

ECONOMIC ANALYSIS OF PRODUCTION AND MARKETING OF SAFFRON IN JAMMU REGION

By

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J-19-M-63-ABM

A Project submitted to

Faculty of Agriculture

in partial fulfilment of the requirements

for the degree of

MASTERS OF BUSINESS ADMINISTRATION

(AGRI-BUSINESS MANAGEMENT)



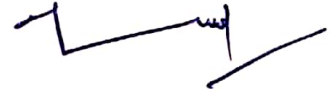
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CERTIFICATE - I

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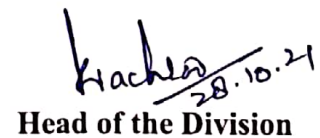
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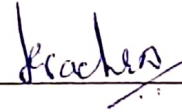
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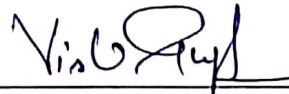


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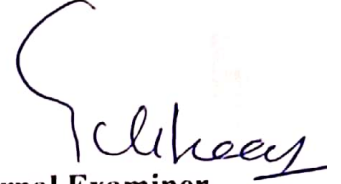
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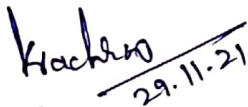
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ABSTRACT

Title of the Project : Economic Analysis of Production and Marketing of Saffron in Jammu Region
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ABSTRACT

The Jammu and Kashmir has a varied type of climate from sub-tropical to cold arid. The main crops grown in the state are rice, maize, wheat, pulses, oil seeds, saffron etc. The cultivation of Saffron is mostly confined to the state of Jammu and Kashmir. It is the legendry crop of Kashmir province and Kishtwar district of Jammu and Kashmir. The present study is an attempt to analyze the cost, return and marketing of Saffron in Jammu region. The study was conducted in the Kishtwar District of J&K UT because Kishtwar is the only district where saffron is grown in Jammu Province. The list of saffron growing villages was collected from the District Saffron Office, Kishtwar and 10 villages on the basis of highest area were selected. Using proportional method, 50 farmers were selected from the different villages. Data related to marketing of saffron was collected from 15 intermediaries involved in its marketing. After the Economic Analysis we found that the total per hectare cost of cultivation of Saffron in Kishtwar district of J&K is ₹7,18,176 per hectare and the net return was ₹11,14,573 per hectare. Hence, giving a cost benefit ratio of 1:2.6. Despite of high cost of cultivation, saffron has given outstanding returns. Nevertheless, the net price received by the farmer in selling it directly to consumers is highest i.e ₹1995/10g but the Saffron produced in Kishtwar has a good market in Amritsar where it is sold at ₹250/g making it the most efficient supply chain for selling bulk quantity and this is the most commonly found supply chain in Kishtwar. After analysing the export data, it was found that India's maximum export of Saffron was \$1.73 Million during the years 2012 and 2013. But in 2020, it has declined to \$1.3 Million due to decline in production. According to the Saffron farmers, there is a major problem of unavailability of labour followed by costly inputs including heavy labour cost and irrigation. There is a huge lack of organized markets and market information for the marketing of saffron.

Keywords: Saffron, cost benefit ratio, net price, export, marketing.



Signature of Major Advisor



Signature of the student

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Chapter-1

Introduction

INTRODUCTION

Saffron (*Crocus sativus*) popularly known as Kesar is considered one of the world's best flavors and a few ancient delicacies will continue to get the highest price in culinary arts in the future. The recorded account of saffron cultivation dates back to 550 AD, about four hundred years before the recorded cultivation of about 961 AD, in Spain by the Arabs (Cappelli and Minco, 1999). Saffron planting ranges between 0-90°E longitude (Spain to Kashmir) and 30-45°N latitude (Persia to England). It is grown in Spain, France, Italy, Greece, Germany, Australia, Algeria, Iran, India, China and Russia. The total production of saffron in the world is about 300 tons per year and Iran sits at the top and supplies about 88 per cent of the world's saffron production. Although, India ranks second in size but produces about 7 per cent of the world's total production. Jammu and Kashmir are the only union area in India where saffron is cultivated. Spain with 600 hectares is the third largest producer with an average production of 8.33 kg/ha in the world. Leading saffron-producing countries such as Iran, Spain and Greece with more manufacturing capabilities are able to achieve higher production and productivity than our production and pose a greater threat to our saffron industry as imports grow each year (CSIR-IIIM Jammu and Kashmir, 2020). Saffron is grown in a variety of climatic zones, varying in height, temperature and humidity. However, it grows well in cool and sunny conditions in well-drained soil. Lower temperatures in winter and longevity of photo period between March-April have a major impact on the production of flowering primordia. In mid-September light weather helps to start plant growth activities and promotes flowering. Heavy rains during flowering, adversely affect the quality of the saffron. Adequate soil moisture during early crop growth (November-December) and extensive photosynthetic activity (March-April) are essential for corm growth and development and subsequent production. Properly distributed rainfall (350-450mm) during the growing season is sufficient for a successful crop. Saffron is a slow-growing plant that grows underground (Douskas, 1980). Saffron is sown in August to mid-September and is separated into Saffron Mongra, which is made up of female part of the flower, saffron lacha, comes from stigma and style, while saffron zarda and saffron patti, are prepared from the rest remaining after the processing of saffron lacha. In Kishtwar, saffron is sold as a guchi where a few stigmas are tied with each other. Increased

demand in the national and international markets makes saffron a lucrative agricultural activity because of its high value. The inclusion of saffron value by export is one of the future ways to capture the international market. Saffron flowers are harvested from mid-October to the first week of November. The flowers are picked in the morning during a period of 3 or 4 days and the stigmas and styles are cut immediately after harvesting and when the back of the saffron is dried for 3-5 days in the sun or shade, it is later stored in air-tight containers to retain its colour, aroma content in a humidity about 6-8 per cent. About 1,50,000 flowers are needed to produce one kilogram of dried saffron (Escribano *et al.*, 2000).

Saffron - Gold Spice has many uses. It is very expensive in all spices. The deep red saffron, is a natural colour and flavor used these days mainly as a food additive in bakery and confectionery. It conveys a delicious taste and yellow colour to the dishes and makes the food delicious. Saffron is also used as a colouring agent for butter, cheese etc. It is also used to cure chronic diarrhoea and snakebites. Apart from that it is also used in religious places in the country.

1.1 Chemical composition of saffron

Saffron actually contains three active ingredients such as crocin, picrocrocin and safranal that determine colour intensity, flavour strength and aroma power respectively. Kamili and Wani in 2006 reported that commercial saffron contains amounts of nitrogen, water, protein, starch and sugar, essential oil, crude fibre, ash (inorganic salts), potassium, phosphorus and boron in traces as shown in Table 1.1. Crocetin glycosyl esters responsible for its colour and composition are found in the most important proportions in stigmas.

Table 1.1. Chemical formulation of Indian saffron

Constituents	Per centage
Total nitrogen-free emissions	54.5 - 57.5
Water	14.5 - 15.5
Crocin	13.5 - 15.0
Protein	12.5 - 13.5
Starch and sugar	12.0 - 13.5
Essential oils	4.7 - 8.5
Crude fibres	4.0 - 5.0
Ashes	4.0 - 4.5
Picrocrocin, safranal, potassium, phosphorus, boron	in traces

1.2 Area, production and yield of saffron in India

The quality of Indian saffron is relatively high but the yield levels are low as compared to Iran and Spain. Decreased saffron cultivation has threatened saffron production and crop yields in Kashmir and Kishtwar. Available data suggest that saffron production has declined over the past few years in the Kashmir and Kishtwar valleys due to severe drought especially during the month of September 2020, which significantly reduced saffron production but somehow by 2020 its production was 16.00 MT in 3715 hectares of area with productivity of 4.00kg/ha. Therefore, it appears from the above facts that the moisture stress in September is a major cause, which is gradually declining saffron cultivation in Jammu and Kashmir. However, systematic studies are still needed to confirm the cause of the depletion of the saffron area in the state and to propose technological interventions to increase the productivity and production of saffron in the region. The yearly trends of area, production and yield of saffron are depicted in Table 1.2.

Table 1.2. Yearly trends of area, production and yield of saffron in Jammu & Kashmir

Year	Area (ha.)	Production (MTs)	Yield Rate (kg/ha)
1997	5707	15.85	2.80
1998	4161	12.88	3.13
2000	2880	7.65	2.27
2001	2742	3.59	1.88
2002	3075	0.30	1.57
2003	2989	6.50	2.96
2004	2928	5.15	1.66
2005	2463	6.86	3.75
2006	3110	7.04	1.63
2007	3130	6.50	2.25
2008	3010	8.20	2.15
2008	3000	7.70	2.50
2009	3280	9.46	2.34
2010	3785	9.55	2.50
2011	3790	15.00	4.08
2012	3674	11.50	3.52
2013	3674	10.00	3.13
2014	3674	8.85	2.72
2015	3674	9.60	2.61
2016	3538	8.25	2.16
2017	3498	8.10	2.03
2018	3450	7.91	1.90
2019	3450	7.70	1.49
2020	3715	16.00	4.00

Source: CSIR-IIIM Jammu and Kashmir; Tantry *et al.*, 2017,

The study was conducted in the Kishtwar District of J&K UT because Kishtwar is the only district where saffron is grown in Jammu province. The area wise detail of saffron cultivation in Jammu province is given in table 1.3. About 120 hectares of the cultivable land has been occupied for Saffron cultivation in Kishtwar area.

Table 1.3. Village wise area under saffron cultivation in Kishtwar district for the year 2019

Name of the Village	Area in Hectares	Name of the Village	Area in Hectares
Poochal	74.50	Matta	3.20
Sangram Bhatta	1.00	Hydial	6.50
Cheerhar	1.45	Hudri	2.15
Dugga	0.50	Draba	1.05
Berwar	01.50	Archi	1.35
Hullar	2.00	Tund	3.50
Hatta	01.75	Lanyl	0.65
Sarkoot	0.10	Malipath	1.00
Bera-Bhatta	10.75	Bindraban	1.00
Bengana	06.05		
Total		120 Hectares	

(Source: District Saffron Office, Kishtwar, 2019)

Chapter-2

The Project

THE PROJECT

2.1 Title and statement of problem

The project work entitled “**Economic analysis of production and marketing of saffron in Jammu region**” was carried out in district Kishtwar of Jammu province of J&K during the year 2020-21.

Saffron has been traditionally used to colour and flavour number of dishes and is used as a key spice for preparation of Kashmiri ‘Kehwa’. Saffron has a significant role in all religions branched out from Hinduism. It is essential in performing some rituals; the Buddhist monks have adopted the saffron colour as the most important one and Hindus use saffron for marking their foreheads. It is used in traditional and modern medicines as antiseptic, antidepressant, antispasmodic, anticancer and carminative and also used as herbal medicine for curing respiratory infections such as coughs, common colds, scarlet fever and asthma. It has many other uses in industries such as cosmetic, perfumery as well as in the textile dyes.

2.2 Global production scenario of saffron

Global producers of saffron include Iran, India, Afghanistan, Greece, Morocco, Spain, Italy, China, Azerbaijan, Argentina, Australia, Korea, Japan, the UAE, Qatar, the Netherlands, Luxembourg, Kuwait, Saudi Arabia, Germany, Poland, France, Portugal, Morocco, Brazil, Peru, Paraguay, Mexico, and the USA. According to the latest statistics for saffron trade in 2019, Iran is the world’s largest producer of saffron; supplying 430 tons of the total 450 tons of saffron produced worldwide and is expected to reach 500 tons in 2021. Iran is the world’s first and largest producer and exporter of saffron, with a 92-95 per cent share of world production of saffron. Spain is the second largest exporter of saffron in the world and has a 20.7 per cent share in world saffron exports worth \$ 57.08 million. Afghanistan accounts for 16.2 per cent of the global export of saffron worth \$ 44.58 million and is a growing market for this product. Second to Iran, India is the world’s second largest producer and importer of saffron and the fourth largest exporter of this product. Saffron imported to India is worth \$ 31.06 million, constituting 11.3 per cent of global saffron imports. The export value of saffron of India is \$ 48.48 million, and its major export destination is UAE.

Other export destinations of Indian saffron are the USA, Oman, Qatar, and Australia. Other countries producing saffron and based on their share in global saffron production include Greece (7.2 tons), Afghanistan (6 tons), Morocco (2.6 tons), Spain (2.3 tons), Italy (1 ton), China (1 ton), and Azerbaijan (0.23 ton) (Tridge, India export analysis, 2019).

2.3 Saffron Cultivation in J&K

Jammu and Kashmir is globally acknowledged due to its cultivation of world famous horticulture fruits. Horticulture sector is considered to be the back bone of the union territory's economy, contributing ₹7000 crore approximately towards State Domestic Gross Product (2016-17), besides provides employment to around 33 lakh people directly or indirectly. The union territory is industrially poor and fewer avenues available in the public sector have made people depend on agriculture sector for their income and livelihood security. Horticulture is important sub sector of agriculture in the union territory. Besides Apple, pear, peach, plum, apricot, almond, mushroom, lavender; saffron-the costliest spice is also cultivated in the state. Saffron is world famous high value low volume cash crop of the Union Territory. Saffron cultivation in Kashmir valley has historical roots from Iran where world's largest amount of saffron is cultivated in the country. Saffron cultivation was started in Kishtwar when the corms were brought from Kashmir under National Saffron Mission. Jammu & Kashmir is having monopoly in the saffron cultivation in India. Nearly 7.3 per cent of world saffron is produced in the Union Territory puts India on the second rank in world saffron production (Statista, 2021).

2.4 Major reasons behind declining production of saffron in Jammu and Kashmir

In spite of the high value low volume, saffron production is declining in Jammu and Kashmir and that is due to various reasons. Some of the reasons are mentioned below:

The fields are senile with inadequate plant population of 2-3 lakh/ha instead of 5 lakh/ha. Majority of saffron fields are under rain fed cultivation which induces moisture stress in the crop. There is inadequate availability of disease-free saffron corms because of lack of tissue culture facilities. Nutrient depletion in saffron fields is becoming more and more with time. In Jammu and Kashmir, saffron corms have a longer planting cycle i.e. >15 years as against 4-5 years. With depletion of nutrients in

saffron fields, there is an increase in incidence of pests and diseases. One more reason for lowering of saffron recovery is delay in stigma separation which is 22 g/kg of fresh flowers against the optimum recovery of 30g/kg. Traditional practices like sun drying, mostly used in Kashmir lowers colouring strength from 16 to 8 per cent deteriorates the quality of saffron. Inadequate quality control facilities, certifications and branding of saffron are there in Jammu and Kashmir. Irrigation facilities for reducing the moisture stress are unavailable. Adequate post-harvest handling practices, processing and marketing of saffron is lacking in the Union Territory which is failing to benefit the saffron farmers. Poor price discovery and lower farm gate price due to involvement of intermediaries has created a massive problem for saffron trade. Issues of adulteration and mixing is common in saffron which reduces its quality. In order to tackle the above-mentioned issues, Government of India and Government of J&K has introduced National Saffron Mission covering all aspects of cultivation, production and marketing of saffron in the state to ensure that interventions are timely and have identifiable performance (Ali *et al.*, 2017).

2.5 Objectives of the study

1. To study the economic analysis of saffron production.
2. To analyse marketing and supply chain of saffron.
3. To find out the export status of saffron.
4. To identify the problems faced by saffron growers.

2.6 Scope of the study

This study has a potential to highlight export, supply chain and value chain in exporting saffron from Jammu and Kashmir to other countries. The study will be helpful in highlighting the major obstacles in cultivation, marketing and export of saffron. On the basis of marketing analysis, the farmers can use it for mobility of saffron from farms to foreign and thus, will also be helpful in elevating the income of the farmers.

2.7 Limitations of the study

1. It was a single student investigation, which placed limitation on time, resources etc which obviously lead to the purposive selection of the area of the study and also, restricted sample size.

2. The method of data, collection in the investigation was mostly confined to personal interview and the results drawn are exclusively based on the verbal impressed opinion and responses provided by the respondents.
3. The study is of limited geographical location. The results may not lead to broader generalizations.
4. The study is confined to 10 villages and 50 respondents and hence the generalization of the study is limited only to the saffron growers of study area.

Chapter-3

Review of Literature

REVIEW OF LITERATURE

Comprehensive and critical review of past studies provides a sound base for scientific investigation. It helps in determining appropriate methods and procedures for conducting investigation. It also lends support in interpreting the findings. In the past investigation there are certain dimensions in which very few studies have been conducted in India and abroad, thus offering limited scope for giving review of research studies. An attempt has, therefore been made here to review literatures which are meaningful and have direct relevance with this study.

3.1 To study the economic analysis of saffron production

Pandey *et al.* (1974) reported that in 3-year trials the percentage survival and the growth and flowering of saffron (*Crocus sativus*) were related to corm size at planting. Corms of 3.5 cm or more in diameter gave the best results.

Nauryal *et al.* (1975) reported that the yield of 2 kg/ha has been recorded for Jammu and Kashmir UT. Survey conducted by the author in Pampore area revealed that average yield ranges between 2-3 kg per hectare whereas yield in Spain was much higher near about 10 kg of dried saffron per hectare.

Gilani (1976) reported that planting saffron (*Crocus sativus*) corms 2-3 cm in diameter some 15 cm deep at 50 x 8 cm and irrigating once gave an average flower yield of 10-40 kg/ha (over 8 kg/ha of dry stigmas).

Rehman and Lodhi (1977) showed that applying 21.943 kg/ha of sheep manure increased the yield of corms of all 3 size grades and particularly the largest, plants from large corms produced the most and largest corms, corm yields were highest' from mid-July plantings, lowest from August plantings and intermediate from June plantings growing under tree shade checked corm production and flowering. In trials at Sariab (Quetta) cvs from Spain, Iran, Holland and Italy were compared for flower yield, saffron yield and flowering date. The Spanish cv. yielded best (55g saffron from 2000 corms planted).

Bali *et al.* (1987) shows the high economic returns, which can be obtained from saffron, in order to promote its cultivation on a commercial scale. It indicates that profits from the crop are high, regardless of the costs.

Munshi (1989) reported that in India, commercial saffron (*Crocus sativus*) production is mainly from Jammu and Kashmir, but other states such as Himachal Pradesh and the North-eastern hill regions have a suitable climate. This short paper first outlines aspects of saffron husbandry under rainfed conditions in Kashmir and also reported that saffron cultivation requires a high initial investment of ₹38,000 for the seed corms.

Kachroo (1992) reported that continued and effective extension approach of the department of agriculture, during the past decade has brought about much needed awareness for extension of saffron cultivation in non-traditional belts of the valley. As part of the programme, off take of saffron corms has picked up from 130.50 quintals in 1986 to 191.25 quintals in 1991.

Sama *et al.* (2000) studied that the quality of saffron produced in India is poor due to outdated processing practices and does not conform to international standards, the main deficiencies being contamination with dust and pollens and low pigment content. The introduction of post-harvest processing equipment i.e., flower harvesters, floral components, air classifier's, stigma and style (Lachha) separators and solar dryers, which have been designed, developed, and fabricated in the laboratory and tested under field conditions at Pampore and Kishtwar. saffron growing areas, have potential to bring improvements over strenuous traditional practices, saving in labour cost to the tune of ₹39,500/ha and bringing higher returns to growers due to the superior quality product.

Panday *et al.* (2001) observed that In Kashmir, farmers use longer planting method of cultivation, under which saffron plants are left in soil for more than 15 years leading to saffron corm decomposition (46 per cent). The unsorted corms are further planted without sorting on the basis of weight and size resulting in to low saffron productivity (2.50 kg/ha) and fetching low economic returns.

Munshi *et al.* (2002) noticed that irrigation facilities to saffron fields at proper timing are a big concern for increasing saffron production and productivity. Although the requirement of water is low for saffron, its availability at proper time is essential for increasing its production and productivity.

Gohar and Wyeth (2006) studied saffron production and farmer perceptions in Pashtun Zarghun district of Heart. Lesser inputs including fertilizer and water were

used in saffron crop. Women were heavily involved in production, especially in saffron harvesting and processing. The risks or difficulties associated with saffron were market uncertainties, pests (mice and bees), inadequate water, and difficulties arising in processing. Experienced farmers were better informed about both production and marketing. Trainings could benefit to raise the quantities as well as the quality of saffron produce.

Alam (2007) examined that time bound availability of corms is not possible and if available, they are beyond the purchasing ability of common saffron growers owing to their high cost, therefore being a major factor in suppressing saffron cultivation. Hence adoption of feasible system for commercial corm production will ensure mass scale corm production and higher economic gains/unit area of saffron.

Ghorbani (2007) estimated the economics of saffron in Iran. Labour requirement for saffron production was found to be 200 man days per hectare. However, this figure is much higher in the processing and marketing sectors. DRC and SCB indices showed that production of saffron in Iran has comparative advantage.

Nehvi *et al.* (2008) revealed that corm weighing 1-2 grams do not flower in first year, while as corms weighing more than 10 grams flower earlier with better yield and In Kashmir valley farmers prefer substandard corms weighing 8 grams in weight and 2 cm in size for sowing resulting in low flower yield and thus shrinking per acre productivity of saffron.

Shah and Tripathi (2009) undertook a study in Kashmir valley of Jammu and Kashmir UT, to investigate the economics of saffron production Results revealed that the gross expenditure of crop during 5 years planting cycle of saffron was ₹4,31,184 per hectare of land because of high establishment cost in first year and the gross returns in the planting cycle of 5 Years were ₹23,65,999. The net profit per annum calculated to be ₹3,86,962/ha @ 230/gram and average net profit per year per kanal of land was ₹ 19,347 including seed which were obtained after completion of 5 years.

Dwivedi and Singh (2010) analysed the cost and return structure of saffron crop in valley. For the present study and random sampling techniques were adopted to select the districts, block, villages and farmers from district Pulwama, as it had the highest area and production of saffron cultivation in Jammu & Kashmir. The overall cost of

cultivation was estimated as ₹ 263138.82/ha for 9 years and net returns comes out to ₹412709.83 giving a cost benefit ratio of 1:2.57.

Husaini *et al.* (2010) worked on technological and policy interventions for sustainable saffron production in Kashmir. They emphasized ample scope for maximizing profitability of saffron for Kashmir saffron growers, provided that sincere efforts are made. Initiatives are needed for reversing this declining trend by adopting strict quality control measures, preventing adulteration, mechanizing production and introducing marketing. Adoption of novel scientific technologies, including biotechnology, can go a long way to reduce the costs of saffron production in the future.

Mahesha and Kuchay (2012) studied production and potential of saffron in Kashmir, India and found that saffron as a cash crop generates good sort of employment and had a good scope of setting up of enterprise during its various stages. That means saffron cultivation has a wide network but it needs the proper and efficient utilization of such resources and appropriate enterprises to process saffron.

Moghadam *et al.* (2013) worked on cultivation methods in saffron (*Crocus sativus*) and principles of fight against pests and weeds. In order to increase production and economic returns, the use of chemical fertilizers should be limited and appropriate amount of animal manures must be used. Lands should be changed before the bulbs become small. Observance of agronomic principles such as water needs based on climate, integrated weeding, fight against weeds, disinfection of seeds. efficient and timely use of fertilizers, and timely cultivation was suggested to increase the performance of saffron farms.

Alireza and Fatemeh (2014) the comparative advantage of saffron in Torbat-e-Heydarieh using DRC index and policy analysis matrix (PAM). The cost-benefit analysis was done using three indices, viz. B.C. ratio, internal rate of return (IRR) and the current value of benefits (NPV). Torbat-e-Heydarieh was found to have more comparative advantage in producing the products.

Golmohammadi (2014) described a brief history of saffron, explained its qualities and introduced the ecosystem of medicinal plants in Southern Khorasan. He also attempted to introduce the problems and difficulties with regard to saffron and its export. Iranian saffron's primary commercial cultivation was in the eastern and south-eastern parts of the country, where the extreme climate and flat, treeless, landscapes

were best suited for the flower's proliferation. The saffron flower, which flourishes best in hot and dry weather in summer and cold in the winter, grows well in the regions of sandy or clay-laden soils.

Haq and Shafi (2014) studied the economic analysis of saffron in Kashmir valley. Cobb-Douglas production function employed to estimate the elasticities of output (yield per hectare) with respect to some major economic and noneconomic variables. The productivity increased with the increase in the size of holding from small farms to medium size farms, but shows a declining trend from medium to large sized farms.

Melfou *et al.* (2015) examined the economic performance of Greek PDO saffron farms in Western Macedonia by estimating their technical efficiency with the application of DEA methodology. The results indicate that average technical efficiency under constant to scale was 0.627. The farms could have achieved the same level of output using 37 per cent less inputs.

Sahabi *et al.* (2016) evaluated saffron and wheat production systems in view of the energy balance in Khorasan Razavi province, Iran. The total energy used in various processes for producing saffron and wheat was 21581 MJ ha⁻¹ and 32062.22 MJ ha⁻¹, respectively. Among the saffron production practices, corm used for cultivation (seed) had the highest energy consumption (59.65 per cent), followed by nitrogen fertilizer (13.78 per cent) and manure (13.34 per cent). In wheat, nitrogen fertilizer (25.88 per cent) and electricity (18.63 per cent) were the energy-consuming inputs. Renewable energy shares were 79.94 per cent and 26.18 per cent in saffron and wheat systems, respectively. Energy use efficiency was 0.0035 for saffron and 2.63 for wheat. The benefit-cost ratios for saffron and wheat production systems were 2.78 and 2.17, respectively. Saffron production was more efficient and sustainable than wheat, because it was more environmentally friendly in terms of ecological indices such as amount of energy used and renewable energy consumption.

3.2 To analyse marketing and supply chain of saffron

Torkamani (2000) investigated the production and marketing of Iranian saffron. The production functions of saffron were estimated by using transcendental stochastic frontier production functions. Wholesale, retail and marketing margins, as well as marketing efficiency were estimated. Results revealed that farmers were not using some

of the inputs optimally. A study of the technical efficiency of saffron growers indicated that there was a considerable possibility of increasing production by increasing farmers efficiencies. The average of wholesale, retail and marketing margins of one kilogram of saffron were estimated to be 483000, 410000 and 893000 rials, respectively in the three study regions. Marketing efficiency was also calculated as 155 per cent and a marketing channel as a part of the marketing strategy was proposed for Iranian saffron.

Zaki *et al.* (2002) noticed that in Kashmir, the trade mechanism of saffron is highly unorganized, as it is largely concentrated in the hands of few brokers (called Dalals/Commission Agents) with a lengthy chain of intermediaries, (viz.; local traders, agents, cooperative societies, government agencies, companies etc.) linking the growers to the consumers.

Ghorbani (2008) estimated the marketing efficiency of saffron in Iran. Marketing margin of Saffron was high and producers received less than 65 per cent of final price of consumer. It was suggested to create regional marketing board beside agricultural exchange market for coordinating production, marketing and export.

Jema (2008) revealed that understanding of margin is important in determining producer's share of final price as key indices of evaluating the efficiency of different marketing channels used for export of saffron.

Mortazavi *et al.* (2013) investigated the knowledge of Iranian Saffron farmers saffron marketing management and factors affecting on it. The results of double-variable analysis indicated that the knowledge of saffron farmers marketing management of saffron has significant relationships age, total area, saffron land area. The education, faming experience, educational extension courses, rural associations and fanners' income have significant effect on independent variable.

3.3 To find out the export status of saffron

Wakefield (1979) has recorded that the red and white stamens only are of value, the yellow being generally given to cattle. The farmers, however, after proper preparation yield the principal ingredients of oriented cooking, the well-known dyestuff and the articles called saffron employed in medicine. The yearly export from Kashmir to India amounts in value to the sum of ₹20,000.

SKUAST Jammu and Kashmir (1987) in year book of agriculture mentioned that the ISI has recognized two grades of saffron. "The Special" and "The Standard".

The grading is done according to colour, florals, waste content and foreign matter present in the saffron; Mongra, which contains top most parts of dried stigma, lacha, which contains part of stigma with style and Gucchi which contains whole stigma with style tied in bundles are commercial grades in trade.

According to Rees (1988) the wholesale price of saffron in England is around 450 pound per kg (Appx. ₹22,500 per kg).

Munshi (1990) reported that saffron is one of the most important foreign exchange earners among the spices of India. Grown mostly in the state of Jammu and Kashmir, this mono-crop is said to account for up to 2 per cent of total export revenue. But its marketing is concentrated in the hands of a few traders and exporters and a more competitive environment is desirable to raise its profitability.

Mattoo and Beigh (1992) have written that saffron is also called "Red Gold" of Jammu & Kashmir, because of its great commercial importance and it earns annually about ₹1.25 crores of foreign exchange.

Najazadeh *et al.* (2010) studied the comparative advantage and export potentials of saffron, known as Iranian red gold. Iran found to have a comparative advantage in the production of saffron. The nominal rate of protection on saffron showed that there has been an indirect tax on saffron production. It was suggested that the amount of land allocated to saffron production in Iran should be increased.

Khanarinejad *et al.* (2012) investigated the role of exchange rate volatility on Iran's agricultural exports including saffron. Monte Carlo simulation with autocorrelation of standard deviation showed the best results in risk modelling and is used for this research. Yield correlation among crops in several oblasts was low to negative, creating opportunities for diversification. However, positive price-yield correlation was dominant for agricultural products in Ukraine due to high dependency on global prices and a large share of export.

Mehdi and Reza (2012) determined the relationship between Saffron export and agricultural value added in Iran. There was a significant relationship between saffron export and agricultural value added. Together the independent variables explained 91 per cent of the variance in the dependent variables. One per cent change in Saffron export rate lead to 35 per cent in agricultural value-added growth. Therefore, saffron export was regarded as an important factor in Iran's agricultural value added.

Gilaninia *et al.* (2013) highlighted the quality and packaging aspects of saffron for exports. It was seen that appropriate product packaging encourages consumers to buy products and recommend its absolute necessity due to its high price in non-oil exports of the country, comparative advantage and its importance in terms of production, acreage and employment in different parts of the country.

3.4 To identify the problems faced by saffron growers

Hussain (1994) has noted that since that post gulf crisis period, the Iranian export in to Indian market has emerged as a potential threat to Kashmiri saffron. In order to earn the maximum. foreign exchange, the Iranians are selling their products. for half of the rate per kg, since the Iranian produce is comparatively packed in a better way and has less price, it dominated the Indian market. This has resulted in another problem that dealers are mixing the Kashmiri saffron with the Iranian and selling it at a high price. This has affected the quality control, which has always remained a problem in the trade especially when the adulteration was always officially sponsored.

Rekhi *et al.* (1997) conducted a survey in Pampore Tehsil, Pulwama district Kashmir, India in 1994. Interviewed 125 saffron growers to determine the technical problems they face. The main problems for which research currently has no solution were identified as lack of a high yielding cultivars. The serious weed *Cyperus rotundus*, corm rotting and gangrene disease, rats and moles as serious pests which eat the corms, lack of research on potential for use of other floral parts besides the stigma; isolation of stigmas and sun drying affects the saffron colour.

Sud *et al.* (1999) stated that the corm rot of saffron (*Crocus sativus*), caused by *Fusarium solani* was found to be one of the major production constraints in Himachal Pradesh, India. Field trials were conducted during 1993-95 at the regional research sub-station, Sangla, Kinnaur to determine the efficacy of six fungicides for the management of corm rot. Out of the six fungicides (Blitox-copper oxychloride), Indofil M45 (mancozeb), Difolatan (captafol), foltaf (captafol), Bavistin (carbendazim) and Tecto (Thiabendazole) tested. Bavistin and Tecto @ 0.2 per cent as a dip or drench gave complete disease control.

Kalha *et al.* (2007) found that Post-harvest treatment of saffron is labour intensive and lack of skilled labourers is a major challenge in production of saffron in Kashmir-India. Post-harvest treatment of saffron from picking of flowers, separation of

stigmas and sun/shade drying is usually done by different family members (both young and older members) with varied levels of skills in handling procedures leading to degeneration in quality.

Zaki and Mantoo (2008) found that the percentage of infestation at Pampore area of Kashmir valley as 16.6per cent by *Helicotylenchus vulgaris*, 14.6 per cent by *Xiphinema*, 13.05per cent by *Tylenchus*, 10.7per cent by *Tylenchorynchus*, 8.8 per cent by *Pratylenchusthrornei*, 5.8 per cent by *Aphelenchusavenae* and 3.2 per cent by *Hemicriconemoides*. Thus, nematodes infestation has also become a major cause of concern owing to substantial production loss.

Chapter-4

Research Methodology

RESEARCH METHODOLOGY

4.1 Research methodology

A methodology is usually a guideline system for solving a problem, with specific components such as phases, tasks, methods, techniques and tools. The present investigation entitled “**Economic analysis of production and marketing of saffron in Jammu Region**” was carried out in 2020-2021. The sampling structure and techniques adopted during the course of investigation have been described in this chapter.

4.2 Locale of study

The study was conducted purposively in the Kishtwar District of J&K UT because Kishtwar is the only district where saffron is grown in Jammu province.

4.3 Collection of data

The primary data from growers of saffron was collected by survey method, using pre-tested structured schedule. Collection of the data was done by the personal interview method of saffron growers/farmers, various markets and contacting the different intermediaries involved in marketing and disposal of the saffron. Also, to study the various support services or market related information, various market functionaries, commission agents, wholesalers and retailers were selected randomly and the required information as well as data was obtained from them.

4.4 Sampling design

A multi stage sampling was adopted for the selection of samples. District, villages and saffron growers were first, second and third stage units, respectively. Kishtwar district of Jammu region was selected purposively because the district covers the maximum area under saffron cultivation and production as well. Ten villages were selected on basis of highest area under saffron cultivation. A total of 50 farmers were selected by proportionate method of sampling. 15 intermediaries of different categories involved in the marketing and supply chain of saffron were selected.

4.5 Data Analysis

4.5.1 Economic Analysis: The cost and returns analysis was worked out using CACP cost concepts like cost A₁, cost A₂, cost B₁, cost B₂, cost C₁, cost C₂ and cost C₃

Cost A₁ includes:

1. Wages of hired human labour
2. Value of hired bullock labour*
3. Value of owned bullock labour*
4. Value of owned machinery labour
5. Hired machinery charges
6. Value of seed (both farms produced and purchased)
7. Value of insecticides and pesticides
8. Value of manure (owned and purchased)
9. Value of fertilizer
10. Depreciation on implements and farm buildings
11. Irrigation charges
12. Land revenue and other taxes
13. Interest on working capital
14. Miscellaneous expenses

Cost A₂:

Cost A₁ + rent paid for leased-in land

Cost B₁:

Cost A₁ + interest on the value of owned fixed capital assets (excluding land).

Cost B₂:

Cost B₁ + rental value of owned land + rent paid for leased in land

Cost C₁:

Cost B₁ + imputed value of family labour

Cost C₂:

Cost B₂ + imputed value of family labour

Cost C₃:

Cost C₂ + value of management input (10 % of Cost C₂)

4.5.2 Marketing and Supply Chain Analysis

The following methodology was used for marketing and supply chain analysis:

4.5.2.1 Net Farmers Price: The net price received by the farmer has been estimated as the difference in gross price received and sum of marketing costs and value loss during harvesting, grading, transport and marketing.

$$\begin{aligned} \text{NPF} &= \text{GPF} - \{\text{CF} + (\text{LF} \times \text{GPF})\} \text{ or} \\ \text{NPF} &= \{\text{GPF}\} - \{\text{CF}\} - \{\text{LF} \times \text{GPF}\} \dots \dots \dots (1) \end{aligned}$$

Where NPF is net price received by the farmers (₹/10g),

GPF is gross price received by the farmers or wholesale price to farmers (₹/10g),

CF is the cost incurred by the farmers during marketing (₹/10g),

LF is physical loss in produce from harvest till it reaches assembly market (per g).

4.5.2.2 Marketing Margins: The margins of market intermediaries included profit and returns, which accrued to them for storage, the interest on capital and establishment after adjusting for the marketing loss due to handling.

Intermediaries Margin = Gross price (sale price) – Price paid (cost price) – Cost of marketing – Loss in value during wholesaling

Net marketing margin of the wholesaler is given mathematically by:

$$\begin{aligned} \text{MM}_w &= \text{GP}_w - \text{GPF} - \text{C}_w - (\text{L}_w \times \text{GP}_w) \text{ or} \\ \text{MM}_w &= \{\text{GP}_w - \text{GPF}\} - \{\text{C}_w\} - \{\text{L}_w \times \text{GP}_w\} \dots \dots \dots (2) \end{aligned}$$

Where, MM_w is net margin of the wholesaler (₹/10g),

GP_w is wholesaler's gross price to retailers or purchase price of retailer (₹/10g)

C_w is cost incurred by the wholesalers during marketing (₹/10g),

L_w is physical loss in the produce at the wholesale level (per g)

In the marketing chain, when more than one wholesaler is involved, i.e., primary wholesaler, secondary wholesaler, etc, then the total margin of the wholesaler is the sum of the margins of all wholesalers.

Mathematically, $\text{MM}_w = \text{MM}_{w1} + \dots \dots \dots + \text{MM}_{wi} + \dots \dots \dots + \text{MM}_{wn}$

Where MM_{wi} is the marketing margin of the i^{th} wholesaler.

Net marketing margin of retailer is given by:

$$\begin{aligned} \text{MMR} &= \text{GPR} - \text{GPW} - \text{CR} - (\text{LR} \times \text{GPR}) \text{ or} \\ \text{MMR} &= \{\text{GPR} - \text{GPW}\} - \{\text{CR}\} - \{\text{LR} \times \text{GPR}\} \dots \dots \dots (3) \end{aligned}$$

Where, MMR is net margin of the retailer (₹/10g), GPR is price at the retail market or purchase price of the consumers (₹/10g)

LR is physical loss in the produce at the retail level (per g),

CR is the cost incurred by the retailers during marketing (₹/10g).

The first bracketed term in equations (1), (2) and (3) indicates the gross return, while the second and third bracketed terms indicate respectively the cost and loss at different stages of marketing. Thus, the total marketing margin of the market intermediaries (MM) is calculated as:

$$MM = MM_w + MMR$$

Similarly, the total marketing cost (MC) incurred by the producer/ seller and by various intermediaries is calculated as

$$MC = CF + CW + CR$$

Total loss in the value of produce due to injury/ damage caused during handling of produce from the point of harvest till it reaches the consumers is estimated as

$$ML = \{LF \times GPF\} + \{LW \times GPW\} + \{LR \times GPR\}$$

4.5.2.3 Marketing Efficiency: Acharya's modified marketing efficiency formula (Acharya and Agarwal, 2001) was used for calculating marketing efficiency.

$$ME = \frac{NPF}{MM + MC + ML}$$

Where NPF is net price received by the farmers (₹/ 10g),

MM is the marketing margin,

MC is marketing cost,

ML is marketing loss.

4.5.3 For Export Analysis

Secondary data was collected from various published sources such as bulletins of the Ministry of Agriculture, Govt. of India, Directorate of Economics and Statistics, Govt. of India, Directorate of Economics and Statistics, Govt. of Jammu and Kashmir and Directorate of Horticulture Planning and Marketing, J&K Agricultural extension office, India-international Kashmir Saffron Trade Centre, district saffron office, Kishtwar and other websites.

4.5.4 Problem faced by saffron growers

In this technique, the percentage position of each rank obtained is converted into scores by referring to the table given by Henry Garret. Then for each factor the scores

of individual respondents are added together and divided by the total number of respondents for whom the scores are added.

Garret Ranking technique was used for problem analysis whose formula is given below:

$$\text{Per cent position} = 100 \cdot (R_{ij} - 0.5) / N_j$$

Where, R_{ij} stands rank given for the i^{th} factor ($i = 1, 2, \dots, 8$)

by the j^{th} individual ($j = 1, 2, \dots$ for urban and rural)

N_j stands for number of factors ranked by j^{th} individual.

4.5.5 Percentage analysis

Percentage refers to a special kind of ratio. It is used to make comparison between two or more series of data. They can be used to compare the relative items, the distribution of two or more series of data, since the percentage reduces everything to a common base and there by allow meaningful comparisons to be made.

Formula:

$$\text{Percentage} = (x/y) \times (100/1)$$

Where:

x = number of respondents respond

y = total number of respondents

Chapter-5

Results

RESULTS

The results pertaining to the present study have been presented in this chapter under the following headings:

5.1 Socio-demographic structure of saffron growers

5.1.1 Socio-demographic profile of farmers

5.1.2 Fixed resource structure

5.1.3 Livestock resource structure

5.2 Economic analysis of saffron cultivation

5.2.1 Cost of establishment of saffron

5.2.2 Year and operation wise cost of cultivation of saffron

5.2.3 Item wise cost of cultivation of saffron

5.2.4 Cost concept wise cost of cultivation of saffron

5.2.5 Income and cost concept wise economics of saffron cultivation

5.2.6 Cost and returns of saffron

5.3 Marketing and supply chain analysis of saffron

5.3.1 Distribution of saffron through different channels in kg

5.3.2 Channel wise distribution of marketing cost components for saffron (₹/10g)

5.3.3 Price spread of Saffron under different marketing channels in (₹/10g)

5.3.4 Marketing efficiency of different channels of saffron

5.4 Export status of Indian saffron

5.4.1 Top importing countries of Indian saffron

5.4.2 Year wise export of Indian saffron

5.4.3 Top ports for export of Indian saffron, 2020

5.5 Constraints faced by saffron farmers

5.5.1 Production constraints

5.5.2 Marketing constraints

5.1 Resource structure of sampled saffron farms

The provision of resources and pattern for use on sample farms was studied by assessing age, gender, qualification and income of the farmers from saffron. The structure of farm resources determines the total value of inputs and outputs and the relationships between them. Therefore, studying the structure of farm resources is important in the proper analysis of the farm economy to know the economics of individual businesses. An important indicator that leads to the creation of a farmer's income is the pattern and size of investment in livestock services and other planned services for farm businesses. The term livestock includes bullocks, cows, buffaloes and sheep used on a farm. The amount of planned resources and livestock was calculated using current values.

5.1.1 Socio-demographic profile of farmers

Socio-demographic profile of farmers of study area is presented in Table 5.1.

Table 5.1. Socio-demographic profile of saffron farmers

S.No.	Demographic	Factors	No. of Farmers	Per centage
1.	Age	15-30	9	18.00
		30-45	19	38.00
		45-60	16	32.00
		Above 60	6	12.00
2.	Gender	Male	44	88.00
		Female	6	12.00
3.	Qualification	Primary	6	12.00
		Middle	5	10.00
		Matriculate	8	16.00
		Intermediate	8	16.00
		Graduate	6	12.00
		Diploma	2	4.00
4.	Income from Saffron	Illiterate	15	30.00
		<50000	27	54.00
		50000-100000	16	32.00
		100000-150000	4	8.00
		150000-200000	3	6.00

The table revealed that maximum number of farmers i.e., 38 per cent fall into the age group of 30-45 years followed by 32 per cent in the age group of 45-60 years, 18 per cent in the age group of 15 to 30 years and 12 per cent in the age group of above 60 years. It was found that out of the 50 farmers, 88 per cent were male and only 12 per cent were female.

Literacy is critical to the economic and social well-being of individuals and communities. Literacy is a common feature of the adoption of modern and advanced farming technologies. The level of direct education directly or indirectly affects the farmer's response to improved technology and market performance since enlightened farmers have a higher incentive to make effective management decisions and earn more money. Table 5.1 also depicts that 30 per cent of farmers were illiterate, 16 per cent were matriculate, 16 per cent have passed intermediate level of education, 12 per cent of farmers attended elementary school and 12 per cent of them were graduate. Only 4 per cent of farmers had an electrical diploma.

The table also shows that 54 per cent of farmers were earning less than ₹50,000 per annum in the 2020 season due to low saffron production because of unavailability of irrigation. Thirty-two per cent had an annual income between ₹50,000 to ₹1,00,000. Eight per cent and 6 per cent had annual income between ₹1,00,000 to ₹1,50,000 and ₹1,50,000 to ₹2,00,000, respectively.

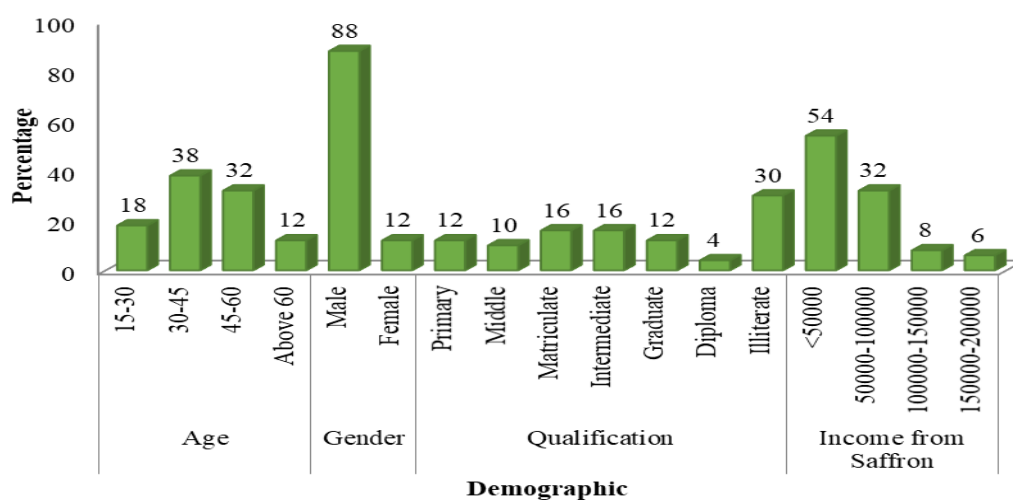


Fig. 5.1: Socio-demographic profile of saffron farmers.

5.1.2 Fixed resource structure

Table 5.2 depicts the farm inventories of the farmers of the study area. This reveals that there were 12 farmers who were having power tiller with average present value of ₹42,667 and were having ₹2,500 depreciation on it. 16 families in the study area were having chaff cutter with average present value of ₹2,937 and depreciation

on it was calculated as ₹228. As the attack of insect/pests was low in the area, hence only 6 farmers were having sprayers which had a present value of ₹1600 and a depreciation of ₹36.93.

Table 5.2. Farm inventories of the farmers

Equipment	Total number	Average present value (₹)	Depreciation (₹)
Power Tiller	12	42667	2500
Chaff Cutter	16	2937	228
Sprayer	6	1600	36

5.1.3 Livestock resource structure

Table 5.3 represents the livestock resource structures of the farmers of the study area.

Table 5.3. Livestock of farmers

Livestock	Total No.	Present Value (₹)
Bullock	24	24791.67
Cow	33	16666.67
Buffalo	22	19181.82
Sheep	62	4435.48

There were total 24 bullocks, 33 cows, 22 buffaloes, and 62 sheep with average present value of ₹24,792/bullock, ₹16,667/cow, ₹19182/buffalo and ₹4435/sheep, respectively.

5.2 Economic analysis of saffron

5.2.1 Cost of establishment of saffron

Saffron is a perennial crop with lifespan of 4 years. The detailed per hectare cost of establishment for 1st year of saffron cultivation is given in Table 5.4. It is revealed from the table that the total cost of establishment was ₹5,60,051/ha. Sowing is the important operation contributing about 68.06 per cent of the total cost. The other important operations were application of farm yard manure, interculture which contributed 2.45 per cent i.e. ₹13,698/ha and 6.70 per cent i.e. ₹37518/ha, respectively to the total cost. Two ploughings and one planking is done for land preparation for the corms which contribute 3.64 per cent of the total cost. It was found that 68.06 per cent i.e. ₹3,81,145/ha of expenditure is incurred in planting of corms. Interest on working capital contributes about 2.39 per cent i.e. ₹20402/ha of total cost. As the fixed cost

assumed to be constant during entire span of crop therefore only rental value of land and depreciation are included as the item of fixed cost which occupies 13.39 per cent i.e. ₹75000/ha and 1.00 per cent i.e. ₹5621/ha of the total cost, respectively. Interest on fixed capital @ 11 per cent of fixed cost contributed 1.58 per cent i.e. ₹8868/ha to the total cost of establishment.

Table 5.4. Cost of establishment of saffron (₹/ha)

S.No.	Name of operation	Cost (₹)
1.	Land Preparation	20403 (3.64)
2.	Farm Yard Manure	13,699 (2.45)
3 (i).	Cost of corms	381145 (68.06)
(ii).	Family labour used for sowing corms	4834 (0.86)
4.	Intercultural operations	37518 (6.70)
5.	Interest on working capital @ 7 per cent	12963 (2.31)
A.	Total Variable Cost (1-5)	470562 (84.02)
6.	Rental value of land	75000 (13.39)
7.	Depreciation	5621 (1.00)
8.	Interest on fixed capital @ 11 per cent	8868 (1.58)
B.	Total Fixed Cost	89489 (15.98)
9.	Total Establishment Cost (A+B)	560051 (100)

Note: Figures in the parenthesis are percentage of the total value

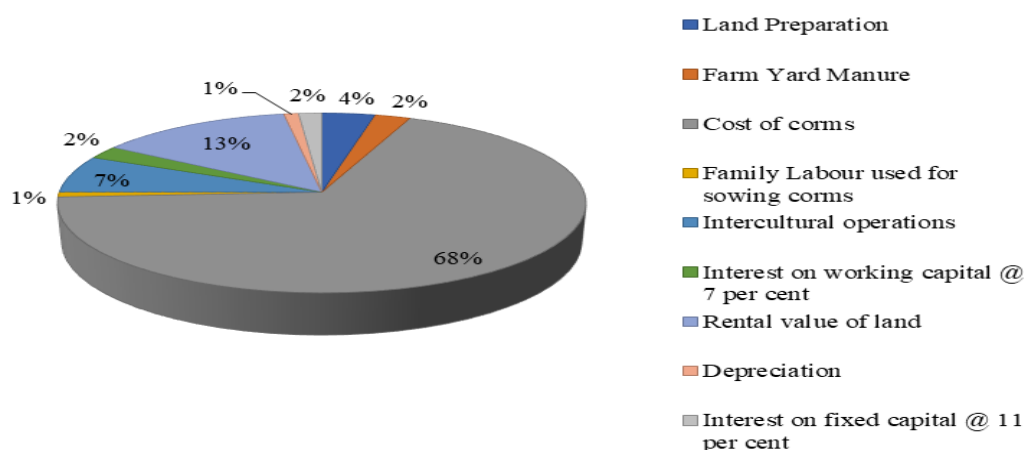


Fig. 5.2: Cost of Establishment of saffron

5.2.2 Year and operation wise cost of cultivation of saffron

The detailed year and operation wise cost of cultivation per hectare of saffron is given below in the table 5.5. It was observed that 80.11 per cent i.e. ₹579120 of the total cost of cultivation of saffron was cost incurred in 1st year whereas 5.74 per cent each during 2nd year and 3rd year and 8.41 per cent during 4th year contributed to the cost of cultivation of saffron.

Table 5.5. Year and operation wise cost of cultivation of saffron (₹/ha)

S.No.	Name of operation	Ist Year Cost ₹/ha	IInd Year Cost ₹/ha	IIIrd Year Cost ₹/ha	IVth Year Cost ₹/ha
1	Land preparation	20403	0.00	0.00	0.00
2	Farm yard manure	13,699	0.00	0.00	0.00
3.(i)	Cost of corms	381145	0.00	0.00	0.00
(ii)	Family labour	4834	0.00	0.00	0.00
4	Intercultural operations	37518	37518	37518	37518
5	Picking	0.00	0.00	0.00	17405
6	Interest on working capital	12963	2626	2626	3844
A	Total variable cost (1-6)	470562	40144	40144	58768
7	Rental value of land	75000	0.00	0.00	0.00
8	Depreciation	5621	0.00	0.00	0.00
9	Interest on fixed capital	8868	0.00	0.00	0.00
B	Total fixed cost	89490	0.00	0.00	0.00
10	Total Cost (A+B)	579120 (80.11)	40144 (5.74)	40144 (5.74)	58768 (8.41)

Note: Figures in the parenthesis are percentage of the total value

5.2.3 Item wise cost of cultivation of saffron

The detailed item wise cost of cultivation of saffron for 4 years is given below in the Table 5.6. This table revealed that per hectare total cost of cultivation of saffron in Kishtwar is ₹7,18,176. Expenditure on family labour, machine labour, corms and farm yard manure (FYM) were the important component of item wise cost which contributed 26.23 per cent, 0.61 per cent 53.07 per cent, 1.91 per cent to the total cost, respectively.

Table 5.6. Item wise cost of cultivation of saffron

S.No.	Particulars	Cost (₹/ha)
1	Machine labour	
(i)	Owned	4,351
(ii)	Hired	0.00
	Total machine labour	4,351 (0.61)
2	Human labour	
(i)	Hired labour	0.00
(ii)	Family labour	1,88,363
	Total human labour	1,88,363 (26.23)
3	Cost of corms	3,81,145 (53.07)
4	Farm yard manure	13,699 (1.91)
5	Interest on working capital	41,129 (5.73)
	Subtotal (A) (from 1 to 05)	6,28,687 (87.54)
	Fixed Cost	
6	Rental value of owned land	75,000 (10.44)
7	Depreciation	5,621 (0.78)
8	Interest on fixed capital	8,868 (1.23)
	Sub –Total (B) (from 8 to 10)	89,489 (12.46)
	Total cost (A +B)	7,18,176 (100.00)

Note: Figures in the parenthesis are percentage of the total value

Similarly, rental value of owned land was the most important component of fixed cost contributing 10.44 per cent to the total cost. The results further revealed that out of all the inputs used, the expenditure incurred on corms was found to be highest i.e. ₹381144/ha followed by human labour i.e. ₹1,88,362/ha. However, the variable cost was ₹6,28,687. per hectare and fixed cost was ₹89490 per hectare which constituted 87.54 per cent and 12.46 per cent of total cost, respectively.

5.2.4 Cost concept wise cost of cultivation of saffron

In order to view of the cost of cultivation of saffron, various cost concepts were worked out on per hectare basis are presented in Table 5.7. The table revealed that per hectare cost A₁ on saffron farms was ₹4,45,545. Cost A₂ was ₹4,45,945 as there was no payment for leased in land. Similarly, per hectare cost B₁ was ₹4,54,813 whereas cost B₂ was ₹5,29,813. The per hectare cost C₁ was ₹6,43,176 as the saffron farmers are skilled in saffron cultivation and therefore only family is indulged in its cultivation. The per hectare cost C₂ was ₹7,18,716. After working out managerial cost, i.e. 10 per cent of cost C₂, per hectare cost C₃ found to be ₹7,89,993. Saffron is highly labour intensive crop and its planting material is expensive therefore, its cost of cultivation is very high.

Table 5.7. Cost concept wise cost of cultivation of saffron

Particulars	Cost in ₹/ha
Cost – A₁	
Machine labour	4,351
Hired labour	0.00
Corms	3,81,145
Farm Yard Manure	13,699
Depreciation	5,621
Interest on working capital	41,129
Total Cost - A ₁	4,45,945
Cost – A₂	
Cost – A ₁	4,45,945
Rent paid for leased in land	0.00
Total Cost - A ₂	4,45,945
Cost – B₁	
Cost – A ₁	4,45,945
Interest on fixed capital (excluding land)	8868
Total Cost – B ₁	4,54,813
Cost – B₂	

Cost – B ₁	4,54,813
Rental value of owned land	75,000.00
Total cost – B ₂	5,29,813
Cost – C₁	
Cost – B ₁	4,54,813
Family Labour	1,88,363
Total cost – C ₁	6,43,176
Cost – C₂	
Cost – B ₂	5,29,813
Family Labour	1,88,363
Total cost – C ₂	7,18,176
Cost C₃	
Cost C ₂	7,18,176
Cost of Management (10 per cent of Cost – C ₂)	71,818
Total cost – C ₃	7,89,994

5.2.5 Income and cost concept wise economics of saffron cultivation

Income and cost concept wise economics of saffron is presented in table 5.8. The table revealed that per hectare cost A₁ on saffron farms was ₹4,45,545. Cost A₂ was ₹4,45,945 as there was no payment for leased in land. Similarly, per hectare cost B₁ was ₹4,54,813 whereas cost B₂ was ₹5,29,813 The per hectare cost C₁ was ₹6,43,176 as the saffron farmers are skilled in saffron cultivation and therefore only family is indulged in its cultivation. The per hectare cost C₂ was ₹7,18,716.

Table 5.8. Income and cost concept wise economics of saffron cultivation

Gross income (₹/hectare)	18,32,973.40
Net Income over cost (₹/hectare)	
Cost A ₁	13,87,028.50
Cost A ₂	13,87,028.50
Cost B ₁	13,78,137.97
Cost B ₂	13,02,935.87
Cost C ₁	11,89,775.01
Cost C ₂	11,14,573.01
Cost C ₃	10,42,732.97
Cost - Benefit Ratio	
Cost A ₁	1:4.1
Cost A ₂	1:4.1
Cost B ₁	1:4.0
Cost B ₂	1:3.5
Cost C ₁	1:2.8
Cost C ₂	1:2.6
Cost C ₃	1:2.3

After working out managerial cost, i.e. 10 per cent of cost C₂, per hectare cost C₃ found to be ₹7,89,993. Saffron is highly labour intensive crop and its planting

material is expensive therefore, its cost of cultivation is very high. Overall net returns of saffron cultivation over cost A₁, cost A₂, cost B₁, cost B₂, cost C₁, cost C₂ and cost C₃ were ₹13,87,028/ha, ₹13,87,028/ha, ₹13,78,138/ha, ₹13,02,936/ha, ₹11,89,775/ha, ₹11,14,573/ha and ₹10,42,734/ha respectively. The return per rupee investment on all farms over cost A₁, cost A₂, cost B₁, cost B₂, cost C₁, cost C₂ and cost C₃ were ₹4.10, ₹4.10, ₹4.00, ₹3.50, ₹2.80, ₹2.60 and ₹2.30, respectively. In spite of its high cost of cultivation, saffron fetches good returns to the farmers as its price in both domestic and international market is high.

5.2.6 Cost and returns of saffron

Cost and return analysis of saffron on per hectare basis on all the sampled farms were analysed and are presented in table 5.9. The table revealed that, the total cost of cultivation of saffron was found to be ₹7,18,176 per hectare. Gross returns of saffron were calculated as ₹18,32,973 per hectare which includes saffron guchi and daughter corms which are produced after 4 years of wait and hard work. The net returns were realized as, ₹11,14,573 per hectare and Cost – Benefit ratio has found to be 1:2.6 which is pretty good.

Table 5.9. Cost and returns of saffron

S.No.	Particulars	₹
1.	Cost (₹/ha)	
	Total variable cost	6,28,686
	Total fixed cost	89,489
	Total cost	7,18,176
2.	Yield (kg)	
	Saffron Gucci	15.72
	Price (₹/kg)	190000
	Corms (qtl.)	180
	Price (₹/qtl.)	15000
3.	Returns (₹/ha)	
	Gross returns	18,32,973
	Net returns	11,14,573
	Cost – Benefit Ratio	1:2.6

5.3 Marketing and supply chain analysis of saffron

Marketing is the most vital activity after production of any kind of commodity. One can get returns on his produce only after it is marketed.

5.3.1 Distribution of saffron through different channels

The marketing channel comprises of chain of various intermediaries like wholesalers, retailers and sometimes direct sale of produce help in distribution of saffron from the farmers to ultimate consumers. The channels identified during the study are depicted in the Table 5.10.

Table 5.10. Marketing channels of saffron and quantity distributed through different channels

Channel No.	Marketing channels	Quantity in kg
Channel I	Farmer - Consumer	2.5 (6.67)
Channel II	Farmer – Wholesaler (Kishtwar) – Wholesaler (Amritsar) - Retailer – Consumer	31.7 (84.53)
Channel III	Farmer - Retailer (Kishtwar) - Consumer	3.3 (8.80)
	Total	37.5 (100.00)

Note: Figures in the parenthesis are percentage of the total value

The table shows that three channels were identified in the study area and the farmers mostly sell their produce through channel II i.e. farmer – wholesaler of Kishtwar – wholesaler of Amritsar – retailer – consumer which is 84.53 per cent of the total produce followed by channel III i.e. farmer – retailer (Kishtwar) – consumer which is 8.80 per cent of the total produce. Only 6.67 per cent of the total produce is sold directly to consumers by farmers.

5.3.2 Channel wise distribution of marketing cost components for saffron

The Table 5.11 presents the distribution of marketing cost incurred in different channels for disposal of saffron. The table shows that the highest marketing cost ₹251.55/10g was found in channel II followed by ₹35.45/10g and ₹5.00/10g in channel III and channel I, respectively. In this channel marketing cost incurred by producer was ₹10.00/10g saffron which include transportation cost and packaging cost of saffron. The farmers sell their produce to the only available wholesaler in the market viz. Dhani Ram market of Kishtwar. The wholesaler then sells the produce to another wholesaler in Amritsar. The marketing cost of wholesaler in Amritsar was ₹201.00/10g saffron which includes transportation cost, cost of branding and labour engaged in labelling the boxes. Marketing cost incurred at retailer level was calculated as ₹40.55/10g saffron. Marketing cost of only ₹5.00/10g is incurred by

producer in channel I as there is direct selling of saffron to the consumers. In channel III, the wholesalers in Dhani Ram market are the retailers of saffron too.

Table 5.11. Channel wise distribution of marketing cost components for saffron (₹/10g)

Functionary	Channel 1	Channel 2	Channel 3
Marketing cost incurred at producer level	5.00	10.00	10.00
1. Transportation cost	0.00	5.00	5.00
2. Labour engaged	0.00	0.00	0.00
3. Cost of Boxes	5.00	5.00	5.00
Marketing cost incurred at wholesaler level (Kishtwar)	0.00	0.00	0.00
1. Transportation cost	0.00	0.00	0.00
2. Cost of boxes	0.00	0.00	0.00
3. Labour engaged	0.00	0.00	0.00
Marketing cost incurred at wholesaler level (Amritsar)	0.00	201.00	0.00
1. Transportation cost	0.00	200.00	0.00
2. Cost of boxes	0.00	0.00	0.00
3. Cost of Branding	0.00	0.50	0.00
4. Labour engaged	0.00	0.50	0.00
Marketing cost incurred at retailer level	0.00	40.55	25.45
1. Transportation cost	0.00	10.00	0.00
2. Cost of boxes	0.00	0.00	0.00
3. Shop charges	0.00	30.55	25.45
Total marketing costs	5.00	251.55	35.45

The local consumers who do not buy saffron directly from farmers buy from these retailers. The total marketing cost in this channel was worked out to be ₹35.45/10g saffron. This includes packaging and transportation cost incurred by producer and shop rent given by the retailer.

5.3.3 Price spread of saffron under different marketing channels

The price spread is the gap between price paid by the consumer and the price received by the farmer at a particular time because from the producer, it has to pass through various agencies before it reaches the final consumer. The price spread as per cent of consumers' rupee for different marketing functionaries of saffron under different marketing channels is presented in Table 5.12. This table reveals that the saffron growers of Kishtwar received the net price of ₹1995.00/10g, ₹1890.00/10g and ₹1890.00/10g which were 99.75 per cent, 75.60 per cent and 94.50 per cent of the price paid by the consumer for channel I, II and III respectively.

Table 5.12. Price spread of saffron under different marketing channels (₹/10g)

Particulars	Channel 1	Channel 2	Channel 3
Net price received by the producer	1995.00	1890.00	1890.00
Marketing cost incurred by the producer	5.00	10.00	10.00
Marketing loss of the producer	0.00	0.00	0.00
Producers sale price/ Wholesaler's (Kishtwar) purchase price	2000.00	1900.00	1900.00
Marketing cost incurred by the wholesaler	0.00	0.00	0.00
Marketing loss of wholesaler (Kishtwar)	0.00	7.00	0.00
Marketing margin of the wholesaler (Kishtwar)	0.00	93.00	0.00
Wholesaler's (Kishtwar) sale price/ Wholesaler's (Amritsar) purchase price	0.00	2000.00	0.00
Marketing cost incurred by the wholesaler	0.00	201.00	0.00
Marketing loss of the wholesaler (Amritsar)	0.00	50.00	0.00
Marketing margin of the wholesaler (Amritsar)	0.00	149.00	0.00
Wholesaler's (Amritsar) sale price	0.00	2400.00	0.00
Marketing cost incurred by the retailer	0.00	40.55	25.45
Marketing loss of retailer	0.00	10.00	5.00
Marketing margin of the retailer	0.00	49.45	69.55
Retailer's sale price	0.00	2500.00	2000.00
Price paid by the consumer	2000.00	2500.00	2000.00
Producer's share in consumer's rupee	99.75	75.60	94.50
Total marketing margin	0.00	291.45	69.55
Total marketing loss	0.00	67.00	5.00

The producers' sale price of saffron was ₹2000/10g in channel I while it was ₹1900.00/10g in channel II and ₹1900.00/10g in channel III. The table further revealed that the per 10g marketing cost incurred by producer was maximum in channels II and III i.e. ₹10.00/10g of saffron.

The marketing cost of wholesaler in Kishtwar is ₹0.00 in all the three channels but a loss of ₹7.00/10g of saffron was incurred by him. The Kishtwar wholesalers' sale price to the Amritsar wholesaler was ₹2,000.00/10g. Marketing cost incurred by wholesaler in Amritsar was ₹201.00/10g whereas the marketing loss was ₹50.00/10g. The selling price to the retailer was ₹2400.00/10g.

The marketing cost of retailer in channel II and III is ₹40.55/10g and ₹25.45/10g respectively. Marketing loss of ₹10.00/10g and ₹5.00/10g was calculated in channel II and III. The retailers' selling price for 10g saffron to the consumers was ₹2500.00 and ₹2000.00 in channel II and III.

There was no marketing margin in channel I because the farmers were selling the saffron directly to the consumers. In channel II, the total marketing margin per 10g of saffron was worked out to be ₹291.45 out of which 31.91 per cent i.e. ₹93.00 was of wholesaler of Kishtwar, 51.12 per cent i.e. ₹149.00 was of wholesaler of Amritsar and lastly 16.97 per cent i.e. ₹49.45 was of retailer. In channel III, the total marketing margin was worked out to be ₹69.55/10g and it was completely of retailer. The highest marketing margin per 10 g of saffron was observed in channel II followed by channel III and II. Channel I is the most efficient channel for gaining maximum profit to the farmer but Channel II is more efficient in selling bulk quantity of saffron. The marketing loss incurred in channel II and III is ₹67.00/10g and ₹5.00/10g, respectively.

5.3.4 Marketing efficiency of different channels of saffron

The marketing efficiency is an important tool and therefore requires more attention. The marketing efficiency of different marketing channels of saffron distribution is shown in table 5.13. The net price received by the farmer in channel I is ₹1995.00 and the marketing efficiency of this channel was maximum i.e. 399.00 as there is neither marketing margin nor marketing loss and only ₹5.00/10g is the marketing cost. The net price received by the farmer in channel II and III is ₹1890.00/10g of saffron. The second highest marketing efficiency was of Channel III which was worked out to be 17.18 with a total marketing margin of ₹69.55, marketing loss of ₹5.00/10g.

Table 5.13. Marketing efficiency of different channels of distribution of saffron

Particulars	Channel I	Channel II	Channel III
Net price received by the farmer	1995.00	1890.00	1890.00
Marketing margin	0.00	291.45	69.55
Marketing cost	5.00	251.55	35.45
Marketing loss	0.00	67.00	5.00
Marketing efficiency	399.00	3.09	17.18

The marketing efficiency of channel II was worked out to be 3.09 as highest marketing margin, maximum marketing loss and maximum marketing cost was in this channel. Hence, we can infer that channel I is the most efficient channel but Channel

It is more efficient in selling bulk quantity of saffron to geographically distant consumers

5.4 Export status of Indian saffron

5.4.1 Top importing countries of Indian saffron

Saffron of India has the maximum crocin content i.e. 13-13.5 per cent hence it is the world's best saffron. It is famous for its quality and hence fetches a good price in international market. The Table 5.14 depicts the list of top five importing countries of Indian saffron in the year 2020.

Table 5.14. Top importing countries of Indian saffron in the year 2020

Country	Value (USD Million)
United Arab Emirates	0.74
USA	0.1
Australia	0.08
Nepal	0.07
Canada	0.04

(Source: APEDA)

Table 5.14 shows that United Arab Emirates is the largest importer of Indian saffron with an import of \$0.74 million. USA is the 2nd largest importer of Indian saffron with an import value of \$0.1 million. Australia, Nepal and Canada hold the 3rd, 4th and 5th position in importing saffron from India with a value of \$0.08 million, \$0.07 million and \$0.04 million respectively.

5.4.2 Year wise export of Indian saffron

The following table 5.15 depicts the export data of saffron in the past 12 years. As table shows that in the year 2011 India did maximum export of saffron with a value of \$1.90 million followed by year 2012 and 2013 with total export value of \$1.73 million. This table also reveals that there has been a decline in export of saffron subsequently till 2019. This was due to decline in production of saffron in India. For addressing these issues, Government of India has taken initiatives like National Saffron Mission (NSM) to promote the knowledge of saffron cultivation and get maximum yield out of minimum inputs and further increase the export of quality saffron.

Table 5.15. Year wise export of Indian saffron

S.No.	Year	Value US Dollar (Million)
1.	2009	1.27
2.	2010	1.38
3.	2011	1.90
4.	2012	1.73
5.	2013	1.73
6.	2014	1.62
7.	2015	1.59
8.	2016	1.57
9.	2017	1.01
10.	2018	0.94
11	2019	0.86
12.	2020	1.3

(Source: APEDA)

5.4.3 Top ports for export of Indian saffron

Top five ports from where Indian saffron was exported in the year 2020 are depicted in the table 5.16 below. The table shows that maximum saffron of worth ₹51 lakh is exported from Mundra port which is located in Gujrat followed by Nhava Sheva seaport of Navi Mumbai (Maharashtra), Delhi Air Cargo of Delhi, Chennai Seaport of Tamil Nadu and Ankleshwar port of Gujrat with a value of ₹35.30 lakh, ₹23.00 lakh, ₹13.30 lakh and ₹10.50 lakh, respectively.

Table 5.16. Top ports for export of Indian saffron in the year 2020

S.No.	Port	Value ₹ (lakh)
1.	Mundra	51.50
2.	Nhava Sheva Seaport	35.30
3.	Delhi Air Cargo	23.00
4.	Chennai Seaport	13.30
5.	Ankleshwar	10.50

(Source: APEDA)

5.5 Constraints faced by saffron farmers**5.5.1 Production constraints**

The problems faced by saffron farmers of the study in the cultivation of saffron were analysed using Garret ranking technique and are presented in the Table

5.17. Unavailability of skilled labour is the biggest problem faced by the majority of farmers followed by costly inputs with average garret score of 75.72 and 75.28. The major reason of decline in production of saffron was lack of assured irrigation as the area is totally rainfed, hence it is ranked 3rd with mean garret score of 55.60. The most common disease in the saffron fields was corm rot of saffron but the disease infestation was low. Hence, it is ranked 4th with average garret score of 55.42. There was a lack of financial sources for the farmers for the cultivation of saffron therefore, this constraint is ranked 5th with mean garret score of 54.78. There was non-availability of quality control laboratory for checking the quality of saffron produced by the farmers of Kishtwar. Hence, it is ranked 6th with average garret score of 54.48. Porcupine was the stray animal which damaged the corms of saffron but only to some extent therefore, it is ranked 7th with average garret score of 34.94. Lack of scientific knowledge of saffron cultivation, depletion of nutrients in land and lack of improved varieties are ranked 8th, 9th and 10th with average garret score of 34.06, 33.32 and 24.40, respectively.

Table 5.17. Garret ranking for production constraints faced by saffron farmers of study area

Problem	Garret Score	Mean Garret Score	Rank
Unavailability of skilled labour	1747	75.72	1
Costly inputs	3764	75.28	2
Lack of assured irrigation	2724	55.60	3
Attack by insect pests/diseases	2780	55.42	4
Lack of financial resources	1220	54.78	5
Lack of quality control laboratory	3786	54.48	6
Crop damage by stray animals	2771	34.94	7
Lack of scientific knowledge of saffron cultivation	2739	34.06	8
Depletion of nutrients in the land	1703	33.32	9
Lack of improved varieties	1666	24.40	10

5.5.2 Marketing constraints

The problems faced by saffron farmers in its marketing were analysed using Garret ranking technique and are depicted in the Table 5.18. Lack of organised market was the major problem faced by majority of farmers which stood on rank 1st with mean garret score of 76.60 followed by lack of market information with average

garret score of 74.40 and 75.28. With passing time, the quality of saffron deteriorates even after its proper packaging, hence it is ranked 3rd with mean garret score of 61.00. Another common problem which was observed in marketing of saffron was malpractices done by traders. Hence, it is ranked 4th with average garret score of 60.00. There was non-availability of grading facilities for saffron therefore, this constraint is ranked 5th with mean garret score of 50.40. Delayed payments were made to the farmers by the traders as saffron was being sold in Amritsar which is very far away from Kishtwar. Hence, it is ranked 6th with average garret score of 49.60. There was a massive lack of government support for the betterment of saffron and saffron growers as said by many farmers therefore, it is ranked 7th with average garret score of 40.00. Lack of assured MSP, prevalence of low prices in local markets high transportation cost were ranked 8th, 9th and 10th by majority of farmers with average garret score of 39.00, 24.60, 22.40, respectively.

Table 5.18 Garret ranking for marketing constraints faced by saffron growers of study area

Problem	Garret Score	Mean Garret Score	Rank
Lack of organised markets	2520	76.60	1
Lack of market information	2000	74.40	2
Quality deterioration	3050	61.00	3
Malpractices by traders	1950	60.00	4
Non availability of grading facilities	3830	50.40	5
Delayed payments by traders	1230	49.60	6
Lack of government support	1120	40.00	7
Lack of assured MSP	3720	39.00	8
Prevalence of low prices in local markets	2480	24.60	9
High transportation cost	3000	22.40	10

Chapter-6

Discussion

DISCUSSION

The results obtained after analysis of data are discussed in this chapter.

6.1 Economic analysis of saffron cultivation

Saffron has a life span of 4 to 5 years therefore, cost of establishment of saffron farm was calculated which was ₹5,60,051/ha. The most expensive input was the saffron corm which contributed 68 per cent to the total cost. Saffron is a slow growing crop hence it gives maximum returns in the final 4th year. Cost of 2 weedings in a year is the maintenance cost of saffron farms for 2nd and 3rd year. It was observed that 80.11 per cent of the total cost of cultivation of saffron was cost incurred in 1st year as it is the cost of establishment. Cost in 2nd year and 3rd year contributed 5.74 per cent each to the total cost of cultivation. Two weedings were done in a year. Picking of saffron is another vital operation which contributes 8.41 per cent to the cost of cultivation of saffron. Picking was done in the morning hours before sunlight appears. Digging out of daughter corms and drying of saffron was also done during picking. Shade drying was the most common method used for drying saffron for upholding its quality. Total cost of cultivation of saffron in Kishtwar is ₹7,18,176/ha. The results further revealed that out of all the inputs used, the expenditure incurred on corms was found to be highest i.e. ₹381145/ha followed by human labour i.e. ₹1,88,363/ha. However, the variable cost was ₹6,28,687 per hectare and fixed cost was ₹89490 per hectare which constituted 87.54 per cent and 12.46 per cent of total cost, respectively. Gross returns of saffron were calculated as ₹18,32,973 per hectare which includes saffron guchhi and daughter corms which are produced after 4 years of wait and hard work. The net returns i.e. Gross returns – Total cost were realized as, ₹11,14,573 per hectare. This on calculation gave a Cost – Benefit ratio of 1:2.6 which is pretty good. The overall cost of cultivation of saffron was estimated as ₹263139/ha for 9 years and net returns comes out to ₹412710 giving a cost benefit ratio of 1:2.57 by Dwivedi and Singh in 2010.

6.2 Marketing and supply chain analysis of saffron

The farmers mostly sell their produce through channel II i.e. farmer – wholesaler of Kishtwar – wholesaler of Amritsar – retailer – consumer which is 84.53 per cent of the total produce followed by channel III i.e. farmer – retailer (Kishtwar) – consumer which is 8.80 per cent of the total produce. Only 6.67 per cent of the total produce is sold directly to consumers by farmers. The highest marketing cost was ₹251.55/10g saffron of channel II. In channel II, the total marketing margin per 10g of saffron was worked out to be ₹291.45 out of which 31.91 per cent i.e. ₹93.00 was of wholesaler of Kishtwar, 51.12 per cent i.e. ₹149.00 was of wholesaler of Amritsar and lastly 16.97 per cent i.e. ₹49.45 was of retailer. The net price received by the farmer in channel I is ₹1995.00 and the marketing efficiency of this channel was maximum i.e. 399.00 as there is neither marketing margin nor marketing loss and only ₹5.00/10g is the marketing cost. The marketing efficiency of channel II was worked out to be 3.09 as highest marketing margin, maximum marketing loss and maximum marketing cost was in this channel. Hence, we can infer that channel I is the most efficient channel but Channel II is more efficient in selling bulk quantity of saffron. We can see a different scenario in marketing margins as usually retailer margin is always higher than the wholesaler margin. This is due to high transportation cost for

6.3 Export status of Indian saffron

United Arab Emirates is the largest importer of Indian saffron with an import of \$0.74 million. USA is the 2nd largest importer of Indian saffron with an import value of \$0.1 million. In the year 2011 India did maximum export of saffron which valued around \$1.90 million followed by year 2012 and 2013 with total export value of \$1.73 million. This table also reveals that there has been a decline in export of saffron subsequently till 2019. This was due to decline in production of saffron in India. For addressing these issues, government of India has taken initiatives like National Saffron Mission (NSM) to promote the knowledge of saffron cultivation and get maximum yield out of minimum inputs and further increase the export of quality saffron. Maximum saffron of worth ₹51 lakh is exported from Mundra port which is located in Gujrat followed by Nhava Sheva seaport of Navi Mumbai (Maharashtra), Delhi Air Cargo of Delhi, Chennai

Seaport of Tamil Nadu and Ankleshwar port of Gujrat with a value of ₹35.30 lakh, ₹23.00 lakh, ₹13.30 lakh and 10.50 lakh respectively.

6.4 Constraints faced by saffron farmers

Unavailability of labour is the biggest problem faced by the majority of farmers followed by costly inputs with average garret score of 75.72 and 75.28. The major reason of decline in production of saffron was lack of assured irrigation as the area is totally rainfed hence it is ranked 3rd with mean garret score of 55.60. Lack of organised market was the major problem faced by majority of farmers which stood on rank 1st with mean garret score of 76.60 followed by lack of market information with average garret score of 74.40 and 75.28. With passing time, the quality of saffron deteriorates even after its proper packaging, hence it is ranked 3rd with mean garret score of 61.00.

Chapter-7

Summary and Conclusions

SUMMARY AND CONCLUSIONS

7.1 Summary

The study entitled “**Economic analysis of production and marketing of saffron in Jammu region**” was conducted in the Kishtwar District of J&K UT. The list of saffron growing villages was collected from the District Saffron Office, Kishtwar and 10 villages on the basis of highest area were selected. Using proportional method, 50 farmers were selected from the different villages. Data related to marketing of saffron was collected from 15 intermediaries involved in its marketing.

7.1.1 To study the economic analysis of saffron production

After the Economic Analysis we found that the total per hectare cost of cultivation of Saffron in Kishtwar district of J&K is ₹7,18,176/ha and the net return was ₹11,14,573/ha Hence, giving a cost benefit ratio of 1:2.6. Despite of high cost of cultivation, saffron has given outstanding returns.

7.1.2 To analyse marketing and supply chain of saffron

Nevertheless, the net price received by the farmer in selling it directly to consumers is highest i.e. ₹1995/10g but the Saffron produced in Kishtwar has a good market in Amritsar where it is sold at ₹250/g making it the most efficient supply chain for selling bulk quantity and this is the most commonly found supply chain in Kishtwar.

7.1.3 To find out the export status of saffron

After analysing the export analysis, it was found that India’s export of Saffron was \$1.73 Million during the years 2012 and 2013. But in 2020, it has declined to \$1.3 Million due to decline in production.

7.1.4 To identify the problems faced by saffron growers

According to the saffron farmers of the study area, there is a major problem of unavailability of labour followed by costly inputs including heavy labour cost

and irrigation. There is a huge lack of organised markets and market information for the marketing of saffron.

7.2 Conclusion

Despite of high cost of cultivation, saffron is capable of giving outstanding returns to the growers. Hence, they must be motivated for cultivation of saffron. There is a hike in price of saffron with increase in involvement of intermediaries. Government support is lacking to address the major issues of farmers. There is a lack of knowledge among farmers of Kishtwar about international demand of saffron. Since production of saffron has declined over past 8 years, it has directly affected the export of saffron from India. There is a huge lack of organised market and market information for Kishtwar saffron. Non availability of quality control laboratory in the region is also a major issue regarding quality check.

7.3 Recommendations

- It is found that sale price of saffron is more in Amritsar so farmers should be facilitated to market their produce in Amritsar.
- Government should also work on marketing and branding of Saffron of Kishtwar on same lines as it is working on Kashmiri Saffron. The National Saffron Mission should also function in Kishtwar district of Jammu and Kashmir.
- Research should be initiated on scientific and quality production of Saffron of Kishtwar so that farmers get healthy corms as in Kashmir in order to enhance production and quality.
- Regulated markets should be created in order flourish the export of Saffron as Indian Saffron is of the best quality with highest Crocin content of 13.5 per cent.
- Saffron farming should be encouraged as it gives a good Cost Benefit ratio of 1:2.6.
- Machines should be used more as compared to human labour in order to minimize the labour cost.
- Tissue culture possibility shall be explored for the seed production of saffron corms.



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Appendices



Sher-e-Kashmir University of Agricultural Sciences and Technology of Jammu
Survey Schedule for Data Collection of MBA-ABM Research Problem
Economic Analysis of Production and Marketing of Saffron in Jammu region

SOCIO-DEMOGRAPHIC PROFILE OF THE RESPONDENT AND BASE LINE DATA

I **Niket Sharma**, a student of Sher-e-Kashmir University of Agricultural Sciences and Technology Jammu, doing my project on “**Economic analysis of production and marketing of saffron in Jammu region**” would be grateful to you if you could kindly cooperate with my work for betterment of my knowledge. All the data will be kept confidential and will be used just for analysis of the project. I request you to please tick the option which in your opinion believes to be true.

1. Name of the farmer Sh. _____
2. Father’s name Sh. _____
3. Age (years) _____
4. Marital Status : Married/ Un-married/ Single
5. Sex : Male/Female
6. Village :
7. Block :
8. Panchayat :
9. Telephone/ Mobile No. : _____
10. Occupation :
 i) Main:
 ii) Subsidiary :

11. What is the highest grade in School/College you have completed? ____
12. No of family members

13. Family Composition

Age	Male	Female	Qualification	Income/Year	Source of income
0-15					
15-30					
30-45					
45-60					
Above 60					

14. Working members in family? _____
15. Members of farmer’s organization
 i. _____ ii. _____ iii. _____
16. How far is your village from nearest market (km)? _____

17. How far is your house from nearest Agriculture Extension Office (km)? _____

18. Operational land holdings (in kanals).

	<u>Irrigated</u>	<u>Unirrigated</u>	<u>Total</u>
(i) Owned	_____	_____	_____
(ii) Leased in	_____	_____	_____
(iii) Leased out	_____	_____	_____
Total operational Land holding (i+ii) – iii			

19. What was the yield of saffron during the last 5 years?

Crop	Area in kanal	quantity

20. Total income from saffron during the last 5 years?

(i) _____

(ii) _____

21. Since, how many years have you been cultivating saffron crop -----

22. Age of Saffron field _____

II. Farm Inventories:

S.No.	Equipment	No.	Year of Purchasing	Depreciation (%)	Depreciation (₹)	Present value (₹)
1.	Farm Building					
2.	Tractor					
3.	Tube well					
4.	Bullock Cart					
5.	Pump set					
6.	Chaff Cutter					
7.	Plough					
8.	Sprayer/Duster					
9.	Others					

III. Livestock

S.No.	Kind of animal	No.	Bred	Age (in yrs)	Owned/Purchased	Month and year of purchase	Purchase value (₹)	Present value (₹)	Expected life period (yrs.)
1.	Bullock								
2.	Cow (local)								
3.	Cow (hybrid)								
4.	Buffalo								
5.	Sheep								
6.	Goat								
7.	Poultry								
8.	Others								

IV. Crop produce and its disposal pattern:

Crop	Quantity sold (in kg/ctl)		Home consumption (in kg/ctl)		Seed (in kg/ctl)	Given for wages (in kg/ctl)		Rate/ctl		Channel of market
	Product/ Grain	By product/ Straw	Product/ Grain	By product/ Straw		Product/ Grain	By product/ Straw	Product/ Grain	By product/ Straw	

V. Cost of Cultivation:

LAND PREPARATION

1. Please give the information about land preparation.

- i) No. of ploughing _____ Cost/ploughing/Kanal _____
- ii) No. of planking _____ Cost/planking/Kanal _____
- iii) Total number of hired/family labour involved in ploughing/planking. _____
- iv) Total expenditure on preparation of one kanal of land including hired and family labour.

v). Time taken to for dressing of fields before sowing in one kanal.-----

2. Please name the varieties of the saffron cultivated by you.

Name of the Variety	Name of the Company/Source

3. Please give the reasons for selecting a particular variety.

Variety	High yield	Good quality	Tolerant to insects	Tolerant to diseases	Market price	Seed availability	Others specify

FERTILIZER USAGE

1. Please give the information regarding manures and fertilizers used in saffron crop.

Crop	Urea kg/kanal	DAP kg/kanal	MOP kg/kanal	FYM/kanal	Vermicompost	Any other

2. Did you apply urea in split doses?

Yes/No

2 (i) If yes, please give the following information.

No. of split doses
(kg)/Stage

Quantity of urea applied

A. Basal Dose

B. Top dressing

i) One

ii) Two

iii) Three

2 (ii) If no, what were the constraints?

a)

b)

c)

2 (iii) Where from did you get the information about the application of urea in split doses?

a) University scientists

b) Krishi Vigyan Kendra

c) Horticulture department. persons

d) Mass Media

e) Others (Please Specify)

2 (iv). Time taken to apply fertilizers in one kanal.

WEED MANAGEMENT

1. Please give the information about the methods of weed control in the field.

i) Manual

ii) Mechanical

iii) Chemical

iv) All

v) None

2. Average number of hoeing/intercultural operations done for control of weeds.

Crop	Number of hoeing/intercultural operations done

(i). Time taken for hoeing one kanal.

3. Expenditure incurred for hoeing one kanal of land in

Crop	Expenditure/kanal	Labour (hired & family labour)

4. If you use herbicides, then give the following information?

Name of herbicide	Quantity of herbicide/kanal	Total cost of herbicide/kanal

- 5 (i) Cost of herbicide application (Rs/kanal) _____
- (ii) Labour required for herbicide application /kanal. _____
- (iii) Constraints you face in weed management.
- a) _____
- b) _____
- c) _____

IRRIGATION

1. Source of irrigation for saffron:

- i) Tube well/ bore well
- ii) Canal
- iii) Tube/bore well and canal

2. Average number of irrigations applied to floriculture crops grown by you.

Name of the crop	Average number of irrigations

3. Expenditure of irrigation **with Tube/Bore well/kanal** for irrigating saffron crop.

Source of irrigation	Expenditure of irrigation/kanal
Tube/bore well (electric/diesel)	
Canal	
Canal+ Tube/bore well	

3(i) Labour required for the total number of irrigations. _____

3(ii) In case of diesel tube well, quantity of diesel used /kanal. _____

PEST & DISEASE MANAGEMENT

1. Name the insect pests prevalent in your crop field/area.

- i) _____ (ii) _____
- iii) _____ (iv) _____

2. What measures you adopted to control these insect pests in your saffron crops?

S.no	Measures available				
1	Chemical				
2	Biological				
3	Cultural				
4	Mechanical				
5	All				
6	None				

3. Did you apply chemical pesticides in your crop last year? **Yes/No**

4. If Yes, please give detail the detail of different insecticides applied in saffron crop.

Name of insecticide	Dose of insecticide/kanal	Against which pest	Cost/kanal	Cost of spraying/kanal

4(i) Source of information about use of pesticide.

Agriculture office/Pesticide dealer/Neighbour/Agri. University/KVK/any other

5. Total production of saffron and their sale rate

Crop	Total production in kg	Sale rate/kg

6. Please give the cost of cultivation of saffron/kanal _____ (in ₹)

7. Gross income from saffron _____ (in ₹)

8. Cost of Picking, Bagging and Transportation of one kg _____ (in ₹)

9. What factors determine the price you get the most, do you think? Specify

01	Seasonality/availability of saffron	
02	Bargaining/negotiation on strength of buyer	
03	Lack of market information	
04	Lack of quality	
05	Other: specify	

S.No.	Name of operation	Qty	Total cost
1.	Area in ha		
2.	Land preparation 1) Bullock/Tractor		
3.	Seed/Sowing a) Variety b) Source c) Quantity d) Cost of seed treatment e) Method of sowing f) Labour		
4.	FYM a) Quantity used qtl. b) Labour used		

5.	Irrigation i) Number ii) Time iii) Source iv) Labour		
6.	Intercultural operations i) No. and times of hoeing ii) By machine/chemical iii) Labour		
7.	Weed Control i) Weedicide use ii) Quantity iii) Cost of hiring sprayer etc iv) Labour used		
8.	Pest & Disease control i) Fungicide/Pesticide used ii) Quantity iii) Labour		
9.	Harvesting (Labour)		
10.	Threshing & Winnowing Machine/Manually Labour		
11.	Transportation Bullock cart/Tractor Trolley		
12.	Land rent		
13.	Production Main crop By product		

Note: 1. Wage rate/day:

Male (₹/day)

Female (₹/day)

2. Bullock labour/day:

3. Machine Rate/day/hour

Method adopted for drying Saffron:

Method used for packaging:

Cost incurred in Packaging:

Storage:

VI. Existing Marketing practices and channels

1. Markets Available _____
2. Pre-Harvest Contract _____
3. Farm Marketing _____
4. Self-Marketing (Local/ Town/ City market)
5. Out of state export marketing _____
6. Cooperative marketing _____
7. Self-Help group marketing _____
8. Government aided marketing _____
9. Any Other _____

VII. Marketing Channels:

VIII. Marketing Cost incurred by Producer (per kg)

S.no.	Operation	Value
1.	Name of market	
2.	Location of market	
3.	Quantity to be sold (kg)	
4.	Whom to be sold	
5.	Price (₹)	
6.	Means of transportation	
7.	Distance from field to market (km)	
8.	Transportation cost (₹)	
9.	Picking, filling (₹)	
10.	Cost of Container/ gunny bags (₹)	
11.	Octroi/ market fee (₹)	
12.	Loading/ unloading charges (₹)	
13.	Commission charges (₹)	
14.	Weighing charges (₹)	
15.	Sale tax on value (₹)	
16.	Shop/rehri charges (₹)	
17.	Cost of carry bags (₹)	
18.	Labour engaged in selling process (₹)	
19.	Any other cost (₹)	
20.	Cost incurred (per kg)	

IX. Problems faced by producer in saffron cultivation:

S.No.	Problems	No. of respondents	%age respondents facing problem
1.	Production problems		
a.	Lack of technical know-how		
b.	Lack of improved varieties		
c.	Costly inputs		
d.	Low quality inputs		
e.	Lack of suitable equipment		
f.	Lack of nutrients in the land		
g.	Unavailability of skilled labour		
h.	Attack by insect pests		
i.	Lack of financial resources		
j.	Crop damage by stray animals		
2.	Post-harvest management problems		
a.	Lack of knowledge about appropriate stage of harvesting		
b.	Non availability of grading facilities		
c.	Costly packing material or non-availability of packing material		
d.	Spoilage		
e.	Lack of cold storage facilities		
f.	Costly cold storage		
3.	Marketing problems		
a.	Prevalence of low prices in local and distant markets		
b.	Lack of regulated markets		
c.	Saffron markets are at distant places		
d.	Lack of link roads		
e.	High transportation cost		
f.	Lack of market information		
g.	Delayed payments by traders		
h.	Malpractices by traders		

Wholesaler's survey:

1. General information:

- i. Name of Wholesaler/Village Merchant:
- ii. Name of market/place:
- iii. Date of interview:

2. Marketing cost incurred:

S.No.	Particulars	Value
1.	Quantity purchased (kg)	
2.	Purchase price (₹)	
3.	Quantity sold (kg)	
4.	Selling price (₹)	
5.	Distance from market place (km)	
6.	Means of transportation	
7.	Transportation cost (₹)	
8.	Picking, filling (₹)	
9.	Cost of Container/ gunny bags (₹)	
10.	Octroi/ market fee (₹)	
11.	Loading/ unloading charges (₹)	
12.	Commission charges (₹)	
13.	Weighing charges (₹)	
14.	Sale tax on value (₹)	
15.	Shop/Rehri charges (₹)	
16.	Cost of carry bags (₹)	
17.	License fee (₹)	
18.	Maintenance expenditure (₹)	
19.	Expenditure on stationary (₹)	
20.	Rent on shop per month (₹)	
21.	Any other cost (₹)	

Retailer's survey:

2. General information:

- iv. Name of retailer/Village Merchant:
- v. Name of market/place:
- vi. Date of interview:

S.No.	Particulars	Value
1.	Quantity purchased (kg)	
2.	Purchase price (₹)	
3.	Quantity sold (kg)	
4.	Selling price (₹)	
5.	Distance from market to selling place (km)	
6.	Total cost of transportation (₹)	
7.	Cost of container/gunny bags (₹)	
8.	Loading/unloading charges (₹)	
9.	Commission charges (₹)	
10.	License fee (₹)	
11.	Packaging cost (₹)	
12.	Rent of shop (₹)	
13.	Cost of carry bags (₹)	
14.	Wastage/ loss (kg)	
15.	Mandi fees (₹)	
16.	Maintenance/expenditure fee (₹)	
17.	Other expenses (₹)	



Vita

VITA

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CERTIFICATE – IV

Certified that all necessary corrections as suggested by the external examiner and advisory committee have been duly incorporated in the thesis entitled “**Economic Analysis of Production and Marketing of Saffron in Jammu Region**”, submitted by Mr. Niket Sharma, Registration No. J-19-M-63-ABM.



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