CHAPTER II

REVIEW OF LITERATURE

2.1 Introduction

The review of literature is simply a summary of existing literature conducted on particular topic. Literature review helps us to critically summarise the current knowledge in the area under investigation, identifying any strengths and weaknesses in previous work. The present chapter makes an attempt to review the existing literature on various aspects of Apple production, marketing, exports in the state of Jammu and Kashmir in particular and in world as general. Thematic and chronological pattern has been adopted for reviewing existing studies. The themes classified in the study are: Issues on; horticulture production, marketing of apple, apple cultivation and Production and finally exports of horticulture crops and apple.

2.2 Horticulture Production

Ahangar (2013) has studied the Production and export performance of fresh and dry fruits in Jammu and Kashmir. The study has come to conclusion that horticulture exports have gained fame in the export market and fetches a very good return in the state of J&K.

Bazaz et al. (2013) has revealed that the crop sector of Jammu and Kashmir agriculture at an aggregate level is gradually diversifying in favour of high-value crops. However, while analyzing the extent of diversification at regional level, the Jammu division is witnessing a specialization in food grain crops, while as Kashmir division depicting a trend towards diversification. Further, an analysis of determinants that facilitated the process of crop diversification revealed all the factors considered under study have significantly affected crop diversification in the state, except fertilizer consumption.

Horticulture Based Production Systems in Indian Arid Regions has been studied by Bhandari, D. C. Bhandari et al (2014) The Indian arid zone covers around 12 percent of country’s geographical area occupying 31.8 million ha of land. It covers parts of Gujarat, Andhra Pradesh, Haryana, Maharashtra, Karnataka, Punjab and Rajasthan states of India.
These areas experience an annual rainfall between 100 and 500 mm with a coefficient of variation varying from 40 to 70 percent. The importance of horticulture in improving the productivity of the land, generating employment, improving economic conditions of the farmers and entrepreneurs, enhancing exports and above all, providing nutritional security to the desert dwellers, can hardly be overemphasized. Horticulture has assumed significant importance in the crop diversification in recent years, which has become essential to arrest serious land degradation and enhancing the farm income. In fact, the horticulture has also gained commercial importance with a very significant share in the economy of the region.

Buchoo Nazir F (2014) has studied the Universal Banking for Horticulture Sector of Jammu and Kashmir. The study reveals that, universal banking system proves as strengthening factor for horticulture by way of its strengths in Economics of Scale, Diversification of Surplus, Optimal utilization of resources, Advantage of Brand Name in Marketing and one point shopping. Universal banking by its broad international basis of information, expertise and funds, is found very instrumental in developing Jammu and Kashmir horticulture by opening up a network of its organizations and projects which are currently active in horticultural development. Universal banking should develop legal private entities for selected entrepreneurs and farmers jointly invest in and exploit supporting production and post harvest infrastructure. Universal banking also enhances economic development by creating farm credit banks which aid farmers.

Choudhary, S.K. (2013) has made an attempt to study the horticulture's development: Prosperity & Constraint and has suggested that horticulture sector in particular has to prioritize development of research in the issues of genetics, biotechnology, integrated and sustainable production systems, post-harvest handling, storage, marketing and consumer education. Further the study has given focus on diversification and has offered an attractive option and a major source of pushing up growth of agricultural sector and technological up-gradation and associated institutional changes are identified as thrust areas for future development of the horticulture sector, exports are considered to be most important for the growth of the sector.

Choudhary, S.K. (2013) has conducted a research on contribution of national horticulture mission in agricultural development in India. National horticulture mission was launched
to provide a thrust to the development of horticulture in the country. It was expected that adoption of an integrated approach covering production, post harvest management, processing and marketing would help attain the objectives enhanced improved nutrition and holistic growth of horticulture production.

The work carried out by Ghosh (2012) on Carrying capacity of Indian horticulture states that the annual growth rate in domestic demands for fruits and vegetables is estimated at 3.34 percent and 3.03 percent respectively. The required growth rates to meet projected demands in the horticulture sub-sector for 2050 may be lower than the growth already achieved during 1998–99 to 2006–07. Economic considerations could lead to diversification of cereal land to high value crops like horticultural crops, as in the southern parts of the country, where cultivation of spices generates more income than food crops for the farmers. This is not likely to happen in the northern states of Punjab, Haryana and Uttar Pradesh that contribute to the food security as buffer stocks of wheat and rice in reserve. Expected climatic changes may increase the overall productivity of coconut in the coastal areas, except in the northern parts. Cultivation of temperate fruits like apples may move to further higher elevations.

Banaeian (2011) has estimated production function of walnut production in Iran using Cobb-Douglas method. The study estimated relationship between agricultural inputs and walnut yield in view of energy inputs, and to make an economical analysis in walnut orchards in Hamedan, Iran. The results of sensitivity analysis of the energy inputs showed that the Marginal Physical Productivity (MPP) value of human labour was the highest, followed by farmyard manure and water for irrigation energy inputs, respectively. The benefit to cost ratio, mean net return and productivity from walnut production was obtained as 2.1, 2043.7 $ ha⁻¹ and 0.3 kg $⁻¹, respectively. Based on the results, applying mechanization, mechanical harvesting and post harvesting such as shaker, sweeper, pickup machine, cracking and handling unit should be developed.

Ghosh (2010) has analysed the deciduous fruit production in India and has stated that Apple production dominates the scene and systematic cultivation and marketing of apple can change the rural economy in the hills of North- Western India. New vision and concerted efforts are required for change in variety mix, supply of quality planting material from elite clones on indexed clonal rootstocks. High density planting, water
management including micro-irrigation, integrated plant nutrient management and IPM strategy for plant protection in some of the areas which need greater R&D focus. Adoption of post-harvest management practices and infrastructure development for grading, packaging, pre-cooling and storage of the produce needs focused developmental attention. Value addition and export promotion, particularly of apple are drawing due attention of the developmental agencies in India.

A study by Farzana and Nusrat (2015) aimed to analyze the peoples view towards use of various technologies and proper implementations of policies for the development of horticulture produces in Kupwara District of Jammu and Kashmir state. This study is like more in a descriptive nature based secondary source of data. It has found from the study that major crops in district Kupwara are Apple and walnuts. Horticulture is concentrated on few major horticulture produces in a particular district and there are numerous inter district disparities in horticulture production. It has suggested that to boost the horticulture sector there should be a diversification in the district. It has also suggested improving the marketing facilities for the promotion of horticulture products.

Ebtisam (2015) has carried out a study on horticulture sector of Kashmir valley, India. It has relied on both primary as well as secondary source of data for meeting the objectives of the study. The study has observed that horticulture sector of the Kashmir supports more than 5 lac families and employs more than 25 lac persons per year directly and indirectly. It has also observed that in terms production apple account for 60 to 65 percent of the total area. The study has found an increase in the area under the fruits in the study area during the last decade at the same time the production has also shown an increasing trend. The study has found apple as the major raw material available for the fruit processing unit in the Jammu and Kashmir. The study has raised a concern against the seasonality of the fruits and it has suggested facilitating storage facility to ensuring the regular supply of raw material to fruit processing units. The study has also observed two systems of trade in Jammu and Kashmir first one is marketing through pre-harvest contractors and the second one is direct marketing by growers. The study has concluded that the efforts of the research and development towards horticulture sector should lead to the better outcomes for the state of Jammu and Kashmir.
Jadhav (2013) has made a holistic view on horticulture development in India. The study has studied various horticulture crops cultivated in India and has given some crucial sufferings that horticulture sector in India is in distress a lot due to some natural, manmade, technical and economical reasons. Some selected reasons behind the crippling growth and proven to obstruct the growth of horticulture sector in India are: Inadequate availability of disease free, high quality planting material, Slow dissemination and adaptability of improve high yielding cultivars/ hybrids., Lack of post-harvest management technology and infrastructure, Weak database and poor market intelligence, Instability of prices with no support price mechanism, Inadequate technical manpower / human resource in farming system and Poor credit supply, high rate of interest coupled with inadequate crop insurance scheme.

Philip (2013) has carried out a study in Manipur state, India. It has tried to examine the horticulture in Indian context. It has used both primary as well as secondary data. The study has found that due to the failure of Jhum cultivation people in the study area have switched to horticulture for its higher rewarding capacity. The study has confirmed that the horticulture has turned as a lifeline of the people in the study area. The study has projected that the increase in the demand for horticulture products by 2020 in this connection study has urged to increase in the area of land and intensive cultivation so as to expand the area under horticulture crops. Because of the failure of Jhum crop and the switch over of occupation to horticulture crop and this has led to the increase in employment opportunities, income and standard of living. Further it has gradually changed the economic scenario of the study area.

Lone et.al (2014) has stated that the trend in production, export, and exchange earnings was increasing, but the area, production and export of fresh fruits was more than dry fruits from last one decade. Among fresh fruits, Apple emerged as major fruit of horticulture. Apple ranks at first, with a share of 80.18 percent followed by Walnut with 8.98 per cent at second rank in the export of fruits from state. District wise fruit production figures as, Baramulla emerges at first with 28.70 per cent next is Shopian claiming 14.09 per cent placing Kupwara at 3rd rank with 10.92 per cent

Zulfiqar (2015) has conducted a study on horticulture and its role in the economic development in Kashmir valley. The study has pointed out the use of surplus pesticides
has resulted in deteriorating the quality of horticulture output. The study has observed that there is a significant relationship between horticulture management and horticulture output. Development of horticultural sector should be accompanied by the growth of the agro processing industry. The opportunity exists to promote the industry by intensifying production of a required, appropriate variety of fruits for the products like jam, juice, marmalade and pickles. If the management is proper, the processing industry can be developed which will help not only in increasing revenues but at the same time will help to drive the economy as whole.

Sangral (2015) has analyzed the district wise production of fresh and dry fruits in Jammu and Kashmir. It has been shown from the study that production of major fruit is concentrated to few districts which have protected the horticulture sector at low level of equilibrium. Horticulture sector is concentrated towards few major horticulture fruits and there are many inter regional disparities in fruit production of Jammu and Kashmir. Crop diversification among districts like Srinagar, Budgam, Baramulla and Anantnag is very high in Kashmir division only the reason for this is due small average farm size and comparative advantage in the region.

Sharma et.al (2012) has studied the important aspect that is; Impact of peace and disturbances on tourism and horticulture in Jammu and Kashmir has found that horticulture sector is adversely affected due to lack of marketing strategy and violence-prone image of the state. Further the study has found that there is no significant growth in the export of horticulture produced outside the state. The decline in the export of fruits outside the state is due the introduction of market intervention scheme (MIS) under which “C” grade apples are produced at a support price of rupee 6 per kg for processing into juice concentrates in the locally established juice processing units. Secondly India is importing fruit from foreign countries as free trade policy is in force at the country level.

Sharma and Alam (2013) have stated that Current trends in horticulture have indicated that consumers are looking for increased variety, freshness, and healthy options in their eating choices. Consumers are also seeking greater ease and a higher proportion of fresh produce in their diets. Those in urban environments are more and more aware of and dependent on green spaces for their livelihoods and wellbeing. The future for horticulture
and its foundation sciences within such an environment is, therefore, exhilarating, tricky, motivating and surely worthwhile.

Singha et al. (2014) have studied Growth and Diversification of Horticulture Crops in Karnataka an inter-district analysis and has found that the districts of Gulbarga, Raichur, Bijapur, Bidar, Koppal, Bagalkot, and Bellary showed a complete diversification toward horticulture crops, whereas the districts of Kolar, Udupi, and Dakshina Kannada were found to be diversified the least. The study has also explored that the districts having complete diversification toward horticulture sector were found to have devoted a lesser share of their cultivable area under horticulture crops. Also, most of the highly diversified districts have come under the dry agro-climatic zones and experienced a high growth rate of horticulture crops cultivation from triennium ending (TE) 2002-2003 to TE 2009-2010. However, the lesser diversified districts have got lesser growth rate of area under the horticulture crops, but devoted relatively a higher share of area under the crops.

Singha et al. (2014) the study reveals that the growth of area, production and yield of horticulture crops in India was found to be statistically significant in the last twenty years. Within the horticulture sector, the value of output for fruits and vegetables was found to be at the highest, accounted for 26 per cent of the total agricultural value of output. However, despite impressive output growth, the yield growth rate of fruit crop was found to be statistically insignificant. To enhance production and productivity of horticulture crops, the study suggests that the large cultivable waste lands of the bigger States should be brought under horticulture cultivation in country.

Dumsile (2014) has analyzed the resource use efficiency in organic vegetable production in Manizini region of Swaziland. The author has analyzed the use of inputs in the production of vegetables showed increasing returns to scale. The study further suggested that in order for farmers to produce efficiently; all inputs that were significant in production of vegetables needed to be doubled in order to double the output.

Sinha and Sujo (2012) have studied the organized retailing of horticultural commodities. The study has made an attempt to explore and evaluate the extent of the transformation and its impact brought by the organized retailing of Horticultural commodities in India. The study has discussed the nature of organized retailing in India alongside the progress and experience of organized retailing of horticulture commodities. The study has found
that the post-harvest issues in horticulture commodities could only solve with joint participation from private and public sector to increase the horticulture productivity. The post-harvest efficiency could be achieved through more investment on agriculture research which will help to explore innovative techniques to reduce post-harvest efficiencies. The commercial outlook to research will allow more private participation. Moreover, there is also utmost need to focus on certain commodities on priority basis in the horticulture sector because it would help to fulfill the research requirements explicitly. Furthermore, the Indian horticulture sector should definitely make its move towards becoming a “globally competitive industry” but before that, the Government should fine tune its policies and set priorities to develop a sustainable and integrated model which becomes “locally efficient” for all stakeholders.

Mittal (2007) has studied the infrastructural problems pertaining to the cold storage facilities are dual as some places don’t have the cold storage while other places have the problem of underutilization of the existing cold storage. The utilization is even lower than 30 per cent of the total capacity in many cases. There are problems with price structure in the processing units; the price offered by them does not justify the prevailing wholesale price or even the cost of production of the produce. Development of competitive international transportation, linked to domestic air, road and rail transport would help in the reduction of post-harvest losses. High air freights are also a hindrance for cost-effective exports.

Taili (2014) has studied the dynamics of horticulture in Kashmir and has analysed that development of agriculture in Kashmir needs some critical management inputs particularly that of supply chain management-collaboration among various stakeholders along with efficient vertical and horizontal integration. The horticulture sector in particular has to prioritize development of research in the issues of genetics, biotechnology, integrated and sustainable production systems, post-harvest handling, storage, and marketing and consumer education. Diversification offers an attractive option and a major source of pushing up growth of agricultural sector.

Yusi (2016) has analyzed the production function and farm marketing efficiency of pineapple in South Sumatera Province, Indonesia. The study has analyzed the input
allocation of pineapple farm from six angles: cultivated area, seed, man power, chemical fertilizer, manure, and insecticide. The result of Cobb Douglas production function approach indicated that, inputs had not been used optimally. Cultivated area, seed, man power, chemical fertilizer, manure, and insecticide should be increased. In the 8 input factors, cultivated area has the biggest influence on pineapple output. In aggregate, the condition of pineapple farm in this area has increasing returns to scale. From the marketing analysis, the farmers who sold their pineapple by using the shortest channel of distribution received more contribution than the other two kinds. Thus, by using the marketing efficiency analysis, the shortest channel of distribution is more efficient.

Rit (2014) has made an attempt to critical evaluation of the studies made on marketing efficiency of agricultural products in India. The study has found that efficiency of the agricultural markets cannot be judged solely by the structure conduct performance framework (correlation coefficient and co-integration analysis) or by the marketing margin analysis. Marketing efficiency needs to be backed up some additional evidences of competitive conditions like low inter-market price differentials, possibility of inter-market trade etc. The study has reviewed the past studies and has critically analyzed the marketing efficiencies in India.

The main aim of the study carried by Ntakyo, et al (2013) in South-Western Uganda was to determine the socio-economic factors influencing on production. It has relied on both primary as well as secondary source of data. For primary data it has carried out a cross sectional survey and adopted a multi-stage sampling technique. The study has adopted the techniques like Cobb-Douglas to estimate the apple production function. It has been observed from the study that the cost of production for apples varied widely depending on tree density, location and management practices, the larger the density of trees, the more labour and materials required; hence, the higher the costs involved. With respect to marketing it is found that the apples sold through direct market options, for example, neighbours and open markets got higher returns because of a higher price than the individuals who sold through wholesale marketing channels. It has also found by the study that the apple production is a profitable enterprise in the study area because of its positive returns and net present value (NPV).
Gul (2006) has conducted a research on technical efficiencies of apple production in Turkey with the help of Data Envelopment Analysis (DEA). The study has interviewed 129 agriculture enterprises during 2001 apple production year. The results of the study has found that mean efficiencies of surveyed apple farms was 0.60 and 0.90 for constant and variable returns to scale assumptions respectively and more drop off were in fertilizers use N,P,K respectively. Further the study suggests appropriate soil tests should be made to establish fertilizer necessities of the soils. Farm size was found to be most significant factor affecting efficiency.

Yadav and Pandey (2015) have checked the growth trends of horticulture crops in India the study found that there are huge differences in area, production and yield among various horticultural crops. Some crops are far at the back in terms of area, production and productivity and some are doing well. Regression analysis and Correlation Co-efficient between area and production, was 0.963 which is of very high degree; predicts that India should increase its area under horticultural crops keeping in mind the present and future needs of the country.

The study undertaken by Hinman and Guy (2011) has given the data on natural apple generation from recent research and producer encounter. It has found that numerous parts of apple production are the same whether the cultivator utilizes low-splash, natural, or routine management. Appropriately, this study has concentrated on the viewpoints that vary from non natural practices—basically nuisance and infection control, promoting, and financial matters. The study has also presented the major apple insect pests and ailments and the best natural administration techniques. It likewise incorporates agriculturist profiles of working plantations and a segment managing financial and promoting contemplations. There is a broad rundown of assets for data and supplies and an index on ailment safe apple assortments.

2.2.1 Synthesis of the Issue:

The above section has focused on the horticulture production in India and Jammu and Kashmir. After reviewing the various issues it has been found that most of researchers affirm the horticulture sector profitable and in case of Jammu and Kashmir the horticulture is the backbone of the economy of the state Ahanger (2013); Ebtisam
Whereas some of the researchers have found that horticulture of Jammu and Kashmir is adversely affected because of disturbances in the valley. Desai and Sheikh (2016); Jadhav (2013); Zulfiqar (2015); Sharma et al. (2012); Mittal (2007) and Taili (2014).

2.3 Marketing of Apple

Baba et al. (2013) has investigated into the utilization pattern, marketable surplus and traditional/modernised supply chain of apricot in cold-arid Ladakh region of Jammu & Kashmir. The study revealed that this crop occupied a major portion (53.6 per cent) of total sown area in the study area. The overall marketable surplus was around 60 per cent of total apricot production; after accounting for field losses and other losses that accrue at picking stage. It was observed that presence of contractors in dry apricot marketing reduces the producers share in consumer’s price. Contrary to this, producer received higher returns where they are able to sell off their produce directly to wholesalers or retailers. Only 11.5 per cent marketable surplus of apricot was sold as fresh.

Desai and Sheikh (2016) have made an attempt to study the role of horticulture in the development of the economy of Jammu and Kashmir. According to analyses of authors the horticulture sector is adversely affected due to lack of marketing strategy. Considering the growth prospects of this sector, the state government needs to plan for higher and more quality production. The results of the study conducted jointly by authors has shown the aggregate production and export of fresh and dry fruits, has shown increasing trend the overall production the fresh and dry fruits during 2004-2005 was 1232.75 thousand metric tons and it reached to 1740.62 thousand metric tons during 2010-11 and the overall export of fresh and dry fruits was 7.6 lakh metric tons in 2003-04 and it reached to 8.66 lakh metric tons in 2010-11.

Marketing management of Kashmir apple has been studied by Bhat and Aara (2013) the study has studied the various marketing channels of apple in Jammu and Kashmir among all the marketing channels the most profitable channel in marketing of apples in Kashmir is the “direct sale to consumer”. In this channel there is no middle man as intermediary, this is the shortest distribution channel. The marketing cost is very low therefore;
consumers are able to get good quality of fruit at the cheaper price. Producers using this channel for marketing usually have small sized orchards. The success of this channel depends largely on large number of contacts with the consumers to get orders for fruits. The growers generally publish information in local dailies or publish small pamphlets containing details regarding the varieties of fruits, their grade and the size to get orders from the consumer. This channel is mostly practiced by the growers, owing orchards near the places of tourist interests on the road side, especially on highway, and as well as sell their fruits on small shops, or make supply to hotels, restaurants or super markets.

Mushtaq, et al (2008) has examined the degree of spatial market integration in the regional apple markets of Pakistan using co-integration analysis and monthly wholesale price data from January, 1996 to December, 2005. The study has found apple markets are perfectly integrated and Quetta dominates the market. The high degree of market integration observed in this case is consistent with view that apple markets in Pakistan are quite competitive and provide little justification for government intervention designed to improve competitiveness to enhance market efficiency.

Minhas and Girish (2016) has analyzed the efficiency of apple marketing in Kullu district of Himachal Pradesh. The study has adopted the modified marketing efficiency analysis to analyse the efficiency of marketing channels of apple. The Garrett’s ranking technique was used in study to rank the marketing constraints faced by apple growers. Producer – Retailer – Consumer marketing channel was the most efficient channel as it had the highest modified marketing efficiency index of 6.97. Majority (50 percent) of the growers marketed apple through this channel. The study has further stated that among the various marketing costs, packing was the major cost followed by transportation for pre-harvest contractor, village trader and retailer; while for the wholesaler, transportation was the major cost followed by storage. The major marketing constraint faced by apple growers was fluctuations in prices.

Malik (2013) has accessed the production and marketing problems of apple in Kashmir valley. The highest percentage (51.37 percent) of total produce is transported through Producer- commission agent- Wholesaler - Retailer – Consumer marketing channel followed by Producer- Forwarding agent- Commission agent- Wholesaler- Retailer - Consumer (23.25 percent) marketing Channel. Sale through pre- harvest Contractor is
most important system of marketing. Normally the small orchardists sell their crop at flowering stage to contractor who organizes plant protection, Plucking and packing of fruit

2.3.1 Synthesis of the Issue

The marketing of apple is an important task for the growers but unfortunately very few studies have been found on apple marketing in Jammu and Kashmir. Less research on marketing of apple has been done.

2.4 Apple Cultivation and Production

Arsalanbod (2016) has made an attempt to make an economic analysis of apple production in Urmia, using linear and Cobb Douglas production functions and ordinary least squares regression method. Independent variables of production functions were costs of manure, fertilizer, labor, machinery, chemicals, other costs, and land per meters. Dependent variable was the value of products, including apple and fodder. Coefficients of determination were, 69 and. 61. The estimated coefficients, except for fertilizer, were positive. Fertilizer negative coefficient is due to complementarily relation between water and fertilizer and lack of apple farmers readiness to cope with drought which makes the efficient use of irrigation methods necessary. Sum of coefficients in Cobb Douglas production function was larger than 1 indicating increasing returns to scale which means increasing the extent of horticultural activity causes cost economies. Production elasticities, except for fertilizer which was negative, were positive and smaller than 1. Labor elasticity was much higher than those of most inputs. Due to large area of land under apple cultivation and intensive unemployment problem in West Azarbayjan, high labor elasticity could provide very good ground for more employment and decrease of unemployment in the province.

Ahmad (2014) has studied Economics of production of Apple in District Budgam in Jammu & Kashmir and has found that the cultivation of Apple in Kashmir is remunerative. The investment on apple orchards is profitable and financially viable; it
also provides employment to people in the area. Net returns from apple can further be increased if the problems are taken care of proper education and training need to be given to the apple growers with regard to the optimum and desired way of allocating the resources in order to have more profit. The suitability among different input factor has to be seen from the technology and profitability point of view. The orchard of age group of 25-30 years provided.

A study by Bravin, et al (2009) was the part of the ISAFRUIT project which was accomplished in Germany. It has identified six factors which influence the economic success of their orchard. Factors identified by the study are; yield quality of apples, orchard size, number of cultivators, production costs, specialization in organic production. In this study the outcomes have been measured by using gross margins as economic key. The study has formulated six hypotheses and whole study has been focused only on these hypotheses. Those hypotheses were linked to six factors as identified by the study. Out of six it has accepted four hypotheses and remaining two were rejected. It has proved that yield and quality of apples are important factors for the economic success of an orchard. It has found that as the number of cultivators increases the economic success of an orchard improves whereas the size and production costs have less influence on the same.

Blake and Zuccollo (2012) have reported the economic assessment of the research programme of apple futures. It has assessed the programme which focused on meeting the market requirements of the apple primarily in European Union. It has used the secondary source of data and applied cost-benefit analysis to quantify the impacts of apple futures. It has found that the economic benefits of Apple Futures were 113 million dollar during the period of four years. The study has also developed a model to estimate the economic impact of future science research. It has concluded that the model developed by the study can also be extended to the other industries for economic assessment.

Deodhar, et al (2006) has stated that strong economic growth is projected to lead to continued expansion of Indian apple demand, but the high cost of domestic and imported apples compared with other Indian fruit is likely to limit consumption to higher income
consumers. U.S. apples have accounted for the largest share of Indian imports, but face increasing competition from high-quality and low cost Chinese apples. Although India has a high (50-per cent) tariff on imported apples, internal marketing margins or returns to traders over and above measured costs account for a significantly larger share of consumer apple prices than do import prices, tariffs, or marketing costs. India’s emergence as an export market for apples since 1999 has been driven by growth in per capita incomes and the removal of quantitative import restrictions. A small but expanding segment of upper middle class consumers now have sufficient income to diversify and upgrade their diets by purchasing high-priced and high-quality products, such as imported apples. However, the high cost of domestic and, particularly, imported apples compared with other Indian fruit is likely to restrict consumption of apples by middle- and lower-income consumers who make up most of India’s population.

According to Garratt, et al (2014) insect fertilization is imperative for food production all around the globe and apples are one of the real natural product crops which are dependent on this ecosystem service. According to the study past studies have essentially surveyed the advantages of fertilization to harvest yield and disregarded quality advantages and how these make translation through to economic values. But this study has examined the impact of insect fertilization benefits on homestead entryway yield of two critical UK apple assortments; Gala and Cox. Utilizing field tests, it has evaluated the impact of insect fertilization on yield and significantly quality and whether either might be constrained by problematic insect fertilization. The study demonstrated that insects are basic in the production of both assortments of apple in the UK and contribute a sum of £36.7 million for each annum, over £6 million more than the value figured utilizing more routine reliance proportion strategies. It has found that insect fertilization influences the amount of generation as well as impact sly affect the nature of apples, affecting size, shape and affecting their characterization for market. The research study has also demonstrated that proceeded with pollinator decrease could have genuine money related ramifications for the apple business however there is significant degree through administration of wild pollinators or utilizing oversaw pollinator expansion, to enhance the nature of generation.
Girmay, et al (2014) have been carried out a study on Empirical Study on Apple Production, Marketing and its Contribution to Household Income in Southern Ethiopia. It has tried to analyse the apple production and marketing chain to enhance household food security in southwest Ethiopia. It has relied on primary data. It has found from the study that apple creation and profitability is low in the study area because of restricted cultivation, poor agronomic practices, deficiency of grafting and pruning materials, lack of trained experts and poor research-expansion and development linkage. The study has observed that the chain of apple marketing is going through producers, buyers, essential cooperatives, retailers and wholesalers. Cooperatives assume basic part in apple marketing and shield apple farmers from exploitation by egotistical agents. In any case, mismatch between supply and demand, absence of foreordained demand, pirating which bargains quality items and unfair competition among cooperatives and nonappearance of transparency are influencing apple marketing.

Anwaar, et al (2013) in their study have discussed the process of tree plantation and people involved in horticulture economy. This study is carried out in Balochistan of Pakistan, and it has adopted qualitative anthropological research techniques for collection of data. It is a longitudinal study which covers the period of 20 years. It has found that the horticulture has been shifted from subsistence to market economy. And cultivators found switching over to the cultivation of the profitable types of apple. This study tried to analyse the changes taking place in the study area in the light of world system theory. During the period of study it has been found that the study area has witnessed some major structural changes. The economic conditions of the natives have improved and use of fertilizers, chemicals and pesticides have become common which is resulting in to the environmental issues and health hazards.

Mugisha (2013) has studied socio-economic factors affecting apple production in southwestern Uganda. The analysis was based on data from a research institute orchard and a survey of 136 farm households. There was positive net cash flow (US$ 2,398.5) after the fourth year. Labour was the highest cost accounting for 41.8 percent of total production costs. Organic fertilizer, farmers experience and labour were the most critical factors of production. They had a positive and significant effect, explaining 63.6 percent
of the variation in apple production. Organic fertilizer had the highest elasticity (0.77), followed by labour and land with 0.28 and 0.01, respectively.

Na Wang et al (2016) has studied the sustainable intensification of apple production in China. The study has clearly pointed out that China stands on top position in apple production globally with both the largest apple growing area and the largest export of fresh apple fruits. However, the annual yield of China’s apple fruit is significantly lower than that of other dominant apple producing countries like USA. Adding together, apple production is based on excessive application of chemical fertilizers and the nutrient use efficiency (especially nitrogen) is therefore low and the nutrient emissions to the environment are high. Apple production in China is considerably contributes to grower’s incomes and is important as export product. There is an urgent need to enhance apple productivity and improve nutrient use efficiencies in intensive apple production systems in China. These can be attained by improved understanding of production potential, yield gaps, nutrient use and best management in apple orchards. The study has suggested on research and development in apple production and exports system and required political interference to more sustainable and environmental-friendly intensification of apple production in China.

Negi, (2011) has analysed the prospects of growth of apple production in Kinnaur district of HP. The study has made the primary investigation in the 33 villages of Kinnaur district, and has found that respondents perceive that there is inadequate government support price, poor marketing facilities and adverse role played by the intermediaries have contributed significantly to low profitability of apple cultivation. It is the perceived opinion of majority of the respondents that factors such as uncertain whether condition, non availability of high quality of apple seeds, poor quality of soil and poor management of apple plant are responsible for low productivity. Most of the respondents felt that poor quality of pesticides, insecticides and lack of irrigation facilities coupled with inadequate pollination and non availability of modern technology were also playing a substantial role in adversely effecting apple productivity.

The research study conducted by Noonari, et al. (2015) on Economic Analysis of apple Production District Mastung Balochistan and has found that the agricultural infrastructure
is the web of personal, economic, social and legal relationships that support the production of agricultural commodities. It includes, most visibly, agricultural input suppliers and output processors. However, it also includes the formal and informal business relationships between individual farms. Infrastructure provides access to input and output markets, access to agricultural services ranging from continuing education to consulting, as well as including institutional arrangements, such as the legal and monetary systems.

Rasouliazar, et al. (2011) has analyzed and identified the problem of apple growers in West Azerbaijan Province of Iran. The study has concluded that apple growers have serious problem in the stage of planting, harvesting, warehousing and marketing. Awareness of apple growers about apple production was in average level. Results indicated that an apple grower is interested in practical educational methods. Therefore agricultural extension educators must pay attention to this serious problem and have special program to solve this educational problem in their educational course.

Zahoor, et al (2014) has stated that Apples in Kashmir are most widely planted and are commercially the most important fruit crop. In this background a close look at the economics of apple cultivation become highly relevant for study to determine the costs, the cultivation of apple crop in Jammu and Kashmir shows particular interest for a number of reasons. In terms of both area and production, apple is very beneficial fruit crop. Apple is an extremely important source of nutritive diet, this provides a major source of income and employment also. It's production in Jammu and Kashmir and its marketing all over the country as well export promotion to other countries by several government initiated programs and policies e.g. price policy credit policy, supply of packing boxes, quality control etc. but their impact positive or negative, remains a topic of considerable controversy.

Baba, et al (2012) has examined the Pesticide delivery system in apple growing belt of Kashmir Valley and has came into the conclusion that the apple production is a capital-intensive venture and the expenditure on pesticides constitutes a major portion of total cost of apple cultivation. Pesticides applied on apple together constituted about 83 per cent of all the agro-chemicals utilized in the state. The pesticide delivery system in the
state is largely unorganized owing to an extensive network of pesticide companies and their authorized distributors/dealers that popularize and sell agro-chemicals in the rural areas.

Beigh, et al (2015) has conducted a study on management of resources with respect to disease and pest management of apple and extent of adoption of recommended plant protection technology undertaken for increasing apple production in Kashmir valley of Jammu and Kashmir State. District Baramulla was purposively selected on the basis of maximum area and production under apple crop. The study has found perception index regarding attributes of technology recommended in two diseases viz. San Jose Scale and Apple Scab was 68.88 percent and 80.76 percent in respect of profitability (83.97 percent), simplicity-complexity each 63.57 percent and 54.27 percent for practicability attributes of technology. The study further reveals none of the apple growers had adopted biological measures for control of San Jose Scale. Similarly, none of the respondents had adopted dormant spray and pre-harvesting spray under chemical control measures. With regard to farmer’s adoption on control of Apple Scab, none of the apple growers had adopted recommendations regarding sprays of chemical under clean cultivation. Majority of the orchardists were unaware of the spray Schedule and sprayed no fungicides and pesticides.

Bhat et.al (2014) has stated that Apple cultivation is highly profitable economic activity in the state, which is famous for its quality apple. It is farm-based, labor intensive and commercially attractive economic activity. The income per acre is much higher than any other horticulture crops, if it is done in systematic way.

A study conducted by Zarini, et al (2015) on energy use analysis for apple production in Iran. The study has used the energy ratio (energy use efficiency), energy productivity, specific energy and net energy were calculated. Inputs in apple production in Iran are human labour, machinery, diesel fuel, chemical fertilizers, manure, pesticides, seeds and irrigation water. Output is apple. Fertilizers were the most energy consuming, and were the premier of energy inputs required in apple production farms. After fertilizers and pesticides, manure, machinery, fuel, labour and electricity are the most energy consumer inputs, contributing 8.29, 8.18, 7.53, 3.65 and 2.4 percent total energy use, respectively.
The study has revealed that there is need by apple farmers to improve the efficiency of energy consumption in production and to employ renewable energy.

Bhat and Choure (2014) has studied the status and strength of apple industry in Jammu and Kashmir. The crux of the study is in order to make apple cultivation a remunerative activity, it is imperative to regularize the trade. Once the market is regularized this will automatically increase the profit of farmers, and subsequently production and productivity will increase by the use of improved technology.

Malik (2014) has studied the Economics of Apple Cultivation “With Special Reference to South Kashmir and has found Apple cultivation a profitable economic activity in the Kashmir valley compare to other horticultural crops. Apple cultivation is labour intensive, farm based and commercially attractive economic activity. The income earned from apple is much higher than any horticultural crop, if it is done is a systematic way. Further the study has concluded that a net income of Rs 2.43 is earned with an investment of Rs. 1.00 from apple cultivation in south Kashmir region of Jammu and Kashmir.

Mir (2014) has carried out the study on problems of apple industry in J&K with special reference to Sopore town. The study reveals that 80 percent of apple growers have responded that horticulture department of J&K state is not providing necessary assistance for apple growers. From some past years it is a complaint of every apple grower that the production is not as much as they are expecting at the flowering stage.

Reshi et al (2010) has evaluated the Assessment of problems and prospects of apple production and marketing in Kashmir valley, India. The Study has highlighted the dimensions of supply chain management of apples in the valley. The authors have concluded this sector is one of the major foreign exchange earners of the state; it should be given the status of an industry so that special attention can be diverted to it. Provisions should be made for more exports. The Apple in the region should be uplifted on the lines of SEZs.

Sheikh and Tripathi (2013) has made an attempt to study the socio economic conditions of Apple growers of Kashmir Valley: A case study of district Anantnag. The study has
shown the male female ratio, education of respondents, occupation and other Social conditions of respondents, the results showed majority of apple growers were males and literacy rate of growers was 45 percent. An economic condition of apple growers in Anantnag district is profitable. The study has made various suggestions for better production and productivity of apple in the study area. Some of the few suggestions made by the study are: enhancement of grading and quality control act, economic packing system, establishment of horticulture marketing training institute, improved marketing channel and cold storage facilities. The study has stressed the policy makers that if suggestions are implemented properly it would prove a gate way to the future prosperity of the horticulture industry in the district.

2.4.1 Synthesis of the Issue

The apple cultivation in India and Jammu and Kashmir has been studied in the above section. Various issues have been studied to check the precision of the apple cultivation in the country. As apple is mostly cultivated in Jammu and Kashmir but the researchers and technocrats have sidelined the importance of apple in the economy of Jammu and Kashmir. The studies on apple in different nations have also been referred but it has been found that India has less productivity as compared to other nations. So need is to rectify the loophole in the apple industry in Jammu and Kashmir.

2.5 Exports of Horticulture Crops and Apple

Reganold, et al (2001) has examined the Sustainability of three apple production systems viz; Organic, Conventional and Integrated production system in Washington, the study has claimed that organic farming systems are less efficient, pose greater health risks and produce half the yields of conventional farming systems. Nevertheless, organic farming became one of the fastest growing segments of US and European agriculture during the 1990s. Integrated farming, using a combination of organic and conventional techniques, has been successfully adopted on a wide scale in Europe. Tikender (2011) has analysed the apple production in Himachal Pradesh and has stated that landholdings and low productivity, coupled with the withdrawal of state support have raised the cost of production substantially, and denied remunerative prices to the poor and
marginal growers. The entry of big private players, the deteriorating transport system, changes in the climate and absence of adequate insurance are all contributing to a major crisis in the apple economy.

Sami, et al. (2009) conducted the study on energy use of inputs and output in apple production in Esfahan province of Iran. Data used in this study were obtained from 146 farmers using a face to face questionnaire method. The study has concluded that production of apple needs to improve the efficiency of energy consumption in production and to employ environmentally friendly agricultural management practices and production methods.

Tegenie (2014) has worked to evaluate the financial feasibility of apple fruit production in Tiyo district of Arsi zone, Ethiopia. The study has shown that the NPV of the apple fruit production was 12,829.14/0.032ha and the IRR was 76.546 percent. It can be concluded that production of apple fruit is financially feasible and the paper has further suggested to the smallholder farmers to maximize net returns from their land and resource inputs, the adoption of apple fruit production should be promoted in the study area.

Paul (2013) has modeled and forecasted meat exports from India with the help of seasonal autoregressive integrated moving average (SARIMA). Augmented Dickey-Fuller test has been used for testing the stationarity of the series. Autocorrelation (ACF) and partial autocorrelation (PACF) functions has been estimated in the study, which have led to the identification and construction of SARIMA models, suitable in explaining the time series and forecasting the future export. The model has demonstrated a good performance in terms of explained variability and predicting power. The forecast values of meat export during January, 2011 to December, 2011 are close to the actual values. The relevant forecast interval for the out-of-sample export of meat and meat preparations can help farmers as well as policymakers for future planning.

Sarika, et al (2011) has conducted on modelling and forecasting time-series data of pigeon pea production in India. Box-Jenkins Autoregressive Integrated Moving Average (ARIMA) time-series methodology was considered for modelling and forecasting country's pigeon pea production data (1969–70 to 2007–08). The augmented Dicky Fuller
test was applied to test stationarity in data set. Root mean square error, Akaike information criterion and Bayesian information criterion were used to identify the best model. One and two-step ahead forecast value for 2006–07 and 2007–08 for India's pigeon pea production was computed as 2.54 and 2.53 million tonnes with standard errors 0.29 and 0.31, respectively.

Borkar (2014) has made an attempt to forecast soybean production in India using season time series model. Yearly soybean production data for the period of 1970-1971 to 2011-2012 of India were analyzed by time-series methods. Autocorrelation and partial autocorrelation functions were calculated for the data in the study. The Box Jenkins ARIMA (autoregressive integrated moving average) methodology has been used for forecasting. The diagnostic checking has shown that ARIMA (1, 1, 1) is appropriate. The forecasts from 2012-2013 to 2024-2025 are calculated based on the selected model. The forecasting power of autoregressive integrated moving average model was used to forecast soybean production for thirteen leading years. The study revealed that by the end of 2024-2025 the soybean production in India will be 12.75 million tonnes.

Kongcharoen and Kruangpradit (2013) the study has examined the forecasting performance of ARIMA models for Thailand export data. The study found that Thailand export data, indirect method does not provide better forecasting performance than direct method.

Nanda, et.al (2008) has analysed that export function of Indian horticultural products have positive price elasticities. However it’s also seen that prices are not really important, factors like standards or information about the market needs as well as available management techniques and technologies could play important role. Horticultural products are competitive in terms of cost of production, they do not remain so once they reach the US or European markets.

Rather, et.al (2013) has studied the changing agricultural scenario, it has been realized that the horticulture sector plays a vital role in providing livelihood security to the farmers globally. Area, production, productivity and export of horticultural produces are vital for increasing farm income and overall employment in the agricultural sector. The
The author has tried to explore potential and strength of Jammu and Kashmir with regard to its production and export of fresh and dry fruits. 77 per cent of apple and 90 per cent of walnut production in India belongs to Jammu and Kashmir and percentage share of state in India’s total production is showing an increasing trend and the state has been declared as the “Agri. Export zone for Apples and Walnuts”

2.5.1 Synthesis of the Issue

The above section has focussed on various exports of horticulture crops and has also studied various issues related to the export potentiality of different crops with the adaptation of econometric models like ARIMA. Again the problem of less literature availability has been found in this section. As India is exporting horticulture crops to different destinations but apple fruit is being sidelined due to high consumption in the domestic market. The present study will focus on apple exports from India viz-a-viz Jammu and Kashmir. The export trends and forecasting’s will be made in the study. This will help the policy makers for better understandings of the loopholes present in the export sector.

2.7 An Overview

Review of literature relating to production of horticulture crops has revealed a mixed outcome, some of the studies have declared horticulture sector a profitable industry, whereas various studies have not been in favour of horticulture sector. The studies have shown horticulture sector is adversely affected due to lack of marketing strategy and violence-prone image of the state. One of the main problems of orchards sustenance is the marketing. The production of apple is mainly confined to few districts; the problem of input usage is high in the valley. The studies have further revealed none of the apple growers had adopted biological measures for control of diseases on apple in the state of Jammu and Kashmir. Improper grading that is manual grading has been found through studies. The packing and transportation costs are significantly high. Moreover, apple orchard owners are facing a tough competition from the apple growers of Himachal Pradesh and Uttrakhand. The good varieties of apple like Delicious are highly vulnerable to pests. Diversification offers an attractive option and a major source of pushing up
growth of agricultural sector. The diversification of crops has positive impact on horticulture sector. There are large numbers of farmers who have converted agricultural land into horticultural orchards.


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