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Case Study

Identification of Problems of Sweet Orange A Case Study from Pyuthan Municipality, Pyuthan

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Abstract

In view of suitable climatic condition in mid hill of Nepal, sweet orange is emerging as a new enterprise for farmers, for which the government of Nepal has also given priority to this crop. In the light of these facts, a case study was conducted in Pyuthan municipality of Pyuthan district to identify the problems related to sweet orange in Pyuthan municipality. All of the farmers had their own land for Sweet orange production. Majority of the respondents (80%) had the annual income below NRs. 20000. Farmers were able to increase their higher education, household expenses, health and savings from Sweet orange production. Transportation, irrigation, citrus greening disorder and green stinky bug were major problem in Sweet orange production in study area. Study suggested that concerned stakeholders should focus their program on quality seedling production, input use, and human resource management, and scientific orchard management, capacity development of farmers, insect pest management, scientific value chain management and post-harvest loss reduction for overall development of sweet orange industry in Pyuthan district.

Introduction

Nepal is an agro-based country where 65.5% of the people depends on agricultural activities with 35.5% of the total gross domestic product (GDP), (ABPSD, 2012). Citrus is the most important fruit crop of Nepal that can bring economic change in the country. Because of appropriate geography and climate, citrus is widely grown throughout the mid-hills (800m-1400m) from east to west across the country. Major citrus species: sweet orange constitutes enormous potential to generate income and employment including nutrition to rural people in the marginal land (NARC, 2007). Among the citrus, it is reported to be cultivated in about 114 countries of the world (Sefoka, 2012). It is successfully grown in 48 districts of Nepal. Putalibazar was dealing with marketing and production issues such as high trade monopolies, price fluctuations, transportation, processing, and storage (Sharma *et al.*, 2021).

Sweet orange is one of the leading fruits growing in midhills of Nepal and is gaining huge popularity among the farmers in recent years (Subedi *et al*., 2002). Sweet Orange (*Citrus sinensis* Osbeck), belongs to Rustaceae is originated from south China. Delicious, juicy, and yellow to orange-red aromatic fruit consists of 10-14 segments, enclosed within the peel. Being a mesocarp edible portion, the fruit is categorized as *Hesperdium* (Goudeau *et al*., 2008).

Citrus is one of the major cash generating fruit crops in mid hills of Nepal and also recognized as high value crop under Agriculture Perspective Plan (APP). Citrus is not just a single fruit that covers a large range of fruits and is adaptable to varied range of area (Ghimire *et al*., 2006). Citrus fruit covers about 22% of total fruit area and production and majorly hilly region is dominant for the production of citrus fruits (Pandey *et al*., 2017) Sweet orange (Junar) is one of the most grown important fruit crops among the citrus along with mandarins, limes, lemons and grape fruits. It has unique sweet taste and considered as special fruit of Nepal so, it can be expressed as national fruit of Nepal (Tomiyasu *et al*., 1998). For increased production and quality of food, mandarin growers should enhance their orchard management and post-harvest handling procedures (Sharma *et al*., 2021). The productive land for sweet orange production in Nepal is 3443 ha with production 33558 metric ton (MT) and productivity of 9.7 ton/hectare (MoAD, 2016). The geographic position and climate of Sindhuli district which lies in inner Terai region of Nepal favors the large number of production and farmers are keenly interested to grow to meet the consumer's demand. Farmers frequently used their indigenous knowledge to protect local crop kinds (Adhikari *et al*., 2021). It can be used for the preparation of jam, jelly, marmalade, cold drinks, and sauce which directly invites many manufacturing industries and generates employment for huge number of economically active population. It is widely known as Junar of Sindhuli all over the country due to its delicious taste with highly nutritive constituents (MoAD, 2011).

The potentiality of growing sweet orange is very high so as to meet the target of production and to scale of the existing situation, the program has been launched namely 'One District One Product' (ODOP). It has the potentiality to export in international market but the production is in limited quantity. To meet the consumer's demand, the fruit is imported from neighbouring countries like India and China in large quantities. It is most grown important fruit crop over the world which constitutes the bulk of global citrus fruit production (Reddy, 2011). The total fruit production is expanding due to good governance, suitable climate and market demand but is still challenging due to traditional management practices (Kaini, 2013). Also, little or no irrigation facility is one of the major problems for the farmers due to which production is very nominal even with the availability of the appropriate climate and environment (Bibash, 2011). Chemical control is appealing since it is rapid, secure, and conservative, but it has some important drawbacks, including as negative effects on products and the environment (Bhandari *et al*., 2022). Beside it, there are still many growers who cannot adapt better technology to maintain and manage the farming. Most of the farmers are still unaware to diversify into other crops to spread agricultural risk (Aurora, 2002). Thus, this study is focused in identifying the problems of sweet orange cultivation and production.

Materials And Methods

Study site

Pyuthan district was selected purposively for the survey as it is well known for sweet orange production since long. The study was conducted in the places like Chhapani, Pakhachhiti, Marang and Kotdhara where most of the people are engaged in medium and small-scale production of sweet orange. Among the total growers, 50 of them were randomly selected out of which 20 respondents were from Chhapani, 8 respondents were from Pakhachiti, 10 respondents were from Kotdhara and the remaining 12 respondents were from Marang of Pyuthan municipality.

Research Instrument and Design

The study has been conducted and completed mainly by collecting primary data and supported by secondary data ta a certain extent. The primary data were collected from the field survey. The secondary data were collected by reviewing various published and unpublished documents related to the topic of the study. Sources of primary data were considered mainly to be the households who are involved in Sweet orange farming. The primary data were collected during the field work by visiting the Sweet orange grower's door to door and interviewing them with the help of semi-structured questionnaire. Personal observation of the trees and the orchids was also done during the visits. Secondary data help primary data more specific and we are able to find out the gaps, deficiencies and additional information required to be collected. Secondary data were collected from the published resources like books, journals, research papers, articles, Central Bureau of Statistics publications (CBS) and all other relevant reports and documents. Group discussion was also carried out with the members to know about their production, yield, and their major constraints associated with the production of sweet orange. The conceptual framework of this study is shown in Fig. 1.

Result and Discussion

In order to get desired information on the problems different age groups and sex ratios of the respondents have been considered. In the survey, the number of the respondent of the age group above 50 was found to be maximum (34 %) and age group 21-30 were found to be minimum (18%).

Likewise, the age group 41-50 was found to be 26 percent, and the percentage of respondents 31-40 years old, was found to be 22 percent. This result show that the people of age group above 50 were involved in agriculture highly.

The participants were categorized into four groups based on their schooling or formal/informal education. It was found that the majority of the respondents (almost 50 percent) were illiterate (Table 1). Education Level of Respondents is shown in the Table 1.

The respondents were found to be engaged in various occupations in the study area. Among them, 78 percent were found engaged in farming. 8 percent were in remittance, while 4 percent were found engaged in business, 7 percent in services, and 3 percent in other activities. Under civil service, most of the respondents were engaged under the government school and offices nearby. Agriculture being common occupation for all types of people like literate as well as illiterate peoples, people doing government job also does farming by helping family members in leisure time. Involvement of respondents in the Sweet orange production is shown in the Table 2.

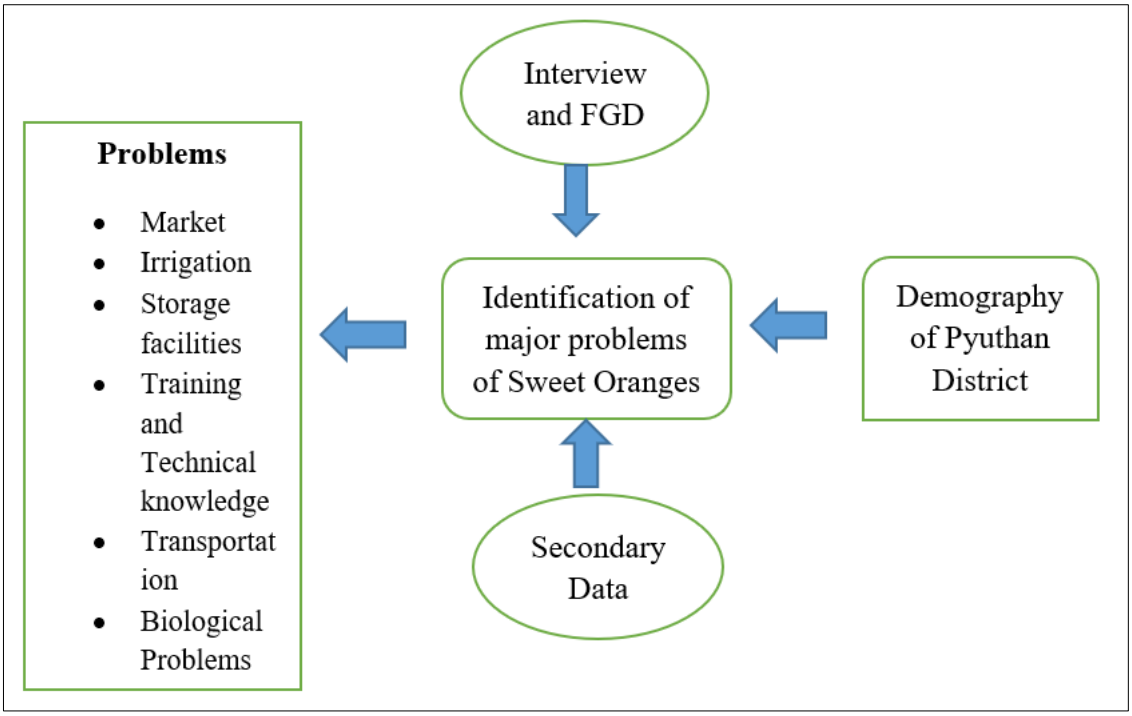

Fig 1. Conceptual Framework

Table 1: Education Level of Respondents

Education Level	Male	Female	Total Percentage
Illiterate	19	31	50
Primary	10	16	25
Secondary	8	12	20
Intermediate	1	2	3
Bachelors	0	0	0
Masters	1	1	2
Total Percentage	41	59	100

Table 2: Involvement of respondents in the Sweet orange production

Involvement time (years)	Frequency	Percentage
9-12	18	36
13-16	6	12
17-20	12	24
≥20	14	28
Total	50	100

Table 3: Intercultural operations done by respondents

Cultural practices	Male only		Female only		Both	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Land preparation	15	30	12	24	23	46
Manure application	8	16	12	24	30	60
Weeding	3	6	21	42	21	52
Harvesting	5	10	9	18	36	72

Majority of the respondent's 90 percent were devoid of the training respectively while 10 percent of the respondents have received training regarding sweet orange cultivation respectively. This is due to lack of government support and illiteracy of the respondents. As a result, most of the farmers of study area are unaware about modern (scientific) system of sweet orange production with modern tools and production of sweet orange is not increasing in the study area also majority of the respondents (92%) used only Farm yard manure in their field. They don't have sufficient manure for their field. They do not combine FYM with other manures. Among them 8% farmers don't use any types of manure in their field due to unavailability of manure due to which the production of such farmer is very less. None of the farmers from my study area use any types of fertilizers in their field because they think the use chemical fertilizers will harm their health and they want their product to be organic.

Those farmers who have their land near river and rivulets they irrigate their land by canal. Farmers having scarce water practice manual irrigation and the farmers having no means of irrigation were dependent in the rainwater. It was found that, the majority of the respondents i.e. eighty-six percent of the respondents use rain feds irrigation system because they cultivate sweet orange in high hills so, they have to depend upon rain for irrigation. Six percent of the respondents irrigate their field manually with the help of pipe as their field is near the water source and eight percent of the respondents used canal system. Insects were also the major problem in the study area and found that 54% of the respondent had moderate effect of insect pest, 20% had severe and 22% had slight effect. Likewise, only few 4% has no any effect of insect pest in their Sweet orange tree (field). The major insect pests seen in sweet orange was green stink bug which made high loss in sweet orange production. Fig. 2 & 3 show damage done by insect pest in study area.

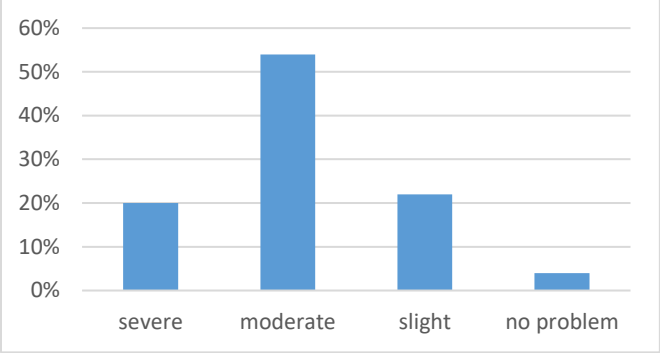

Fig. 2: Damage done by insect pest in study area

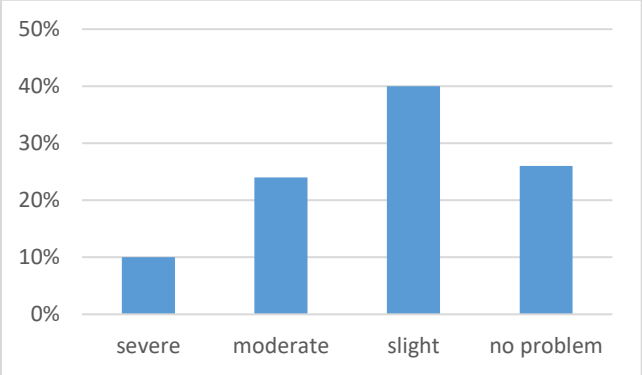

Fig. 3: Damage done by disease in the study area

Major Problems of the Respondents

The major problem faced by the respondents from all places were suffering from transportation problem due to which they were not being able to supply their sweet orange efficiently to the market. Farmers are also suffering from the problems like lack of proper irrigation system, lack of storage facility of sweet orange, lack of labor, financial problem. One of the major problems is lack of training for the good production of the sweet orange. Government support is must but sweet orange growing farmers of

Pyuthan had no subsidy given by the government for sweet orange production, which was one of the problems. However, the major problem is no road access to all sweet orange producing areas and to areas having potentiality to produce sweet orange. The farmers of that area carry sweet orange to the market manually which leads to post harvest loss and due to that, they have to drop the price of sweet orange, which affects their livelihood. The other problems were the physiological disorders like Fruit drop, Citrus decline, and alternate bearing which led to decrease the production of sweet orange.

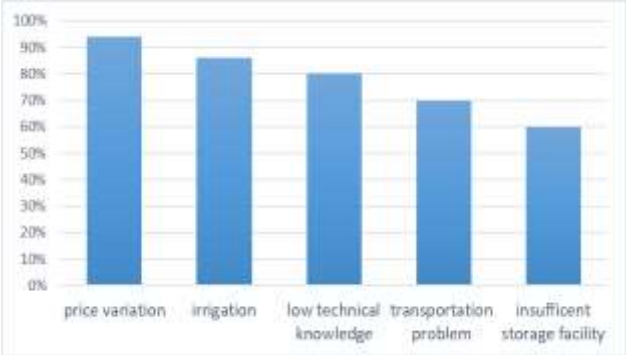

Fig. 4: Physical Problem prioritization

Based on respondents' statement, their problems were ranked using physical problem priority index and it was found that their physical priority problem were a) Price variation b) Irrigation, c) low technical knowledge, d) transportation problem, e) insufficient storage facilities (Fig. 4). Price variation was one of the major physical problems of the respondents it is due to lack of proper market where the market is small and there is no facility of transporting the orange to the market of other district due to which farmers are forced to sell their product in less price from bargaining with consumer and further irrigation was also major problem. In my study area, the availability of water is less and due to the lack of government policy for training and workshop about the cultivation practice of sweet orange.

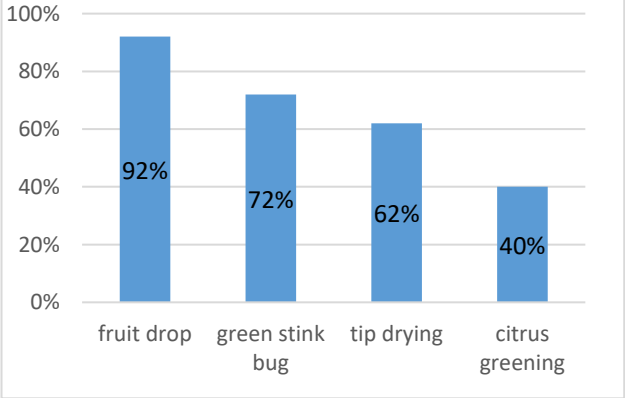

Fig. 5: Biological problem prioritization

Based on respondents' statement, their problems were ranked using biological problem priority index and it was found that their Biological priority problem were a) Fruit drop b) Green stink bug, c) Tip drying, d) Citrus greening. Majority of respondent (90%) has problem of fruit drop and this is due to water stress, production of ethylene, carbohydrate limitations and bacterial toxicity (Fig. 5).

Conclusion

The study concluded that Sweet orange production helped the farmers of Pyuthan municipality to improve their livelihood such as improving child education, health of family, availability of nutritious food. Sweet orange is the important source of income for the farmers in the surveyed areas of Pyuthan municipality.

Although, the production area and productivity of sweet orange is lower in compare to different high growing districts of Nepal but the yield was better than them which shows that there is high possibility of good production of sweet orange if the farmers goes on commercial production of sweet orange from traditional farming system. The sweet orange production area was on the hilly side due to which there is not good irrigation facilities and the production is fully organic (use only FYM). FYM is also not sufficient due to which the problem of fruit drop is high as well as the disease, citrus greening and pest, green stinky bug were the main source for lowering the production. Similarly, there was high problem of road transportation and proper vehicle to deliver the sweet orange up to market which makes high loss of fruit (fruit damage). As the market was small, and exporting is not possible, the farmers are forced to lower the price of sweet orange after 3 pm because they get more cost to return their fruit and again taking it back next day.

Author's Contribution

A Adhikari conceptualize the research plan, performed experiment, collected data and prepare the manuscript. Bigyan G.C performed experiment, collected data and analysed the data; Final form of manuscript was approved by both authors.

Conflict of Interest

The authors declare that there is no conflict of interest with present publication

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