CHAPTER II

REVIEW OF LITERATURE

This chapter reviews of the literature under the following heads:
a) Review of marketed surplus and marketable surplus, b) Review of productivity and c) Review of cost and returns structure.

2.1 REVIEW RELATED TO MARKETED SURPLUS AND MARKETABLE SURPLUS

A.S.Khalon and H.N.Dwivedi (1963)\(^{14}\) in their study “Inter Relationship between production and marketed surplus” examined that some of the key factors relating to marketed surplus in Luthiana District of the Punjab. They used the linear multiple regression model to determine the significance of various factors relating to marketed surplus. The main findings of the study revealed that besides the size of the holding the nature of ownership contributed a substantial difference in the proportion of marketed surplus.

K.K.S.Chan and Barivedi (1971), in their study “Price and pattern of marketable surplus and marketed surplus of Maize in Udaipur District” examined the price and pattern of marketable and marketed surplus of maize in Udaipur District. The main findings of the study revealed that the marketed surplus was more than the marketable surplus among the small group of farmers while with the medium and large farmers it was less than the marketable surplus. Further, it was also concluded that there was distress sale in the case of the small farmers due to immediate cash requirements. But in the case of small and large farmers the stocks are held in anticipation of higher price because of the availability of storage facilities and greater retention capacity.

V.K.Pandey, et al., (1979) in their article “A case study on Price Spread of Agricultural Commodities in Kurukshetra District, Hariyana”, observed that the net price received by the farmers had a negative and significant relationship between distance and marketing cost but a positive and significant relationship with marketed surplus. They concluded that the

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producers exercised their performance to sell their agricultural produce to
the commission agents according to family tradition, immediate need for
money after harvest and lack of storage facilities also led to such sales.

Praduman Kumar (1989)\textsuperscript{17} “Price Policy and Marketed Surplus of
Paddy and wheat in India” attempted to analyses the impact of price and
non-price factors on marketed surplus and also suggest adjustments in price
and non-price factors to attain the specific goals of producer and consumer
welfare. The author employed Cobb-Douglas type profit functions by using
the time series cross-section household data on crop inputs and outputs for
paddy and wheat.

In “Factors Affecting the Marketed Surplus of Milk of Members and
Non-Members of Milk Co-Operatives in Punjab in 1993”, S.S.Chahal and
K.S.Gill (1993)\textsuperscript{18} analysed the incomes of the farmers which were directly
related to the quantum of marketed surplus available with them. The
functional analysis was carried out to assess the effect of various factors
which determined the marketed surplus of milk on various sizes of dairy

\textsuperscript{17} Praduman Kumar (1989), “Price policy and marketed surplus of paddy and
wheat in India”, \textit{Indian Journal of Agricultural Economics}, Vol.44, No.4, October-

\textsuperscript{18} S.S.Chahal and K.S.Gill, (1993), “A study into factors affective the marketed
surplus of milk of member and non-members of milk co-operatives in Punjab”, \textit{Indian
farms owned by the members or by non-members. The findings of the study pointed out that production elasticity was higher in the case of members as compared to non-members for all categories of milk sellers. The results pertaining to the dummy variables showed that co-operatives affected the marketed surplus of milk positively. It is found that production, consumption and marketed surplus of milk in case of members were higher as compared to these of non-members. It was concluded that the milk co-operatives may be provided with dairy input and extension services in a better way leading to relatively higher milk production for the member than for the non-member. There was need to expand the milk co-operatives in rural areas.

Barbara Harriss\(^{19}\) (1994) in her study “The Marketed Surplus of Paddy in North Arcot District, Tamilnadu; A micro level causal model” attempted to study the exchange through an analysis of price and non-price factors conditioning the marketed surplus of paddy in a district of Northern Tamilnadu with a relatively simple agrarian economy. The data used in this study are derived from a random sample of 200 paddy cultivators. She has employed the simultaneous equations model. The main findings of the study

revealed that cultivators with small families contribute more to the marketed surplus than these with large families.

D.S.Thakur (1997)\textsuperscript{20}, in his study “Market Supply Response and Marketing Problems of Farmers in the Hills”, examined the marketable and marketed surplus of different crops generated by different categories of farmers. The author used the multiple linear and the log linear regression function models. The main findings of the study revealed that while marketing agricultural produce, the farmers in the hills encounter problems such as lack of transport facility, unremunerative prices, market intervention.

Parmod Kumar (1999)\textsuperscript{21} studied “marketed surplus of different crops across farm size in Haryana”, surveyed 400 households in two districts in Haryana during the agricultural year 1993-94. The findings of the study revealed that the marketed surplus depends on output and farm size and it observes that the marginal farmers marketed 68 per cent of their output and the large farmers marketed 91 per cent of their output, on an average the


farmers marketed 87 per cent of the aggregate output. It is concluded that the dominant role of the large farmers accounted for 45 per cent of the marketed surplus.

S.K.Goyal and Ernst Berg (2004) in “An analysis of marketed surplus response of cereals in Haryana State of India” used a model that considers the effect of both factor and output prices on marketed surplus. To derive the input demand and the output supply elasticities, the normalized quadratic profit function and demand equations were estimated jointly with the Seemingly Unrelated Regressions (SUR) estimation technique using the Farm Level Panel Data. The data confirm the theoretical framework. The derived price elasticities of input demand, output supply, and marketed surplus have been simulated to examine alternative price policies for securing different levels of marketed surplus. At the observed price structure, the marketed surplus of wheat will increase almost equal to population growth, but in the case of paddy it will grow at a very low rate. The study further reveals that besides price adjustment, technological improvement and non-price factors are also of critical importance for increasing output supply and hence marketed surplus.

H.N. Atibudhi (2004) conducted a study on “The problem of marketed surplus and distress sale of major food grains in the K.P.K. District, Orissa”. The objectives were 1) to work out the marketing and marketed surplus of principal food grains, that is Paddy and maize, for different categories of farmers; 2) to examine factors affecting the marketed surplus of different crops and 3) to analyse and study the problems of agricultural marketing in the area.

The study used multistage stratified random sampling technique. In the first stage two blocks were selected at random, and in the second stage two villages were selected from each block. The farmers were classified into marginal farmers (38), small farmers (40) and large farmers (22) and also farm size groups.

The findings of the study were 1) the marketable surplus of paddy, the major food grain crop for marginal farmers is 4.91 quintals for small farmers 1.21 quintals, and for large farmers 17.85 quintals respectively; 2) there was distress sale for marginal and small farmers. Maize is used as cash crop and grown for sale; 3) the most important factor which increases

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marketed surplus is the increased production or output followed by the size of the family, the payments in kind and price received. Payments in kinds and the size of the family negatively affect the marketed surplus in case of the staple food of the area, that is paddy; 4) Small farmers are forced to sell their produce just after harvest to pay their debt. The other problems faced by the farmers are high transportation cost, lack of co-operative marketing societies, malpractices and unnecessary deductions and charges in the market.

Nazim Uddin Khadem (2008)\textsuperscript{24} “Marketed Surplus Magnitude of a Backward Regional Economy: A cross sectional study” attempted to study marketed surplus with the following objectives 1) To Examine the magnitude of farmers’ consumption level of rice and its behavioural pattern with respect to size and class and 2) The factors dermining the volume of marketed surplus by the farmers of different size groups.

The study was based on the cross-sectional farm data obtained from the primary sources through field survey. The tabular analysis and the percentage variation, the behavioural relationship of marketed surplus with

respect to other independent factors has been estimated through regression techniques.

The study concluded that there is an inverse relationship between consumption as a proportion of the output and the size class throughout. Marketed surplus varies directly with the size class, which is also true in the case of the relationship between marketed surplus from post-harvest season to midseason and further to lean-season according to price rise. The same positive relationship is also found in the case of the marketed surplus and prices according to size class.

G.S. Randhawa, et.al., (2009), in their article “A study into the factor determining marketed surplus of milk in Rural People”, examined the milk production, consumption pattern and marketed surplus over different categories of household, in rural Perjab. The results revealed that the high income category of households produced 291.21 kg of milk per month per household, which was higher than both low (76.13 kg) and medium (219.86 kg) income category of households in the developed region of the state. They examined the pattern of milk production, consumption and marketed surplus.

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surplus of different categories of selected households and to generate information on other parameters, the tabular analysis was carried out. To study the effect of production, consumption, price of milk, income, etc. on marketed surplus, multiple regression function was carried out. It is found that the consumption elasticity worked out to be negative for all the income categories. The negative sign of consumption elasticity shows that with one percent in consumption the marketed surplus decreased.

The main factors affecting the marketed surplus of milk are production price and consumption pattern of the milk. Production elasticity was positive and significant statistically for all the income category households in the less developed region. The elasticity of production shows that with the per cent increase in the production, the marketed surplus increased. The price elasticity of production shows that with ten per cent increase in the production, the marketed surplus increased. The price elasticities for all the income categories were positive which indicate that with increase in price, the marketed surplus also increased.

Raj Krishna (1962)\textsuperscript{26} ““Note on the Elasticity of the marketable surplus of a subsistence crop”, pointed the critical importance of understanding the

behaviour of marketed supply of food crops grown partly for home consumption. The author commented that in a growing economy, “the rate of growth of the urban industrial sector depends on the availability of food from the rural, agricultural sector”.

J.T.Dorge et al., (1998)\textsuperscript{27} in their study “Marketable surplus of Milk in Konkan Region and Western Maharashtra” attempted to estimate the marketable surplus of milk and to study the pattern of disposal and mode of transport of milk and to estimate the cost of marketing milk. The problems encountered by the milk producers in transportation and disposal of milk were studied. The main findings of the study revealed that the major problems faced by producers were low milk rates offered by the buyers, no alternate buyers for the milk, larger distance of the milk collection centres, inadequate transport facilities and the poor condition of roads. Further, it was concluded that the per farm average marketable surplus of milk of the sample farms in Western Maharashtra was 31.35 litres/day, while in Konkan it was 13.85 litres/day. In terms of percentage to total production, however, the marketable surplus was the same. The co-operatives were major buyers of milk in Western Maharashtra.

K.Malarmathi and A.P.Pandey (2008), in their study “Marketing of Guava in Allahabad District, Uttar Pradesh”, attempted to identify the supply chain with respect to guava, a tropical fruit in Allahabad District of Uttar Pradesh. Their study based on the objectives to examine various channels involved in the marketing of processed guava fruits, to study the problems faced by the entrepreneur and to conduct SWOT (Strength, Weaknesses, Opportunity and Threat) analysis. The study estimated the weighted average of the price received by the guava producer and also the average marketing cost incurred by the farmers to sell their produce to various intermediaries. Further the study used the measure of marketing efficiency to calculate the efficiency of the channels. It concluded that as the marketing cost increased, marketing efficiency decreased. The paper highlighted the SWOT analysis in terms of the presence of the Agri-export Zones dedicated to horticulture, easy availability of labour at low cost as strength, lack of a credit support system, inadequate post harvest management etc., as weaknesses, favourable government vision, opening of  

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large retail shops, contract farming, etc., as opportunities, competition from other states and non-tariff barriers etc., as threats.

2.2 REVIEW RELATED TO PRODUCTIVITY

Rathakrishnan (1964)\textsuperscript{29}, in his study “A study of Regional Productivities of Agricultural Inputs” examined the productivities of canal-irrigated region, and a well-irrigated region. The author used the farm management data for these regions, and the study was done during the period of 1957-60. The main findings revealed that, the farm business activity operated under constant returns to scale and increasing gross income was due to increase in working expenses, and a higher input of bullock and human labour had a positive impact on the value of output.

A.M.Khusro (1964)\textsuperscript{30} in his study “Returns to scale in Indian Agriculture” attempted to examine the relationship among farm size with output per acre, net farm business income per acre and net profit per acre. The author used the secondary source of data which were obtained from studies in the economics of farm management conducted by the Government

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of India. The author has employed the simple linear regression model in his analysis. The main findings of the study revealed that, 1) An inverse relationship existed between farm size with productivity and net farm business income per acre and; 2) Direct relationship between farm size and profit per acre.

Raj Krishna (1964)\textsuperscript{31} in his study, “Some production for the Punjab”, the attempted to estimate the efficiency of different farm inputs by using Cobb-Douglas production function for the Punjab agriculture for three years viz, 1954-55, 1955-56, and 1956-57. The main findings of the study revealed that 1) Farmers in the Punjab had optimally utilized the given resources as the marginal productivity to each input was equal to its acquisitions cost; 2) Constant returns to scale operated in the Punjab agricultural farms and, 3) There was an inverse relationship between farm size and productivity.

D.Petter (1974)\textsuperscript{32}, studied on “Input-Output Relationship of Banana Plantations in Kanyakumari District (Tamilnadu)”. The objective of the study is to estimate the productivity of various inputs used in the Banana Plantations. In his study the author fitted a Cobb-Douglas model of the

production function. The main findings of the study revealed that there was a highly significant positive response in gross income to the positive changes in the manuring expenses.

I.J. Singh et al. (1974)\textsuperscript{33}, in their study “Production function for commercial crops in Haryana” estimated the marginal value productivity of inputs. The author used the cobb-douglas type of production function. The main findings of the study revealed that the marginal products of irrigation and human labour for cotton fertilizers and irrigations for sugarcane and human labour for oilseeds were negative.

Gongwar and Singh (1974)\textsuperscript{34} in their study “Production function for chemical crop in Haryana” examined the marginal value productivities of the farm sector of Haryana for different crops namely cotton, mustard, sugarcane and oil seed. They used the Cobb-Douglas production function, for their analysis. The main findings of the study revealed that the use of fertilizer, irrigation and human labour was about 87.72 and 59 per cent of the variation in the production of sugarcane; cotton and mustard respectively.


The marginal value of productivity of fertilizer and irrigation for sugarcane was found to be less than one and cotton was a more profitable crop than sugarcane and mustard in Haryana.

Anjaiah (2008)\textsuperscript{35} did a study on “Inter-regional and Inter-state disparities in cultivation, production and productivity in food process agricultural commodities in Andhra Pradesh in 2008. The main objective of the study was to investigate with regard to the productivity capacity comparison, and the rank of Andhra Pradesh in various selected commodity items. This study has basically partial aiming at highlighting inter-regional variations of cultivation. This study is focused mainly on the supply of agricultural inputs-particularly raw materials pertaining to food processing units. The study has concluded that the production of sugarcane in Andhra Pradesh ranks 5\textsuperscript{th} in the country.

\textbf{2.3 REVIEW RELATED TO COST AND RETURNS STRUCTURE}

Cost of cultivation is of vital importance in agriculture because costs measure efficiency in production. The term cost refers to the outlay of funds

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\textsuperscript{35} Anjaiah, “Inter-regional and Inter –state Disparities in cultivation, production and productivity in Food Process Agricultural Commodities in Andra Pradesh”, \textit{Southern Economist}, January 15, 2008.
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for productive services. In agriculture, cost of production refers to the expenditure incurred by the farmers on various inputs to final produce. The nature of the cost incurred by the farmer for the cultivation of crops is of two types:

i) variable cost or operational cost and

ii) fixed cost

i) Variable cost

Farming expenses which are a function of farm output are known as variable costs. There will be no variable cost if the farmer decides to leave his land idle for a year. These costs change with the quantity of farm output turned out in the production process. Variable costs include payments such as wages paid to hired labour, the price of seed, fertilizer, manure, pesticide, bullock labour, livestock feed, fuel and power, used expenses on transport and the like. Since variable cost is a function of output, total variable cost increases with the level of farm production, the farmers own resources and labour.

The Farm Management Studies (FMS) in India have involved and used four important cost concepts in the cost of cultivation of crops.

They are (i) cost A₁ (ii) cost A₂ (iii) cost B and (iv) cost C
Cost $A_1$

Cost $A_1$ is defined to represent the cash and kind expenses (or out first of pocket expenses) actually incurred by the owner-operator.\textsuperscript{36}

Cost $A_1$ – all actual expenses in cash and kind incurred in production of crops by owner – operation.\textsuperscript{37}

Cost $A_2$

Cost $A_2$ is obtained by adding rent paid for leased in land to cost $A_1$. This cost concept represents the out of pocket expenses incurred by a tenant operator. Cost $A_2$ – It implies cost A and

Cost $B$

Cost $B$ is derived by adding to cost $A_1$ or $A_2$ as the case might be the imputed value of rent for owned land and interest paid to fixed capital owned excluding land.

Cost $B$ – It includes cost $A_1$ and

\textsuperscript{36} Mukhopathyay (1990), “Crops costs and variation”, Mitital publication, New Delhi, 1990, p.11.

Cost C

Cost c is arrived at by adding to Cost B. The imputed value of the farm operator and his family. Cost C is the most comprehensive cost and represents the estimate of the farm cost.

Cost C – It includes Cost B

Hanumantha Rao (1968)\textsuperscript{38} in has article ‘Alternative Explanation of the Inverse Relationship between Farm Size and Output per acre in India’. analyses the relationship between farm sizes and output per acre under the traditional technologies in the 50’s and the adoption of new technologies in the late 60’s in acre faster charge with regarded to wheat and rice namely Muzaffar Nagar (Uttar Pradesh) Ferozepore (Punjab) and West Godaweri (Andra Pradesh).

An inverse relationship between farm size and output per acre was found under traditional technologies. The relationship was statistically significant in 50’s in Ferozepore village with the adoption of new technologies. In the mid 60’s a weakening in the inverse relationship was observed in Muzaffar nagar.

Over the transition period the regression co-efficient progressively got reduced from -0.25 in 1955-56 to 0.04 in 1968-69. The relationship was statistically significant for Muzaffar Nagar, while it was insignificant in the latter period in Kerozepore and west Godawari. The weakening or disappearance of the inverse relationship between farm size and output per acre implied a higher rate of growth of output among the large farmers not through greater application of labour input per acre, but through the greater use of capital inputs or the increasing substitution of capital for labour.

Rajur Singh and R.K. Patel (1973) in ‘Return to scale farm size and productivity in Meerut District’ made an attempt to examine the validity of inverse relationship between farm size and productivity and also to examine the returns to scale in the wake of new technologies. To study these objectives the data on the area under maximum varieties of wheat in all the development blocks of Meerut district (Uttar Pradesh) were collected. The study period was 1969-70 and the data were collected from 120 farmers. Cobb-Douglas type of production function equation was fitted.

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Observing the pattern of relationship between farm size and productivity, this study arrived at conclusion that there is increasing return to scale and it rejected the earlier findings of Khusro, Rajkrishna, Rudra and Saini.

While the study examined the inverse relationship, concluded by Rao, Khusro, Saini, Sen and others. In the new technology there was no indication of decrease in output per hectare with an increase in farm size and therefore the hypothesis of inverse relationship was to be rejected.

G.Subramaniyan and Chelladurai (1985) in ‘Farm Size Returns to scale and Absorption of labour in Tamil Nadu Agriculture - A Micro Analysis’ examined some of the issues relating to Returns to scale in the Tamilnadu Agricultural University. This study was based on Alwarkurichi village in Tamilnadu. A random sample of 40 small farmers and 40 large farmers was chosen by using the stratified random sampling technique. The data used pertained to the per human. The season of December 1983 to March 1984. The study estimated “ponni” variety alone for this. The Lou and Youtopoulous profit function was used along with four variable input demand function relating to labour, fertilizer, pesticide and bullock labour.

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These equations were estimated by using Zellner’s seemingly unrelated Regression model.

The study showed that there was no appreciable difference between small and large farming with regard to yield per acre and net revenue per acre. However there was considerable difference in Total revenue, mainly due to the fact that large farmers sold their product at a relatively higher price. Further, supply of paddy price them to mage rate moreover the sum of the Indirect production Elasticites obtained from profit the function revealed consumed returns to scale. Thus the result spoke against consolidation of large holdings in the study area.

G.Subramaniyan (1986) in ‘Labour demand supply responsiveness of cotton in Madurai District’ made on attempt to estimate the cotton supply and Input demand elasticity using a profit function Analysis from a sample of farmers producing the MCU05 and LRA-5166 varieties in cotton in Theni and Madurai Districts in Tamilnadu. The analysis revealed the following.

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Supply of output and labour demands were found to be highly elastic to change in the cotton price of both must and IRA – 9166 variety of cotton – An increase in the price of available inputs resulted in a fall in the output supply demand for labour with respect to the two varieties of cotton.

With respect to labour, is highly elastic study that the demand for labour is highly elastic to ways charges and that a right and shift in the supply function of labour may easily be observed by reducing the ways rate.

Further results show that an increase in cotton price is found to have a solitary effect an labour absorption. The output price policy in not only the instrument to increase labour absorption in agriculture. By adopting an incentive price policy and appropriate technology for the supply of cotton varieties with better yield potentials than the present ones can be considered a better alternative to increasing labour demand optimal package of strategies purchase of stratifies and improving non-economic factor such and labour organization can also have four able effect on labour absorption. However, the robustness of any policy internet should be judged only by its over all social and economic consequences.

The indirect estimates of production causticities seem to indicate constant return to scale for both the varieties of it cotton. This the speaks
about consolidation of the holdings next to the share of factor and had the highest share it more than 20 percentage in the total output it both varieties. These findings are in conformity with the finding of Alshi, Kumar and Matter in relation to cotton production in Akola. The share in the remaining features are quite low.

S.A.Sabur and M.Zamldul Hague (1992)\textsuperscript{42} in their work on “Resource use efficiency and returns from some selected winter in Bangaladesh” made on attempt to assess relative profitability of the winter crops in 1987-88. the Cobb-Douglas production function was fitted to estimate the regression co-efficients. The major findings of the study revealed that the Potato and wheat had higher production cost because of the use of more amount of fertilizer and large amount of human labour; the farm size productivity was negatively associated in potato cultivation; the human labour and seed were found to contribute significantly to the production of pulses; the per hectare production of the small farms was higher than that of the large farms; the production of potato increased by using more fertilizer per hectare; the use of human labour would add more to gross returns for all crops except potato

and animal labour and machine power were found to be used more than the recommended required level for all the crops.

Venkatasa Palanichamy et al., (1992)\textsuperscript{43} in ‘production and marketing of Alfalfa on Economic Analysis’ found that the cost production alfalfas per hectares worked out to Rs.24,428 in which the variable costs and fixed cost accounted for Rs.19,386 and 5,042 respectively, among the components of variable costs followed by the interest on working capital, seeds, plant protection, chemicals fertilizers, farmyard manure, bullock labour and other costs in the order. Among the various components in the total fixed cost, the rental value of owned land alone worked out to Rs.4,066 accounting for 16.55 percent in the total cost of production. This was due to the higher land value reflected by the fertile nature of the land. The interest on fixed capital, depreciation and land revenue accounted for 2.94, 1.73 and 0.21 percent respectively of the total cost of production.

Lavleen Kaur and M.K.Sekhon (2006)\textsuperscript{44} in their article ‘Cost structure and Rate of Return in Major paddy producing state of India’ studied the cost


\textsuperscript{44} Lavleen Kavr and M.K.Sekhon (2006), “Cost structure and Rate of Return in Major paddy producing state of India” Agricultural Situation in India, June pp.155-160.
structure of paddy for different states of India from 1981-82 to 1996-97. The operational cost per hectare of paddy cultivation during 1981-1982 was the highest in the Punjab state i.e Rs.3622 followed by Tamilnadu, West Bengal AndhraPradesh, UttarPradesh, with Rs.2821, Rs.2659, Rs.2436 and Rs.1702 respectively. The total cost per hectare was also the highest in the Punjab.

The rate of return from paddy cultivation in different states is shown for the cost of cultivation and value added from paddy in the Punjab state. The cost of cultivation for rice increased from Rs.5474 per hectare in 1981-82 to 18695 per hectare during the year 1999-2000. It is observed that the fixed investments during the some period increased from Rs.1841.40 per hectare of paddy to Rs.8535 in 1999-2000. Fixed farm investment includes rental value of owned land, rent paid for leased land, land revenue, cess and taxes, depreciation on implements and farm buildings and interest on fixed capital. The operational cost for paddy has also increased from Rs.3633 in 1981-82 to Rs10161 in 1999-2000. The role of the return for paddy was 34.72 percent in 1981-82 which increased to 61.07 percent in 1999-2000. The rate of return was less than fifty percent upto 1987-88 and after that it was always more than fifty percent except for few bad years. More than fifty percent shows the profitability of the rice crop.
Trilochan Tripathy et.al., (2006)\textsuperscript{45} in their article, ‘Trend of production Adoption and utilization of high Quality paddy seeds, A study in Orissa’ have collected data from both primary and secondary sources. The secondary data are collected from several issues of the economics survey of the Government of Orissa, books, reports, unpublished theses, primary data have been collected from the farmers, households during the last quarter of 2002 by canvassing two different structural interview schedules: One for the sampling households and the other for the officials of the Agricultural Extension Services spread over the different agro climatic regions of Orissa. A multi–stage sampling method has been used to select the ultimate sampling units of study. The existing 30 districts of Orissa are distributed over three regions, Central, Northern, and Southern determined mostly by dissimilarity in agro-climatic conditions.

The ultimate sample units of farmers have been classified into three broad groups on the basis of their land holdings: big (>3ha), small (1 to 3 ha) and marginal (<1 ha). Having followed the methodology, three farmers from each size class per village aggregating 324 farmers over three regions have

been chosen for the study and each has been interviewed through a pre-designed questionnaire.

This model specifies a binary response function in which the dependent variable is a dummy being dichotomous in character. The dummy dependent variable assumes a value of 1 for those who are adopters of the hybrid type of seeds in cultivation; otherwise for the non-adopters. The logit is then regressed on the variable comprising farm size, distance from seeds sale centres, age and education of farmers and a dummy variable for the region.

The log function in the present context is specified as

$$L_i = \beta_0 + B_1 x_1 + B_2 X_2 + \gamma_1 Z_1 + \gamma_2 Z_2 + \gamma_3 Z_3 + S + V_i$$

where $X_1$ and $X_2$ are two demographic variables, namely, age number of years spent in educational institutions respectively, $Z_1$, $Z_2$ and $Z_3$ are economic variables like land holdings of the farmers, price of factor inputs and distance from seeds sale centers, respectively and $S$ is dummy variable for region of Orissa. It is found that on an average, 18.5 percent of the total farmers turn every year to purchase quality seeds from the department seeds sales centres. Among those who actually purchase seeds 21.7 percent are marginal farmers, 32.8 percent are small farmers and 45.6 percent are large
farmers 49.9 percent within distance of 5km, 32.8 percent are within a
distance of 5-10km and 17.8 percent are from places beyond 10 k.m. This
has affected more than 29.6 percent of the farmers of the state in spite of
their willingness to adopt and utilize such seeds in paddy cultivation.

Kishor Goswami (2006)46 ‘Factors influencing the yield of paddy in
Assam: An Economic Analysis’ studied agricultural crops which are
generally classified under different seasons depending upon the times of
harvest of the crop. The Kharif season, starts from April–May and lasts upto
September-October in the state. The Rabi season which is from October–
November to March–April is cool and free from heavy downfall. As the
harvesting period of Avitumn and winter paddy is during June – July and
October respectively.

The impact of different factors on the yield of paddy has been
measured through the production function analysis. The study shows the
impact of technical factors such as fertilizer, high yielding varieties,
irrigation, etc, and climatic factors such as rainfall, food etc, on the yield of
paddy. Although application of the Cobb-Douglas functional form is

46 Kishor Goswami and Bani Chatterjee (2006), “Factor influencing the yield of
paddy in Assam: An Economic Analysis”, The ICFAI Journal of Agricultural
common in agricultural research, for the present analysis the log-linear (Cobb-Douglas) functional forms have been selected. Based on goodness of the fit and the Durbin–Watson (D-W) value the best–fitted equation has been selected for Kharif Rabi paddy separately.

The proportion of the area under irrigation has a negative but insignificant impact on the yield of Kharif paddy, whereas flood has a negative but insignificant impact on the yield of the crop analyzing the result during the period from 1971-72 to 1999-2000. It is found that the independent variables fertilizer (kg/ha) proportion of area under HYVs flood–affected area and average monthly rainfall altogether explain about 79 percent variation in the yield of Kharif paddy.

In the case of Rabi paddy the explanatory variables fertilizer (Kg/ha), proportion of area under high yielding varieties, proportion of area under irrigation and rainfall altogether explained about 87 percent of variations in the yield. The decreasing trend of proportion of the irrigated area to total Rabi paddy area made the impact of proportion rate irrigated area negative but insignificant.
S.Iyyampillai and Balamurugan (2007)\textsuperscript{47} in their article ‘An economic Analysis of the production and Marketing Aspects of Grape cultivation in Theni District, Tamilnadu’ made an attempt to study the major expenses of grape cultivation use of the fertilizers and pesticides respectively, thus the average cost incurred by the farmers per acre was Rs.37,223. It is found that the cost of cultivation and the size of the land holding under grape crop are negatively correlated with the yield of grape per acre. It is found that there is a negative relationship between farm size and productivity. In a season, the small farmer production per acre is 5,484 kg which relatively is higher than that of the medium and large farmers. It is also evident that since the small farmers are directly involved in the farming activities, they are relatively more efficient in production than the others; further it is found that whole sale commission agents and retailers are involved in the purchase of grapes from the farmers.

To improve the post management procedure and the productivity of the vineyard, agricultural clinics should be opened to provide expert advice and training to the farmers to overcome their problems in grape cultivation. So far, there are no cold storage facilities in the study region. Since the

farmers could not afford for construction of the cold storage facility on their own, the government should come forward to provide this facility. These facilities would enable farmers to get reasonable price for their production.

Surrender Singh (2007)\(^{48}\) in this study of the variables used in stochastic frontier production function model found that the average size of the operational holding was 6.89 acres at the aggregate level and 16-43, 5.64 and 1.86 acres for the large-size, medium size and small size farms respectively. The value of output per acre was highest for medium – size farms that is Rs.9.144, followed by the large and small-size farms with Rs.8.972 and Rs.9.925 respectively, and for farms at aggregate level, it came to be Rs.9.001. It is observed that there was an inverse relationship between use of labour per acre and farm size, whereas a positive relationship is found between the use of chemical fertilizer and farm size. The large sized of farms found using more agrochemicals per acre (Rs.1.164) followed by medium and small sized farms (Rs.1.156 and Rs.1.350) respectively whereas the farms at aggregate level used agrochemicals of medium-size farms followed by small and large-size farms. The average education level of the decision maker at aggregate level was 7.26 years of formal education. The average age of the decision maker was 44 years. The level of fragmentation is the

highest in the large-size farms (2.46) followed by the medium size farms (1.93) and small size farms (1.58) respectively.

There is a need to promote young farmers as decision makers along with raising the education level of the farming community, and also efforts should be made to strengthen the extension contacts and access to institutional credit for farmers. There is also an immense need to check the fragmentation of farm holding in the state.

N.Kumar et al., (2007)\(^{49}\) in ‘Relative response of High yielding variety and a hybrid of rice to levels and sources of nitrogen’, made a sandy of clay loam soil of the main block 14c of the farm of the Indian Agricultural Research Institute (IARI), New Delhi in the kharif (wet) season (July – October) of crop years (July – June) 1998-1999 and 1999-2000. The soil of the experimental field had 58kg organic C, 182kg N/ha alkaline permanganate oxidizable W, 23.6 kg/ha 0.5m sodium bicarbonate extractable p, 286 kg/ha 1m amoniam acetate exchangeable K and PH (1.25 soil to solution ratio).

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The experiment was laid out in a factorial randomized block design with three replications. There were 20 treatments which included all 18 combinations of two rice cultivars (pusa 834 and PR43). 3 levels of N (60, 120 and 180kg N/ha) and 3 sources of W prilled urea neam cake coated prilled urea, (NCV) and pusa neam golden urea (PNGU) and two no nitrogen (no) controls one for each rice variety important characteristics of rice cultivators.

The results of the present study thus clearly bring out the superiority of the hybrids over the conventional high yielding varieties of rice. In yield attributes and gain yield of rice hybrid may be slow to start with but catch up and finally surpass the conventional high yielding varieties. For realizing the higher yield potential rice hybrids need more fertilizer N than the current high yielding varieties. Neem coated/blended area materials in hybrid rice production

**Farm Costs**

The returns of any agricultural activity depend on the quantities of various inputs applied in the production process. The costs incurred on these inputs influence the profit structure of the farm business. There are various interpretations by different authors on the estimation of cost of production.
Samuelson\textsuperscript{50} divided costs into fixed and variable costs. Fixed costs represented the total expenses that were incurred even when no output was produced but production was committed. This usually included rent, maintenance, depreciation and salaries and was not affected by the variation in the level of output.

According to Sharma (1968)\textsuperscript{51}, permanent labour and animal labour, depreciation on farm implements and machinery, land revenue and cess, rental value of land and interest on payment investment other than land were included in fixed cost.

Hanumantha Rao (1975)\textsuperscript{52} compare the changes in cost and returns of high yielding variety rice IR 8 with local varieties of rice per acre in Ferozepur District of the Punjab on the basis of farm management data for the year 1969-70. This study revealed that high yielding variety technology proved to be factor cost saving on land, labour and capital. There was also a

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\textsuperscript{52} C.H.Hanumantha Rao, “Changes in costs and returns with the use of high yielding seeds”, \textit{Technological change and distribution of Gains in Indian Agriculture}, Mac Millan Company of Indian Ltd., Delhi, 1975, pp.75-88.
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significant fall in the unit cost of fertilizers to the whole for HYV rice, the cost on current inputs constituted 48.6 per cent of the total input as against 41.9 per cent for the local variety.

In the study of “New Technology of paddy yield: Adoption and yield differentials of high yielding varieties and local paddy in hospet (Bellar
district), Bhadravathi (Shimoga District) and Mandya (Mandya District)
taluks of Karnataka State”, by Singh and Govindarajan (1976)\(^5\), the profitability of small and large farmers. In the cost structure, operating cost accounted for about three fourths of the total cost. It was seen that small farmers were not only equally good adopters of the new technology of paddy, but also made greater or equally intensive use of the modern inputs. It is inferred that the per acre productivity of small farmers was relatively higher than that of the large farmers, since the needs of labour rice cultivation decline with the farm size.

The cost and return structure of the small and large farmer groups in Tanjore District of Tamilnadu State was studied by Harrison (1972)\(^{54}\), during the kuruvai season of 1967-68. It was seen that there was a greater intensity of land use by the small holdings than the larger ones. There was more intensive use of labour by the small farmers due to family labour, by than the large farmers. Again, the other variable inputs did not vary very much for the two groups. It was observed that the small farmers incurred more variable cost per hectare than the large farmers.

Sweason (1983)\(^{55}\), analysed the relationship between paddy crop and farm size and cost of input used, in his study, “The effect of increases in Rice production on employment and income distribution in Thanjavur District, South India”, conducted during the comparative period of 1965-66 and 1970-71. The inference was that with the production of paddy per acre consistently higher, the levels of purchased inputs per acre also higher for large farmers on all paddy crops in both years, the differences being more pronounced in 1970-71 than 1965-66. Except for purchased inputs in large

\(^{54}\) James Guighley Harrison, “Agriculture Modernization and Income Distribution: An Economic Analysis of the impact of New Seed varieties on the crop production of large and small farmers in India” (MIMEO), Ph.D., Princeton University, 1972.

farms for Samba Paddy, the value of purchased inputs used per acre was at least three times higher on both farm size group in 1970-71 compared to 1965-66. As far as the labour input is concerned, negative relationship was found between farm size and the number of man days per acre. And also it was observed that the general tendency was for small farms to have a somewhat higher value per acre of man purchased inputs.

According to Johl and Kapur (1981)\(^{56}\) fixed costs can be cash or non-cash, but incurred even when production is not undertaken.

Subhash chand et al (2009)\(^{57}\) studied marketed surplus and price spread of milk in Bay Island as Micro level Analysis.

The authors attempted to study the marketing costs, margin of intermediaries, price spread in various channels and marketed surplus of milk in the south Andaman District of Bay Islands. The author also identified the different marketing channels, the reference year of the study was 2006-07 to 2007-08.


The findings of the study revealed that on an average, family size consisted of size members in a family. The overall landholding size was found to be 1.23 hectare per family. The milk marketing channels involved in milk procurement were both co-operative societies and private agencies. Marketing costs margins and price spread were examined in the following channels.

I. Channel → Producer-Vendor-Consumer
II. Channel → Producer-Co-operative society-Consumer
III. Channel → Producer-Tea shops-Consumers
IV. Channel → Producer-Consumers

The marketed surplus of milk has an important role to play in enhancing the farmer’s income and meeting the demands of the non-producing segments of the society.

K.R.Sundaravaradarajan et al., (2000)\(^{58}\) in “Marketable surplus in Rice. A study in Cuddalore District in Tamil Nadu” studied the problems of marketable surplus with regard to the production and consumption sides of the commodity. The importance of marketed surplus cannot be ignored in view of the tendency of small cultivators to succumb to forced sales to meet

urgent needs. Hence a study on marketable surplus and the factors which govern the flow of marketed surplus was considered important in order to identify the weakness of the present marketing system.

Rice is the staple food of Tamil Nadu. Rice is cultivated in 22.65 lakh hectares and 70.2 lakh tones (1996-97) produced in the state. The Cauvery delta zone is considered the rice bowl of Tamil Nadu and this zone accounts for a third of the area and production of rice in the state.

The scatter diagram constructed between the marketable surplus of rice and independent variable, such as size of operational holding, area under the rice, size of the family, the retention for seed purpose, wages and home use consumption exhibited linear relationships. Thus, the per farm marketable surplus was specified as

\[ Y = a_0 + a_1 x_1 + a_2 x_2 + a_3 x_3 + a_4 x_4 + a_5 x_5 + \ldots \ldots \text{etc} \]

\[ Y \] = marketable surplus of price (\ldots)

\[ x_1 \] = size of operational loading

\[ x_2 \] = area under rice

\[ x_3 \] = size of family

\[ x_4 \] = retention for purpose

\[ x_5 \] = wages in find (g)

\[ x_6 \] = home consumption (g)

\[ b_1 \ldots b_2 \] = regression

\[ e \] = error term.

The size of the family is the deciding factor for small farmers in marketable surplus of their produce. Hence, the Government should the
necessary propaganda for family planning and welfare measures which bring more income to the farming community and could to the nation.