ECONOMICS OF PRODUCTION AND MARKETING OF BANANA IN KURNOOL DISTRICT OF ANDHRA PRADESH

By

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CERTIFICATE

Miss. **P.SHYAMALA DEVI** has satisfactorily prosecuted the course of research and that the thesis entitled **"ECONOMICS OF PRODUCTION AND MARKETING OF BANANA IN KURNOOL DISTRICT OF ANDHRA PRADESH"** submitted is the result of original research work and is of sufficiently high standard to warrant its presentation to the examination. I also certify that the thesis or part thereof has not been previously submitted by her for a degree of any University.

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This is to certify that the thesis entitled **"ECONOMICS OF PRODUCTION AND MARKETING OF BANANA IN KURNOOL DISTRICT OF ANDHRA PRADESH"** submitted in partial fulfilment of the requirements for the degreeof **Master of Science in Agriculture** of the Andhra Pradesh Agricultural University, Hyderabad, is a record of the bonafide research work carried out by Miss. **P.SHYAMALA DEVI** under my guidance and supervision. The subject of the thesis has been approved by the Student's Advisory Committee.

No part of the thesis has been submitted for any other degree or diploma or has been published. Published part has been fully acknowledged. All the assistance and help during the course of investigation have been duly acknowledged by the author of the thesis.

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I, **P.SHYAMALA DEVI** hereby declare that the thesis entitled **"ECONOMICS OF PRODUCTION AND MARKETING OF BANANA IN KURNOOL DISTRICT OF ANDHRA PRADESH"** Submitted to Andhra Pradesh Agricultural University, Hyderabad for the degree of **Master of Science** in Agriculture is the result of original research work done by me. It is further declared that thesis or any part ther of has not been published earlier in any manner.

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ABSTRACT

Name of the author	:	**P. SHYAMALA DEVI**
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The present study entitled **"Economics of Production and Marketing of Banana in Kurnool District of Andhra Pradesh"** was undertaken mainly to study the costs and returns, resource use efficiency and price spread along with production and marketing problems. The study covered four villages with 80 farmers were stratified into two size groups i.e., small and large. Data were collected through survey method with the help of pretested schedule. Both conventional and functional analyses were used to analyse the data and to arrive at valid conclusions.

The human labour utilisation per hectare was highest on small farms (392.44 man days) compared to large farms (316.62 man days). It showed an inverse relationship with that of farm size.

The total cost of cultivation and gross returns per hectare of banana were highest on small farms (Rs.48,586.65 and Rs.99,280.13) compared to large farms (Rs.45,705.41 and Rs.98,444.08) and the net returns per hectare realised from banana was more on large farms (Rs.52,738.67) than that of small farms (Rs.50,693.48).

Farm business income and family labour income were observed to be more on small farms whereas farm investment income was more on large farms. Analysis of benefit-cost ratio revealed that the net returns per rupee of expenditure was higher in case of large farms (Rs.1.15) than small farms (Rs.1.04).

Results of functional analysis indicated for the reallocation of resources to increase income on all farms. It was observed that land had positive impact and showed greater scope for further use in the production of banana in all size farms. Manures and fertilizers had positive and significant impact on small and large farms respectively. Both human labour and suckers had not contributed significantly to yields of banana in all size farms.

The percentage of break-even output to total output for small, and large farms was 21.89 and 20.18 respectively.

Producer's share in consumers rupee was 59.45 and 47.97 per cent in direct and contract sales respectively.

The major production problems faced by farmers were high cost of inputs and input services, power shortage and inadequate credit facilities and the marketing problems were unorganised markets and low prices, wide price fluctuations, distressed sales and lack of transportation facilities.

INTRODUCTION

CHAPTER I

INTRODUCTION

India is one of the largest producer of fruits and vegetables in the world. It produces nearly 12 per cent of world's vegetables and 8 per cent of its fruits. More than 70 million tonnes of fruits and vegetables are produced annually on 5 million hectare area. India is the second largest producer of fruits, growing about 28 million tonnes annually over 3.32 million ha (Financing Agriculture 1995). Inspite of this, our share in the world trade is hardly one per cent and the per capita availability of fruits is only 42 grams per day against a minimum consumption requirement of 92 grams pescribed by the Indian Council of Medical Research. Hence there is an urgent need to increase production and also be able to export fruits to earn foreign exchange. For meeting this estimated consumption requirement, a production level of 33 million tonnes of fruits would be necessary after allowing for a post-harvest loss of 25 per cent. (Financing Agriculture 1992).

The wide range of agro-climatic conditions prevailing in India, permit growing of different tropical, sub-tropical and temparate fruits. The Major fruits grown in India are mango, banana, citrus, guava, pineapple, grape and papaya in tropics and apple in the temparate region. Apart from these sapota,custurd apple, ber, pomegranate, anola, litchi, pearplum, apricot and walnat are also grown on a sizeable area. There is a vast potentiality for India to emerge as a major exporter of fruits and processed products. The export of fresh fruits rose from 27, 208 tonnes (Rs. 173 million) in 1983-84 to 83,100 tonnes (Rs.1,437 million) during 1992-93 and in 1993-94

(Rs.1,795.00 million). The average annual value of export of processed fruit products was about Rs.34 crores between 1980 and 1986.

India produces 50 per cent of world mango and 8 per cent of banana and pineapple and 3 per cent of citrus. Inspite of this, its share in global export is only about 0.40 per cent in terms of value (Financing Agriculture 1995). Surprisingly, less than one per cent of fruits produced in India is processed into products like fruit Juices, squashes, Jams, marmalades, concentrates, pulp and canned fruits despite the fact that they can match international quality standards. Scientific fruit processing is one of the neglected area in our country which needs an immediate attention. The processing fruit industry in horticulturally advanced countries uses more than 60 per cent of the produce and helps to stabilise the prices of fruits. However, in India the use of fruits by this industry is hardly 0.5 per cent. To pay greater emphasis in this sector, a separate ministry for food processing has been set up by the government.

Banana is one of the important major fruit crops grown in India next only to mango. The banana culture in India is as old as Indian civilisation. It seems that it is one of the earliest fruit crops grown by mankind at the dawn of civilisation. In India bananas are so predominant and popular among people that is linked both by poor and rich alike. Considering the nutritive value and fruit values of bananas, it could be considered as "poor man's apple" and it is the cheapest among all other fruits. Banana fruits are available through out the year unlike seasonal availability of other fruits, it

has been become an inevitable necessity in any house hold in India for all functions.

Bananas are put into varied uses in India, especially in South India. Almost every part of the plant is used some way or other in South India. The fruits are used for dessert purpose all well as culinary purpose and jams, sweets and chips are made out of banana fruit. The leaves are used as dinner plates and the plants are used as decorators in all auspicious occasions. All these multifaceous uses of banana where literally every part of the plant is useful has made banana pro-verbally the "poor man's food"

Banana is one of the tropical fruits with a highly organised international trade. However, India's share in international trade is poor, the reason for such low level of exports is that bananas are prone to develop black spots during ripening which makes them unsuitable for exports. Since, there is a consistent demand for banana in the international market, concerted efforts will have to be made for boosting its export and earn valuable foreign exchange. Total world banana production was 55MT (F.A.O 1995). India is the second largest producer of banana after Brazil.

Banana, a queen of tropical fruit, is cultivated in India over an area of 366 thousand hectares with a production of 6.73 million tonnes (Stastical Abstract, India 1992). Quantity wise banana topped the list (nearly 32 per cent) followed by mango (28 per cent). Productivity of banana increased by nearly 150 per cent during the last decade, in 1992-93 alone there was a quantum jump in production by about 34 per cent (Survey of Indian Agriculture 1995). The major banana producing areas in the country lies in

the states of Kerala, Tamil Nadu, Maharashtra, Assam, Andhra Pradesh, Orissa and Karnataka of which Kerala, Tamil Nadu and Maharashtra together occupy 50 per cent of the total area under banana crop, contributing about 54 per cent of total annual production.

In Andhra Pradesh during 1992-93 banana was cultivated in an area of 39,727 hectares with a production of 827.59 thousand tonnes (Crop and Season Report 1992-93). In Andhra Pradesh major banana producing districts are East Godavari, West Godavari, Guntur, Prakasam, Vizayanagaram, Cuddapah, Visakhapatnam and Kurnool of which East Godavari, West Godavari and Guntur together occupy 60 per cent of total area under the banana crop, contributing about 62.43 per cent of annual production of state. In Rayalaseema region Cuddapah district ranks first both in area and production and Kurnool district ranks second both in area and production in which banana was cultivated 2,049 hectares with a production of 50.33 thousand tonnes (Crop and Season Report 1992-93).

To increase the area under fruits, farmers are made to understand that growing of fruits offers great employment potential and is also much more profitable than growing cereal crops. Establishment of fruit orchards also has potential for more bio-mass output per unit area, which helps to maintain the ecological balance. Further, fruits and their processed products also have great export potential. If we organise our export sector properly, the income of even small and marginal farmers can be raised considerably.

The profitability of banana production depends upon the income generating capacity and cost structure of the enterprise. However, much

information is not available on the economic aspects of banana cultivation. In this context, it is felt necessary to probe into the economic aspects of banana cultivation at micro level. The present study was designed to evaluate empirically the profitability of banana production and to analyse the constraints if any to the production of this crop.

1.1 OBJECTIVES

The study was undertaken with the following specific objectives.

1. To estimate the costs and returns of banana crop.
2. To study the resource use efficiency of banana crop.
3. To estimate the marketing costs, margin and price spread in different marketing channels of banana.
4. To identify the problems faced by producers in production and marketing of banana.

1.2 SCOPE OF THE STUDY

The result of the study provide information on the cost structure, returns, factor productivity and factor use efficiency in banana cultivation. This information is useful to the existing banana growers in planning for higher returns and to the new entrepreneurs who plan for the establishment of new banana orchards. The findings of the study are also useful to the institutional financing agencies in estimating the credit requirement for banana orchards and thus form the basis for formulating their lending

policies. Also provides information on the magnitude of employment opportunities as a result of investment in banana production.

1.3 LIMITAITONS OF THE STUDY

The study being one man research project, suffers from some draw backs. The study is carried out in limited period of time, in limited area of a particular agroclimatic situation. Hence, generalisation of results is not advisable. The necessary primary data regarding production and marketing of banana was collected from respondents based on their recall memory by interview method and hence has inherent limitations.

1.4 PLAN OF THE THESIS

This thesis is presented in six chapters.

The first chapter deals with the economic importance of fruits in general and banana in particular, objectives, scope and limitations of the study are presented.

The second chapter attempts a critical review of past work done.

The third chapter deals with sampling design, method of collection of data, methods of estimation and explanation of various concepts and definitions adopted for this study.

The fourth chapter describes the agro-economic features of the selected district and mandals.

The fifth chapter presents critical analysis of the results and discussion.

The last chapter presents the summary and conclusions of the study.

REVIEW OF LITERATURE

CHAPTER II

REVIEW OF LITERATURE

For any investigation, the findings of earlier studies possibly give indications of the problems and provides guidelines for the present study. In addition the earlier studies provide the lacunae in the existing information and form the basis for formulating new studies. In this chapter a review of the related studies pertaining to the costs and returns, resource productivity and marketing of banana are presented under the following heads.

2.1 Studies on costs and returns.

2.2 Studies on resource use productivity

2.3 Studies on break-even analysis

2.4 Studies on marketing aspects

2.5 Studies on production and marketing problems

2.1 STUDIES ON COSTS AND RETURNS

Singh *et al.* (1974) conducted a study on economics of guava plantation in Allahabad district of U.P. Covering all the stages of growth and concluded that the total investment on the establishment of guava orchard up to the age of three years was Rs.5107.32 per hectare. The intial investment for first year was Rs.2,705.17 per hectare of which lay out and

fencing amounted for highest expenditure of 28.55 per cent followed by labour charges for maintenance (17.45 per cent) and digging of pits (13.59 per cent)

Ramasubramanian (1979) in his study on production pattern and market structure for Robusta banana in Uthamapalyam taluk of Madurai district reported that the total cost was Rs.5,927.27 per acre. The major items of costs were manures and fertilizers, human labour and rent accounting for 28.37, 19.78 and 20.91 per cent of the total cost respectively. The per acre gross and net returns were Rs.10,456.48 and Rs.4,529.21 respectively .

Verma (1981) conducted a study on the employment potential on farm holdings in district Unnano, Uttar Pradesh. The study revealed that the percentage utilisation of family labour days decreased with the increase in the size of farm while that of hired labour increased with the increase in the farm size.

Reddy *et al.* (1984) revealed that the rental value of land was the major cost component followed by apportioned planting cost and labour in planted and ratoon crops of robusta and cavendish varieties of banana.

Ramanathan (1985) in his study on the profitability of banana as an inter crop in coconut estimated the total costs and gross returns at Rs.9,321 and Rs.40,419 respectively (Per ha).

Subramanyam (1985) worked out the returns in Robusta variety of banana at Rs.12,500 per hectare which was high when compared with Rs.5,000 to Rs.10,000 per hectare of the other cultivars. The input-output coefficients for Robusta was also high (1:2.4).

Naidu *et al.* (1986) conducted a study on resource productivity of banana farms in East Godavari district and revealed that the rental value of land was a major item of cost followed by human labour and manures and fertilizers. They concluded that the banana was a labour intensive and fertilizer responsive crop.

Rao *et al.* (1986) conducted a study in costs and returns from banana farms and reported that the per hectare costs of plant and ratoon were Rs. 22,237 and Rs.18,252 per hectare. Expenditure on manures and fertilizers noticed to be the highest cost factor followed by rental value of land and human labour cost in the total costs.

Mandalia (1987) worked out the net returns per hectare and tonne of banana at Rs.7,147 and Rs.2,581 respectively. The input-output ratio worked out to be 1:1.34. He also concluded that the medium farms were more efficient in banana production when compared to large farms.

Subramanyam (1987) conducted a study on economics of papaya cultivation and revealed that cost of cultivation included the establishment cost in the first year and maintenance costs during the subsequent two years. A total out lay of Rs.16,850 per hectare was required for papaya cultivation (irrigation, manures and fertilizers)

Thomas and Gupta (1987) revealed that manures and fertilizers followed by labour were the major items of expenditure in the cultivation of banana crop. It was also found that the family labour contribution was more on small farms as compared to large farms.

Arputharaj and Kesavan (1988) conducted a study on economics of banana cultivation in Kerala and revealed that the highest item of expenditure was human labour accounted about 23.00 per cent of total cultivation expenses. Banana was highly labour intensive, requiring about 275.00 mandays per hectare. Labour requirement was highest (29 per cent) for preparatory cultivation followed by after cultivation (28 per cent), harvesting and handling (27 per cent).

Arputharaj and Kesavan (1988) reported that on an average Rs.36,252 per hectare had incurred towards cost of cultivation of banana in Kerala. Farm business income, family labour income and farm investment income were Rs. 13,243, Rs.27,153 and Rs.27,406 per hectare respectively. The benefit-cost ratios at cost A_1,A_2,B and C worked out to 2.16, 2.10, 1.84 and 1.64 respectively.

Latha Bastine and Radhakrishnan (1988) in their study on economics of banana cultivation estimated the total cost, gross returns and net returns per hectare at Rs.36,249, Rs.45,068 and Rs.8,819 respectively. Their study also revealed that the contribution of family labour was 30.50 per cent of the total expenditure on labour. The contribution of family labour showed a decreasing trend as the size of holding increased.

Sudha and Reddy (1988) stated that the costs incurred in the sweet orange cultivation in the first year were higher than in the subsequent years. The total cost of cultivation of sweet orange in the first year was worked out to Rs.7,664.52 where as the average annual cost of maintaining a bearing orchard amounted to Rs.7,446.00 per hectare. Manuring (49.00 per cent),irrigation (8.00 per cent) and plant protection (14.00 per cent) were the major cost items of maintaining a bearing orchard. It was also found that gross returns showed a steady increase from Rs 9,206.00 per hectare in the sixth year to Rs. 13,043.00 in the fifteenth year of the crop.

Basha (1989) in his study on economics of production and marketing of banana in Cuddapah district estimated the total costs per hectare of banana at Rs.32,888.89, Rs.27,039.00 and Rs.24,936.22 on small, medium and large farms respectively and thus indicating inverse relationship between costs and farm size. He also reported that the net income was highest (Rs.16,231.11) on large farms and lowest (Rs.10,361.87) on small farms.

Thomas *et al.* (1989) reported that the total cost of cultivation for Robusta variety of banana worked out to be Rs.36,908.00 per hectare. The major items of costs were material costs (60.57 per cent) and labour cost (39.43 per cent). The gross income from one hectare of Nendran and Robusta varieties of banana were Rs.38,575.00 and Rs.49,318.00 respectively. They concluded that cost as well as receipts from Robusta variety were found to be higher than that of Nendran.

Chennarayudu *et al.* (1990) from their study reported that the total costs per hectare of banana were Rs.22,253.63 out of which total variable cost and total fixed cost were Rs.15,477.63 and Rs.6,776.00 respectively. The gross and net returns were Rs.31,171.18 and Rs.8,917.55 respectively. Cost-benefit ratio was found to be 0.40.

Sudha and Reddy (1990) from their study on economic evaluation of guava orchards revealed that the cost of establishing a hectare of guava orchard worked out to Rs.7,211.00 and average annual cost to maintain a bearing orchard at Rs.3,345.00. On an average a bearing orchard provided an income of Rs.3,722.00. The B-C ratio was worked out to 2.08 and was highest (4.06) in the 12 years of the orchard.

Senthilnathan and Srinivasan (1994) worked out the total cost of cultivation of banana to be Rs.1,24,678.11 per hectare over a period of three years. The net returns per bunch in the first, second and third year were Rs.25.73, Rs.27.06 and Rs.23.10 respectively.

2.2 STUDIES ON RESOURCE USE PRODUCTIVITY

Patil and Acharya (1974) fitted Cobb-Douglas production function with the modified equation for analysis to study the comparative resource productivity of sugarcane and banana farms and the results revealed that the regression coefficients of land and labour in banana farms were more than that of sugarcane farms.

Peter (1974) conducted a study on input and output relation of banana planting in Kanyakumari district and revealed that there was highly significant positive response of the gross income to the positive changes in the manuring expenses. Since the marginal value productivity of manuring was higher than the rupee expenditure on it to realise more income.

Singh and Srivasthava (1974) estimated the productivity of various capital inputs of sugarcane. The elasticities of production were positive for all the inputs and significant at five per cent level. The marginal value productivities of fertilizers and irrigation were significantly greater than their respective prices.

Sain and Chattopadhyay (1977) through their study found that marginal value productivities of fertilizers, irrigation and capital were greater than their factor costs on Aus paddy and Boro paddy in West Bengal.

Chamak *et al.* (1979) studied the resource use efficiency in Punjab agriculture by fitting Cobb-Douglas production function and found that the marginal value, productivity of land was highest on small farms followed by

large and medium farms. Marginal value productivities of labour and capital were positively correlated and bullock labour was negatively correlated with the size of holding.

Carlisle and Pembertan (1981) conducted a study on resource productivity in agriculture in developing countries and stated that, increasing returns to scale existed both on small and large farms. Productivity of land and capital were higher on small farms than on large farms and labour productivity was higher on large farms than on small farms. Among variables considered productivity of land was higher followed by capital on both small and large farms.

Anjaneyulu *et al.* (1984) estimated the efficiency of resources on turmeric farms of four different sizes viz., marginal, small, medium and large in Guntur district of Andhra Pradesh. The study revealed increasing returns to scale on marginal farms, constant returns to scale on small farms and decreasing returns to scale on medium and large farms.

Ramakumar (1985) fitted Cobb-Douglas production function to study the profitability of sugarcane farming in Anantapur district. His study indicated constant returns to scale for the whole sample and the prevalence of diminishing returns to scale on small farms, increasing returns to scale on medium and large farms.

Naidu *et al.* (1986) studied the resource productivity of banana and found that the coefficients of all variables, except human labour were significant reflecting their contribution to profitability. The MVP/MFC ratio for

land was higher than unity. Which indicate that the area under banana crop could be increased inorder to get high returns.

Mandalia (1987) conducted a study on production economics of banana cultivation in Surat district of Gujarat and revealed that in terms of production efficiency the medium farmers proved to be the most efficient and the large farmers were least efficient.

Thomas and Gupta (1987) fitted Cobb-Douglas production function to study the resource use efficiency in banana cultivation in Kottayam district of Kerala and found increasing returns to scale. The response of gross income to an increase in the expenditure on suckers, plant protection chemicals, propping materials, baskets, transportation and marketing were highly significant and positive. The MVP to MFC ratios were less than unity for labour and manures and fertilizers and thus showed little scope for further use.

Jayamma (1988) conducted a study on sugarcane crop and the results of functional analysis revealed that on pooled farms of plant crop, the production elasticities of all inputs except seed material were significant. The production elasticity of seed was positive and significant which indicated increasing factor returns.

A study conducted on economics of production and marketing of sugarcane in East Godavari district by Ramesh (1988) indicated constant returns to scale in planted crop except on pooled farms and increasing returns to scale in ratoon crop except on small farms. Land exerted

significant influence on gross returns on all the farm sizes in both planted and ratoon crops. Human labour and irrigation were exerting significant influence on gross returns in planted crop and human labour, and manures and fertilizers were exerting significant influence on gross returns in ratoon crop.

Thomas *et al.* (1989) fitted Cobb-Douglas production function to estimate the productivities of different resources used in the production of banana and found that the independent variables included in the model explained the variation in the gross income of Robusta and Nendran to the extent of 84 and 91 per cent respectively. It was also observed that the material cost and plant protection were the important variables affecting the gross income. The coefficient of manures cost was found to be negative indicating that with one per cent increase in manures cost, the gross income from Nendran and Robusta was reduced by 0.056 and 0.075 per cent respectively. The coefficient of plant protection chemicals revealed that with one per cent increase in this variable, the gross income from Nendran and Robusta increased by 1.18 and 0.584 per cent respectively.

Chennarayudu *et al.* (1990) conducted a study on land use efficiency of banana and they revealed that the ratio of MVP/OC for land was more than one indicating the scope for bringing more area under banana cultivation. They also stated that inefficiency of land use in the study area resulted in low levels of cost-benefit ratio. The land use inefficiency was more on large farms compared to marginal farmers.

Hiremath *et al.* (1994) employed Cobb-Douglas production function to examine the resource use efficiency in lime production. The regression coefficients of labour was non significant in small and large orchards, where as in medium orchards it was 0.66 and significant at 5 per cent level. The negative regression coefficients were with respect to plant protection chemicals in small orchards and with respect to FYM in large orchards. The study further revealed that the MVP to MFC ratio for land was more than unity for all size groups of orchards. The marginal value productivity of labour was more than marginal factor cost (Rs.2.00) in small and medium orchards. FYM and plant protection chemicals were almost optimally utilised in medium orchards, where as in the other orchards they were over utilised.

Koujalagi and Kunnal (1995) fitted Cobb-Douglas production function for the pomegranate cultivation and showed the positive significant contribution of the factors like land, labour and manures and fertilizers to the pomegranate productivity and further concluded that the variables included in the function explained about 70 per cent of the variation in the gross returns.

Sucharitha *et al.* (1995) conducted a study on resource use and productivity of turmeric crop in Nizamabad district of Andhra Pradesh and stated that in case of medium farms the ratios of MVP/OC were less than one for fertilizers, manures and cattle labour and the ratios of MVP/OC were more than one in case of land, seed and human labour. They also revealed that in large farms, the ratio of MPV/OC were less than one for seed and

manures and MVP/OC ratio was more than one for remaining inputs in turmeric cultivation.

2.3 STUDIES ON BREAK-EVEN ANALYSIS

Ramakumar (1985) worked out the break-even output of sugarcane as 17.05 and 81.25 tonnes for small and large farms respectively in plant crop. In ratoon crop, the break-even out put was 12.16 and 62.79 tonnes for small and large farms respectively. For the entire sample break-even out put was 44.07 tonnes for plant crop while it was 41.50 tonnes for ratoon crop.

Jayarani (1993) worked out the percentage of break-even output to average yield of betelvine as 37.96, 35.63, 31.27 and 34.62 per cent for small, medium, large and pooled farms respectively. Further, revealed that the betelvine is highly profitable and remunerative enterprise.

Radhika (1995) indicated that the average yield or out put obtained in mango cultivation at different farm levels was greater than the break-even output (BEO) and worked out the difference between BEO and the average output per hectare at 1.94, 2.04 and 1.02 for small, large and pooled farms respectively.

Ramesh Reddy (1995) worked out the break-even output over a period of one, two and three years of papaya orchards were 24.20, 48.56 and 59.92 tonnes respectively and further revealed that the break-even output of two and three years old orchards of papaya was quite lower than the actual average yields obtained and thus indicating that the growers of papaya were operating in the profit zone.

2.4 STUDIES ON MARKETING ASPECTS.

Qadri (1976) traced out five different channels of distribution in marketing of apples in Jammu and Kashmir Out of these five channels commission agents and pre-harvest contractors were playing dominating role by handling 95 per cent of the total produce produced in the region. The marketing costs and margins were the highest for the produce marketed through pre-harvest contractors and the lowest for the produce marketed through co-operatives.

Rao *et al.* (1976) studied marketing of important fruits in Bombay and stated that the retailers found to be key persons in the fruit trade for the reason that they dictate both retailer's price and consumer's price in the market. Labour charges and losses were the major expenses for retailers.

Biradar and Kasar (1983) conducted a study on marketing of Jalagoan banana in Delhi Market and stated that the cost of marketing of banana was slightly lower and producer's share in consumer's rupee was slightly higher in case of co-operative fruit sales societies (31.62 per cent) compared to the private marketing agencies (30.04 per cent). The margins of wholesalers and retailers were 16.05 and 21.40 per cent respectively in case of fruit sales through co-operative societies and while they were 16.46 and 21.95 per cent respectively through the private agencies.

Ashturkar and Deole (1985) estimated the producer's share in the consumer's price of banana, sweet orange, mandarine and lime in Maharastra. The producer's share for banana varied between 45 and 70 per

cent in different marketing channels. It was lowest when the produce was sold to pre-harvest contractor and highest in the channel with out commission agent and processors. They further revealed that the marketing costs and middlemen's share increases the consumer's price and decreases the producer's profit.

Nagaraj *et al.* (1985) appraised the marketing of fruits and vegetables in Bangalore and identified two distinct marketing channels in banana fruit marketing viz., producer—pre-harvest contractor— retailer— consumer (Channel I) and producer— commission agent— retailer— consumer (Channel II). On an average the share of producer, commission agent and retailers were 30.00, 19.23 and 17.00 per cent respectively.

Subramanyam (1986) identified two types of sales for mango in Madurai district of Tamilnadu. The first type of sale was the contract sale in which the producer sold the produce to the pre-harvest contractors and realised 56 per cent of the total returns. The second type of sale was the self marketing of the produce through commission agent. It was also found that the gross and net returns realised by the producer through self marketing was two and half times more than the returns realised through sale to pre-harvest contractor.

Jaiswal *et al.* (1987) in their study on marketing of guava revealed that the producer's share in consumer's rupee worked out to be about 67.00 per cent. The total marketing cost per quintal of guava was calculated at Rs.60.00. They suggested the need to provide fruit preservation facilities and

increasing the efficiency of the marketing system to reduce the cost of marketing.

Singh and Kumar (1987) analysed changes in prices and marketing margin of fruits in India and observed the largest rise in the price for cashew followed by banana and oranges. The producer's share in consumer's rupee of fruits varied from market to market because of the existence of large differences in the marketing system.

Subramanyam (1988) identified three channels in pineapple marketing.

1) Producer—commission agent/co-operative society—wholesaler— retailer—consumer.
2) Producer—trader/commission agent—retailer—consumer
3) Producer—trader/commission agent—wholesaler—retailer—consumer

He reported that the marketing expenses in channels I, II and III were Rs.9.75, Rs.23.80 and Rs.28.56 respectively.

Vigneshwara (1988) in his study on marketing of banana in India stated that the dependence of producer on several intermediaries to dispose the produce in local markets resulted in lower prices to his produce. He further revealed that growers incurred high transportation costs due to bulkiness of the products.

Basha (1989) conducted a study on marketing of banana in Cuddapah district of A.P and identified two channels in banana marketing.

1. Producer—pre-harvest contractor—commission agent—wholesaler— retailer — consumer.

2. Producer— pre-harvest contractor — commission agent — retailer — consumer

He revealed that producer's share in consumer's rupee was only 54.32 per cent while 45.68 was distributed as marketing costs and margins of various intermediaries.

Singh *et al.* (1989) conducted a marketing survey on plums and apricots in Himachal Pradesh and revealed that the marketing costs included were picking, assembling, grading, packing, transportation and selling etc., In plums marketing the share of producer, wholesaler, retailer were observed to be 13.48, 2.00 and 6.99 per cent respectively and in apricot marketing the same were 42.58, 2.07 and 7.16 per cent respectively in Delhi market.

Sashoo (1991) had revealed that the export of fresh fruit and vegetables constituted only 5 per cent of the total value of exports of agricultural and allied products, but could be enhanced at a growth rate of 10 per cent per annum if concerted efforts could be made to implement the strategies suggested. APEDA, Horticulture Board, ITFT and Trade Fair Authority of India should be involved to prepare a comprehensive study for the benefit of the exporters. The adoption of marketing techniques on scientific lines would ensure remunerative returns to growers and product satisfaction to the consumers in the target market.

Senthilnathan and Srinivasan (1994) conducted a study on marketing of Poovan banana in Trichirapalli district and identified two major channels of distribution viz., 1) producer—-pre-harvest contractor—-commission agent—-wholesaler—-retailer—-consumer and 2) producer-regulated market—-wholesaler—-retailer—-consumer. They further revealed that producer's share in consumer's price was highest in channel II (71.60 per cent) compared to channel I (61.27 per cent) and also stated when more number of intermediaries and high marketing cost involved, the actual price paid by the ultimate consumer per bunch was also high.

While studying marketing of grapes in Haryana, Singh and Khatkar(1994) concluded that majority of the produce is marketed through direct sales (73 per cent). The cost of packing material and transportation were the major components of the marketing costs. Through the direct sales producer-farmers were getting about 44.00 per cent of the consumer's rupee as compared to 26.00 per cent received in contract sales.

Subrahmanyam *et al.*(1994) in their a study on marketing of fruits and vegetables compared the prices of HOPCOMS with market prices. They stated that the procurement prices of HOPCOMS were 6-10 per cent higher than the wholesale prices prevailing in the market and thus indicated that the producers obtained better price by selling through the society.

2.5 STUDIES ON PRODUCTION AND MARKETING PROBLEMS

Balakrishnan (1979) identified that indebtedness of farmers as the major factor that was responsible for forced sales of farm products at

unfavourable prices and terms and further, available transport facilities were highly inadequate for efficient marketing of farm products and inadequacy of storage facilities had become a serious problem.

Agarwal (1981) analysed the problems of agricultural marketing in India and stated that main problems of Indian agricultural marketing are forced sales, presence of large number of middlemen, lack of established regulated markets and malpractices by the middlemen and lack of proper storage facilities etc.,

Sikka and Swarup (1989) identified the following problems faced by orchardists 1) grading and packing 2) non-availability of labour and materials in time at desaired place and at reasonable price 3) non-availability of inputs on credit basis 4) high cost of transportation 5) lower prices obtained for the produce due to involvement of commission agent.

Bhogal (1994) conducted a study on marketing problems faced by the apple producer and identified the problems viz., 1) problem of short supply of both skilled and unskilled labour during the peak marketing season 2) problems of inappropriate availability of packing cases 3) difficulty in arranging the finance to carry out the apple marketing and 4) non availability of market price information at appropriate time and lack of cold storage facilities are the major problems in the study area.

METHODOLOGY

CHAPTER III

METHODOLOGY

The present study was undertaken in Kurnool district of Andhra Pradesh with specific objectives of computing costs and returns of banana, analysing the resource use efficiency, marketing costs and margins and identifying the production and marketing problems. In this chapter an attempt is made to give the procedural details adopted in sampling design, method of data collection, and analytical tools applied in attaining the stated objectives. It also familiarises various concepts and terms used in the study. The contents of this chapter are presented under the following heads.

3.1 Sampling design

3.2 Collection of data

3.3 Methods of computation.

3.4 Tools of analysis

3.5 Concepts and terms used in the study.

3.1 SAMPLING DESIGN

3.1.1 Selection of the District

Kurnool district which ranked second both in area (1,535.90 hectares) and production (37,732 tonnes) of banana in the Rayalaseema region of Andhra Pradesh was selected purposively.

3.1.2 Selection of Mandals

Out of 53 mandals of Kurnool district, two mandals namely Mahanandi and Nandyal were selected as they ranked first and second in area under banana cultivation.

3.1.3 Selection of Villages

The list of villages growing banana in the selected mandals along with acerage was obtained from the office of the Mandal Revenue Officer, Nandyal. These villages were arranged in descending order of the area under banana. The first two villages from each mandal having maximum area under banana were selected for a detailed study. The selected villages were Bukkapuram, Thimmapuram, Nandyal rural and Kothapalli.

3.1.4 Selection of Respondents

List of all the farmers cultivating banana in the selected villages was made. These farmers were stratified into two size groups i.e small and large on the basis of operational holding as per the criterion adopted by IRDP. Those farmers with 2 hectares or less of dry land were considered as small and the farmers with more then 2 hectares of dry land were considered as large.

In this classification, 2 acres of dry land was considered equal to one acre of wet land in accordence with the income generating capacity of dry and wet lands.

From each of the selected villages, ten farmers in each size group were selected at random. Thus 40 small and 40 large farmers constitute the sample for the study. The total number of farmers selected for the purpose of study was 80.

Table 3.1 Sample size of selected villages

S.No	Villages	Small	Large	Total
1.	Bukkapuram	10	10	20
2.	Thimmapuram	10	10	20
3.	Nandyala rural	10	10	20
4.	Kothapalli	10	10	20
	Total	40	40	80

Further, to analyse the costs and efficiency of marketing, ten pre-harvest contractors, ten commission agents, ten wholesalers and ten retailers were randomly selected from the study area.

3.2 COLLECTION OF DATA

The data used in the study to fulfil various objectives were collected through personal interview of selected farmers and marketing agencies with the help of pretested schedules designed for the purpose. The data on family

composition, land holdings, farm inventory of the respondents were collected. Besides, the data on input-output coefficients and prices were collected. An opinion survey was conducted to find out the constraints faced by the farmers in production and marketing of banana. From the market functionaries data relating to quantity purchased, costs incurred, price paid/received were also collected. Every effort was made at the time of interview to convince the respondents that the study was undertaken purely for research and not for any other purpose. The data for the present study pertained to agricultural year 1994-95.

3.3 METHODS OF COMPUTATION

The economic analysis of banana cultivation necessiated proper valuation or estimation of the costs of inputs, input services and output. The detailed procedure followed in calculating the production costs of banana is described below.

3.3.1 Human Labour

Actual days worked were recorded separately for male and female, family and hired labour. The women-days were converted into man-equivalent days by assigning a ratio of 1.5 woman-days equivalent to one man equivalent day. Human labour was quantified in terms of productive man-work units (usually about 8 hours of productive work). Wages, whether paid in cash or kind or in combination of both were computed in rupee

equivalent. Family labour was valued at the prevailing wage rates of casual labour engaged for similar operations in the study area.

3.3.2 Bullock Labour

It included both owned and hired bullock labour and was measured interms of plough units of 6 hours. The wage rates of both hired and owned bullock labour were estimated at the prevailing rates in the locality.

3.3.3 Tractor Services

Tractor services both owned and hired was charged at the prevailing rates in the locality per an hour of work.

3.3.4 Suckers

The cost of suckers both purchased and farm produced was computed at the prevailing market prices.

3.3.5 F Y M

The cost of FYM per tonne was calculated on the basis of prevailing market rates both for farm produced and purchased manure.

3.3.6 Fertilizers and Plant Protection Chemicals

The cost of fertilizers and plant protection chemicals was valued at the actual price paid by the farmers.

3.3.7 Transportation Cost

The cost incurred in transporting the banana bunches from farm to market and farm supplies from home to farm were considered as transportation cost. It varied according to the distance and mode of transportation.

3.3.8 Propping Material

The cost of bamboo poles either owned or purchased was valued at the local rates.

3.3.9 Electricity charges

Actual amount paid by the respondents on the use of electricity was considered. Then the amount was apportioned to banana based on its acreage.

3.3.10 Interest on Working Capital

It was calculated at the rate of 12 per cent per annum (The rate at which commercial banks advance short term loans) for the half of the amount for full crop period and for the rest of the amount for half of the crop period, since the capital was used at different stages of crop production. Imputed value of family labour was excluded while calculated interest on working capital.

3.3.11 Rental Value of Owned Land

It was charged at the prevailing lease rates for the similar type of land in the study area.,

3.3.12 Land Revenue

Prevailing land revenue which was actually paid was considered. Later it was apportioned according to acreage under banana crop.

3.3.13 Depreciation

Amount of depreciation on each asset owned by the farmers was calculated following the procedure of straight line method. Later it was apportioned according to area under banana.

3.3.14 Interest on Fixed Capital

Interest charges on fixed capital was calculated at the rate of 12 per cent as the fixed deposits in commercial banks would fetch this rate of interest. Since rental value of owned land was considered, no interest was charged on the land value. Then the amount so calculated was apportioned on crop acreage.

3.3.15 Marketing aspects of Banana

Data were collected from pre-harvest contractors, commission agents, wholesalers and retailers about the source of purchase, the price paid, labour charges, transportation cost, commission charges and other incidental charges if any and also the price received by them.

3.3.15.1 Marketing costs. These included packing, loading, transport, unloading, rent, grading, smoking and commission charges which were paid by the marketing functionaries per bunch of banana.

3.3.15.2 Marketing margins. This referred to net share to the different market intermediaries of a particular produce after deducting marketing costs from gross marketing margins at each stage of marketing for handling the commodity.

3.3.15.3 Price spread. It was worked out by taking the difference between the price paid by the consumer and the price received by the producer.

3.3.15.4 Producer's share in consumer's rupee. It is the price received by the producer expressed as a percentage of the consumer's price (i.e., price paid by the consumer). If Pc is the consumer's price and PF is the producer's price, then the producer's share (Ps) in consumer's rupee may be expressed as follows.

$$Ps = \frac{Pf}{Pc} X100$$

3.4 TOOLS OF ANALYSIS

Both conventional and functional analysis were employed to analyse the data and to arrive at valid conclusions. For finding out costs and returns,

farm efficiency measures and price spread, simple arithmetic averages and percentages were worked out.

Regression analysis was done to estimate resource productivity and resource use efficiency and break-even analysis was employed to find out the profitability in banana cultivation.

3.4.1 Conventional Analysis

3.4.1.1 Cost Concepts. These were used to estimate the cost of cultivation and to derive the farm efficiency measures such as farm business income, farm family labour income, net income and farm investment income. The cost concepts viz., cost A_1, cost A_2 , cost B and cost C were used in the present study and these are computed as follows.

3.4.1.1.1 Cost A_1. This cost includes 1. value of hired human labour, 2. value of owned and hired bullock labour, 3. value of owned and hired tractor services, 4. value of suckers, 5. value of manures and fertilisers, 6. value of plant protection chemicals, 7. value of propping material, 8. depreciation charges, 9. electricity charges, 10. interest on working capital, 11. land revenue.

3.4.1.1.2 Cost A_2. Cost A_1+ rent paid for leased in land. In the present study all the farmers were owner cultivators. Hence cost A_1 and A_2 were one and the same.

3.4.1.1.3 Cost B. Cost A_1 + rental value of owned land + interest on fixed capital (excluding land value)

3.4.1.1.4 Cost C. Cost B + imputed value of family labour . It gives the total cost of cultivation.

3.4.1.2 Farm efficiency measures

3.4.1.2.1. Farm business income = Gross income - cost A

3.4.1.2.2. Family labour income = gross income - cost B

3.4.1.2.3. Net income = gross income - cost C

3.4.1.2.4. Farm investment income = Net income + rental value of owned land+ interest on owned fixed capital

3.4.1.3 Benefit - cost ratio. This was calculated by the following formula

$$\text{Benefit - Cost ratio} = \frac{\text{Net Income}}{\text{Cost C}}$$

3.4.2 Regression Analysis

Production function approach was used to study the resource productivity and resource use efficiency in different size groups of banana farms.

Among the different types of production function Multiple linear regression was selected for the present study.

The model included 6 variables, one dependent variable and five independent variables. The linear model used is

$$Y = bo + b_1x_1 + b_1x_2 + b_3x_3 + b_4x_4 + b_5x_5 + Ui$$

Where in the case of banana production

Y= Yield of banana produce in bunches per farm

x_1= Land in hectares

x_2= Human labour in mandays

x_3=Manures in tonnes

x_4= Fertilisers in kgs.

x_5= Suckers in number .

Here bo is the intercept term, giving average effect on Y when all the included variables were absent. The stochastic disturbance term Ui is useful to reflect intrinsic randomness in the data.

b_1,b_2- - - b_5 are partial regression coefficients. The meaning of partial regression coefficients is that b_1 measures change in the mean value of y per unit change in x_1, holding other variables at constant. Like-Wise other partial regression coefficients viz., b_2,b_3,b_4,and b_5 measure change in the mean value of Y per unit change in levels of respective variable keeping other variables at constant.

Separate linear model was fitted for all size groups viz., small, large and pooled farms.

For testing the partial regression coefficients or production function 't' values were calculated using the formula.

$$t = bi/S.E \text{ of } bi$$

Where bi = Partial regression coefficients of xi

S.E of bi = Standard error of bi

In order to know the goodness of fit, the adjusted coefficients of multiple determination (R^{-2}) was calculated by using the formula.

$$R^{-2} = 1 - (1-R^2)\ \frac{n-1}{n-k}$$

where R^{-2} = Adjusted coefficient of multiple determination

R^2 = Original coefficients of multiple determination

n= Sample size

k= Number of parameters in the model

3.4.2.1 Marginal value products. Equality of marginal value product to factor cost is the basic condition that must be satisfied to assess efficient resource use. In linear production function, marginal physical products of x_i, the i^{th} input factor is given by the following formula.

$$y = bo + b_1x_1 + b_2x_2 + - - - - + b_i x_i$$

$$y = bo + \sum_{i=1}^{n} bixi$$

i= 1 to n inputs...

MPP of x_i input = dy/dx=bi

MPP= Marginal physical product of i^{th} input

bi= Partial regression coefficients of i^{th} input

The Marginal value product (MVP) for each factor is obtained by multiplying the MPP of each factor with the unit price of the output i.e.,

$$MVP = MPP \times Py$$

where Py= Price per unit of out put

Marginal value productivities are compared with acquisition costs inorder to study the resource use efficiency. A resource is said to be efficiently used when its MVP=MFC.

3.4.3 Break-Even Analysis

A break-even analysis is the determination of the functional relationship of revenue and costs to output rate and the derivation of functional relation of profit to out put as a residual. A break-even analysis chart can be defined as a chart which shows profit or loss at various levels of activity, the level at which neither profit nor loss is shown being called the break -even point. A firm is said to be at brea -even point when its costs are equal to revenue i.e., when the contribution margin is exactly equal to the fixed costs. Thus break-even analysis is the method used to calculate that level of output at which the firm neither makes profit nor suffers a loss. The appropriate formula to estimate break-even output is.

$$\text{Break - even out put} = \frac{\text{Total fixed costs}}{\text{Selling price per unit - variable cost per unit.}}$$

3.5 CONCEPTS AND TERMS USED IN THE STUDY

3.5.1 Small Farmer

Farmer having up to 2 hectares of dry land is grouped as small farmer.

3.5.2 Large Farmer

Farmer having more than 2 hectares of dry land is termed as large farmer.

3.5.3 Manday

It refers to the work accomplished by a normal healthy human being in a day of 8 hours.

3.5.4 Bullock pairday

It refers to the work turned out by a pair bullocks in a day of six hours.

3.5.5 Farm Assets

Land, farm buildings, livestock, farm machinery and implements are included under farm assets.

3.5.6 Cost of Cultivation

Cost of various factors and resource services used for raising a crop on an unit area.

3.5.7 Variable Costs

The costs that were incurred towards inputs like suckers, manures and fertilizers, payment towards human and cattle labour ,plant protection chemicals, electricity charges, propping material and interest on working capital.

3.5.8 Fixed Costs

In the present study, rental value of owned land, depreciation on capital assets, land revenue and interest on fixed capital were considered as fixed costs.

3.5.9 Explicit Costs

Payments made on the purchase or hiring of inputs used in the production of crops by the farmer.

3.5.10 Implicit Costs

Costs of self owned and self employed resources were considered for computing the total costs. They were rental value of owned land, wages to farmer's own labour and family labour.

3.5.11 Resource use Efficiency

A resource is said to be efficiently employed if its marginal value product is just sufficient to meet the acquisition cost or opportunity cost.

3.5.12 Break-Even Output

It is that out put at which there is neither profit nor loss.

3.5.13 Pre-Harvest Contractor

These are the merchant middlemen who enter into contract with producers to buy banana in the field itself at negotiated prices before

harvesting of bananas and sells them in the urban market through commission agents.

3.5.14 Retailer

Retailer is one who finally disposes the produce to the consumers after purchasing at the wholesale market.

3.5.15 Marketing Channel

The chain of intermediaries through which the produce moves from producer to consumer termed as marketing channel.

AGRO-ECONOMIC FEATURES

CHAPTER IV

AGRO-ECONOMIC FEATURES OF THE DISTRICT AND THE MANDALS

The nature of farming in a locality depends largely on location of the farm, rainfall, soil type, climate and irrigation facilities. Thus, it is desirable to have a general view on the agro-climatic features of the area under study, so as to have comprehensive knowledge of the area. This chapter deals with the overall description of the study area.

4.1 THE DISTRICT IN BRIEF

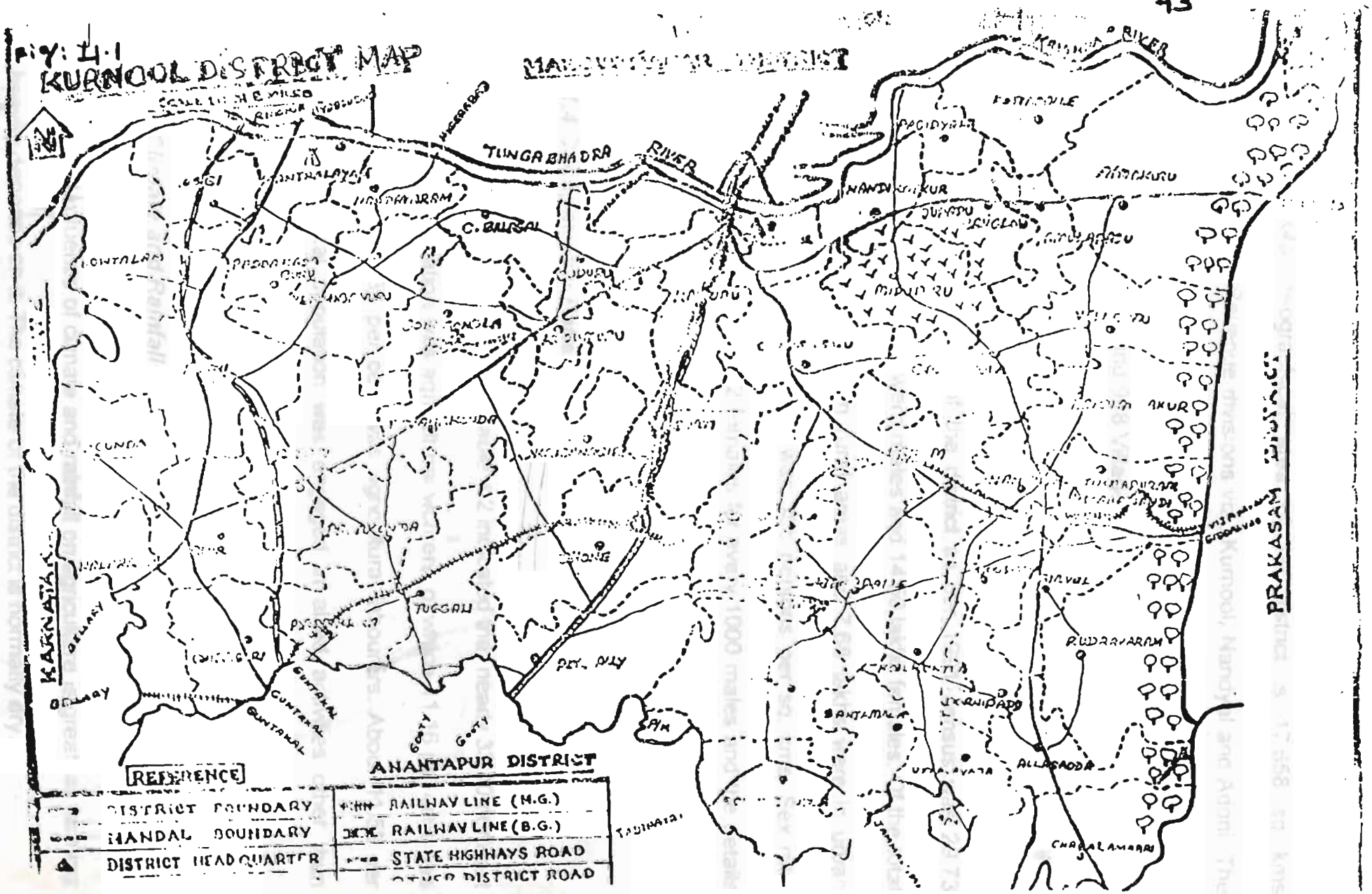
.1.1 Location

The study was undertaken in Kurnool district of Andhra Pradesh. The district is situated between the Northern latitudes of $14^0$54' and $16^0$11' and Eastern longitudes of $76^0$58' and $78^0$25'. The altitude of the district varies from 1000ft, above the mean sea level.

The district is bound on the North by Tungabhadra and Krishna rivers as well as Mohaboob Nagar district, on the South by Cuddapah and Anantapur districts, on the West by Karnataka state and on East by Prakasam district.

Fig: 4.1

KURNOOL DISTRICT MAP



4.1.2 Area

The total geographical area of the district is 17,658 sq kms administered by 3 Revenue divisions viz., Kurnool, Nandyal and Adoni. The district is comprising of 54 Revenue mandals, 53 Mandal praja parishads, 821 Grama panchayats and 918 Villages.

4.1.3 Demographic Features

The total population of the district as per 1991 census was 29.73 lakhs, of which 15.22 lakhs were males and 14.50 lakhs females. Of the total population, 22.04 lakhs live in rural areas and 7.68 lakhs were in urban areas. The density of population was 168 persons per sq. kms. Sex ratio indicating that there were 952 females for every 1000 males and the details are presented in Table 4.1.

4.1.4 Occupational Pattern

The details presented in Table 4.2 indicated that nearly 33.50 per cent of the total population was agricultural workers, of which 11.16 per cent was cultivators and 22.34 per cent was agricultural labourers. About 11.58 per cent of the total population was engaged in allied activities other than agriculture.

4.1.5 Climate and Rainfall

The influence of climate and rainfall on agriculture is great, as farming heavily depends on it. The climate of the district is normally dry.

Table 4.1 Demographic features of Kurnool district (1991 census)

S.No.	Particulars	Number	Percentage to the total population
1.	Total population	29,73,024	100
	a) Males	15,22,618	51.21
	b) Females	14,50,406	48.78
2.	Rural population	22,04,924	74.16
3.	Urban population	7,68,100	25.83
4.	Literacy rate	9,66,974	32.52
5.	Density of population	168	
6.	Sex ratio	952	

Source : Hand book of Statistics (1991-92), Kurnool

Table 4.2 Occupational pattern in Kurnool district (1991 census)

S.No.	Particulars	Number	Percentage to the total population
1.	Total population	29,73,024	100
2.	Total main workers	13,40,980	45.10
3.	Agricultural workers	99 61 70	33.50
	a) Cultivators	3,31,821	11.16
	b) Agricultural labourers	6,64,349	22.34
4.	Household industry	31,495	1.05
5.	Other workers	3,13,315	10.53

Source : Hand book of Statistics (1991-92), Kurnool

Table 4.3 Average rainfall of Kurnool district (1992-93)

(in mm)

S.No.	Particulars	Normal	Actual
1.	South-West monsoon		
	a. June	74.1	52
	b. July	115.5	128
	c. August	117.5	169
	d. September	141.1	55
	Total	448.2	404
2.	North-East monsoon		
	a. October	82.7	50
	b. November	24.3	72
	c. December	5.1	-
	Total	112.1	122
3.	Winter period		
	a. January	1.4	-
	b. February	2.9	-
	Total	4.3	-
4.	Summer period		
	a. March	5.4	9
	b. April	17.9	11
	c. May	42.4	28
	Total	65.4	48
	District Average	630.00	574.00

Source : Chief Planning Office, Kurnool

The district receives rainfall during both South-West and North-East monsoon periods. The annual normal rainfall of the district is 630mm. The district receives about 70.38 per cent of total precipitation (574mm) from South-West monsoon which is more copious compared to North-East monsoon. The incidence of rainfall is not uniform and certain. For normal cropping, even a 5.00 per cent short fall in the annual rainfall is likely to affect the agricultural operations quite adversely. The details are presented in the table 4.3

4.1.6 Soils

The district has four types of soils viz., black soils, red soils, mixed soils (red plus black) and rocky soils. The distribution of the soils in the district is presented in Table 4.4. It is evident from the table that the black soils are predominant in the district (47.30 per cent) followed by mixed soils (29 per cent) and red soils (23 per cent), remaining 0.7 per cent are rocky soils.

Table 4.4 Area under different soils

S.No	Types of soils	Percentage to the total area
1.	Black soils	47.30
2.	Red soils	23.00
3.	Mixed soils	29.00
4.	Rocky soils	0.7

Source : Andhra Pradesh Darshini 1987

4.1.7 Land Utilisation

The area of land and its quality, the intensity of its use for plants and animals and the degree to which it is modified by man to increase production are all essential in the consideration of land utilisation. The land utilisation in Kurnool district during the period 1993-1994 is presented in Table 4.5.

It is perceptible from the particulars furnished in the table 4.5, that the barren and uncultivable land was 5.65 per cent of total geographical area in the district. Nearly one-fourth of the total area is occupied by forests (18.08 per cent), which considered to be a healthy phenomenon. Cultivable waste, fallow lands and current fallows put together accounting for 19.24 per cent of the total geographical area, which could be easily be brought under cultivation with proper planning and development. Net area sown constitutes 50.95 per cent of the geographical area. Area under miscellaneous tree crops and permanent pastures constitute nearly 0.4 per cent.

4.1.8 Irrigation Facilities

The main sources of irrigation in the district are canals and wells. There are tanks, tube wells and other minor irrigation sources in addition to the main sources. The gross irrigated area of the district was 4.74 lakh acres, of which 54.62 per cent of area was irrigated through canals. Dug wells covered 25.17 per cent of the gross irrigated area followed by tanks (8.[illegible] per cent), tube wells (7.02 per cent) and other minor sources (4.83 percent). The details are given in the table 4.6.

Table 4.5 Land utilisation pattern of Kurnool district (1993-94)

S.No	Particulars	Area in ('000acres)	Percentage to total geographical area
1.	Total geographical area	4,349	100
2.	Forests	786	18.08
3.	Barren and uncultivable land	245	5.65
4.	Land put to non-agricultural uses	249	5.73
5.	Cultivable waste	201	4.63
6.	Permanent pastures and other grazing lands	10	0.23
7.	Current fallows	287	6.61
8.	Land under miscellaneous tree crops	5	0.12
9.	Other fallow lands	348	8.00
10.	Net area sown	2216	50.95

Source: Hand Book of Statistics (1992-93), Kurnool

Table 4.6 Sources of irrigation in Kurnool district (1993-94)

S.No.	Source of irrigation	Area in acres	Percentage to gross area irrigated
1.	Canals	2,59,440	54.62
2.	Tanks	39,560	8.32
3.	Wells	1,19,580	25.17
4.	Tube wells	33,380	7.02
5.	Other sources	22,960	4.83
6.	Net area irrigated	3,87,150	81.51
7.	Area irrigated more than once	87,770	18.48
8.	Gross area irrigated	4,74,920	100

Source : Hand Book of statistics(1993-94) Kurnool

Table 4.7 Area under principal crops in the district (1993-94)

S.No	Particulars	Area in acres	Percentage to the gross cropped area
1.	Rice	1,91,470	7.70
2.	Jowar	3,45,010	13.87
3.	Bajra	42,870	1.72
4.	Korra	1,03,690	4.17
5.	Sunflower	3,94,800	15.88
6.	Red gram	55,060	2.21
7.	Cotton	2,02,511	8.14
8.	Ground nut	8,34,620	33.57
9.	Tobacco	61,080	2.45
10	Chillies	13,050	0.52
11.	Fruits and Vegetables	64,840	2.60
12.	Other crops	1,77,070	7.12
	Gross cropped area	24,86,120	100

Source : Hand Book of Statistics (1993-94) Kurnool

4.1.9 Cropping Pattern

The cropping pattern, usually is determined by many factors, the more important of which are climate, soil, topography and distance from market. It is evident from the details furnished in Table 4.7. Ground nut accounted for 33.57 per cent of gross land, indicating groundnut is the major crop in Kurnool district. Next to groundnut, sunflower and jowar occupy 15.88 and 13.87 per cent of gross land respectively. Paddy and cotton are of subsequent importance. Fruits and vegetables occupy comparatively less area which is accounted only 2.60 per cent of gross cropped area.

4.2 SELECTED MANDALS IN BRIEF

4.2.1 Introduction

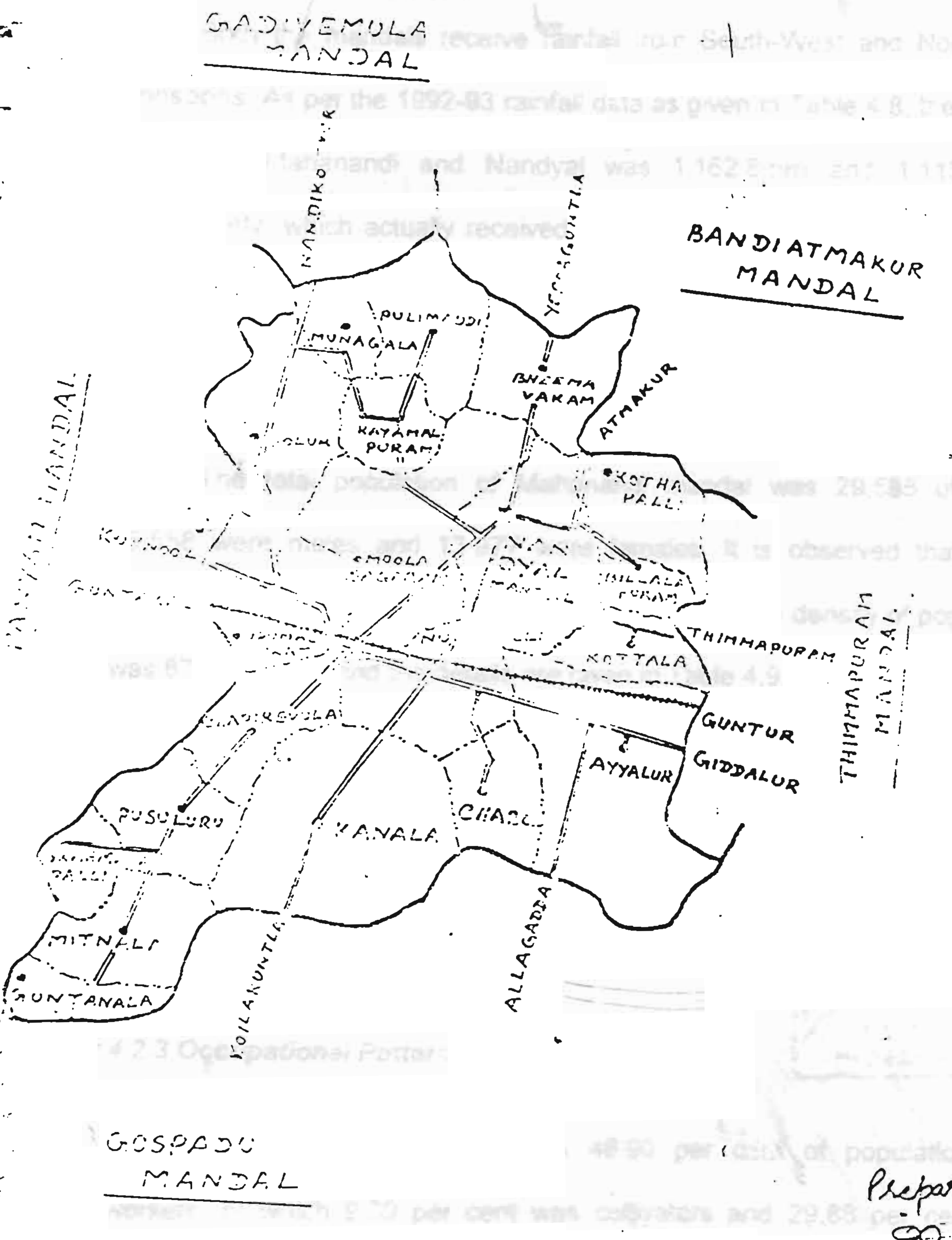
Mahanandi and Nandyal mandals are the important mandals having more area under banana crop.

Mahanandi mandal is bounded on the North by Bandi Atmakur mandal, on the South by Ongole district, on the East by Nandyal mandal and on the West by Giddalur mandal, having 64,159 acres of geographicall area with 9 revenue villages.

Nandyal mandal is bounded on the North by Gadivemula mandal on the South by Gospadu mandal, on the East by Panyam mandal and on the West by Mahanandi mandal. It consists of 19 revenue villages with geographical area of 53,713 acres.

Fig 4.2 **MAHANANDI MANDAL**

Fig 4.3 NANDYAL MANDAL MAP



Both the mandals receive rainfall from South-West and North-East monsoons. As per the 1992-93 rainfall data as given in Table 4.8, the annual rainfall in Mahanandi and Nandyal was 1,162.8mm and 1,115.10mm respectively, which actually received was higher rainfall than normal in the year 1992-93.

4.4.2 Demographic Features

The total population of Mahanandi mandal was 29,535 of which 15,558 were males and 13,977 were females. It is observed that entire population were living in rural areas (100 per cent). The density of population was 87 per sq.km and the details are given in Table 4.9.

Nandyal mandal has a total population of 1.68 lakh of which 51.11 per cent was male population and 48.88 per cent was female population. The density of population per sq.km was 385 and 70.02 per cent of total population live in the urban areas.

4.2.3 Occupational Pattern

In Mahanandi mandal nearly 48.90 per cent of population was workers, of which 9.69 per cent was cultivators and 29.88 per cent was agricultural labourers.

With respect to Nandyal mandal, 19.42 per cent of population was workers, of which 3.03 per cent was cultivators and 8.99 per cent was agricultural labourers. Details are given in the table 4.10.

Table 4.8 Average rainfall of the mandals (1992-93)

(in mm)

S.No	Particulars	Mahanandi		Nandyal	
		Normal	Actual	Normal	Actual
1	South-West monsoon				
	a. June	97.6	79.2	97.6	76.8
	b. July	145.00	370.00	145.00	360.50
	c. August	140.90	110.6	140.90	102.40
	d. September	168.20	250.00	168.2	258.46
	Total	551.70	809.00	551.70	798.16
2.	North-East monsoon				
	a. October	87.5	18.00	87.5	8.00
	b. November	27.5	60.00	27.5	63.00
	c. December	4.80	-	4.80	-
	Total	119.80	78.00	119.00	71.80
3.	Winter Period				
	a. January	2.10	-	2.10	-
	b. February	4.30	-	4.30	-
	Total	6.40	-	6.40	-
4.	Summer period				
	a. March	5.40	5.00	5.40	4.00
	b. April	19.80	2.00	19.80	2.40
	c. May	47.20	268.00	47.20	239.40
	Total	72.40	275.0	72.40	245.80
	Mandal Average	750.3	1,162.8	750.3	1,114.96

Source : Chief Planning Office, Kurnool

Table 4.9 Demographic features of the mandals (1991 census)

S.No	Particulars	Mahanandi		Nandyal	
		Number	Percentage to the total population	Number	Percentage to the total population
1.	Total population	29,535	100	1,68,925	100
	a. Males	15,558	52.67	86,339	51.11
	b. Females	13,977	47.32	82,586	48.88
2.	Rural population	29,535	100	49,112	29.07
3.	Urban population	-	-	1,19,813	70.92
4.	Density of population	87	-	385	-
5.	Sex ratio	898.38	-	956.46	-

Source : Hand Book of Statistics (1991-92), Kurnool

Table 4.10 Occupational pattern in the mandals (1991 Census)

S.No	Particulars	Mahanandi		Nandyal	
		Number	Percentage to the total population	Number	Percentage to the total population
1.	Total population	29,555	100	1,68,925	100
2.	Total main workers	14,453	48.90	32,822	19.42
3.	Agricultural workers	11,697	39.57	20,324	12.03
	a) Cultivators	2,865	9.69	5,134	3.03
	b) Agricultural labourers	8,832	29.88	15,190	8.99
4.	House hold industry	803	2.71	253	0.14
5.	Other workers	2,324	7.86	4,706	2.78

Source : Hand Book of Statistics(1991-92), Kurnool

4.2.4 Land Utilisation

From the details given in Table 4.11. it is evident that of total geographical area 27.76 was net sown area in Mahanandi mandal. The net sown area is 78.65 per cent of total geographical area in Nandyal mandal. Cultivable waste, fallow lands and current fallows together accounted for 8.38 per cent and 11.26 per cent in Mahanandi and Nandyal mandals respectively. Land put to non-agricultural uses constitutes 1.41 and 10.09 per cent in Mahanandi and Nandyal mandals. In Mahanandi mandal nearly 62 per cent of geographical area was occupied by the forests.

4.2.5 Irrigation

It is observed from the table 4.12, that the wells formed the major source of irrigation in Mahanandi mandal, covering about 87.36 per cent of gross area irrigated followed by tanks (7.85 per cent), canals (2.71 per cent) and other sources of irrigation (2.10 per cent).

In Nandyal mandal canals are the major source of irrigation, irrigating 82.37 per cent of gross area irrigated.

4.2.6 Cropping Pattern

It is evident from the table 4.13, groundnut an important oil seed crop occupied the highest portion of the total area under crop, followed by paddy and cotton in Mahanandi mandal. In Nandyal mandal paddy occupied major portion of the total area (27.78 per cent) followed by cotton (24.03 per cent) and tobacco (12.50 per cent).

Table 4.11 Land utilisation pattern of the mandals (1993-94)

S.No	Particulars	Mahanandi		Nandyal	
		Area in acres	Percentage to the total geographical area	Area in acres	Percentage to the total geographical area
1.	Total geographical area	64,159	100	53,713	100
2.	Forests	39,630	61.77	-	-
3.	Barren and un cultivable land	106	0.17	-	-
4.	Land put to non - Agricultural use	907	1.41	5,424	10.09
5.	Cultivable waste	2,127	3.32	3,070	5.72
6.	Permanent pastures and other grazing lands	284	0.44	-	-
7.	Current fallows	2,031	3.16	1,477	2.75
8.	Land under miscellaneous tree crops	45	0.07	-	-
9.	Other fallow lands	1,221	1.90	1,498	2.79
10.	Net area sown	17,808	27.76	42,244	78.65

Source: Hand Book of Statistics (1993-94), Kurnool

Table 4.12 Source of irrigation in the mandals (1993-94)

S.No	Particulars	Mahanandi		Nandyal	
		Area irrigated in acres	Percentage to total irrigated area	Area irrigated in acres	Percentage to total irrigated area
1.	Canals	320	2.71	16,750	82.37
2.	Tanks	924	7.83	-	-
3.	Wells	10,302	87.34	2,752	13.53
4.	Tube wells	-	-	479	2.35
5.	Other sources	248	2.10	354	1.74
6.	Net area irrigated	9,332	79.12	18,409	90.52
7.	Area irrigated more than once	2,460	20.85	1,526	7.50
8.	Gross area irrigated	11,794	100	20,335	100

Source : Hand Book of Statistics (1993-94), Kurnool

Table 4.13 Area under principal crops in the mandals (1993-94)

S.No	Particulars	Mahanandi		Nandyal	
		Area in acres	Percentage to the total area	Area in acres	Percentage to the total area
1.	Rice	4,427	21.87	12,351	27.78
2.	Jowar	906	4.47	5,518	12.41
3.	Bajra	2,080	10.26	162	0.36
4.	Korra	385	1.86	211	0.47
5.	Sunflower	36	0.17	1,276	2.87
6.	Red gram	444	2.19	1,120	2.51
7.	Cotton	2,780	13.71	10,686	24.03
8.	Ground nut	5,162	25.46	2,685	6.03
9.	Tobacco	-	-	5,559	12.50
10.	Chillies	87	0.42	407	0.91
11.	Banana	1,862	9.18	561	1.26
12.	Other fruits and vegetables	992	4.89	1,632	3.67
13.	Other crops	1,107	5.46	2,288	5:14
	Total	20,268	100	44,456	100

Source : Hand Book of Statistics (1993-94), Kurnool.

The area under banana cultivation was 1,862 acres (9.18 per cent) in Mahanandi mandal and 561 acres (1.26 per cent) in Nandyal mandal.

RESULTS AND DISCUSSION

RESULTS AND DISCUSSION

CHAPTER V

RESULTS AND DISCUSSION

The present study embodies the results of a field investigation concerning the economics of production and marketing of banana in Kurnool district of Andhra Pradesh. The important findings of the study are presented and discussed under the following heads in accordance with the objectives of the study.

5.1 Socio-economic profile of sample farmers

5.2 Costs and returns from banana production.

5.3 Resource productivity and allocative efficiency.

5.4 Break-even analysis

5.5 Marketing aspects of banana.

5.6 Opinion survey.

5.1 SOCIO-ECONOMIC PROFILE OF SAMPLE FARMERS

The socio-economic profile shows the social and financial status of farm families. In this section, average family size, average farm size and pattern of assets are discussed.

5.1.1 Average Family Size

The family composition of selected banana growers according to size groups is presented in Table 5.1. The particulars of farm family workers are also furnished in the same table. The average family size was 6.73 and 7.44 in case of small and large groups while the same was 7.08 for pooled farms. This indicates that the average size of family was positively related to the size of holding. The composition of family in respect of male and children was larger in case of large farmers compared to small farmers. However, the number of females exhibited the opposite trend.

Further it is observed from the table that with increase in the size of the holding, family members participation in agriculture decreased. This means that the participation of members of well-to-do families in agriculture was relatively less. Their participation rate ranged from 33.87 per cent (large) to 59.28 per cent of family size (small).

5.1.2 Average Farm Size

Farm size is one of the crucial factors that affects the magnitude and efficiency of production and income for the farm families. Historically, net farm income has been highly correlated with farm size. Farm size is measured in physical units of land in acres or hectares.

It is seen from the table 5.2 that the average farm size was 0.70 hectares of irrigated land on small farms as against 5.25 hectares on large farms. The same on pooled farms was 2.97 hectares. Banana which was

Table 5.1 Family composition and family labour contribution on selected farms

S.No	Particulars	Small	large	Pooled
1.	Family composition			
	a. Male	2.12	2.55	2.33
		(31.5)	(34.27)	(32.90)
	b. Female	2.47	2.07	2.27
		(36.7)	(27.81)	(32.06)
	c. Children	2.14	2.82	2.48
		(31.79)	(37.90)	(35.02)
	Total	6.73	7.44	7.08
		(100)	(100)	(100)
2.	Farm family worker			
	a. Male	2.00	1.70	1.85
		(50.12)	(67.46)	(56.92)
	b. Female	1.07	0.55	0.81
		(26.81)	(21.82)	(24.92)
	c. Children	0.92	0.27	0.59
		(23.05)	(10.71)	(18.15)
	Total	3.99	2.52	3.25
		(100)	(100)	(100)

Note : Figures in parentheses indicate percentage to the total

Table 5.2 Average size of land holding of sample farms (area in hectares)

S.No	Particulars	Small	Large	Pooled
1.	Net cropped area	0.70	5.25	2.97
		(100)	(100)	(100)
2.	Area under banana crop	0.47	2.63	1.55
		(67.17)	(50.09)	(52.18)

Figures in parentheses indicate percentage to the cropped area

selected enterprise for economic analysis occupied 0.47 ha (67.17 per cent), 2.63 ha (50.09 per cent) and 1.55 ha (52.18 per cent) on small, large and pooled farms respectively. The area under banana showed direct relationship with farm size. On the contrary, the percentage of area under banana was minimum on large farms and maximum on small farms.

5.1.3 Pattern of Farm Assets

The economic background in terms of technology followed by the farmers largely depends on the composition and value of assets owned by him. The particulars of farm assets per hectare according to size groups are presented in Table 5.3. Farm investment on fixed assets per farm and per hectare for different size farms was worked out and the same is presented in the table. A perusual of the results show that the investment on capital assets for productive purpose increased with the farm size. The average value of farm assets per farm was Rs.1,65,581.92, Rs.14,68,954 and Rs.8,17,267.96 on small, large and pooled categories respectively. As regards magnitude and pattern of value of assets excluding land, the value of machinery and implements occupied first place on small and large farms claiming 62.15 and 57.64 per cent of value total assets excluding land respectively. Next, in order was value of wells which contributed 31.12 and 38.86 per cent respectively in the same order. This suggested that farmers gave high priority to working assets and for the development of irrigation sources that aid in increasing productivity.

Realising that per farm value of assets may not give a very clear and comparable picture, an attempt is made to present the same on per hectare basis. The per hectare value of assets ranged from Rs.2,79,481.34 on large farms to Rs.2,36,140.94 on small farms with an average of Rs.2,74,389.10 on pooled farms. This clearly showed positive relationship between land holding and asset value.

Further, it was observed that land, the basic resource which supports the production of all agricultural commodities was the single most valuable asset on the sample farms. Proportionate value of land was marginally higher on large farms (92.59 per cent) as compared to small farms (90.58 per cent). Lands of large farmers might be having better accessibility and more physical amenities and hence their values were higher. The share of land value in total value of farm assets of pooled farms was more or less same to that of large farms. An assessment of value of assets excluding land was made. It is evident from the table, that the value of assets other than land showed negative relationship with land holding. Small farmers had invested more on non land assets (wells, farm buildings, machinery and implements and livestock) per hectare when compared to large farmers. The value of farm assets (excluding land) on the sample farms varied from Rs.22,221.94 on small to Rs.20,705.69 on large farms where the same was Rs.20,884.82 on pooled farms.

Table 5.3 Asset structure of sample farms

(in rupees)

S.No	Particulars	Small farms		Large farms		Pooled farms	
		Per farm	Per hectare	Per farm	Per hectare	Per farm	Per hectare
1	Value of land	1,50,000 (90.58)	2,13,919.00 (90.58)	13,60,125 (92.59)	2,58,775.68 (92.59)	7,55,062.5 (92.38)	2,53,504.28 (92.38)
2	Value of wells	4,849.90 (2.92)	6,916.71 (2.92)	42,299.97 (2.87)	8,047.94 (2.87)	23,575 (2.88)	7,915.05 (2.88)
3	Value of farm buildings	5 25.00 (0.31)	748.72 (0.31)	937.5 (0.06)	178.36 (0.06)	731.25 (0.08)	245.5 (0.08)
4	Value of implements and machinery	9,684.900 (5.84)	13,811.90 (5.84)	62,729.04 (4.27)	11,934.75 (4.27)	36,206.97 (4.43)	12,156.10 (4.43)
5	Value of livesock	522.12 (0.31)	744.6 (0.31)	2,862.47 (0.19)	544.61 (0.19)	1,692.29 (0.20)	568.17 (0.20)
6	Value of total assets						
	a. with out land value	15,581.92 (9.38)	22,221.94 (9.38)	1,08,828.98 (7.40)	20,705.69 (7.40)	62,205.45 (7.61)	20,884.82 (7.61)
	b. with land value	1,65,581.92 (100)	2,36,140.94 (100)	1,68,954 (100)	2,79,481.34 (100)	8,17,267.95 (100)	2,74,389.1 (100)

Note: Figures in parentheses indicate percentage to the total value of assets including land value

Table 5.3 Asset structure of sample farms

(in rupees)

S.No	Particulars	Small farms		Large farms		Pooled farms	
		Per farm	Per hectare	Per farm	Per hectare	Per farm	Per hectare
1	Value of land	1,50,000 (90.58)	2,13,919.00 (90.58)	13,60,125 (92.59)	2,58,775.68 (92.59)	7,55,062.5 (92.38)	2,53,504.28 (92.38)
2	Value of wells	4,849.90 (2.92)	6,916.71 (2.92)	42,299.97 (2.87)	8,047.94 (2.87)	23,575 (2.88)	7,915.05 (2.88)
3	Value of farm buildings	5 25·00 (0.31)	748.72 (0.31)	937.5 (0.06)	178.36 (0.06)	731.25 (0.08)	245.5 (0.08)
4	Value of implements and machinery	9,684.900 (5.84)	13,811.90 (5.84)	62,729.04 (4.27)	11,934.75 (4.27)	36,206.97 (4.43)	12,156.10 (4.43)
5	Value of livesock	522.12 (0.31)	744.6 (0.31)	2,862.47 (0.19)	544.61 (0.19)	1,692.29 (0.20)	568.17 (0.20)
6	Value of total assets						
	a. with out land value	15,581.92 (9.38)	22,221.94 (9.38)	1,08,828.98 (7.40)	20,705.69 (7.40)	62,205.45 (7.61)	20,884.82 (7.61)
	b. with land value	1,65,581.92 (100)	2,36,140.94 (100)	14,68,954 (100)	2,79,481.34 (100)	8,17,267.95 (100)	2,74,389.1 (100)

Note: Figures in parentheses indicate percentage to the total value of assets including land value

5.2 COSTS AND RETURNS FROM BANANA PRODUCTION

5.2.1 Human Labour Utilisation

Human labour is one of the important factors of production and the major cost component influencing the cultivation of any crop. Successful completion of every farm operation requires some amount of human labour. Keeping this in view, an attempt has been made to examine the magnitude of labour use in banana cultivation. A close perusal of Table 5.4 shows that on an average 328.23 mandays per hectare were used in banana cultivation on pooled farms. It is interesting to note that labour days used has inverse relationship with the size of holding as it was 392.44 mandays on small farms and only 316.62 mandays on large farms.

It is noted, that major labour absorbing operations were weeding and earthing up, application of manures and fertilizers, watch and ward and irrigation as more than 68 per cent (ranging from 68.17 on small farms to 68.45 per cent on large farms) of the total labour was used in these operations. It is further revealed that maximum labour, absorbtion was in weeding and earthing up (29.58 per cent) followed by application of manures and fertilizers (15.56 per cent), watch and ward (12.48 per cent) and irrigation (10.75 per cent) on pooled farms. More or less same trend persisted in both the size groups with reference to labour absorption.

A close examination of the results (Table 5.4) revealed that family labour use was maximum (153.09 mandays) on small farms and minimum (26.37 mandays) on large farms indicating negative relationship with the size

Table 5.4 Human labour utilisation - operation wise (in mandays per hectare)

S.No	Particulars	Small farms			Large farms			Pooled farms		
		F.L	H.L	Total	F.L	H.L	Total	F.L	H.L	Total
1	Preparatory cultivation	3.25	7.2	10.45 (2.66)	2.9	3.07	5.97 (1.88)	2.95	3.69	6.64 (2.02)
2	Digging, ridges and furrows and formation of irrigation channels	4.14	23.4	27.54 (7.01)	0.53	20.04	20.57 (6.49)	1.07	20.55	21.62 (6.58)
3	Planting	3.92	17.19	21.12 (5.37)	0.46	16.09	16.55 (5.22)	0.98	16.25	17.23 (5.24)
4	Manuring and fertilizer application	14.89	45.9	60.79 (15.47)	0.98	48.39	49.37 (15.59)	3.09	48.01	51.1 (15.56)
5	Desuckering	17.19	16.08	33.27 (8.47)	0.93	28.83	29.76 (9.39)	3.39	26.89	30.28 (9.22)
6	Weeding and earthing - up	22.94	90.65	113.6 (28.92)	0.93	93.24	94.17 (29.74)	4.27	92.84	97.11 (29.58)
7	Propping	3.18	4.72	7.91 (2.01)	0.59	4.69	5.29 (1.67)	0.98	4.69	5.88 (1.79)
8	Irrigation	44.21	4.24	48.46 (12.33)	0.36	32.6	32.96 (10.41)	7.02	28.29	35.41 (10.75)
9	Plant protection	-	-	-	-	1.3	1.3 (0.41)	-	1.1	1.1 (0.33)
10	Watch and ward	33.75	11.25	45 (11.45)	18.4	21.86	40.26 (12.71)	20.73	20.24	40.97 (12.48)
11	Harvesting	5.62	18.68	24.3 (6.18)	0.29	20.13	20.42	1.09	19.9	20.99 (6.39)
	Total	153.09 (39.00)	239.31 (59.39)	392.44 (100)	26.37 (8.07)	290.24 (89.36)	316.62 (100)	45.57 (13.88)	282.45 (86.05)	328.23 (100)

Note : Figures in parantheses indicate percentage to total
F.L : Family Labour
H.L : Hired Labour

of holding. The involvement of family labour on pooled farms was to the extent of 45.57 mandays accounting for 13.88 per cent of the total labour use. It shows that small farms used more owned labour and large farms engaged more of hired labour.

It is evident from the above analysis that banana is labour intensive enterprise. The labour requirement was maximum on small farms and minimum on large farms and thus revealing negative relationship with the size of the farm. This means small farms were more labour intensive than large farms. All the labour absorbing operations were negatively related with the size of holdings in absolute terms. Out of all operations weeding and earthing-up, manuring and fertilizer application occupies first and second places on small and large farms. It was further observed that with increase in the size of holding, family labour use declined indicating inverse relationship. This finding was in confirmity with the findings of Verma (1981), Thomas and Gupta (1987) and Latha and Radha Krishna (1988). However, the contribution of family labour in the cultivation of banana was less than that of the hired labour on both the size groups.

5.2.2 Bullock and Tractor Services

Bullocks and Tractors were employed for operations like ploughing, levelling and transportation of inputs and output. The particulars of bullock and tractor services utilised in banana cultivation are presented in Tables 5.5 and 5.6.

It is discernible from the data furnished in the table 5.5 that the cattle labour utilisation in growing an hectare of banana was 8.30, 6.61 and 6.85 on small, large and pooled farms respectively. As was observed in the human labour utilisation, bullock labour use too had shown an inverse relationship with farm size. Maximum bullock labour use was for preparatory cultivation followed by transportation on all the size groups. It is interesting to note that the entire bullock labour was hired on small farms. it is clear that small farmers were not maintaining workstocks on their farms. This might be due to the fact that the small holdings may not provide sufficient work for bullocks and there fore the maintenance of bullocks becomes uneconomical. Further, it was found that more than 70 per cent of cattle labour requirement of large farms was owned labour indicating that large farms were maintaining livestock on their farms.

The results presented in Table 5.6 shows that the machinery use was maximum at 2.21 hours per hectare on large farms followed by 2.07 hours on pooled farms and 1.43 was on small farms. Unlike in the case of human labour and bullock labour, machinery use showed positive relationship with the size of holding, indicating mechanisation on large farms. As observed in bullock labour use, preparatory cultivation required more than 65 per cent of total machinery use on all the size groups and increased from 0.95 hours on small farms to 1.92 hours on large farms. The other important operation was transportation which required 0.48, 0.29 and 0.31 hours on small, large and pooled farms. It is interesting to note that machinery use for transportation exhibited negative relationship with the size of farm.

Table 5.5 Cattle power utilisation - operation wise

(in cattle pair days per hectare)

S.No	Particulars	Small farms			Large farms			Pooled farms		
		Owned	Hired	Total	Owned	Hired	Total	Owned	Hired	Pooled
1.	Preparatory cultivation	-	5.94 (71.51)	5.94	2.53	1.52	4.05 (61.17)	2.14	2.19	4.33 (62.77)
2.	Transportation	-	2.36 (28.49)	2.36	2.19	0.37	2.56 (38.67)	1.85	0.67	2.52 (36.78)
	Total	-	8.30 (100)	8.30 (100)	4.72 (71.40)	1.89 (28.59)	6.61 (100)	3.99 (58.24)	2.86 (41.75)	6.85 (100)

Note : Figures in parentheses indicate percentage to the total.

Table 5.6 Tractor power utilisation-operation wise

(in hours per hectare)

S.No	Particulars	Small farms			Large farms			Pooled farms		
		Owned	Hired	Total	Owned	Hired	Total	Owned	Hired	Pooled
1.	Preparatory cultivation	-	0.95 (66.43)	0.95	0.37	1.55	1.92 (86.87)	0.31	1.45	1.76 (85.02)
2.	Transportation	-	0.48 (33.56)	0.48	0.29	-	0.29 (13.12)	0.24	0.07	0.31 (14.97)
	Total	-	1.43 (100)	1.43 (100)	0.66 (29.86)	1.55 (70.13)	2.21 (100)	0.55 (26.57)	1.57 (73.42)	2.07 (100)

Note : Figures in parentheses indicate percentage to the total.

5.2.3 Material Inputs

It is evident from the table 5.7 that small, large and pooled farms used 2,296, 2,602.18 and 2,555 suckers per hectare respectively. In case of use of FYM as against recommended dose of 15 tonnes per hectare, the average quantities of FYM used by small and large farmers was 11.63 and 10.93 tones, which were less than the recommended level.

The small farms on an average applied 267Kg, 46Kg, 120Kg of N,P,K and 8Kg of Ca and 42 Kg of SO_4 per hectare respectively. Whereas large farms used 224Kg, 62Kg, 120Kg of N,P,K and 28Kg and 36.5Kg of Ca and So_4 respectively. The respondents as a whole used 230.53Kg, 59.56Kg and 120Kg of N,P,K and 25 and 37.33Kg of Ca and SO_4 per hectare respectively. The recommended dose of N,P,K and SO_4 are in the order of 180Kg, 68Kg 178Kg, and 80Kgs respectively.

It is also observed from the table that the small farmers were not using any plant protection chemicals. However, large farmers used 3Kg of plant protection chemicals per hectare.

Table 5.7 Material inputs used in banana production (per hectare)

S.No	Particular	Small Farms	Large Farms	Pooled farms
1.	FYM in tonnes	11.63	10.93	11.03
2.	Fertilizers in Kgs			
	a) N	267.00	224.00	230.53
	b) P	46.00	62.00	59.56
	c) K	120.00	120.00	120.00
	d) Ca	8.00	28.00	25.00
	e) So_4	42.00	36.50	37.33
3.	Suckers in No.	22 96.97	2,602.18	2,555.82
4.	Plant protection chemicals in kgs	-	3.00	2.54

5.2.4 Cost of Cultivation of Banana

Generally in any economic investigation total costs are discussed under different cost components. This type of discussion is quite useful and easily understandable to all sections. Hence, an attempt has been made to discuss the total costs under two heads such as variable costs and fixed costs, the widely accepted norm. In general variable costs alone are reckoned to be the cost of cultivation by the farming community and the profit and loss too are worked out accordingly, ignoring the fixed costs in accounting. But in any business enterprise the fixed costs are also taken into account to arrive at total costs and thereby to work out the farm returns.

The break-up of costs are also helpful to the farmers and other entrepreneurs to have an in depth understanding. Under variable costs were included labour expenses for different operations of banana cultivation and expenses incurred on material inputs viz., suckers, manures and fertilizers, plant protection chemicals, propping material, electricity charges and interest on working capital. The fixed costs were rent on land, depreciation charges, land revenue and interest on fixed capital. The particulars of cost of cultivation of banana according to size are presented in Table 5.8.

On an average, the total cost of cultivation of banana per hectare was estimated at Rs.46,125.76 on pooled farms. The cost of cultivation decreased with the increase in the farm size from Rs.48,586.65 on small farms to Rs.45,705.41 on large farms. On all categories of sample farms, it was observed that operational costs accounted for a major part of the total costs. The total variable costs ranged from Rs.35,343.07 on small farms to

Rs.32,674.75 on large farms, with an overall average of Rs.33,062.77 for the sample as a whole. The operational costs accounted for 72.74, 71.48 and 71.67 per cent of total costs on small, large and pooled farms respectively.

Among the operational costs, the share of human labour cost was higher than that of other input costs accounting for 35.00, 32.41 and 32.83 per cent of the total costs on small, large and pooled size groups respectively. Expenditure on manures and fertilizers was the next important item of cost on all categories of farms. It ranged from Rs.10,573.50 (21.76 per cent) on small farms to Rs.10,085.17 (22.06 per cent) on large farms. The overall average was Rs.10,159.33 (22.01 per cent). The other items of expenditure in the order of importance were suckers (5.54 per cent) interest on working capital (5.50 per cent), propping material (3.09 per cent) for the overall size group. More or less similar trend was noticed on both the size groups. The study further revealed that bullock labour and machinery use contributed the least towards the total operational cost on all the sample farms.

The results also revealed that the fixed costs amounted to Rs.13,243.58, Rs.13,030.66 and Rs.13,062.99 accounting for 27.25, 28.51 and 28.32 per cent for the size groups small, large and pooled farms respectively. Further, it was found that rental value of land was high at Rs.9,808.87 (21.46 per cent) on large farms as against Rs.9,670.19 (19.90 per cent) on small farms. It was Rs.9,787.80 (21.21 percent) for pooled farms. The other major item of fixed costs was interest on fixed capital accounting for more than 4 per cent on all categories of farms.

Table 5.8 Cost of cultivaiton of banana according to farm size and componen t-wise (Rupees per hectare)

S.No	Particulars	Small farms	Large farms	Pooled farms
1	Operational costs			
	a) Human labour	17,007.16	14,814.33	15,147.36
		(35.00)	(32.41)	(32.83)
	i) Family labour	6,589.57	1,546.20	2,312.33
		(13.56)	(3.38)	(5.01)
	ii) Hired labour	10,417.59	13,268.08	12,835.03
		(21.44)	(29.02)	(27.82)
	b) Bullock labour	415	331.23	343.67
		(0.85)	(0.72)	(0.74)
	c) Tractor power	214.5	331.5	275.07
		(0.44)	(0.72)	(0.59)
	d) Suckers	2,296.97	2,602.18	2,558.80
		(4.72)	(5.69)	(5.54)
	e) Manures and fertilizers	10,573.50	10,085.17	10,159.33
		(21.76)	(22.06)	(22.01)
	i) Manures	4,654.98	4,375.00	4,417.52
		(9.58)	(9.57)	(9.57)
	ii) Fertilizers	5,918.52	5,710.17	5,741.81
		(12.18)	(12.49)	(12.44)
	f) Propping material	1,725.05	1,374.90	1,428.08
		(3.55)	(3.00)	(3.09)
	g) Electricity/Irrigation Charges	736.46	472.77	512.54
		(1.51)	(1.03)	(1.11)
	h) Plant protection chemicals	-	120.15	101.9
			(0.26)	(0.22)
	I) Interest on working capital	2,374.07	2,542.53	2,539.02
		(4.88)	(5.56)	(5.50)
	Total operational costs	35,343.07	32,674.75	33,062.77
		(72.74)	(71.48)	(71.67)
2	Fixed costs			
	a) Land revenue	39.5	41.82	41.46
		(0.08)	(0.09)	(0.08)
	b) Rental value of land	9,670.19	9,808.87	9,787.80
		(19.90)	(21.46)	(21.21)
	c) Depreciation	1,087.38	962.52	981.48
		(2.23)	(2.10)	(2.12)
	d) Interest on fixed capital	2,446.51	2,217.45	2,252.24
		(5.03)	(4.85)	(4.88)
	Total fixed costs	13,243.58	13,030.66	13,062.99
		(27.25)	(28.51)	(28.32)
	Total costs	48,586.65	45,705.41	46,125.76
		(100)	(100)	(100)

Note : Figures in parantheses indicate percentage to total cost.

The overall analysis of cost structure of banana enterprise revealed that the small farms had incurred higher costs than large farms. This was mainly because of intensive use of labour for major operations on small farms and economies of large scale production enjoyed by the large farms. Besides human labour, the cost of other inputs viz., manures and fertilizers, suckers and propping materials were also more on small farms. Large farms because of large sized holdings, kept labour to the required levels, thus reducing the total costs. Among the operational costs, human labour followed by manures and fertilizers accounted for more than 54 per cent of the total costs. The operational and fixed costs were in the ratio of 72:28 . Banana is both labour and capital intensive enterprise. These findings were in confirmity with the results of Naidu *et al.* (1986), Rao *et al.* (1986), Arputharaj and Kesavan (1988) and Basha (1989).

5.2.5 Output and Returns from Banana Production

The details of physical output and returns per hectare of banana for different size groups are presented in Table 5.9 . The returns from banana production include the income from fruit bunches and suckers. On an average, the yield of banana fruit bunches was 2,070.00, 2,047.00 and 2,050.49 on small, large and pooled farms respectively. The respondents on an average realsied gross returns of Rs.98,571.05 per hectare. The gross returns were marginally higher on small farms (Rs.99,280.13) as compared to Rs.98,444.08 in the case of large farms. It was also found that the income from fruit bunches alone accounted for 99.03, 98.76 and 98.81 per cent of the total returns on small, large and pooled categories respectively.

It is clear from the preceding discussion that the small farms obtained higher gross returns than large farms due to higher productivity which is consistent with the fact that productivity is inversely related with farm size.

Table 5.9 Output and returns per hectare of banana

S.No	Particulars	Units	Small farms	Large farms	Pooled farms
1.	Yield in physical units				
	a) Fruit bunches	Number	2,070.00	2,047.00	2,050.49
	b) Suckers	Number	600.00	911.85	864.48
2.	Yield in monetary units				
	a) Fruit bunches	Rs.	98,352.00	97,232.50	97,398.43
	b) Suckers	Rs.	928.13	1,211.58	1,172.62
3.	Gross returns per ha	Rs.	99,280.13	98,444.08	98,571.05

5.2.6 Costs and Returns per bunch of Banana

The contents of Table 5.10 revealed that the cost of production has inverse relationship with the size of holding as it was Rs.23.47 on small farms and only Rs.22.32 on large farms. The same was Rs.22.49 for pooled farms. The net returns per bunch of banana were higher by Rs.1.15 on large farms when compared to small farms, exhibiting a positive relationship with the farm size.

Table 5.10 Cost and returns per bunch of banana

S.No	Particulars	Small farms	Large farms	(Rupees per bunch) Pooled farms
1.	Cost			
	a)Variable cost	17.07	15.96	16.12
	b) Fixed costs	6.40	6.36	6.37
	c)Total	23.47	22.32	22.49
2.	Returns			
	a) Gross income	47.50	47.50	47.50
	b) Net income	24.03	25.18	25.01

5.2.7 Cost of Cultivation According to Cost Concepts

The cultivation of banana is also dealt by adopting the cost concepts used in farm management studies undertaken in our country. Cost A_1, cost A_2, cost B and cost C were adopted in the present study. The concept of cost C is the most comprehensive one. It includes all costs, both fixed and variable and hence provides a basis for comparison between different types of operational holdings. The cost worked out on the basis of cost A_1 is the variable costs incurred in cash or kind by an owner farmers which excludes the imputed value of family labour. Under cost B besides the costs considered under cost A_1, indirect costs such as interest on fixed capital and rental value of owned land are included.

Cost C is computed by adding the imputed value of family labour to cost B. The information on cost of cultivation according to cost concepts per hectare of banana is presented in Table 5.11.

It is clear from the particulars furnished in the table that there was no leasing activity among the sample farmers and hence cost A_1 and cost A_2 remained the same.

It is also noticed that commercial cost of cultivation (cost C) was higher at Rs.48,586.65 on small farms compared to large farms (Rs.45,705.41) indicating an inverse relationship with the farm size. However cost A_1/A_2 (Rs.32,090.75) and cost B (Rs.44,158.89) were found to be higher on large farms than on small farms (Rs.29,840.83 and Rs.41,997.03) reflecting proportionate association with the size of holdings. This might be due to the fact that large farmers employed more of hired labour whereas small farmers used more of their own labour. For the sample as a whole cost A_1/A_2, cost B and cost C worked out to be Rs.31,731.92, Rs.43,813.43 and Rs.46,125.76 respectively.

5.2.8 Measures of Farm Income

Costs and returns are two elements of any business enterprise. Cost represents the value of the inputs used in the production process where as returns present the value of the output achieved. The relative magnitude of the costs and returns from the enterprise indicates the success of the farm business are the gains to the farm operation.

An important element in the farm business management relates the manner in which available resources are allocated. A measuring stick is necessary to provide guidelines and standards for appraising use of various resources. To achieve this objective various farm efficiency measures viz., gross income, net income, farm business income, family labour income and farm investment income were computed. In addition, benefit-cost ratio was also worked out and presented in Table 5.12.

Table 5.11 Cost concepts -banana production

(Rupees per hectare)

S.No	Particulars	Small farms	Large farms	Pooled farms
1.	Cost A_1/A_2	29,840.83	32,090.75	31.731.92
2.	Cost B	41,997.03	44,158.89	43,813.43
3.	Cost C	48,586.65	45,705.41	46,125.76

Table 5.12 Measures of farm income-banana production

(Rupees per hectare)

S.No	Particulars	Small farms	Large farms	Polled farms
1.	Gross income	99,280.13	98,444.08	98,571.05
2.	Net income	50,693.48	52,738.67	52,445.29
3.	Farm business income	69,439.30	66,353.33	66,839.13
4.	Family labour income	57,283.10	54,285.19	54,757.62
5.	Farm investment income	62,849.68	64,806.81	64,526.80
6.	Benefit-cost ratio	1.04	1.15	1.13

5.2.8.1 Gross income. It is observed from the data presented in the table that on an average, the selected banana cultivators realised gross income of Rs.98,571.05 per hectare. Size wise analysis revealed that gross income decreased with the size of holding. This ranged from Rs.99,280.13 on small farms to Rs.98,444.08 on large farms. The probable reason for this trend might be higher productivity on small farms.

5.2.8.2 Net income. Although gross income is a good measure to guage the productivity and efficiency of the farm, but it alone does not tell the success of farm business. Hence net income was worked out to make the comparison among different farms. Higher the net income, more success is the business and vice versa. On an average, the net income was Rs.52,445.29 for the sample as a whole. It was observed that the large farms obtained more net income (Rs.52,738.67) than small farms (Rs.50,693.48) and thereby indicating direct relationship with farm size.

5.2.8.3 Farm business income. It was found that the small farms realised a farm business income of Rs.69,439.30 followed by large farmers with Rs.66,353.33 establishing an inverse relationship with the farm size. The same on pooled farms was Rs.66,839.13.

5.2.8.4 Family labour income. It is also evident from the results of Table 5.12 that the family labour income received by small and large farms was Rs.57,283.10 and Rs.54,285.19 respectively establishing an indirect relationship with the farm size.

5.2.8.5 Farm investment income. It was of the order of Rs.62,849.68, Rs.64,806.81 and Rs.64,526.80 on small, large and pooled farms respectively exhibiting positive relationship with the size of holding.

5.2.8.6 Benefit-cost ratio. This measure indicates the returns for every rupee of investment. Benefit-cost ratio was computed by dividing the net returns with cost C. It is observed from the analysis that benefit-cost ratio has positive relationship with farm size. The benefit-cost ratio ranged between 1.04 on small to 1.15 on large farms.

From the foregoing analysis it is clear that small farms obtained higher gross income than large farms. However, the net income on small farms was lower than the large farms on account of higher cost of production. The farm business income and family labour income were less on large farms due to more employment of hired workers on their farms. Benefit-cost ratio clearly reflected higher profitability of banana enterprise.

5.3 RESOURCE PRODUCTIVITY AND ALLOCATIVE EFFICIENCY

5.3.1 Resource Productivity

Farmers have limited resources and their objective is to maximise farm returns from the resources available with them. Hence, in order to operate the farm business at economic optimum level, they make some adjustments in the allocation of their resources. The question that arises is whether the farmers belonging to different size groups respond equally to

economic opportunities and make rational use of resources. How does the resource use efficiency behave with the size of farms particularly in the banana growing area of Kurnool district? with this in mind, the present study was carried out to examine the input-output relationship and resource use efficiency on different sizes of farms. The multiple linear production function which gave the best fit was selected to establish the input-output relationship. With yield per farm as dependent variable and five inputs viz., land (X_1), human labour (X_2), manures (X_3), fertilizers (X_4), and suckers (X_5) as independent variables. The regression coefficients of different inputs used in the production function were estimated separately for each size group of sample farms and results are presented in Table 5.13.

The results for small farms revealed that out of the five independent variables included in the model, land (X_1) and manures (X_3) were positively significant at one per cent level. On the other hand, the coefficients of variables like fetrilizers (X_4) and suckers (X_5) were positively related but found non-significant, while human labour had negative coefficient and non significant. The regression coefficients of the production function indicate the response of output due to unit change in input. For example, one unit (ha) increase in the land and manures (tonne) would result in an increase of 1434.0491 and 45.8236 bunches of banana. The adjusted coefficient of multiple determination (R^{-2}) for banana small farms was 0.9264. This indicated that the variables included in the function expressed about 92.64 per cent of variation in the production of banana.

Table 5.13 Regression coefficients of the input factors in banana

S.No	Particulars	Small farms	Large farms	Pooled farms
1.	No. of farmers	40	40	40
2.	Intercept (a)	68.68460	83.6166	243.2141
3.	Land in hectares (X_1)	1434.0491** (254.6836)	1873.1740** (209.2539)	2828.0006** (779.7572)
4.	Human labour in mandays (X_2)	-0.5569^{NS} (0.5970)	-0.0445^{NS} (0.1095)	0.0007^{NS} (0.9770)
5.	Manures in tonnes (X_3)	45.8236** (13.0810)	1.3434^{NS} (1.5609)	-32.0749^{NS} (37.4572)
6.	Fertilizers in Kgs. (X_4)	0.1610^{NS} (0.1632)	0.2097* (0.1158)	-0.1057^{NS} (0.3968)
7.	Suckers in No. (X_5)	0.3266^{NS} (0.0895)	-0.0702^{NS} (0.0849)	-0.3097^{NS} (0.2792)
8.	Adjusted coefficient of multiple determination (R^{-2})	0.9264	0.9853	0.8561

Note : Figures in parentheses indicate standard error
NS : Non-Significant
** : Significant at 0.01 level of probability
* : Significant at 0.10 level of probability

In case of large farms, the regression coefficients of land (X_1) and fertilizers (X_4) were positively significant at one per cent and 10 per cent levels respectively. The results mean that one unit increase in land (X_1) and fertilizers (X_4) above their respective mean level would result in an increase of 1873.1740 and 0.2097 bunches in the yield of banana, when all other variables kept constant. It was further observed that the regression coefficient of manures (X_3) was positively non-significant, while the same in case of human labour and suckers were negatively non-significant and indicated that the change in the level of these inputs did not affect the yield.

The adjusted coefficient of multiple determination (R^{-2}) was 0.9853. This would indicate good fit of multiple linear production function for the data and explained about 98.53 per cent of variation in the yield of banana.

On combined farms, the production coefficient of land (X_1) alone turned out to be positive and significant at one per cent level indicating that one unit increase in the land over its mean level would result in an increase of 2828.0006 bunches of banana. The other variables viz., manures (X_3), fertilizers (X_4) and suckers (X_5) were negatively related but found non-significant, while human labour (X_2) was positively related and non-significant. The adjusted coefficient of multiple determination (R^{-2}) was 0.8561 indicating that variables included in the function expressed 85.61 per cent of variation in the production of banana.

5.3.2 Allocative Efficiency

To examine the economic efficiency of resource use, the marginal value product of each input was compared with its acquisition cost. MVP/MFC ratios indicate potentiality of factors for further use. Its higher value (greater than unity) shows greater potentiality for further use. Its value less than one indicates less profitability for use. The negative ratio indicates over use of the input and suggests reduction in the present level of input use. The resource is said to be allocated efficiently if the MVP=MFC. The ratio of MVP to their acquisition cost per unit were calculated only for the significant factors for each size farm and are presented in Table 5.14.

It is seen from the table that the ratios of marginal value products of land and manures to their acquisition costs were considerably higher than unity on small farms. This indicates that there was under utilisation of these resources by the small farms in the production of banana. It is found from the results that every additional rupee investment on land and manures would add Rs.7.01 and Rs.5.44 to the returns of banana farms respectively.

On large farms, the ratios of MVP to MFC in case of land and fertilizers were 9.03 and 1.89 respectively indicating returns of Rs.9.03, and Rs.1.89 respectively for every additional rupee spent on these factors. Hence, there was scope for using additional units of these resources to increase the gross income.

On pooled farms, the ratio of MVP to MFC was greater than unity for land (13.66) which indicate that the area under banana crop could be increased in order to get high returns.

Table 5.14 Comparison of marginal value products with their factor costs in banana

S.No	Particulars	Small farms			Large farms			Pooled farms		
		MVP	MFC	MVP/ MFC	MVP	MFC	MVP/ MFC	MVP	MFC	MVP/ MFC
1.	Land (X_1)	68,117.33	9,709.69	7.01	88,975.76	9,850.69	9.03	1,34,330.03	9,829.27	13.66
2.	Human Labour (X_2)	NS	-	-	NS	-	-	NS	-	-
3.	Manures(X_3)	2,176.22	400	5.44	NS	-	-	NS	-	-
4.	Fertilizers(X_4)	NS	-	-	9.96	5.26	1.89	NS	-	-
5.	Suckers(X_5)	NS	-	-	NS	-	-	NS	-	-

Note : MVP - Marginal value product (Rs.)
MFC - Marginal factor cost (Rs.)
NS - Non-significant

5.4 BREAK-EVEN ANALYSIS

It is an important tool to study the profitability and prospects of the enterprise. In fact, this technique was used to locate the point of break-even output, which is the minimum output that has to be produced in order to continue the production process without loss. The results of the break-even analysis (Table 5.15) revealed that the break-even output of both the size groups were quite lower than the actual average yields obtained and thus indicating that the growers of banana were operating in the profit zone. the break-even output for small, large and pooled farms was 435.21, 413.14 and 419.08 bunches respectively. The percentage of break-even output to average yield ranged between 21.89 on small farms to 20.18 on large farms. The same for the sample as a whole was 20.43 per cent.

From the above analysis it is clear that banana cultivation was highly profitable in the study area. Thus, there is greater scope to increase the area under banana since all the selected farmers were operating in the profit zone.

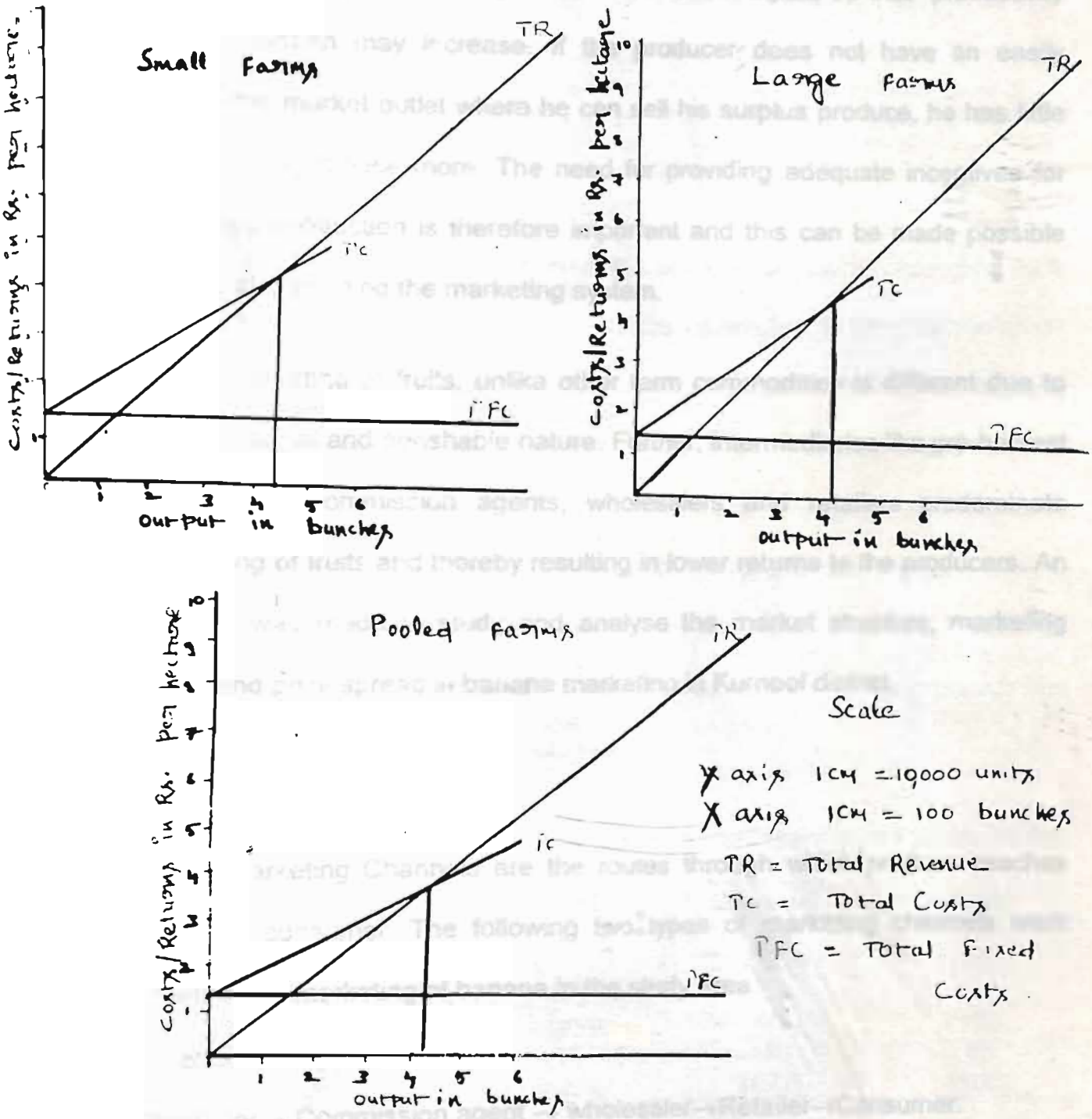
5.5 MARKETING ASPECTS OF BANANA

Agricultural marketing plays an important role not only in stimulating production and consumption, but also in accelerating the pace of economic development. Its dynamic functions are of primary importance in promoting economic development. An efficient marketing system ensures higher levels of income for the farmers by reducing the number of middlemen or by restricting the commission on marketing services and the malpractice

Table 5.15 Break-even analysis

S.No	Particulars	Small farms	Large farms	Pooled farms
1.	Average yield in bunches/ha	2,070	2,047	2,050.48
2.	Total revenue excluding suckers Rs.	98,325	97,232.50	97,398.43
3.	Price per bunch Rs.	47.50	47.50	47.29
4.	Fixed cost per hectare Rs.	13,243.58	13,030.66	13,062.99
5.	Variable cost per hectare Rs.	35,343.07	32,674.75	33,062.77
6.	Total cost per hectare Rs.	48,586.65	45,705.41	46,125.76
7.	Variable cost per bunch Rs.	17.07	15.96	16.12
8.	Break-even output in bunches	435.21	413.14	419.08
9.	Percentage of Break-even output to average yield	21.89	20.18	20.43

Fig 5.1 BREAK-EVEN ANALYSIS OF BANANA



adopted by them in marketing of farm products. An efficient system guarantees the farmers better prices for farm products and induces them to invest their surpluses in the purchase of modern inputs so that productivity and production may increase. If the producer does not have an easily accessible market outlet where he can sell his surplus produce, he has little incentive to produce more. The need for providing adequate incentives for increased production is therefore important and this can be made possible only by streamlining the marketing system.

Marketing of fruits, unlike other farm commodities is different due to their seasonal and perishable nature. Further, intermediaries like pre-harvest contractors, commission agents, wholesalers and retailers predominate marketing of fruits and thereby resulting in lower returns to the producers. An attempt was made to study and analyse the market structure, marketing costs and price spread in banana marketing in Kurnool district.

5.5.1 Marketing Channels

Marketing Channels are the routes through which produce reaches the final consumer. The following two types of marketing channels were identified in marketing of banana in the study area.

Channel I

Producer→ Commission agent → wholesaler→Retailer→Consumer.

Channel II

Producer→Pre-harvest contractor→commission agent→wholesaler→ Retailer→Consumer.

Between the two marketing channels, the most commonly used channel for marketing of banana in the study area was channel II, that is producer to pre-harvest contractor. This is evident from the fact that as high as 87.5 per cent of farmers sold their produce through this channel (Table 5.16). The proportion of small and large farmers who had used this channel was 100 and 75 respectively.

Channel I, that is producer to commission agent was followed by 12.5 per cent of the total selected farmers. It is interesting to note that no small farmer had preffered direct sales. In this channel of marketing, the farmers attempt to sell the produce by taking it to the nearby urban market eliminating the pre-harvest contractors in the trade. The commission agent in the urban market making contracts with the producers and pre-harvest contractors, receives the harvested bunches from them and sells to wholesalers by auction. Different costs involved in the marketing through this route were borne by the producers only.

Table 5.16 Marketing channels adopted by different sized farms in the sale of banana.

S.No	Size groups	Channel I	Channel II	Total
1.	Small	0	40	40
			(100)	(100)
2.	Large	10	30	400
		(25)	(75)	(100)
3.	Total	10	70	80
		(12.5)	(87.5)	(100)

Note: Figures in parentheses indicate percentage to the total.

5.5.2 Marketing Costs

The marketing cost is sum total of all costs incurred in the movement of the produce and includes such costs as transportation, loading and

unloading, packing, commission, market fee and quantity loss in the process of sales. The costs incurred by producer-seller and intermediaries in handling banana were worked out and presented in Table 5.17.

Table 5.17 shows that the producers on an average incurred a total cost of Rs.6.49 per bunch of 125 bananas towards selling. Among the costs incurred by producer-seller, commission and transportation charges were found to be the major components. These two cost components alone accounted for 79.50 per cent of total costs. The other cost components of minor importance were loading and unloading (9.54 per cent), spoilage (8.01 per cent) and market fee (2.15 per cent). Any reform contemplated for reducing costs at this stage had, therefore to consider the scope of reduction in transport expenses. These costs were incurred in Channel I.

A close perusal of table reveals that, these marketing costs borne by the pre-harvest contractors amounted to Rs.9.88 which include Rs.4.36 towards commission to broker, Rs.2.76 for transportation, Rs.1.30 for loading and unloading and Rs.1.16 towards spoilage. These items of costs put together accounted for 97.75 per cent of total costs. Other cost components of minor importance were packing, octroi, market fee and other expenses.

Table (5.17) portrays that the commission agents on an average incurred a total of cost of Rs.1.63 per bunch of banana. As regards marketing charges on different items, smoking/processing accounted for higher expenses (61.34 per cent) followed by grading (22.69 per cent), maintenance cost (12.26 per cent) and miscellaneous charges (3.68 per cent).

e 5.17 Marketing cost of banana met by functionaries

(Rupees per bunch)

o	Particulars	Producer	Pre-harvest contractor	Commission agent	Wholesaler	Retailer
	Loading and unloading	0.62	1.3	-	-	-
		(9.54)	(13.96)			
	Packing	-	0.06	-	-	-
			(0.60)			
3	Transportaion	0.8	2.76	-	0.4	0.6
		(12.32)	(27.93)		(21.62)	(10.77)
4	Comission	4.36	4.36	-	-	-
		(67.18)	(44.12)			
5	Octroi	-	0.05	-	-	-
			(0.50)			
6	Market fee	0.14	0.14	-	-	-
		(2.15)	(1.41)			
7	Maintenance cost	-	-	0.2	0.3	0.99
				(12.26)	(16.21)	(17.77)
8	Grading	-	-	0.37	0.44	0.1
				(22.69)	(23.78)	(1.79)
9	Smoking/processing	-	-	1	-	-
				(61.34)		
10	Spoilage	0.52	1.16	-	0.65	3.82
		(8.01)	(11.74)		(35.13)	(68.58)
11	Miscellaneous	0.05	0.05	0.06	0.06	0.06
		(0.77)	(0.50)	(3.68)	(3.24)	(1.07)
12	Total costs	6.49	9.88	1.63	1.85	5.57
		(100)	(100)	(100)	(100)	(100)

Note: Figures in parantheses indicate percentage to the total costs

It is noticed from table that loss due to spoilage, cost of grading, cost of transportation and cost of maintenance formed the major items of costs incurred by the wholesaler accounting for 35.13, 23.78, 21.62, 16.21 per cent of total marketing costs respectively. The expenses on these items listed above amounted to Rs.0.65, Rs.0.44, Rs.0.40 and Rs.0.30 respectively.

The results presented in table indicated that the marketing costs incurred by retailer were Rs.5.57. Spoilage constituted the biggest item of total marketing costs amounting to Rs.3.82 per bunch or 68.58 per cent of total marketing costs. Next in order of importance was the maintenance cost (rent and electricity charges) amounting to Rs.0.99 and formed nearly 18 per cent of the total cost of marketing. This was followed by cost of transportation forming more than 10 per cent of total marketing costs.

From the above discussion, it is clear that the pre-harvest contractor had to borne highest marketing costs followed by producer-seller due to high commission and transportation charges. Next important intermediary was retailer who incurred maximum costs due to spoilage.

5.5.3 Marketing Costs, Margin and Price Spread

Marketing functionaries move the commodities from the producers to consumers. Every service or function involve cost. The intermediaries or middlemen make some profit to remain in the trade after meeting the cost of function performed.

In the marketing of farm commodities, the difference between the price paid by consumer and the price received by the producer for an equivalent quantity of farm produce is known as price-spread. The magnitude of the marketing margin relative to the price of the product indicates the efficiency or otherwise of the marketing system. Studies on marketing margins and costs are important, for they reveal the cost incurred by each agency in different channels and the share of each agency in the total cost. This knowledge ultimately helps us to identify the reasons for high marketing costs and the possible ways of reducing them.

Marketing of banana was done in bunches (on an average each bunch consists of 125 fruits) at all levels of trading, till it reaches the consumer. Hence marketing costs margin and price spread were computed per bunch. Marketing costs and margins of two most common channels in operation in the study area were worked out separately to asess the share of different functionaries involved and ultimately the producer's share in consumer's rupee and are shown in the table 5.18.

Channel I

In this channel, the producers bring their produce to the local market and sell to the wholesaler through commission agent, and thus eliminating pre-harvest contracts in the trade. Different costs involved in the marketing process are borne by producers only. The commission agent in the market making contractors with the producers and or pre-harvest contractors, receives the harvested bunches from them and sells to wholesalers by auction. In this channel, only three intermediaries i.e., commission agent,

wholesaler and retailer were involved between the producers and consumers. The wholesaler sells his produce to the retailers.

It can be observed from Table 5.18, that the producer's share in the consumer's rupee was 59.45 per cent. The producer-seller incurred Rs.6.49 towards marketing costs per bunch. He received a net price of Rs.53.51 per bunch.

The commission agent secured a margin of Rs.2.73, incurring a marketing cost of Rs.1.63. The marketing costs and margin of wholesaler were Rs.1.85 and Rs.6.15 respectively and the corresponding figures for the retailer were Rs.5.57 and Rs.16.43 respectively.

Channel II

Pre-harvest contractors play a crucial role in a banana marketing in the study area. These traders enter into contract with producers to buy banana in the field itself at negotiated prices before harvesting of bunches and sell them in the urban markets through commission agents. In this channel four middle men viz., pre-harvest contractor, commission agent, wholesaler, and retailer were involved between producer and consumer.

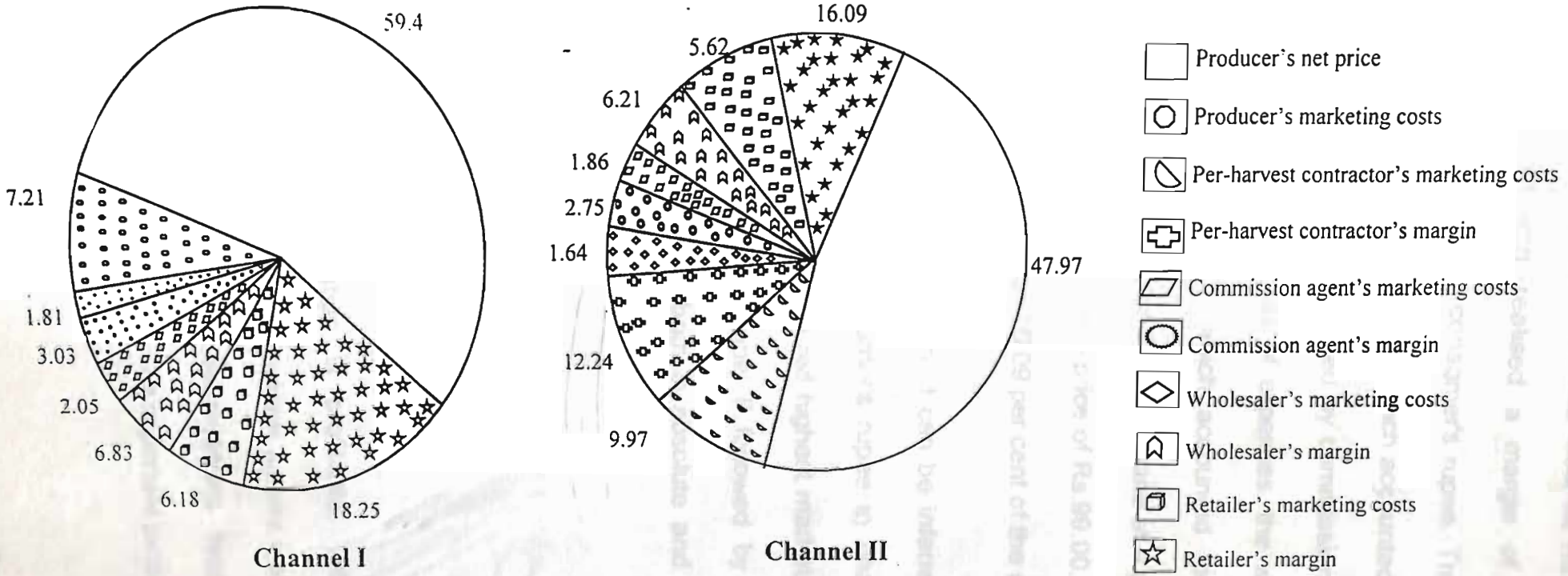
The analysis of marketing costs and margins (Table 5.18) reveals that the producer realised a net price of Rs.47.5 per bunch of banana which accounted for 47.97 per cent of price paid by the consumer. The producer had not incurred any marketing cost as he did not involve directly in the marketing of produce. Therefore, the purchase price of the pre-harvest contractor was the net price received by the

Table 5.18 Price spread in banana marketing

S.No	Particulars	Channel I (P-C.A-W.S-R-C)	Channel II (P-P.H.C-C.A-W.S-C.A-R-C)
1.	Producer (P)		
	a. Marketing costs	6.49	
		(7.21)	
	b. Net price received	53.51	47.5
		(59.45)	(47.97)
2.	Pre-harvest contractor (P.H.C)		
	a. Purchase price	-	47.5
	b. Marketing costs	-	9.88
			(997)
	c. Sale price	-	69.5
	d. Margin	-	12.12
			(12.24)
3.	Commission agent (C.A)		
	a. Commission	4.36	4.36
	b. Marketing costs	1.63	1.63
		(1.81)	(1.64)
	c. Margin	2.73	2.73
		(3.03)	(2.75)
4.	Wholesaler (W.S)		
	a. Purchase price	60	69.5
	b. Marketing costs	1.85	1.85
		(2.05)	(1.86)
	c. Sale price	68	77.5
	d. Margin	6.15	6.15
		(6.83)	(6.21)
5.	Retailer (R)		
	a. Purchase price	68	77.5
	b. Marketing costs	5.57	5.57
		(6.18)	(5.62)
	c. Sale price (or) consumers price	90	99
	d. Margin	16.43	15.93
		(18.25)	(16.09)

Note : Figures in parentheses indicate percentage share of functionaries in consumer's price.
C: Consumer

Fig.5.2 Price Spread in Banana Marketing



producer-seller. Pre-harvest contractor had incurred Rs.9.88 (9.97 per cent) towards marketing cost and realised a margin of Rs.12.12 which is accounted for 12.24 per cent of consumer's rupee. The commission agent incurred Rs.1.63 as the marketing cost which accounted for 1.64 per cent of consumer's rupee. The margin realised by commission agent was Rs.2.73 (2.75 per cent). After deducting all of expenses, the wholesaler realised a margin to the tune of Rs.6.15 which accounted for 6.21 per cent of consumer's rupee. The retailer purchased banana at a price of Rs.77.50 per bunch and sold to the consumer for a price of Rs.99.00. The retailer made a margin of Rs.15.93 accounting for 16.09 per cent of the consumers rupee.

From the preceding discussion, it can be inferred that the producer was getting higher share of consumer's rupee in channel I than that of channel II. The producer-seller incurred highest marketing cost in channel I and pre-harvest contractor in channel II followed by the retailer. It was observed that the profit margin both in absolute and relative terms was maximum in case of the retailer.

5.6 OPINION SURVEY

Though banana cultivation is profitable, yet its production is associated with many problems. An opinion survey was carried out for the sample of 80 farmers regarding the problems faced by them in the production and marketing of banana. The important problems as indicated by

Table 5.19 Opinion survey

S.No	Particulars	Percentages
1.	Production front	
	a) Shortage of labour	40.00
	b) Lack of good availability of suckers in required quantity	15.00
	c) Power cuts	75.00
	d) Lack of latest technical know-how	35.00
	e) Inadequate credit facilities	52.00
	f) High cost of inputs and input services	85.00
2.	Marketing front	
	a) Unorganised marketing and low prices	95.00
	b) Lock of transportaiton facilities	50.00
	c) Lack of information and market news	32.00
	d) High marketing margins	44.00
	e) Price fluctuations	90.00
	f) Distressed sales	75.00

the farmers are presented in Table 5.19, and each constraint is assessed interms of the percentage to sample farmers who feel it was a limiting factor.

With regard to problems of production, a large majority (85 per cent) of the farmers felt that the cost of inputs and input services was very high. The problem of power shortage was reported by about 75 per cent growers. Inadequate credit facilities was a problem for 52 per cent of the selected farmers. About 40 per cent of the farmers indicated scarcity of labour as one of the major problem of banana production particularly at the time of harvesting. Lack of latest technical know-how was also reported by 35 per cent of cultivators. Another problem faced by the farmers was the non availability of quality suckers in sufficient number.

With respect to problem of marketing, majority of farmers (95 per cent) expressed their concern about unorganised marketing and low prices. 44 per cent of sample farmers expressed that there was high marketing margin in the marketing of banana. Lack of quick and timely transportation was reported by about half of the respondents. Wide price fluctuations was an important problem expressed by vast majority of farmers (90 per cent). About 32 per cent of cultivators did not get adequate market information. Distress sales was reported by 75 per cent of the farmers in the study area.

SUMMARY AND CONCLUSIONS

CHAPTER VI

SUMMARY AND CONCLUSIONS

Fruit crops occupy a vital position in Indian economy. Banana is one of the most important fruit crop grown in India next only to mango. Banana is cultivated over an area of 366 thousand hectares with a production of 6.73 tonnes. The production share of banana in total fruit production was 31.70 per cent. Banana fruits are available through out the year unlike seasonal availability of other fruits. Banana has plurality of uses besides providing employment through out the year unlike cereals. Banana is one of the tropical fruit with a highly organised international trade.

The present study entitled Economics of production and marketing of banana in Kurnool district of Andhra Pradesh was intended to examine the cost structure, resource use efficiency, marketing aspects and price spread in banana.

6.1 THE OBJECTIVES OF THE STUDY

1. The estimate the costs and returns of banana corp.
2. To study the resource use efficiency of banana crop.
3. To estimate the marketing costs, margins and price spread in different marketing channels of banana.
4. To identify the problems faced by producers in production and marketing of banana.

The investigation was carried out in Kurnool district of Andhra Pradesh. Two mandals with maximum area under banana cultivation were selected. Four villages from two mandals were selected and the sample farmers were stratified into two size groups i.e., small (2 hectares and less of dry land) and large (more than 2 hectare of dry land). Altogether 80 farmers were selected for the detailed study taking 40 from each size group.

The data were analysed to fulfil the objectives by using conventional, functional and break-even analysis. The major findings of the study are as follows.

6.2 MAJOR FINDINGS OF THE STUDY

The basic feature of the selected farms revealed that the average size of the family was 6.73 , 7.44, and 7.08 in small, large and pooled farms respectively indicating direct relationship with farm size. However, the number of family members working on the farm decreased with farm size.

The average size of holding was 2.97 hectares for the sample as a whole with 52.18 per cent of area under banana cultivation. Obviously, the average size of holding of large farmers was higher than that of small farmers. However, the percentage of area under banana was higher on small farms (67.17 per cent) than on large farms (50.09 per cent).

The sample farms exhibited a direct relationship between asset structure and farm size. The land value was to the extent of 92.38 per cent of total farm assets. This trend was similar on small as well as on large farms.

An inverse relationship between labour use and farm size was observed in banana production as it was 392.44 and 316.62 mandyas on small and large farms respectively. Human labour requirement was more for weeding and earthing-up, manuring and fertilizer application operations in all size groups.

Percentage utilisation of hired bullock labour to total bullock labour utilisation decreased with the increase in farm size as it was 100 and 28.59 per cent on small and large farms respectively. In case of tractor power utilisation it exhibited direct relationship with the farm size.

It was observed that on an average farmers applied organic manures in the farm of FYM amounting 11.03 tonnes and N,P,K were 230.53Kg, 59.56Kg and 120.00Kg per hectare respectively.

The average total cost of cultivation per hectare of banana worked out to Rs.46,125.76 of which operational costs and fixed costs accounted for 71.67 and 28.32 per cent respectively. Among the operational costs expenditure on human labour, manures and fertilizers and suckers constituted the major costs. However, on an average, the total costs were higher on small farms (Rs.48,586.65) than that of large farms (Rs.45,705.41).

The findings of the study indicated that on an average farmers produced 2050 .49 and 864.48 number of fruit bunches and suckers respectively. The sample farms exhibited an inverse relationship between

yield of fruit bunches and farm size. Per hectare gross returns of small farms was higher than large farms by Rs.836.05.

On an average about Rs.16.12 and Rs.6.37 of variable and fixed costs were incurred for a bunch of banana production. The per bunch cost of banana was higher on small farms (Rs.23.47) compared to large farms (Rs.22.32). Net income realised from a bunch of banana worked out to be Rs.24.03, Rs.25.18 and Rs.25.01 on small, large and pooled farms respectively.

The cost concepts on an average worked to be cost A_1/A_2 (Rs.31,732.92), cost B (Rs.43,813.43) and cost C (Rs.46,125.76). Further it was found that cost A_1/A_2, cost B showed positive relationship with the farm size and cost C showed an inverse relationship with the farm size.

Farm income measures revealed that gross income, farm business income and family labour income were higher on small farms when compared to large farms. Whereas net income and farm investment income had a direct relationship with the farm size. Large farmers registered higher benefit-cost ratio (Rs.1.15) than small farms (Rs.1.04), this implies that the large farmers were relatively more efficient than small farms.

The resource productivity revealed that regression coefficient of land, manures and fertilizers had positive impact on the yields. Human labour and suckers had not contributed significantly to the yields of banana in all size farms.

For resource adjustment, the MVPs were estimated for all those inputs, whose regression coefficients appeared significant and compared with their MFC. It is revealed that MVP to MFC ratio of manures and fertilizers was more than unity on small and large farms respectively. Similarly, the land had greater scope for further use in the production of banana in all size farms.

The break-even analysis revealed that percentage to break-even output to average yield ranged between 21.89 on small farms to 20.89 on large farms thus indicated high profitability of the banana cultivation.

With regards to marketing of banana two channels were identified. The marketing costs incurred by the producer (Rs.6.49) in channel I, pre-harvest contractor had incurred a marketing cost of (Rs.9.88) in channel II and the commission agent, wholesaler and retailer had incurred Rs.1.63, Rs.1.85 and Rs.5.57 respectively in both the channels (I and II).

The share of producer in consumer's rupee was higher in channel I (59.45 per cent) when compared to channel II (47.97 per cent).

It was observed that producers of banana were facing numerous problems with regard to production and marketing. In production, the major problems were high cost of inputs and input services, power shortage and inadequate credit facilities. In marketing the major problems faced by the farmers were unorganised marketing and low prices, wide price fluctuations, distressed sales and lack of proper transportation facilities.

6.3 CONCLUSIONS

The followings are the major conclusions of the present study

1. The total human labour utilisation was highest on small farms and lowest on large farms indicating an inverse relationship with that of farm size. Weeding and earthing-up, manuring and fertilizer application operations accounted for the major share of the total requirement.

2. The total cost of cultivation and gross returns were inversely related to farm size.

3. Net returns exhibited direct relationship with farm size.

4. Analysis of benefit-cost ratio revealed that the net returns per rupee of investment was higher in large farms when compared to small farms.

5. There are possibilities for increasing the returns through reallocation of resources at their existing mean levels. Hence there is a need to educate farmers about the optimum resource use in the production of banana.

6. The percentage of break-even output to total output on small and large farms was 21.89 and 20.18 respectively, thus indicated banana production was highly profitable to the farmers.

7. Producers realised about 59.45 and 47.97 per cent of consumer's rupee in channel I and II respectively.

6.4 POLICY IMPLICATIONS

In short, findings of the study indicated that the banana production was more profitable and economically viable and thus there is greater scope to bring more area under banana. Hence, the concerned agencies should educate the farmers on the scientific methods of cultivation. Banana cultivation is labour intensive and hence seen as a source of employment. The farmers can increase the returns through reallocation of resources at their existing level. Hence there is a need to educate the farmers about rational resource use.

There is no regulated market yard for marketing in the study area. Hence there is need for establishment of regulated market yard as it helps in minimising the number of intermediaries and provide remunerative prices to the producer. Banana fruits were easily subjected to spoilage or become unfit for consumption due to their perishable nature, Hence, the government should take initiation in providing the cold storage facilities and establishment of processing industries to avoid wastages and to reduce glut in the market during the peak harvest period. There is a need to provide crop insurance facility to the banana growers because of wind damages are more in banana crop.

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