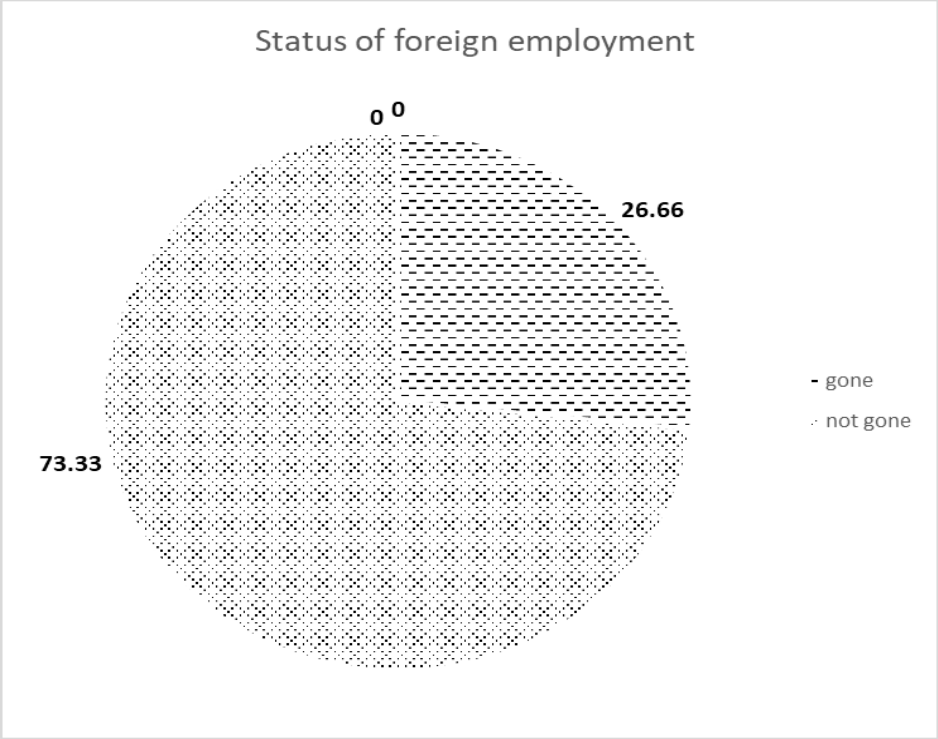

Figure 3: Status of foreign employment

Training on Kiwi cultivation

The result shows that only 35% of the growers have received training on Kiwi cultivation, whereas 65% of farmers are growing Kiwi without any pieces of training. It was evident during the field visit that most of the Kiwi orchard was poorly managed and training pruning was not done.

Major problems on Kiwi cultivation

Among the many problems of Kiwi cultivation in Solukhumbu district, the most severe are selected and ranked as below. Kiwi being a vine crop, needs a cemented T bar pillar system for support. Among other problems, it was found to be most severe (total score 82), followed by knowledge on Kiwi

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cultivation practices (66.2). Lack of Quality sapling ranks third with a score of 36.6. This has compelled farmers to use saplings of poor graft compatibility and of unknown variety. The other problems in the area were found to be hailstorm damaging the crop, threats from wild animals, lack of irrigation, mechanization in agriculture and unavailability of chemical fertilizers.

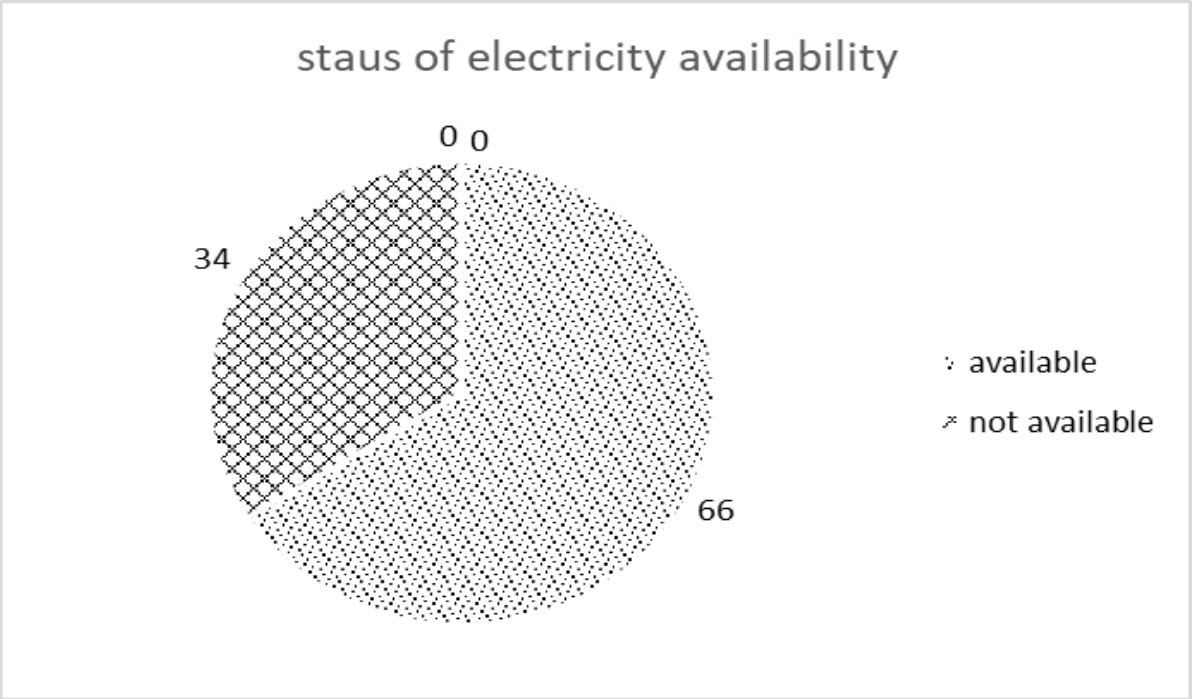

Figure 4: Availability of electricity

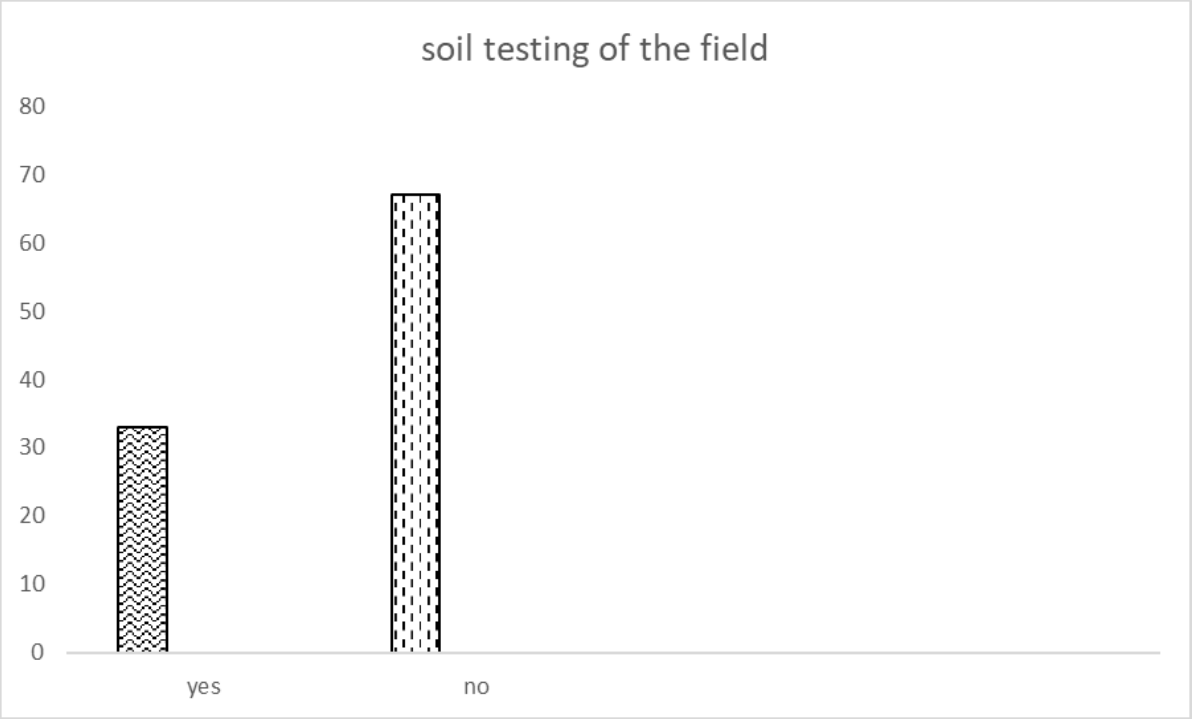

Figure 5: Soil testing of field

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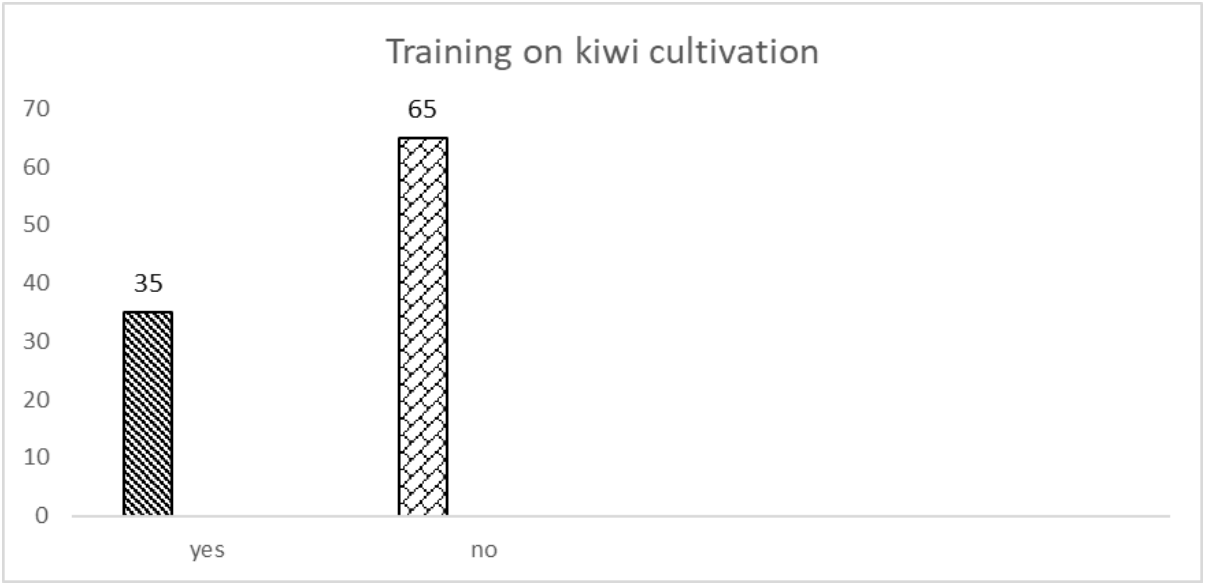

Figure 6: Training on Kiwi cultivation

Table 3: Major Problem on Kiwi cultivation

S.N	Name of Problem	Total Score Received
1	T bar pillar construction	82
2	Lack of Knowledge on cultivation practices	66.2
3	Unavailability of Quality sapling	36.6
4	Marketing	49.4
5	Others	35.8
Total		270

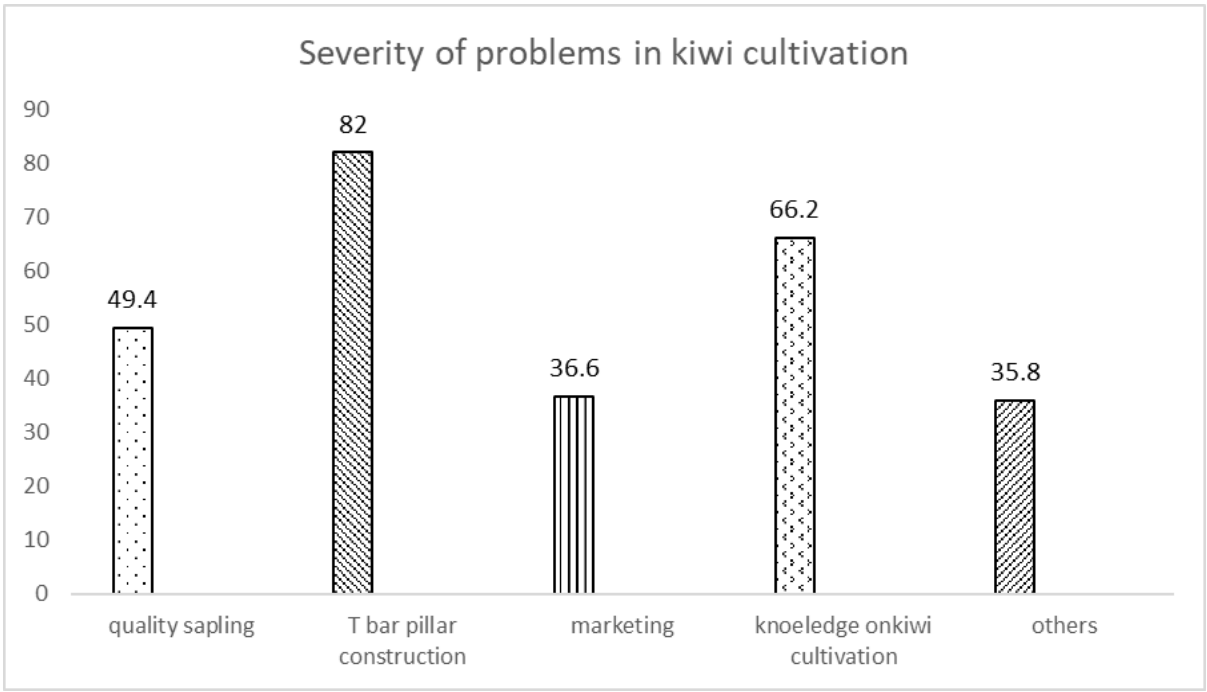

Figure 7: Severity of problem in Kiwi cultivation

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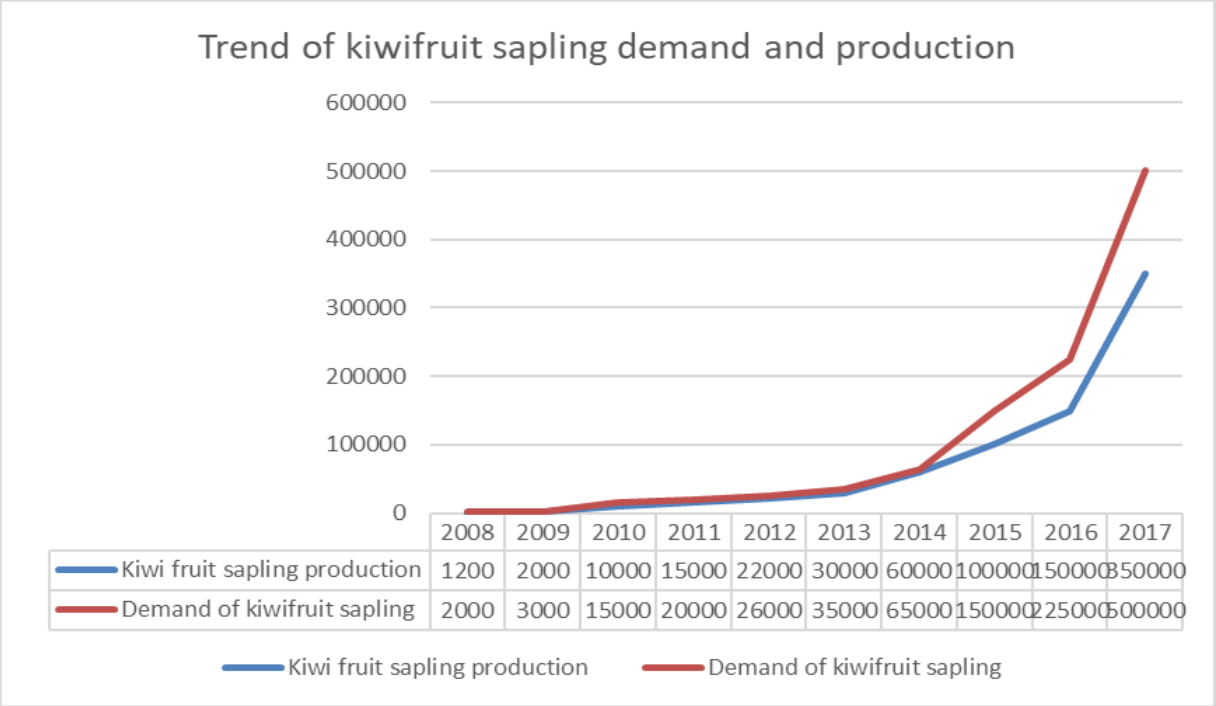

Figure 8: Trend of Kiwifruit demand and production

Source: Field Survey 20117/18, (Manandhar L.K., 2017, A Study of Kiwifruit Production and Marketing- A case of hill districts of Nepal.)

The T bar pillar system in the Kiwi vineyard is built from reinforced cement concrete (R.C.C), GI pipes, and wires. Being a rural area where transportation costs are too high, the cost of those ingredients is too expensive. The estimated cost of construction of T bar in the 1 ropani land area is NRs. 1,23,920 (PMAMP Solukhumbu 2020) which is greater than the per capita income of Nepalese people US $ 1004 – NRs. 1,06,333 annually (2018). Farmers of Solukhumbu district who are relying upon subsistence agriculture are unable to afford this. They were making wooden and bamboo pillar systems, but they lasted only for a couple of years.

Similarly, Kiwi being a new crop to farmers they lack the know-how of its cultivation like training pruning, grafting, intercropping, etc. Only 35 % of farmers have received training on the cultivation practices of Kiwi. 65% of growers are managing their orchards without any former pieces of training. This was also evident during the farmer's field visit during the study as the orchard was poorly managed and plants were in dilapidated condition.

The quality saplings of Kiwi fruits are expensive and difficult to find. During the study, some farmers reported that they had bought Kiwi saplings from abroad, viz. China, Italy, etc. As grafting saplings are only recommended for commercial Kiwi farming, the lack of farmer's knowledge on grafting and lack of screen house to grow saplings is causing this huge gap between demand and supply (AKC Solukhumbu).

Among other problems of Kiwi, cultivation marketing lies in the fourth position as per its severity (score 49.4). Within many problems related to marketing, lack of transportation was the main problem with a score of 80.6, followed by lack of storing facility, i.e., cold storage (score 76.8). The third-ranked problem of marketing was the lack of knowledge on post-harvest processing for value addition and product diversification (score 52.8). The untimely return back of the

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money was the fourth problem with a score of 37.8. These problems are followed by some other problems related to marketing like lack of crates for harvest and storing, the role of middle man, price fluctuations, etc.

Table 4: Major problem in Kiwi marketing

S.N	Name of the problem related to marketing	Total Score Received
1	Transportation	80.6
2	Cold storage	76.8
3	Lack of knowledge on post-harvest processing, value addition and product diversification.	52.8
4	Untimely return of money	37.8
5	Others	22
Total		270

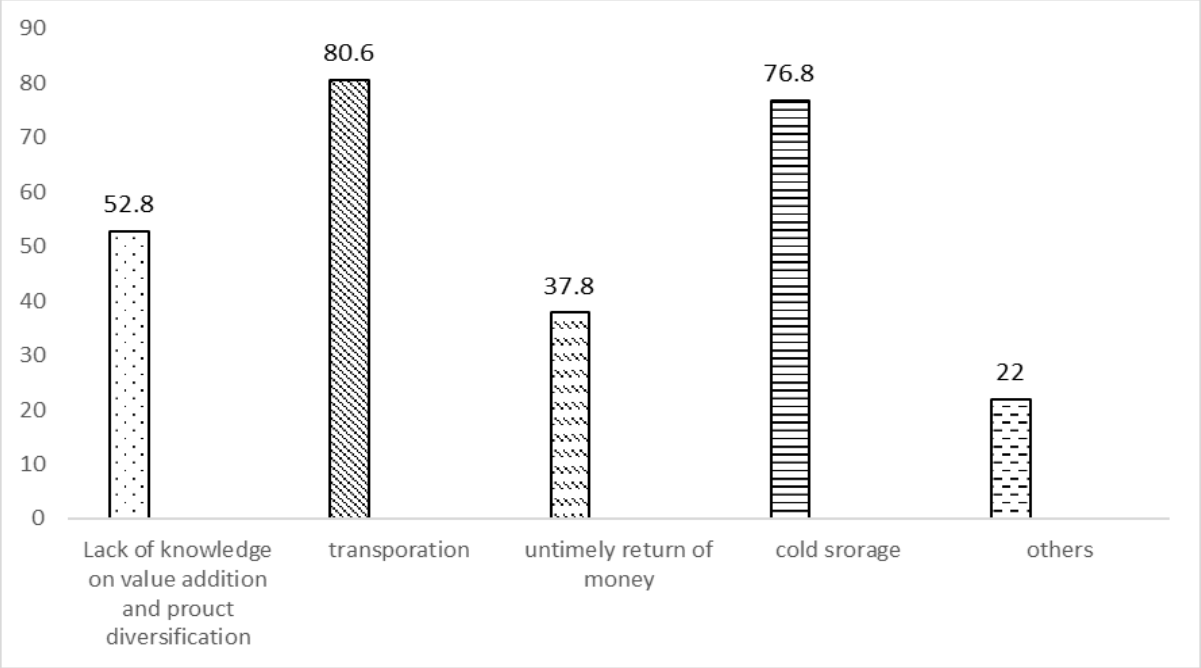

Figure 9. Severity of problems of Kiwi marketing

The average age of Kiwifruit among the respondents was found to be 2.94 Years, while the economic bearing age of the plant is 4 years (Shrestha C.M). So, as the majority of plants are under the economic bearing age, the supply of Kiwifruit in the market is not high. But within few years after the plants reaching economic bearing age, the supply of the Kiwi is going to be too high which will disrupt the present balance of demand and supply. So measures should be taken from right now so that the balance is kept and price fluctuation is minimize

Transportation has got the highest score among all other problems of Kiwi marketing. This can be attributed to the fact that geographical constraints pose a huge burden on transportation. The average time required for the farmer to reach a related municipality is 99 minutes. Also, the average time to reach the nearest market from the farmer's house is 90 minutes. This suggests that the Kiwi growing area is quite far from related markets and municipalities. But the Kiwi field seems close to the road network (25 minutes walking time). 35.5% of respondent's field

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was linked to the seasonal road, 34.4 % of respondent's field was linked with gravel road, 17 % field was linked with peach road and 13% of the total field was out of reach from any road networks.

As the roads are seasonal, the transportation of Kiwi via public vehicles is too costly which can't be offered by the farmer. If they carry Kiwi themselves on doko to sell in the market they have to stay in hotels for several days which is costly too. So geographical constrain impose a huge challenge on Kiwi marketing.

Table 5: Access to infrastructure

S.N	Statements	Average time (min)
1	Municipality/rural municipality to field	99
2	Road to field	25
3	House to market	90
4	Market to field	99

Table 6: Status of roads near to the field

S.N	Type of road	No. of farmers	%
1	Seasonal	32	35.5
2	Gravel	31	34.4
3	Peach	15	17
4	Out of access to roads	12	13

The cost of a single cold storage establishment is about 15 lakh (PMAMP Solukhmumbu), which can store products from one municipality, so to cover all the Kiwi growing areas, we need to construct 3 of them, which will cost about 45 lakhs. This is a huge sum of money without proper subsidy from the government and related bodies, which can't be constructed.

As the majority of the farmer hasn't received any training regarding Kiwi, they lack knowledge on value addition of the product. Different measures of product diversification like jam Mada, juice, wine preparation from Kiwi can fetch a higher price than raw fruit itself. With proper training on these things market of Kiwi fruit can be widened and farmers can fetch a higher price.

Being rural area barter system of economy is still prevalent in the area (DDC Solukumbu). So, if farmers sell Kiwi to their local neighbors, they won't get payback in time. So instead of targeting the local market, the farmers should target the national and international market for their product.

CONCLUSION

The major problems of Kiwi cultivation were found to be the establishment of the T bar pillar system followed by lack of knowledge on Kiwi cultivation practices, quality sapling unavailability, marketing of Kiwi, and others, respectively. Within marketing, the major problems were lack of transportation facility followed by the cold storage facility, lack of knowledge on value addition and product diversification, untimely payback of the money, and others respectively. The study suggests that for promoting Kiwi, the cultivation government should bring programs like subsidy on T bar pillar construction, training for farmers on cultivation practices of Kiwi, subsidy for screen house construction for Kiwi nursery

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which will address the growing demand of quality sapling, etc. On the marketing side, if a vehicle is given to farmers groups/cooperatives for Kiwi transportation, it will be a great relief to them. The establishment of cold stores and training to farmers on post-harvest processing for value addition and product diversification can spread the market of Kiwi at the national as well as international level.

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