

# **Impact Assessment Study of National Saffron Mission in Kashmir-An Economic Approach**

**Basir Ul Islam**  
(2017-AE-02-M)



**School of Agricultural Economics and  
Horti-Business Management**

**Faculty of Horticulture**

**Sher-e-Kashmir University of Agricultural Sciences and  
Technology of Kashmir  
2020**

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**Basir Ul Islam**  
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**Thesis**

Submitted to

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**University of Agricultural Sciences & Technology of Kashmir in  
partial fulfilment of requirement for the award of the degree of**

**Master of Science in Agriculture  
(Agricultural Economics)**

**2020**



*DEDICATED  
TO MY FAMILY*



**Sher-e-Kashmir**  
**University of Agricultural Sciences & Technology of Kashmir**  
**Faculty of Horticulture,**  
**School of Agricultural Economics & Horti-Business Management**

**Certificate – I**

This is to certify that the thesis entitled “**Impact Assessment Study of National Saffron Mission in Kashmir-An Economic Approach**” submitted in partial fulfilment of the requirements for the award of the degree of **Master of Science in Agriculture (Agricultural Economics)**, to the Faculty of Horticulture, Sher-e-Kashmir University of Agricultural Sciences and Technology of Kashmir, is a record of bonafide research work carried out by **Mr. Basir Ul Islam (Regd. No. 2017-AE-02-M)** under my supervision and guidance. No part of the thesis has been submitted for any other degree or diploma.

It is further certified that any help or information received during the course of investigation have duly been acknowledged.

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Approach”**

### **ABSTRACT**

The present study was selected purposively in two districts of Kashmir division, viz., Pulwama and Budgam based on the objectives of study. Two blocks, viz., Pampore from Pulwama district and Nagam from Budgam district were selected owing to the maximum number of beneficiaries under National Saffron Mission. Out of these two blocks, 120 respondents from six villages were selected through stratified random sampling method. The present study attempted to analyze the costs, returns and profitability of saffron growers before and after the launch of National Saffron Mission. The impact of National Saffron Mission on production, productivity and marketability of saffron in Kashmir. The study further analyses constraints in production and marketing faced by respondents in study area. The study reveals that the average cost of cultivation kanal<sup>1</sup> before and after inception of NSM was found Rs. 3190 and Rs. 7067 respectively. However, area-wise net returns obtained by respondents before and after the launch of National Saffron mission has shown an increased net return of more than two times. Before the commencement of Mission, the average net returns

kanal<sup>1</sup> were Rs. 6547 which then raised to the tune of Rs. 15398. The production and productivity of area under National Saffron Mission was found better than area which have not been covered under the Mission. However, the impact of National Saffron Mission was found significant only on few components. The area, production and productivity of saffron in J&K has recorded a compound growth rate of -0.17, 0.07 and 3.15 per cent from 1996-97 to 2017-18 respectively. While as the compound growth rate of export of saffron from J&K was recorded 0.29 per cent. Marketing system of saffron in Kashmir was found highly unorganized, as it has been largely in the hands of private enterprises, and there exists a long chain of intermediaries between the producer and the ultimate consumer. The study in the end comes with few policy suggestions for eradicating the existing problems of production, productivity and marketability of saffron.

**Key words:** Economics, impact, marketing, national saffron mission

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Signature of Major Advisor

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**Place :** Shalimar, Srinagar

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## CONTENTS

Chapter	Particular	Page No.
1.	INTRODUCTION	1-4
2.	REVIEW OF LITERATURE	5-15
3.	MATERIALS AND METHODS	16-26
3.1	Description of study area	16
3.2	Sampling design	16
3.3	Preparation of research instrument	18
3.4	Data collection	20
3.5	Analytical framework	21
4.	RESULTS	27-65
4.1	Costs and returns of saffron	27
4.2	Economic viability of saffron	48
4.3	Impact assessment of National Saffron Mission	51
4.4	Growth and trend analysis of saffron	54
4.5	Marketing of saffron	60
4.6	Constraints in production and marketing	62
5.	DISCUSSION	66-75
5.1	Costs and returns from saffron	66
5.2	Economic viability of saffron before and after inception of national saffron mission	68
5.3	Impact assessment of National Saffron Mission	70
5.4	Growth and trend analysis of saffron in J & K	72

5.5	Marketing pattern of saffron in Kashmir	74
5.6	Constraints in production and marketing	75
6.	SUMMARY AND CONCLUSION	76-82
	LITERATURE CITED	i-v
	APPENDIX	

---

## LIST OF TABLES

Table No.	Particulars	Page No.
3.1	Selection of villages and respondents	18
4.1	Year – wise cost of cultivation of saffron (Rupees kanal <sup>-1</sup> ) before inception of NSM, Size Group- 1	30
4.2	Year – wise cost of cultivation of saffron (Rupees kanal <sup>-1</sup> ) before inception of NSM, Size Group–2	31
4.3	Year – wise cost of cultivation of saffron (Rupees Kanal <sup>-1</sup> ) before inception of NSM, Size Group – 3	32
4.4	Year – wise cost of cultivation of saffron (Rupees Kanal <sup>-1</sup> ) after inception of NSM, Size Group - 1	33
4.5	Year – wise cost of cultivation of saffron (Rupees Kanal <sup>-1</sup> ) after inception of NSM, Size Group -2	34
4.6	Year – wise cost of cultivation of saffron (Rupees Kanal <sup>-1</sup> ) after inception of NSM, Size Group- 3	35
4.7	Item-wise cost of cultivation of saffron for different size groups over a cropping cycle of seven years before and after inception of NSM	36
4.8	Year wise cost of cultivation (Rupees kanal <sup>-1</sup> ) of saffron for different size groups before and after inception of NSM	37
4.9	Year–wise gross returns from saffron (Rupees kanal <sup>-1</sup> ) before inception of NSM, Size group-1	40
4.10	Year–wise gross returns from saffron (Rupees kanal <sup>-1</sup> ) before inception of NSM, Size group-2	41
4.11	Year–wise gross returns from saffron (Rupees kanal <sup>-1</sup> ) before inception of NSM, Size group-3	42
4.12	Year–wise gross returns from saffron (Rupees kanal <sup>-1</sup> ) after inception of NSM, Size group-1	43
4.13	Year–wise gross returns from saffron (Rupees kanal <sup>-1</sup> ) after inception of NSM, Size group-2	44

4.14	Year-wise gross returns from saffron (Rupees kanal <sup>-1</sup> ) after inception of NSM, Size group-3	45
4.15	Year wise gross returns from saffron of different size groups before and after inception of NSM, (Rupees kanal <sup>-1</sup> ).	46
4.16	Year wise net returns from saffron of different growers before and after inception of NSM, (Rupees kanal <sup>-1</sup> )	47
4.17	Economic viability of Saffron Cultivation before and after launch of National Saffron Mission	50
4.18	District wise targeted area and achievements under NSM	51
4.19	Distribution of soil mechanization implements under NSM	52
4.20	Distribution of post-harvest equipment's under NSM	52
4.21	Details of Irrigation system under NSM	53
4.22	Compound growth rate of area, production and productivity of saffron in J & K from 1996-97 to 2017-18	56
4.23	Compound growth rate of area, production and productivity under NSM and traditional system from 2011-12 to 2017-18. (Area in ha, Production in MT and Productivity in kg/ha)	57
4.24	Compound growth rate of export of saffron from J&K from 1996-97 to 2017-18	58
4.25	Marketing channels of saffron	60
4.26	Percentage share of different marketing channels of saffron (N=120)	60
4.27	Marketing cost, physical loss, marketing margin, price spread, producers share in consumers rupee and marketing efficiency of different channels (Rs/10g)	63
4.28	Constraints faced by saffron growers in the production of saffron (N=120)	64
4.29	Constraints faced by the saffron growers in the marketing of saffron (N=120).	65

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## LIST OF FIGURES

<b>Fig. No.</b>	<b>Particulars</b>	<b>After page No.</b>
1.	Trends in area, production and productivity of saffron in J & K	59

## LIST OF ABBREVIATIONS

@	:	At the rate
Rs.	:	Rupees
PBP	:	Payback period
<i>et al.,</i>	:	And others/ and co-workers
F	:	Frequency
NSM	:	National Saffron Mission
Fig.	:	Figure
MT	:	Metric ton
Ha	:	Hectare
INM	:	Integrated nutrient management
IPM	:	Integrated pest management
<i>i.e.</i>	:	That is
Kg	:	Kilogram
IDM	:	Integrated disease management
BCR	:	Benefit cost ratio
IIKSTC	:	Indian International Kashmiri Saffron Trading Center
FOF	:	Farm operating families
No.	:	Number
NHB	:	National Horticulture Board
IRR	:	Internal rate of return
MED	:	Mechanical and Engineering Department
J & K	:	Jammu and Kashmir
NPV	:	Net present Value
%	:	Per cent
NPRF	:	Net price received by farmer
POP	:	Package of practices
<i>viz.</i>	:	Namely
FYM	:	Farm yard manure

## Chapter-1

### INTRODUCTION

Saffron (*Crocus sativus* L.), a perennial low growing herb with a globular corm, is highly prized as one of the best natural food flavouring and colouring substance having general panacea properties. It is derived from the dry stigmas of the plant popularly known as the “Golden Condiment”. The colour, flavour and aroma of saffron are mainly due to the presence of bio-active constituents crocin, picrocrocin and safranal, respectively. It is the legendary crop of Jammu and Kashmir produced on well drained karewa soils of where ideal climatic conditions are available for good growth and flower production. It grows at an elevation of 1500-2000 m amsl. It is also one of the oldest and most valued aromatic crops native of Southern Europe and cultivated in Spain, Iran, France, Italy, Austria, Greece, Turkey, England, China and India (Yasmin and Nehvi, 2013).

Saffron is an important cash crop and a good source of foreign exchange earning among the spices of India. Jammu and Kashmir enjoys a virtual monopoly for the cultivation of saffron in the sub-continent and contributes about 99 per cent of the national saffron production (Saraf, *et al.*, 2018). The saffron of Kashmir is acclaimed internationally as of superior quality with high demand. About seven lakh people across 226 villages are solely dependent on saffron cultivation for their livelihood (Gurkoo, 2007). The number of people associated directly or indirectly with the saffron industry is estimated to be more than ten lakhs in the State (Anonymous, 2007).

Total world production of saffron is around 300 tons per year. Iran, India, Spain and Greece are the major saffron producing countries with Iran occupying the maximum area (43408 ha) and contributes about 88 per cent of world’s saffron production. Though, India occupies the 2<sup>nd</sup> largest area (3715 ha) however produces approximately 7 per cent of the total world production. Jammu & Kashmir is the only state in India where saffron is produced. Spain with 600 ha of land is the 3<sup>rd</sup> largest producer in the world. The State of Jammu and Kashmir in

India produces 8 to 10 tonnes of Saffron (Tantry, *et al.*, 2017). The leading saffron growing countries like Iran, Spain and Greece with intensive production technologies are able to achieve higher production and productivity than India and posing great threat to our saffron industry as imports are increasing every year. Thus, there is a need to increase production by bringing more area under cultivation and double the average productivity by adopting intensive production system, efficient processing and marketing to make it globally competitive and remunerative to growers.

The data available with Directorate of Agriculture, Govt. of J&K reveals that the total area under saffron cultivation during the year 1996-97 was 5707 hectares with annual production of 15.95 metric tonnes, while productivity was recorded at 2.8 kg per hectare. However, during 2009-10 the total area under saffron cultivation was 3715 with annual production of 10.40 metric tonnes, while the productivity was recorded at 2.75 kg per hectare. This means there has been a significant decline in area, production and productivity of saffron in Jammu & Kashmir from the year 1996-97 to 2009-10.

Concerned over the declining trends of saffron production in Kashmir and keeping in view the importance of saffron industry for overall growth and future of large number of farmers working with Saffron, the Government of India approved a flagship programme for revival of saffron through “National Saffron Mission” in August 2010. Being late season for Saffron sowing practically very little work was executed during the first year however the process geared up during 2011-12. The mission was initially sanctioned with a total amount of Rs. 372.18 crores, of which Government of India share was Rs. 288.06 crores and farmer’s share were Rs. 84.12 crores. The mission was initially proposed to be completed within a period of 4 years so the saffron sector in the state shall be revived. The mission envisaged to provide saffron growers drip irrigation, mechanization, processing, research and marketing support to ease the crisis and improve overall production and productivity of saffron in Jammu and Kashmir.

The National Saffron Mission also seeks to develop appropriate systems for organised marketing, quality-based pricing of saffron and for formulating direct transactions between growers, traders, exporters and industrial agencies.

Since the various components of Mission have been implemented by J&K State Agriculture Production Department while research support (technological back stopping), has been provided by SKUAST-Kashmir and Central Institute Temperate Horticulture (CITH) since 2010. Keeping in view the infusion of a huge amount of money incurred and other resources involved through National Saffron Mission besides questions being raised about its impact at ground level, the present study entitled “Impact Assessment Study of National Saffron Mission in Kashmir -An Economic Approach” was planned to present the actual scenario of the Mission with the following specific objectives:

1. To compare the costs, returns and profitability associated with saffron cultivation in the study areas before and after the launch of National Saffron Mission.
2. To work out the impact of National Saffron Mission on production, productivity and marketability of saffron in Kashmir.
3. To identify constraints in marketing of saffron in Kashmir and suggest suitable policy measures thereof.

**Scope and importance of the study**

- a) Saffron being heritage crop of Kashmir and covered under a flagship programme of Ministry of Agriculture and Farmers welfare, Government of India, with huge outlay earmarked under National Saffron Mission (NSM) since 2011-12; the present study is expected to enlighten with an economic evaluation as to what extent the results of the Mission have facilitated in achieving the set objectives and targets
- b) Saffron has immense potential to emerge as one of the best remunerative Agri-oriented livelihood activities for the farmers and also as the important foreign exchange earner for the State of Jammu and Kashmir, provided the

cultivation of the crop are put on scientific lines besides availability of efficient marketing system

- c) The findings of study will help policy makers and other stakeholders to develop strategies and policies for future growth and development of saffron. There by ensuring profitability to the farmers.

**Limitations of the study**

- a) Since the study was based on the expressed opinion of the farmers, the validity of the findings of the study was limited to the extent to which the respondents were objective in their expression.
- b) The study was limited to only two districts due to the scarcity of time and resource implications.
- c) The findings are based on responses perceived by the respondents through “recall memories”- before and their present position after inception Mission. The possibility of the errors involved in the recall of the information can't be ruled out.

## Chapter 2

### REVIEW OF LITERATURE

Lawrence (1895) reported that saffron has been used as an ingredient in Ayurvedic medicines by the famous Kashmiri Vaid, namely, Vegbhatta and Sushtra. The recorded account of saffron cultivation in Kashmir dates to year 550 A. D., nearly four centuries earlier than its recorded cultivation in Spain by Arabs around year 961 A. D.

Bali and Sagwal (1987) stated that high economic returns can be obtained from saffron on commercial scale. They observed that profits from the crop are very high, regardless of the costs.

Munshi *et al.* (1989) observed that saffron is the most famous crop of J & K. It was grown over an area of about 3030 hectares producing 9000 kgs of dry saffron. The productivity however remained quite low.

Munshi (1990) opined 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. He observed that government intervention in specific areas was needed to ensure a better price for the product and a consistent quality for export.

Munshi and Baba (1991) observed that saffron is the world's most expensive spice. It is the spice of commerce fetching Rs. 15000 to Rs. 20000 per kg. A yield of 2 kg per hectare has been recorded for J&K State. They also revealed that in Pampore area the average yield ranged between 2-3 kg/hectare, whereas yield reported from Spain was much higher, being about 10 kg of dry saffron per hectare.

Mattoo and Beigh (1992) reported that saffron is also called 'Red Gold' of Jammu and Kashmir, because of its great commercial importance as it earns annually about Rs.1.25 crore of foreign exchange.

Munshi (1992) reported that the J & K State is the sole state growing saffron in India. It is grown in tehsil Kishtwar of district Doda in Jammu Province and in the district of Pulwama, Srinagar, Budgam, and Anantnag in Kashmir Province and suggested that to increase the production in the State, it is important to evolve varieties which are capable of fostering maximum economic yield and consistent in their performance in a given environment.

Pruthi (1992) stated that the richest soil for saffron cultivation in the valley is said to be at Pampore and this fact has been taken advantage through ages for the cultivation of the *Crocus sativus*, the stamens of whose flower, known as saffron, is a chief article of commerce in this country, yielding a revenue to the government. Kashmir valley is famous for saffron fields located on the sides of National Highway on the karewas (elevated dry table land of alluvial origins) of saffron at Pampore. Some saffron is grown also in Kishtwar region of Jammu.

Dhar and Mir (1997) observed that saffron, the dried stigmas of *Crocus sativus*, is an important commodity of commerce, prized for its delicate flavour and intense colour. They opined that saffron is one of the oldest commodities of Jammu and Kashmir agriculture, spread over more than 200 villages with 40000 families. It is an important ingredient of Ayurveda and Unani systems of medicine in India.

Torkamani (2000) studied the production and marketing of Iranian saffron. He observed that farmers were not using some of the inputs optimally, a study of the technical efficiency indicated that there was a considerable possibility of increasing production by increasing farmers' efficiencies. Marketing efficiency of saffron was calculated at 155 per cent.

Kamili *et al.* (2007) concluded that sustainability of saffron crop is the most vital aspect to improve the economy of growers and earn foreign exchange for the state. Therefore, immediate attention is required towards the transfer of technology through methodical extension, establishment of seed villages, value addition and ban on import of saffron, marketing and quality testing laboratory.

Ghorbani (2008) suggested that increasing the number of marketing channels cause inefficiency in marketing process of saffron. So, decreasing distance between producer and consumer by transplanting marketing process can increase producer and consumer welfare. According to special advantage of this product, creation of regional marketing board beside exchange market for coordinating production, marketing and export and maintaining market share is suggested.

Lopz (2009) suggested that type of package seems to have the main influence on the determination of retail prices, glass packaging with the highest implicit value, around 35% over the mean price. Different brand strategies also lead to distinct price premium which is maximum for brands owned by processors specialized in the processing and marketing of saffron.

Shah and Tripathi (2009) observed that the saffron cultivation is relatively complicated and expensive. Gross expenditure of crop during 5 years planting cycle of saffron was Rs: 431185 per hectare, this is because of high establishment cost in first year and the gross returns in planting cycle of 5 years were Rs. 2366000. The net profit per annum was Rs. 386963 per hectare.

Shah and Wani (2009) observed that lack of irrigation scheduling technology was the major problem articulated by majority of the growers as a technological problem followed by lack of technical guidance for extension problems. As per the marketing constraints the non-availability of clean and competent marketing infrastructure was considered the main problem of growers and lack of insurance facilities to cover risk was reported as economic problem.

Among communication problems and physical problems lack of literature regarding improved cultivation and small size of land were reported as major problems.

Wani *et al.* (2010) observed that overall technological gap was more than 50 % of saffron regarding production technology, small growers of the valley had highest technological gap in terms of production technology. With a view to decrease technological gap, it is necessary to aware them about improved technologies of saffron production. The planners and policy makers should take steps to meet the needs and challenges of the saffron growers and promote production technologies at gross root level.

Sheykhdavodi (2010) developed an innovative policy framework based on multi-criteria decision-making (MCDM) techniques for the mechanization of crust crushing in saffron fields. Five harrowing systems (two full mechanized systems, one semi-mechanized and two traditional systems) were defined as harrowing candidates. Six key factors (time, cost, energy, availability, quality of work and employment) were considered as technical attributes. After applying MCDM techniques, results indicate that for this specific region, employment is likely the most important criterion for decision making and tiller is the optimal system. It is worth noting that this same dynamic decision-making framework will flexibly accommodate any innovations in future production systems.

Husaini *et al.* (2010) concluded that saffron in Kashmir is totally rainfed crop and if rains are received at the sprouting and pre-flowering stage, flowering is optimum and saffron yield is normal. Any major drop in precipitation at these stages or unseasonal rains during October causes serious damage to flowering and saffron yield.

Hosseinia *et al.* (2010) analysed the socioeconomic characteristics of local people and application of investment criteria and regression analysis. Results show that investment on research projects of saffron is very economical, because

it causes yield increase and more income for farmers. So, in order to improve the situation, investment on saffron research projects is recommended to strengthen qualitative and quantitative extension for transfer of new findings to the saffron farmers.

Santucci (2010) concluded that saffron, besides processed with priced packaging, has generated an interesting case of multisector development, with links to cultural heritage, gastronomy and rural tourism.

Rekha *et al.* (2011) concluded that adulteration in saffron and drawing of adequate standards need closure attention. The degree of adulteration is not well established the purity of saffron can be adulterated with many substances. Proper statistics of production, revenue and export is not completely known. Formation of saffron marketing societies at village levels in the growing areas will help to maintain records. Also, the intermediaries in the trade of saffron will be reduced. These societies can provide adequate loan to small and marginal farmers for purchasing the necessary inputs for producing greater yield. Government intervention in the marketing of the crop is necessary.

Sharma *et al.* (2012) stated that there is vast opportunity for improving the production, productivity and income of the saffron growers by improving their quality diversification of area, improving in packaging material, efficient marketing channel's proper distribution of price spread etc., will surely result in increasing the income as well as employment of the saffron growers.

Malik (2012) reveals that area under saffron in J & K has receded to 31%, and the production level of saffron reduced to 47%, while the productivity of saffron has declined to about 23% from year 1997-2010.

Kheirandish and Gowda (2012) revealed that there is considerable scope to increase the producers share in the consumers price if the number of intermediaries is reduced and the government intervenes pro-actively in order to organise and streamline the marketing cooperative unions so that the farmers use

these unions as a profitable channel to sell their product. Only 4.29% of the farmers sold their produce through cooperative societies. The wholesalers in the distribution market popularly known as packaging companies purchase saffron from middlemen and very rarely directly from farmers and allow brokers to thrive at the cost of farmers.

Maner and Semwal (2013) reported the major factors responsible for decline of saffron industry in Kashmir include; lack of availability of good-quality corms as seed material, poor soil fertility, lack of assured irrigation, infestation by rodents and diseases, poor postharvest management, improper marketing facilities, increased urbanization on saffron land, helplessness of the Government in checking adulteration and clandestine smuggling of cheap saffron (allegedly from Iran), which is then sold in the name of Kashmir saffron.

Yasmin and Nehvi (2013) concluded in a study ‘saffron as a valuable spice’ that cultivation is under threat of extinction and thus warrants attention of researchers and policy makers. In Kashmir, its revival is to be taken on ‘Mission Mode’, particularly in the areas where its cultivation has been abandoned by the farmers. SKUAST–Kashmir and other International Organizations, have instituted research programme for systematic improvement of saffron from production to consumption system.

Kaloo *et al.* (2014) reported that for increasing production and productivity in saffron there is need of the development of irrigation schemes and the application of drip and sprinkler and enriching soils with recommended levels of manures and fertilizers and organic cultivation

Haq and Shafi (2014) concluded that the concerned Government Departments / agencies need to encourage and involve educated unemployed youth in the rural areas of the saffron growing belts to take over this venture on scientific basis. Organising the foreign tours especially to the countries like Spain, Netherlands and Iran etc., is very essential to motivate and encourage them. Poor

economic background of these farmers compels them to borrow money in advance from dalals resulting into distress sale. This issue needs to be tackled by the government by providing cheap credit facilities to the growers. Besides, emphasis should be given on inculcating the spirit of cooperative farming. By cooperative marketing the chains of middlemen and intermediaries can be eliminated.

Golmohammadi (2014) concluded that use of more efficient methods and tools has been the center of attraction. Packing is one of the effective measures in the process of selling products to count. Iran enjoys favourable climate conditions; therefore, it can produce many crops such as saffron and it also is the biggest producer of it in the world. But due to lack of proper facilities for packaging, the license of direct exports of the product is lost.

Saqib (2015) laid emphasis on geographic indication as a branding tool for saffron reported that Kashmir has variety of agricultural products and one agricultural product which should immediately be registered as Geographical Indication is Saffron. “Kashmir Saffron” needs to be branded as branding of saffron will allow saffron producers to achieve market recognition, differentiate their offerings and gain legal protection and Geographical Indication can be the branding tool for it.

Manzo *et al.* (2015) suggests that the cultivation of saffron represents a viable opportunity to diversify agricultural income in multifunctional farms in mountain areas. This opportunity should be seen within a context of reduced generalized public support for agriculture and a focus on specific targets and priorities.

Toktam *et al.* (2016) measured the technical efficiency of small and large Saffron farms in Iran. They collected data from 170 questionnaires completed by saffron producers in Torbat-e-Heydarieh and Zaveh counties in year 2014. In order to ensure the accuracy of selected production function, the performance of

three Cobb Douglas, Transcendental and Trans log functional forms were tested. Results suggest that Trans log functional form is the most appropriate form for expression of production technology of this product. Moreover, the comparison of technical efficiency between two groups of farms indicates that 49 per cent of small farms and 18 per cent of large farms work at inefficient level of production. The large difference between lowest and highest technical efficiency in large farm group shows that there is an option to increase technical efficiency in these fields through the use of good management practices.

Nehvi and Yasmin (2016) identified issues of traditional saffron value chain and provided solution to all missing links for making farming system sustainable and economically viable. Research lead to development and release of GAP for saffron cultivation, mechanization, water management, integrated disease management and post-harvest management with an aim to double farmers income and profitability. Technologies gave birth to National Saffron Mission for revival of saffron Industry that has improved overall production from 9.6 MT (2009) to 15 MT (2013).

Nasseer *et al.* (2016) observed that the corms weighing more than 8 g have the potential of flowering the same year whereas the corms weighing less than 6 g are suitable for nursery management to yield bigger sized corms for the area expansion under saffron cultivation and high density.

Tantry *et al.* (2017) concluded that saffron is playing a significant role in the economy of Jammu and Kashmir and contributes about 16 per cent of the total agriculture income. The basic growth retarding factors of crop are its weak research base, unscientific in all respects, discouraging marketing mechanism and non-interference attitude of government, lack of irrigation, unavailability of pesticides etc. Its marketing structure which is totally under the control of private enterprise is quite discouraging. It has been observed that intermediaries, on an average basis take about 41 per cent of total income from saffron as their commission leaving only 59 per cent to the actual growers.

Tantry (2017) concluded that saffron in J & K is function of multiple input variables. However, he takes only two independent variable factor inputs into consideration reveals that  $X_2$  (labour) is relatively playing vital role than  $X_1$  (fertilizer) for enhancing the productivity of saffron in state of J & K. This means that saffron is labour intensive crop needs keen watching right from plantation to recycling period.

Hamid *et al.* (2017) identified that the price/kg of saffron appears to be highest in the month of September and October due to the new arrival and harvesting season of the saffron crop. Meanwhile, the Compound annual growth rate for saffron in J&K in terms of area, production and productivity depicted a declining trend, whereas they founded that the farmer under saffron cultivation are residing in rural areas with an average landholding 5.5 to 8.0 kanals and contributing to the total production of 10 MT. Their study also determined the economic relationship between the stakeholders in different marketing channels of saffron value chain. It was found using Acharya's and Shepherd's Index techniques, that the maximum marketing margin were grabbed by the intermediaries (retailers, agents) followed by Wholesalers' leaving saffron growers an unfair margin.

Ganaie *et al.* (2017) revealed that the per hectare total cost of cultivation was higher in small size group as Rs. 273354.67 followed by medium size group as Rs. 91086.38 and large size group as Rs. 88486.80. The overall net income on different categories of farms is negative during 1st year as Rs. 126424.5 and highest during 9th year as Rs. 172953.66. It increases from 1st to 7th year and remains constant up to 7th year; decreases in 8th year and then again increases during 9th year. The output-input ratio is 1:2.49, which varies from 1:2.14 in small size group to 1:6.45 in medium size group and 1:7.42 in large size group. Thus, ratio indicates that the saffron crop is profitable.

Ali and Hakim (2017) suggested that technological intervention can help to address the issues related to post-harvest losses and will ensure better quality.

Moreover, the implementation of organized way of marketing with direct grower to consumer contact will boost the confidence of saffron growers about the future prospects of saffron cultivation and will thus enhance their profitability and accordingly the sustainability in its export. Hence, further research is needed in this direction. Also, with rapid increase of saffron price in international market, growers may show more interest in investing in scientific tools and unique technology based on breeding and biotechnology for better yield, but due to marginal nature of this crop, investments by manufacturers on such scientific tools are unlikely to be repaid as quickly as they would expect. In fact, this is a general limitation with the saffron crop in Kashmir (India).

Menia *et al.* (2018) concluded that the application of nitrogenous fertilizers especially urea results greater impact on dry and fresh stigma weights of saffron. Various types of disease control fungicides, pesticides and other materials should be used in adequate proportion by the growers so that they have easy to control these devastating diseases at the earliest. The establishment of weather stations in the main saffron growing areas of the state so that it can provide daily information bulletins regarding weather to the growers. There is necessity to take steps to educate farmers of the latest developments by state government and help them to enhance their yield and productivity by adopting the good management practices.

Qadri (2018) concluded that marketing channels expropriate a substantial proportion of the profit with both the growers as well as the consumers being losers. Saffron income being highly responsive to marketing channels or income elasticity of channel being high, government should provide support to saffron growers so that their income will increase which will escalate output as well. By cooperative marketing the chains of middlemen can be eliminated and grower's share in consumer's rupee can be increased. Harmonised link or connection between the ultimate consumers and the growers can improve their monetary status and provide them with the market incentives important for the extension of

this shrinking industry. Once the marketing is regularized the demand would increase and the farmers will get better incentives and subsequently divert more land for the cultivation of this crop.

Raja *et al.* (2018) concluded that there has been a drastic change in terms of the adoption of recommended package of practices by saffron growers of the Pulwama district after the launch of National Saffron Mission. However, a lot needs to be done to further expedite the production and productivity of the saffron in the valley. In addition to this, the flagship programme needs to be continued so as to extend its benefits to all the saffron growers of the valley.

Saraf *et al.* (2018) revealed that the saffron crop is highly remunerative and offers ample scope for employment generation. The economic analysis in terms of costs and returns, net present value, benefit cost ratio, payback period, internal rate of return and farm profit measures indicated that the crop is economically viable. The results of study indicated that the marketing margins exceed the marketing costs in each channel. Saffron, being a high value and low volume product, the marketing costs remained comparatively low. The maximum marketing margins were received by brokers followed by retailers.

Noori *et al.* (2018) revealed that major destination of Afghanistan saffron export was India from 2014-17 with the contribution of almost 60%. The transition probability of saffron export from Afghanistan reveals that United Arab Emirates was a highly stable destination country for saffron export from Afghanistan and India is a somewhat stable destination country. A cost and price analysis of saffron in Afghanistan indicates that the price spread was 27026 Afs/kg. The producers share in export value was 76%. Farmers prefer cultivating saffron instead of cash crop poppy which is also prohibited by law.

## **Chapter-3**

### **MATERIALS AND METHODS**

The research methodology adopted for conducting the present study has been discussed in this chapter under the following headings:

- 3.1 Description of the study area
- 3.2 Sampling design
- 3.3 Preparation of research instrument
- 3.4 Data collection
- 3.5 Analytical framework

#### **3.1 Description of the study area**

In J & K state, saffron is mainly cultivated in four districts, namely; Pulwama, Budgam, Srinagar and Kishtwar. The three districts, viz., Pulwama, Budgam and Srinagar are in Kashmir division while district Kishtwar lies in Jammu division. District Pulwama, commonly known as saffron bowl of Kashmir, is the main contributor to saffron production followed by Budgam, Srinagar and Kishtwar. The proposed study was selected purposively in two districts of Kashmir division, viz., Pulwama and Budgam based on the pre-determined objectives of study.

#### **3.2 Sampling design**

Multistage stratified sampling procedure was adopted to select the ultimate samples for the study. In first stage, districts were selected; followed with selection of blocks and villages and at last stage respondents were selected to obtain requisite information through interview method.

##### **3.2.1 Selection of districts**

The proposed study was selected purposively in two districts viz., Pulwama and Budgam of Kashmir division due to following reasons: -

- a. Saffron is the major crop of Pulwama district and has the highest acreage in the entire J&K State. Pulwama district alone contribute about 80 per cent of the total saffron area/production in the State.
- b. Pulwama is followed by Budgam and contributes about 10 per cent of total saffron area/production in State.
- c. Investigator's familiarity with the district was helpful in collecting the valid data from the respondents by explaining every question /statement in their mother tongue (Kashmiri).

### **3.2.2 Selection of blocks**

One block from each district, namely; Pampore from Pulwama and Nagam from Budgam districts were selected purposively due to following reasons:

- a) Saffron is grown on commercial scale in these blocks and world's best saffron is grown there.
- b) The investigator has intimate knowledge and familiarity with local conditions about these blocks.
- c) In Pulwama there are 11 blocks, however four blocks, viz., Pampore, Awantipora, Newa and Kakapora were rejuvenated under NSM. Block Pampore being famous for saffron cultivation has maximum area/production out of four blocks which were rejuvenated under NSM.
- d) In Budgam there are 17 blocks, however four blocks, viz., Chadura, B. K. Pora, Nagam and Chrar-e-Sharief were rejuvenated under NSM, while Nagam has maximum area under saffron compared to rest of the block brought under Mission, therefore block Nagam was selected purposively for the present study.

### **3.2.3 Selection of villages and respondents**

A list of saffron growers was obtained from Nodal Officer, National Saffron Mission (NSM), Pampore and other relevant sources. Out of the list, village wise beneficiaries were sorted out as per their acreage under the NSM programme. Six villages meeting the requirement were selected and the

beneficiaries of NSM were distributed as per their acreage (kanals) viz; 0-4, 4-8, and 8 & above. A sample of 120 respondents was obtained by Stratified Random Sampling proportional to size of holding, which is depicted in table 3.1.

**Table 3.1 Selection of villages and respondents**

S.No.	Villages	Acreage (Kanal or 500m <sup>2</sup> )		
		Group - 1 (0-4)	Group- 2 (4-8)	Group - 3 (8 & above)
01	Chandhara	144	112	76
02	Konibal	136	97	58
03	Ladhoo	148	89	66
04	Hafroo	138	--	--
05	Bringin	69	--	--
06	Choudrigund	67	--	--
<b>Total</b>		<b>702</b> <b>(70)</b>	<b>298</b> <b>(30)</b>	<b>200</b> <b>(20)</b>

(Figures in parenthesis indicate number of respondents selected), 1 kanal = 0.05 hectare or 500 m<sup>2</sup>

The selected respondents in each group were arrived by using the below formula;

$$n_1 = n/N_1 \times N$$

$n_1$ =Total sample from all villages sorted as per acreage under NSM.

$n$ =Total number of respondents from the concerned villages.

$N_1$ =Total number of respondents from the all villages.

$N$ =sample size (120)

### 3.3 Preparation of research instrument

For obtaining reliable and the valid data, an interview schedule (*Appendix-I*) was prepared keeping in view the objectives of the study. It consisted of two parts:

**Part I:** Includes the following parameters: -

#### Fixed costs

Fixed costs may be defined as those costs which do not affect the volume of output, even if the latter is zero. The fixed costs remain unchanged, irrespective of production. In case of saffron farming it includes depreciation on farm equipment's,

interest on fixed capital, land rent and Government taxes, if any.

### **Depreciation**

Depreciation is the loss of value of an asset due to its use, wear / tear and time. It represents the amount by which a farm asset decreases in value. Annual depreciation on farm equipment's was calculated by Straight-Line Method.

### **Interest on fixed capital**

Interest on fixed capital assets was worked out at the rate of 8 per cent per annum. This rate of interest on the fixed investment was charged on the assumption that if farmers had invested their funds in terms of deposits for a period of three years, they could have earned at least 8 per cent interest from the bank (Lead Bank i.e. Jammu and Kashmir Bank Ltd.).

### **Rental value of land**

The rental value of land was taken. @ Rs. 16000 ha<sup>-1</sup> annum<sup>-1</sup> fixed by the Government for saffron land or the actual rent, prevalent in the area after NSM and @ Rs. 12000 ha<sup>-1</sup> annum<sup>-1</sup> before NSM.

### **Variable costs**

The variable costs are those costs for which the variable factors are responsible and are thus dependent in total magnitude upon the volume of output. Variable costs vary with the output. In case of saffron crop farming variable cost included the cost of planting material, manure and fertilizers, irrigation, human labour, plant protection chemicals and miscellaneous expenditure.

### **Interest on working capital**

Interest on working capital was charged as per the current bank rate of 4 per cent on savings charged half yearly.

### **Miscellaneous expenditure**

The expenditure incurred on the minor repairs of implements, hand tools, irrigation structures, and other minor costs were included in miscellaneous expenses. The joint costs were apportioned and were allocated on the basis of crop-wise.

### **Human labour**

The amount of labour used on various operations was estimated by recording the amount of time spent on different operations. The cost of hired labour was based on the actual wage rate prevailing in the study area. The cost of family labour was calculated on the basis of average wage paid to a permanent labour in the study area. All the types of labour viz., male, female and child used in the different operations were converted in to man-equivalent days. A man-day of eight hours was taken equivalent to 1.5 women workday and 2 workdays of child.

**Part II:** Was designed to collect information by identifying total area put under saffron by the respondents. This part contained questions wherein the respondents were asked to recall various practices followed by them before the National Saffron Mission (2010) and the practices followed by the respondents after National Saffron Mission (2018). This part also contained questions pertaining to constraints, if any, faced by the respondents in the marketing of saffron.

The research instrument so prepared was then pre-tested in non-sample area Dasoo village, Block Pampore, and some necessary modification in light of the pre-testing were made in interview schedule before its final use in the sample area.

## **3.4 Data collection**

This include both primary as well as the secondary data;

### **3.4.1 Primary Data**

Primary data on the given parameters was collected by survey method through personal interviews. Every effort was made to clarify the questions posed

to the respondents in their local language (Kashmiri) to get the true responses.

### 3.4.2 Secondary data

The secondary data was collected from the research material of SKUAST-Kashmir, besides; the study was supplemented with the data available from concerned Directorates including Agriculture, Horticulture, Financial Commissioner's office, Directorate of Economics & Statistics, Horticulture-(Planning & Marketing) and other relevant organisations / agencies.

### 3.5 Analytical framework

To meet out the objectives of the present study, both tabular and functional/statistical approaches were employed for analysis and interpretation of results.

#### 3.5.1 Tabular method

The primary data collected through schedules was tabulated to workout averages, ratios, percentages and indices.

#### 3.5.2 Economics viability measures

Economic viability measures like payback period, net present value, internal rate of return and benefit cost ratio were used to analyse the data.

#### Payback period (PBP)

The length of time required for an investment to recover its initial outlay in terms of profits or savings. Function of the following structural form was employed to find the length of time required to recover the cost of an investment. (*Financial and Managerial Accounting*)

$$\text{Payback period} = \frac{\text{Cost of the investment}}{\text{Annual net cash flow}}$$

For feasibility the returns should exceed the costs i.e.

$$\sum_{t=0}^n R_t > \sum_{t=0}^n C_t$$

### Net present value (NPV)

Net Present Value (NPV) is the difference between the present value of cash inflows and the present value of cash outflows. NPV was used in capital budgeting to analyse the profitability of a projected investment or project. (*The Journal of Finance*)

The following is the formula for calculating NPV:

$$NPV = \sum_{t=1}^n \frac{B_t - C_t}{(1+i)^t}$$

Where;

B = benefits in the year t,

C = costs in the year t,

i = selected discount rate, and

t = number of time periods

Generally, an investment with a positive NPV will be a profitable one and vice versa.

### Internal rate of return (IRR)

Internal rate of return (IRR) is the interest rate at which the net present value of all the cash flows (both positive and negative) from a project or investment equal zero. Internal rate of return is used to evaluate the attractiveness of a project or investment. If the IRR of a new project exceeds a company's required rate of return, that project is desirable. If IRR falls below the required rate of return, the project should be rejected. (*Project Economics and Decision Analysis*)

The formula for IRR is:

$$IRR = \text{[lower DF]} + \frac{\text{[Difference between two DF's]} \times \text{PW of cash flow at lower DF}}{\text{Absolute difference between the PW's of the cash flow at two DF's}}$$

IRR equals the project's internal rate of return. When the calculated IRR is more than that of the market rate of interest then the investment will be considered viable.

### **Benefit cost ratio (BCR)**

A benefit cost ratio (BCR) attempts to identify the relationship between the cost and benefits of a proposed project. Benefit cost ratios are most often used in corporate finance to detail the relationship between possible benefits and costs, both quantitative and qualitative, of undertaking new projects or replacing old ones.

Function of the following exponential form was employed to identify the relationship between the cost and benefits of a proposed project; (Head first PMP)

$$BCR = \frac{\sum_{t=1}^n \frac{B_t}{(1+i)^t}}{\sum_{t=1}^n \frac{C_t}{(1+i)^t}}$$

Where

‘B’ are the benefits accruing in year ‘t’

‘C’ are the costs accruing in year ‘t’

‘i’ is the selected discount rate

‘n’ no. of years for which system will operate

The BCR should be greater than 1 for any working system, and then only it can be considered worthy.

### **3.5.3 Compound growth rate (CGR)**

Compound growth rate (CGR) for production and productivity of saffron in Kashmir using time series data was evaluated by using the formula.

$$Y = A B^t$$

Taking log on both sides

$$\log Y = \log A + t \log B$$

Assuming  $\log Y = y$

$$\log A = a$$

$$\log B = b$$

we get

$$Y = a + bt$$

where  $(t = 1, 2, \dots, n)$

After regression between  $y$  and  $t$

We have values of  $a$  and  $b$

$a = \text{constant}$

$b = \text{coefficient}$

as  $b = 1 + r$

Hence  $r = (b - 1) \times 100$

Where;

$r = \text{compound growth rate}$

$$= (\text{antilog } b - 1) \times 100$$

$t = \text{time variable; } t = 1, 2, \dots, n,$

$b = \text{regression coefficient and}$

$y = \text{index no. of production and productivity of saffron.}$

#### 3.5.4 Trend Analysis

Least square method was used to obtain the trend values of production and productivity of saffron in Kashmir.

The equation of straight line:  $y = a + bx$ .

Here 'a' is intercept, 'b' is regression coefficient, 'x' is independent variable and 'y' is dependent variable.

### **3.5.5 Marketing analysis**

#### **Identification of different marketing channels**

Collection of information regarding marketing of the saffron shall be done by visiting various markets and contacting the different intermediaries involved in marketing of same crop in the given area.

#### **Estimation of marketing efficiency**

Marketing efficiency was computed by using modified marketing efficiency measure, given by Acharya and Agarwal (2001), which was estimated by commonly used formula: -

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

Where;

ME is marketing efficiency

NPf is net price received by farmer

MC is total marketing cost

MM is total marketing margin

ML is total marketing loss

#### **Price Spread**

In the present investigation, price spread in the marketing of saffron was composed of costs of marketing incurred in rendering marketing services such as plucking, picking, assembling, grading, packing and packaging, forwarding, transporting/ parceling, wholesaling, retailing, etc, and the margins of the intermediaries. These margins and costs are influenced by the performance and efficiency of different marketing functions, which in turn, influence the returns to the farmers on the one hand and price to the consumers on the other hand. The price spread was analysed by following formula: -

$$P_S = (P_P / P_R) 100$$

Where;

$P_S$  is the producer's share in consumer's rupee

$P_P$  is the Producer's price and

$P_R$  is the retail price.

## **Chapter -4**

### **RESULTS**

The present chapter is going to put forth the results obtained from the analysis on various objectives which are already mentioned in chapter-1. The findings of the study have been presented under the following heads:

- 4.1 Cost and Returns of saffron
- 4.2 Economic viability of Saffron Cultivation
- 4.3 Impact assessment of National Saffron Mission
- 4.4 Growth and trend analysis of Saffron
- 4.5 Marketing of saffron
- 4.6 Constraint in production and marketing of saffron

#### **4.1 Cost and Returns of saffron**

The study of farm business as a whole can give an idea of the profitability of the farm and efficiency of resource use. Such a study takes into account inputs and outputs involved in the business of farming. The farm receipt consists of the value of all the produce on a farm whether sold, consumed or stocked. Similarly, the farm expenses include cost of human labour, hired as well as family, bullock labour both owned as well as hired, seed, manure and fertilizer, pesticides and other changes. The value of farm inputs varies from area to area. At the micro level, it enables the farm management experts to study the efficiency of the various cultivation practices and alter the crop planning by providing information regarding their profitability. This helps the experts to make practical recommendations for farm planning aimed at better allocation of existing resources and introduction of improved agronomic practices which would increase the efficiency of saffron production. For the present study the cost and return analysis of saffron has been worked out for economically viable life i.e., seven years. The findings are presented under following heads.

#### **4.1.1 Cost of cultivation of saffron before and after inception of NSM**

The cost of cultivation is of wide interest to the users of cost data and assumes importance in the area of planning. For the present study cost of cultivation incurred by respondents in study area has been worked out over the crop cycle of seven years. The present study compares the cost incurred by respondents in saffron cultivation before and after inception of National Saffron Mission (NSM). The findings of study are presented under following sub-heads.

##### **Cost of cultivation incurred by respondents “before inception of NSM”**

A perusal of data presented in table 4.1, 4.2, 4.3 and 4.7 reveals item wise cost of cultivation of saffron incurred by respondents before inception of NSM. The results of cost of cultivation of saffron kanal<sup>-1</sup> over a crop cycle of seven years reveals that the major item of cost incurred by all the three size groups of growers, was the amount spent on human labour followed by value of seed. Further, table 4.7 and 4.8 reveals that the average cost of cultivation kanal<sup>-1</sup> over a crop cycle of seven years was Rs. 3311, Rs. 3151 and Rs. 3109 in first, second and third size groups respectively. The establishment costs during the first year of cultivation was worked out as Rs. 6796, Rs. 6559 and Rs. 6617 for first, second and third size groups respectively which means that 29-30% of the total costs are incurred during first year of cultivation only. The cost incurred on value of seed formed its major component. It was 58.85, 60.99 and 60.45% of the establishment cost in first, second and third size groups respectively. The cost incurred on human labour was higher for size group 1<sup>st</sup> followed by 2<sup>nd</sup> and 3<sup>rd</sup> size group. The expenses on manures, fertilizers, plant protection measures, bullock and machine power formed the other cost components. The fixed cost ranged from 25 -32% of the total cost of cultivation over the period of seven years of crop cycle. The total cost of cultivation kanal<sup>-1</sup> of saffron over a crop cycle of seven years was Rs. 23177, Rs. 22057 and Rs. 21760 in first, second and third size groups respectively. The cost of cultivation was higher for first size followed by second and third size groups.

### **Cost of cultivation incurred by respondents “after inception of NSM”**

A perusal of data presented in table 4.4 to 4.7 reveals item-wise and year-wise cost of cultivation of saffron incurred by respondents after inception of NSM. The results of cost of cultivation of saffron kanal<sup>-1</sup> over a crop cycle of seven years reveals that the major item of cost incurred by the size groups 1 and 2 was the amount spent on human labour followed by value of seed; however in case of size group 3, it was value of seed followed by human labour. Further it is evident from table 4.7 that the major item of cost incurred by all the three size groups was the amount spent on value of seed followed by human labour. The average cost of cultivation kanal<sup>-1</sup> over a cropping cycle of seven years was Rs.7653, Rs. 7116 and Rs. 6432 for size group 1, 2 and 3 respectively. The average cost of cultivation kanal<sup>-1</sup> is highest for size group 1 followed by size group 2 and 3. The establishment cost during the first year was worked out as Rs. 21227, Rs. 20670 and Rs. 19965 for size group 1, 2 and 3 respectively which means that 39-44% of costs are incurred during first year of cultivation only. The cost incurred on value of seed formed its major component. It was 70.66, 72.57 and 76.28% of the establishment cost in first, second and third size groups respectively. The cost incurred on human labour was higher for size group 1<sup>st</sup> followed by 2<sup>nd</sup> and 3<sup>rd</sup> size group. The expenses on manures, fertilizers, plant protection measures, bullock and machine power formed the other cost components. The fixed cost ranged from 16 -18% of the total cost of cultivation over the period of seven years of crop cycle. The total cost of cultivation kanal<sup>-1</sup> of saffron over a crop cycle of seven years was Rs. 53571, Rs. 49814 and Rs. 45727 in first, second and third size groups respectively. The cost of cultivation was higher for first size followed by second and third size groups.

Further it is evident from table 4.1 to 4.8 that the cost of cultivation kanal<sup>-1</sup> over the crop cycle of seven years before and after inception of NSM has increased more than twice. The total cost kanal<sup>-1</sup> over a crop cycle of seven years of all the three size groups before and after inception of NSM was Rs. 22331 and Rs. 49370 respectively. While the average cost of cultivation kanal<sup>-1</sup> over a crop cycle of seven years of all three the size groups before and after inception of NSM was Rs. 3190 and Rs. 7053 respectively.

**Table 4.1: Year – wise cost of cultivation of saffron (Rupees kanal<sup>-1</sup>) before inception of NSM, Size Group- 1**

Particulars	Period (2004-05 to 2010-11)							
	Years							
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	Total
Human labour (6-Labours)	900	950	1100	1350	1450	1800	1900	9450
Family labour@2labours	300	310	350	370	420	450	500	2700
Hired labour @5labours	600	640	750	980	1030	1350	1400	6750
Bullock labour (4-pair)	440	-	-	-	-	-	-	440
Machine labour (disc plough)	150	-	-	-	-	-	-	150
Value of seed @1quintal	4000	-	-	-	-	-	-	4000
Manure (only FYM @2quintal)	106	150	170	190	210	250	270	1346
Fertilizer (N: P: K @3:2:1)	39	42	68	85	105	134	180	653
Plant protection (only Rodenticide)	20	55	35	20	36	25	50	241
Miscellaneous	45	20	55	80	25	105	70	400
Interest on working capital @4%	228	49	57	69	73	93	99	667
<b>Total variable cost</b>	<b>5928</b>	<b>1266</b>	<b>1485</b>	<b>1794</b>	<b>1899</b>	<b>2407</b>	<b>2569</b>	<b>17347</b>
Rental value of land	600	600	600	600	600	600	600	4200
Depreciation	148	148	148	148	148	148	148	1038
Interest on fixed capital @8%	120	108	96	85	73	61	49	592
Total fixed cost	868	857	845	833	821	809	797	5830
<b>Total cost</b>	<b>6796</b>	<b>2122</b>	<b>2330</b>	<b>2627</b>	<b>2720</b>	<b>3216</b>	<b>3366</b>	<b>23177</b>

Note: the figures have been rounded off.

**Table 4.2: Year – wise cost of cultivation of saffron (Rupees kanal<sup>-1</sup>) before inception of NSM, Size Group–2**

Particulars	Period (2004-05 to 2010-11)							
	Years							
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	Total
Human labour (6-Labours)	700	750	950	1250	1300	1500	1650	8100
Family labour	200	220	250	400	400	450	500	2420
Hired labour	500	530	700	850	900	1050	1150	5680
Bullock labour (3-pair)	320	–	–	–	–	–	–	320
Machine labour (disc plough)	150	–	–	–	–	–	–	150
Value of seed@1 quintal	4000	–	–	–	–	–	–	4000
Manure (only FYM@2quintal)	90	105	130	150	170	200	220	1065
Fertilizer (N: P: K, 3:2:1)	42	56	68	96	120	146	180	708
Plant protection (only Rodenticide)	25	22	32	28	26	33	21	187
Miscellaneous	20	102	58	22	35	48	45	330
Interest on working capital @4%	214	41	49	62	66	77	85	594
Total variable cost	5561	1076	1287	1608	1717	2004	2201	15454
Rental value of land	600	600	600	600	600	600	600	4200
Depreciation	227	227	227	227	227	227	227	1589
Interest on fixed capital @8%	171	152	134	116	98	80	62	813
Total fixed cost	998	979	961	943	925	907	889	6602
Total cost	<b>6559</b>	<b>2056</b>	<b>2249</b>	<b>2551</b>	<b>2642</b>	<b>2911</b>	<b>3089</b>	<b>22057</b>

Note: the figures have been rounded off.

**Table 4.3: Year – wise cost of cultivation of saffron (Rupees Kanal<sup>-1</sup>) before inception of NSM, Size Group – 3**

Particulars	Period (2004-05 to 2010-11)							
	Year							
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	Total
Human labour (6-Labours)	700	610	820	1150	1250	1400	1650	7580
Family labour	200	150	220	300	350	400	550	2170
Hired labour	500	460	600	850	900	1000	1100	5410
Bullock labour (3-pair)	320	–	–	–	–	–	–	320
Machine labour (disc plough)	150	–	–	–	–	–	–	150
Value of seed@1 quintal	4000	–	–	–	–	–	–	4000
Manure (only FYM@2quintal/Kanal)	95	80	120	120	170	200	150	935
Fertilizer (N: P: K, 3:2:1)	39	52	62	84	110	185	170	702
Plant protection (only Rodenticide)	25	22	32	28	26	33	21	187
Miscellaneous	20	102	58	22	35	48	45	330
Interest on working capital @4%	214	35	44	56	64	75	81.44	568
Total variable cost	5563	901	1136	1460	1655	1941	2117	14772
Rental value of land	600	600	600	600	600	600	600	4200
Depreciation	233	233	233	233	233	233	233	1629
Interest on fixed capital @8%	221	203	184	166	147	128	110	1159
Total fixed cost	1054	1035	1017	998	980	961	942	6988
<b>Total cost</b>	<b>6617</b>	<b>1936</b>	<b>2153</b>	<b>2458</b>	<b>2634</b>	<b>2902</b>	<b>3060</b>	<b>21760</b>

Note: the figures have been rounded off.

**Table 4.4: Year – wise cost of cultivation of saffron (Rupees Kanal<sup>-1</sup>) after inception of NSM, Size Group - 1**

Particulars	Period (2011-12 to 2017-18)							
	Year							
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	Total
Human labour (6-Labours)	1850	2250	2500	2700	2950	3100	2800	18150
Family labour	450	600	700	750	850	900	700	4950
Hired labour	1400	1650	1800	1950	2100	2200	2100	13200
Bullock labour(4-pair)	820	-	-	-	-	-	-	820
Machine labour	250	-	-	-	-	-	-	250
Value of seed @2.5q	15000	-	-	-	-	-	-	15000
Manure (FYM@5quintal + Vermicompost@10 kg)	542	520	620	420	650	740	680	4172
Fertilizer (N: P: K, 5:5:3)	360	360	410	450	430	510	580	3100
Plant protection (Seed treatment & Rodenticide)	80	90	75	105	90	120	150	710
Miscellaneous	120	80	120	150	50	70	95	685
Interest on working capital @4%	765	132	149	153	167	182	172	1719
Total variable cost	19887	3432	3874	3978	4337	4722	4477	44706
Rental value of land	800	800	800	800	800	800	800	5600
Depreciation	309	309	309	309	309	309	309	2165
Interest on fixed capital @8%	231	207	182	157	132	108	83	1099
Total fixed cost	1341	1316	1291	1266	1242	1217	1192	8864
<b>Total cost</b>	<b>21227</b>	<b>4748</b>	<b>5165</b>	<b>5244</b>	<b>5578</b>	<b>5938</b>	<b>5669</b>	<b>53571</b>

Note: the figures have been rounded off.

**Table 4.5: Year – wise cost of cultivation of saffron (Rupees Kanal<sup>-1</sup>) after inception of NSM, Size Group -2**

Particulars	Period (2011-12 to 2017-18)							
	Year							Total
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	
Human labour (6- labours)	1680	1855	1850	2260	2320	2500	2875	15340
Family labour	560	615	610	740	720	700	853	4780
Hired labour	1120	1240	1240	1520	1600	1800	2040	10560
Bullock labour (3-Pair)	600	–	–	–	–	–	–	600
Machine labour	220	–	–	–	–	–	–	220
Value of seed	15000	–	–	–	–	–	–	15000
Manure (5quintal+ 10Kg Vermicompost)	542	520	620	420	650	740	680	4172
Fertilizer (N: P: K, 5:4:2)	340	340	410	450	420	510	580	3050
Plant protection (Seed treatment & Rodenticide)	105	90	65	45	70	58	60	493
Miscellaneous	125	70	102	94	50	72	93	606
Interest on working capital @4%	744	115	122	131	140	155	172	1579
<b>Total variable cost</b>	19356	2990	3169	3400	3650	4035	4460	41060
Rental value of land	800	800	800	800	800	800	800	5600
Depreciation	263	263	263	263	263	263	263	1838
Interest on fixed capital @8%	251	230	209	188	167	146	125	1316
<b>Total fixed cost</b>	1314	1292	1272	1251	1230	1209	1188	8754
<b>Total cost</b>	<b>20670</b>	<b>4283</b>	<b>4440</b>	<b>4650</b>	<b>4880</b>	<b>5244</b>	<b>5647</b>	<b>49814</b>

Note: the figures have been rounded off.

**Table 4.6: Year – wise cost of cultivation of saffron (Rupees Kanal<sup>-1</sup>) after inception of NSM, Size Group- 3**

Particulars	Period (2011-12 to 2017-18)							
	Year							
	1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	Total
Human labour (3–Labours)	750	740	960	960	1100	1280	1450	7240
Family labour	150	140	320	320	300	350	450	2030
Hired labour	600	600	640	640	800	930	1000	5210
Bullock labour	620	–	–	–	–	–	–	620
Machine labour	400	550	650	720	630	700	600	4250
Value of seed	15000	–	–	–	–	–	–	15000
Manure (5quintal+ 10Kg Vermicompost /Kanal)	542	520	620	420	650	740	680	4172
Fertilizer (N: P: K, 5:5:3)	340	340	410	450	420	510	580	3050
Plant protection (Seed treatment & Rodenticide)	105	90	65	45	70	58	60	493
Miscellaneous	50	45	42	36	55	40	70	338
Interest on working capital @4%	712	91	110	105	117	133	138	1407
<b>Total variable cost</b>	18519	2376	2857	2736	3042	3461	3578	36570
Rental value of land	800	800	800	800	800	800	800	5600
Depreciation	202	202	202	229	229	237	238	1540
Interest on fixed capital @8%	144	128	111	173	156	162	143	1018
<b>Total fixed cost</b>	1146	1130	1114	1202	1185	1200	1181	8158
<b>Total cost</b>	<b>19665</b>	<b>3506</b>	<b>3971</b>	<b>3938</b>	<b>4227</b>	<b>4661</b>	<b>4759</b>	<b>44727</b>

Note: the figures have been rounded off.

**Table 4.7: Item-wise cost of cultivation of saffron for different size groups over a cropping cycle of seven years before and after inception of NSM**

Particulars	Before NSM				After NSM			
	Group-1	Group-2	Group-3	Average	Group-1	Group-2	Group-3	Average
Human labour	9450	8100	7580	<b>8377</b>	18150	15340	7240	<b>13577</b>
Bullock labour	440	320	320	<b>360</b>	820	600	620	<b>680</b>
Machine labour	150	150	150	<b>150</b>	250	220	4250	<b>1573</b>
Value of seed	4000	4000	4000	<b>4000</b>	15000	15000	15000	<b>15000</b>
Manure	1346	1065	935	<b>1115</b>	4172	4172	4172	<b>4172</b>
Fertilizer	653	708	702	<b>688</b>	3100	3050	3050	<b>3067</b>
Plant protection	241	187	187	<b>205</b>	710	493	493	<b>565</b>
Miscellaneous	400	330	330	<b>353</b>	685	606	338	<b>543</b>
Interest on working capital	667	594	568	<b>610</b>	1719	1579	1407	<b>1568</b>
<b>Total variable cost</b>	17347	15454	14772	<b>15858</b>	44706	41060	36570	<b>40779</b>
Rental value of land	4200	4200	4200	<b>4200</b>	5600	5600	5600	<b>5600</b>
Depreciation	1038	1589	1629	<b>1419</b>	2165	1838	1540	<b>1847</b>
Interest on fixed capital	592	813	1159	<b>855</b>	1099	1316	1018	<b>1144</b>
<b>Total fixed cost</b>	5830	6602	6988	<b>6473</b>	8864	8754	8158	<b>8592</b>
<b>Total cost (a + b)</b>	<b>23177</b>	<b>22057</b>	<b>21760</b>	<b>22331</b>	<b>53571</b>	<b>49814</b>	<b>44727</b>	<b>49370</b>

Note: the figures have been rounded off.

**Table 4.8: Year wise cost of cultivation (Rupees kanal<sup>-1</sup>) of saffron for different size groups before and after inception of NSM**

<b>Before mission (2004-05 to 2010-11)</b>				
<b>Years</b>	<b>Group -1(0-4 Kanal)</b>	<b>Group -2(4-8 Kanal)</b>	<b>Group- 3(8 &amp; Above)</b>	<b>Average</b>
<b>1</b>	6796	6559	6617	6657
<b>2</b>	2122	2056	1936	2038
<b>3</b>	2330	2249	2153	2244
<b>4</b>	2627	2551	2458	2545
<b>5</b>	2720	2642	2634	2665
<b>6</b>	3216	2911	2902	3009
<b>7</b>	3366	3089	3060	3172
<b>Total</b>	<b>23177</b>	<b>22057</b>	<b>21760</b>	<b>22331</b>
<b>Average</b>	<b>3311</b>	<b>3151</b>	<b>3109</b>	<b>3190</b>
<b>After mission (2011-12 to 2017-18)</b>				
<b>Years</b>	<b>Group -1</b>	<b>Group -2</b>	<b>Group- 3</b>	<b>Average</b>
<b>1</b>	21227	20670	19665	20521
<b>2</b>	4748	4283	3506	4179
<b>3</b>	5165	4440	3971	4525
<b>4</b>	5244	4650	3938	4611
<b>5</b>	5578	4880	4227	4895
<b>6</b>	5938	5244	4661	5281
<b>7</b>	5669	5647	4759	5358
<b>Total</b>	<b>53571</b>	<b>49814</b>	<b>45727</b>	<b>49370</b>
<b>Average</b>	<b>7653</b>	<b>7116</b>	<b>6390</b>	<b>7053</b>

Note: the figures have been rounded off.

#### **4.1.2 Returns from saffron before and after inception of NSM**

The returns from saffron includes main product, by product and daughter corms. The returns were calculated over a cropping cycle of seven years before and after inception of NSM. The present study compares the returns obtained from saffron cultivation before and after inception of NSM. The findings of study are presented under following sub-heads.

##### **Returns from saffron before inception of NSM**

A perusal of data presented in table 4.9 to 4.11 depicts that the gross returns kanal<sup>-1</sup> in a planting cycle of seven years was Rs. 69280, Rs. 68015 and Rs. 67176 for size group 1, 2 and 3 respectively. The yield from saffron remains relatively low in first year and increases considerably from second year onwards. The yield from daughter corms is received after the completion of cropping cycle. The gross returns were lowest during the first year and highest during the seventh year. The table 4.15 depicts that gross returns in a planting cycle of seven years were highest for size group 1 followed by 2 and 3.

The average returns kanal<sup>-1</sup> were Rs. 9897, Rs. 9716 and Rs. 9597 for size group 1, 2 and 3 respectively. The average returns were highest for size group 1 followed by 2 and 3 (table 4.15).

Further table 4.16 reveals net reruns kanal<sup>-1</sup> obtained by respondents were negative in 1<sup>st</sup> year. The net returns in a planting cycle of seven years were Rs. 46103, Rs. 45958 and Rs. 45416 for size group 1, 2 and 3 respectively.

##### **Returns from saffron after inception of NSM**

A perusal of data presented in table 4.12 to 4.14 depicts that the gross returns kanal<sup>-1</sup> in a planting cycle of seven years was Rs. 167140, Rs. 158244 and Rs. 146386 for size group 1, 2 and 3 respectively. The gross returns over a crop cycle of seven years were highest for size group 1 followed by 2 and 3. The gross returns over a planting cycle of seven years for all the three size groups were lowest for first year and highest for seventh year.

A perusal of data presented in table 4.15 depicts the average returns kanal<sup>-1</sup> in a planting cycle of seven year were Rs. 167140, Rs.158244 and Rs. 146386 for size group 1, 2 and 3 respectively. The average returns over a cropping cycle of seven years is highest for size group 1 followed by 2 and 3.

The table 4.16 presents net returns kanal<sup>-1</sup> of saffron for size group 1, 2 and 3. The net returns were negative during first year and increases from second year onwards. The net returns in a planting cycle of seven years were Rs. 113569, Rs. 108431, Rs. 101359 for size group 1, 2 and 3 respectively.

Further it can be concluded from table 4.16 that the area-wise net returns obtained by respondents before and after the launch of National Saffron Mission has shown an increased net returns of more than two times.

**Table 4.9: Year-wise gross returns from saffron (Rupees kanal<sup>-1</sup>) before inception of NSM, Size group-1**

Period (2004-05 to 2010-11)									
Year	Main product		By product						Total Returns (Rs)
	Stigma (Laccha)		Stamens (Pati)		Petals (Phool pati)		Daughter Corm		
	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	
1	0.056	840	0.028	84	0.560	42	–	–	966
2	0.086	2150	0.043	129	0.860	65	–	–	2344
3	0.094	3760	0.047	141	0.940	94	–	–	3995
4	0.102	10710	0.051	204	1.020	102	–	–	11016
5	0.106	12720	0.053	212	1.060	159	–	–	13091
6	0.108	13500	0.049	294	0.980	147	–	–	13941
7	0.110	13750	0.055	385	1.100	193	192	9600	23928
<b>Total</b>	<b>0.662</b>	<b>57430</b>	<b>0.326</b>	<b>1449</b>	<b>6.52</b>	<b>801</b>	<b>192</b>	<b>9600</b>	<b>69280</b>

Note: the figures have been rounded off.

Table 4.10: Year-wise gross returns from saffron (Rupees kanal<sup>-1</sup>) before inception of NSM, Size group-2

Period (2004-05 to 2010-11)									
Year	Main product		By product						Total Returns (Rs)
	Stigma (Laccha)		Stamens (Pati)		Petals (Phool Pati)		Daughter Corm		
	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	
1	0.052	780	0.026	78	0.52	39	–	–	897
2	0.082	2050	0.041	123	0.82	62	–	–	2235
3	0.088	3520	0.044	132	0.88	88	–	–	3740
4	0.104	10920	0.052	208	1.04	104	–	–	11232
5	0.104	12480	0.052	208	1.04	156	–	–	12844
6	0.105	13125	0.053	318	1.05	158	–	–	13601
7	0.108	13500	0.054	378	1.08	189	188	9400	23467
<b>Total</b>	<b>0.643</b>	<b>56375</b>	<b>0.322</b>	<b>1445</b>	<b>6.43</b>	<b>795</b>	<b>188</b>	<b>9400</b>	<b>68015</b>

Note: the figures have been rounded off.

Table 4.11: Year-wise gross returns from saffron (Rupees kanal<sup>-1</sup>) before inception of NSM, Size group-3

Period (2004-05 to 2010-11)									
Year	Main product		By product						Total Returns (Rs)
	Stigma (Laccha)		Stamens (Pati)		Petals (Phool Pati)		Daughter Corm		
	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	
1	0.051	750	0.025	75	0.500	38	–	–	863
2	0.078	1950	0.039	117	0.780	58.5	–	–	2126
3	0.086	9030	0.043	129	0.860	86	–	–	3655
4	0.102	14280	0.051	204	1.020	102	–	–	11016
5	0.103	18540	0.052	208	1.030	103	–	–	12671
6	0.105	12600	0.056	336	1.050	158	–	–	13619
7	0.111	11000	0.055	385	1.100	193	178	8900	23228
<b>Total</b>	<b>0.634</b>	<b>68150</b>	<b>0.321</b>	<b>1454</b>	<b>6.340</b>	<b>737</b>	<b>178</b>	<b>8900</b>	<b>67176</b>

Note: the figures have been rounded off.

**Table 4.12: Year-wise gross returns from saffron (Rupees kanal<sup>-1</sup>) after inception of NSM, Size group-1**

Period (2011-12 to 2017-18)									
Year	Main product		By product						Total Returns (Rs)
	Stigma		Stamens (pati)		Petals (Phool pati)		Daughter Corm		
	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	
1	0.058	6960	0.029	203	0.580	116	–	–	7279
2	0.104	10400	0.052	420	1.040	300	–	–	11120
3	0.134	16200	0.067	568	1.340	426	–	–	17194
4	0.076	11780	0.038	304	0.760	228	–	–	12312
5	0.156	23400	0.078	624	1.560	546	–	–	24570
6	0.162	22680	0.081	729	1.620	648	–	–	24057
7	0.064	8000	0.032	320	0.640	288	476	62000	70608
<b>Total</b>	<b>0.754</b>	<b>99420</b>	<b>0.377</b>	<b>3168</b>	<b>7.540</b>	<b>2552</b>	<b>476</b>	<b>62000</b>	<b>167140</b>

Note: the figures have been rounded off.

**Table 4.13: Year-wise gross returns from saffron (Rupees kanal<sup>-1</sup>) after inception of NSM, Size group-2**

Period (2011-12 to 2017-18)									
Year	Main product		By product						Total Returns (Rs)
	Stigma		Stamens (pati)		Petals (Phool pati)		Daughter Corm		
	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	
1	0.056	6720	0.028	196	0.560	112	–	–	7028
2	0.100	10000	0.050	385	1.000	275	–	–	10660
3	0.128	15360	0.064	520	1.280	390	–	–	16270
4	0.072	11160	0.036	272	0.720	204	–	–	11636
5	0.146	20440	0.071	568	1.430	501	–	–	21509
6	0.156	21840	0.078	684	1.560	608	–	–	23132
7	0.061	7625	0.031	310	0.610	275	460	59800	68010
<b>Total</b>	<b>0.719</b>	<b>93145</b>	<b>0.358</b>	<b>2935</b>	<b>7.16</b>	<b>2364</b>	<b>460</b>	<b>59800</b>	<b>158244</b>

Note: the figures have been rounded off.

**Table 4.14: Year-wise gross returns from saffron (Rupees kanal<sup>-1</sup>) after inception of NSM, Size group-3**

Period (2011-12 to 2017-18)									
Year	Main product		By product						Total returns (Rs)
	Stigma		Stamens (pati)		Petals (Phool pati)		Daughter Corm		
	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	Quantity (kg)	Value (Rs)	Quantity (Kg)	Value (Rs)	
1	0.054	6480	0.027	189	0.540	108	–	–	6777
2	0.92	9200	0.053	371	1.050	263	–	–	9834
3	0.110	13200	0.063	504	1.250	375	–	–	14079
4	0.058	8990	0.029	232	0.580	174	–	–	9396
5	0.141	19740	0.071	568	1.410	494	–	–	20802
6	0.148	19240	0.074	666	1.480	592	–	–	20498
7	0.058	7250	0.029	290	0.580	261	440	57200	65001
<b>Total</b>	<b>1.489</b>	<b>84100</b>	<b>0.346</b>	<b>2820</b>	<b>6.89</b>	<b>2266</b>	<b>440</b>	<b>57200</b>	<b>146386</b>

Note: the figures have been rounded off.

**Table 4.15: Year wise gross returns from saffron of different size groups before and after inception of NSM, (Rupees kanal<sup>-1</sup>).**

<b>Before mission (2004-05 to 2010-11)</b>				
<b>Years</b>	<b>Group -1</b>	<b>Group -2</b>	<b>Group- 3</b>	<b>Average</b>
<b>1</b>	966	897	863	909
<b>2</b>	2344	2235	2126	2235
<b>3</b>	3995	3740	3655	3797
<b>4</b>	11016	11232	11016	11088
<b>5</b>	13091	12844	12671	12869
<b>6</b>	13941	13601	13619	13720
<b>7</b>	23928	23467	23228	23541
<b>Total</b>	<b>69280</b>	<b>68015</b>	<b>67176</b>	<b>68157</b>
<b>Average</b>	<b>9897</b>	<b>9716</b>	<b>9597</b>	<b>9737</b>
<b>After mission (2011-12 to 2017-18)</b>				
<b>Years</b>	<b>Group -1</b>	<b>Group -2</b>	<b>Group- 3</b>	<b>Average</b>
<b>1</b>	7279	7028	6777	7028
<b>2</b>	11120	10660	9834	10538
<b>3</b>	17194	16270	14079	15848
<b>4</b>	12312	11636	9396	11115
<b>5</b>	24570	21509	20802	22293
<b>6</b>	24057	23132	20498	22562
<b>7</b>	70608	68010	65001	67873
<b>Total</b>	<b>167140</b>	<b>158244</b>	<b>146386</b>	<b>157257</b>
<b>Average</b>	<b>23877</b>	<b>22606</b>	<b>20912</b>	<b>22465</b>

Note: figures have been rounded off.

**Table 4.16: Year wise net returns from saffron of different growers before and after inception of NSM, (Rupees kanal<sup>-1</sup>)**

<b>Before mission (2004-05 to 2010-11)</b>				
<b>Years</b>	<b>Group -1</b>	<b>Group -2</b>	<b>Group- 3</b>	<b>Average</b>
<b>1</b>	-5830	-5662	-5755	-5749
<b>2</b>	221	179	189	196
<b>3</b>	1665	1491	1502	1553
<b>4</b>	8389	8681	8558	8543
<b>5</b>	10371	10202	10037	10203
<b>6</b>	10725	10690	10717	10711
<b>7</b>	20561	20378	20168	20369
<b>Total</b>	<b>46103</b>	<b>45958</b>	<b>45416</b>	<b>45826</b>
<b>Average</b>	<b>6586</b>	<b>6565</b>	<b>6488</b>	<b>6547</b>
<b>After mission (2010-11 to 2017-18)</b>				
<b>Years</b>	<b>Group -1</b>	<b>Group -2</b>	<b>Group- 3</b>	<b>Average</b>
<b>1</b>	-13948	-13642	-13188	-13593
<b>2</b>	6372	6378	6327	6359
<b>3</b>	12029	11830	10108	11322
<b>4</b>	7068	6986	5458	6504
<b>5</b>	18992	16629	16575	17398
<b>6</b>	18119	17888	15837	17281
<b>7</b>	64939	62362	60242	62514
<b>Total</b>	<b>113569</b>	<b>108431</b>	<b>101359</b>	<b>107786</b>
<b>Average</b>	<b>16224</b>	<b>15490</b>	<b>14480</b>	<b>15398</b>

Note: figures have been rounded off.

## **4.2 Economic viability of Saffron Cultivation**

Economic viability of saffron cultivation was worked out by determining benefit cost ratio, net present value, internal rate of return and payback period. The economic feasibility of saffron enterprise was examined before and after launch of NSM for the crop cycle of seven years respectively. The findings are put as under.

### **4.2.1 Economic viability of saffron cultivation before and after inception of NSM**

A perusal of data presented in table 4.17 reveals that benefit cost ratio (B-C ratio) at 12 % discounting rate for size group 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> before inception of NSM was found 2.40, 2.46 and 2.46 respectively while it was found 2.42, 2.46, and 2.48 for respective size groups after inception of NSM. The average B-C ratio for all the three size groups before and after inception of NSM was found 2.44 and 2.45 respectively. Further B-C ratio without discounting rate was found 2.99, 3.08 and 3.08 for size group 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> respectively while after inception of NSM the it found 3.12, 3.18 and 3.25 for respective groups. The average B-C ratio without discounting before and after inception of NSM was found 3.05 and 3.18 respectively.

The net present value (NPV) at discounting rate 12% was found Rs. 22105, Rs. 22086 and Rs. 21766 for size group 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> respectively before inception of NSM while it was found Rs. 55005, Rs. 52466 and Rs. 48606 after inception of NSM for respective groups. The average NPV at 12 % discounting rate for all the three size groups before and after inception of NSM was found Rs. 21986 and Rs. 52026 respectively. Further NPV without discounting rate was found Rs. 46103, Rs. 45958 and Rs. 45416 for size group 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> respectively before inception of NSM while after inception of NSM the it found Rs. 113569, Rs. 108430 and Rs. 101359 for respective groups. The average NPV

without discounting for all the three groups before and after inception of NSM was found Rs. 45826 and Rs. 107786 respectively.

The internal rate of return (IRR) at 12% discounting rate was found 65.91%, 66.88% and 65.87% for size group 1<sup>st</sup>, 2<sup>nd</sup> and 3<sup>rd</sup> respectively before inception of NSM while it was 76.91%, 75.98% and 73.85% after inception of NSM for respective groups. The average IRR was found 66.22% and 75.58% before and after inception of NSM respectively.

The payback period (PBP) for all the three size groups was found 5<sup>th</sup> year before inception of NSM and 4<sup>th</sup> after inception of NSM.

Further it is evident from table 4.17 that B-C ratio before and after inception of NSM remained almost same. There has been an increase in net return of more than two times after inception of NSM. The IRR has also increased after inception of NSM. While the PBP has reduced by one year after inception of NSM.

**Table 4.17: Economic viability of Saffron Cultivation before and after launch of National Saffron Mission**

S.No.	Particulars	Before NSM				After NSM			
		Group - 1	Group -2	Group - 3	Average	Group -1	Group -2	Group - 3	Average
1	<b>B -C ratio</b>								
	a. At 12% discounting rate	2.40	2.46	2.46	<b>2.44</b>	2.42	2.46	2.48	<b>2.45</b>
	b. Undiscounted	2.99	3.08	3.08	<b>3.05</b>	3.12	3.18	3.25	<b>3.18</b>
2	<b>NPV (Rs)</b>								
	a. At 12% discounting rate	22105	22086	21766	<b>21986</b>	55005	52466	48606	<b>52026</b>
	b. Undiscounted	46103	45958	45416	<b>45826</b>	113569	108430	101359	<b>107786</b>
3	<b>IRR (%)</b>	65.91	66.88	65.87	<b>66.22</b>	76.91	75.98	73.85	<b>75.58</b>
4	<b>PBP (years)</b>	5 <sup>th</sup>	5 <sup>th</sup>	5 <sup>th</sup>	<b>5<sup>th</sup></b>	4 <sup>th</sup>	4 <sup>th</sup>	4 <sup>th</sup>	<b>4<sup>th</sup></b>

### 4.3 Impact assessment of NSM

The impact assessment of NSM in Kashmir was worked out by using secondary source of data available from various sources. The component wise impact study of NSM is as follows: -

#### 4.3.1 Rejuvenation of exiting saffron area for improving productivity

A perusal of the data presented in Table 4.18 would reveal that the department has been able to rejuvenate only 2391.25 ha as against a target of 3715 ha. The table further reveals that only 1874 ha out of 3200 ha has been rejuvenated in Pulwama under NSM till 2018. The total number of farm operating families (FOF) which were provided with incentives under NSM in J & K are 25293 out of the total 32401. In Srinagar and Kishtwar all FOF were covered under NSM however, in Pulwama and Budgam targets have not been achieved till 2018.

**Table 4.18 District wise targeted area and achievements under NSM**

District	Area(ha)		FOF	Incentives provided to FOF
	Target	Achievement		
Pulwama	3200	1874	16140	9918
Budgam	300	328	7225	6339
Srinagar	165	166.25	1380	1380
Kishtwar	50	50	7656	7656
<b>Total</b>	<b>3715</b>	<b>2391.25</b>	<b>32401</b>	<b>25293</b>

Source: Directorate of Agriculture Kashmir, 2019.

#### 4.3.2 Improving Soil Health

A perusal of the data presented in Table 4.18 would reveal that the department has successfully through INM, IPM and IDM improved soil health of 2391.25 ha as against a target of 3715 ha. Further the data available from

directorates of agriculture Kashmir reveals that 758 vermicompost units have been established since the inception of the Mission till 2018.

### 4.3.3 Saffron Mechanization

A perusal of the data presented in Table 4.19 would reveal that the Department was able to distribute 437 out of the sanctioned 507 weeders @ Rs.1.0 lakh/weeder with 50% subsidy support. Besides seven weeders were also distributed with 100% assistance for public farms. Further, four planters and four tractors were distributed for establishment of public nurseries at Government farms and for custom hiring at farmers' fields in Pulwama and Budgam districts.

**Table 4.19 Distribution of soil mechanization implements under NSM**

S.No	Implements (No.)	Sanctioned (No.)	Achievements	Percentage achievement
01	weeders	507	437	86
02	Tractors	04	04	100
03	Planters	04	04	100

Source: Directorate of Agriculture Kashmir, 2019.

### 4.3.4 Enhancing product quality

A perusal of data presented in table 4.20 reveals that 8000 Hot Air Dryers were to be distributed to the farmers but only 223 Hot Air Dryers have been distributed till 2018.

**Table 4.20: Distribution of post-harvest equipment's under NSM**

S.No.	Equipment	Targets	Achievements	Percentage achievement
01	Solar/hot air dryer	8000	223	27.88

Source: Directorate of Agriculture Kashmir, 2019.

#### 4.3.5 Transfer of Technology

A data available from Directorate of Agriculture Kashmir reveals that 200 demonstrations of 250 m<sup>2</sup> have been established since the inception of Mission based upon technological backstopping/scientific interventions from SKUAST-Kashmir.

#### 4.3.6 Irrigation system under NSM

A perusal of data presented in table 4.21 reveals the details of irrigation system provided under NSM. There was a need to establish 128 bore-wells with 100 per cent project assistance in the targeted area to be brought under rejuvenation with complete network of sprinklers. Each bore well shall had to irrigate 30 hectares of Saffron area, however, under this component major shortfall was reported in harnessing of bore-wells by way of installation of electro mechanical equipment and providing of sprinkler system under strengthening of irrigation system component.

**Table 4.21: Details of Irrigation system under NSM**

S. No.	Particulars	Total Target	Total Achievement	Shortfall
01	Production wells private sector	126	111	15
02	Production wells in Public Sector	02	02	00
<b>Total</b>		<b>128</b>	<b>113</b>	<b>15</b>
03	Harnessing of Bore-wells by way of installation of electro mechanical equipment	128	108	20
04	Sprinkler irrigation system (with cumulative command of 207 ha as against 250 ha)	128	08	120

Source: Directorate of Agriculture Kashmir, 2019.

#### **4.3.7 Quality testing and marketing**

A data available from Director Agriculture Kashmir reveals that under this component Indian International Kashmiri Saffron Trading Center (IIKSTC) with a revised project cost of Rs. 37.81 crore, was constructed under National Saffron Mission at Dussu, Pampore. The facility viz. collection centre, cold storage unit, stigma separation unit, quality evaluation lab, drying unit, processing block, packaging unit is complete in all respects with certain incompleteness needed but the facility has not been handed over by the National Horticulture Board (NHB) to the Government of J & K as on date. The E-auction Centre has been completed.

The IIKSTC has been provided with the best of machinery and equipments viz. Analytical balances, Moisture weighing balance, pH. meter, Polari meter, Refractometer, Fiber extractor, Total Kjeldahl Nitrogen System, Double Beam VU Visible Spectrophotometer, Atomic Absorption Spectrophotometer, High pressure liquid chromatography (HPLC), Liquid Chromatography Mass Spectrophotometer (LCMS), Gas Chromatography Mass Spectrophotometer (GC-MS), BOD incubators/Autoclave/Laminar air flow and the Technical resource persons posted there have been well trained at different reputed institutes across the country viz. Spices Board, NABL. The E-Auction Software was developed with the help of National Stock Exchange (NSE).

#### **4.4 Growth and trend analysis of saffron**

In this section compound growth rate and trend values of area, production and productivity of saffron in Jammu and Kashmir were estimated separately by using exponential form of regression model and ordinary least square method respectively. The findings are presented under following heads.

##### **4.4.1 Compound growth rate of area, production and productivity of saffron in Jammu & Kashmir**

A perusal of data presented in table 4.22 reveals that area under saffron cultivation in Jammu and Kashmir has shown compound growth rate of -0.17%

while as production and productivity has shown compound growth rate of 0.07% and 3.15% respectively. Further it can be concluded that area under saffron cultivation has decreased significantly, while as production and productivity of saffron over past two decades in J & K has increased non-significantly. The area under saffron cultivation in J & K has declined from 5707 ha in 1996-97 to 3715 ha in 2017-18. In past two decades, the highest production and productivity of saffron in J & K was found in year 2016-17 which was 16.45 MT and 4.42 kg/ha respectively.

#### **4.4.2 Compound growth rate of area, production and productivity of saffron in J & K under NSM**

A perusal of data presented in table 4.23 reveals that the targeted area for rejuvenation of saffron was 3715 ha under NSM, however this area was brought under rejuvenation with the compound growth rate of 29.37%. The table further reveals that production and productivity under NSM has shown compound growth rate of 18.36% and -8.52% respectively while as production and productivity under traditional system has shown compound growth rate of -22.26% and -29.92% respectively. The overall compound growth rate of production and productivity of saffron in J & K was found -5.18% and -5.15% respectively from 2011-12 to 2017-18.

**Table 4.22: Compound growth rate of area, production and productivity of saffron in J & K from 1996-97 to 2017-18**

S.No.	Year	Area(ha)	Production (MT)	Productivity (Kg/ha)
01	1996-97	5707	15.95	2.80
02	1997-98	4618	13.39	2.90
03	1998-99	4116	12.88	3.13
04	1999-00	3997	7.65	1.89
05	2000-01	2831	3.59	1.27
06	2001-02	2713	0.30	0.095
07	2002-03	2825	6.50	2.28
08	2003-04	2742	5.15	1.88
09	2004-05	3143	6.86	2.23
10	2005-06	3010	6.50	2.15
11	2006-07	3280	8.20	2.50
12	2007-08	3280	7.70	2.34
13	2008-09	3785	9.46	2.50
14	2009-10	3715	10.40	2.75
15	2010-11	3715	10.03	2.69
16	2011-12	3715	10.79	2.90
17	2012-13	3715	12.45	3.34
18	2013-14	3715	14.01	3.77
19	2014-15	3715	5.57	1.50
20	2015-16	3715	16.17	4.35
21	2016-17	3715	16.45	4.42
22	2017-18	3715	5.20	1.40
<b>CGR</b>		<b>-0.17*</b> (0.0026)	<b>0.07</b> (0.0122)	<b>3.15</b> (0.0111)

Source: Directorate of Agriculture Kashmir, 2019.

\*- At 5% level of significance

Figures in parenthesis indicate standard error of coefficient

**Table 4.23: Compound growth rate of area, production and productivity under NSM and traditional system from 2011-12 to 2017-18. (Area in ha, Production in MT and Productivity in kg/ha)**

Year	Rejuvenated method			Traditional method			Over all		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
2011-12	331	1.49	4.5	3384	9.30	2.75	3715	10.79	2.90
2012-13	1274	5.73	4.5	2441	6.71	2.75	3715	12.45	3.34
2013-14	1802	8.65	4.8	1913	5.36	2.80	3715	14.01	3.77
2014-15	1959	2.94	1.50	1756	2.63	1.50	3715	5.57	1.50
2015-16	2135	11.74	5.50	1580	4.42	2.80	3715	16.17	4.35
2016-17	2218	12.19	5.49	1497	4.26	2.85	3715	16.45	4.42
2017-18	2391.25	3.92	1.64	1323.75	1.28	0.08	3715	5.20	1.40
<b>CGR</b>	<b>29.37*</b> (0.3766)	<b>18.36</b> (0.0617)	<b>-8.52</b> (0.0479)	<b>-13.27*</b> (0.0087)	<b>-22.26*</b> (0.0322)	<b>-29.92</b> (0.0939)	<b>0</b> (0)	<b>-5.18</b> (0.0421)	<b>-5.15</b> (0.0421)

Source: Directorate of Agriculture Kashmir, 2019.

\*- At 5% level of significance

Figures in parenthesis indicate standard error of coefficient

#### 4.4.3 Compound growth rate of export of saffron from J&K

A perusal of data presented in table 4.24 reveals that the compound growth rate of export of saffron in MT from J & K was found 0.29%. The export of saffron in MT from J & K has shown an increasing trend from year 1996-97 to 2017-18.

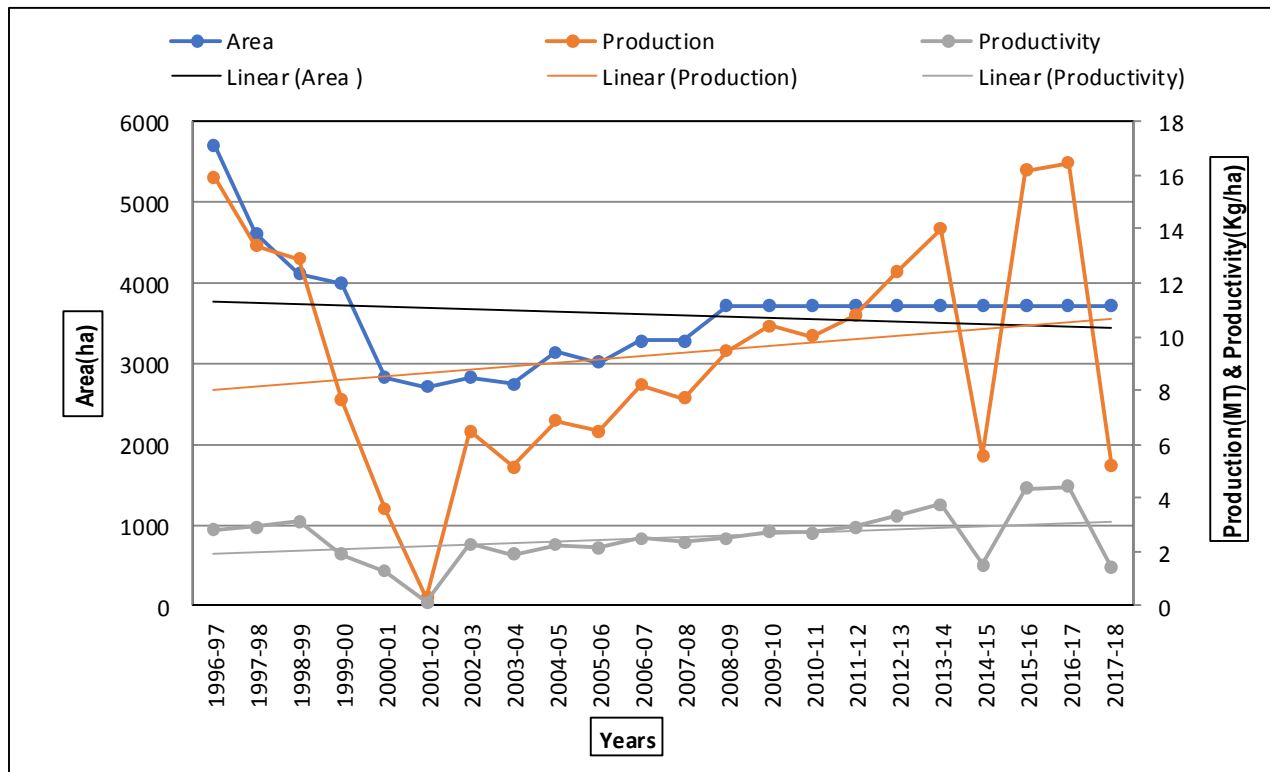
**Table 4.24: Compound growth rate of export of saffron from J&K from 1996-97 to 2017-18**

S.No.	Year	Quantity (MT)	Value (Million Rs.)
1	1996-97	2.13	7.00
2	1997-98	6.57	25.00
3	1998-99	9.77	35.50
4	1999-00	8.14	27.40
5	2000-01	2.82	16.20
6	2001-02	2.15	19.80
7	2002-03	5.78	25.80
8	2003-04	6.98	30.60
9	2004-05	5.19	20.90
10	2005-06	6.08	20.10
11	2006-07	7.18	40.80
12	2007-08	2.03	22.50
13	2008-09	3.90	66.00
14	2009-10	1.59	59.80
15	2010-11	4.80	63.30
16	2011-12	5.89	94.50
17	2012-13	8.59	93.40
18	2013-14	6.40	106.70
19	2014-15	5.43	101.20
20	2015-16	6.50	107.10
21	2016-17	6.16	106.80
22	2017-18	2.63	68.50
<b>CGR</b>		<b>0.29</b> (0.0026)	<b>10.73</b> (0.0058)

Source: Center for Monitoring Indian Economy (CMIE), 2019.  
Figures in parenthesis indicate standard error of coefficient

#### **4.4.4 Trends in area, production and productivity of saffron in J & K**

Jammu and Kashmir agriculture has an international identity. The world's best saffron is grown in the valley and its major intensity is in district Pulwama and Budgam. Nearly 90% of the total area in the state under the crop is cultivated in Kashmir province only. Its cultivation in Jammu division is limited to district Kishtwar only. Saffron is a rain fed crop and the main output of the crop is a dark red substance obtained from the flowers called the saffron. Saffron is a Kharief crop. It is evident from figure 1 that saffron cultivation has majorly declined from 1996-97 to 2001-02 in terms of area, production and average yield rate, because of inadequate irrigation facilities and increasing diversion of agricultural land into urbanisation and industrialization. After 2003-04 with the coming of Horticulture Technology Mission (MM-I and MM-II), National Agriculture Technology Project (NATP) and National Agriculture Innovation Project (NAIP) the crop got the technological boost and incentives for area expansion and production with the result area since then increased up to 3785 ha and production up to 9.46 MT by 2008-09. Further after launch of NSM the production and productivity has increased but area under saffron cultivation has remained same i.e. 3715 ha. It is evident from figure 1. That area under saffron cultivation has shown decreasing trend while as production and productivity has shown increasing trend from 1996-97 to 2017-18.



**Fig. 1: Trends in area, production and productivity of saffron in J & K**

#### 4.5 Marketing pattern of saffron in Kashmir

In this section an attempt was made to study the important parameters of saffron marketing like market functionaries, marketing costs, losses and margins, issues of efficiency, price realized by the growers and price spread in the study region.

It was revealed from study that marketing system of saffron in Kashmir is not organised and systematic, as it has largely been in the hands of private enterprises, there exists a long chain of intermediaries between the producer and the ultimate consumer.

The following were identified as main channels in the sampled area for the marketing of saffron (Table 4.25).

**Table 4.25: Marketing channels of saffron**

Channel-I	(Direct Marketing) Producer-domestic consumer
Channel-II	Farmer – retailer – consumer
Channel-III	Farmer –wholesaler – retailer – consumer
Channel-IV	Farmer-commission agents-wholesaler-retailer-consumer
Channel-V	Farmer – sub-firm – wholesaler – retailer – consumer

**Table 4.26: Percentage share of different marketing channels of saffron (N=120)**

S.No.	Marketing channel	Number (f)	Percentage
1	Channel-I	15	6.44
2	Channel-II	30	12.88
3	Channel-III	20	8.58
4	Channel-IV	85	36.48
5	Channel-V	83	35.62
<b>Total</b>		<b>233</b>	<b>100</b>

It is evident from table 4.26 that channel-IV and channel-V were followed by 36.48% and 35.62% of respondents respectively. While, channel-II, channel-III and channel-I were followed by 12.88%, 8.58% and 6.44% of respondents respectively.

#### **4.5.1 Marketing costs, margins, losses and price spread in different channels of saffron**

The price spread is the gap between the 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 to the final consumer. The price spread consists of marketing costs, losses and margins of intermediaries involved in the marketing process. It explains the variance in the price received by the producer and price paid by the consumer. The study of price spread is very essential from the stand point of efficiency of the marketing system. The channel wise price spread in terms of consumers price is given in Table 4.27.

A cursory glance of the Table 4.27 revealed that, Net Price Received by Farmer (NPRF) is more in channel I (84 % of the consumer's price) followed by channel II, III, V and IV. To sum up NPRF is more in the channel where the numbers of intermediaries are very less.

As far as the price spread of saffron was concerned, retailer grabbed maximum margins because he sold the produce in much small quantities and furnishes it before consumers on relatively high prices.

#### **4.5.2 Marketing efficiency**

Marketing efficiency essentially reflects the degree of market performance. The existence of competitive conditions and desire to maximize profit are the main forces which induce firms to operate efficiently. In this section an attempt has been made to measure the marketing efficiency, particularly for comparing the efficiency of alternate markets/channels in saffron trade. The marketing efficiency of different channels as presented in the Table 4.27 revealed

that the channel-I turns out to be economically more efficient, followed by channel-II, channel –III and channel- V and least efficient is channel-IV. The table revealed that the marketing efficiency of Channel-I, II, III, IV and V was recorded as 5.25, 3.46, 2.54, 2.07 and 2.20 per 10 grams in the study area.

#### **4.6 Constraint in production and marketing of saffron**

This section includes various constraints encountered by saffron growers in production and marketing of saffron. The findings are presented under various heads:

##### **4.6.1 Constraints faced by saffron growers in production of saffron**

The constraints as expressed by the respondents in the production of saffron are presented in Table 4. 28. A perusal of the data would reveal that the major economic constraint as expressed by the Saffron growers in the production of Saffron include: high rate of interest for loans (38.36%), high labour charges (31.05%), inadequacy of capital for purchasing of improved implements (23.74%) and other economic constraint were the high cost of fertilizers (3.65%) and lack of insurance facilities to cover risk (3.20%). The data further reveals that the major supply constraints as expressed by the Saffron growers in the production of Saffron were: Non-availability of labours for intercultural operations (32.18%), non-availability of proper irrigation facilities (31.42%), fragmented land holdings (29.89%) and non-availability of inputs (6.51%). The technological Constraints as expressed by respondents were lack of efficient post-harvest technology (44.16%), lack of agronomic management technology (31.17%) and lack of utilizing improved tools and implements (24.68%).

**Table 4.27: Marketing cost, physical loss, marketing margin, price spread, producers share in consumers rupee and marketing efficiency of different channels (Rs/10g)**

Particulars	Channel-I	Channel-II	Channel-III	Channel-IV	Channel-V
Gross farmers price	1300	1290	1274	1280	1285
a. Cost incurred by farmer	190	195	215	231	235
b. Losses at farmer level	18	21	27	35	34
c. Net farmers price	1092	1074	1032	1014	1016
Gross price of agent	-	-	-	1340	-
a. Cost incurred by agent	-	-	-	2.50	-
b. Losses at agent level	-	-	-	6	-
c. Margins at agent level	-	-	-	51.50	-
Gross price of firm	-	-	-	-	1328
a. Cost incurred by firm	-	-	-	-	12
b. Losses at firm level	-	-	-	-	11
c. Margins at firm level	-	-	-	-	20
Gross price of wholesaler	-	-	1351	1405	1391
a. Cost incurred by wholesaler	-	-	18	14	16
b. Losses at wholesale level	-	-	24	26	27
c. Margins at wholesale level	-	-	35	25	20
Gross price of retailer	-	1384	1438	1500	1478
a. Cost incurred by retailer	-	10	6	5.50	6
b. Losses at retail level	-	13	14	15	15
c. Margins at retail level	-	71	67	74.50	66
Price paid by Consumer	1300	1384	1438	1500	1478
Total marketing costs	190	205	239	256	269
Total physical losses	18	34	65	82	87
Total marketing margin	0	71	102	151	106
<b>Price spread</b>	<b>208</b>	<b>310</b>	<b>406</b>	<b>489</b>	<b>462</b>
<b>Producer Share in Consumer's Rupee (%)</b>	<b>84</b>	<b>77.60</b>	<b>71.76</b>	<b>67.40</b>	<b>68.74</b>
<b>Marketing efficiency</b>	<b>5.25</b>	<b>3.46</b>	<b>2.54</b>	<b>2.07</b>	<b>2.20</b>

**Table 4.28: Constraints faced by saffron growers in the production of saffron (N=120)**

<b>Constraints</b>	<b>Respondents</b>		
	<b>Frequency</b>	<b>Percentage</b>	<b>Rank</b>
<b>(A) Economic</b>			
(i) Lack of insurance facilities to cover risk	7	3.20	V
(ii) High rate of interest for loans	84	38.36	I
(iii) High cost of fertilizers	08	3.65	IV
(iv) Inadequacy of capital for purchasing of improved implements	52	23.74	III
(v) High labour charges	68	31.05	II
<b>B) Supply constraints</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Rank</b>
(i) Non-availability of inputs	17	6.51	IV
(ii) Non-availability of labours for intercultural operations	84	32.18	I
(iii) Non-availability of proper irrigation facilities	82	31.42	II
(iv) Fragmented land holdings	78	29.89	III
<b>C) Technological constraints</b>	<b>Frequency</b>	<b>Percentage</b>	<b>Rank</b>
(i) Lack of agronomic management technology	48	31.17	II
(ii) Lack of efficient post-harvest technology	68	44.16	I
(iii) Lack of utilizing improved tools and implements	38	24.68	III

#### 4.6.2 Constraints faced by saffron growers in the marketing of saffron

A perusal of the data presented in Table 4.29 would reveal that the constraints as expressed by the Saffron growers in the marketing of saffron include: adulteration (15.64%), lack of maintaining ISO grade (13.78%), exploitation by middleman (12.10%), highly privatized (11.55%), high market price fluctuations (11.17%), lack of market information (10.24%). Other constraints as expressed by the Saffron growers in marketing were: lack of regulated and co-operative marketing societies (9.68%), flow of saffron from Iran (6.52%), availability of synthetic dyes (5.59%) and lack in value addition and post-harvest technologies (3.73%).

**Table 4.29: Constraints faced by the saffron growers in the marketing of saffron (N=120)**

S.No.	Constraints	Frequency	Percentage	Rank
1	Adulteration	84	15.64	I
2	Exploitation by middleman	65	12.10	III
3	Lack of regulated and co-operative marketing societies	52	9.68	VII
4	Flow of saffron from Iran	35	6.52	VIII
5	High market price fluctuations	60	11.17	V
6	Highly privatised	62	11.55	IV
7	Lack of market information	55	10.24	VI
8	Lack of maintaining ISO grade	74	13.78	II
9	Availability of synthetic dyes	30	5.59	IX
10	Lack in value addition and post-harvest technologies	20	3.73	X

## Chapter-5

### DISCUSSION

The findings of the investigation are discussed to interpret them in proper perspective, to relate them with other relevant studies and to arrive at valid conclusion and recommendations in this chapter.

#### 5.1 Cost and returns from saffron

##### 5.1.1 Costs of cultivation of saffron before and after inception of NSM

The results given in table 4.1 to 4.8 depicts cost of cultivation of saffron before and after inception of NSM. The cost of cultivation of saffron include both variable costs as well as fixed costs. The variable costs formed major component of cost incurred by respondents. The variable costs affect the level of production of saffron, while as fixed costs do not affect and remains same throughout cropping cycle. The total cost of cultivation kanal<sup>-1</sup> before launch of NSM over a crop cycle of seven years was Rs. 23177, Rs. 22057 and Rs. 21760 in first, second and third size group respectively. While as total cost of cultivation after inception of NSM was Rs. 53571, Rs. 49814 and Rs. 45027 for same size groups. This means that cost of cultivation kanal<sup>-1</sup> incurred by respondents before and after launch of NSM has increased by more than twice. The possible reasons for this might be that the respondents have adopted recommended package of practices (POP) which were supposed under NSM. These recommended POP were not followed by respondents before inception of NSM, which resulted in poor production and poor yield. The other possible reason for increase in costs after inception of NSM might be due to inflation.

The respondents had used high density corm plantation i.e. 2.5 quintal kanal<sup>-1</sup> after inception of NSM instead of one quintal kanal<sup>-1</sup>. They have used seed treatment for control of corm rot disease, rodenticide for control of rodent attacks, recommended dose of farm yard manure (FYM), fertilizers and vermicompost for improving soil health.

The establishment cost incurred by respondents during the first year was 29-30% and 39-44% of total cost of cultivation before and after inception of NSM respectively. The value of seed and human labour formed the major component of cost incurred by respondents over a planting cycle of seven years before and after inception of NSM. Similar results were observed in the study conducted by Amod Sharma *et al.* (2012). The fixed cost ranged from 25-32% and 16-18% for all the three size groups before and after inception of NSM.

Further, it was revealed from table 4.7 that cost of cultivation  $\text{kanal}^{-1}$  over a planting cycle of seven years was highest for size group 1, followed by size group 2 and 3 both before and after inception of NSM. Similar trend was found for cost incurred on human labour. The possible reason for this might be that smaller (size group-1) and medium (size group-2) farmers cannot afford farm mechanization implements, even though farm mechanization implements were subsidized at 50% rate under NSM, which results in dependence on human labour. Larger farmers (size group-3) have used farm mechanization implements under NSM and dependence on human labour has reduced than smaller and medium farmers. This means that smaller and medium farmers have used labours  $\text{kanal}^{-1}$  intensively on their farms than larger farmers. This further implies that smaller and medium farm units are more labour intensive than larger farmers. Similar results were observed in the study conducted by Saraf *et al.* (2018).

### **5.1.2 Returns from saffron before and after inception of NSM**

The results given in table 4.9 to 4.16 depicts gross and net returns  $\text{kanal}^{-1}$  from saffron in a planting cycle of seven years before and after inception of NSM. The returns from saffron include main product, bi product and daughter corms. The overall gross returns  $\text{kanal}^{-1}$  of all the three size groups in a planting cycle of seven years were found more than twice after the inception of NSM. The gross returns  $\text{kanal}^{-1}$  from saffron before inception of NSM in a planting cycle of seven years were Rs. 69280, Rs. 68015 and Rs. 67176 for size group 1, 2 and 3 respectively. The gross returns  $\text{kanal}^{-1}$  from saffron after inception of NSM in a

planting cycle of seven years were Rs. 167140, Rs. 158244 and Rs. 146386 for size group 1, 2 and 3 respectively. The possible reason for higher gross returns from saffron after inception NSM might be due to high yield of daughter corms in seventh year. The other possible reason might be due to adoption of recommended package of practices followed under NSM. The other possible reason for increase in net-returns after inception of NSM might be due to inflation. Meanwhile the difference lies in yield from main product before and after inception of NSM. The gross returns were highest for size group 1 followed by 2 and 3 both before and after inception of NSM. Further gross returns were lowest during first year and highest during last year both before and after inception of NSM. These results are in accordance with the findings of Ganaie *et al.* (2018).

The area-wise net returns obtained by respondents before and after the launch of National Saffron Mission has shown an increased net return of more than twice. The area wise net returns before inception of NSM were Rs. 46103, Rs. 45958 and Rs. 45416 for size group 1, 2 and 3 respectively. The area wise net returns after inception of NSM were Rs. 113569, Rs. 108431, Rs. 101359 for size group 1, 2 and 3 respectively. The net returns were negative during the first year obviously due to high value of seed incurred in first year. Similar results were observed in the study conducted by Raja *et al.* (2018).

## **5.2 Economic viability of saffron before and after inception of NSM**

Economic viability of saffron cultivation was worked out by determining; benefit cost ratio, net present value, internal rate of return and payback period. The economic viability over a crop cycle of seven years was worked both before and after inception of NSM. The results are depicted in table 4.17. The B-C ratio was greater than one before and after inception of NSM. The B-C ratio of all the three size groups remained almost same before and after inception of NSM. The average B-C ratio at discounting rate 12% of all the three size groups before and after inception of NSM was 2.44 and 2.45 respectively. The results indicating B-C ratio greater than one reveals that saffron is economically a viable crop. Similar

results were observed in the study conducted by Saraf *et al.* (2018).

The net present value was found positive before and after inception of NSM. The area-wise net returns obtained by respondents before and after the launch of National Saffron Mission has shown an increased net return of more than twice. The average NPV at 12% discounting rate over a crop cycle of seven years before and after inception of NSM was Rs 21986 and Rs. 52026 respectively. The increase in net return may be attributed to the fact that respondents have used recommended packages of practices under NSM. The other possible reason might be that respondents were given incentives under NSM Rs. 32300 kanal<sup>1</sup>, out of which Rs. 5000 were charged for irrigation, Rs. 2000 were charged for fertilizers and manures and 25300 were given cash in hand for purchase of corms and other practices. The positive NPV before and after inception of NSM indicates that the crop is economically viable. Further results indicated that profitability of growers was found better after inception of NSM. The results are in accordance with the study conducted by Raja *et al.* (2018).

The internal rate of return was found sufficiently higher than the current interest rate prevailing in banks. Further IRR for all the three size groups has increased by 10% after inception of NSM, which means that profitability has increased after inception of NSM. The results indicating IRR greater than interest bank rate reveals that crop is economically viable for cultivation. The possible reason for increase in IRR by 10% might be due to high corm yield in seventh year after inception of NSM.

The payback period for all the three size groups before and after inception of NSM was 5<sup>th</sup> year and 4<sup>th</sup> year respectively. The payback period for all the three size groups has reduced by one year after inception of NSM. The possible reason for this might be that gross returns from first year onwards were comparatively better than before NSM. Further returns were greater than costs over a crop cycle of seven years indicating crop is economically viable. Similar results were observed in study conducted by Shan and Tripathi (2009).

### 5.3 Impact assessment of NSM

The results given in table 4.18 reveals that only 2391.25 hectare were rejuvenated against a target of 3715 ha under NSM. The same area was improved through use of INM, IPM and IDM for improving soil health condition. The shortfall in achieving the targets may be attributed to floods in 2014 and the turmoil conditions prevailing during 2016 in Kashmir. The main purpose of rejuvenation was to improve soil health and to increase production and productivity of saffron. Before inception of NSM the fields were senile with inadequate plant population (2-3 lakh/ha instead of 5 lakh/ha), nutrient depletion in saffron fields, inadequate availability of disease-free saffron corms, longer planting cycle of saffron corms (>15 years as against 4-5 years), higher incidence of pests and diseases and sorting of corms was not practiced. All these factors were responsible for lower production and productivity of saffron. Similar statement was put forth in a study conducted by Menia *et al.* (2018). With the launch of NSM the recommended POP were followed viz., adoption of seed rate of 5 lakh corms (weighing more than 8 gm each) per ha, balanced nutrition through fertilizer application, vermicomposting and organic manuring, fungicides for control of corm rot and pesticides for rodent management for increasing production and productivity.

The data presented in table 4.19 reveals that the department has been able to distribute 437 out of the sanctioned 507 weeders @ Rs.1.0 lakh/weeder with 50% subsidy support. Introduction of weeders has facilitated quick weeding and hoeing and reduced cost of cultivation. However, these farm mechanization implements were not sufficient to fill the gap in all FOF as saffron is a labour intensive crop. The majority of field work is done by women. Hoeing of Saffron fields to facilitate soil aeration and emergence of sprouts is labour intensive requiring 80-man days per ha. Similar results were observed in the study conducted by Tantry, (2017).

The table 4.20 reveals that only 223 hot air dryers out of 8000 have been distributed under NSM till 2018. Kashmiri Saffron is known for its high quality, but suffers from poor post-harvest handling. The traditional method of sun drying

reduces saffron quality due to degradation of colouring along with odour and bitterness imparted by pigments like crocin, saffranal and picrocrocin. Similar statement was put forth in the study conducted by Ali and Hakim (2017). Scientific drying method using Solar/Hot Air dryers designed by SKUAST-K ensures high product quality, due to reduction in drying time from 27-54 hours to 3-4 hours. Popularization of such dryers among the farmers has resulted in high product quality. However, under this component major shortfall has been reported which might be due to insufficient funds among farmers for purchase of such technology. The other reason might be unawareness among farmers about this modern technology.

Saffron in Kashmir is grown under rainfed conditions as no water source is available in saffron karewas. Farmers are dependent on September rains for a good flush of flowers and delayed rainfall is detrimental to the crop as it is accompanied with low minimum and maximum temperature leading to flower abortion. However, since the last several years, the weather has become quite erratic. Rains are either scanty or irregular, thus adversely affecting flowering and subsequent plant stand. Lack of irrigation facilities is one of the main reasons for low productivity. Similar results were observed in the study conducted by Kaloo *et al.* (2014). There was need to establish 128 tube wells with 100 per cent project assistance in the targeted area to be brought under rejuvenation with complete network of sprinklers. Each tube-well was able to irrigate 30 ha of Saffron area. However, the data presented in table 4.21 reveals that major shortfall has been reported in harnessing of bore-wells by way of installation of electro mechanical equipment and sprinkler system to facilitate assured irrigation. The main purpose of sprinkler system was to provide assured irrigation to protect the crop from uneven yield losses and to boost vegetative phase to enhance corm production. The possible reason for shortfall in achieving targets under irrigation system might be the fault of sponsored agency (Mechanical and Engineering Department).

Under the Transfer of Technology Component 200 demonstrations of 250 m<sup>2</sup> have been established since the inception of the Mission. The on-farm demonstrations serve as one of the most effective extension education tools while as small demonstration plots provide a backdrop to demonstrate and teach appropriate technologies as well as venues to test new methods side by side with traditional methods.

Saffron is one of the most important foreign exchange earners among various spices of India. Because of consumers preference for quality, grading on scientific lines has assumed significant attention. Prize of saffron is also decided by the physical appearance of the product, colour and percentage of floral wastes and foreign matter. However, in view of being expensive material, marketing is in the hands of private entrepreneurs and a long chain of middle men are involved in the market practices resulting in menace of adulteration. Adulterants include floral parts (other than stigma) of safflower mixed with genuine material as such or after being dyed, corn silk, fibers of shredded meat dyed with saffron water, fibrous roots of various grasses, coloured nylon fiber, florets of marigold and slender roots of willow. Besides, fats, oils, and glycerine are also sometimes used to increase the weight. It is also reported that low quality and cheap saffron of Iran is mixed with pure saffron of Kashmir. This calls for strict quality control checks to meet the export quality standards. Similar results were observed in the study conducted by Kamili *et al.* (2007). In order to ensure the quality, it is subjected to quality control and inspection and should have an India Standards Institute (ISI) specification. The above ill effects in marketing can be checked if Indian International Kashmiri Saffron Trading Center (IIKSTC) established under NSM at Pampore is made functional.

#### **5.4 Growth and trend analysis of saffron in J & K**

The results given in table 4.22 reveals that area, production and productivity of saffron in J & K has recorded a compound growth rate of -0.17, 0.07 and 3.15 per cent from 1996-97 to 2017-18 respectively. The increasing

trend in production and productivity may be attributed to adoption of modern technologies under NSM. The results are in accordance with the study conducted by Nehvi and Yasmin (2016). The area under saffron cultivation in J & K has decreased significantly, while as production and productivity has increased non-significantly. The decrease in area under saffron cultivation may be attributed to intensive and expensive cost of cultivation as well as low productivity of saffron. It is necessary that replacement of the existing corms, through introduction of new variety of germ plasma and significant enlargement of the area under saffron cultivation on the highest priority basis. The same results were reported by Kaloo (2014).

The results presented in table 4.23 reveals that the production and productivity of rejuvenated area was found better than the area which has not been rejuvenated. The possible reason for better production and productivity under rejuvenated method may be attributed to the fact that scientific method of farming was practiced under NSM while as conventional method of farming was practiced in the area which has not been rejuvenated under NSM. The same results were observed in the study conducted by Nehvi and Yasmin (2016). Further it can be revealed that there was low production and productivity of saffron in J & K in year 2014-15 and 2017-18. The possible reason for this might be floods in 2014 and continuous dry spell in 2017. The trends in area, production and productivity are quite fluctuating due to the reasons of inadequate irrigation facility and the role of natural elements which play a vital role in overall production.

It is evident from figure 1 that area under saffron cultivation from 1996-97 to 2017-18 shows a declining trend while as production and productivity has shown an increasing trend. However, there was a declining trend in area, production and productivity of saffron in Kashmir from 1996-97 to 2010-11. Further area under saffron cultivation has remained same after the inception of NSM i.e. 3715 ha while as there has been subsequent increase in production and productivity of saffron in J & K after the inception of NSM. The results are in

accordance with the study conducted by Tantry *et al.* (2017).

The results presented in table 4.24 indicates that export of saffron from J & K has increased over the recent past years and has shown compound growth rate of 0.29 per cent. The results indicate increasing trend of export of saffron from J & K. However, it was reported that export of saffron from India is not properly recorded as it is not despatched to various centres through spice exporting ports. The possible reason for this might be adulteration of Iranian saffron with Kashmiri saffron to fetch higher price. The similar statement was put forth in the study conducted by Rekha *et al.* (2011).

### **5.5 Marketing pattern of saffron in Kashmir**

Marketing of saffron was found highly unorganized and unsystematic. It is largely in the hands of brokers, with a long chain of intermediaries linking the grower to the consumer. The main marketing channels are brokers, local traders, agents, cooperative societies, government agencies and companies. Since the broker is the mainstay of the marketing channel, there is rampant exploitation of farmers mainly due to the ignorance regarding the prices prevailing in major trading centres.

The results presented in table 4.26 revealed that five marketing channels were identified in the marketing of saffron in study area. As far as the price spread of saffron was concerned, retailer grabbed maximum margins because he sold the produce in smaller quantities and furnished it before consumers on relatively high prices. The results also revealed that the producers share in consumers rupee was more in channel-I as compared to channels in the sample area. The study revealed that there was considerable scope to increase the producers share in the consumers rupee if the number of intermediaries is reduced & the government intervenes pro-actively in order to organize saffron organized markets and by framing the farmers clubs and unions so that the farmer use these unions as profitable channels to sell their produce. As far as efficiency was concerned channel-I was

found to be the most efficient marketing channel for the grower of saffron followed by other channels. These results are in accordance with study conducted by Hamid *et al.* (2017).

#### **5.6 Constraints in production and marketing of saffron**

While going through the constraints expressed by the respondents in the production and marketing of Saffron, it is evident that banks charge high rate of interest to the loans disbursed to the Saffron growers. Government should take adequate steps so that banks charge low interest rates. The government should provide subsidies on inputs (corms, manures, fertilizers, fungicides) so that the Saffron growers are encouraged to go for expansion of area with low investment. The extension personnel should arrange meetings with bank officers/officials so that the delays caused in the disbursing of loans is sorted out and adequate loans are sanctioned to the saffron growers so that all the initial costs are duly covered. The extension personnel of the development department should ensure that the defunct bore wells are made functional so that proper irrigation facilities are made available to Saffron growers. Extension personnel should organise training programmes before the flowering of Saffron so that the Saffron growers are provided useful tips regarding good recommended management practices for obtaining higher yields. Jammu & Kashmir government should take measures so that adulteration in Saffron is checked and ensure that organised mandis are established so that the Saffron growers can sell the dried Saffron at remunerative price.

## Chapter-6

### SUMMARY AND CONCLUSION

Saffron (*Crocus sativus* L.), a perennial low growing herb with a globular corm, is highly prized as one of the best natural food flavouring and colouring substance having general panacea properties. The data available with Directorate of Agriculture Government of Jammu and Kashmir reveals that the total area under saffron cultivation during the year 1996-97 was 5707 hectares with annual production of 15.95 metric tonnes, while productivity was recorded at 2.8 kg per hectares. However, during year 2009-10 the total area under saffron cultivation was 3715 with annual production of 10.40 metric tonnes, while the productivity was recorded at 2.75 kg per hectare. This means there has been a significant decline in area, production and productivity of saffron in Jammu & Kashmir from the year 1996-97 to 2009-10. Concerned over the declining trends of Saffron production in Kashmir, Government of India (GOI) approved a flagship programme for revival of Saffron through National Saffron Mission in the year 2010-11 in order to improve the overall production and productivity of Saffron. The mission envisages to provide Saffron growers drip irrigation, mechanization, processing, research and marketing support to ease the crisis. The National Saffron Mission also seeks to develop appropriate systems for organized marketing quality-based pricing of Saffron and for formulating direct transactions between growers, traders, exporters and industrial agencies. Since the various components of National Saffron Mission was implemented by J&K State Agriculture Production Department and research support has been provided by SKUAST-Kashmir.

The present investigation entitled “Impact Assessment Study of National Saffron Mission in Kashmir – An Economic Approach” was planned to present the actual scenario of National Saffron Mission, with the following specific objectives:

1. To compare the costs, returns and profitability associated with saffron cultivation in the study areas before and after the launch of National Saffron Mission.
2. To work out the impact of National Saffron Mission on production, productivity and marketability of saffron in Kashmir.
3. To identify constraints in marketing of saffron in Kashmir and suggest suitable policy measures thereof.

### **6.1 Findings of the study**

#### **Cost of cultivation of saffron before and after inception of NSM**

The cost of cultivation  $\text{kanal}^{-1}$  over the crop cycle of seven years before and after inception of NSM has increased more than twice. The average cost  $\text{kanal}^{-1}$  over a crop cycle of seven years of all the three size groups before and after inception of NSM was Rs. 22331 and Rs. 49371 respectively. While as average cost of cultivation  $\text{kanal}^{-1}$  over a crop cycle of seven years of all the size groups before and after inception of NSM was Rs. 3190 and Rs. 7053 respectively.

#### **Returns from saffron before and after inception of NSM**

The area-wise net returns obtained by respondents before and after the launch of National Saffron Mission has shown an increased net returns of more than two times. The net returns obtained by all the three size groups over a planting cycle of seven years before and after inception of NSM were Rs. 45826 and Rs. 107786 respectively. While as average net returns  $\text{kanal}^{-1}$  over a cropping cycle of seven years of all the three size groups before and after inception of NSM were Rs. 6547 Rs. 15398 respectively.

#### **Economic viability of saffron cultivation before and after inception of NSM.**

B-C ratio at 12% discounting rate has remained almost same before and after inception of NSM. The NPV at 12% discounting rate has increased more than twice after inception of National Saffron Mission. The IRR has also

increased by almost 10% after inception of NSM. While as PBP has reduced by one year after inception of NSM.

### **Impact assessment of NSM**

- Department has successfully rejuvenated and improved soil health of 2391.25 ha against a target of 3715 ha. However, Pulwama targets have not been achieved attributed to floods in 2014.
- Out of total sanctioned soil mechanization implements about 90% of were distributed under NSM. However, these implements were not sufficient for the whole farm operating families in J & K. Meanwhile these implements were taken by only approached farmers.
- Out of total 8000 hot air dryers, only 223 were distributed under NSM for enhancing product quality till 2018.
- 200 demonstrations of 250 m<sup>2</sup> have been established since the inception of the Mission till 2018.
- Major shortfall has been reported in harnessing of bore-wells by way of installation of electro mechanical equipment and providing of sprinkler system under strengthening of irrigation system component.
- Establishment of Quality Control Laboratory, Grading and Packing Centre and Saffron Park for Quality Control certification, Grading, Packaging and Marketing of the Saffron is complete with certain incompleteness needed but the facility has not been handed over by the NHB to the Government as on date.

### **Growth and trend analysis of saffron in J & K**

The area, production and productivity of saffron in J & K has recorded a compound growth rate of -0.17, 0.07 and 3.15 per cent from 1996-97 to 2017-18 respectively. The area under saffron cultivation from 1996-97 to 2017-18 shows declining trend while as production and productivity has shown an increasing trend. While as the compound growth rate of export of saffron from J & K was found 0.29% from 1996-97 to 2017-18.

### **Marketing of saffron in Kashmir**

Marketing system of saffron in Kashmir was found highly unorganised and unsystematic, as it has largely been in the hands of private enterprises, and there exists a long chain of intermediaries between the producer and the ultimate consumer.

Five marketing channels were identified in marketing of saffron in the study area. As far as the price spread of saffron was concerned, retailer grabbed maximum margins because he sold the produce in much small quantities and furnishes it before consumers on relatively high prices.

### **Constraints faced by Saffron growers in the production and marketing of saffron**

The constraints as expressed by the respondents in the production of Saffron were economic, supply and technical: high rate of interest charged on loans (38.6%), high labour charges (31.05%) and inadequacy of capital for purchasing of improved implements (23.74%). The supply constraints as expressed by the respondents were: Non-availability of labours for intercultural operations (32.18%) non-availability of proper irrigation facilities (31.42%), fragmented land holdings (29.89%). The major technical constraints as expressed by the respondents were: lack of efficient post-harvest technology (44.16%), and lack of agronomic management technology (31.17%)

The major marketing constraints as expressed by the respondents were: Adulteration (15.64%), lack of maintaining ISO grade (13.78%), exploitation by middleman (12.10%), highly privatized (11.55%), high market price fluctuations (11.17%) and lack of market information (10.24%).

## CONCLUSION

- Though cost of cultivation kanal<sup>1</sup> has increased by 55%, however, at the same time the area wise net returns has also significantly increased by 58% this means that profitability of saffron has slightly increased after the inception of Mission.
- The production and productivity of area under NSM was found better than the area which have not been covered under the Mission. However, it can be concluded from the findings of study that there was mild impact of NSM in J & K as major short-fall has been reported in sprinkler irrigation system, enhancing product quality and saffron mechanization components.
- The area under saffron cultivation in J & K shows declining trend, while as production and productivity has shown increasing trend from 1996-97 to 2017-18.
- Marketing system of saffron was found highly unorganised. The ill effects in marketing can be removed only and only if the infrastructure (Spice Park) developed under NSM is made functional.
- Saffron being heritage of Kashmir and covered under flagship programme needs to be continued in order to extend its benefits to all the saffron growers of the valley.
- Taking the advantage of the flagship programme there is further scope to enhance production and productivity of saffron besides providing efficient market facilities in the valley.

## Policy measures

- Emphasis on the standardized production technologies like nutrient and irrigation management, plant geometry, plant protection and seed rate planting cycle, intercropping etc. for increasing productivity.
- Organic cultivation of saffron to fetch higher returns in the international market.
- Mechanization of farm operations and harvesting.

- Inclusion of non-traditional areas for saffron cultivation which requires demonstration of technologies in such areas.
- Since there is only limited scope for increasing area under saffron in Jammu and Kashmir as a mono crop, the existing potentialities of cultivating Saffron as an intercrop in almonds, may also be exploited to the maximum possible extent. In Saffron cultivation, emphasis should, therefore, be given on both productivity increase and area expansion.
- Law and enforcement agencies need to play more significant role to check conversion of saffron land.
- Front Line Demonstration (FLDs) for cultivation of saffron on scientific lines need to be gear up.
- There is strong need of some synergy between Agriculture Department (Nodal agency for NSM), SKUAST-Kashmir to harness maximum benefits for farmers.
- High Density Plantation – saffron may be tested on trail basis in the farmers fields to motivate maximum number of farmers for cultivation of saffron.
- Taking due technology of NSM, efforts need to be done to explore the scope of growing saffron in non- traditional areas Kashmir valley.
- The Technological Interventions, new genotype developed by saffron research station (SRS), saffron needs to be taken care by KVK Pulwama, KVK B Budgam and KVK Srinagar, under their ON-Farm-Trail (OFT) programme for further strengthening cultivation based upon micro-level-testing/assessment.
- Explosive visits of farmers yet to be brought under the mission to the demonstration units needs to be arranged regularly for popularization and motivation.
- Use of Information Communication Technology (ICTs) in saffron would give further flip to the action by reaching to the unreached. Therefore, extensive use of electronic and other largest gadgets may be done.

- Emphasis on Quality control, brand name and co-operative collection and marketing.
- To develop appropriate systems for organized marketing, quality – based pricing of Saffron and for formulating direct transactions between growers, traders, exporters and industrial agencies.
- Promotion of grading, quality testing and packaging at farm gate, establishing an electronic marketing channel for graded and quality certified Saffron, promotion of Saffron growers' societies and Self-Help Groups for promoting cluster farming and collective marketing.
- Emphasis on value addition of saffron through use of efficient post-harvest technologies.
- In order to increase the production and export of saffron, there is need to impose ban on import of saffron. This will also help in avoiding adulteration of Kashmir saffron.
- Spices Board of India is required to open its office in Pampore (Kashmir) for promoting the trade and export of saffron.
- There is need to declare the traditional saffron growing areas of Kashmir as Agri- Export Zone.

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Interview Schedule

**Research Topic: Impact Assessment Study of National Saffron Mission in Kashmir-An Economic Approach**

**PART-A Personal Profile**

1. Name of the farmer
2. Fathers name
3. Age
4. Educational qualification
5. Name of the village
6. Name of the block
7. Contact number
8. No. of family members
  - a. Males
  - b. Females
9. Annual income from all sources
10. Land inventory
  - a. Total holding
  - b. Fallow land
  - c. Operational holding
  - d. Irrigated
  - e. Unirrigated

**Cropping pattern**

Crops	Area (kanal)	Production (kg/kanal)
<b>Kharif</b> Rice Maize Pulses Any other, specify		
<b>Rabi</b> Mustard Oats Pulses Any other, specify		
<b>Perennial</b> Saffron Apple Almond Any other, specify		

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**B Cost of Cultivation and Returns from Saffron**

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\*(Note: To be calculated per kanal basis but recorded as per the land holding of farmer under saffron)

**A. Costs and Returns Before National Saffron Mission****1. Fixed Cost (Rs.)**

Items	1 <sup>st</sup> yr.	2 <sup>nd</sup> yr.	3 <sup>rd</sup> yr.	4 <sup>th</sup> yr.	5 <sup>th</sup> yr.	6 <sup>th</sup> yr.	7 <sup>th</sup> yr.
Sprinkler irrigation							
Farm assets							

**2. Variable Cost (Rs.)**

Item	1 <sup>st</sup> yr.	2 <sup>nd</sup> yr.	3 <sup>rd</sup> yr.	4 <sup>th</sup> yr.	5 <sup>th</sup> yr.	6 <sup>th</sup> yr.	7 <sup>th</sup> yr.
Human labour							
Family labour							
Hired labour							
Bullock labour							
Machine labour							
Value of seed(corn)							
Value of manure							
FYM							
Manure							
Value of fertilizer							
Urea							
DAP							
MOP							
Value of seed treatment							
Irrigation charges							
Plant protection spray							
Fungicide							
Insecticide							
Herbicides							
Miscellaneous							
Marketing cost							
Harvesting							
Grading							
Packaging							
Transportation							

### 3. Returns (Rs.)

Returns	1 <sup>st</sup> yr.	2 <sup>nd</sup> yr.	3 <sup>rd</sup> yr.	4 <sup>th</sup> yr.	5 <sup>th</sup> yr.	6 <sup>th</sup> yr.	7 <sup>th</sup> yr.
Saffron flower							
Dry saffron							
Corm							

### B. Costs and Returns After National Saffron Mission

#### 1. Fixed Cost (Rs.)

Items	1 <sup>st</sup> yr.	2 <sup>nd</sup> yr.	3 <sup>rd</sup> yr.	4 <sup>th</sup> yr.	5 <sup>th</sup> yr.	6 <sup>th</sup> yr.	7 <sup>th</sup> yr.
Sprinkler irrigation							
Farm assets							

#### 2. Variable Cost (Rs.)

Item	1 <sup>st</sup> yr.	2 <sup>nd</sup> yr.	3 <sup>rd</sup> yr.	4 <sup>th</sup> yr.	5 <sup>th</sup> yr.	6 <sup>th</sup> yr.	7 <sup>th</sup> yr.
Human labour							
Family labour							
Hired labour							
Bullock labour							
Machine labour							
Value of seed(corm)							
Value of manure							
FYM							
Manure							
Value of fertilizer							
Urea							
DAP							
MOP							
Value of seed treatment							
Irrigation charges							
Plant protection spray							
Fungicide							
Insecticide							
Herbicides							
Miscellaneous							
Marketing cost							
Harvesting							
Grading							
Packaging							
Transportation							

#### 3. Returns (Rs.)

Returns	1 <sup>st</sup> yr.	2 <sup>nd</sup> yr.	3 <sup>rd</sup> yr.	4 <sup>th</sup> yr.	5 <sup>th</sup> yr.	6 <sup>th</sup> yr.	7 <sup>th</sup> yr.
Saffron flower							
Dry saffron							
Corm							

**PART- C****Impact of National Saffron Mission****1. Rejuvenation /Replanting of Existing Saffron Area for improving productivity**

- a. Total area under saffron \_\_\_\_\_
- b. Area rejuvenated under mission \_\_\_\_\_

**2. Field preparation (scientific/traditional, whether raised bed with furrows or not)**

- a. Before mission \_\_\_\_\_
- b. After mission \_\_\_\_\_

**3. Soil treatment (improving soil health by INM, IPM, IDM practices)**

Item	Before mission	After mission	remark
Soil treatment			
Corm treatment			
Management of rodents			

**4. Duration of corm Replacement (years)**

- a. Before Mission \_\_\_\_\_
- b. After Mission \_\_\_\_\_

**5. Plant population (no. of corms) maintained per kanal**

- a. Before Mission \_\_\_\_\_
- b. After Mission \_\_\_\_\_

**6. Irrigation system**

Item	Before mission	After mission	Remarks
Irrigation if provided			0 for No, 1 for yes
Type of irrigation			If yes, indicate type of irrigation, whether drip, bore well, manual etc
No. of irrigations			If is it yes, indicate number here
Time of irrigation			Indicate month

### 7. Application of manures and fertilizers

Application of Manures and Fertilizers as per Recommendations						
	Before mission			After mission		
Item	Recommended dose	Lesser	Greater	Recommended dose	Lesser	Greater
Urea						
DAP						
MOP						
FYM						

Recommended Dose of SKUAST-Kashmir (kg/Kanal)

Urea=5 kg, DAP=5 kg, MOP=3 kg & FYM=500 kg

### 8. Implements used before and after mission

Implements/Equipment's used	
Before mission	After mission

### 9. Maturity time and picking

Item	Before mission	After mission	Remarks
Identification of maturity time			Indicate Own experience By seeing fellow farmers By expert advice Or any other
Timing for pistil removal			Indicate both for before as well as after the timings for pistil removal, also indicate if some prototype is now used under the mission

### 10. Method of drying

Methods used for drying of saffron		
Before mission	After mission	Remarks
		Indicate method of drying
		Is it now tent/poly-house/ other protected drying or open sun drying? Also indicate time required for drying through different methods.

### 11. Production and Productivity of dried saffron

Item	Before mission	After mission
Production (grams/kanal)		
Productivity(grams/kanal)		

### 12. Transfer of technologies

Item	Before mission	After mission	Remarks
Training received			
No. of trainings			

### 13. Marketing system

Item	Before mission	After mission	Remarks
Packaging			Indicate method of packaging. Also indicate where these producers get packing material and capacity wise.
Grading of saffron and its subsequent marketing			Indicate if they were grading the saffron prior to marketing
Marketing through			Channels involved (identification of different channels)
Gross price received by farmer in different marketing channels			

**14. What are the problems that you have faced in this mission?**

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**15. What are your recommendations for improvement of this mission?**

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**Sher-e-Kashmir**  
**University of Agricultural Sciences & Technology of Kashmir**  
**Faculty of Horticulture, School of Agricultural Economics and**  
**Horti-Business Management**

**C E R T I F I C A T E**

Certified that all the corrections/amendments as suggested by External Examiner Prof. Sudhaker Dwivedi during Viva-Voce examination held on 06-03-2020 have been incorporated in the manuscript entitled “**Impact Assessment Study of National Saffron Mission in Kashmir-An Economic Approach**” submitted by **Mr. Basir Ul Islam (Regd. No. 2017-AE-02-M)**.

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