CHAPTER II
REVIEW OF LITERATURE

2.1 INTRODUCTION

Review of relevant studies relating to the field of investigation provides and insight into the conceptual framework and the scheme which helps in providing an essential link that is required for making comparisons and drawing conclusions with clarity and precision. In this chapter, the studies reviewed have been organized first under the following headings for better exposition:

(i) Studies relating to cost and returns
(ii) Studies resulting to resource use efficiency
(iii) Studies relating to market structure and channels, marketing cost and efficiency and
(iv) Studies relating to mango cultivations

2.2 STUDIES RELATING TO COSTS AND RETURNS

Costs and returns decide the profitability of farm business. Costs and returns vary according to the nature of the life span and the yield of the corps
and therefore various methodological problems may arise in their estimation. A review of some of the concepts relevant to the field of study is discussed below.

The Directorate of Economics and Statistics\(^1\) has used the cost concept in many cost of production studies and farm management studies. According to them the cost of production is grouped under four concepts, viz., Cost A1, Cost A2, Cost B and Cost C. These concepts are discussed below.

**Cost A1**

Cost A1 is an approximation of the actual expenditure incurred in cash and kind and it includes value of hired human labour, value bullock labour – owned and hired, machine labour, seeds, manures and fertilizers, plant protection chemicals, irrigation charges, land revenue, cess, water rates, etc., interest paid on working capital and depreciation on implements, machinery and farm buildings.


Cost B included Cost A2 plus rental value of owned land plus interest on fixed capital (excluding land).

Cost C consists of Cost B plus imputed value of family labour.

Kahalon and Singh\textsuperscript{2}, Kahlon and Miglon\textsuperscript{3}, Mishre and Gupta\textsuperscript{4}, and Shukla and Mishra\textsuperscript{5} are some of the researchers who have used the same concept (i.e. as Cost A1, Cost A2, Cost B and Cost C).

George and Joseph\textsuperscript{6} in their study, estimated the cost of production of coconut by including all the capital as well as current expenditure with the rental value of land to represent the opportunity cost of land in raising some annual crop.


Alikhan and Rajagopalan\textsuperscript{7} considered the total cost of production of coconuts as the sum of establishment cost and operation cost. Total establishment costs up to the bearing age were spread over the life of the coconut palm which was taken as 90 years. Annual share of establishment costs, interest on working and fixed capital and depreciation charges were included under indirect cost.

Umakesan\textsuperscript{8} in his study on coffee divided total cost into indirect cost and direct cost. All the costs which had a bearing on the capital assets were grouped under indirect cost and those which had a bearing on the output were grouped under direct cost. He mentioned that maintenance cost, operational cost and capital cost were the ingredients of total cost. He considered the maintenance cost which included cost of repairs, maintenance of farm and upkeep, as an indirect cost; operational cost which included welfare cost, material cost, labour cost and interest on working capital as direct cost; capital cost which included capital expenses, replanting and new planting expenses.


and its maintenance expenses up to the beginning of economic production as an indirect cost.

Madappa\textsuperscript{9} divided the cost of production of coffee into three main categories, viz., (i) cost of cultivation, (ii) cost of preparing the produce for the market and (iii) other costs.

Sivanandam, Kandaswamy and Ramasamy\textsuperscript{10} in their study on forest plantations grouped costs into two categories, viz., (i) investment cost or establishment cost which included the opportunity cost of land, cost of cleaning of land, aligning and peg marketing, digging pits, pandal erections, cost of seedling, providing shade, cost of manuring, plant protection, watering, watching and all other expenses incurred up to the commercial bearing in cashew and (ii) the maintenance cost which included the expenditure incurred on gap filling, plant protection, manuring, pay of plot watcher, watering, inter-cultivation, cleaning and expenses on collection of nuts.


In his study, Srinivasan\textsuperscript{11} has grouped costs incurred in the grape cultivation under (i) establishment cost and (ii) operation and maintenance costs. Indirect costs refer to the sum of costs such as annual share of establishment costs, interest on fixed capital, interest on working capital and depreciation charges. Direct costs refer annual operation and maintenance cost of the reference year. The sum total of the direct and indirect costs formed the total cost of production. Cost of production of grapes was worked out per unit of land and per unit of output.

Wallis\textsuperscript{12} in his study on Economics of growing coffee classified costs into (i) fixed cost what was incurred in growing coffee, (ii) crop cost that including expenditure on marketing, (iii) over-head cost that included depreciation, cost of vehicles, equipment, general transport and control, service expenses and (iv) overhead estimated cost that included management and rent expenditure.


In the study on Economic and Horticultural Crops\textsuperscript{13} estimates of costs of production of perennial crops like mango, guava, grapes and lime were made in two parts viz., (i) cost of establishment which included the cost of preparing land, planting and maintenance of the crops to the bearing age and (ii) maintenance cost which included the cost of maintenance, harvesting, preparation to the market and selling. The maintenance cost was estimated year wise for the entire life span of the crop.

In the study Betel vine gardens in Trivandrum district of Kerala state\textsuperscript{14}, it was observed that in betel vine cultivation all investment costs were incurred during the first year itself, which included both recurring and non-recurring expenditure. The important non-recurring expenditure refers the land development costs, cost of preparing platforms and trenches for planting of vines, cost of vine cutting and setting up of standards. The recurring expenses includes cost of manures, irrigation cost, training of vines in standards, weeding intercultural, repair of standards and harvesting.


The initial investment made prior to setting up of betel vine garden was on the construction of tail well. In this, cost of labour for excavation was the major item besides often material costs such as cement, sand, granite stone, etc., and wages for skilled masons for lining work.

Though betel vine garden gets well established by the end of the first year itself, production of leaves gets established only in the third year. Hence, cost incurred during the second year onwards are all of a recurring nature and this maintenance costs included both material and labour costs associated with lowering of vines, application of manures like farmyard manure, green manure, repair of standards and training of vines, irrigation and harvesting. The male family members contributed much as labourers in these gardens.

(b) Returns

Returns from farm enterprises are an indicator of farm efficiency and the efficiency of resource-use in farms. The returns in the form of gross income, farm business income and net income are computed for the purpose of analysis. The gross income is worked out by multiplying the value of main and by-products by their respective market price. Farm business income is gross income minus total variable cost. Net income is obtained by subtracting the
total cost from gross income. The returns as worked out in farm studies by different authors are discussed below:

Dhaiya (1976)\textsuperscript{15} in his study on land allocation pattern realized net income by deducting cash and kind expenditure (variable cost) incurred in the cultivation of crops during the year from the gross income of the farmer obtained from his farm produce.

The gross income of the grape garden was equated to the total value of the output realized in a year. Net income was arrived at by deducting from the gross income the total cost, which contained both the direct and indirect cost viz., the annual operations and maintenance costs, the annual share of establishment cost, interest on working capital, interest on fixed capital and depreciation charges\textsuperscript{16}.

According to Tandon and Dhondyal,\textsuperscript{17} gross income is the cash received on account of sale of farm produce, value of the produce is main or by –

\begin{itemize}
    \item S.Srinivasan, op.cit., 1987, p.53.
\end{itemize}
product used for home expenses, consumption and for cattle feed or given as wages in kind and value of the seed stored for sowing purposes.

In the study of Economics of Horticultural Crops\textsuperscript{18} it is observed that yield of mango starting from the age of five increases up to the 30\textsuperscript{th} years, remain steady up to 40\textsuperscript{th} year and then starts declining. Therefore, the return per year is worked out by multiplying the average yield of entire life span at the current price of mango. From this gross income, cost per hectare was subtracted to get net income per hectare.

Waghmare and Maral\textsuperscript{19} defined net income as either net profit or net loss to the operator of land after deducting all expenditure such as paid out costs both in kind and cash, depreciation charges, land rent, interest on capital and imputed charges of family labour from total income.


2.3 STUDIES RELATING TO RESOURCE – USE EFFICIENCY

Resource – use efficiency is very important and it is measured by computing the ratio of inputs to outputs. Resource – use efficiency is governed by factors such as size of the farm, family labour use, and technical efficiency measure related to land-use, labour efficiency and machinery efficiency. Technical efficiency refers to the highest amount of output for given amount of inputs. Economic efficiency measures are concerned with the analysis of cost rations, capital ratios and income ratios. The efficiency of inputs used is usually found by estimating their marginal productivity from production function. The choice of appropriate production function is important in giving proper explanations.

The efficiency of capital is worked out by different methods. Investment criteria can by be judged by working out Internal Rate of Return (IRR) and Pay Back Period. Internal rate of return is the discount rate which just makes net present worth of cash flow from the project equal to zero. The payback period is the length of time required by the project to pay itself out. Studies relating to resource-use efficiency and production function are reviewed below:
Wyllie\textsuperscript{20} defined efficiency as the capacity or ability of any person, process or thing to achieve the desired end.

Heady\textsuperscript{21} used price ratio as the choice indicator by which decision could be made. He sets down the necessary conditions for use of variable resources to a fixed factor as equality of the factor /product price ratio to the marginal productivity of the resources. Economic efficiency depends on the usage of resources in a manner to maximize the particular objective with least cost.

The concept of marginal productivity of resource is more valid and more widely used by the economists than the average productivity in resource- use efficiency studies marginal productivity is the measure of the increase in total product with addition of one unit of particular resource above the mean level, while other resources are held constant at mean level\textsuperscript{22}.


With a simple theory of farms, Desai\textsuperscript{23} has pointed out the conditions for the attainment of both technical and economic efficiency in factor – product, factor – factor and product – product relationships. Use of given resource to the point of its marginal productivity is the condition he states to attain technical efficiency and equation of marginal revenue and marginal cost of resource in the rational zone of conventional production function is a necessary condition to attain economic efficiency in factor – product relationship.

Kushro\textsuperscript{24} measured the farm efficiency in terms of output per unit of single input, acreage or as output per unit cost of all inputs.

Salikran and Lal Gupta\textsuperscript{25} used Cobb-Douglas type of production to express the input-output relationship per hectare of farm and to workout productivity of resources.


The marginal productivity of resources is conveniently derive from production functions. Production function has been considered as a mathematical equation expressing a given output as a function of certain resource inputs\textsuperscript{26}.

Reghupathy, Bisaliah and Hiremath\textsuperscript{27} considered the net present worth model, net benefit cost ratio and internal rate of return as the relevant techniques of project evaluation applied to coconut production.

Samuelson\textsuperscript{28} defined production functions as that which indicated the maximum amount of output capable of being produced by each and every set of specified inputs or factors of production and it was defined for a given state of technical knowledge.

Production function has been defined as a technical or engineering relationship between input and output. As long as the natural laws of


technology remained unchanged the production function also remained unchanged\textsuperscript{29}.

Job and Mukundan\textsuperscript{30} worked out a linear production function to evaluate the influence of a set of factors such as the age of plantation, labour days, quantity of fertilizers, cost of protection and holding size on the yield of rubber.

\textbf{2.4. STUDIES RELATING TO MARKET STRUCTURE AND CHANNELS MARKETING COST AND EFFICIENCY}

\textbf{2.4.1 Marketing Concept}

To understand the complex system of markets, that is, a complex system of communication negotiation and transaction and the problems related with each aspect, several concepts have been developed. Market, marketing structure, marketing channel, marketing cost, marketing margin, price spread, and marketing efficiency are the few concepts used in this study and the studies relating to these concepts are reviewed below:

\textsuperscript{29} L.R. Klein, \textit{An Introduction of Econometrics}, Prentice Hall of India Private Limited, New Delhi, 1973, p.84.

Market

To analyze the marketing of any commodity, the concept of market has to be defined. A market may be a place or an institution or an organization in which exchange of produce from producer to consumer take place. The study of market also includes marketing, marketing structure and marketing channel of which a brief review is made.

It includes both place and region in which buyers and sellers are in free intercourse with each other\(^\text{31}\).

Bell Martin (1966)\(^\text{32}\) has described marketing as a management taste to strategically planning, directing and controlling the application of enterprise effort to profit marketing process which will provide customer satisfaction, a taste which involves the integration of all business activities (including manufacturing, finance and sales) into a fixed system of action.


Thambi\textsuperscript{33} point out that agricultural marketing is not mere selling or distribution. It embraces all activities that begin with ascertaining the needs of the consumer and market opportunity, setting up production to meet the anticipated demand, pricing, distribution, advertising and culminating in the sale of the product hopeful at a small profit.

Srinivasan\textsuperscript{34} has defined agricultural marketing as the performance of all business activities such as determining the needs of consumers, organizing the production process to meet expected demands, pricing, distributions, selling and all other related activities involved in selling the products in motion from the producer to the consumer through time, space and form.

According to John and Savit \textsuperscript{35}market may be a place or an institution or an organization in which exchange of produce from producer to consumer took place. A market is a contact between demander (buyers or lessees) and suppliers (sellers or lessors) for transferring ownership or use rights to a factor good or service.


\textsuperscript{34} Srinivasan, \textit{op.cit.}, 1987, p.54.

(ii) Market Structure

Market structure was described as the main functionaries who affected the marketing and through whom the produce was channelised to the retailers\(^\text{36}\).

(iii) Marketing Channel

The sequence of intermediaries and markets through which goods pass en route from producers to consumer is known as marketing channel.

Bert Rosanbloom (1978)\(^\text{37}\), marketing channel is the external contractual organization that management operate to achieve its distribution objective.

S.M. Bilgrami\(^\text{38}\) had defined market channel in his study as a distributor that involved direct or indirect transfer of title to a product as it moved from producer to consumers of industrial users.


Singh and Raghubanshi (1977)\textsuperscript{39} identified two marketing systems and nine marketing channels for apples in Himachal Pradesh. The two marketing systems were (i) marketing through commission agents/ Himachal Pradesh Horticultural produce marketing and processing corporation, (ii) selling the crop to pre-harvest contractors who in turn used the services of commission agents. The marketing channels were: (1) Outright sale at the assembling point. (2) Sale Directly to (a) the consumer, (b) other agency at the orchard, (c) through a forwarding agency to a commission agent in the whole-sale market, (d) through the forwarding agency, Himachal Pradesh marketing corporation, (e) through producers’ co-operative to a wholesale market, (f) directly to commission agent, (g) from a wholesales to a commission agent, (h) directly to a retailer in consumer centre, and (i) to a processing unit.

(iv) Marketing Cost

The marketing cost reflects the extent of service given, the cost of labour, equipment and degree of risk involved. It includes outlay for marketing of farm products to local shopping points. It also includes outlays for transportation and storage from point to point as the product moves to the

market. Cost of retail expenses involved in inspection, standardization, assorting and packing, financing and risk taking and the cost of gathering disseminating and interpreting marketing news also form marketing cost. Marketing cost concepts under different studies attempted earlier are presented below.

Marketing cost were the actual expenses required in bringing the goods and services from the producer to the consumer\textsuperscript{40}.

Dhull and Gangevar\textsuperscript{41} defined marketing costs as the actual costs incurred by each agency involved in the marketing channel for performing the multi various functions. This included transportation, loading and unloading, weighing, cleaning, control, market fee, commission, sales tax, processing cost and wastage.


According to Kulkarni, marketing cost referred to handling charges at local points, assembling charges, transport charges, handling charges to wholesalers and retailing charges to the retailers.

Singh et.al., included the cost of transportation, labour including weighing, taxes such as octroi, market fee and sales tax, commission and brokerage and deduction and other storage, transport and insect damage in the marketing cost.

According to Tousley and others (1968) the cost of marketing of a commodity is measured roughly by the difference between the price received by its producers and the price paid for it by the final consumers. This difference includes transportation charges and entrepreneurial profit.

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(v) Marketing Margins

It referred to the difference between the value of physical quantify equivalents at different levels of marketing which was essentially the same as the difference between the prices paid and received by any specific marketing agency such as single retailers or by any types of marketing agencies such as retailers or assemblers as a group or by any combination of marketing agencies such as the marketing system as a whole.\(^{45}\)

Marketing margin represented the income of the marketing agencies who might themselves have paid most of the cost to cover their own expenses, the price they paid for labour, equipment, etc., employed in carrying out the marketing functions, leaving a portion as a reward for management or the enterprises and risk.\(^{46}\)

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According to Singh and Kahlon, marketing margin refers to the difference between values of physical quantify equivalents at different levels of marketing. There are represented by the difference between the prices paid and received by any specific marketing agency.

Khols observes that market margin is the difference between consumers pay for the final product and the amount producers receive which includes all of the cost of moving the product from the point of production to the point of consumption, of any processing which may be undertaken and of handling at all levels in the marketing machinery.

(vi) Price Spread

Price spread is defined as the difference between the retail price of the product and its farm value and referred to as marketing margins or marketing charge.

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Sharma and Pandey (1972)\textsuperscript{49} in their study observed that at the Allahabad market in the case of producer grower, the producers share in the consumer price was 20.36 per cent and the middlemen’s margin accounted for 46.67 per cent. The marketing charges came to 28.17 per cent.

Ranjit Singh and George (1970)\textsuperscript{50} state that price spread is made up of marketing costs incurred and market margins earned or lost in the movement of produce from the primary source to the ultimate consumer.

**(vii) Marketing Efficiency**

The outputs of marketing are consumer satisfaction with goods and services. The inputs are the various resources of labour capital management that marketing terms use in the process. So the marketing efficiency is the maximization of input-output ratio\textsuperscript{51}.


\textsuperscript{51} Richard L. Kohls, \textit{op.cit.}, p.11.
According to Desai\textsuperscript{52}, marketing efficiency of agricultural produce could be assessed by size of share which the producers obtained in the ultimate price paid by the consumers.

V.Rajagopalan, Varadharajan and Srinivasan\textsuperscript{53} defined marketing efficiency as the maximization of input-output ratio where buyer’s satisfaction would be the output and cost of marketing would be the input.

Marketing efficiency is defined as the transfer of goods from the producers to the consumers at the lowest cost consistent with the provision of services and is measured by the ratio between money costs and degree of service\textsuperscript{54}.

In the present study, the cost of cultivation of mango is classified into two categories, namely, direct and indirect cost. The direct cost included the operation and maintenance cost and indirect costs included the annual share of

\textsuperscript{52} V.V. Desai, “Dynamics and Price Spread Components”, \textit{Indian Journal of Agricultural Economics}, Vol.34 (4), 1979, p.156.


establishment cost, interest on fixed capital, interest on working capital and depreciation. All the recurring costs during the bearing stage of the reference year such as human labour, bullock labour, plant protection, watch and ward and land tax are included in the operational cost. Maintenance cost included repair and upkeep of implements, transport cost with unloading and commission charges. The pre-bearing costs incurred up to bearing stage formed the establishment cost and it included initial establishment such as seed material and planting, gap filling and fencing, human labour, bullock labour, fertilizer and manures, watch and ward, interest on land value and land tax and repair and upkeep of farm implements.

In order to estimate the relation between various input factors and gross income received from the mango and also to test the resource – use efficiency of various input factors, a multiple linear regression model is fitted. For measuring the capital productivity of investment made, four methods namely, (i) present value of flow of future returns, (ii) benefit cost ratio, (iii) internal rate of return and (iv) payback period are used in the present study.
2.5 STUDIES RELATING TO MANGO CULTIVATIONS

Jadhar Balaji, Manjunath and Patil\textsuperscript{55} in their present study backward and forward linkages of mango growers was carried out during 2008-09 by selecting 150 respondents from ten villages of two taluks through simple random sampling. The results revealed that mango growers had linkage with fellow farmers, followed by UAS scientists. For information on a nutrient management, majority of farmers had linkage with UAS scientists followed by private companies and fellow farmers. Whereas information on plant protection, majority among them had linkage with private companies followed by fellow farmer and UAS scientists. A large majority of farmers had invested their own money for orchard establishment. Nearly, on equal per cent of the farmer had linkage with nationalized banks and co-operative banks for financial assistance for orchard establishment. Almost 21.00 per cent of the farmers had forward linkages with growers association processing units for information on a various aspects of harvesting processing.

Shafique, Ibrahim, Helali and Biswas,\textsuperscript{56} in their article made a comparative study on physiological and biochemical composition of ten varieties of mangoes was carried out at three maturity stages viz immature, mature and ripe to find out the standard one. During the investigation, whole weight of the mangoes, pulp contest, weight of peel and stone, total soluble solid (TSS), PH, acidity, sugar content and vitamin C were determined at three maturity stages. It was observed that all varieties of ripe stages had higher sugar content as compared to immature and mature stages. Attractive flavour and pleasant taste were also developed in ripe stages and differedenced from one another due to vertical specific. This characteristics order which appeared during ripening is due to enter and components of carbonyl types.

Mehta and Madhuri Sonawene\textsuperscript{57} in their research study conducted an Entrepreneurial behaviour of mango growers of Val sad district of Gujarat state mango growers from 10 villages who cultivated mango since five years were selected randomly. Majority of the mango growers were found in medium to


high level category as far as entrepreneurial behaviour is concerned. The indicators decision making was ranked first followed by market orientation and economic motivation. Majority of respondents were observed is the medium entrepreneurial behaviour category, thus, the entrepreneurial behaviour of the respondents was predominantly medium. Education, area under mango cultivation, annual income, social participation, awareness regarding value additions, mango yield index, employment generation, extension participation, mass media exposure, and extent of adoption, management orientation, innovativeness, progressiveness, and knowledge of mango growers had significantly relationship with entrepreneurial behaviour of mango growers, whereas age, land holding, facility, family size and cropping intensity had no association with entrepreneurial behaviour of mango growers.

Prakash Alok, Keerthana, Jhachadha Kumar, Kumar Rates and Ayrewal Dnesh Chad\textsuperscript{58} in their study carried at to find a natural source of antibacterial egret because of the during resistant of bacterial pathogens to the communally available antibacterial agents in the market and at the sometime to enhance the utilization of the waste products from the mango processing industries. There

\textsuperscript{58} Prakash Alok, Keerthana, Jhachadha Kumar, Kumar Rates and Ayrewal Dnesh Chad “Antibacterial Property of Two Different Varieties of Indian Mango Kernel Extract from Various Concentration against some Human Pathogenic Bacterial Strains”, International Research Journal of Biological Sciences, Vol.24.
kernels, as a waste product, came tremendous investment of capital to decompose it safely and to prevent any environmental pollution. If there waste products can be converted as a raw material for the productions of any bioactive compounds, there it well keep the food processing industries free from investing its capital in decomposing there was ter. The mango samples studied in our work were Bagnapalli and Santhure varieties of Magnifera India. The fruit samples were collected from Vellore district of Tamilnadu. The spread plate technique was used to determine the antibacterial property. The count of viable calls after the applications of kernels extracts to the bacterial pathogens was used for the determination of antibacterial property of the kernel extraction. At the concentration of 10 per cent of kernel extracts, no viable colony was found in the petidish of Bangnapalli kernel extract and hence it proves to be a potent antibacterial agent.

Sarada Gopalakrishnan59 in her article reveals that mangoes account for approximately half of all tropical fruits produced worldwide. India is the latest mango producer, accounting for about half of the global mango production. But, less than five percent of the produced mangoes are processed and mango pulp is the main export product in both in terms of volume contract system is

the major marketing systems in the supply of mangoes, because (i) producers usually avoid the marketing of fruit by themselves as they do not wait be involved in the complication of the marketing system. (ii) They do not want to take risk of price and income variation due to predictability, qualities and seasonality and (iii) lack of knowledge of marketing. This paper attempts to study about the type of marketing system existing at present in India and suggestions to realer higher value for the produce.

Khuda Bakhsh, Ishtiaq Hassian and Muhammad Shafiq Akhtier in their present study have been designed to investigate cost of production, and return per acre over the life time of mango trees. A sample of 20 mango growing farmers was taken purposively from various villages of Multan District. The objective was to work out benefit cost ration and net present worth of growing mango orchard. Net present worth Rs.155607.16 per acre was estimated for the sampled respondents which indicates that mango cultivations fetches higher return whereas benefit cost ratio is reasonably high and it came to be 2.61 implying that investing one rupee in mango cultivations world return Rs.2.61. there results that investing in mango orchard would bring huge returns to the

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farmers an one hand and for the county in the farm of foreign earnings on the other hand.

Gathanbir, Gitonya, Kumar, Njuguna, Kime, Muchoui, Gatambia and Muchira\(^{61}\) in their article carried a survey in eastern province to assess the potential and limitations of post harvest value addition of mango fruit. Seventy seven respondents were interviewed using a structural questionnaire. In addition, secondary data were used to collect productions levels in each district. The results indicated that there is high potential for agro processing sina tomyathlan variety which is widely grown by farmers is appropriate for processing. Majority of farmers are women hence on–farm processing would be appropriate in that area since the activity is not labour intensive. The farmers have been carrying out on–farm processing at low scale therefore there is a high potential to upscale the technology. However they require training and also introduction of new or improved mango processing technologies to diversify their markets.

\(^{61}\) Gathanbir, Gitonya, Kumar, Njuguna, Kime, Muchoui, Gatambia and Muchira, “Assessment of Potential and Limitation of Post Harvest Value Addition of Mango Fruits is Eastern Province – A Case study in Mbeaera and Embu District”, Kenya Agricultural Research Insitute, Thike.
Geethalakshmi\textsuperscript{62} in her article infer that India is the biggest mango producer in the world, accounting for about 52 per cent of the world mango productions. Mango is an important agricultural product for the economy of developing countries in the tropics, both for domestic trade and for export. However, production techniques should be improved in order to increase its yield. India’s fresh mango exports could improve if we focus on producing varieties that are demanded by foreign consumer. If export revenues from mango trade are used in a production way, they can make a great contribution to the development process. It is important for mango producing countries to concentrate on products that offer them comparative advantages – in most cases labour intensive products.

Biswa and Lalith Kumar\textsuperscript{63} in their article revealed that the traditional planting method, poor management of the orchard low or no use of plant nutrients, improper irrigation or no irrigation, use of low yielding old varieties, problem of alternative bearing of mango trees, etc., are some of the important reasons of declining mango productivity in the country. Adoption of HIGH


\textsuperscript{63} Biswas and Lalith Kumar, “Revolution in Mango Production”, Fertilizer Marketing News, March 2011.
DENSITY PLANTING with hybrids and high yielding varieties, use of festinates, better management of the orchards, the hormones to induce flowering and fruiting etc., results in higher mango productivity which can be considered to a revolutions is mango productions. Interestingly some farmers have come forward to adopt the high tech mango culture contribution of some companies like join irrigation system Ltd and RIL are also worthy to mention is this respect.

Tohad Elahi Lodhi, Mazher Abhas, Muhammad Arif and Diwan Abid Hussain in their study analyze the agricultural extension services in mango productions and marketing with special reference to world trade organizations in district Multan. The population of the study consisted of all mango growers, all officers in agriculture department, and all research officers of mango research statues shujabad. Three union’s councils from each tehsil were selected through simple random sample technique. Thus the study sample consisted of 90 mango growers as respondents, 15 middlemen, and 15 exporters were selected randomly with simple random sampling technique. The collected data were analyzed and tabulated by using statistical package for

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64 Tohad Elahi Lodhi, Mazher Abhas, Muhammad Arif and Diwan Abid Hussain, “To Analyze the Future Perspective of Agricultural Extension Services in Mango Production and Marketing with Special reference to WTO in District Multan, Pakistan”, Pakistan Journal of Life and Social Science, 2006.
social sciences to draw results, conclusion and making pertinent recommendation. The research findings indicate that on overwhelming majority of the respondents were aware of WTO. The positive impact of WTO as identified by the respondents was that it will be helpful in providing finished product at the doorsteps of consumers and safe to human and animal health but an the other had the main threat of total commode over markets by developed countries through their higher technology and well equipped industry especially related to mango fruit and its by products.

Jayaraj. J. and D.S. Rajavel. (2010) 65 The nut “weevil or stone weevil” of mango is a peculiar pest. It attacks soft pulped varieties such as Neelum Bangalora, Alphonsa, Mulsoa Himayuddin Kalepad Beneshan etc. It feeds only on mango seeds and is considered to be the most serious pest of mange, after the consumption of the pulp. The entire life cycle is completed in 40-50 days and there is only one generation in a year. The adult is a stout greyish brown shout beetle measuring 6-8mm camouflaged by the bark of mango trees. They become active during mango season are no cultural in habit and feign death when disturbed.

Debnath G.C, Ahamed (2010) The abnormally high temperature has become a feature of early April since last year and winter rain has been scarce due to western disturbances. Farmers said mostly langra and Fazli the varieties for which meld is famous for have been affected by the heat wave. Other varieties like Himsasar and currently mango are grown in orchards covering 27000 hectares and every year 300 hectares meld exports mangoes to European countries Bangladesh Malaysia the U.S and the Netherlands and talks are about to send mangoes to Japan officials said:

Jayashree Bhosale (2010) The Agricultural and processed food products exports development Authority (APEDA) has been trying to develop overseas market for Indian mangoes. The United States opened its market for Indian mangoes five years ago. The US has one of the strictest hygiene norms and mangoes have to be treated at the irrigation facility. The Indian and Australian governments are currently working on preparing the standard operation procedures (SOP) for mango exports. Mangoes are irradiated at the losalsaan facility where the US officials remain physically present mango


exports has declined 30 percent from 83.703 tonne in 2008-09 to 5922 tonne in 2010-11 exports for the juicy fruit to the US has also declined during the same period. Middle East is an easy market for Indian mangoes. The US market needs much compliance. The mangoes have to be transported from the growing area to the irradiation facility; and then to Mumbai for shipping. These results in deterioration of quality, mango exports to Japan which needs VHP treatment have declined 88 percent during 2008-09 to 2010-11.

Balamohan T.N. (2011) 68 The mango is one of the oldest and most popular fruits having delightful flavour and taste of the tropical world. India is the leader sharing 65 per cent of the world’s mango production currently; mango is cultivated in an area of 2.3 million hectares with a total production of 12.75 million tonnes in India.

There are more than 1000 mango varieties exist in India most of these regional varieties are happened to be either poor. Yields (or) alternate bearers and new plantations are now established through mango grafts only. In general mango orchards take 4 to 7 years to give sustainable yield due to several

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factors which include soil climatic cultural methods etc. Except few varieties viz. Neelum and Bangalora most of the choice varieties are either alternate bearers or poor yielders.