

**PRODUCTION AND MARKETING PERFORMANCE OF
OILSEEDS IN KARNATAKA - AN ECONOMETRIC ANALYSIS**

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JANUARY, 1993

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Thesis Submitted to the
University of Agricultural Sciences, Dharwad
in partial fulfilment of the requirements for the
Degree of

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in
AGRICULTURAL ECONOMICS

By
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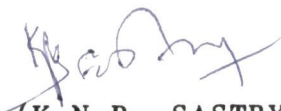
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C E R T I F I C A T E

This is to certify that thesis entitled "PRODUCTION AND MARKETING PERFORMANCE OF OILSEEDS IN KARNATAKA - AN ECONOMETRIC ANALYSIS" submitted by Mr. SHIVANAGOUDA M. MUNDINAMANI, in partial fulfilment of the requirements for the degree of DOCTOR OF PHILOSOPHY in AGRICULTURAL ECONOMICS of the University of Agricultural Sciences, Dharwad, is a record of research work done by him under my guidance and supervision, and that the thesis has not previously formed the basis of the award of any degree, diploma, associateship, fellowship or the other similar titles.

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Affectionately Dedicated
To
My Parents, Brother
Sri. Basanagouda Mundingamani
and
my mama
Prof. S. D. Kololgi

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INTRODUCTION

I INTRODUCTION

India's overall economic development, being a peasant dominant agrarian economy to a considerable extent depends upon the growth in the agricultural sector. The achievement in the agricultural sector will continue to be the crucial factor in realising our plan targets for years to come.

The agricultural situation in India has undergone a rapid change, especially in the last two and a half decades. The area under irrigation and cropping intensity have steadily increased. Consumption of fertilisers and pesticides has increased manifold. Investment in agriculture through institutional and other sources has risen. A number of policy decisions have been taken to give a high priority to agriculture. India has achieved a significant progress in agricultural production, particularly in cereals. However, of late, necessity for changes in the composition of agricultural production is being highlighted and the production of oilseeds has been identified as one of the major thrust area keeping in view dietary, economic and other associated considerations.

1.1 Importance of Oilseeds in the Indian Economy.

Indian oilseeds sector accounts for about 10 per cent of the nation's gross cropped area and 5 per cent of its gross product. Oilseeds account for about 10 per cent of the total

agricultural production in terms of value, engaging about 30 million cultivators in the production process and another five million persons in processing industries. Besides, a substantial workforce is employed in the various other intermediate sectors like marketing and transport.

Oilseeds produce edible as well as non-edible oils which have various uses. Edible oil is one of the five nutrient elements essential for our body. Non-edible oils are used in various products like paints, varnishes, lubricants, textile auxiliaries and for illumination in households. Apart from these, oilseeds cake, being highly proteinaceous, is extensively used as a cattle feed. Some oilseeds are leguminous crops which fix atmospheric nitrogen into the soil. In the face of steeply rising fertilizer prices, these crops play a crucial role in maintaining soil fertility.

India is ideally suited to grow a variety of oilseed crops like groundnut, rapeseed-mustard, sesamum, niger, safflower, sunflower, coconut, castor and linseed. The country occupies fourth place among the major oilseed producers in the world, next to USA, China and Brazil. It also enjoys the unique distinction of having a large base in oilseed sector which includes availability of a wide range of varieties of oil-yielding crops. India is the world's largest producer of

groundnut, sesamum and niger, the second largest producer of castor and safflower and the third largest producer of rapeseed-mustard, linseed and coconut. The important states producing oilseeds are Gujarat, Andhra Pradesh, Madhya Pradesh, Maharashtra, Karnataka, Uttar Pradesh, Rajasthan and Tamil Nadu. Groundnut is mainly grown in Gujarat, Andhra Pradesh, Tamil Nadu, Karnataka and Maharashtra, whereas rapeseed-mustard in Uttar Pradesh, Rajasthan and Madhya Pradesh, sesamum in Uttar Pradesh and Himachal Pradesh and linseed in Uttar Pradesh, Madhya Pradesh, Gujarat, Orissa and Karnataka are being grown. Safflower is mostly grown in Maharashtra, Karnataka and Andhra Pradesh. Sunflower production is concentrated in Karnataka, Maharashtra and Andhra Pradesh and soybean production comes from Madhya Pradesh, Uttar Pradesh and Karnataka.

The technological break-through, which ushered a new era in the Indian agriculture during the mid-sixties, has hardly contributed to the oilseeds production. The green revolution has not touched the oilseed sector. Instead, it has adversely affected the oilseeds, while it has led to substantial increase in the cereal production to the point of self sufficiency.

The growth rate of country's oilseeds production was only 2.04 per cent per annum against 5.88 per cent for wheat and

2.54 per cent for paddy during the period, 1949-50 to 1988-89. The production growth rate of oilseed production had slowed down in post-green revolution period (1967-68 to 1989-90) to less than 2.0 per cent as compared to the growth rate of more than 3.00 per cent per annum in pre-green revolution period (1949-50 to 1964-65).

1.2 Demand-Supply Gap

Oil and fats constitute an essential part of human diet and the caloric requirement cannot be resolved without their adequate supply. Efforts have been made to estimate the demand for and supply of edible oils towards the formulation of Eighth Five Year Plan.

Although the country enjoys the unique distinction of having largest cultivated area under oilseeds (22 million hectares during 1988-89) the consumption level of edible oils is not only below the world average of 66 gm/day/capita but also below the minimum prescribed by the Indian Council of Medical Research (ICMR) which is 18 gm/day/capita. The per capita net availability of edible oils has been increased from about 11 gms. per day in 1961 to about 17.8 gms. in 1989. Even at this low level of edible oil intake, the fluctuating levels of production of various oilseeds have forced the country to import a large quantity of edible oil to meet the demand which

is growing at the rate of 5 per cent per annum. The country was importing annually around one to two million tonnes of edible oil from 1980-81 to 1988-89. Only in the year 1989-90, the imports of edible oils fell to 0.29 million tonnes as a result of acute foreign exchange shortage. The import bill of edible oils increased from just Rs. 40 lakhs in 1972-73 to Rs. 1008 crores in 1984-85. Although there is a declining trend in the import of edible oils since 1984-85, the import bill during 1988-89 was as high as Rs. 727 crores (Agarwal, 1991).

Despite these large scale imports of edible oils over the decade, the per capita availability failed to increase significantly from year to year which is hovering around 6 to 7 Kgs. per annum. Also, there has been a spurt in the prices of edible oils recently which is due to the inadequate domestic production and drastic reduction in country's import of edible oils in the face of ever expanding demand. If this state of affairs is allowed to continue in the production of edible oilseeds, it will adversely affect the overall development of the country in general and its poor masses in particular. Thus, the edible oil economy of the country is characterised by an overall shortage in supply in relation to its demand.

1.3 Research Efforts

Recognising the importance of oilseeds in the Indian economy, several measures have been initiated by the government

from time to time. Significant efforts from the view-point of research are outlined below :

Research work on oilseed crops in India dates back to the period of establishment of the Imperial Agricultural Research Institute at Pusa in the year 1929, when the work was initiated by collection of varieties of major oilseed crops of the Northern India. At the same time, similar work on groundnut was initiated in the erstwhile Madras and Bombay presidencies. Overall emphasis in those days was to select varieties suited to prevailing conditions of fertility and moisture-stress. The erstwhile Government of India recognised the need for development of high yielding varieties on oilseeds and set up a Special Cess Fund in May 1947 for the research and development of oilseeds. The fund so created was placed at the disposal of the Indian Council of Oilseeds Committee, which in turn financed Oilseed research schemes of the State Agriculture Departments, Central Agricultural Research Institutes and a few traditional Universities on an ad-hoc basis.

The oilseeds research in India progressed in bits and fragments until the establishment of an All India Coordinated Research Project on Oilseeds in 1967. At the end of the Sixth Five Year Plan, this project had 70 centres spread all over the country. After a decade, the Directorate of Oilseeds Research

with Hyderabad as its headquarters was established. It works through several organisations, Agricultural Universities and State Departments of Agriculture.

1.4 Problems in Production and Marketing of Oilseeds

All the above said efforts are yet to reflect in increased productivity of oilseeds as the oilseeds sector is still confronted with many problems. Some of the important ones are as follows.

The basic problem facing the oilseed economy is that of stagnation in yield levels on the one hand and the instability in production and prices on the other (Uma Kapila, 1982). The stagnation in yield has been mainly due to lack of improved technology and want of high yielding varieties.

The yield potentials of major oilseed crops in India have been found to be far below the levels of their productivities in other countries. For example, the per-hectare yield of groundnut in India averaged to 826 kgs during 1988-89 as against the world average of 1111 kgs. The USA has achieved a yield almost 4 times higher than that of India. The average yield of rapeseed-mustard is around 712 kgs/ha in India which is much less compared to the world average of 1291 kgs, and far below the average yield of Poland (2451 Kg/ha), Canada (1253 kg/ha) and China (1223 kg/ha). Even in the case of other

oilseeds like sesamum, safflower, soybean, sunflower and linseed, productivities in India are less as compared to those in the other countries.

Another problem that hinders the spread and productivity of oilseeds is the lack of irrigation. Oilseeds are generally grown as rainfed crops and the proportion of irrigated area under these crops was as low as 19.8 per cent of the total area covered under oilseeds in 1988-89. Sen and Das (1986) noticed that the increase in the groundnut area in southern states was due to increase in irrigation. On the contrary, the spread of irrigation has found to adversely affect the area under oilseeds in some States where farmers have opted to grow high-value and low-risk crops like sugarcane, paddy and wheat with the extension of irrigation facilities which resulted in either decrease or stagnation in the area under oilseeds in these states. Besides, the inadequacy of research efforts in generating location-specific effective technology for various agro-climatic regions and inherent deficiencies in the organisational set up for promoting oilseed production have aggravated the problems in oilseed production.

Studies in the past have repeatedly established the fact that the price of the product is an important factor which can stimulate the farmers to produce more either by allocating more

area or by increasing the productivity of the crops. The lack of a strong price incentive to produce more in oilseeds sector was noticed by Chetha and Singh (1986). An efficient marketing system plays a crucial role in boosting the production. This is more so in the case of oilseed because of high marketable surplus which varies between 80 to 82 per cent in case of groundnut (Ranade, 1982) and more than 95 per cent in the case of other oilseeds. In fact, the production benefits do not sustain for a longer period if it is not supported by an appropriate and efficient marketing system. The National Commission on Agriculture (1971) also amply pointed out the inadequacies in marketing facilities for oilseeds.

Most of the times the existing marketing network is against the interest of the farmer. The farmer's share in the consumers rupee declined from 61 per cent (1962-63) to 52.67 per cent (1980-81). The present market structure of oils and oilseeds is largely controlled by the oil millers and traders (Narappanavar and Bharadwaj, 1983). Ample scope was observed for increasing the farmers' income and reducing the burden on the consumers through promotion of vertical integration of production, processing and marketing of oilseeds and their products through co-operatives (Sah and Hanumantha Rao, 1979). Suitable management practices have been advocated for the co-operatives. The need for intervention, in the form of

refinance facility by NABARD or RBI to farmers at concessional rates has also been observed. In addition, the need for extending the period of repayment of such refinance has been emphasized so that the co-operative sector can compete in the market (Ranade et.al., 1982).

To sum up, there are numerous physical, technological, economic and institutional constraints in increasing area and productivity of oilseeds (Mundinamani et.al., 1991). Lack of high yielding varieties suitable for dry land conditions, in which oilseeds are usually grown; risk of crop failure due to erratic rainfall, lack of institutional credit facilities, less remunerative prices and lack of institutional mechanism for integrating production, processing and marketing of oilseed are some of the major factors identified as responsible for stagnation of oilseeds economy (Katar Singh and Ranjana, 1982).

In order to overcome the aforesaid problems and to find a permanent solution to step-up oilseeds production in the country, the government of India have appointed the Technology Mission on Oilseeds in May 1986. Two centrally sponsored schemes viz, National Oilseeds Development Project (NODP) and Oilseeds Production Thrust Project (OPTP) are operated by Technology Mission on Oilseeds. These two schemes were merged into a single scheme, namely, Oilseeds Production Programme

(OPP) during 1990-91 with an outlay of Rs. 54 crores for achieving the best possible results in the sphere of production, marketing, processing, storage and other infrastructure required for boosting oilseeds production. The OPP continues to be implemented during 1991-92, covering all the nine major oilseeds with a total outlay of Rs. 60 crores (Anonymous, 1991).

1.5 The Present Study

Marketing of agricultural products in general and oilseeds in particular has not received as much attention as the introduction of new technology for expansion of output and yield in our country. With the gradual displacement of subsistence farming by commercial agriculture, marketing system of farm products has assumed greater importance in recent years. For the farmer, disposal of his farm produce has become as important as the adoption of new technology for improving yields in agriculture. The pattern of movement of the product from farm to the ultimate consumer plays a crucial role in determining the returns to the farmer. Unless marketing improves, incentives only to increase production will not attract the cultivator to the desired extent. Better returns, stable price and attractive terms of trade will induce the cultivators to produce more and market a major proportion of what they produce. Appropriate growth of market mechanisation

appears to be crucial in this context. Market competition and existence of adequate infrastructural facilities play an important role in improving the market structure, conduct and performance and thereby, the economic status of the cultivators. In order to increase the market efficiency and rationalise market margins and reduce the costs, an understanding of the nature and extent of market competition, marketing margins, costs and price spread is essential.

Karnataka is one of the five major States growing oilseeds in the country and accounted for 10.39 per cent of the area and 8.10 per cent of the production during 1988-89. Although all types of edible oilseed crops cultivated in the country are also grown in Karnataka, groundnut, sunflower, safflower and sesamum are the major oilseed crops in the State. These four crops together account for 93 per cent of the area and 95 per cent of the total oilseeds production in the State. Karnataka is one of the states selected under the Technology Mission on Oilseeds. Out of the 180 potential oilseed growing districts selected for the National Oilseed Development in the country, nine districts of Karnataka have been included. They are Belgaum, Bellary, Bidar, Bijapur, Chitradurga, Dharwad, Gulbarga, Raichur and Tumkur. These nine districts contribute about 85 per cent of the area and 81 per cent of the oilseeds production in the State. In the recent years, sufficient work

has been done to improve oilseeds production. Marketing aspects are yet to receive sufficient attention. Unless an appropriate and orderly marketing system is established to assure remunerative price to the farmers, efforts to increase production by itself would not meet with sustained results. Hence an in-depth study of marketing of oilseeds becomes greatly relevant and will be of practical significance.

In view of the importance of oilseeds in Karnataka, the present study was undertaken to analyse some of the above aspects in the present system of oilseeds marketing in major oilseeds growing districts of the State. The study examines the growth in area, production and productivity of oilseeds, factors influencing the supply of oilseeds and concentration of market power with a view to highlight the present status. The focus is on the oilseed growers with reference to the marketing of their produce in the selected markets. / The study would provide adequate insight into the working of the markets, including the strong and weak points, in order to provide basis for policy formulation.

Specific Objectives :

The specific objectives of the study are ;

1. To study the growth in area, production and productivity of important oilseeds in the selected districts of Karnataka.

2. To identify the price and non-price factors influencing the production of oilseeds in selected districts.
3. To assess the nature and magnitude of competition in marketing of oilseeds through the degree of sellers and buyers concentration and their size distribution.
4. To analyse the behaviour of arrivals and prices of oilseeds in the selected markets.
5. To estimate the share of the producer in the consumer's rupee in different channels of oilseeds marketing.
6. To suggest ways and means to overcome the bottlenecks in ^{production and} marketing of oilseeds.

1.6 Presentation of the Study

The entire study has been presented in six chapters. Chapter I gives an overview of the oilseed economy of India. It highlights the importance of edible oilseeds, the growth rate of edible oilseeds and the gap in supply and demand. A brief mention has been made as to how this has become a perpetual problem over the years. It also spells out the specific objectives of the study. Chapter II deals with the review of literature closely connected with the objectives of the present study. Chapter III gives the conceptual framework of the study and also explains the selection of the study area, crops, markets, collection of data and methods of analysis

employed. Chapter IV summarises the results obtained under appropriate heads consistent with the objectives of the study. In Chapter V, results have been discussed in detail. Chapter VI summarises the overall findings to indicate the policy implications to improve the production and marketing systems of oilseeds.

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REVIEW OF

LITERATURE

II REVIEW OF LITERATURE

There are a number of theoretical and empirical studies on the various aspects of production and marketing of agricultural commodities in general and oilseeds in particular. In this chapter, the most related reviews have been presented keeping in view the objectives and methodology of the present study.

The reviews have been presented under the following heads

- 2.1. Growth performance
- 2.2. Identification of price and non-price variables
- 2.3. Market structure for farm commodities
- 2.4. Pattern of arrivals and prices
- 2.5. Market integration
- 2.6. Marketing costs, margins and price spread
- 2.7. Methodology adopted.

2.1 Growth Performance

Kahlon et. al. (1968) studied growth performance of the selected crops in Punjab for the period, 1950-51 to 1965-66. They estimated crop-wise and district-wise growth rates. Their study reveals that the extension of irrigation facilities to dry districts led to changes in cropping pattern. They also found that overall increase in the growth rates for major crops was the outcome of extended area under these crops rather than from an increase in their productivities.

Pareira (1976) studied the compound growth rates of output at the district and State level in Karnataka for the period 1956 to 1973. The growth rates in the production of ragi, cotton, groundnut and tobacco were negative during the pre-green revolution period, while the remaining crops had registered positive growth in production. But, during the green revolution period, all the crops except bengalgram had positive growth in production. In the State, Shimoga, Raichur and Hassan had growth rates of more than four per cent. Tumkur, Dharwad and Kolar districts had registered growth rates of below one per cent in the total agricultural production. The productivity component was the most dominant source of growth during ^{Post}green revolution period.

Ranga Rao and Ray (1985) have examined the exponential trends in production of pulses in India during the period, 1967-68 to 1983-84. In Karnataka, pulse production had grown by 3.0 per cent per annum. While productivity had grown by 1.20 per cent, the compound growth rate of area was 1.95 per cent. During the corresponding period the growth rates of area, production and productivity, at the national level were 0.37, 0.17 and -0.24, respectively. To raise production, the authors advocated making the pulses competitive in relation to their substitute crop by providing irrigation, developing high yielding varieties and providing price incentives.

Ray and Chahal (1986) using time series data from 1967-68 to 1983-84 analysed growth rates of area, production and productivity of major oilseeds across the States. The growth in area under groundnut was highest in Orissa followed by Gujarat, Andhra Pradesh, Karnataka and Tamil Nadu, while the rest of the states experienced negative growth rates. Positive productivity growth rates were noticed for Karnataka, Gujarath and Maharashtra. Area and Production growth rates in sesamum were substantially higher in States like Orissa, Karnataka and Maharashtra. With respect to safflower, Karnataka recorded the highest growth rates in productivity as well as production whereas, Maharashtra showed the maximum growth in area in the country.

Gangawar and Rai (1988) examined the growth rates in area productivity and production of major edible oilseeds in major oilseed growing districts and at all India level for the period, 1970-71 to 1985-86. They noticed a growth of 2.56 per cent in edible oilseed production, of which the contribution of area and yield were 1.62 and 3.27 per cent respectively. Most of the States showed consistent positive growth in edible oilseeds acreage. Among individual oilseed crops, rapeseed and mustard displayed the highest growth rates in acreage, yield and production. Groundnut and sesamum exhibited a mixed trend.

Ninan (1989) examined the growth performance of groundnut at all India level for pre and post green revolution periods and identified significant increase, significant decrease and stagnant States. Karnataka was stagnant in area, production and also productivity. Further, he reported that the area had been the prime source of growth in groundnut output in most of the States as well as at all India level.

Mitra and Jena (1991) analysed the growth in area, production and yield of groundnut in Orissa for the period from 1950-51 to 1985-86 and also the two periods, 1950-53 to 1962-65 and 1967-70 to 1983-86. The growth in production during first period was 5.86 per cent and was a result of increased area and yield. The growth rate of production of groundnut was still higher (9.76%) during the second period which was mainly due to increased area. This rate was far above the groundnut output rate at the national level.

Naik and Mohanty (1991) estimated compound growth rates of area, production and yield for groundnut crop across the important groundnut producing States in the country as also the important districts with particular reference to Orissa during the period 1970-71 to 1987-88. They have reported that growth in groundnut production in Orissa across the districts was largely due to significant increase in area and a declining

trend in productivity was noticed in most of the districts. As far as Karnataka was concerned, the growth in groundnut production was largely due to significant increase in productivity levels and the growth in area under groundnut in this State was found to be declining.

Sidhu and Sidhu (1991) documented a growth rate of around one per cent for area, production and yield of groundnut at the national level over the last four decades. The growth in production of groundnut for period I (1949-50 to 1964-65) was largely a result of growth in area. They further noticed that a significant increase in oilseeds production (15.3%) with respect to Karnataka was largely because of change in area (130%) from 1965-66 to 1988-89.

Tripathi and Ballabh (1991), noticed positive growth rates in area for all the three periods under study, viz., pre-high yielding variety period (1950-51 to 1964-65), high-yielding variety period (1967-68 to 1986-87) and overall period (1950-51 to 1986-87). In Karnataka negative growth rates were documented for districts of Raichur and Bijapur for the pre-high yielding variety period and overall period. Raichur district experienced a mild positive growth rate during high-yield variety period. Dharwad district registered positive growth rates for all the three periods. However, the growth rate in

area was quite high during pre-high yielding variety period. The production growth rates in groundnut displayed mixed results across the districts of Karnataka over the three periods under consideration. The districts of Bijapur, Dharwad and Raichur experienced high and negative growth in production for pre-high yielding variety period, while for high yielding varieties period, they registered mild positive growth in production. As far as growth in productivity is concerned, most of the districts exhibited negative growth rates during pre-high yielding varieties period, whereas during high-yielding varieties period, the growth in productivity was substantial across the districts of Karnataka.

Umesh (1992) reported a marginal increase in the growth pattern of groundnut productivity and area which led to an 1.81 per cent increase in production in Karnataka after green revolution, while a negative growth rate was noticed during pre-green revolution period.

From the foregoing reviews it could be concluded that, the growth rates in area, production and productivity of oilseeds were much less than those for the major foodcrops like wheat and rice. Most of the studies revealed almost stagnant growth rates of area, production and productivity of oilseeds as against the encouraging growth rates of area, production and

productivity in wheat and rice particularly after the green revolution period.

Components of changes in Production

Gangawar and Rai (1988) examined the total change in production/value of output of oilseeds by decomposing the area, yield, price and their interaction. According to them in the case of total edible oilseeds, the area effect in general was higher than the yield effect with the exception of Tamil Nadu, Maharashtra and Andhra Pradesh, where yield effect dominated. However, when the price factor was included, its effect on individual oilseed crops was found to be most powerful force accounting for more than 60 per cent increase in value of production of oilseeds studied.

Cauvery (1991) following Minhas and Vaidyanathan, identified the contribution of different elements to the changed production of groundnut in Tamil Nadu and reported that the contribution of yield was more than that of area, to the total output of groundnut.

Mitra and Jena (1991) estimated the contribution of area, yield and their interaction to the total change in production of groundnut in Orissa using Minhas's additive decomposition model. The effect of area component was found to be the highest (80.55%) during period II (1967-70 to 1983-86) but it

was reduced to 51.34 per cent for the period III (1950-53 to 1983-86) under study. The effect of yield component was observed to have the highest contribution (24.79%) in period I (1950-53 to 1962-65) and then reduced drastically to 4.11 per cent in period III.

Most of the studies revealed that the contribution of area, yield and their interaction to the output varied from region to region. It was however found that the contribution of groundnut acreage to its production was more significant than that of its productivity.

2.2 Identification of Price and Non-Price Variables

Price Variable :

A large number of researchers have rated price as an effective tool in increasing agricultural production. However, in order to use it as incentive for better production, it becomes imperative to study how farmers react to price factors. Similar to this question is the second query as to which price do farmers respond to, while making their production decisions. Reviews related to these aspects are presented as they have a distinct relationship with the present study.

Rajagopal (1967) considered the prices received by farmers for their products at the point of first sale as the ideal data for estimating farmers response to price changes. In the

absence of such data, he used wholesale prices for the purpose. He took prices both in absolute and relative terms and opined that better results were obtained when absolute prices of crop and its substitute crops were made use of in the model.

Sahay (1971) considered eight different price specifications relevant to farmers decisions for groundnut production and concluded that different specifications proved better in different areas. However the post harvest preceding year price gave the best results for most of the zones.

Sawant (1978) reported that it was the real price to which farmers actually respond in making the production decisions. As the data pertaining to prices of all the inputs that enter into production process were not readily available, she used the All commodities Index of Wholesale prices as a deflater.

Singh (1979) examined the supply response of pulses to changes in various factors among which the post-harvest price as an appropriate factor.

Dixit (1982) opined that relative post harvest price of groundnut, with the production of competing crops used as the weights, would be an appropriate price specification having a bearing on the supply of groundnut.

Acharya (1985) analysed the role of price and non-price factors influencing production of pulses in Rajasthan State by employing principal components analysis. Ten factors were included in the analysis. They are lagged price of gram, wheat and rapeseed-mustard, lagged yields of gram, wheat and rapeseed-mustard, current year rainfall during September-October and June-September months and gross irrigated area. The results of the study revealed that the first three principal components accounted for 82.66 per cent of the variation in all the explanatory factors. The correlation coefficients between principal components and explanatory factors showed that the first principal component was identified closely with lagged price, lagged wheat yield and gross irrigated area. Second and third principal components were closely associated with rainfall.

The above reviews clearly brings out the various views in the specification of price variable to capture its impact on production of a crop. Some researchers were in favour of using expected prices, while others considered absolute prices, realised prices, relative prices, lagged prices as appropriate specification for the price variable.

Non-Price Variable

The variation in agricultural production is caused by a multitude of factors and hence product prices reflect only a

limited portion of it. The vagaries of climatic factors and incidence of pests and diseases adversely affect the agricultural production in the short-run, while the technological advancement causes long-run supply changes. Such factors shift the production and supply curve, even under the unaltered economic environments.

Raj Krishna (1963) in his hectareage response study used relative yield to account for technology; irrigation and rainfall as non-price variables in the adjustment lag model.

Jakhade and Mujumdar (1964) maintained that the farmers decision to raise a crop in any season may be influenced by a complex group of factors like consumption needs, weather conditions at the sowing time and the prices of competitive crops. They found it difficult to isolate the influence of price from that of non-price factors.

Jha (1970) included yield in the preceding year, area under competing crops, rainfall in the pre-sowing months and trend as non-price variables in his supply response study.

Sahay (1971) incorporated previous year yield, rainfall in pre-sowing months and trend as the non-price factors in his study of acreage response of groundnut.

Sawant (1978) noticed that technological advancement might induce a shift in supply function either through changes in the proportion of inputs used in agriculture or through changes in the levels of output per unit of input used or changes in both. She used 'trend' as a 'catch all' variable to take care of the gradual changes in technology. To account for the weather factor in hectare response, she took average rainfall in the three pre-sowing months.

Singh (1979) considered yields of both pulse and non-pulse crops in the particular season, irrigation facility, average rainfall during critical periods of crop growth, risk arising from price and yield variation as the factors in his analytical model to study the shift in pulse acreage.

In the above reviews the non-price factors generally considered by the researchers are the lagged yield of the crop, weather (mainly rainfall), irrigated area and gross cropped area.

2.3 Market Structure For Farm commodities

The concentration of market power is an important element of market structure and determines the nature of competition and consequently of market conduct and performance. The extent of concentration represents the control of an individual firm or a group of firms over the buying and selling of the produce

and is measured by the number and size of the firms existing in the market. Some studies assessing market structure and conduct are reviewed briefly in this section. The performance is the economic outcome of the market structure and conduct and the reviews relating to it are presented in the subsequent sections.

Bain (1959) examined the market structure, conduct and performance of American industries with a view to establishing inter-relationships among these variables. The author emphasised the following factors in the study of market structure

- i) the degree of seller concentration
- ii) the degree of buyer concentration
- iii) size of the distributing firms
- iv) degree of product differentiation, and
- v) the condition of entry in the market.

Sosmick (1961) gave a theoretical framework of analysing market structure, conduct and performance and held that the term market performance stands for the outcome of an action in the market, which would be reflected in the quantity a buyer would buy from seller, the market price, the transfer cost and profit of the firms operating in the market.

In a thought provoking discussion on market structure, Clouidius and Mueller (1961) clarified the concept of market structure, conduct and performance in a wider perspective and recommended the use of Bain's concepts in empirical studies. The author urged the potential research workers to conduct field investigation on

- i) the relationship between market structure, conduct and performance and technological change.
- ii) the impact of cooperative institutions on market structure and
- iii) impact of government intervention on market structure of products, among other things.

Williams (1966) reported that the study of market structure had a key role to play in the transformation of the traditional agriculture. It was mentioned that the ultimate goal of the study was the development of criteria for use in policy formulation in the field of business competition, market regulation and market power.

Hoffman (1969) examined the implications of changing competition in the food trade. It was observed that the large firms would perform the function more efficiently than the small ones. It was felt that it would be wrong to examine the market structure just in terms of the number of firms in the

market. More important than the number was the attitude of competing firms towards each other.

George and Singh (1970) analysed the structure, conduct and performance of wholesale vegetable markets in Punjab. They observed that the sellers were numerous, unorganised and from widely dispersed areas. The market structure for buyer was similar to oligopsony with a few large buyers handling most of the business and numerous small buyers, the rest. Price discrimination was a common practice. The prevalence of sale-avoiding auctions, price leadership, market sharing and predatory practices to discourage competition to the detriment of producers' interest were other features of vegetable markets.

Holmes (1970) studied the market structure in a North Indian Tahsil. The number, size and spatial location of marketing agents, conditions of entry into the market and availability of price information to farmers were the factors considered in the market structure. It appeared that the food-grain marketing system had a good basic strength. The analysis of structure indicated the existence of a substantially competitive environment.

Krishnaswamy (1971) evaluated the structure of selected foodgrain markets in Rajasthan on the basis of buyers and

sellers concentration and concluded that foodgrain marketing system was fairly competitive.

Chouhan and Singh (1973) analysed the structure of Rajasthan wheat market. The study revealed that marketing of wheat in the State was dominated by private traders, particularly wholesalers. The competition in the market was imperfect. According to the authors, the farmers having a poor retention capacity were the worst affected.

Singh and Arora (1975) studied spatial price differential in groundnut in Punjab market. The variations in the prices of groundnut were attributed to the variations in the number of commission agents, number of processing plants for groundnut and increased demand for its by products in populous areas.

Jasdanwala (1977) in her study of some markets of agricultural commodities, opined that the existing marketing structures were in need of radical overhaul in terms of regulation of increasing number of markets and improved infrastructural facilities.

Bhide et.al., (1981) studied the structural changes in the arecanut market of Mangalore, using data on the size distribution of firms and coefficients of inequality for the period 1965-66 to 1972-73. The analysis suggested an

Ramamurthy et.al., (1984) analysed tomato market structure of Coimbatore as per Bains classification and concluded that the sellers (farmers) were atomistically competitive, while the buyers were imperfectly competitive.

The foregoing reviews reveal a considerable variation in the use of terminologies relating to market structure, conduct and performance. Similarly, varied techniques have been adopted to assess the nature and magnitude of competition. Diverging views prevailed as far as the concentration of market power was concerned. This varied from crop to crop and over location and time. However, most of the studies documented a approaching competitiveness for most of the foodgrain markets. Such a situation is lacking mostly in the cases of pulses and oilseeds as a number of marketing functions have been performed by a single firm or a small group of firms which held sway over market transaction.

2.4 Pace and Pattern of Arrivals and Prices of oilseeds.

The seasonal character of arrivals was found to have an impact on commodity prices in the short period. It could reasonably be expected that larger arrivals would depress prices in certain months of the year, while in other months, the low arrivals would boost up the prices. This effect might however be counteracted in the long run by some other factors

depending on their strength. In this section, it was proposed to review the results of earlier studies showing the relationship between arrivals and prices in the long and short run periods.

Gurumallappa (1972) in his study on marketing of groundnut in Raichur district, observed a continuous increasing trend both in arrivals and prices between 1950 and 1968. The relationship between arrivals and prices over the years was thus found to be positive. The analysis of seasonal variations in prices of "Gunguru" variety (bunch type) of groundnut in Raichur market showed that the seasonal index was the lowest in October followed by November and was the highest in June. For "Jowar" variety (spreading type), the seasonal index of price variation was less than the average during October to March and was above the average during April to September. Looking at the quantity of arrivals into the market, it was found that, contrary to expectation, in most of the months, prices ruled high when there were heavy arrivals.

Singh and George (1972), on the basis of the data for the year 1967-68, found that the bulk of the groundnut produce arriving at the market during the harvesting months of October to December was due to lack of storage facilities and pressing

financial needs and this phenomenon led to a decreasing trend in prices during this period.

According to Singh and Chandra (1975), arrivals and prices of rapeseed and mustard increased simultaneously over the period 1967-75 in selected markets of Rajasthan. They attributed this phenomenon to the general increase in the price level due to inflation. However, they have also noticed that the prices were highest during March-June and during October-January, when arrivals were observed to be lowest. On the basis of these trends, a significant negative correlation between arrivals and prices was reported.

Verma and Nigam (1979), in their study on arrivals and prices of groundnut in Kanpur district, found that arrivals in the mandi were higher during December and February, accounting for 56.48 per cent of the total arrivals, while prices were low during that period. The prices were higher in off season, thereby indicating the negative character of the relationship between arrivals and prices. The warehousing and storage facilities had to be increased both in mandi and village markets to reduce price fluctuations over time.

Kahlon and Singh (1966) analysed seasonal price fluctuations of groundnut and found that the seasonal price was lowest in October and November and highest in August. The

study revealed that most favorable months for marketing groundnut were June through August. Appreciable price differences were also noticed between small and large markets due to greater concentration of demand in big markets.

Awasti et.al., (1985) studied the relationship between arrivals and prices of groundnut in three groundnut markets in Western region of Madhya Pradesh. They observed an abrupt and sudden decline in the price of groundnut just after the harvest period and subsequent moderate price increase upto the month of February. The price after this period increased substantially till August. However, the researchers reported a positive association between the price and arrivals of the produce during the study period.

Muniyandi (1985) in his study on pricing efficiency of groundnut marketing system in North Arcot district had observed two seasonal troughs in price movements. The first one was observed in the month of November in all the selected markets which coincided with the harvest of rainfed groundnut and the second one in the month of March and April coinciding with the harvest of irrigated crop. He concluded that there was no definite relationship between arrivals and prices of groundnut and indicated that prices of groundnut increased without corresponding decrease in arrivals of groundnut and vice-versa.

Dinakar (1990) analysed the relation between arrivals and prices of groundnut in three markets of Raichur district of Karnataka State computing monthly index numbers of market arrivals and prices for the years, 1979-80 to 1985-86. It was reported that the index number for prices showed that the prices ruled high in May to June in all the markets. The correlation coefficient of arrivals and market price was negative in Kukanoor and Koppal markets confirming that high arrivals in the markets have depressed the prices thereby putting the farmers into disadvantageous position. However, in the Raichur market this was not the case as the correlation coefficients were found to be positive. This revealed that arrival pattern may not influence the price and the price may be determined by the forces not taken into account in the analysis. Similar observations were made by Gajarajan and Satish (1985), for the Raichur market arrivals and prices data for the period 1974-75 to 1983-84.

An analysis of long-term and short-term variations in price and arrivals of groundnut in Gadag and Ranebennur regulated markets in Karnataka was done by Naik (1990). It was found that in Ranebennur market, arrivals were maximum in the periods September-October and April-May and in Gadag market during October-January. He concluded from the arrival pattern that farmers sold bulk of their produce immediately after

harvest, probably for want of cash and /or lack of storage facilities. Further, an analysis of seasonal pattern in price showed the presence of seasonality over months and constancy of these pattern over years in both the markets.

The studies presented above revealed that oilseeds exhibited seasonality in market arrivals. The fluctuations in market arrivals were more as compared to fluctuations in prices. The increased arrivals of oilseeds have found to depress the oilseed prices generally. Higher arrivals were observed immediately after harvest and arrivals were vary low during sowing seasons.

2.5 Market Integration

The aspects of market integration probes into whether the movements of prices of a commodity in different spatial markets are synchronised or divergent. Markets are considered to be integrated when the price changes over time among markets are synchronous or correlated. Market integration has been analysed by various researchers. Some of the studies relevant to the present study are presented hereafter.

Parthasarathy (1961), Cummings (1967), Lele (1967), Subba Rao (1978) examined the market integration through the trend analysis of price which revealed certain characteristic movements relating to the general direction over a long

interval of time. Presence of uniform trends among markets showed that the markets were integrated with respect to price movements. Jasdanwala (1966) and Kahlon (1970) adopted the correlation analysis to study the aspect of market integration. Jasdanwala (1966), Kahlon (1970) and Subba Rao (1978), extended their studies to examine the magnitude of monthly price variability in the markets through the analysis of coefficient of variation (CV). Further, an observation of uniform decreasing trends in the CVs over time in a group of markets, subject to the evidence of unidirectional movements in all market prices, indicates the efficiency of information flow among these markets or indirectly the faster rate of adjustment of price among the markets. In other words, some values of CVs in various market prices over time coupled with higher positive correlation was an indicator of price or market integration.

Lele (1967) studied the market integration with respect to jowar prices in western India, the results of which pointed out that the regional price differences were mainly due to the interdependence between wholesale and retail markets and the inter-varietal differences in the grain traded. Since the prices for the same product did not differ significantly between different markets beyond the transportation costs, she concluded that these markets were more or less integrated.

In another study by Lele (1973), the extent of monopolistic forces in the markets was determined by comparing the millers purchase prices with wholesale paddy prices in the same market. The results showed the markets to be poorly integrated on account of imperfect mobility, transport inadequacies, imperfect homogeneity of the product and imperfect knowledge.

Acharya (1985) using zero-order correlation coefficients for prices assessed the extent of integration of markets in price formation for pulses in 12 markets of Rajasthan. He noticed high and significant correlation coefficients and concluded that the distance and accessibility did not matter as far as price integration was concerned.

Patnaik (1989) examined the inter-market integration in groundnut products price formation in six markets of Rayalseema region of Andhra Pradesh using correlation coefficient analysis. He reported that the oil markets were better integrated as most of the oil prices were found to be highly correlated.

Dinakar (1990) used coefficient of variation (CV) to assess the extent of price integration between the markets. He noticed a poor integration between the village markets and

secondary markets as was demonstrated by significant differences in the coefficient of variations of prices.

Anita Arya (1991) examined the spatial integration of four markets in Gujarath using zero-order price series correlation analysis. She observed significant and high correlations in the price movements between the markets and concluded that the markets under consideration were integrated in terms of price movements.

The above studies illustrate the existence of divergent market settings. Some authors have identified less integrated markets, while others reported a strong integration among some other markets. In general, it was found that markets were integrated in price formation irrespective of rate of flow of information and location of markets.

2.6 Marketing Costs and Margins

The information on marketing costs and margins serves as an useful basis for measuring marketing efficiency. Many a time, market efficiency over a period of time and space as well, are compared and contrasted with the help of these indicators. Marketing costs and price spread are measured with the help of simple tabular analysis technique. Some of the relevant studies on oilseeds are briefly reviewed with a view to get an idea about the nature and magnitude of marketing

costs, margins and channels followed for disposing of commodities.

Patel (1971) studied the farmer's and intermediary's shares in the price spread of groundnut for Gujarath State for the period 1962-68 and concluded that the millers had increased their share in the consumers rupee and the farmers had not improved their position over the time.

Arora and Jayapraksh (1979), made an attempt to examine the relative efficiency of regulated and private markets for groundnut in Tamil Nadu by taking marketing costs and margins of different categories of middlemen. It was found that the marketing costs incurred by the peasants in the private media were 77 per cent higher than those incurred in the regulated markets. The private marketing agencies were found to levy exorbitant market charges for all categories of farmers, irrespective of their size of operations. It was concluded that regulated markets offered better opportunities for sale of agricultural products compared to privately operated markets.

Verma and Nigam (1979), analysed the price spread of groundnut in Kanpur district of Uttar Pradesh and found that the producers share in the consumers rupee for roasted groundnut and oil preparation came to 63.85 per cent and 73.82 per cent, respectively. The observation of higher storage cost

at farmers level as compared to that in warehouse pointed out the need for provision of storage and warehousing facilities at mandi and local markets.

Ranade (1982), studied the price spread in groundnut and analysed the shares of the various participants at macro as well as micro levels. The micro level study indicated that the income of cultivators after vertical integration through co-operatives could be increased by about 35 to 115 per cent depending upon the marketing channel through which integration was effected. The macro study noted with concern the declining share of groundnut growers in the total value generated in the system during the period 1963-64 to 1977-78.

Katar Singh and Ranjana (1982), while outlining a strategy for modernising the oilseeds and vegetable oil sub-sector of India's economy based on the experience of National Dairy Development Board (NDDB), proposed an integrated system of production, processing and marketing controlled by the producer-farmers. They advocated an organisational structure with three tiers - 'oilseeds growers co-operatives' at the village level, 'unions' at the district level and 'federation' at the State level. The unions were expected to arrange for the supply of inputs and technical know how to the members through the co-operatives, the collection of the

produce of the producer-members, and its transport to the processing plants. The authors also proposed the sale of oil and by products through co-operative network to the consumers.

Patnaik (1985), in his study on groundnut marketing in four markets in Andhra Pradesh identified the following five important channels.

Channel I : Farmers selling through village merchants in unregulated market.

Channel II : Farmers selling through brokers or agents of processing units and/or traders in unregulated market.

Channel III : Farmers selling to processing units in unregulated market.

Channel IV : Farmers selling through co-operative processing units in unregulated market.

Channel V : Farmers selling through commission agents in regulated market.

The producers share was the highest in the channel IV, followed by channel V and the lowest in channel I, indicating that the farmers would be benefitted if they sold either

directly to the co-operative processing units or through commission agents in regulated markets.

Singh et.al. (1985) identified seven marketing channels for groundnut in Madhuganj regulated market in Hardoi district in Uttar Pradesh during the year 1983-84. The per quintal marketing charges paid by the producer, mill owner, wholesaler and retailer worked out to Rs. 4.12, Rs. 30.98 Rs. 24.27 and Rs. 17.49 respectively. The producers share in the consumers price in the marketing of processed groundnut products came to 58.58 per cent in groundnut oil, 31.31 per cent in dal mhot and 59.87 per cent in roasted groundnut. The balance of the consumers price was appropriated by the middlemen involved in the marketing and processing of groundnut.

Srivastav (1988) in his study on financing groundnut systems based on all-India data, described four sub-systems as, the groundnut production sub-system, trade in groundnut, processing of groundnut and the trade in oil and oil cakes. He observed the following broad channels of trade in groundnut :

- i) Producer to village trader who inturn sells either directly to mills or indirectly through wholesaler or commission agents.
- ii) Producers to commission agent to millers either directly or through wholesalers.

- iii) Producer to broker who sells to mill either directly or sometimes through wholesalers.
- iv) Producer to miller directly.
- v) Producer to co-operative society to co-operative oilmills.

The processing sub-system consisted of village ghanis which were bullock driven and power operated oilmills, both of which catered to the cooking oil needs of the rural areas. Some oil mills also processed the expeller oilcake by solvent extraction method.

Mundinamani et.al. (1989) in their study on market finance identified the following four groundnut marketing channels in Hubli and Gadag regulated markets of Karnataka.

Channel I : Producer ---> Village Merchant ---> Commission agent ---> Wholesaler ---> Oil miller ---> Consumer.

Channel II : Producer ---> Commission Agent ---> Wholesaler ---> Oilmiller ---> Consumer.

Channel III : Producer ---> Co-operative Society ---> Oilmiller ---> Consumer.

Channel IV : Producer ---> Oilmiller ---> Consumer.

Among the four marketing channels, channel II and III were found to be most popular with nearly 55 per cent of the marketable surplus flowing through channel II and about 28 per

cent through channel III. Channel I was found to have the highest marketing margins followed by channel IV. The lower marketing margin in II and III channels could largely be attributed to relatively lower profit margins as well as operational costs of marketing with increase in the volume of business. The above findings revealed that it could be often erroneous to conclude that the shortest channel necessarily results in the least marketing margin and would be the most profitable one for the producer as well as the consumer. Thus, the study strengthens the view that it is essential not to eliminate the middlemen but to improve their efficiency by providing the requisite facilities.

Naidu and Tirupathaiah (1991) worked out price-spread in groundnut marketing under different channels in Vijayanagaram district of Andhra Pradesh. They found that a large proportion of cultivators disposed off their produce through the village markets (Channel - I) followed by direct sale to oilmiller (Channel - II). The share of the producer in the consumer rupee was found to be higher in channel II (83.63%) compared to channel I (79.66%).

The foregoing studies revealed a considerable variation in the size of the marketing costs and margins in oilseeds. The channel selected for disposing of oilseeds appeared to be

crucial factor in influencing the magnitude of marketing costs and margins. Some studies documented a declining producers share in the consumer rupee over a period of time. Most of the researchers noticed improved producers share in the integrated marketing operations. Marketing costs and margins were relatively lower in the channel that involved cooperatives, though it was not much popular among the producers.

2.7 Methodological Aspects

2.7.1 Growth Rate Analysis

Some of the important functional forms employed to study growth rates include linear, log-linear, exponential and power functions. The rate of growth 'r' as given by the well known compound interest formula is $Y_t = Y_0(1+r)^t$, where Y_0 and Y_t are the variables in question in the initial and terminal years respectively, 'r' is the compound growth rate over previous year and 't' is the time period. Many economists in past tried several functional forms for working out growth rates and concluded that the choice of functional form should be made on *a priori* reasonable considerations. However, the most frequently used functional form of growth rate by many economists was exponential function of the form $Y_t = AB^t$, Where, ' Y_t ' represents the variable in period 't', 'A' is the constant, 'B' represents (1+r), 'r' represents growth rate and 't' is the time variable. This model has been used to estimate

the growth rates in area, production and productivity of crops in a number of studies. Some of them relevant to the present study are reviewed hereunder.

Different functional forms were tried for measuring rates of growth in groundnut output/area/yield by Ray and Chahal (1986), Gangawar and Rai (1988), Chandra Banu et.al., (1991) and Umesh et.al., (1992). The important forms tried were the linear growth model of the form $Y = a+bt$, exponential function of the form $Y = AB^t$, quadratic function of the form $Y = A + bt + ct^2$. However, it was the exponential form of the function which was ultimately chosen for the analysis as it gave good fit to the data.

Sastry et. al., (1975) analysed trends in per capita production of five food and three non-food agricultural commodities in Karnataka as well as at the national level with the help of orthogonal polynomial regression analysis of the form $\hat{Y} = \bar{Y} + b_1Z_1 + b_2Z_2 + b_3Z_3 \dots$

Where \bar{Y} = The general mean of per capita production

\hat{Y} = The predicted per capita production for any specific year X via Z.

Z_i 's = orthogonal polynomials

$Z_1 = X - \bar{X}$

$Z_2 = (X - \bar{X})^2 - (n^2 - 1)/12$, etc.

expressed explicitly in terms of equally spaced original X , and b_i 's are the regression coefficients whose values are to be determined from the sample data.

The authors claimed that in the absence of *á*priori knowledge regarding the exact mathematical form of the trend functions, the orthogonal polynomial regression analysis was suitable for analysis of time series data. The added advantage of this technique was the computational ease with which stepwise forward polynomial regression analysis was facilitated.

Naik and Mohanty (1991) computed compound growth rate of area, production and yield of groundnut in Orissa by using log-linear function of the form $\log Y = a + bt$, where Y is area/production/yield, 't' represents time variable and growth rate 'r' is given by $(e^b - 1) \times 100$.

Tripati and Bhallabh (1991) analysed the growth rates in area, production and yield of groundnut for 26 major districts in the country with the help of exponential compound growth rate function of the form $Y = AB^t$, where Y is area/yield/production of groundnut, 'A' is constant and 'B' is $(1 + r)$, 'r' representing the compound growth rate. To analyse the impact of green revolution on groundnut production, they

divided the study period into two namely, pre-high yielding variety period (1950-51 to 1964-65) and high yielding variety period (1967-68 to 1986-87) and also worked out the growth rates for the entire period (1950-51 to 1986-87).

The foregoing discussions revealed that most of the researchers used exponential form of function for computing growth rates. The results of the investigations revealed considerable differences in the nature and magnitude of growth rates. This was probably due to variation in the period under study and the functional forms used.

2.7.2 Decomposition Analysis

The output of any crop undergoes a change over the years either as a result of change in the area or yield or both and hence an understanding of the extent of contribution of these components to the quantum of output becomes necessary. For analysing the interrelationship among the variables, Minhas and Vaidyanathan (1965) suggested the decomposition model. They used four factor model and later devised a seven factor model of decomposition considering the other interaction terms, since the four factor model could not be useful when interaction term was relatively larger. Subsequently, some of the researchers modified the decomposition model by taking relevant variables as weights. Some of the studies which have

used this model for analysing the contribution of different variables on production of a crop in question are reviewed hereunder.

Kaul (1966) in order to isolate the contribution of different factors such as change in yield, cropping pattern, and acreage towards agricultural production in Punjab, used the additive decomposition model of the following form,

$$P_t - P_o = (A_t - A_o) \sum W_i Y_{io} + A_t \sum W_i C_{io} (Y_{it} - Y_{io}) \\ + A_t \sum W_i (C_{it} - C_{io}) Y_{io} + A_t \sum W_i (C_{it} - C_{io}) (Y_{it} - Y_{io})$$

Where, P_t = Production at the period t,

P_o = Production at the period o,

A_t = Cropped acreage at time t,

A_o = Cropped acreage at time o,

C_{it} = Crop pattern at time t,

C_{io} = crop pattern at time o,

Y_{it} = Yield of the crop i at time t,

Y_{io} = Yield of the crop i at time o and

W_i = Weights derived from the prices of i^{th} crops.

Singh and Gangawar (1986) in order to decompose the total change in value of production of coarse grains and pulses due to area, yield, price and their interaction effects, used the following model.

$$\Delta X = P_0 A_0 \Delta Y + P_0 Y_0 \Delta A + A_0 Y_0 \Delta P + P_0 \Delta A \Delta Y$$

$$+ A_0 \Delta P \Delta Y + Y_0 \Delta P \Delta A + \Delta A \Delta Y \Delta P$$

Where $P_0 A_0 \Delta Y$ gives the yield effect, $P_0 Y_0 \Delta A$ gives the area effect and $A_0 Y_0 \Delta P$ gives the price effect. $A_0 \Delta P \Delta Y$, $P_0 \Delta A \Delta Y$, $Y_0 \Delta P \Delta A$ and $\Delta A \Delta Y \Delta P$ represent interactions of price and yield, area and yield, price and area and area, yield and price respectively. ΔX was calculated by subtraction of

$$X_0 \text{ from } X_n, \text{ where } X_0 = A_0 Y_0 P_0, \quad X_n = A_n Y_n P_n$$

Subba Reddy (1988), in order to isolate and measure the effects of area and yield on the production of a crop, used the following decomposition scheme.

$$Q_2 - Q_1 = A_2 Y_2 - A_1 Y_1$$

$$\text{or } \Delta Q = A_1 \Delta Y + \Delta A Y_1 + \Delta A \Delta Y$$

$$\text{where } \Delta Q = Q_2 - Q_1; \Delta A = A_2 - A_1; \Delta Y = Y_2 - Y_1$$

The change in production (ΔQ) from period II to period I was due to yield effect ($A_1 \Delta Y$), area effect ($Y_1 \Delta A$) and their interaction effect ($\Delta A \Delta Y$).

Cauvery (1991) used following decomposition model to isolate the contribution of different factors like area, yield, cropping pattern, area and yield, area and cropping pattern, yield and cropping pattern on groundnut production in Tamil Nadu.

$$\begin{aligned}
P_t - P_o &= (A_t - A_o) \sum_t^n W_i C_{io} Y_{io} + A_o \sum_t^n W_i C_{io} (Y_{it} - Y_{io}) \\
&+ A_o \sum_t^n W_i Y_{io} (C_{it} - C_{io}) + (A_t - A_o) \sum_t^n W_i Y_{io} (C_{it} - C_{io}) \\
&+ (A_t - A_o) \sum_t^n W_i (Y_{it} - Y_{io}) C_{io} + A_o \sum_t^n W_i (C_{it} - C_{io}) (Y_{it} - Y_{io}) \\
&+ (A_t - A_o) \sum_t^n W_i (C_{it} - C_{io}) (Y_{it} - Y_{io})
\end{aligned}$$

Where, P_t = Production in current period

P_o = Production in the base period

W_i = Weight used for each crop (average of three years farm harvest prices were taken as weights).

C_{io} = Cropping pattern in the base year.

C_{it} = Cropping pattern in the current year.

Y_{io} = Yield level in the base year.

Y_{it} = Yield level in the current year.

A_o = Gross cropped area in the base year.

A_t = Gross cropped area in the current year.

Further, P_t and P_o were equated as under

$$P_t = A_t \sum W_i C_{it} Y_{it} \quad \text{and} \quad P_o = A_o \sum W_i C_{io} Y_{io}$$

Each component of the equation was multiplied by 100 and divided by the total of the components under consideration as to obtain percentage growth rate of each component. These percentages would help to directly assess the share of each component in the growth of groundnut output.

It is evident from the above studies that different scholars incorporated different factors like area, yield, prices, cropping pattern and their interaction into the decomposition models to ascertain their contribution to the output of the crops in question. It was however, found in most of the studies that area, yield and their interaction accounted for the major change in the output.

2.7.3 Principal Components Analysis

The procedures and analytical techniques used for identification of price and non-price factors by different researchers are reviewed hereunder.

Walsh (1944), Bowlen (1955) used simple regression model to gauge the output response to price. Brennan (1958) regressed cotton output against its expected price. Nerlove (1958) viewed that farmers would react not to the previous years price but to the price they expected and that this expected price depended only to a limited extent on the previous years price. He developed adjustment and distributed lagged models. Following Nerlove (1958), a number of researchers attempted to study the price responses for different crops at different places.

Subsequently, a number of non-price factors like rainfall, irrigation, yield levels, the extent of risk, relative productivities of substituting and competing crops which were assumed to influence the output response have been incorporated into the model. The parameters were estimated by Ordinary Least Square (OLS) Technique. The parameters estimated through OLS technique in most of the studies appeared to be spurious because of the problem of multicollinearity and auto-correlation. Further, indiscriminate inclusion of explanatory variables in the model severely reduced the degrees of freedom. In this context, many researchers found it necessary to identify those price and non-price factors which exerted significant influence on the dependent variable and resorted to the technique of the principal components analysis to get rid of the problem of multicollinearity. A few important studies which used this technique are reviewed below.

Nieuwoudt (1972) compared the results obtained by Principal Components analysis and Cobb-Douglas Production function analysis in order to economise the number of variables and to avoid the problem of multicollinearity prevailing in the data by the orthogonal transformation of variables. The production function was derived from the orthogonal variates by dropping components that contributed little to the variation in explanatory variables. The 't' value in the former function

showed a substantial improvement over the value obtained by Cobb-Douglas Function.

Greenburg (1975) illustrated the use of regression Principal Components in a situation in which the independent variables were nearly collinear. He showed that the coefficient obtained from the dependent variable regressed on the principal components of the independent variables might be interpreted as an estimator with least variance.

Fomby et al. (1978) presented a new optimal property for principal regression and it was shown that the trace of the covariance matrix for estimators obtained by principal components associated with the smallest values was at least as small as that for any other least square estimates with an equally smaller number of linear restrictions.

Acharya (1985) employed principal components analysis technique to identify the most important price and non-price factors influencing pulse production in Rajasthan State and in its important pulse growing districts. The variables included in the analysis varied from crop to crop and district to district. Among the various variables, the most important ones identified were lagged area, price, yield, sowing time or seasonal rainfall and gross irrigated area. For further analysis of the results, he selected only first three

components which accounted for major variation (60-70%) in the explanatory variables.

Shankaramurthy (1986) studied the performance of Karnataka State Cooperative Marketing Federation and its impact on farm market. He used factor analysis technique with principal component solution in analysing the performance indicators of the federation over a period of 25 years. The factor analysis revealed the existence of two main underlying dimensions in the performance of the federation namely "Growth in Physical and financial indicators" and "Growth in assets and liabilities".

Chandra Reddy (1987) used principal components analysis technique to identify the most important variables which influence the silk cocoon production. He found that out of the 19 variables which were expected to have influence on the silk cocoon production, only 12 were indicated to have a strong relationship. For further analysis, he used only first three principal components, since they together accounted for a bulk (63 to 84%) of the variation.

Dadibavi (1988) used the principal component analysis to construct composite development index to identify backward talukas in Karnataka. Accordingly, he identified 29 talukas as highly developed, 27 as highly backward and 68 as backward. He

concluded that use of principal component analysis could give better results when there are many indicators.

Choubey et.al. (1989) indicated that when the independent variables in a regression model exhibited perfect or high degree of multicollinearity among themselves, the method of least squares failed to provide satisfactory estimates of regression coefficient. They emphasized on the use of principal component regression as the suitable method.

Bhat (1991) tried regression analysis and principal component analysis to identify the most important variables influencing short-term agricultural credit absorption in selected districts of Karnataka. To mitigate the problem of multicollinearity, he found that the technique of Principal Component Regression Analysis was more appropriate. The first four principal components were found to explain 85 per cent of the variation. The variables which significantly influenced the credit absorption were irrigation, fertilizer consumption and the number of bank branches.

2.7.4 Lorenz Coefficient of Inequality

A number of measures of assessing market concentration are available in the literature such as Gini-concentration ratio, coefficient of variation, standard deviation of logs, Theils Index, Atkinson's Index and the like. Use of these measures

depends largely on the problem of inquiry and the specific issues in which the researcher is interested. In the context of distribution of market power, the use of Gini concentration ratio or Lorenz coefficient of inequality was more popular. Some of the studies which used these techniques are briefly reviewed hereafter.

Bhide et. al. (1981), examined the structure of arecanut marketing in Mangalore of Karnataka State. The degree of buyers and sellers concentration were used as characteristics for determining the market structure. Measures of such concentration defined in terms of market shares of buyers and sellers were reflected in the coefficient of inequality which was estimated as follows :

$$L = 1 - \sum_{i=1}^n \left(P_i - p_{i-1} \right) \left(Q_i + Q_{i-1} \right)$$

Where L = Coefficient of inequality.

P_i = Cumulative proportion of of firms

upto and including i^{th} class and

Q_i = Cumulative proportion of transactions of firms

upto and including i^{th} class

Lower the value of L, more equal is the distribution of firms by size.

Following Bhide et. al. (1981), Elangovan and Zeaudeen (1983), Sujata et. al. (1989) employed the technique of Lorenz

coefficient of inequality to analyse respectively the market structure for groundnut in Tamil Nadu and size distribution of buyers and sellers handling important agricultural commodities in Bangalore Regulated market of Karnataka State.

Aulukh (1983) analysed the degree of concentration on the buyer's side through the technique of Lorenz curve for different foodgrains. Further, to arrive at single index of concentration, Gini coefficients were computed using the following formula.

$$\text{Gini Ratio} = 1 - 2L = 2A$$

$$\text{Where } L = 1 - \sum_{j=1}^k (Q_j + Q_{j-1})$$

$$Q_j = \frac{\sum_{i=1}^j P_i Y_i}{\sum_{i=1}^k P_i Y_i}$$

$$P_j = \sum_{i=1}^j P_i$$

Where, P_i is the estimated proportion of population in the i^{th} size class

2A = twice the area of concentration

Acharya (1985) measured the concentration of market power with buyers in pulse marketing in Rajasthan adopting Lorenz Coefficient of Inequality (L). The magnitude of this coefficient is directly related to the degree of concentration i.e. higher the value of L, more concentrated was buying power

or more unequal is the distribution and vice-versa. The value of L, which lies between zero and one, was estimated with the help of following formula.

$$L = \frac{1 - \sum_{i=1}^n (X_i - X_{i-1}) (Y_i + Y_{i-1})}{10,000}$$

Where, L = Lorenz coefficient of inequality or Lorenz Ratio.

X_i = Cumulative percentage of number of firms upto and including i^{th} class

and Y_i = Cumulative percentage of quantity handled/volume of purchase by firms upto and including the i^{th} class.

Among the various techniques available for measuring the market concentration. Lorenz coefficient of inequality has been widely employed.

METHODOLOGY

III METHODOLOGY

This chapter deals with the selection of the study area and its description, selection of the commodities, sampling procedure, nature and source of data, and Statistical techniques employed for analysing the data.

The methodology is presented under the following heads.

- 3.1 Sampling procedure
- 3.2 Description of the study area
- 3.3 Nature and source of data
- 3.4 Statistical techniques employed

3.1 Sampling Procedure

3.1.1 Delineation of the Study area

Karnataka is one of the major oilseed producing State in the country. The State occupied 3rd and 4th position with respect to area and production, in that order in the case of groundnut and 1st and 2nd position respectively in the case of sunflower and safflower in respect both of area and production. With regards to sesamum, the position occupied was 6th in respect of area and 2nd in respect of production (Table-3.1).

3.1.2 Selection of Oilseed Crops

As per the reports for the triennium ending 1990-91, groundnut, sunflower, safflower and sesamum accounted for 93.74 per cent of the total area and 96.47 per cent of the total

Table 3.1 : Statewise Area and Production of Major Edible Oilseeds during 1988-89.

Sl. No.	State	Area (Ha.)				Production (tonnes)			
		Groundnut	Safflower	Sesamum	Sunflower	Groundnut	Safflower	Sesamum	Sunflower
1.	Andhra Pradesh	2290800 (27.17)	19200 (2.45)	169200 (6.95)	98000 (9.31)	2200600 (23.06)	5800 (1.37)	17800 (2.67)	26300 (6.63)
2.	Gujarat	1823400 (21.63)	-	154500 (6.35)	-	2875000 (30.12)	-	88800 (13.32)	-
3.	Karnataka	1264003 (14.99)	165400 (21.15)	199000 (8.18)	461881 (43.89)	1009555 (10.58)	90800 (21.45)	90000 (13.50)	197686 (49.83)
4.	Madhya Pradesh	302500 (3.58)	3850	217100 (8.92)	-	335600 (3.52)	929	58200 (8.73)	-
5.	Maharashtra	900100 (10.67)	589900 (75.45)	379700 (15.60)	455500 (43.28)	1005900 (10.54)	330200 (78.00)	77500 (11.63)	153700 (38.74)
6.	Orissa	376650 (4.46)	3220	292920 (12.04)	2860	562740 (5.89)	1200	139220 (20.89)	1100
7.	Rajasthan	234480 (2.78)	-	322322 (13.25)	5300	259965 (2.72)	-	61642 (9.25)	1500
8.	Tamil Nadu	1044118 (12.38)	-	159411 (6.55)	23840 (2.26)	1104424 (11.57)	-	46565 (6.98)	12880 (3.24)
9.	Uttar Pradesh	128620 (1.52)	-	373192 (15.34)	3000	123356 (1.29)	-	16104 (2.42)	2600
	All India	8430306 (100.00)	781839 (100.00)	2432564 (100.00)	1052323 (100.00)	9543777 (100.00)	423323 (100.00)	666478 (100.00)	396716 (100.00)

Source : Districtwise final estimates of Area and Production of oilseeds during 1988-89, Agril situation in India, 45(10) : 699-719.

oilseed production in the State and hence they were selected for the present investigation. Table 3.2 depicts area and production of oilseeds in Karnataka.

3.1.3 Selection of Districts

Among the 180 potential oilseeds growing districts identified by the Government of India under Intensive Oilseed Development Programme during VII plan, for achieving self sufficiency in the oilseed sector, 9 districts are in Karnataka State. Looking at the relative importance of area under four major oilseeds, from out of 9 districts (Table 3.3), three districts namely Bijapur, Dharwad and Raichur have been selected for the study (Fig. - 3.1). These three districts together accounted for 39.39 per cent of the total area under four major oilseeds in the State.

3.1.4 Selection of Markets

Markets were selected based on the arrivals of the selected oilseeds in each district. Two markets which handled maximum quantities in each district were chosen (Table 3.4). Thus, in all, six markets from three districts were selected for the study. These were, Bijapur and Talikoti markets in Bijapur district, Gadag and Ranebennur markets in Dharwad district (Fig. -3.3) and Gangavati and Raichur markets in Raichur district (Fig. -3.4). The selected markets in Bijapur,

Table 3.2 : Area and Production of Oilseeds Grown in Karnataka for the Triennium ending 1990-91

Sl. No.	Oilseeds	Area (ha)	Production (tonnes)
1.	Groundnut	1148738 (52.72)	1072017 (67.30)
2.	Sunflower	514591 (23.62)	269792 (16.94)
3.	Safflower	202279 (9.29)	119509 (7.50)
4.	Sesamum	176697 (8.11)	75285 (4.73)
5.	Nigerseed	60000 (2.75)	13970 (0.88)
6.	Linseed	43000 (1.97)	15000 (0.84)
7.	Castor	28122 (1.29)	24506 (1.54)
8.	Mustard	5609 (0.25)	2749 (0.17)
Total		2179036 (100.00)	1592828 (100.00)

Source : Directorate of Economics and Statistics, Bangalore, 1991.

Note : Figures in parantheses indicate percentage to the total.

Table 3.3 : District-wise Area under Major Oilseeds Grown in Karnataka for the Triennium ending 1990-91

Sl. District No.	(Area in hectares)				
	Groundnut	Sunflower	Safflower	Sesamum	Total
1. Tumkur	134761 (11.73)	3269 (0.64)	358 (0.18)	1453 (0.82)	138388 (6.78)
2. Chitradurga	107465 (9.36)	53176 (10.33)	4280 (2.12)	16869 (9.55)	181790 (8.90)
3. Dharwad	147476 (13.30)	52222 (10.15)	31298 (15.47)	19298 (10.92)	255628 (12.52)
4. Belgaum	118268 (10.30)	20348 (3.95)	16687 (8.25)	2771 (1.57)	158074 (7.74)
5. Bijapur	129097 (11.24)	106460 (20.69)	39263 (19.41)	5985 (3.39)	280805 (13.75)
6. Bellary	69650 (6.06)	6332 (11.92)	19190 (9.49)	8826 (4.99)	163666 (8.01)
7. Bidar	11721 (1.02)	20190 (3.93)	6690 (3.31)	21836 (12.36)	60437 (2.96)
8. Raichur	154095 (13.41)	76813 (14.93)	27936 (13.81)	9066 (5.13)	267910 (13.12)
9. Gulbarga	95980 (8.36)	63724 (12.38)	55806 (27.59)	33112 (18.74)	248622 (12.17)
State total	1148738 (100.00)	514591 (100.00)	202279 (100.00)	176697 (100.00)	2042305 (100.00)

Source : 1. Directorate of Economics and Statistics, Bangalore
2. Figures in parantheses indicate percentage to total

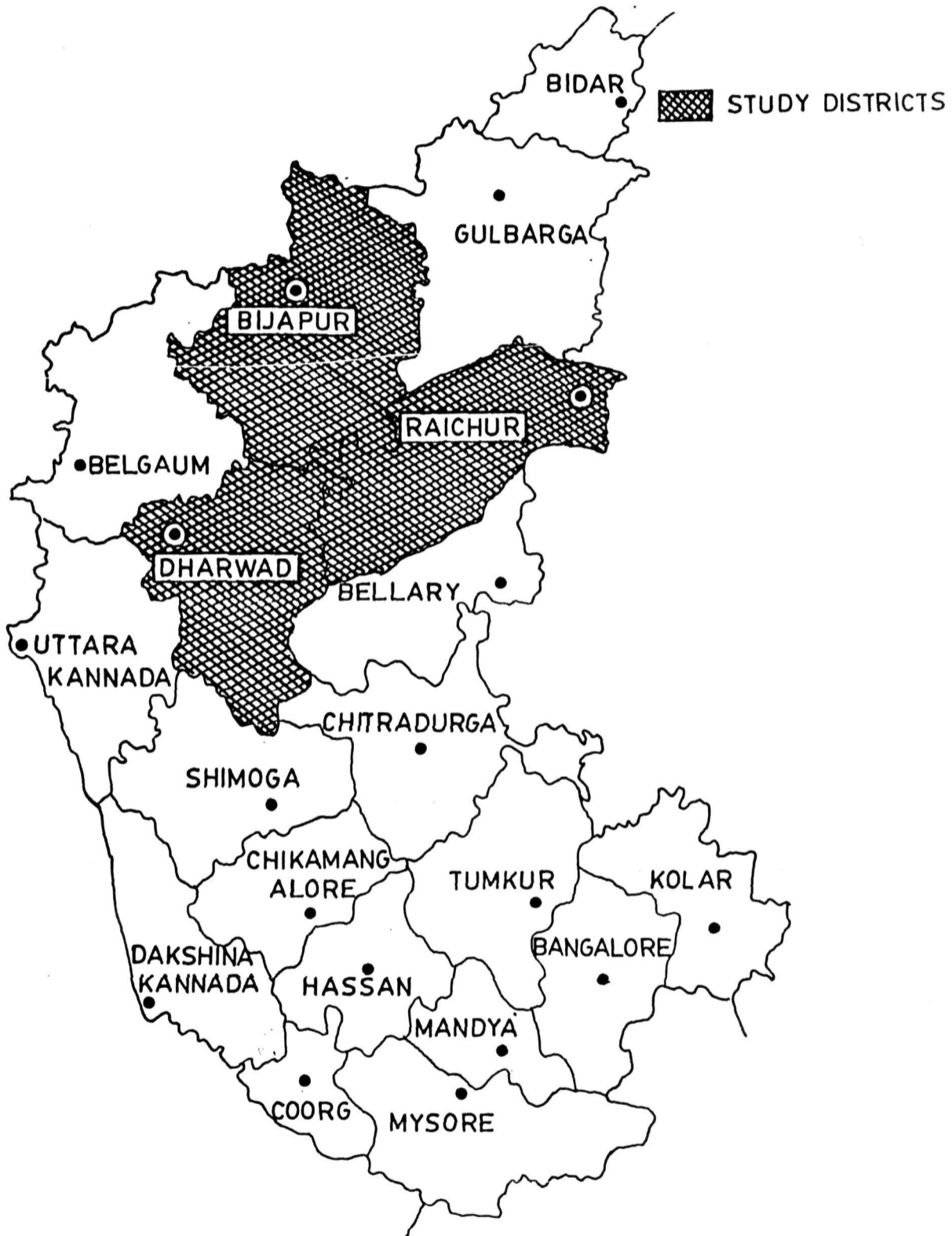


FIG:3-1-MAP OF KARNATAKA STATE SHOWING STUDY DISTRICTS.

Table 3.4 : Marketwise Arrivals of Oilseeds in the Regulated Markets of Selected Districts in Karnataka (Average for 1988-89 to 1990-91)

Sl. No.	District/Market	Arrivals (in quintals)				Total	%
		Groundnut	Sunflower	Safflower	Sesamum		
I Bijapur District							
1	Bijapur	118188	68336	34480	1608	222612	39.08
2	Talikoti	88877	84111	1248	556	174792	30.68
3	Bagalkoti	76808	28771	3041	7092	115712	20.31
4	Badami	23361	3724	306	186	27577	4.84
5	Mahalingpur	3663	10044	58	-	13765	2.42
6	Hunugund	3065	4901	539	-	8505	1.49
7	Jamakhandi	1873	4752	69	-	6694	1.18
Total		315835	204639	39741	9442	569657	100.00
II Dharwad District*							
1	Gadag	240772	45150	19120	9383	314425	50.86
2	Ranebennur	125985	527	-	-	126512	20.46
3	Dharwad	42903	-	3700	-	46603	7.54
4	Hubli	38426	652	1336	677	41091	6.65
5	Ron	29986	2072	362	1272	33692	5.45
6	Shirahatti	10550	2012	469	11148	24179	3.92
7	Mundaragi	13182	2356	614	1133	17285	2.80
Total		514851	53929	25774	23613	618167	100.00
III Raichur District							
1	Raichur	353209	254384	4900	10285	622778	79.25
2	Gangavati	37143	6970	175	9898	54186	6.90
3	Sindhanur	9084	21097	25	5968	36174	4.60
4	Koppal	23987	3493	210	4209	31899	4.06
5	Kustagi	3604	1329	2357	9792	17082	2.17
6	Yelaburga	14547	-	262	28	14837	1.89
7	Manvi	7825	1062	-	-	8887	1.13
Total		449399	288335	7929	40180	785843	100.00

Source : Offices of the Additional Directorates of Agricultural Marketing, of Bijapur, Raichur and Dharwad.

* Data available only for the year 1990-91 and only top 7 markets of the total 15 markets are listed.

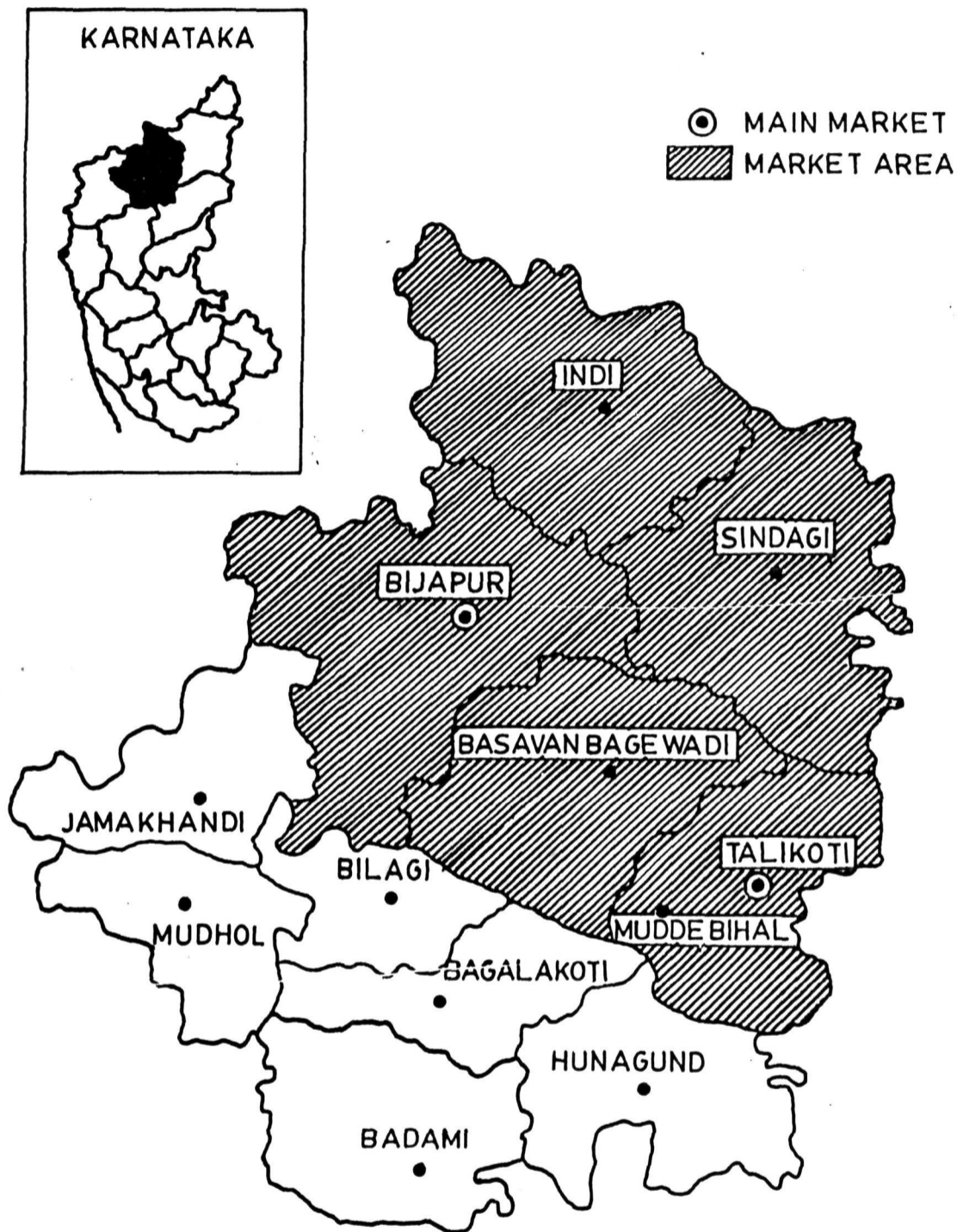


FIG:3-2- MAP OF BIJAPUR DISTRICT SHOWING STUDY MARKETS.

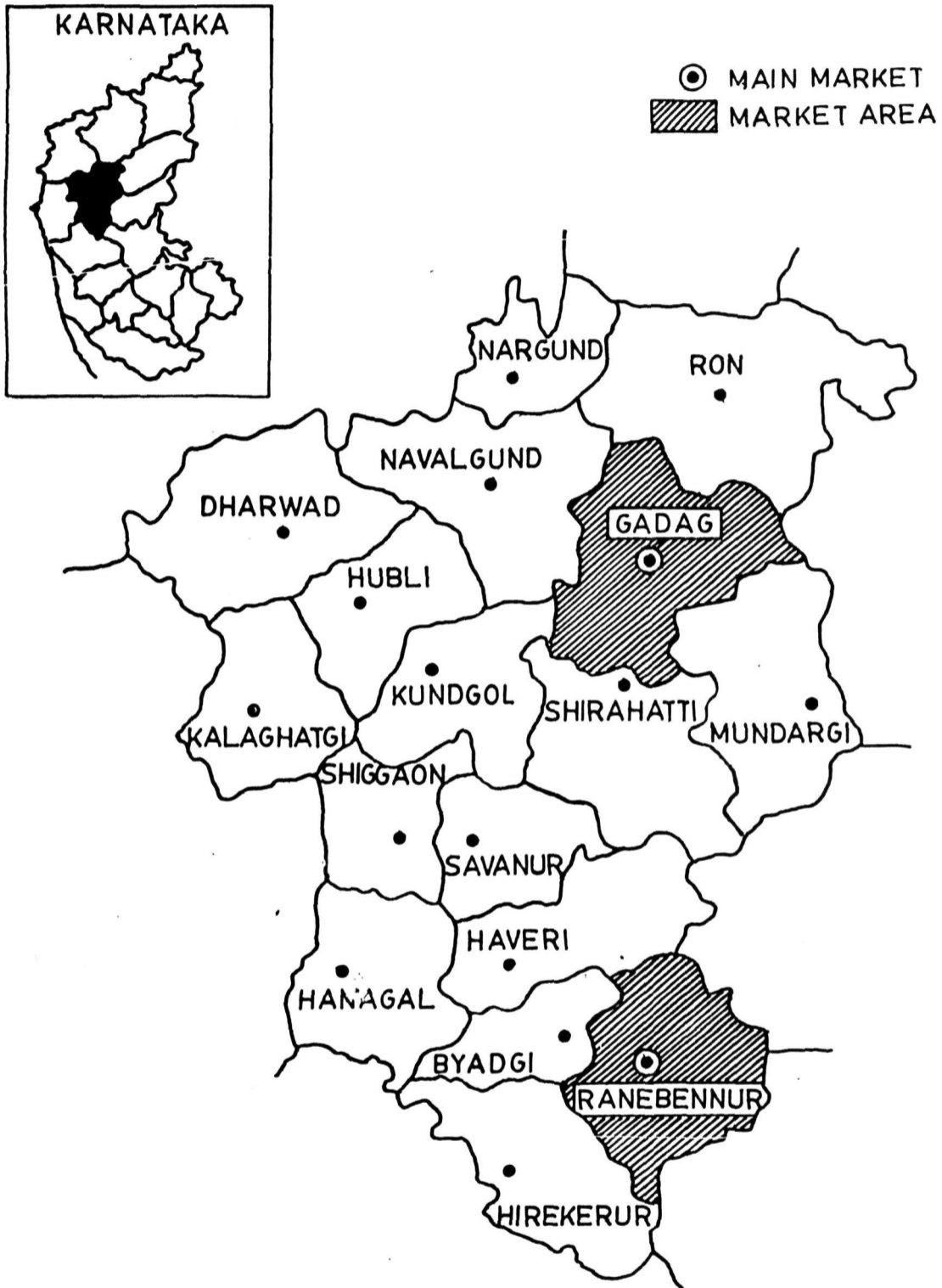


FIG:3.3 - MAP OF DHARWAD DISTRICT SHOWING STUDY MARKETS.

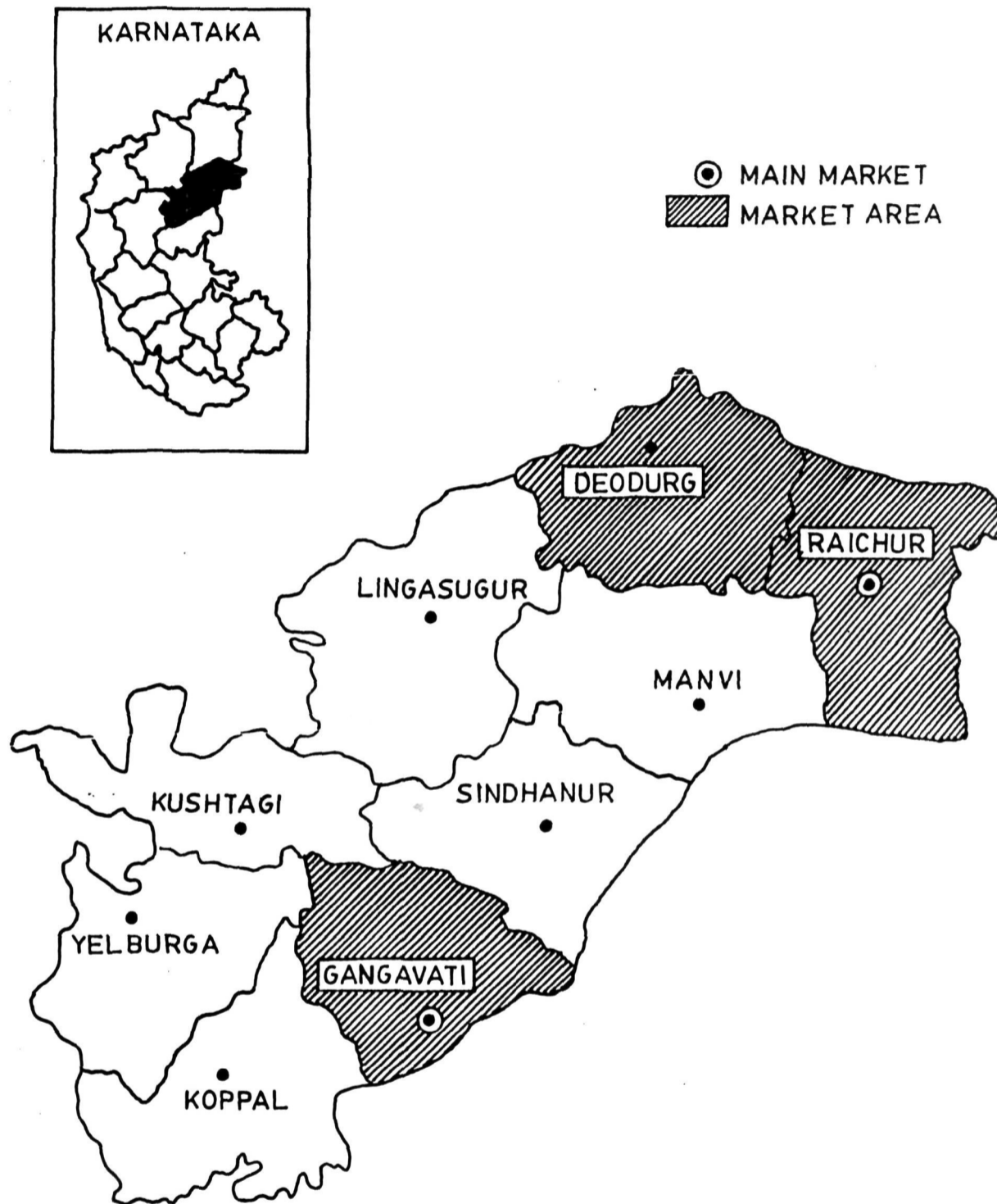


FIG:3-4-MAP OF RAICHUR DISTRICT SHOWING STUDY MARKETS.

Dharwad and Raichur districts accounted for 70 per cent, 71.32 per cent and 86.15 per cent respectively of the total arrivals of the selected oilseeds (Table 3.4).

3.1.5 Selection of Farmers

Detailed primary information with respect to production, sale, prices, costs, channel of marketing preferences were collected from farmers. For this purpose, 40 farmers were selected from each market at random. Thus, in all, 240 farmers were chosen for detailed interviews.

3.1.6 Selection of Market Functionaries

To study marketing costs, margins and channel of marketing, the total market functionaries were considered under under five groups namely commission agents, wholesale traders, oil millers, village traders and retailers. A representative number of market functionaries, that is 60 commission agents (10 from each market), 60 wholesale traders (10 from each market), 30 oil millers (5 from each market), 30 village traders (5 from each market) and 30 retailers (5 from each market) were chosen and interviewed.

3.2 Description of the Study Area

The State of Karnataka is situated between 11.5° and 19.0° North latitudes and between 74° and 78° East longitudes in Southern plateau of India. It is the eighth largest State in

India with an area of 190 lakh hectares. The population of the State is 37.14 million of which 71.11 per cent is rural and 28.89 per cent is urban population as per 1981 census.

The State has a wide variety of soils ranging from light to deep black cotton soils, porous to heavy impervious soils and well drained laterite to problematic 'Karl' soils. The State has been delineated into 10 agro-climatic zones (Fig 3.5). Entire Bijapur and parts of Raichur districts of the study area and part of Dharwad district fall under Northern Dry Zone. The remaining part of Dharwad district comes under Northern Transition Zone. The cultivation of oilseed crops is concentrated in Northern Dry Zone, Central Dry Zone and Southern Dry Zone of the State.

Of the geographical area of 190.5 lakh hectares, an area of 105.02 lakh hectares is under cultivation in the State. Food grains which have the largest share in the cropping pattern, occupy 73.51 lakh hectares (nearly 61 per cent of the gross cropped area). The important foodgrains are jowar, paddy, ragi, bajra and tur. Oilseeds cover an area of 22.05 lakh hectares, assuming the second position among the crops grown in the State (Table 3.5). The important oilseeds of the State are groundnut, sunflower, safflower and sesamum which

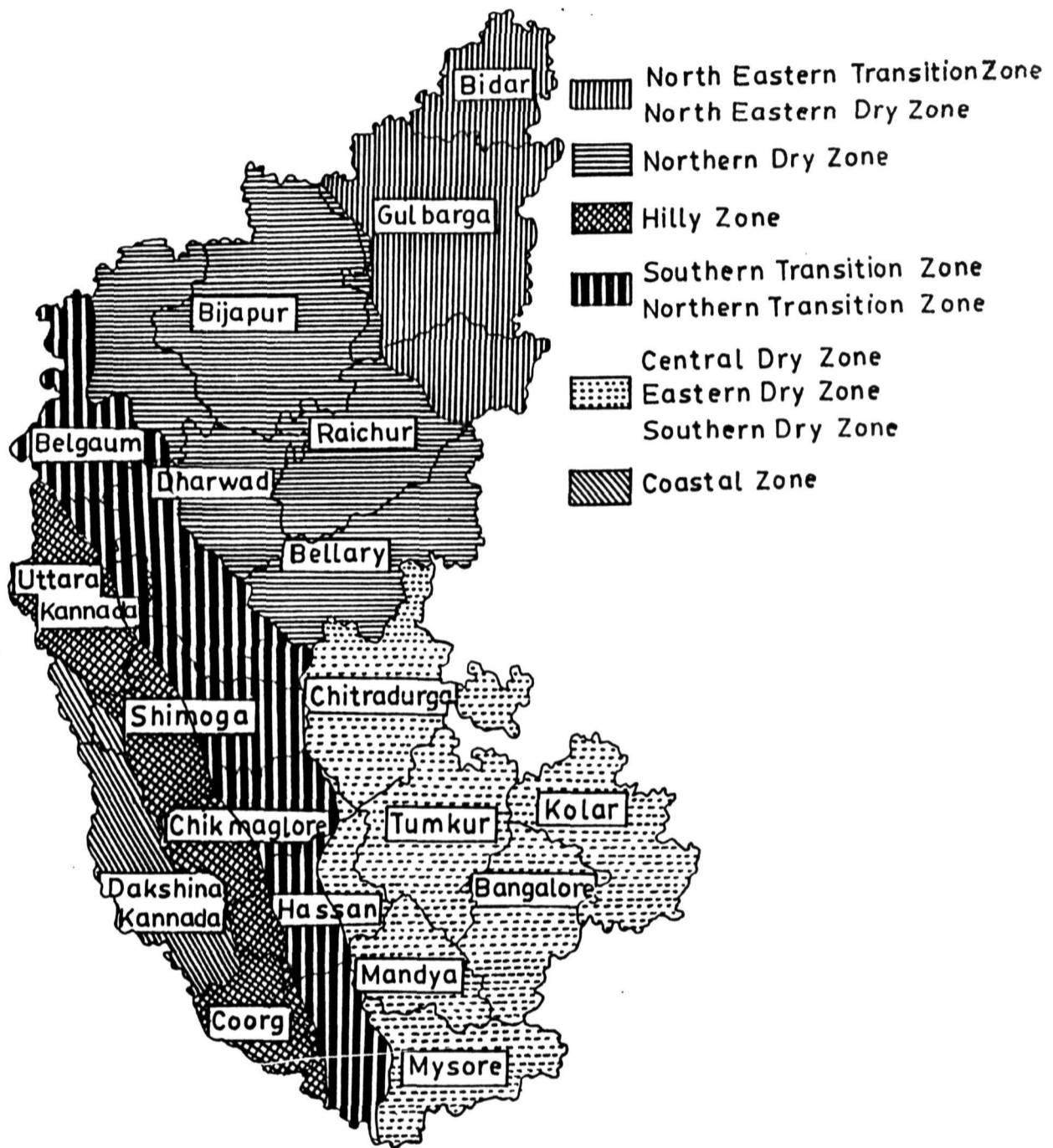


FIG:3-5-MAP OF KARNATAKA STATE SHOWING AGRO-CLIMATIC ZONES.

Table 3.5 : Major Crops of the Study Area (1989-90)

Sl. No.	Crops	Bijapur		Dharwad		Raichur		State	
		Area	Percentage	Area	Percentage	Area	Percentage	Area	Percentage
1. Cereals :									
	Paddy	1852	0.12	81993	6.59	84873	7.88	1183336	9.77
	Jowar	552706	37.32	266895	21.46	331433	30.77	2338896	19.31
	Bajra	172538	11.65	1827	0.02	111326	10.34	514210	4.24
	Maize	44863	3.03	22220	1.79	8887	0.83	252738	2.09
	Ragi	-	-	9294	0.75	-	-	1167265	9.64
	Wheat	58011	3.92	80729	6.49	18604	1.73	247874	2.05
	Total cereals	829970	56.04	462958	37.22	555123	51.55	5704319	47.08
2. Pulses :									
	Tur	27995	1.89	19385	1.56	48089	4.46	482216	3.98
	Greengram	24048	1.62	34120	2.74	13644	1.27	189057	1.56
	Bengalgram	40829	2.77	48647	3.91	18972	1.76	224288	1.85
	Total pulses	169266	11.43	141038	11.34	111787	10.38	1646761	13.59
3. Oilseeds :									
	Groundnut	115749	7.82	145326	11.68	133893	12.43	1194353	9.86
	Sunflower	182915	12.35	44465	3.57	71937	6.68	580573	4.79
	Safflower	47150	3.18	28655	2.30	27003	2.51	198280	1.64
	Sesamum	4709	0.32	9404	0.76	24749	2.30	152400	1.26
	Total oilseeds	373947	25.25	232587	18.70	257582	23.92	2204828	18.20
4. Cash crops									
	Sugarcane	3125	2.24	5138	0.41	2366	0.23	264870	2.19
	Cotton	41209	2.78	233049	18.74	100787	9.36	697332	5.76
	Chillies	3099	0.21	95581	7.68	1848	0.17	151590	1.25
5. High yielding varieties									
		234200		169200		266100		3137000	
Gross cropped area		1481008		1243862		1076939		12114597	

Source : Fully Revised Estimates of Principal Crops of Karnataka for the year 1989-90, Directorate of Economics and Statistics, Bangalore.

account for nearly 95 per cent of the total area under oilseeds in the State.

The normal rainfall of the districts ranges from as low as 552 mm in Bijapur district to as high as 3932 mm in Dakshina Kannada district. The average normal rainfall of the State is 1139 mm. The maximum rainfall occurs in ghat regions followed by coastal, malnad, transition and maidan regions. It progressively declines from South-West to North-East of the Karnataka State except in Bidar and northern part of Gulbarga districts. The State receives rainfall both from South-West and North-East monsoons.

The mean temperature ranges from 21.5° to 31.7° C, the minimum and maximum temperatures being 14° C and 39° C respectively. The climatic endowments are favourable for the production of crops throughout the year if water is made available.

The irrigation potential in the State is estimated at about 25 per cent of the arable land. At present, the gross irrigated area in the State is 21.29 per cent of the gross cropped area. It is important to note that nearly 70 per cent of the area of the State falls under drought prone regions. Canals, wells and tanks are the main sources of irrigation

accounting for 40.43 per cent, 24.52 per cent and 15.49 per cent of the irrigated area respectively.

The crops having major share in the gross irrigated area in the State are paddy (28.55%), sugarcane (10.25%) groundnut (9.52%), maize (7.58%), jowar (7.23%), cotton (6.88%) and sunflower (5.25%). These crops together account for 75.26 per cent of the gross irrigated area of the State. Most of the oilseeds in the State are cultivated under rainfed conditions and only about 20 per cent of the area under groundnut and sunflower in some parts of the State has irrigation facilities (Table 3.6).

The selected districts fall under northern dry zone. These districts are ideally suited for cultivation of oilseeds in terms of their soil characteristics and agro-climatic features. The area under oilseeds in these districts is shown in Table 3.3. This area varies between 18.75 per cent of the gross cropped area in the case of Dharwad district and 25.25 per cent in Bijapur district. Among the oilseeds grown in Bijapur district, sunflower has the largest area followed by groundnut and safflower, whereas in the case of Dharwad district, groundnut occupies maximum area followed by sunflower and safflower and the same is true in the case of Raichur district.

Irrigated sunflower occupied 13.67 per cent of the gross irrigated area in Bijapur district. In the case of Dharwad and Raichur districts respectively 14.94 per cent and 17.65 per cent of the gross irrigated area was under groundnut crop. The proportion of the irrigated area under oilseeds to the total oilseeds area was around 35 per cent in Raichur district, 20 per cent in Bijapur district and 16 per cent in Dharwad district (Table 3.6).

In the State, there are 397 regulated markets of which, 116 are main markets and 281 are sub-markets. The market regulation in the State covers a wide range of crops like cotton, groundnut, sunflower, paddy, jowar, safflower, chilli, and onion. The total transaction of regulated markets in the State is in the order of Rs. 2023 crores.

The number of total regulated markets is 29 in Bijapur district, 53 in Dharwad district and 28 in Raichur district. There are seven main regulated markets each in Bijapur and Raichur districts and 15 in Dharwad district. The total turnover of the regulated markets is Rs. 96 crores in Bijapur district, to 240 crores in Dharwad district and Rs. 210 crores in Raichur district.

The annual arrivals of the four major oilseeds varied from 130 thousand quintals (Ranebennur) to 611 thousand quintals

Table 3.6 : Irrigated Area under Major Crops (1989-90)

Sl. No.	Crops	Bi japur		Dharwad		Raichur		State	
		Area	Percentage	Area	Percentage	Area	Percentage	Area	Percentage
1.	Paddy	668	0.24	33564	20.46	80963	31.13	736539	28.55
2.	Jowar	52132	18.78	10230	6.23	48636	18.7	186464	7.23
3.	Bajra	18486	6.66	260	0.16	8280	3.18	46371	1.8
4.	Maize	44508	16.03	16296	9.93	8887	3.42	195628	7.58
5.	Tur	463	0.17	134	-	1309	0.5	8118	0.31
6.	Bagalgram	6479	2.33	2242	1.37	608	0.23	24993	0.97
7.	Groundnut	23474	8.46	24515	14.94	46687	17.95	245499	9.52
8.	Sunflower	37950	13.67	6702	4.09	26455	10.17	135329	5.25
9.	Safflower	283	0.10	509	0.31	594	0.23	3107	0.12
10.	Sesamum	2	-	26	-	157	-	1526	0.06
11.	Sugarcane	33125	11.93	5113	3.12	2366	0.91	264375	10.25
12.	Cotton	7316	2.64	40828	24.89	25215	9.69	177477	6.88
13.	Chillies	3097	1.12	1496	0.91	790	0.30	18427	0.71
Gross irrigated area (all crops)		277597	-	164058	-	260123	-	2579468	

Source : Annual and seasonal crops report 1989-90.
Directorate of Economics and Statistics, Bangalore.

(Raichur). The total turnover of the selected oilseeds was highest in Raichur market followed by Talikoti and Gadag markets. The number of commission agents operating in these markets ranged from 125 in Talikoti market to 360 in Gangavati market. The number of traders operating in these markets varied between 121 (Ranebennur) and 509 (Bijapur). The number of oil processors functioning in the markets varied from as low as 5 in Ranebennur market to as high as 50 in Gadag market. The brief profile of the study area is presented in Tables 3.7 and 3.8.

3.3 Nature and Sources of Data

In the present study, both primary and secondary data were used.

To study the growth rates of oilseeds, district-wise time series data on area, production and productivity of total oilseeds, groundnut, safflower, sesamum were collected for the period, 1955-56 to 1989-90 from the the Directorate of Economics and Statistics, Government of Karnataka, Bangalore. The data in respect of sunflower were collected only for the period from 1978-79 to 1989-90, owing to meagre acreage and the production of the crop during the earlier years.

The time series data relating to the area, production and productivity of the competing crops, monthly rainfall, farm

Table 3.7 : Profile of the Study Area (1989-90).

Sl. No.	Particulars	Units	Bijapur	Dharwad	Raichur	State
1.	Geographical area	'000 ha	1712	1378	1388	19050
2.	Population: i) Rural	'000s	1823	1908	1440	26407
	ii) Urban	'000s	577	1038	344	10729
	Total (i + ii)	'000s	2400	2946	1784	37136
3.	Literacy rate	%	32	42	25	38
4.	Net area sown	'000 ha	1329	1040	911	10502
5.	Net area irrigated					
	Sources: i) canals	'00	637	439	1518	8456
	ii) Tanks	"	101	276	29	3241
	iii) Wells	"	1028	165	220	5129
	iv) Borewells	"	11	199	17	1350
	v) Others	"	523	232	59	2741
	Total (i to v)	"	2300	1311	1843	20917
6.	Rainfall Normal	mm's	569	717	599	1139
	Actual	"	651	526	489	1004
7.	Gross cropped area	'000 ha	1481	1244	1077	12114
8.	Area under crops :					
	i) Cereals	'000 ha	830	463	555	5704
	ii) Pulses	"	169	141	112	1646
	iii) Oilseeds	"	374	232	257	2205
	iv) Cash crops	"				
	- Sugarcane	"	33	5	2	265
	- Cotton	"	41	233	100	697
	- Chillies	"	3	95	18	151
	v) HYV's	"	234	169	266	3137
9.	Regulated markets					
	i) Main markets	No's	7	15	7	116
	ii) Sub markets	"	22	38	21	281
	Total (i + ii)	"	29	53	28	397
10.	Turnover of regulated Markets	Rs. in Crores	96	240	210	2023

Source : Karnataka State At a Glance, 1989-90.
Directorate of Economics and Statistics, Bangalore.

Table 3.8 : Selected Regulated Markets At a Glance (1990-91)

Sl. No.	Particulars	Units	Bijapur	Talikota	Gadag	Ranebennur	Gangavati	Raichur
1.	Establishment		1938	1962	1943	1953	1953	1934
2.	Market area (talukas)		Bijapur, Indi, B. Bage-wadi and Sindagi	Muddebihal	Gadag	Ranebennur	Gangavati	(Raichur, Devadurga)
3.	Market yards		Bijapur	Talikota	Gadag	Ranebennur	Gangavati	Raichur
4.	No. of sub-markets		9	2	6	1	3	2
5.	No. of notified commodities		28	24	34	26	45	53
6.	Arrival of notified commodities	qtls.						
	All commodities		923486	334358	590246	708944	2837669	2199602
	All oilseeds		186901	283691	294957	130665	(N.A.)	611662
	Selected oilseeds		183082	283518	294066	130098	(N.A.)	611602
	Live stock	Mos.	71976	28937	-	3629	(N.A.)	(N.A.)
7.i)	Total Turnover of all commodities	Rs. in crores	45.31	35.02	46.09	52.16	73.21	122.72
	Total Turnover of All oilseeds		15.12	27.82	27.5	8.59	-	39.21
	Total Turnover of Selected oilseeds		14.88	27.81	27.44	8.55	(N.A.)	39.2
8.	No. of important market Functionaries	No's						
	i) Commission agents		179	125	197	307	360	188
	ii) Traders		509	153	330	121	267	337
	iii) Crushers/Oilmillers		46	13	50	5	15	28

Note : NA - Not available

Source : Annual Reports of Study Markets, 1990-91

harvest prices, gross and net cropped area and irrigated area were also obtained from the records at the Directorate for the period from 1960-61 to 1989-90. The data collected for ascertaining the influence of price and non-price variables on the production of sunflower was confined to the period from 1978-79 to 1989-90.

For analysing the nature and magnitude of competition in the oilseed marketing, the data on quantity of groundnut and sunflower handled by each market functionary-mainly commission agents and wholesale traders-were collected from the Tender Registers maintained in the selected regulated markets. For this purpose, transactions for two representative weeks - one each from peak and lean arrival months for the year 1990-91 have been considered. Further, annual, monthly and weekly data on arrivals and prices were collected from the register maintained in each APMC office. The period of this part of the study varied from crop to crop and market to market and is produced in the appropriate places in this study.

The other sources consulted for the collection of relevant secondary data for the present study are The Directorate of Agricultural Marketing. The Karnataka State Oilseeds Federation, Bangalore, The Department of Agriculture, Offices

of the Additional Director of Agricultural Marketing and the District Statistical Offices in the study districts.

The primary data for the present study were obtained for the year 1990-91 from the sample farmers and market functionaries through personal interview by using pre-tested and structured schedules. The schedules farmers for covered information on disposal pattern of oilseeds, cost incurred by them under different marketing channels, price received, awareness about the marketing regulation and the problems faced in marketing of the produce. A separate schedule was prepared for eliciting information from the market functionaries involved in oilseed marketing. This schedule included information on quantity handled, price paid, marketing costs and margins, etc. The method of personal interview was adopted to ensure that the data made available by the respondents were relevant, comprehensive and reasonably correct and precise.

3.4 Statistical Techniques Employed

3.4.1 Compound Growth Rate Analysis

Compound growth rates in area, yield and production of oilseeds were estimated by specifying the following form of the relationship.

$$Y_t = ab^T u_t \dots\dots\dots (3.1)$$

where Y_t = area, yield or production of crops in year t

t = year which takes values 1,2, ---- n

u_t = disturbance term

'a' and 'b' are parameters to be estimated.

Logarithmic transformation of (3.1) provided the estimating equation :

$$Y_t^* = a^* + b^* t + u_t^* \quad (3.2)$$

Where $Y_t^* = \log Y_t$, $a^* = \log a$, $b^* = \log b$ and $u_t^* = \log u_t$

Equation (3.2) was estimated by Ordinary Least Square(OLS) Technique. Compound growth rate (g) was then estimated by the identity given in equation (3.3).

$$\hat{g} = (\hat{b} - 1)100 \quad (3.3)$$

Where \hat{g} = estimated compound growth rate in per cent per year.

and

$$\hat{b} = \text{antilog of } \hat{b}^*$$

The standard error of the growth rate was estimated and tested for its significance with 't' statistic.

Growth rates on area, production and yield of groundnut, safflower and sesamum and total oilseeds were computed for a period of 35 years (1955-56 to 1989-90). Data on sunflower was available only for 12 years from 1978-79 onwards. Thus, the selection of period for the analysis of sunflower was dictated by the availability of data.

To study the impact of green revolution on growth of area, yield and production of groundnut, safflower and sesamum and

total oilseeds separate growth rates were computed for the two sub-periods, namely, pre-green revolution period (1955-56 to 1965-66) and post-green revolution period (1966-67 to 1989-90). Compound growth rates for the selected oilseeds were computed for three major oilseeds growing districts viz., Bijapur, Dharwad and Raichur and Karnataka State as a whole.

3.4.2 Decomposition Analysis

The change in production of a crop is influenced by area, yield and their interaction. In order to measure the relative importance of area, yield and their interaction on production, the technique of decomposition has been adopted (Singh and Gangawar, 1986).

Let P_o and P_n be the production in base and terminal years respectively expressed as

$$P_o = A_o \times Y_o \quad \dots\dots\dots (3.4)$$

$$\text{and } P_n = A_n \times Y_n \quad \dots\dots\dots (3.5)$$

Where (A_o, A_n) and (Y_o, Y_n) represent the area and yield for the base and the final year respectively. To even out the annual fluctuations due to varying climatic factors, the triennium averages for the base and terminal periods were considered. For the present study, the triennium averages of the agricultural years 1956-58 and 1964-66 for pre-green revolution period ; 1966-68 and 1988-90 for post-green

revolution period and 1956-58 and 1988-90 for overall period were considered for groundnut, safflower, sesamum and total oilseeds. For sunflower, only one period i.e., the triennium averages of the agricultural years 1978-80 for base period and 1988-90 for final period was considered.

Further

$$Y_n - Y_o = \Delta Y ; A_n - A_o = \Delta A ; P_n - P_o = \Delta P \dots\dots\dots (3.6)$$

Where, A_o and y_o indicate base year area and yield.

A_n and Y_n indicate terminal year area and yield.

$$\Delta P = A_o \Delta Y + Y_o \Delta A + \Delta A \Delta Y \dots\dots\dots (3.7)$$

Thus, the change in production (ΔP) from terminal period to base period is decomposed into area effect ($\Delta A Y_o$), yield effect ($A_o \Delta Y$) and interaction effect ($\Delta A \Delta Y$).

3.4.3 Trend Analysis

Orthogonal polynomial Regression analysis was adopted to study the trends in area, yield and production of selected oilseeds in the selected districts as well as for the state as a whole.

The trend function of the following form was employed.

$$\hat{Y} = \bar{Y} + b_1 Z_1 + b_2 Z_2 + b_3 Z_3 \dots\dots\dots (3.8)$$

Where \hat{Y} = the predicted area/yield/production of oilseeds

\bar{Y} = the general mean of area/yield/production for any specific year X via Z

Z_i 's = the orthogonal polynomials.

$$Z_1 = X - \bar{X} ; Z_2 = (X - \bar{X})^2 - (n^2 - 1)/12, \text{ etc.}$$

expressed explicitly in terms of equally spaced original X and b_i 's are the regression coefficients whose values are to be determined from the sample data.

Since the objective is to find the polynomial of lowest degree that seems an adequate fit for the data, it is necessary to test for the significance of each 'b' coefficient in successive stages until two successive 'b's turn out to be non-significant (Snedecar and Cochran, 1968).

This method is more suitable for the present study because of absence of prior knowledge regarding the exact mathematical form of the trend functions of different oilseeds and computational ease with which step-wise forward polynomial regression analysis is facilitated.

This technique was used to analyse trends in arrivals and prices of oilseeds in selected markets also.

3.4.4 Principal Component Analysis

In order to identify the most important price and non-price variables which can capture most of the variability in explanatory variables, principal component analysis was carried out. Principal components are a set of linear

combination of new variables which are mutually uncorrelated (independent) and exhibit maximum variance. To find the principal components, first, the correlation matrix for explanatory variables will be worked out. Let this matrix be 'A', which is of size $m \times m$ for 'm' number of explanatory variables. Then, the solution of following set of 'm' equations yields 'm' different values of characteristic roots (also called latent roots or eigen values) denoted as 'b'

$$|A - bI| = 0 \dots\dots\dots (3.9)$$

Where, A = correlation matrix of size $m \times m$

I = identity matrix of size $m \times m$

b = a scalar

Let these characteristic roots be denoted as b_1, b_2, \dots, b_m in descending order. Corresponding to each characteristic root (say b_j), a characteristic vector or eigen vector (a_j) of size $m \times 1$ will be worked out by solving the following matrix.

$$\begin{bmatrix} A - b_j I \end{bmatrix} \begin{bmatrix} a_j \end{bmatrix} = [0] \dots\dots\dots (3.10)$$

Where, A = $m \times m$ scalar matrix as defined earlier

b_j = a scalar

I = $m \times m$ identity matrix

a_j = $m \times 1$ column vector and

0 = $m \times 1$ column vector of zeros.

An additional step is required to normalise a_j vector such that $a_j' a_j = 1$. Similarly, characteristic vectors corresponding

to other roots will be worked out. The principle components corresponding to j^{th} characteristic root will be then defined as

$$Z_j = a_{j1} X_1 + a_{j2} X_2 + \dots + a_{jm} X_m \quad (3.11)$$

and is interpreted to explain $\left[b_j / \sum b_j \right] \times 100$ per cent of the variation in all the explanatory variables.

In the present study, this analysis was carried out to identify the influence of price and non-price factors on production of major oilseeds viz., groundnut, safflower, sesamum and sunflower in three major oilseeds growing districts of Bijapur, Dharwad and Raichur.

The influence of price and non-price factors varies from crop to crop and district to district overtime because of variation in soil conditions, weather conditions, spatial and temporal distribution of rainfall and the like. Selection of these variables was made in consultation with crop scientists and extension agencies. The cropping pattern of the districts was also kept in mind while making the selection. The variables identified for different crops have been presented in the Tables 4.6 to 4.9 in the subsequent chapter.

3.4.5 Lorenz Curve Technique

Lorenz Curve technique was used for analysing market power concentration with commission agents and wholesale traders for

two major oilseeds viz., groundnut and sunflower transacted in selected markets. Besides graphical representation with Lorenz curve, Lorenz coefficient of inequality was also estimated using the following formula :

$$L = 1 - \frac{\sum_{i=1}^n (X_i - X_{i-1}) (Y + Y_{i-1})}{10000} \dots\dots\dots (3.12)$$

Where L = Lorenz Coefficient of Inequality

X_i = Cumulative percentage of number of firms upto and including i^{th} class

Y_i = Cumulative percentage of quantity handled or value of transaction by firms upto and including i^{th} class.

n = number of firms / size groups

i takes value 1,2,3 n size groups.

L value ranges between '0' and '1'

When L = 0, there is a perfect equality in the distribution.

When L = 1, there is a perfect inequality in the distribution.

3.4.6 Time series Analysis

A time series is a complex mixture of four components viz., trend (T), seasonal (S), cyclical (C) and irregular (I). These four types of movements are frequently found either separately or in combination in a time series. The relationship among these components is assumed to be either

additive or multiplicative. A composite economic time series data is expressed in multiplicative model as

$$O_t = T \times C \times S \times I \quad \text{.....} \quad (3.13)$$

Where O_t = original observation at time 't'

T = trend element

C = cyclical movement

S = seasonal variation and

I = irregular fluctuations.

In the present study only trend and seasonal indices were computed to study the behaviour of arrivals and prices of oilseeds.

Seasonal Indices

For computing the seasonal indices of monthly arrivals and prices of selected oilseeds, twelve-month-moving-averages method was used.

3.4.7 Regression Analysis

Following Simple Linear regression analysis was carried out to ascertain the response of price to a given change in arrivals.

$$Y_i = a + bx_i \quad \text{.....} \quad (3.14)$$

Where, Y_i = Prices

X_i = market arrivals

This analysis was extended only to such cases where the adequate data necessary for the application of the technique was available.

3.4.8 Correlation Analysis

This analysis was adopted to assess the nature and magnitude of the association between arrivals and prices of selected oilseeds. The coefficient of correlation was computed separately for peak, lean and overall periods. The identification of peak and lean periods for different crops was based on the seasonal indices of arrivals (Tables 20 to 23) calculated for each month. The months showing the indices of more than 100 constituted peak period and lesser indices constitute lean period. The overall period referred to all the 12 months of the year. The correlation coefficients thus computed were tested for their statistical significance.

The coefficient of variation analysis was also adopted to find out the extent of fluctuations in market arrivals and prices of selected oilseeds and also to know the extent of integration in the study markets.

3.4.9 Tabular Analysis

Tabular analysis was made with the data relating to utilisation and disposal of oilseeds, costs, prices, sales etc. separately for producer-seller and different market functionaries with the aid of statistical averages, ratios, percentages etc. to obtain meaningful results.

RESULTS

IV RESULTS

In consistence with the objectives of the study, the data collected from different sources were analysed. The results of the investigation and analysis are presented under the following heads.

4.1 Growth Performance of Oilseeds

4.1.1 Growth rates in area, yield and production of oilseeds

4.1.2 Components of changes in production of oilseeds

4.1.3 Trends in area, yield and production of oilseeds

4.2 Identification of Price and Non-Price Factors Influencing Production of Oilseeds

4.3 Market Structure For Oilseeds

4.3.1 Classification of markets based on nature of competition

4.3.2 Market power concentration in oilseeds trade

4.3.3 Size-Distribution of sellers and buyers in oilseeds transaction.

4.4 Behaviour of Market Arrivals and Prices of Oilseeds.

4.4.1 Trends in annual market arrivals and prices of oilseeds.

4.4.2 Seasonal indices of monthly market arrivals and prices of oilseeds.

4.4.3 Impact of market arrivals on prices of oilseeds.

4.4.4 Association between arrivals and prices of oilseeds.

4.4.5 Variations in arrivals and prices of oilseeds.

4.4.6 Market integration.

4.5 Marketing of oilseeds by sample farmers

4.5.1 Utilization of oilseeds

4.5.2 Disposal pattern of oilseeds

4.5.3 Preference of marketing channels

4.5.4 Marketing cost incurred by sample farmers

4.5.5 Marketing cost incurred by traders

4.5.6 Marketing margins under different channels

4.1 Growth Performance of Oilseeds

4.1.1 Growth Rates in Area, Yield and Production of Oilseeds.

The results of the compound growth rate analysis of area, yield and production of individual and total oilseeds in the selected districts as well as for the State of Karnataka as a whole are presented in Table 4.1.

Groundnut

In Bijapur district area and yield showed negative trend in both pre and post-green revolution periods. There by resulting in decreasing trend in production in both the periods.

Table 4.1 : Compound Growth Rates of Area, Yield and Production of Oilseeds.

Crop	Bijapur			Dharwad			Raichur			Karnataka State		
	Pre	Post	Overall	Pre	Post	Overall	Pre	Post	Overall	Pre	Post	Overall
1 Groundnut	Area	-5.05**	-1.22*	-1.46**	5.27**	-0.53	0.50	-0.51	0.95**	-0.21	0.50*	0.33*
	Yield	-4.82*	-0.28	-0.14*	-4.89*	0.32	-0.66	-2.29	0.53	-2.41	0.94*	0.71*
	Production	-10.12*	-1.52	-1.66*	-0.39	-0.23	-0.24	-3.35	1.46	-3.13	1.47*	0.95
2 Safflower	Area	-5.76**	3.31**	3.01**	-1.31	3.23**	1.76**	-0.14**	1.94*	-2.34**	2.25**	1.56**
	Yield	-10.46**	15.90**	6.93**	1.55	5.63**	3.86**	-3.66**	6.30**	-2.41*	8.08**	4.46**
	Production	-15.63**	16.32	8.82	0.21	8.72	5.46	-3.79	7.94	-4.68**	10.18	5.86
3 Sesamum	Area	-0.27	-0.97	-0.24	-8.25**	6.33**	3.51**	-2.76	3.21**	-0.88	3.76**	2.79**
	Yield	-1.14	1.61	1.34	1.75	0.43	1.34**	9.33	2.96**	4.83*	1.50*	1.72**
	Production	-2.08	0.63	0.99	-7.26	6.78	4.80	5.61	6.26**	3.57	5.36	4.45**
4 unflower ^a	Area	-	-	59.59**	-	-	58.51**	-	-	-	-	45.45**
	Yield	-	-	-6.08**	-	-	-5.93**	-	-	-	-	-6.25**
	Production	-	-	49.88**	-	-	49.09**	-	-	-	-	36.23**
5 Total oilseeds	Area	-4.63**	3.58**	1.73**	3.68*	1.28**	1.25**	-0.76	3.44**	-0.74*	2.71**	1.61**
	Yield	-5.49*	0.67**	4.41**	-4.17	0.26	-0.49	-2.52	0.72**	-2.38	0.56**	0.63**
	Production	-9.86*	3.94**	1.58	-0.57	1.21	0.57	-3.58	3.85	-4.32	3.25	2.28

Notes : ** Significant at 1% level

* Significant at 5% level

Pre Pre-Green Revolution period (1955-56 to 1964-65)

Post Post-Green Revolution period (1965-66 to 1989-90)

Overall Overall period (1955-56 to 1989-90)

^a 1978-79 to 1989-90

In Dharwad district negative trend in area in the post-green revolution period and negative trend in yield in pre-green revolution period have ultimately influenced the production during the entire period adversely.

In Raichur district the negative trends in area, yield and production during pre-green revolution period is more than off set by their better growth rates in the post-green revolution period. Thus, the trends for over-all period are positive.

The trends in the State is similar to those observed in Raichur district. The post-green revolution has witnessed positive growth rates in area, yield and production which was able to more than off set the negative trends during pre-green revolution period.

Safflower

In Bijapur district pre-green revolution period evidenced a negative growth in area, yield and production of the crop. However, the trend was more than off set by the positive growth achieved during the post-green revolution period as was reflected in the increasing trend observed for the overall period.

In the case of Dharwad district the highly significant positive growth rates observed during post-green revolution period led to a rising trend in area, yield and production during overall period. The mild negative growth in area observed during pre-green revolution period as an exception, was found to be of no consequence.

In Raichur district, the case was similar to that of groundnut. The declining trend noticed in area, yield and thereby production in the pre-green revolution period was more than compensated by impressive positive growths in all the variables in the post-green revolution period. Thus, the overall period projected remarkable rising trend.

The result for the state as a whole revealed that area, yield as well as production of this crop during pre-green revolution period had gone down considerably. However, during the post-green revolution period, the trend was reversed and the positive growth performance during entire period.

Sesamum

In Bijapur district, area, yield as well as production showed a negative trend in pre-green revolution period. However, there observed a increase in yield and production

of the crop during post-green revolution as well as overall period.

In respect of Dharwad district, a considerable decrease in the area under the crop in pre-green revolution period was noticed which was however more than off set by the significant increase during post-green revolution period resulting in an increase in area for overall period. The yield levels were positive for all the periods and thus the production for the entire period showed a significant positive growth.

With regards to Raichur district all the growth rates were positive except that of area in pre-green revolution period. The significant rising trend observed in post-green revolution period was mainly responsible for the observed positive growth rates in all the three variables during the entire period.

The situation for the State as a whole revealed that all the growth rates during pre-green revolution and post-green revolution periods were positive - most of them are significant - with only exception of area growth in pre-green revolution period which turned out to be negative. The State, for the overall period, naturally experienced highly significant positive growth in area, yield as also the production.

Sunflower

The growth rates of area, yield and production were examined only for one period i.e., from 1978-79 to 1989-90 owing to the non-availability of the data for the earlier period. The growth rates of area and production in all the districts as also at the aggregate level were invariably positive and highly significant. However, it is noteworthy that the yield growth rates in all the cases were negative without exception.

Total Oilseeds

In Bijapur district both area and yield growths of total oilseeds were negative. However, their positive growth during post-green revolution period were stronger enough so that there was an increase in area, yield and consequently production over the entire period.

In Dharwad district, all the three periods evidenced an increase in the area under total oilseeds. The declining trend in the yield was observed during pre-green revolution period as well as overall period. However, the positive growth of area being stronger than the negative growth of yield during overall period, the production showed an upward trend.

In the case of Raichur district, the growth in area, yield and production were all negative. However, the positive trend witnessed during post-green revolution period was strong enough to cause an upward trend in these variables considered for the overall period.

The picture for the State as a whole revealed that the oilseed sector was neglected as indicated by the negative growth rates in area, yield and production. The post-green revolution period brought about an improvement in the situation for the significant increase in area, yield and production of total oilseeds.

4.1.2 Components of Changes in Production of Oilseeds

In order to isolate the relative contribution of area, yield and their interaction to changes in production of individual as well as total oilseeds in the study area, the decomposition analysis was carried out and the results are presented in Table 4.2.

It is evident from the table that the production of groundnut during pre-green revolution period was affected by the negative growth in area and yield in the entire study area except Dharwad district. The rate of decline in yield was higher than the rate of decline in area. In the case of

Table 4.2 : Contribution of Area, Yield and Their Interaction To the Changes in Production of Oilseeds (%)

Crop	Bijapur			Dharwad			Raichur			Karnataka State			
	Pre	Post	Overall	Pre	Post	Overall	Pre	Post	Overall	Pre	Post	Overall	
1 Groundnut	Area	-58.50	-111.64	-64.69	1078.84	-484.38	5490.98	-20.12	300.10	47.01	-10.83	43.47	55.69
	Yield	-61.53	14.70	-54.81	-630.00	400.11	-3548.54	-82.63	-166.37	45.36	-90.61	45.18	34.56
	Interaction	20.03	-3.06	19.50	-348.84	-15.73	-1842.44	2.75	-33.73	7.63	1.44	11.35	9.75
2 Safflower	Area	-49.26	5.62	15.33	-317.20	24.80	19.10	-0.18	12.98	15.15	-55.51	13.96	16.47
	Yield	-80.21	51.49	43.36	252.23	31.56	35.28	-99.86	62.13	56.13	-54.27	51.81	54.84
	Interaction	29.47	42.89	41.31	-35.03	43.61	45.61	0.04	24.89	28.72	9.78	34.23	28.69
3 Sesamum	Area	-7.94	11.91	25.01	-100.41	62.43	37.24	-30.13	25.35	23.87	-14.86	43.42	6.28
	Yield	112.37	71.65	46.13	0.87	8.49	27.36	161.44	28.77	29.81	121.21	22.57	26.78
	Interaction	-4.43	16.44	28.86	-0.46	29.08	35.40	-31.31	45.88	46.32	-6.35	34.01	36.94
4 Sunflower	Area	-	-	206.71	-	-	209.34	-	-	207.70	-	-	209.68
	Yield	-	-	-1.90	-	-	-2.21	-	-	-1.73	-	-	-3.54
	Interaction	-	-	-104.81	-	-	-107.13	-	-	-105.97	-	-	-106.14
5 Total oilseeds	Area	-53.38	98.77	635.40	4447.79	106.43	265.76	-24.81	132.69	89.38	-32.41	81.02	87.83
	Yield	-67.14	0.60	-296.18	-3332.33	-4.40	-81.62	-79.15	-15.44	5.18	-71.83	9.75	6.39
	Interaction	20.52	0.63	-239.22	-1215.46	-2.03	-84.14	3.96	-17.25	5.44	4.24	9.23	5.78

Dharwad district, the area effect (1078.84%) was stronger than yield (-630.00%) and interaction (-348.84%) effects. During post-green revolution period, the contribution of area and yield were almost equal at the State level. In Bijapur and Dharwad districts, yield effect was found to be positive (14.17% in Bijapur, 400.11% in Dharwad). However, in Raichur district, the effect of yield was negative (166.37%). During overall period, the drastic reduction in groundnut area and yield led to a decrease in output, while in Dharwad district, change in output was mainly contributed by area. In Raichur district, the area and yield have had almost equal contribution to total changes in groundnut output. At the State level, the effect of area was found to be higher than that of yield.

The change in safflower production was negative during pre-green revolution period in the study area which was evidenced by negative effects of area and yield. But in the case of Dharwad district, yield effect was positive (252.23%). Increase in safflower output was noticed in the study districts as well as at the State level during post-green revolution and overall periods. In the increased output, the contribution of yield was more than that of area. The yield effect ranged from as high as 62.13 per cent in Raichur district to as low as 31.56 per cent in Dharwad district. The contribution of area

ranged from 5.62 per cent in Bijapur district to 24.83 per cent in Dharwad district. The effect of interaction was found to be positive in all the districts and at the State level. It was found to be highest in Dharwad district (45.61%) during overall period and lowest in Raichur district (0.04%) during pre-green revolution period.

The pattern of change in production of sesamum was more or less similar to that of safflower in the study area. The increased production of sesamum was mainly due to significant contribution of yield which had more than offset the negative growth of area except in Dharwad district. Contribution of yield to the change in sesamum output was more in Raichur district (161.41%) than State average (121.21%) and it was less than state average in Bijapur district (112.27%). The rate of decrease in area was found to be highest in (-100.41%) Dharwad district followed by Raichur district (-30.13%), and Bijapur district (-7.94%) with a State average of -14.86%. During post-green revolution period and overall period under study, an increasing trend in production of sesamum was noticed which was the result of increasing trends in area, yield and interaction. During post-green revolution period, the change in output was mainly due to area effect in Dharwad district and at the State level. On the contrary, it was higher yield effect (71.65%)

which led to an expansion in production in Bijapur district. In Raichur district, the interaction effect was higher (45.68%) than area (25.35%) and yield (28.77%) effects. During the overall period, increase in output was mainly due to increase in area, yield and interaction effects, the interaction effect being highest in Raichur district (46.32%) and yield effect being highest (46.13%) in Bijapur district. In the case of Dharwad district and at the State level, area and yield effects made more or less equal contribution to changes in production.

For the last one and a half decade, sunflower has been one of the most important oilseed crops in the study area, which competes with almost all the crops during all the seasons. It has registered a substantial increase in production in recent years. The decomposition analysis was carried out for the period, 1978-79 to 1989-90. The increase in sunflower production was mainly due to area effect, which ranged from 206.71 per cent in Bijapur district to 209.68 per cent at the State level. The yield and interaction effects however had negative bearing on change in production in all the districts and there by the State as a whole.

Change in production of total oilseeds mainly depends upon the change in production of above mentioned four oilseeds which

accounted for more than 95 per cent of the total oilseeds area and production in the study area. During pre-green revolution period, the area and yield have negative contribution to the change in total oilseeds production in Bijapur and Raichur districts as well as at the State level. In Dharwad district, the area component had positive contribution. During post-green revolution and overall periods, the expansion in the volume of production of total oilseeds was mainly due to area effect. The contribution of area effect to change in production of total oilseeds was found to be highest in Bijapur district (635.40%) followed by Dharwad district (265.76%) as compared to the state average (89.38%) during overall period, while during post-green revolution period, the highest contribution to production came from increased area in Raichur (132.69%) followed by Dharwad (106.43%), Bijapur district (98.77%), while the State average was 81.02 per cent. With regards to yield and interaction effects during post-green revolution period, Bijapur district and the State revealed positive effect, while Dharwad and Raichur districts exhibited negative effect. However yield and interaction effects have had negative contribution in Dharwad and Bijapur districts, while positive contributions were noticed in Raichur district as well as at the State level.

The table reveals that the contribution of area, yield and their interaction to changes in production of individual as well as total oilseeds varied from period to period and crop to crop. The contribution of area was found to have negative impact on production of individual and total oilseeds in the study area except for Dharwad district during pre-green revolution period and positive impact in most of the cases during post-green revolution and overall periods. The yield and interaction effects recorded mixed results. In general, the increased output of oilseeds in the study area was a result of expansion of area under the crops rather than increments in yield.

4.1.3. Estimated Trends and Growth Rates For Oilseeds

The growth rates obtained for area, yield and production of individual as well as total oilseeds in the study area (Table 4.1) using exponential function did not indicate a clear picture over the years, which was evidenced by poor fit of growth model (R^2) and non-significant 'b' coefficients. To study the trend and growth pattern of oilseeds over the years Orthogonal Polynomial Regression analysis was attempted.

It could be seen from the table 4.3 and figures 4.1 to 4.4 that the changes in area under individual as well as total

Table 4.3 : Estimated Trend and Growth Rate Functions for Oilseeds Area (1955-56 to 1989-90)

District	Crops	Trend Functions					Growth Rate Functions (dy/dx)					
		Intercept	x	x ²	x ³	x ⁴	R ²	F	Intercept	x	x ²	x ³
1 Bijapur	Groundnut	122884.80	-1893.80**	99.80**	-	-	0.60**	24.00	-1893.80	199.60	-	-
	Safflower	40109.52	1210.40**	39.30**	-4.74**	-	0.75**	30.20	1210.40	78.66	-14.22	-
	Sesamum	4353.94	2.91NS	-	-	-	0.01NS	0.02	2.91	-	-	-
	Sunflower	105840.00	10063.00**	-	-	-	0.73**	27.30	10063.30	-	-	-
	Total oilseeds	220697.00	4567.80**	531.03**	-	-	0.76	50.64	4567.80	1062.06	-	-
2 Dharwad	Groundnut	139332.80	601.67**	-107.69**	16.02**	-	0.62**	16.85	101.67	-215.38	48.11	-
	Safflower	17533.86	358.27**	33.43**	-	-	0.43**	12.27	358.27	66.86	-	-
	Sesamum	5547.11	202.14	13.99	-	-	0.74	44.96	202.14	27.98	-	-
	Sunflower	26024.25	2911.20	-	-	-	0.66**	19.25	2911.20	-	-	-
	Total oilseeds	177457.50	2321.10	61.88	24.00	-	0.69**	24.04	2321.10	123.76	72.00	-
3 Raichur	Groundnut	121055.90	677.76**	56.14**	-	-	0.56**	20.00	677.76	112.28	-	-
	Safflower	22530.31	372.12**	23.27**	-	-	0.33*	7.87	372.12	46.40	-	-
	Sesamum	13659.49	422.26**	23.40	1.36*	0.11**	0.83**	36.80	422.26	46.80	4.07	-
	Sunflower	58641.67	6694.80**	-	-	-	0.57**	13.10	6698.80	-	-	-
	Total oilseeds	186159.30	4308.20**	358.63**	18.61*	-	0.73	28.58	4038.20	717.26	-	-
4 State	Groundnut	94775.60	3509.60**	411.45**	76.22**	1.71**	0.69**	16.83	3509.60	822.92	288.66	6.84
	Safflower	169097.00	2858.60**	161.20**	-	-	0.64**	27.90	2858.60	322.40	-	-
	Sesamum	96735.40	2783.20**	114.28**	-	-	0.87**	104.29	2783.20	228.56	-	-
	Sunflower	353515.60	36338.00**	-	-	-	0.72**	25.44	36338.00	-	-	-
	Total oilseeds	1468573.00	26784.00**	2106.50	136.20	-	0.85	59.49	26784.00	4213.00	408.60	-

Note : ** Significant at 1% level
* Significant at 5% level

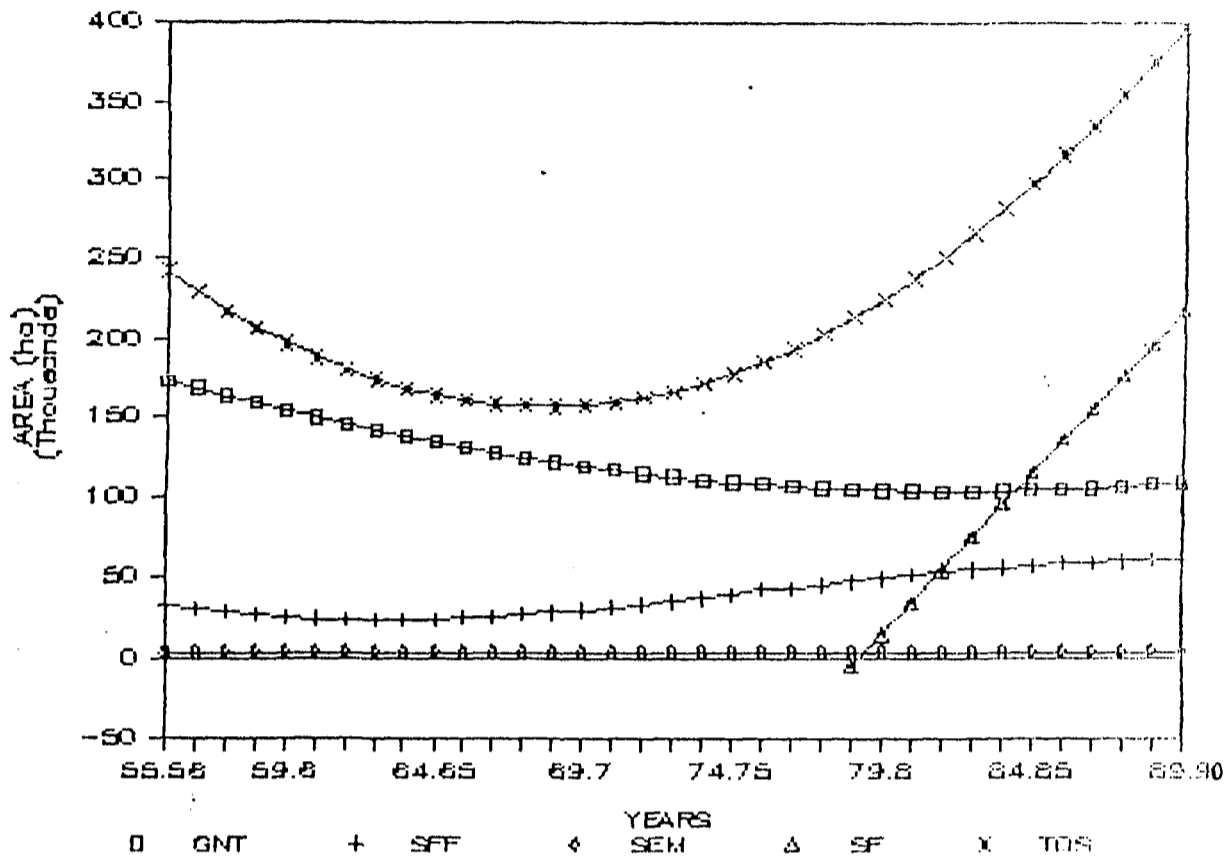


Fig 4.1 : Trends in Oilseeds Area in Bijapur District.

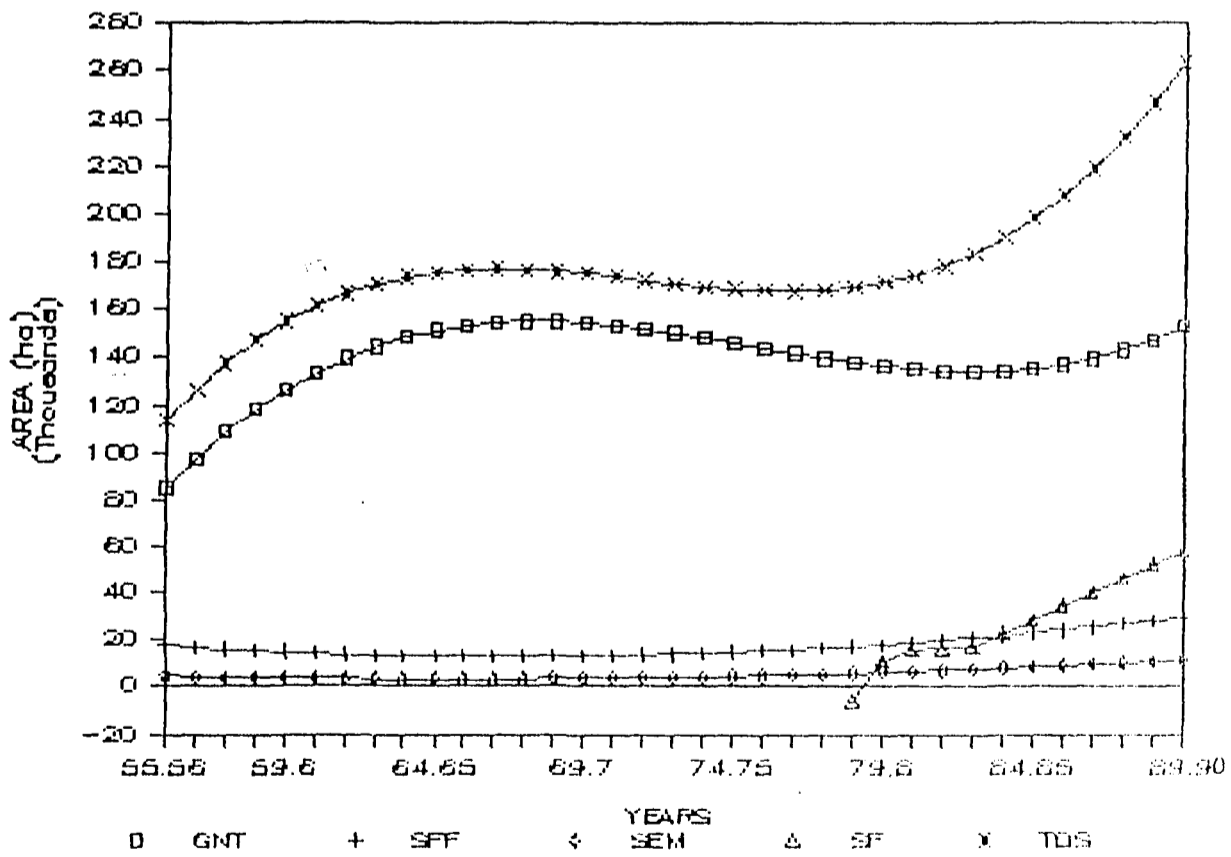


Fig 4.2 : Trends in Oilseeds Area in Dharwad District.

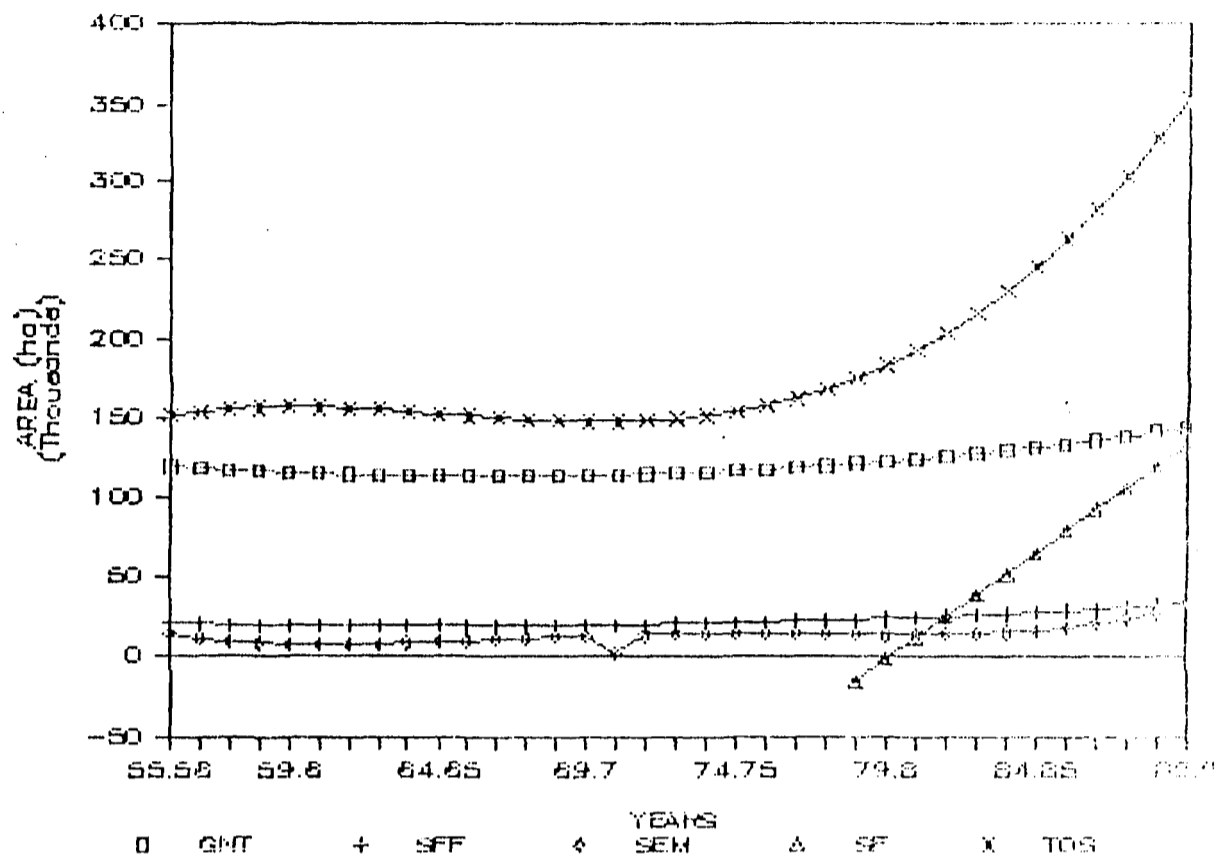


Fig 4.3 : Trends in Oilseeds Area in Raichur District.

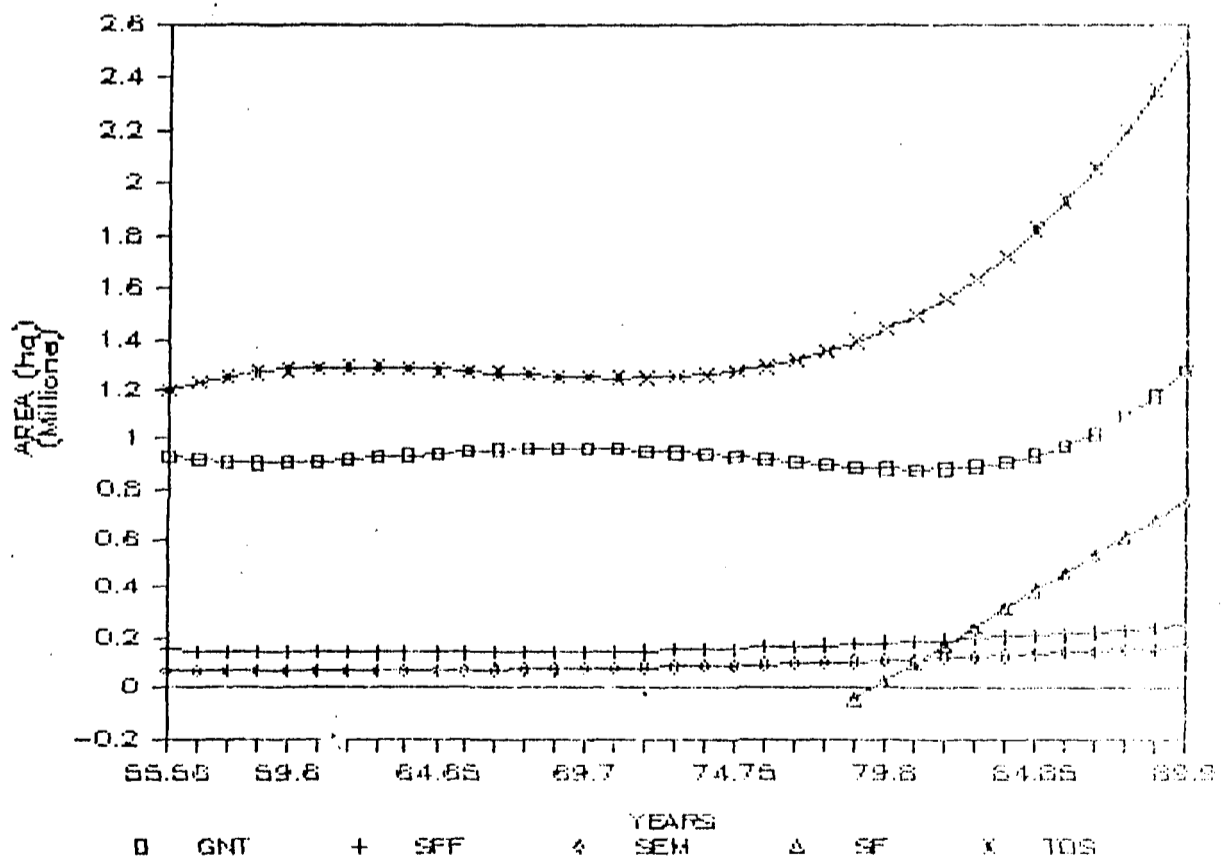


Fig 4.4 : Trends in Oilseeds Area in Karnataka.

oilseeds varied over the space and time. Bijapur district showed a continuous decline in groundnut area till 1979-80 and thereafter a mild increase was observed, while in Dharwad district, a continuous significant increase in groundnut area was noticed till 1964-65 and thereafter it almost stabilised. At the State level, the increase in the groundnut area was noticed only in the recent years. A similar pattern of area trend was witnessed for Raichur district. The area under safflower and sesamum in the study area showed over the years except in the case of safflower in Bijapur district. Wherein a continuous increase in area was noticed from 1964-65 onwards. In rest of the study area a marginal increase in area was noticed in recent years. An impressive growth in area under sunflower was observed since its introduction, which was evidenced by the continuous upward trend across the districts and at the State level. The area under total oilseeds across the districts and at the State level showed a substantial increase in the recent years as a result of introduction of sunflower.

An interesting trend pattern of yield of oilseeds was observed from the Table 4.4 and figures 4.5 to 4.8. The yield of sunflower showed a steep fall during the initial years in all the districts and at the State level as well. Sunflower

Table 4.4 : Estimated Trend and Growth Rate Functions for Oilseeds Yield (1955-56 to 1989-90)

District	Crops	Trend Functions					Growth Rate Functions (dy/dx)							
		Intercept	x	x ²	x ³	x ⁴	x ⁵	R ²	F	Intercept	x	x ²	x ³	x ⁴
1 Bijapur	Groundnut	486.08	-2.60 ^{NS}	-	-	-	-	0.03 ^{NS}	0.88	-2.59	-	-	-	-
	Safflower	242.23	15.33 ^{**}	0.94 ^{**}	-	-	-	0.65 ^{**}	29.98	15.33	1.83	-	-	
	Sesamum	288.77	2.60 ^{NS}	-	-	-	-	0.04 ^{NS}	1.37	2.60	-	-	-	
	Sunflower	453.08	-18.80 ^{**}	2.46 [*]	-4.51 [*]	5.84	-	0.86 [*]	10.72	-18.80	4.93	-	-	
	Total oilseeds	400.83	-1.16 ^{NS}	-	-	-	-	0.01 ^{NS}	0.25	-1.16	-	-	-	
2 Dharwad	Groundnut	650.74	-5.11 ^{**}	0.85 ^{**}	0.06 [*]	0.01 ^{NS}	-0.01 ^{**}	0.57 ^{**}	7.58	-5.11	1.70	-0.19	0.0056	-0.3
	Safflower	291.40	12.43 ^{**}	0.61 ^{**}	-	-	-	0.69 ^{**}	36.92	12.43	1.23	-	-	
	Sesamum	283.63	33.69 [*]	-	-	-	-	0.11 [*]	4.14	3.69	-	-	-	
	Sunflower	468.92	-18.69 ^{**}	2.02 ^{NS}	-5.30 [*]	4.86 ^{**}	-	0.79 ^{**}	6.77	-18.69	4.04	-	-	
	Total oilseeds	564.37	-3.29 ^{NS}	0.58 ^{**}	-	-	-	0.23 ^{**}	4.71	-3.29	1.16	-	-	
3 Raichur	Groundnut	653.71	6.38 [*]	-	-	-	-	0.12 [*]	4.61	6.38	-	-	-	
	Safflower	327.00	15.87 ^{**}	0.36 ^{NS}	-0.09 ^{**}	-	-	0.62 ^{**}	16.98	15.87	0.73	-0.27	-	
	Sesamum	259.71	6.07 ^{**}	-	-	-	-	0.21 ^{**}	8.96	6.02	-	-	-	
	Sunflower	556.75	-17.26 ^{**}	1.44 ^{NS}	-4.25 ^{**}	2.20 ^{NS}	1.99 ^{**}	0.87 ^{**}	-17.26	2.87	-12.74	8.79	9.95	
	Total oilseeds	532.57	5.93 ^{**}	-	-	-	-	0.18	7.32	5.93	-	-	-	
4 State	Groundnut	947765.60	3509.60 ^{**}	411.45 ^{**}	76.22 ^{**}	1.71 ^{**}	-	0.69 ^{**}	16.83	5.07	-	-	-	
	Safflower	295.34	14.14 ^{**}	0.70 ^{**}	-0.05 [*]	0.02	-	0.79 ^{**}	28.16	14.14	1.40	-	-	
	Sesamum	295.80	4.78 ^{**}	-	-	-	-	0.37 ^{**}	19.24	4.78	-	-	-	
	Sunflower	530.66	-19.24 ^{**}	2.11 [*]	-3.12 [*]	2.46 [*]	-	0.87 [*]	11.70	-19.24	4.21	-9.35	9.85	
	Total oilseeds	564.48	3.46	-	-	-	-	0.17 ^{**}	7.04	3.46	-	-	-	

Note : ** Significant at 1% level
 * Significant at 5% level
 NS non-significant

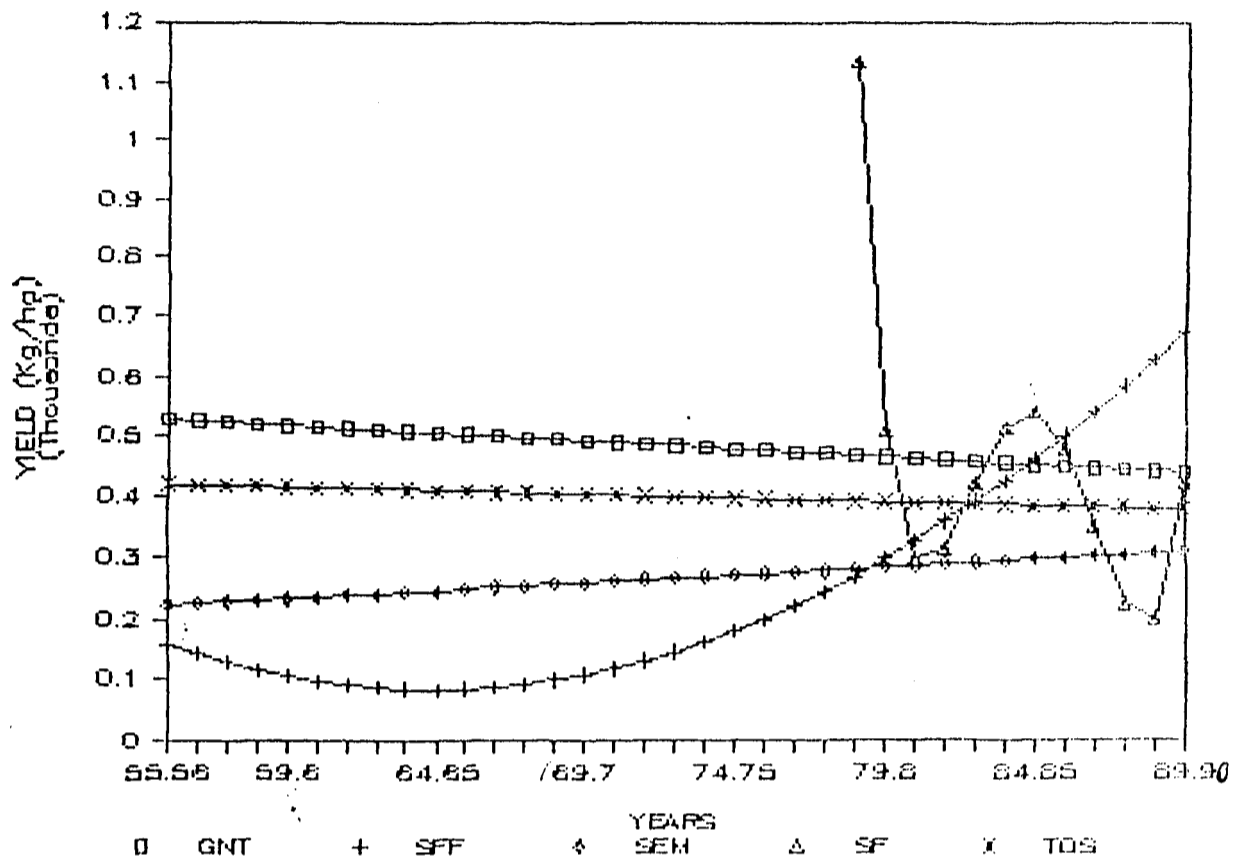


Fig 4.5 : Trends in Oilseeds Yield in Bijapur District.

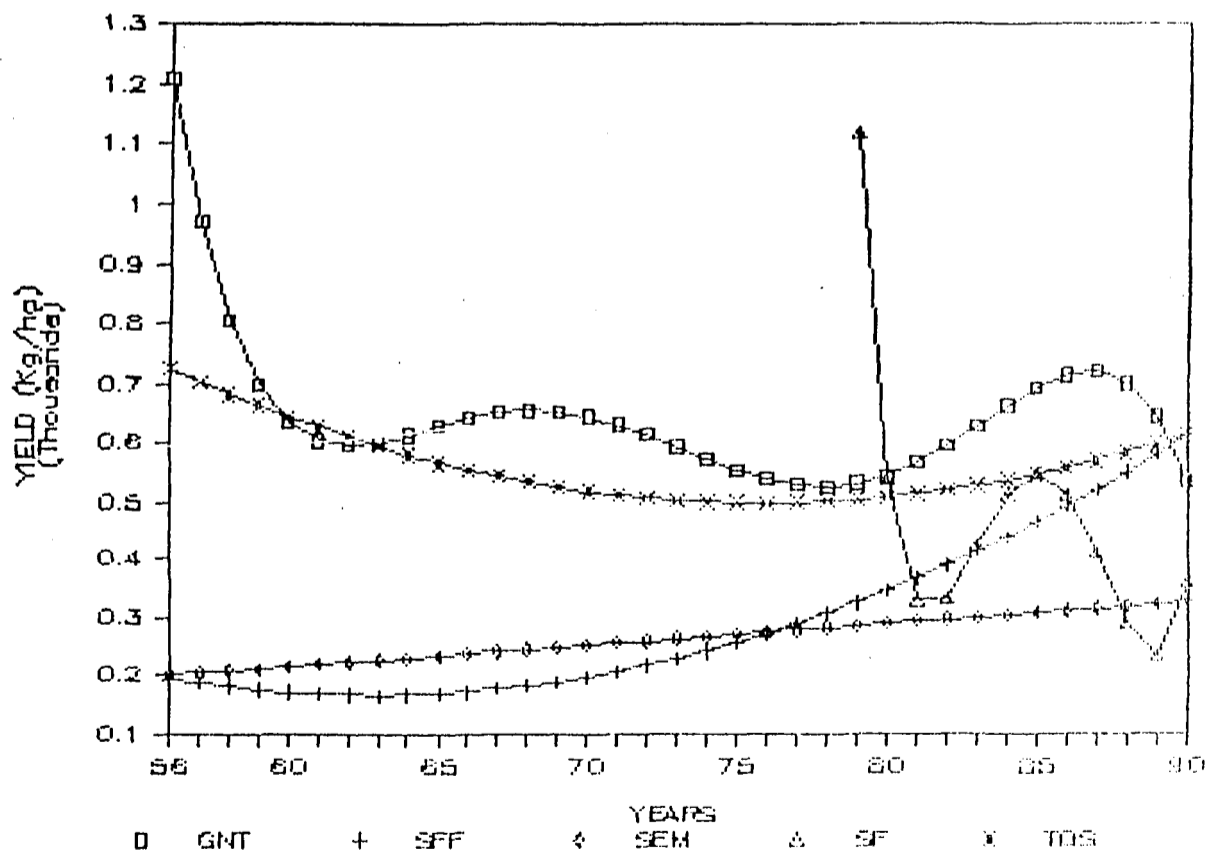


Fig 4.6 : Trends in Oilseeds Yield in Dharwad District.

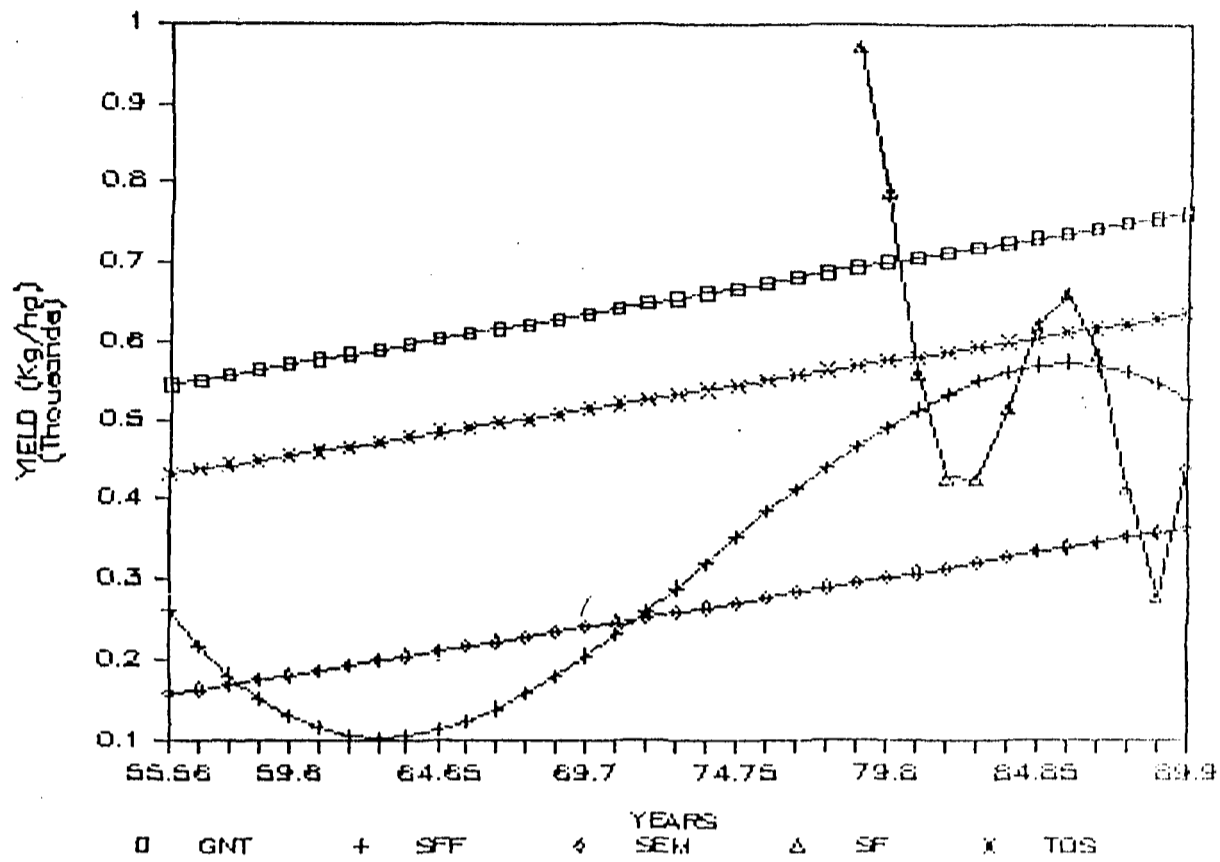


Fig 4.7 : Trends in Oilseeds Yield in Raichur District.

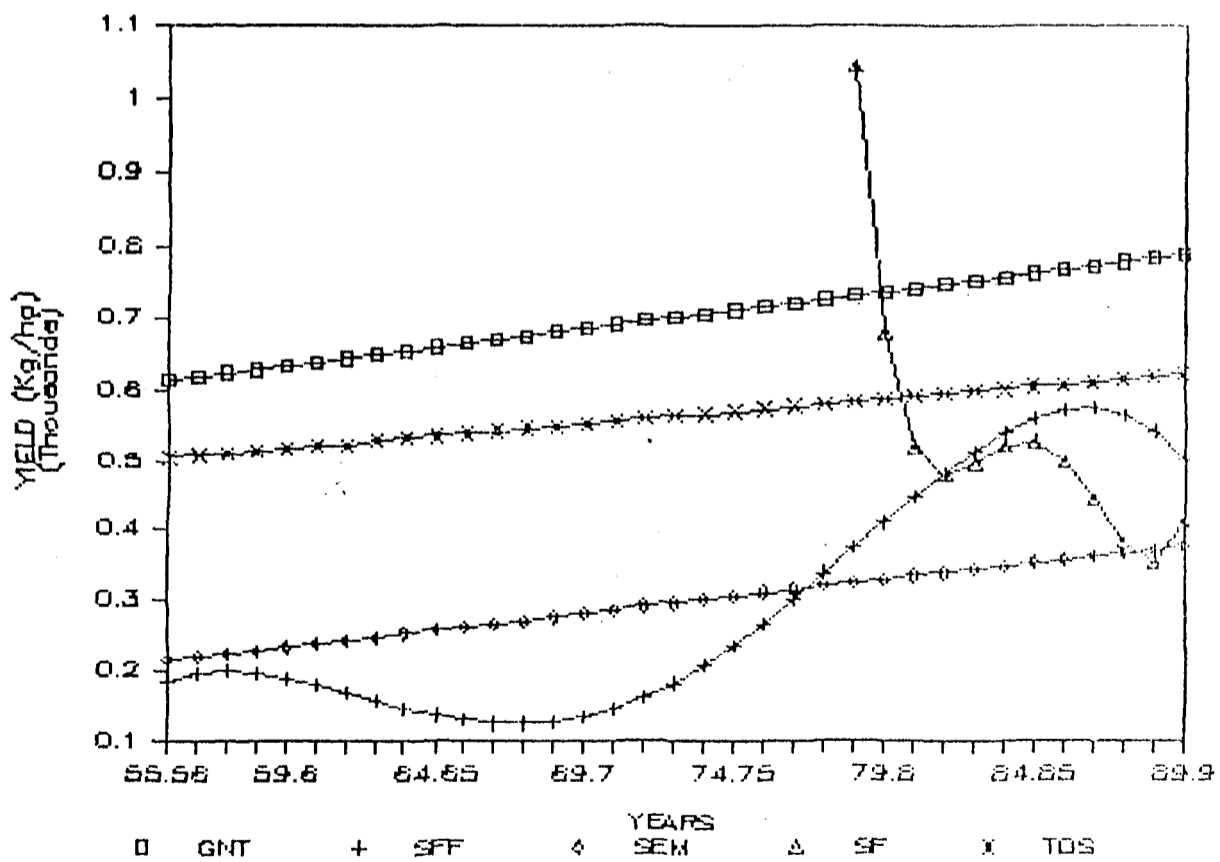


Fig 4.8 : Trends in Oilseeds Yield in Karnataka.

productivity trend, after reaching the lowest point, started increasing for a brief period and again experienced a decreasing trend. Trend in safflower yield was quite encouraging in the districts of Bijapur and Dharwad. Though it experienced a declining trend in Raichur district and at the State level during initial period, it increased in the post-green revolution period. As far as groundnut productivity is concerned, Raichur district and State as a whole experienced a similar pattern of rising trends while in Bijapur district a continuous falling trend was evidenced. Groundnut productivity decreased at a faster rate during pre-green revolution period in the case of Dharwad district and almost stabilized with mild fluctuations during post-green revolution period. Sesamum crop exhibited a continuous mild increase in yield over the space and time without any exception. The total oilseeds yield trend followed the yield trends of groundnut in the study area.

As far as production of individual as well as total oilseeds was concerned, the production trend of all oilseeds in the study area followed more or less the area trend pattern, except groundnut in Bijapur district and sunflower in Raichur district and at the State level (Table 4.5 and Fig 4.9 to 4.12). In Bijapur district, groundnut production showed wide fluctuations over the years, whereas the production levels of

Table 4.5 : Estimated Trend and Growth Rate Functions for Oilseeds Production (1955-56 to 1989-90)

District	Crops	Trend Functions						Growth Rate Functions (dy/dx)					
		Intercept	x	x ²	x ³	x ⁴	R ²	F	Intercept	x	x ²	x ³	
1 Bijapur	Groundnut	58611.43	-1413.60**	123.66**	-6.40NS	0.51**	0.45**	6.16	-1413.60	247.36	19.20	2.05	
	Safflower	11292.49	915.12**	49.84**	-2.41NS	-0.12	0.82**	35.15	915.12	99.68	-7.23	0.46	
	Sesamum	1156.60	18.33NS	-	-	-	0.06NS	1.99	18.33	-	-	-	
	Sunflower	38527.33	2994.80**	-	-	-	0.44**	7.93	2994.80	-	-	-	
	Total oilseeds	88017.23	1319.70NS	300.89**	-	-	0.50NS	15.74	1319.90	601.78	-	-	
2 Dharwad	Groundnut	83713.66	91.04NS	-	-	-	0.01NS	0.06	91.04	-	-	-	
	Safflower	5624.54	363.14**	25.79**	-	-	0.73**	43.94	363.14	51.58	-	-	
	Sesamum	1510.63	80.27**	5.07*	-	-	0.47**	14.11	80.27	10.14	-	-	
	Sunflower	9697.17	913.56**	-	-	-	0.53*	17.07	913.56	-	-	-	
	Total oilseeds	97336.77	702.96NS	95.83*	-	-	0.20**	4.10	702.96	191.66	-	-	
3 Raichur	Groundnut	76397.46	1107.60**	-	-	-	0.20**	8.28	1107.60	-	-	-	
	Safflower	7088.80	414.93**	17.94*	-	-	0.74**	46.34	414.9	35.88	-	-	
	Sesamum	13697.74	198.85**	-	-	-	0.36**	18.65	198.85	-	-	-	
	Sunflower	27564.75	2810.10**	-220.93NS	-716.73**	-	0.73**	7.33	2810.10	-441.86	-2150.19	-	
	Total oilseeds	99026.26	3146.30**	179.70**	-	-	0.57**	21.38	3146.00	359.40	-	-	
4 State	Groundnut	642530.10	6736.80**	682.52**	-	-	0.40**	10.50	673.80	-	-	-	
	Safflower	51903.54	3219.80**	187.48*	-5.97NS	-0.36**	0.89**	62.68	3219.80	374.96	-	-	
	Sesamum	28897.86	1258.20**	36.93*	-	-	0.65*	29.47	1258.20	73.86	-	-	
	Sunflower	146113.00	13507.00**	-732.97**	-1662.80NS	-	0.81**	11.30	13507.00	-1465.94	-4988.40	-	
	Total oilseeds	801436.00	19520.00**	1445.20	-	-	0.71	39.17	19520.00	2890.40	-	-	

Note : ** Significant at 1% level
 * Significant at 5% level
 NS non-significant

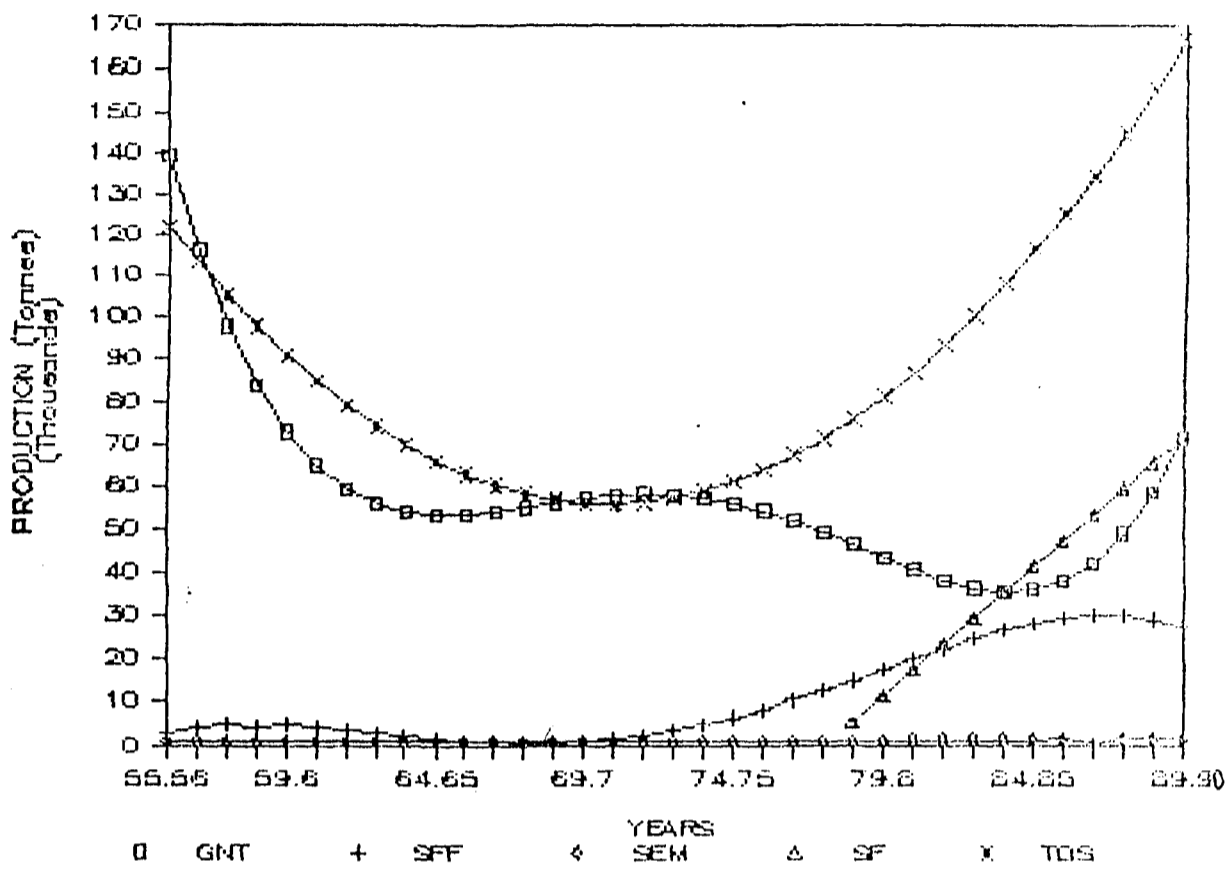


Fig 4.9: Trends in Oilseeds Production in Bijapur District.

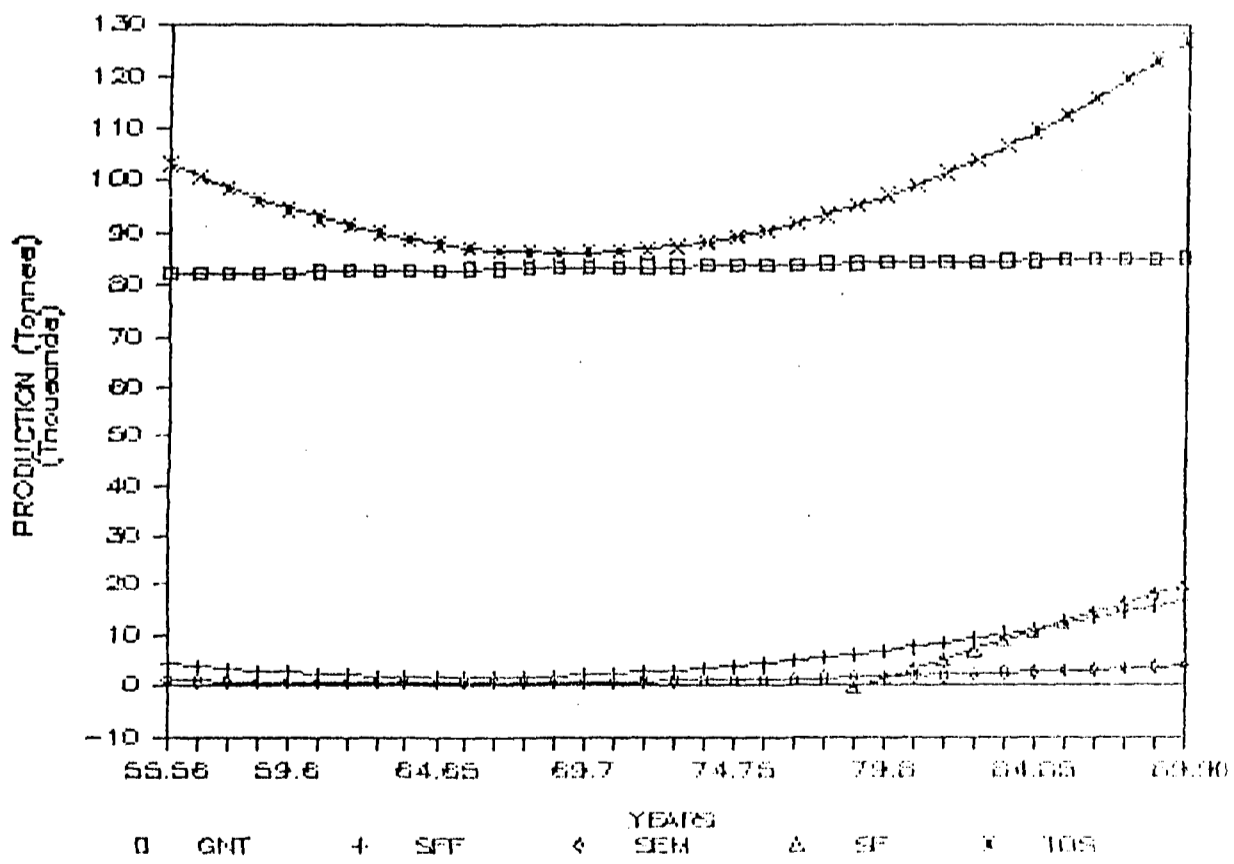


Fig 4.10: Trends in Oilseeds Production in Dharwad District.

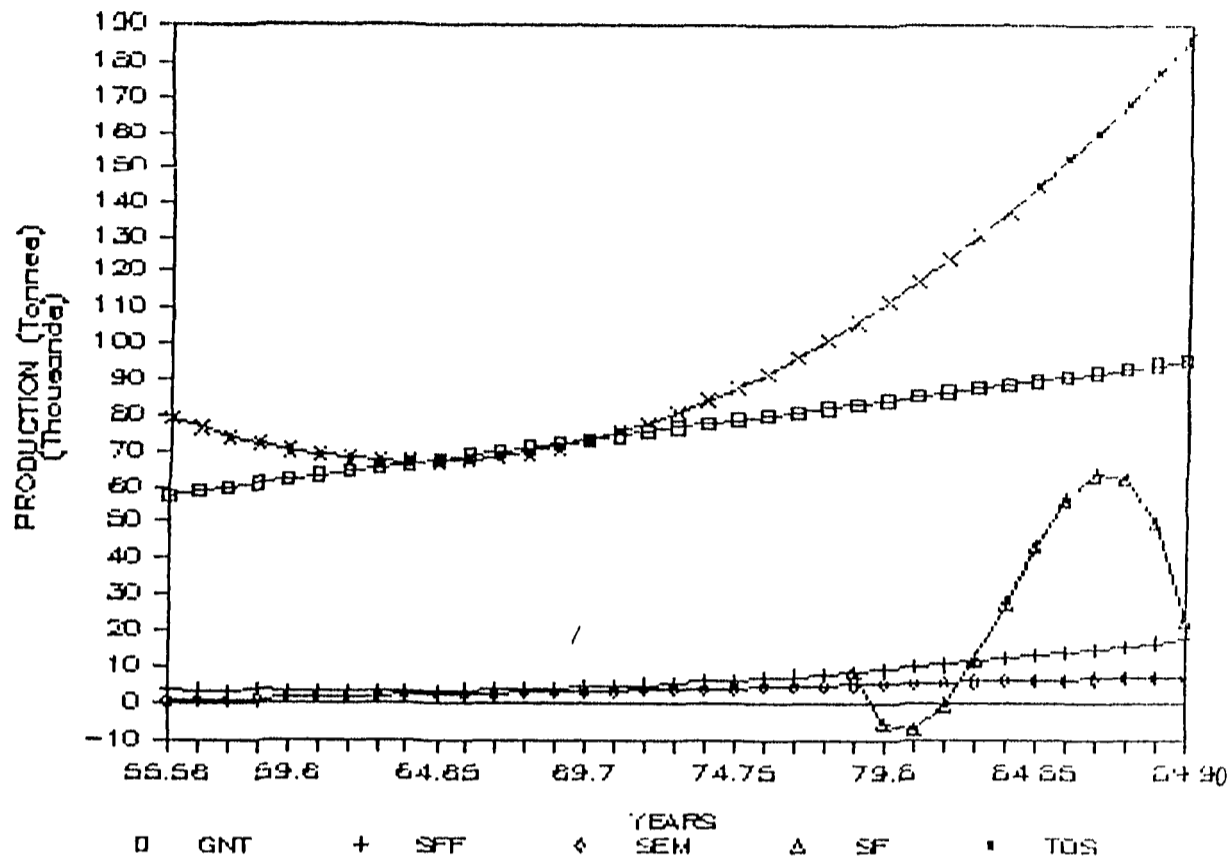


Fig 4.11 : Trends in Oilseeds Production in Raichur District.

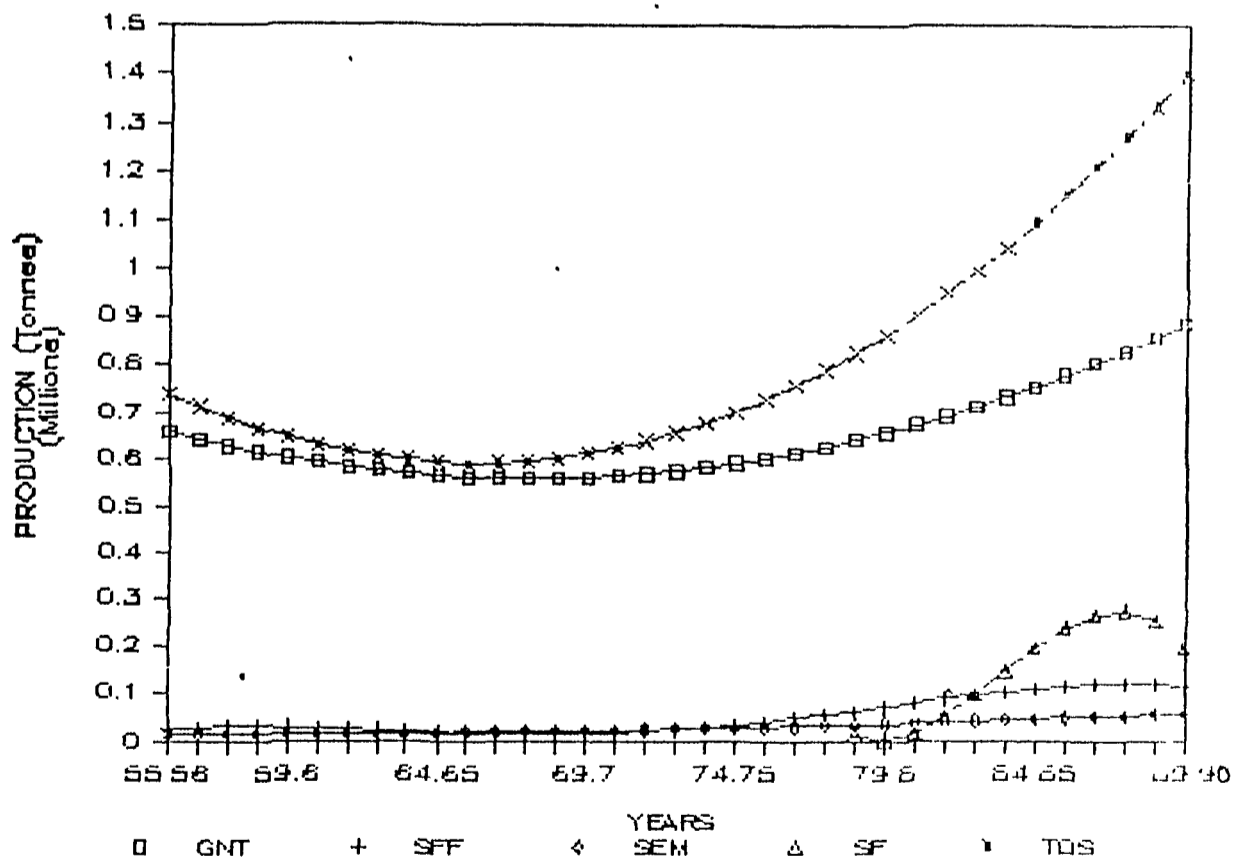


Fig 4.12 : Trends in Oilseeds Production in Karnataka.

sunflower in Raichur district and at the State level have followed the yield pattern. The change in sesamum production was almost constant and safflower indicated constant rate of change in the initial years and a continuous rise in recent years. Highest increase in safflower production was noticed in Bijapur district. The production of total oilseeds showed a declining trend during the initial period and a continuous sharp increase in the recent years in the entire study area.

From the above paragraphs, it could be concluded that, oilseeds production in the State is mainly led by area. The contribution of yield was limited to a few cases.

4.2 Identification of Price and Non-Price Factors Influencing Oilseeds Production

To identify the price and non-price variables influencing production of the four oilseeds in the three districts viz., Bijapur, Dharwad and Raichur, Principal components analysis was adopted. The district-wise analysis was carried out separately for each of the four crops selected for the study. Only first three principal components were finally selected for detailed analysis, since they together accounted for a bulk (63 to 76%) of the variation. Using the correlations of first, second and third principal components with the explanatory variables, the

most closely associated variables were identified. Tables 4.6 to 4.9 reveal the coefficients of the first three principal components together with the associated Eigen values (characteristic roots/latent roots), the percentage of variation explained and the number of price and non-price variables considered for each crop.

The details of identification of variables most closely associated with the production of selected oilseeds in different districts are presented below.

Groundnut

It was apparent from Table 4.6 that in Bijapur district, 16 variables were assumed to have had their influence on groundnut production. The first three principal components accounted for nearly 63 per cent of the variation, of which 28.20 per cent was explained by the first component, 21.70 per cent by the second and 12.80 per cent by the third component. The variables most closely associated with the first component were groundnut area, production, its price, July month rainfall and net sown area. The second component was associated with June-August rainfall, total oilseeds area, net sown area and gross cropped area. The variables associated with third component were June and August rainfall.

Table 4.6 : Principal Components and their Correlation with Explanatory Variables Influencing Groundnut Production.

Particulars	Bijapur			Dharwad			Raichur		
	I PC	II PC	III PC	I PC	II PC	III PC	I PC	II PC	III PC
Eigen Values (Latent Roots)	4.51	3.46	2.05	6.11	2.99	2.15	7.29	2.51	2.08
Variation explained (%)	28.20	21.70	12.80	34.00	16.60	11.90	40.50	13.90	11.60
Correlation with									
1 Groundnut Production	0.66	0.34	-0.38	0.78	0.19	-0.01	0.44	0.52	0.18
2 Lagged Groundnut price	-0.75	0.54	-0.23	0.93	0.01	0.15	0.96	0.07	0.06
3 Lagged Cotton Price	-0.78	0.53	-0.13	0.89	-0.07	0.04	0.93	-0.06	-0.04
4 Lagged Chilli Price	** *	** *	** *	0.82	0.15	-0.23	** *	** *	** *
5 Lagged Kharif Jowar Price	-0.75	0.49	-0.15	0.92	0.09	-0.14	0.95	-0.01	-0.02
6 Lagged Paddy price	** *	** *	** *	** *	** *	** *	0.95	0.04	-0.04
7 Lagged Groundnut Yield	0.36	-0.14	-0.48	0.10	0.48	0.57	0.38	0.01	-0.41
8 Lagged Cotton Yield	-0.37	-0.04	0.35	0.85	-0.02	0.05	0.75	-0.14	-0.14
9 Lagged Chilli Yield	** *	** *	** *	-0.40	0.48	-0.02	** *	** *	** *
10 Lagged Kharif Jowar Yield	-0.02	0.42	-0.02	0.65	-0.03	0.04	0.57	-0.46	0.05
11 Lagged Paddy Yield	** *	** *	** *	** *	** *	** *	0.71	-0.33	-0.02
12 June Rainfall	-0.13	0.54	0.60	0.13	-0.76	0.37	-0.05	-0.03	0.71
13 July Rainfall	0.52	0.33	0.18	-0.29	-0.01	0.48	0.12	-0.06	-0.45
14 Aug. Rainfall	0.34	0.28	0.48	0.15	-0.73	0.15	0.05	-0.58	0.67
15 Jun.-Aug. Rainfall	0.33	0.64	0.56	-0.02	-0.77	0.54	0.10	-0.55	0.54
16 Groundnut Area	0.66	0.18	-0.39	-0.23	0.57	0.58	0.39	0.49	0.03
17 Total Oilseeds Area	-0.54	0.65	-0.31	0.48	0.54	0.28	0.80	0.31	0.33
18 Net Sown Area	0.66	0.55	-0.24	-0.41	0.09	-0.16	-0.46	0.71	0.25
19 Gross Cropped Area	0.41	0.76	-0.31	0.45	0.34	-0.04	0.44	0.64	0.45
20 Gross Cropped Area Irrigated	0.47	0.33	0.36	0.94	-0.03	0.07	0.88	-0.01	-0.19

Note : Lagged price refers to Farm Harvest Price of the Previous Year
 ** * Corresponding variable is not applicable
 PC - Principal Component

In Dharwad district, among the 19 variables listed, nine were associated with the first component, seven with the second component and four with the third component. The variables most closely associated with the first component were production of groundnut, prices of groundnut, cotton, kharif jowar; yields of cotton and kharif jowar, and gross cropped area irrigated. The second component was mostly associated with total oilseeds area. The variables associated with third component were groundnut yield, area and June-August rainfall, except July month rainfall. These components together accounted for 62.20 per cent of the variability in explanatory variables. Among the three components, the first component alone captured as high as 34 per cent of variation.

In Raichur district, the first, second and third components explained 40.50 per cent, 13.90 per cent and 11.60 per cent of variation respectively. Prices and yields of competing crops barring yield of groundnut, total oilseeds area and irrigated gross cropped area were observed to be the variables which had the maximum association with the first component. The variables associated with second component were groundnut production net sown area and gross cropped area. The

third component showed a high association with June and June-August rainfall

From the foregoing presentation it follows that prices of groundnut and its competing crops, production and area of groundnut, gross cropped irrigated area and area under total oilseeds were mostly associated with the first principal component, rainfall being associated with second and third components with some exception.

With a view to have a close look at the pattern of association of variable with the components, coefficient of the first component were plotted against the coefficient of the second component for the selected crops in the study area. Clustering of the variables would reflect the extent of combined influence of the variables with reference to the first and second components on the production. Fig 4.13, 14 and 15 revealed the extent of influence of price and non-price variables on groundnut production in the study district. The variables closely associated with groundnut production in Bijapur district were gross cropped area irrigated, June and August rainfall, groundnut area and net sown area. In Dharwad district prices of groundnut, chilli, kharif jowar and cotton; yields of cotton and kharif jowar; gross cropped area irrigated

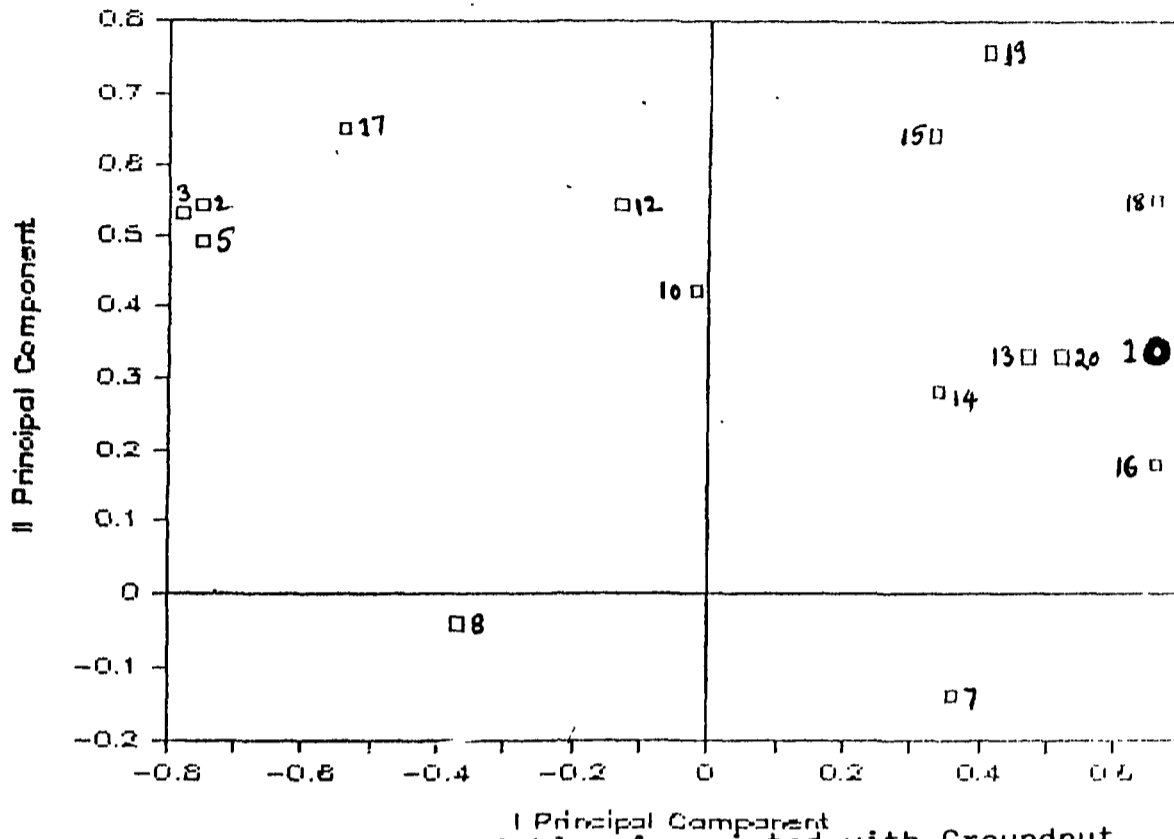


Fig: 4.13 : Variables Associated with Groundnut Production in Bijapur District.

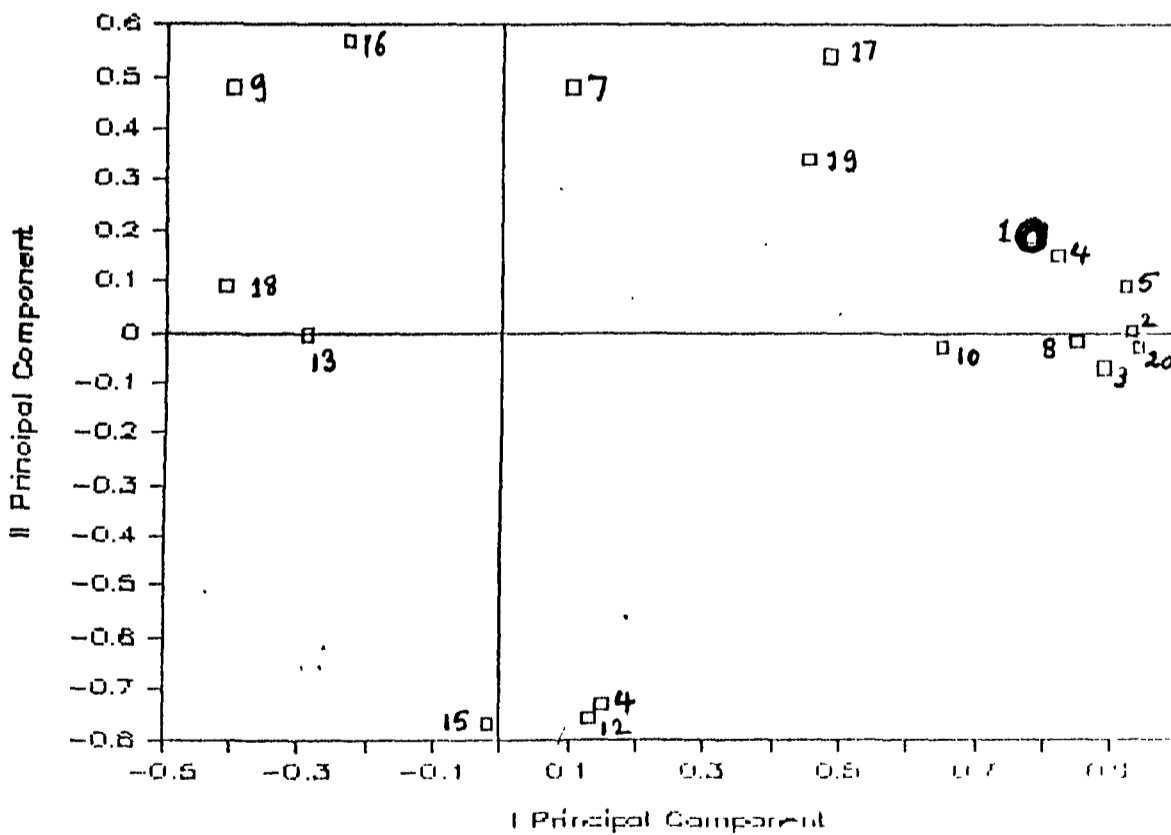


Fig 4.14: Variables Associated with Groundnut Production in Dharwad District.

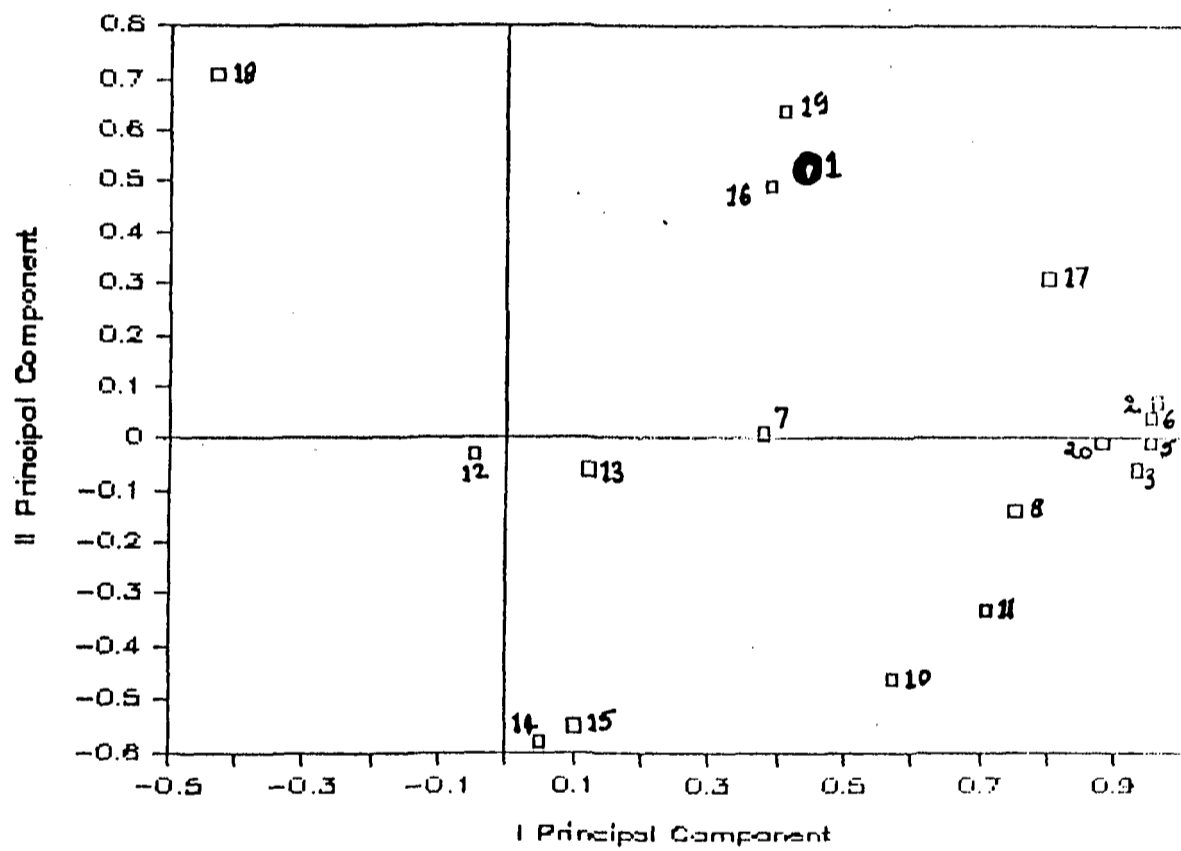


Fig 4.15: Variables Associated with Groundnut Production in Raichur District.

and gross cropped area had close association with groundnut production. More or less similar pattern was observed in Dharwad district.

Safflower

Table 4.7 depicts the result of the first three principal components along with the price and non-price variables expected to influence safflower production.

Among 19 variables included in the analysis for Bijapur district, the first component was highly associated with 10 variables. They are production, yield, area and price of safflower, prices of competing crops viz., rabi jowar, cotton, Bengalgram, yield of wheat and gross cropped area irrigated. The second component was found to be associated more with September, October and September-October rainfall and third component with net sown area and gross cropped area. The first three components together captured as much as 70 per cent of variation in the explanatory variables.

In Dharwad district, the first three components accounted for about 72 per cent of variation. The variation explained by the first, second and third components was 45 per cent, 14.52 per cent and 11.57 per cent respectively. The important variables associated with first principal component were

Table 4.7 : Principal Components and their Correlation with Explanatory Variables Influencing Safflower Production.

Particulars	Bijapur			Dharwad			Raichur		
	I PC	II PC	III PC	I PC	II PC	III PC	I PC	II PC	III PC
Eigen Values (Latent Roots)	8.16	2.84	2.31	8.55	2.76	2.20	7.22	3.08	1.62
Variation explained (%)	42.95	14.94	12.15	45.00	14.52	11.57	42.47	18.12	9.53
Correlation with									
1 Safflower production	0.88	-0.06	0.14	0.82	-0.16	0.35	0.86	-0.07	-0.19
2 Lagged Safflower price	0.97	-0.07	0.06	0.96	0.04	-0.05	0.94	0.06	0.08
3 Lagged Rabi Jowar Price	0.94	0.03	0.01	0.92	0.21	-0.02	0.88	0.17	0.18
4 Lagged cotton Price	0.95	-0.02	-0.01	0.93	0.12	-0.09	** *	** *	** *
5 Lagged Bengal gram Price	0.94	0.01	0.06	0.96	-0.04	-0.16	0.90	0.03	0.11
6 Lagged Wheat price	0.96	-0.03	0.14	0.94	0.12	0.05	0.92	0.08	0.03
7 Lagged Safflower Yield	0.79	0.07	-0.03	0.62	-0.19	0.20	0.63	0.21	-0.42
8 Lagged Rabi Jowar Yield	0.31	0.50	0.17	-0.35	0.66	-0.40	0.45	0.68	-0.19
9 Lagged Cotton Yield	0.23	0.43	-0.52	0.80	0.08	-0.16	** *	** *	** *
10 Lagged B.Gram Yield	0.20	0.09	0.11	-0.03	0.80	0.03	0.18	0.68	-0.33
11 Lagged Wheat Yield	0.53	0.39	-0.29	0.33	0.70	-0.16	0.11	0.82	-0.26
12 Sept, Rainfall	0.16	0.75	0.05	-0.02	0.52	0.43	0.03	-0.08	-0.21
13 Oct, Rainfall	-0.22	0.73	-0.21	-0.38	-0.24	0.62	-0.30	0.49	0.75
14 Sept. - Oct. Rainfall	-0.07	0.93	-0.13	-0.28	0.24	0.79	-0.28	0.43	0.59
15 Safflower Area	0.81	-0.19	-0.07	0.42	-0.42	0.15	0.69	-0.39	0.26
16 Total Oilseeds Area	0.02	-0.15	0.46	0.73	-0.18	0.45	0.86	-0.25	0.25
17 Net Sown Area	-0.27	0.33	0.85	-0.36	0.58	0.36	-0.25	-0.69	-0.09
18 Gross Cropped Area	0.06	0.29	0.93	0.53	0.33	0.46	0.61	-0.50	0.03
19 Gross Cropped Area Irrigated	0.97	-0.08	0.01	0.93	0.13	-0.16	0.83	0.20	0.23

Note : Lagged Safflower price refers to wholesale price of safflower in previous year
 * * * Corresponding variable is not applicable

production, price and yield of safflower, prices of all crops included, cotton yield, total oilseeds area, gross cropped area and gross cropped area irrigated. The second component could be identified with yields of rabi jowar, bengalgram and wheat, September rainfall and net sown area. The only factor which associated with third component was September-October rainfall.

In Raichur district, in addition to area, yield, production and prices of safflower, prices of all crops, total oilseeds area, gross cropped area and gross cropped area irrigated were closely associated with the first component. The second component mostly associated with yield of rabi jowar, cotton, Bengalgram and wheat yield and the third component with October and September-October rainfall. The first component explained as much as 42.47 per cent of variability. The second and third components respectively explained 18.12 per cent and 9.53 per cent variation.

The variables included were almost common for all the three districts except cotton price and yield which were not considered for Raichur district. As a result, the association of variables with the three principal components across the districts was almost similar. Fig 4.16, 17 and 18 depict

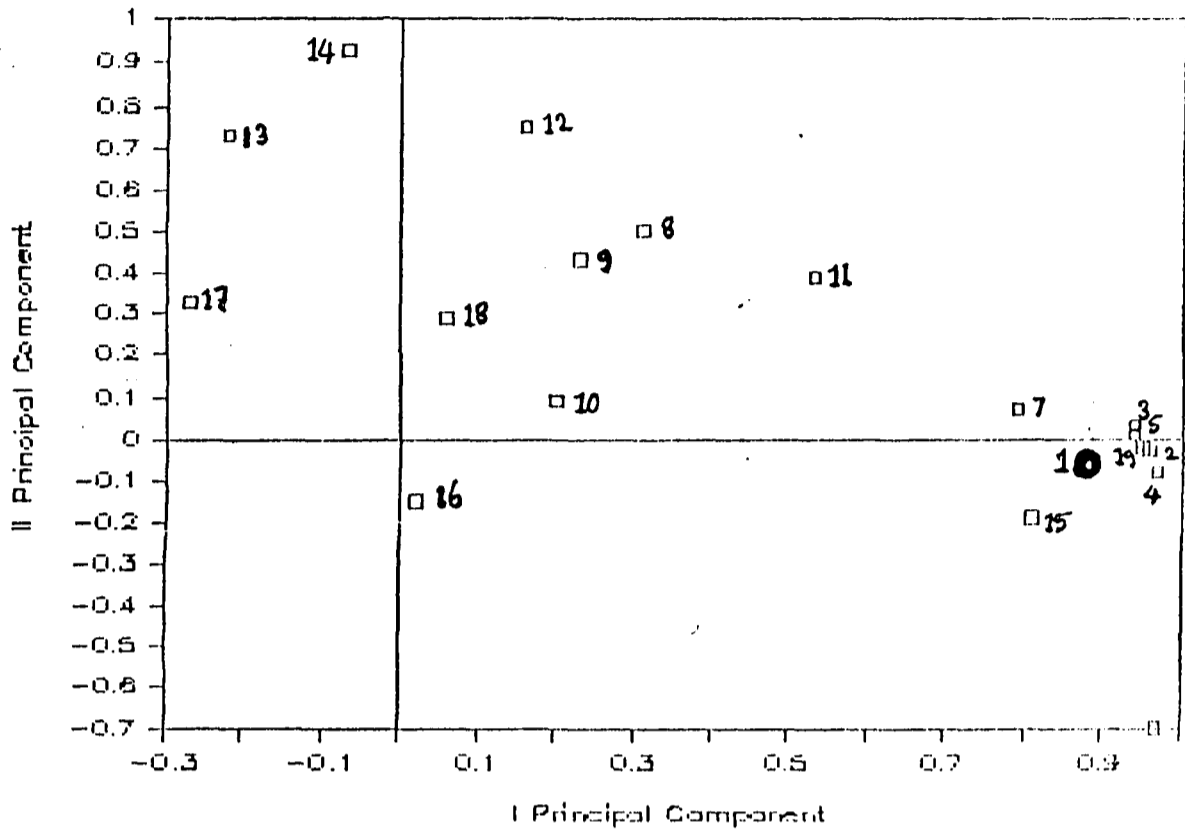


Fig 4.16: Variables Associated with Safflower Production in Bijapur District.

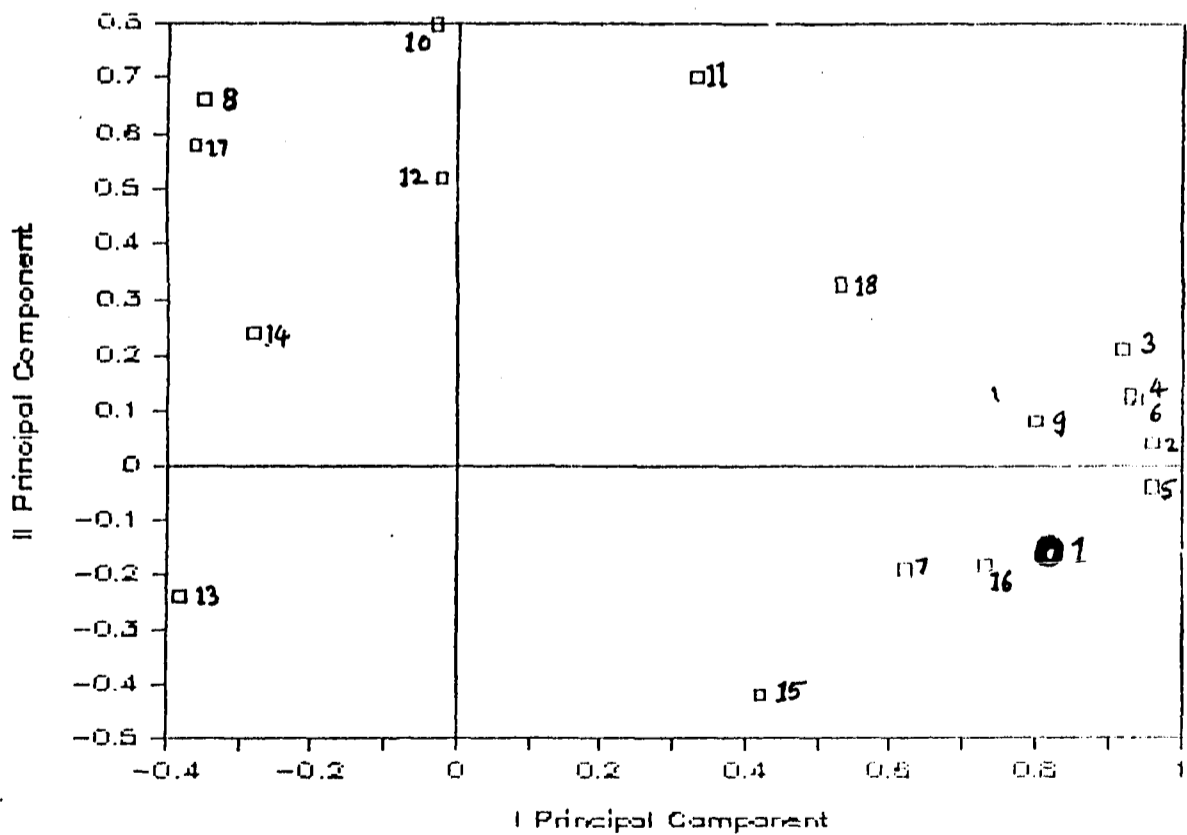


Fig 4.17 : Variables Associated with Safflower Production in Dharwad District.

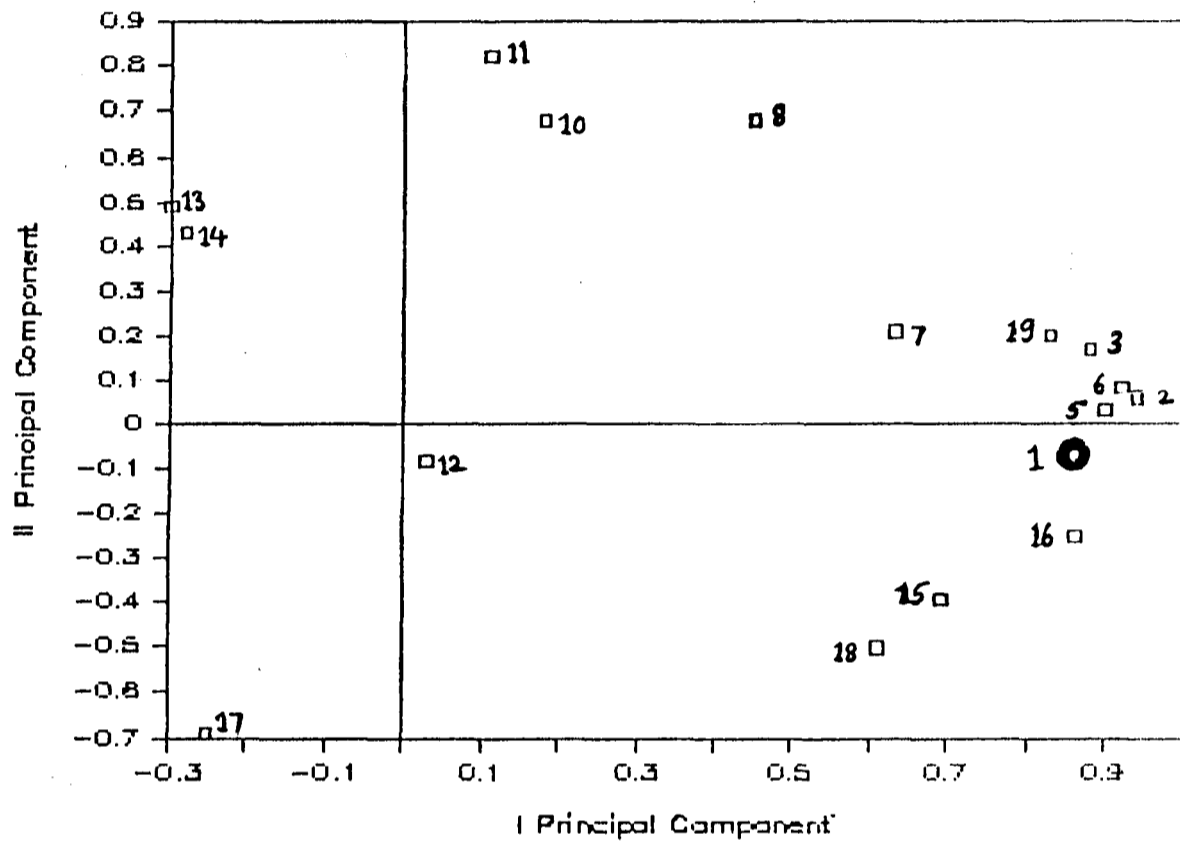


Fig 4.18 : Variables Associated with Safflower Production in Raichur District.

variables most closely associated with safflower production in Bijapur, Dharwad and Raichur districts respectively. The variables which have loose association with safflower production are area, yield and price of safflower, prices of wheat, rabi jowar and wheat, total oilseeds area, gross cropped area and gross cropped irrigated area.

Sesamum

Eighteen variables influencing sesamum production in the study districts are presented in Table 4.8. The important variables associated with first principal component in Dharwad and Raichur districts were area, price and yield of sesamum, prices of groundnut, cotton and kharif jowar, total area under oilseeds and gross cropped area irrigated, while June and August rainfall were associated with the second component. The net sown area and the gross cropped area were closely identified with the third component of Dharwad and Raichur district respectively. In Bijapur district, the first component explained 32.20 per cent of the variability. The important variables associated with this component were prices of sesamum, groundnut, cotton and kharif jowar, total oilseeds area and gross cropped area irrigated. August rainfall and net sown area were associated with the second component which accounted for 13.70 per cent of the variation,

Table 4.8 : Principal Components and their Correlation with Explanatory Variables Influencing Sesamum Production.

Particulars	Bijapur			Dharwad			Raichur		
	I PC	II PC	III PC	I PC	II PC	III PC	I PC	II PC	III PC
Eigen Values (Latent Roots)	6.79	2.47	2.38	6.84	2.82	1.85	7.87	2.37	2.18
Variation explained (%)	37.72	13.70	13.20	38.00	15.70	10.30	43.70	13.20	12.10
Correlation with									
1 Sesamum production	0.41	-0.55	0.30	0.77	0.08	0.22	0.74	0.48	0.12
2 Lagged Sesamum price	0.98	0.03	0.04	0.98	-0.03	-0.09	0.97	0.01	0.12
3 Lagged Groundnut Price	0.98	0.01	-0.01	0.95	0.05	-0.15	0.94	-0.15	0.09
4 Lagged cotton Price	0.95	0.07	0.02	0.92	0.08	-0.04	0.89	-0.20	-0.04
5 Lagged Kharif Jowar Price	0.89	0.15	-0.03	** *	** *	** *	0.93	-0.18	0.01
6 Lagged Chilli price	** *	** *	** *	0.75	-0.14	0.16	** *	** *	** *
7 Lagged Sesamum Yield	0.09	-0.15	0.68	0.24	-0.25	0.36	0.28	0.10	-0.45
8 Lagged Groundnut Yield	-0.24	0.03	0.62	0.15	-0.44	-0.67	0.32	-0.46	-0.16
9 Lagged Cotton Yield	0.18	0.23	-0.28	0.32	-0.33	-0.20	0.75	-0.18	-0.18
10 Lagged Kharif Jowar Yield	0.26	-0.07	0.34	** *	** *	** *	0.57	0.13	-0.37
11 Lagged Chilli Yield	** *	** *	** *	-0.34	-0.51	-0.18	** *	** *	** *
12 June Rainfall	0.21	-0.25	-0.66	0.09	0.83	-0.02	0.04	0.57	0.35
13 July Rainfall	-0.03	0.11	0.75	-0.19	0.05	-0.04	0.08	-0.27	-0.48
14 August Rainfall	-0.16	-0.72	-0.35	0.15	0.74	-0.12	0.18	0.86	-0.19
15 Jun-Aug. Rainfall	0.03	-0.69	-0.18	0.02	0.84	-0.09	0.22	0.77	-0.36
16 Sesamum Area	0.22	-0.64	0.19	0.89	0.15	0.12	0.89	0.10	0.09
17 Total Oilseeds Area	0.89	-0.19	-0.02	0.74	-0.33	-0.13	0.83	0.04	0.44
18 Net Sown Area	-0.20	-0.72	0.23	0.33	-0.07	0.81	-0.46	-0.03	0.66
19 Gross Cropped Area	-0.09	-0.12	0.03	0.50	-0.28	0.62	0.43	0.02	0.75
20 Gross Cropped Area Irrigated	0.96	0.11	0.03	0.95	0.06	-0.04	0.90	-0.19	0.09

Note : ** * Corresponding variable is not applicable

whereas the July rainfall was associated with the third component which explained only 13.20 per cent of the variation.

Fig 4.19,20 and 21 showed the closely associated variables with sesamum production in the study districts. Such variables in Bijapur district turned out to be sesamum area, June and June-August rainfall, yields of kharif jowar and sesamum and total oilseeds area. In Dharwad district, yields and prices of competing crops, total oilseeds area and gross cropped area irrigated had close association, while in Raichur district area, price and yield of sesamum, total oilseeds and gross cropped area and kharif jowar influenced the sesamum production.

Sunflower

Sunflower has emerged as one of the most important oilseeds in recent years. It is grown in all the seasons of the year. It competes with almost all the crops grown in the study districts during kharif and rabi seasons and to some extent with summer crops. Therefore, its production is influenced by more number of factors as compared to the production of other oilseed crops. Table 4.9 shows the most important factors influencing sunflower production in the study districts.

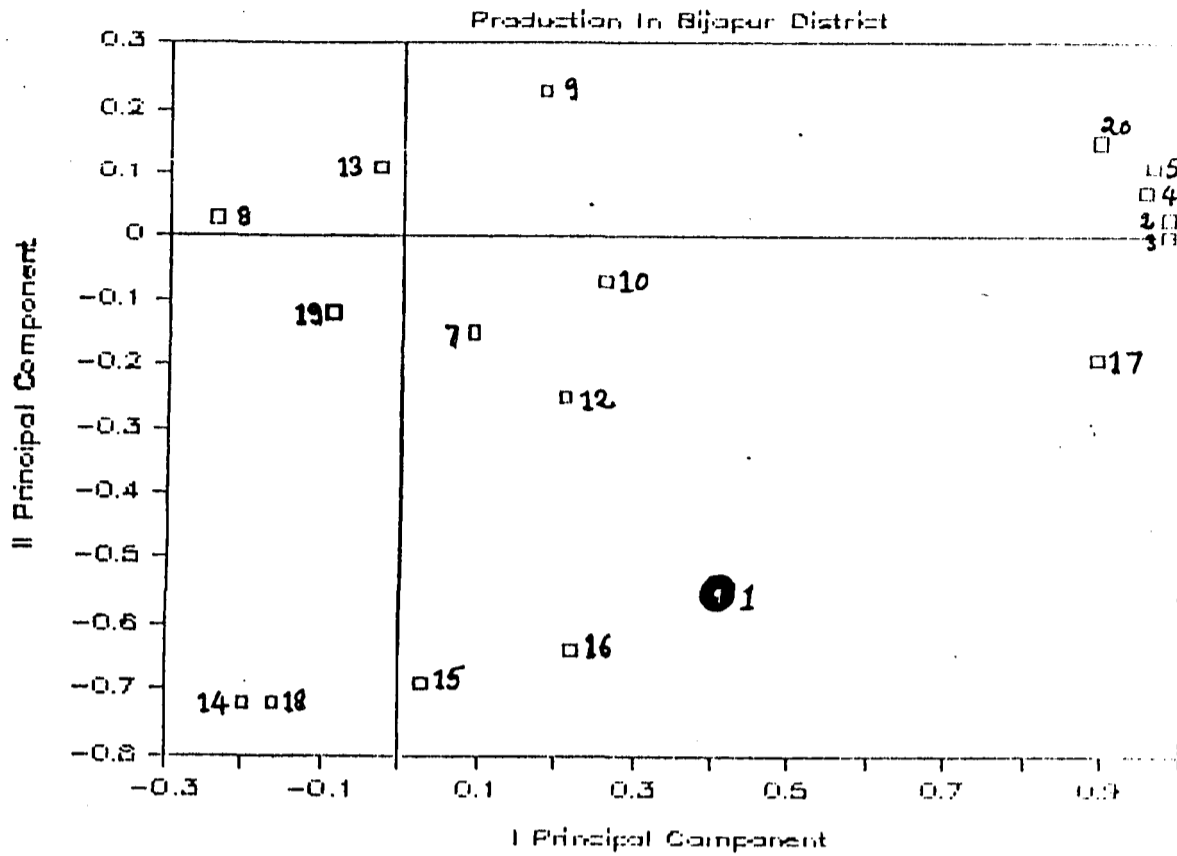


Fig 4.19: Variables Associated with Sesamum Production in Bijapur District.

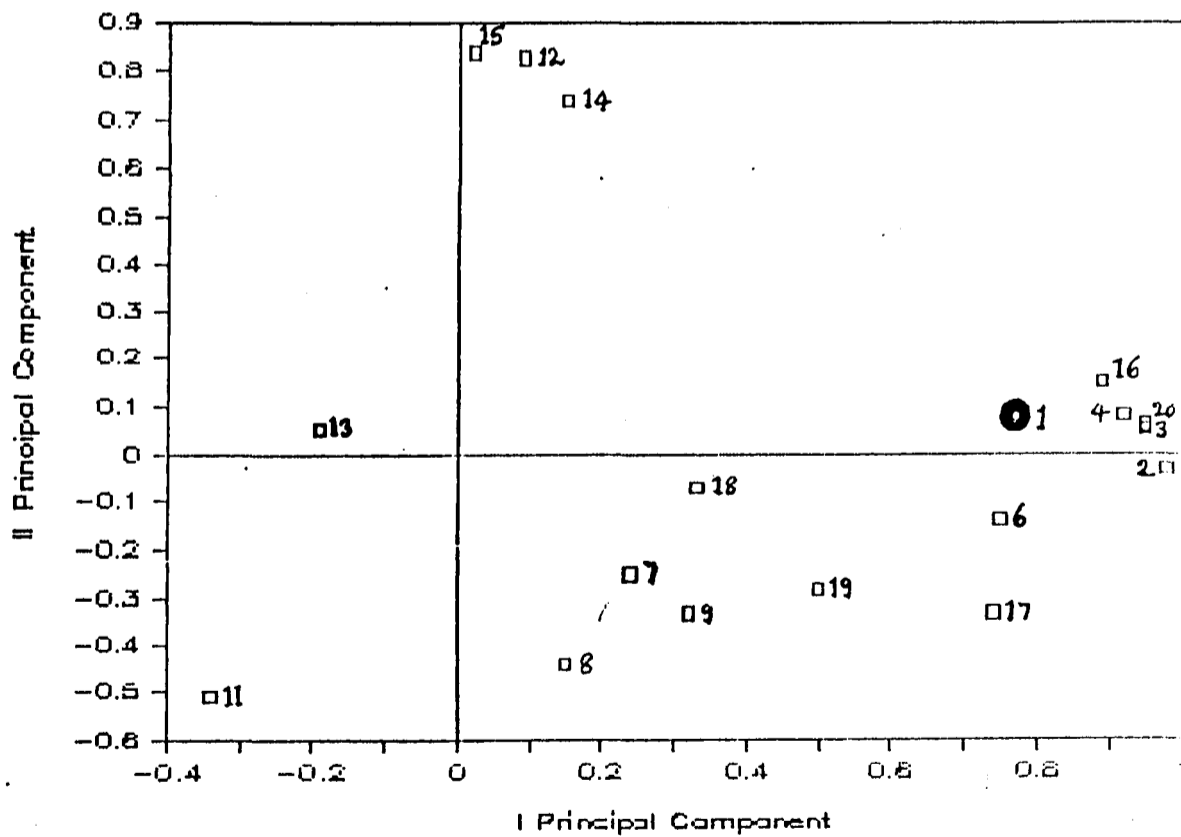


Fig 4.20: Variables Associated with Sesamum Production in Dharwad District.

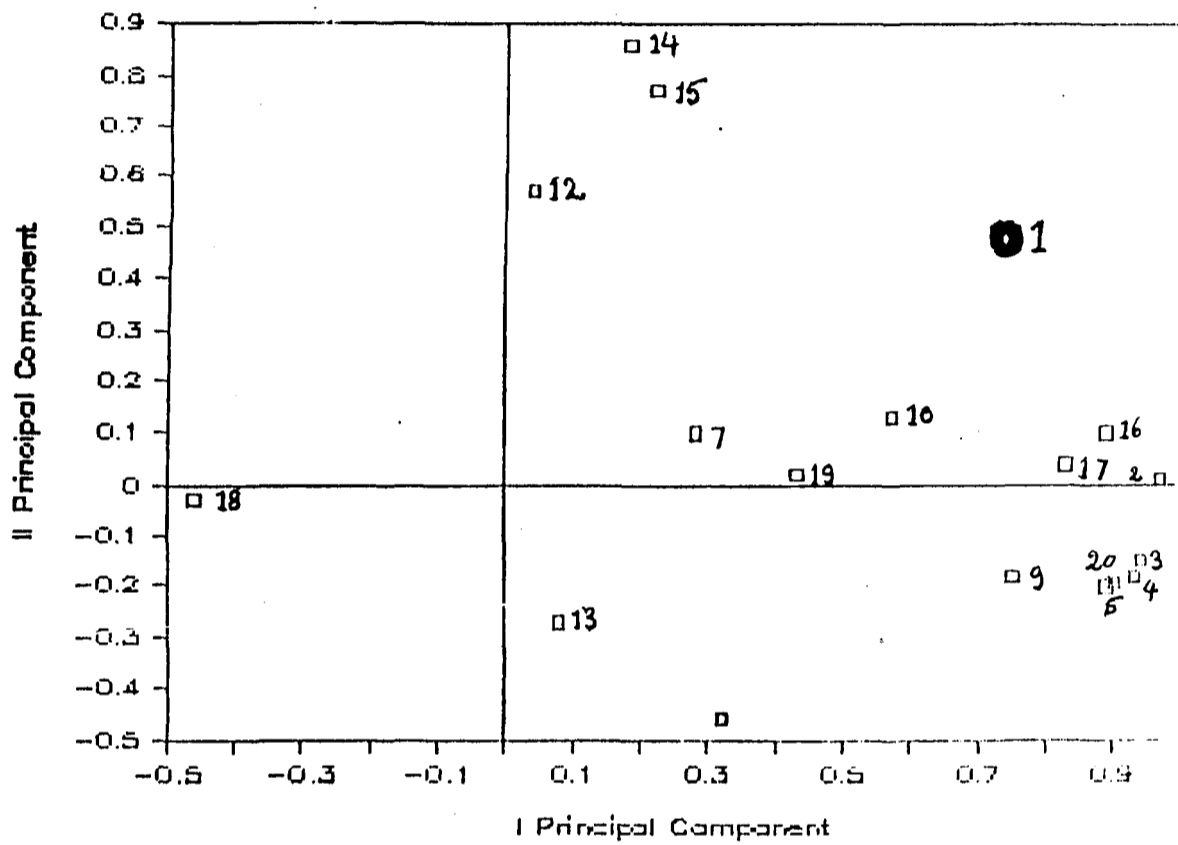


Fig 4.21 : Variables Associated with Sesamum Production in Raichur District.

Table 4.9 : Principal Components and their Correlation with Explanatory Variables Influencing Sunflower Production.

Particulars	Bijapur			Dharwad			Raichur		
	I PC	II PC	III PC	I PC	II PC	III PC	I PC	II PC	III PC
Eigen Values (Latent Roots)	9.46	4.48	3.61	9.90	3.45	2.55	7.71	3.90	2.78
Variation explained (%)	41.10	19.50	15.70	43.00	15.90	11.10	36.70	18.60	13.20
Correlation with									
1 Sunflower Production	0.72	-0.13	0.11	0.79	0.42	0.06	0.75	0.57	-0.05
2 Lagged Sunflower price ^a	0.94	-0.12	-0.09	0.95	0.16	0.08	0.92	0.09	0.04
3 Lagged Groundnut Price	0.87	-0.27	-0.12	0.84	-0.27	0.14	0.91	-0.24	-0.09
4 Lagged Rabi Jowar Price	0.79	-0.34	0.12	0.76	-0.08	0.47	0.78	-0.44	-0.02
5 Lagged Cotton Price	* * *	* * *	* * *	0.68	-0.06	-0.02	0.69	-0.59	-0.08
6 Lagged wheat price	0.98	-0.11	0.01	0.85	-0.04	0.38	* * *	* * *	* * *
7 Lagged Safflower Price	0.88	-0.19	-0.10	* * *	* * *	* * *	* * *	* * *	* * *
8 Lagged sunflower Yield	-0.79	-0.36	0.15	-0.50	0.47	-0.14	-0.62	0.50	-0.07
9 Lagged Groundnut Yield	-0.38	-0.84	-0.07	0.39	0.04	-0.19	0.26	-0.21	0.46
10 Lagged Rabi Jowar Yield	0.16	0.03	0.72	-0.71	-0.38	0.09	-0.83	-0.01	-0.02
11 Lagged Cotton Yield	* * *	* * *	* * *	0.75	0.04	-0.08	0.59	-0.29	0.63
12 Lagged Wheat Yield	0.31	-0.48	0.42	-0.45	0.20	0.65	* * *	* * *	* * *
13 Lagged Safflower Yield	0.01	-0.61	0.50	* * *	* * *	* * *	* * *	* * *	* * *
14 June Rainfall	0.24	0.86	0.22	-0.68	0.19	0.32	-0.20	0.62	0.26
15 July Rainfall	-0.04	-0.73	0.34	-0.34	-0.40	0.56	0.21	-0.75	0.27
16 August Rainfall	0.25	0.76	-0.15	-0.52	0.31	-0.01	0.06	0.53	-0.26
17 Jun-Aug Rainfall	0.35	0.75	0.36	-0.77	0.09	0.40	-0.25	0.05	0.42
18 Sept. Rainfall	-0.11	0.14	0.82	-0.51	0.50	0.40	-0.42	-0.24	0.25
19 Oct. Rainfall	-0.61	-0.10	0.54	0.12	0.72	-0.48	0.09	0.25	0.85
20 Sept.-Oct. Rainfall	-0.49	-0.01	0.75	-0.29	0.90	-0.09	-0.18	-0.11	0.85
21 Sunflower Area	0.90	-0.07	-0.02	0.86	0.40	0.01	0.81	0.56	-0.04
22 Total Oilseeds Area	0.91	-0.03	-0.02	0.89	0.35	0.09	0.86	0.45	-0.02
23 Net Sown Area	0.61	0.24	0.62	-0.43	0.59	0.49	-0.02	0.54	0.43
24 Gross Cropped Area	0.75	0.15	0.56	0.56	0.60	0.42	0.58	0.64	0.21
25 Gross Cropped Area Irrigated	0.79	-0.49	-0.20	0.66	-0.33	0.53	0.88	-0.12	-0.20

Note : ^a Whole sale price

* * * Corresponding variable is not applicable

Twenty three variables influencing sunflower production in Bijapur and Dharwad districts and 21 variables in Raichur district were considered for the analysis. First three components of the analysis explained about 76.30 per cent of variation in Bijapur district followed by Dharwad (70 per cent) and Raichur (68.5 per cent) district. The first component alone accounted for nearly 41 per cent variation in Bijapur district, 43 per cent in Dharwad district and 36.7 per cent in Raichur district. The most important factors associated with this component in Bijapur district were production, price, area and yield of sunflower, prices of groundnut, rabijowar, wheat and safflower, total oilseeds area, gross cropped area and gross cropped area irrigated. Similar pattern could be seen with respect to association of variables in Dharwad and Raichur districts. The rainfall variable had its association mostly with second and third components, in the study districts. In Dharwad district, July-August rainfall was associated with first principal component. In Bijapur district, in addition to rainfall, groundnut and rabijowar yields were identified with the second and third components.

Figures 4.22, 23 and 24 depict the association of variables with sunflower production. The highly associated variables in the Dharwad and Raichur districts were area under

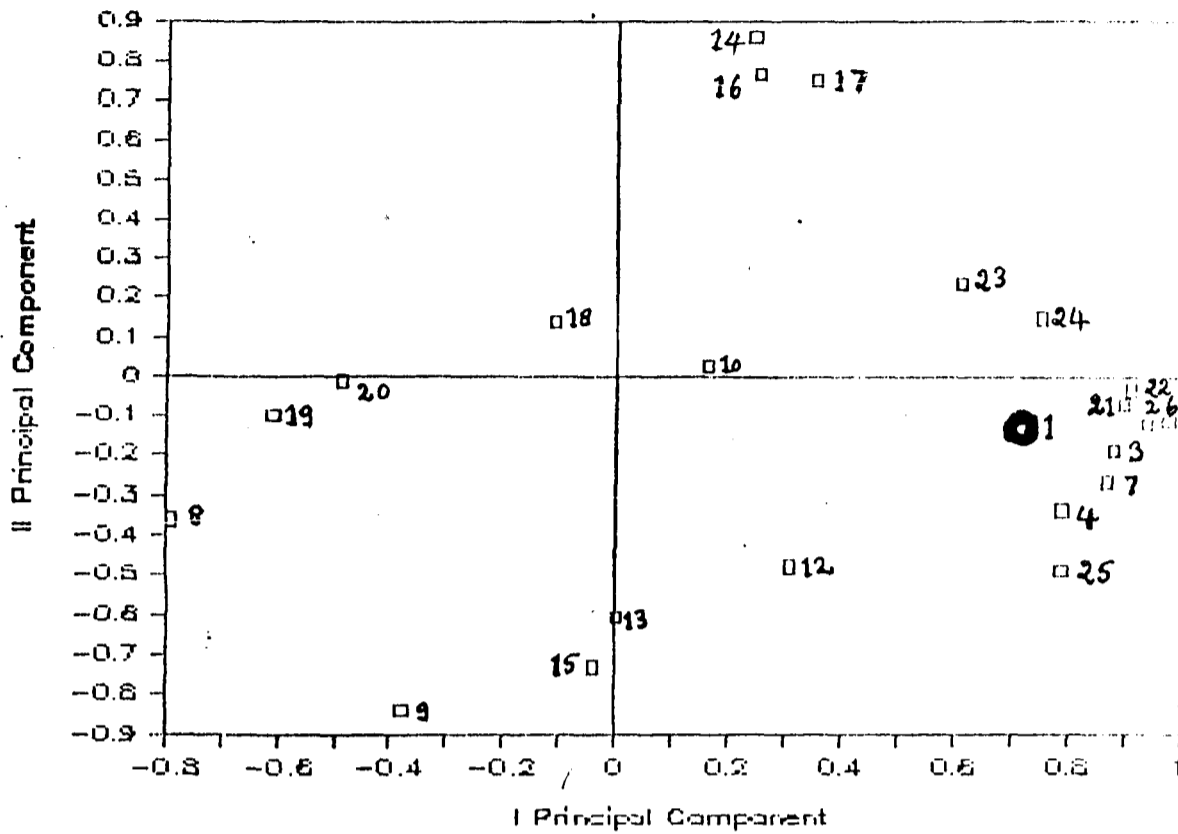


Fig 4.22 : Variables Associated with Sunflower Production in Bijapur District.

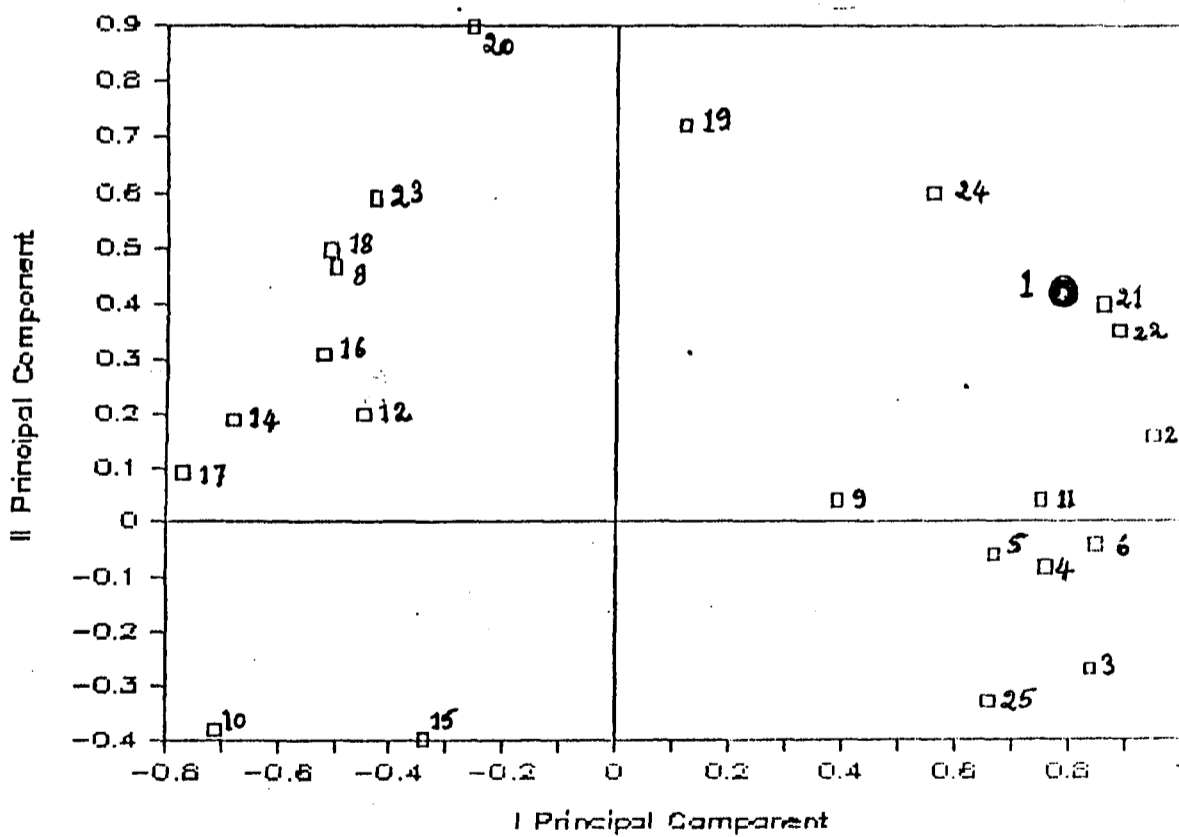


Fig 4.23 : Variables Associated with Sunflower Production in Dharwad District.

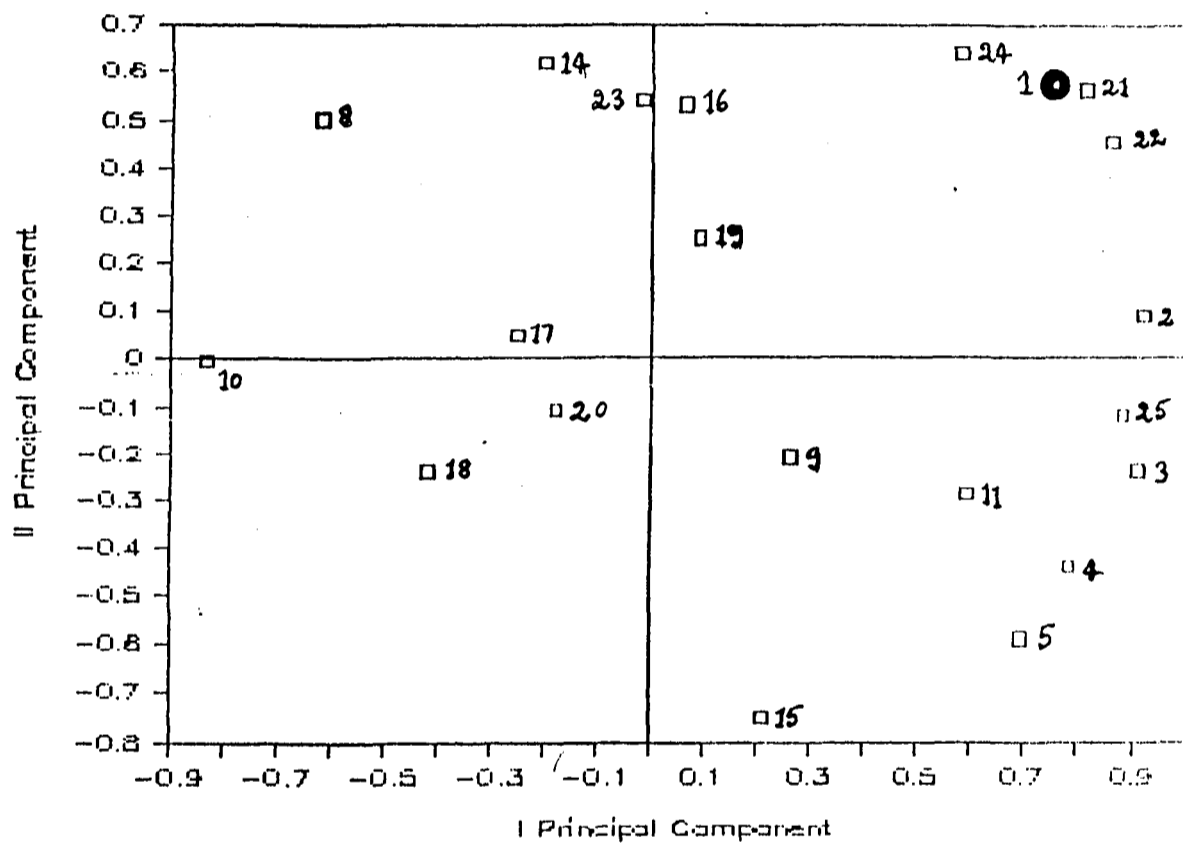


Fig 4.24 : Variables Associated with Sunflower Production in Raichur District.

sunflower, total oilseeds and gross cropped area. In Bijapur district, in addition to above three variables, prices of sunflower, wheat, safflower, rabi jowar and groundnut were also closely associated with sunflower production.

From the Tables 4.6 to 4.9, it could be made out that the first three principal components explained most of the variation in the explanatory variables. The percentage of variation ranged from as low as 62.7 per cent in Dharwad with respect to groundnut crop to as high as 76.3 per cent with respect to sunflower in the same district. The price and yield variables mostly associated with the first component in all the crops and districts where as, rainfall variable was found to have association on either with the second or third component. The association of area, net sown area and gross cropped area could be identified either with first, second or third component.

4.3 Market Structure For Oilseeds

The concentration of market power is an important element of market structure and determines the nature and competition and consequently market conduct and performance. The relative degree of concentration of transactions among the categories of sellers and buyers is one of the important methods to examine the nature of competition in the market. On the basis of the

extent of the total quantity (total business) controlled by the top four firms, a given market was classified into following four categories by Bain (1956).

I	Highly concentrated Oligopoly/sony	75 - 100%
II	Moderately concentrated Oligopoly/sony	50 - 75%
III	Slightly concentrated Oligopoly/sony	25 - 50%
IV	Atomistically competitive	< 25%

An attempt was made in this section to analyse the market structure of two prominent oilseeds during peak and lean periods of their arrivals. Table 4.10 and 4.11 respectively present the transactions of top four firms (Sellers refers to commission agents who act as seller of the farmers produce and Buyers refers to wholesale traders and oilmillers who are the purchaser of oilseeds) in two prominent oilseeds viz., groundnut and sunflower during peak and lean months of arrivals in the selected markets.

4.3.1 Market Power Concentration With Sellers

Table 4.10 revealed mixed pattern of competition in groundnut transaction based on the number of firms and quantity handled. Bijapur, Gangavati and Raichur markets exhibited atomistically competitive nature with respect to groundnut transaction. Here top four firms handled less than 25 per cent

Table 4.10 : Classification of Markets Based on Quantity of Oilseeds Handled by Top Four Sellers During Different Periods

Market	Quantity handled (%)						Nature of Market					
	Groundnut			Sunflower			Groundnut			Sunflower		
	Peak	Lean	Peak	Lean	Peak	Lean	Peak	Lean	Peak	Lean	Peak	Lean
1 Bi japur	21.31 (5.48)	57.72 (15.38)	28.71 (10.81)	66.56 (30.77)	IV	II	III	II	III	II	III	II
2 Talikoti	29.00 (7.69)	74.36 (44.44)	25.27 (7.69)	54.37 (16.67)	III	II	III	II	III	III	II	II
3 Gadag	33.84 (3.25)	37.15 (5.55)	21.86 (3.54)	38.39 (8.51)	III	III	III	IV	IV	III	III	III
4 Ranebennur	30.70 (3.67)	29.72 (8.89)	-	-	III	III	III	-	-	III	-	-
5 Gangavati	18.04 (2.90)	36.43 (9.09)	-	-	IV	III	III	-	-	III	-	-
6 Raichur	17.49 (3.54)	31.28 (4.94)	17.79 (3.70)	30.11 (5.71)	IV	III	IV	III	IV	III	IV	III

Figures in parantheses indicate percentage of top four firms to total number of firms and the quantity handled

of total groundnut transaction, while other study markets exhibited slightly concentrated oligopolistic situation. However, during lean period, except Bijapur and Talikoti, other four markets showed slightly concentrated oligopoly nature of competition. The quantity handled by the top four firms in these markets ranged from 29.72 per cent in Ranebennur market to 37.15% in Gadag market. The top four firms in Bijapur and Talikoti markets were respectively 15.38 per cent and 44.44 per cent of the total number of firms in these markets and the quantity handled by them in the respective markets was 57.72 per cent and 74.46 per cent of the total market transaction.

As far as sunflower handling is concerned, Gadag as well Raichur markets exhibited atomistically competitive and slightly concentrated oligopoly situation during peak and lean periods respectively while Bijapur and Talikoti markets exhibited moderately concentrated oligopoly and highly concentrated oligopoly situation during peak and lean periods respectively.

In general, the degree of concentration in terms of quantity handled was higher during lean period than during peak period.

4.3.2 Market Power Concentration With Buyers

The price received by the oilseed growers for their produce is influenced, to a large extent, by the degree of competition among the buyers for the produce and to some extent by the commission agents.

In this section the concentration of market power is reflected by the proportion of total market business shared by each of the selected oilseed buying firms. The classification of markets based on the volume of transaction of top four buying firms is presented in Table 4.11. The analysis revealed that during peak period, out of 6 markets selected, only top four firms, in four markets controlled more than 75 per cent of the groundnut trade. The share of these firms in these markets in the total volume of transactions varied from 77.78 per cent in Raichur market to 91.73 per cent in Bijapur market. The shares of top four firms in Talikoti and Gangavati markets were almost equal (84 per cent). Based on the share of the top four firms, these markets could be characterised as highly concentrated oligopsony. However, such a share in Gadag and Ranebennur markets was 55.44 per cent and 58.72 per cent respectively, thus exhibited moderately concentrated oligopsony situation.

Table 4.11 : Classification of Markets Based on Volume of Transaction of Oilseeds by Top Four Buyers During Different Periods

Market	Volume of Transaction (%)						Nature of Market					
	Groundnut			Sunflower			Groundnut			Sunflower		
	Peak	Lean	Peak	Lean	Peak	Lean	Peak	Lean	Peak	Lean	Peak	Lean
1 Bijapur	91.73 (13.33)	66.53 (26.67)	58.46 (16.67)	72.52 (44.44)	I	II	I	II	II	II	II	II
2 Talikoti	84.60 (22.22)	90.73 (66.67)	76.02 (28.57)	83.39 (40.00)	I	I	I	I	I	I	I	I
3 Gadag	55.44 (5.71)	38.18 (11.43)	42.61 (10.00)	64.56 (21.05)	II	III	II	III	III	III	III	II
4 Ranebennur	58.72 (9.09)	81.44 (30.77)	-	-	II	I	II	I	-	-	-	-
5 Gangavati	83.87 (26.66)	91.10 (80.00)	-	-	I	I	I	I	-	-	-	-
6 Raichur	77.78 (16.00)	84.46 (50.46)	59.92 (14.81)	68.55 (15.38)	I	I	I	I	I	II	II	II

Figures in parantheses indicate percentage of top four firms to total number of firms and their volume of transaction

During lean period also, highly concentrated oligopsony forces were evident in respect of four markets viz., Talikoti, Ranebennur, Gangavati and Raichur. However, Bijapur and Gadag markets respectively exhibited moderately concentrated oligopsony and slightly concentrated oligopsony situation.

In case of sunflower transaction, share in the total purchases of top four firms ranged from as low as 42.61 per cent during peak period in Gadag market to as high as 83.93 per cent during lean period in Talikoti market. Based on the share of these firms in the total volume of transaction of all the firms, Talikoti market could be characterised as highly concentrated oligopsony and Bijapur and Raichur markets as moderately concentrated oligopsony both during lean and peak periods. On the same criterion, Gadag market turned out to be moderately concentrated oligopsony during lean period and slightly concentrated oligopsony during peak period.

From the tables 4.11 and 4.12 it was clear that the oilseeds trade is highly concentrated with buying firms compared to selling firms.

4.3.3 Size Distribution of Sellers

In this section, degrees of sellers and buyers concentration were used as characteristics for determining the

market structure for oilseeds. Measures of such concentration were defined in terms of market shares of different sizes of sellers and buyers. For the convenience of presentation and analysis, different firms operating in the oilseeds markets were categorised into five size groups. Table 4.12 and 4.13 present the size distribution of sellers respectively in groundnut and sunflower, based on their volume handled during peak and lean periods.

The number of firms and quantity of groundnut handled varied from market to market and over the two periods. The number of sellers involved ranged from as low as 52 in Talikoti market to as high as 138 in Gangavati market, while the quantity handled varied from 2090 quintals in Talikoti market to 21,353 quintals in Raichur market during peak period. It was evident from the Table 4.12 that a few large firms handled a major portion of arrivals of groundnut during peak period. In Bijapur, about 38 per cent of the total number of firms handled 80 per cent of the total quantity, while in Gadag and Ranebennur markets, only 12 to 13 per cent of the firms handled more than 60 per cent of the arrivals. The majority of the firms belonged to other four size groups. Their number was relatively large compared to the quantity handled. The extent of market power concentration was confirmed by computing the

Table 4.12 : Size Distribution of Sellers in Groundnut Marketing During Different Periods

Size Groups (Qty. in qtls.)	Bijapur		Talikota		Gadag		Ranebennur		Gangavati		Raichur	
	Firms (%)	Qty. (%)	Firms (%)	Qty. (%)	Firms (%)	Qty. (%)	Firms (%)	Qty. (%)	Firms (%)	Qty. (%)	Firms (%)	Qty. (%)
	N=73	Q=9239	N=52	Q=2090	N=123	Q=6702	N=109	Q=4456	N=138	Q=8810	N=113	Q=21353
	<u>Peak Period</u>											
0 - 10	9.59	0.38	26.92	4.21	36.59	3.55	46.79	4.82	18.12	1.58	5.31	0.13
10 - 25	12.33	1.75	23.08	10.29	22.76	6.85	18.35	7.59	21.00	5.99	7.96	0.75
25 - 50	16.44	4.38	26.92	25.36	13.82	9.30	12.84	10.41	19.57	11.68	14.16	2.58
50 - 100	23.28	13.17	13.46	24.98	13.01	17.35	10.09	16.61	24.64	27.16	19.47	7.68
100 & Above	38.36	80.32	9.62	35.16	13.82	62.95	11.93	60.57	16.67	53.59	53.10	88.86
L - Value	0.46		0.50		0.65		0.67		0.52		0.37	
	<u>Lean Period</u>											
	N=26	Q=1123	N=9	Q=312	N=72	Q=1666	N=81	Q=1106	N=44	Q=1545	N=45	Q=2530
0 - 10	42.32	2.46	22.22	3.85	59.72	11.46	65.43	14.47	22.73	3.18	31.10	2.77
10 - 25	15.38	5.89	22.22	12.82	16.67	12.07	20.99	29.39	34.09	14.70	15.56	4.66
25 - 50	11.54	8.66	33.34	38.78	9.72	15.85	7.41	20.07	20.45	20.64	15.56	10.87
50 - 100	15.38	25.27	22.22	44.55	9.72	28.57	4.94	24.14	13.64	25.05	17.78	25.42
100 & Above	15.38	57.72	-	-	4.17	32.05	1.23	11.93	9.09	36.43	20.00	56.28
L - Value	0.63		0.36		0.64		0.60		0.52		0.54	

Note : N = Number of firms
Q = Quantity handled

Table 4.13 : Size Distribution of Sellers in Sunflower Marketing During Different Periods.

Size Groups (qty. in qtls.)	Bijapur		Talikota		Gadag		Raichur	
	Firms (%)	Qty. (%)	Firms (%)	Qty. (%)	Firms (%)	Qty. (%)	Firms (%)	Qty. (%)
	N=37	Q=3285	N=52	Q=3114	N=113	Q=1743	N=108	Q=14049
0 - 10	10.81	0.85	11.54	1.35	56.64	14.49	12.04	0.54
10 - 25	8.11	1.92	23.08	6.79	27.43	31.48	17.59	2.51
25 - 50	21.62	8.55	25.00	15.36	9.70	21.48	9.26	2.67
50 - 100	27.03	25.88	21.15	24.89	4.43	18.80	17.59	9.70
100 & Above	32.43	62.80	19.23	51.61	1.77	13.75	43.52	84.58
L - Value		0.39		0.46		0.54		0.45
			<u>Peak Period</u>					
	N=13	Q=450	N=24	Q=710	N=47	Q=106	N=70	Q=6831
0 - 10	46.16	9.44	54.17	9.86	97.87	85.31	15.71	0.56
10 - 25	-	-	8.33	3.80	2.13	14.69	8.57	1.26
25 - 50	30.77	33.44	12.50	15.92	-	-	24.29	9.37
50 - 100	15.38	30.78	20.83	50.14	-	-	20.00	13.83
100 & Above	7.69	26.34	4.17	20.28	-	-	31.43	74.98
L - Value		0.48		0.57		0.13		0.50
			<u>Lean Period</u>					

Note : N = Number of firms
Q = Quantity handled

Lorenz coefficient of inequality. The Lorenz coefficients varied across the markets and over the periods under consideration. During peak period of market arrivals, this value ranged between 0.67 in Renebennur market and 0.37 in Raichur market. In Gadag and Ranebennur markets, only 12-13 per cent handled more than 60 to 63 per cent of the total quantity which was indicative of oligopolistic situation of the markets, while in Bijapur and Raichur markets, the Lorenz coefficient of inequality ranged between 0.37 and 0.46 which indicated that major portion of the groundnut arrivals was handled by the large sized firms which handled more than 100 quintals. This situation revealed that few large firms compete with each other to purchase the required quantity of the groundnut produce. The other markets also exhibited more or less similar pattern.

During lean period, in Gadag, Ranebennur and Gangavati markets, the seller's market power concentration as reflected by the Lorenz coefficients was not different from the one that was observed during peak period. However, the value of coefficient was higher in respect of Raichur and Bijapur markets and lower in Talikoti market, as compared to the value observed during the peak period for respective markets.

In sunflower marketing, an almost similar situation was observed over time. In Bijapur and Raichur markets the Lorenz

coefficients were relatively higher during the lean period compared to the peak period. It was interesting to note that in Gadag market, during lean period, no individual seller (commission agent) handled significantly large quantity of the produce. The small lots of arrivals were shared by a large number of firms thus establishing the absence of inequality in market power ($L = 0.13$). As indicated by the L-value, inequality in market power in Talikoti market increased during lean period. Lorenz curves, indicating the extent of concentration of groundnut and sunflower trade with sellers during peak and lean periods are depicted in figures 4.25 to 4.28.

4.3.4 Size - Distribution of Buyers

Size-distribution of buyers of groundnut and sunflower during peak and lean periods and volume of transaction are presented in Tables 4.14 and 4.15. The number of traders who participated in groundnut purchases varied from 15 in Gangavati to 70 in Gadag markets. In Gadag and Ranebennur markets, Lorenz coefficients indicated high concentration of trade with a few large buyers. In Ranebennur market, only 5 firms (11.36 per cent) purchased a quantity worth 65.74 per cent of the total value of transactions. In Gadag market 88.67 per cent of the value of total transactions was handled by 25.71 per cent

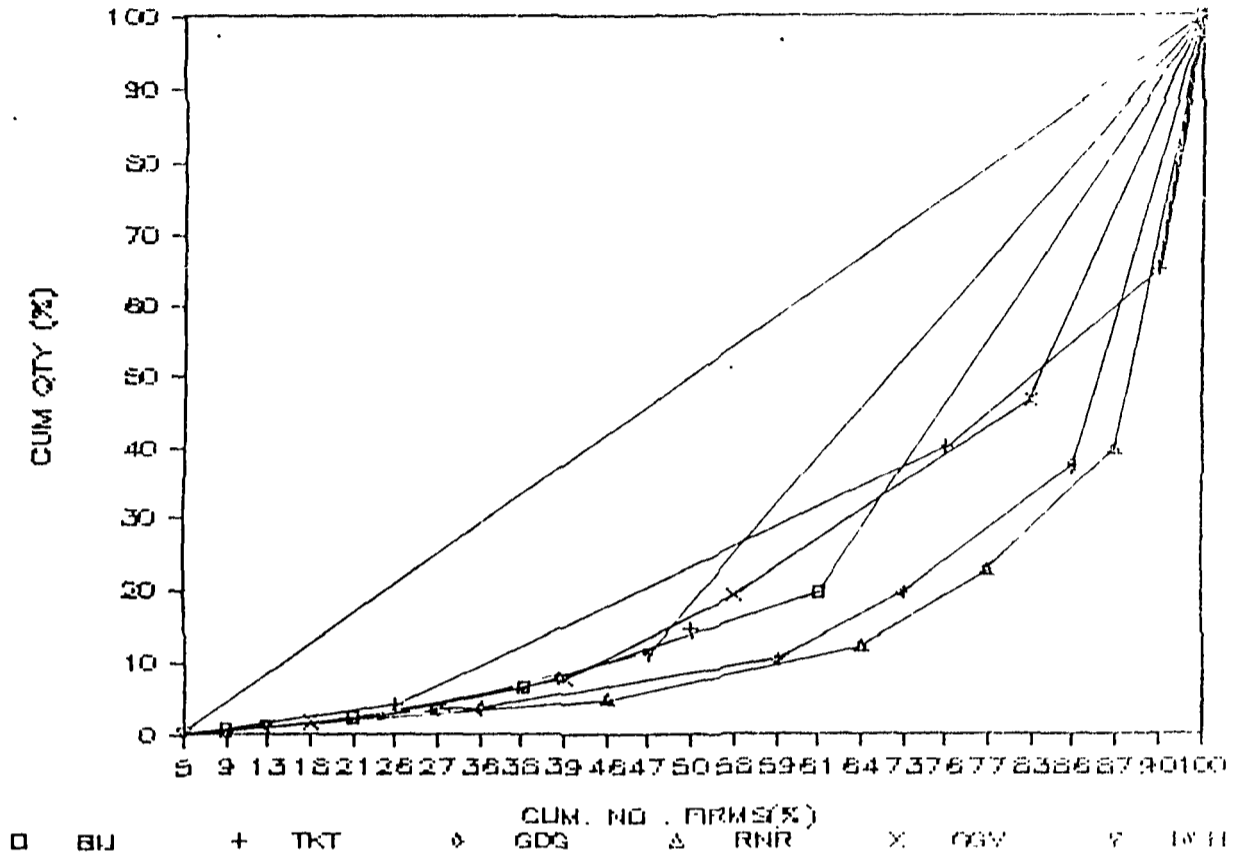


Fig 4.25: Groundnut Trade Concentration with Sellers During Peak Period.

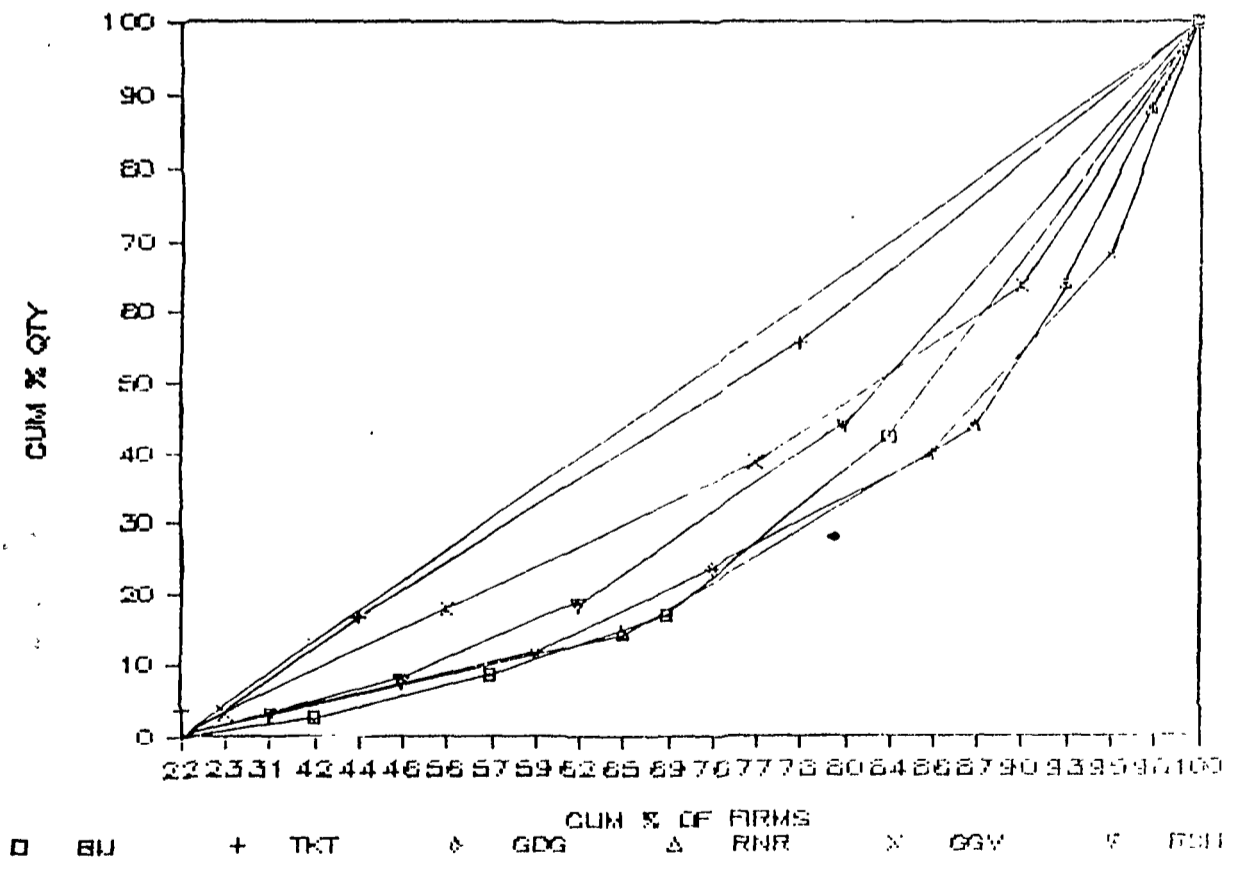


Fig 4.26: Groundnut Trade Concentration with Sellers During Lean Period.

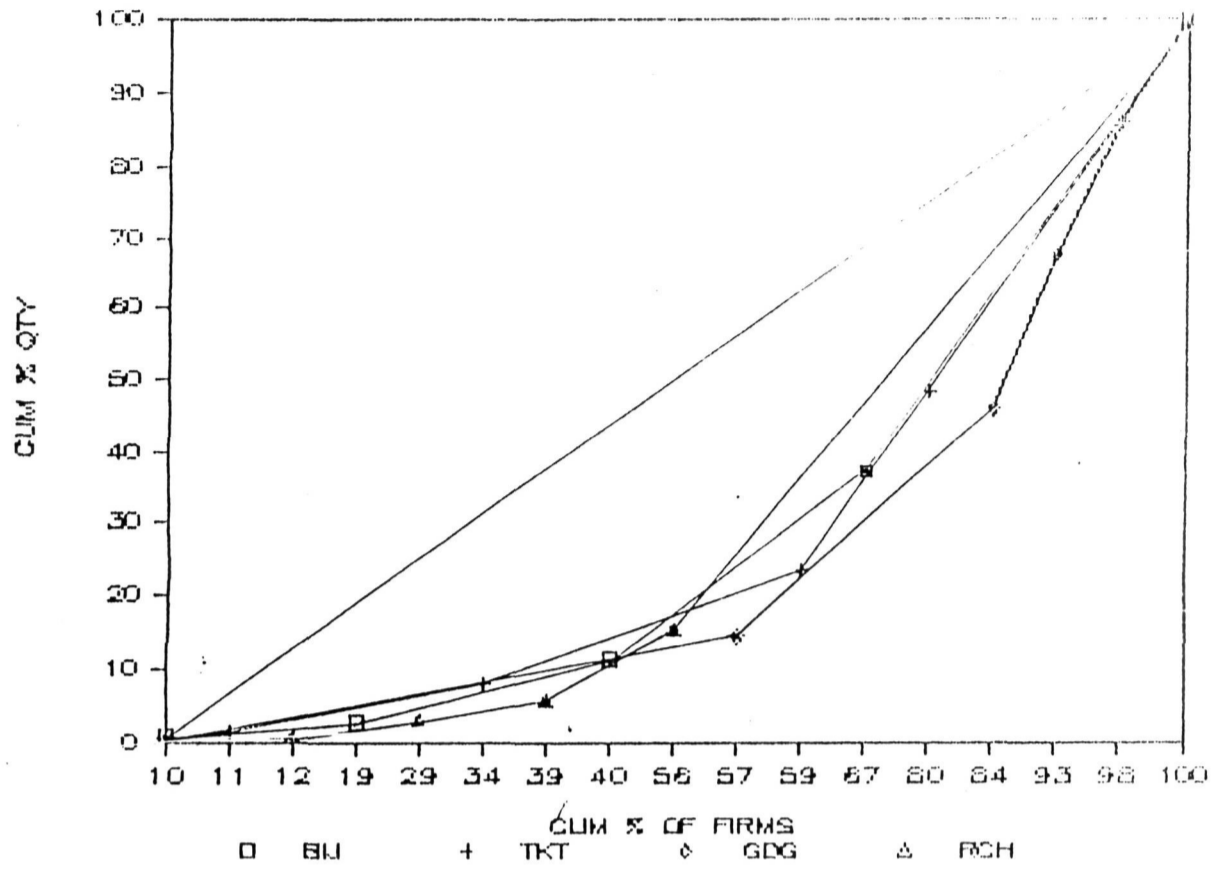


Fig 4.27: Sunflower Trade Concentration with Sellers During Peak Period.

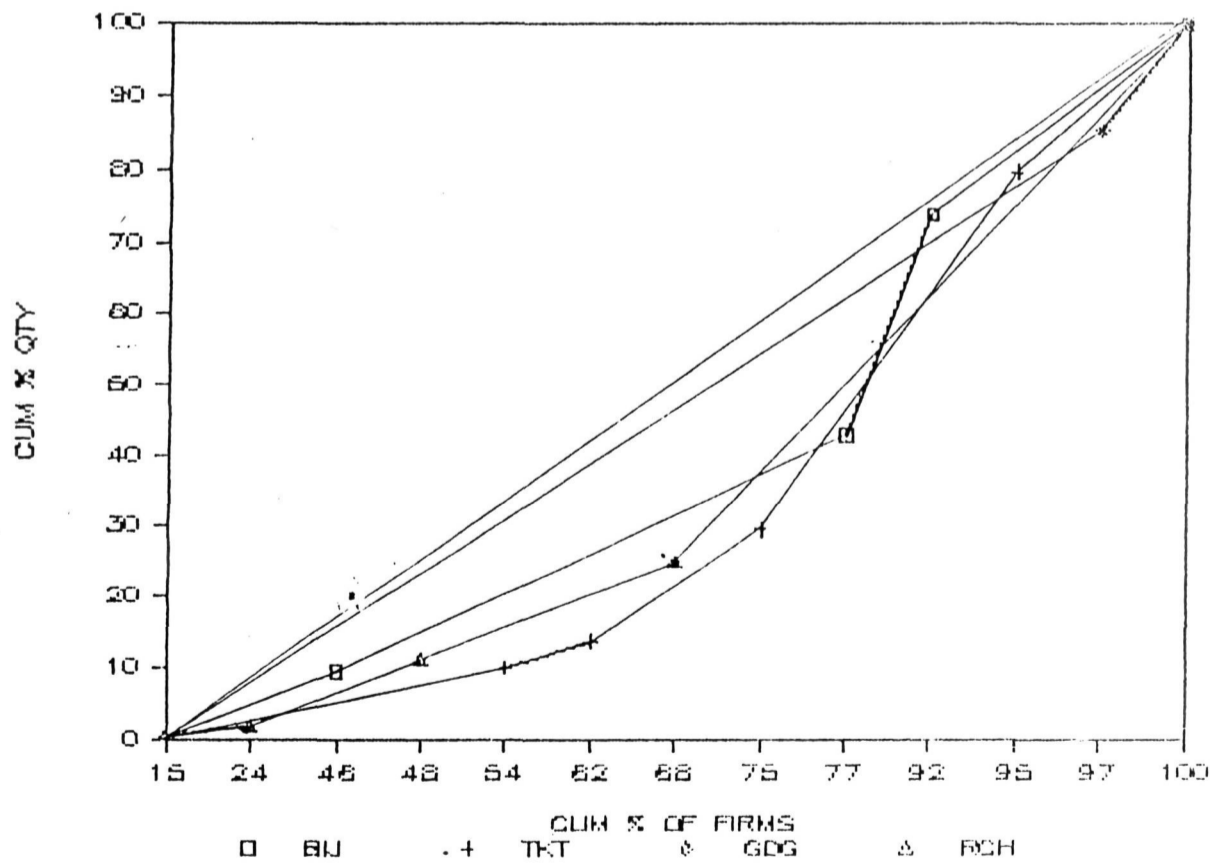


Fig 4.28 : Sunflower Trade Concentration with Sellers During Lean Period

Table 4.14 : Size Distribution of Buyers in Groundnut Marketing During Different Periods

Size Groups (Vol. Trs. in Rs.)	Bijapur		Talikota		Gadag		Ranebennur		Gangavati		Raichur	
	Firms (%)	Vol. Trs. (%)	Firms (%)	Vol. Trs. (%)	Firms (%)	Vol. Trs. (%)	Firms (%)	Vol. Trs. (%)	Firms (%)	Vol. Trs. (%)	Firms (%)	Vol. Trs. (%)
	N=30	V=44140973	N=18	V=3540296	N=70	V=10030461	N=44	V=1962044	N=15	V=15351418	N=25	V=23902021
	<u>Peak Period</u>											
0 - 10000	6.67	0.04	33.33	0.70	32.86	0.82	54.55	2.41	6.67	0.03	20.00	0.12
10000 - 25000	20.00	0.23	11.11	1.01	14.29	1.55	9.09	2.64	20.00	0.38	-	-
25000 - 50000	13.33	0.28	11.11	1.64	17.14	4.39	13.64	11.07	-	-	24.00	0.92
50000 - 1 Lakh	13.33	0.71	11.11	3.59	10.00	4.57	11.36	18.14	6.67	0.37	4.00	0.36
1 Lakh & Above	46.67	98.74	33.34	93.06	25.71	88.67	11.36	65.74	66.66	99.22	52.00	98.60
L - Value	0.52		0.62		0.67		0.75		0.32		0.47	
	<u>Lean Period</u>											
	N=15	V=1070221	N=6	V=289370	N=24	V=976435	N=13	V=638588	N=5	V=1345782	N=8	V=1226710
0 - 10000	20.00	0.46	16.67	1.48	40.00	5.25	38.46	1.55	-	-	25.00	2.26
10000 - 25000	20.00	4.84	-	-	22.86	15.02	23.08	9.03	-	-	12.50	4.05
25000 - 50000	6.67	4.46	16.67	7.79	20.00	28.39	-	-	-	-	-	-
50000 - 1 Lakh	33.33	31.89	-	-	11.43	27.82	23.08	33.19	40.00	12.97	62.50	93.69
1 Lakh & Above	20.00	58.35	66.66	90.73	5.71	23.52	15.38	56.23	60.00	87.03	-	-
L - Value	0.52		0.25		0.52		0.62		0.27		0.32	

Note : N = Number of firms
V = Volume transaction

Table 4.15 : Size Distribution of Buyers in Sunflower Marketing During Different Periods.

Size Groups (Vol. Trs. in Rs.)	Bijapur		Talikota		Gadag		Raichur	
	Firms (%)	Vol.Trs. (%)	Firms (%)	Vol.Trs. (%)	Firms (%)	Vol.Trs. (%)	Firms (%)	Vol.Trs. (%)
	N=24	V=3070653	N=14	V=3478756	N=40	V=1409559	N=27	V=12381230
	<u>Peak Period</u>							
0 - 10000	8.33	0.48	7.14	0.27	47.50	3.73	14.81	0.10
10000 - 25000	25.00	2.95	7.14	0.40	15.00	7.89	14.81	0.60
25000 - 50000	12.50	3.44	14.29	1.93	17.50	17.67	3.70	0.33
50000 - 1 Lakh	16.67	10.93	28.57	6.52	10.00	21.10	7.41	1.02
1 Lakh & Above	37.50	82.20	42.86	90.88	10.00	49.61	59.27	97.95
L - Value	0.49		0.49		0.66		0.39	
	<u>Lean Period</u>							
	N=9	V=483198	N=10	V=854646	N=19	V=105800	N=26	V=6481208
0 - 10000	-	-	10.00	0.59	78.95	35.43	23.08	0.47
10000 - 25000	22.22	5.89	30.00	5.43	21.05	64.56	15.38	1.01
25000 - 50000	44.44	31.02	10.00	4.45	-	-	11.54	1.86
50000 - 1 Lakh	22.22	34.93	40.00	36.01	-	-	3.85	1.40
1 Lakh & Above	11.12	28.16	10.00	53.52	-	-	46.15	95.26
L - Value	0.36		0.59		0.52		0.50	

Note : N = Number of firms
V = Volume transaction

of the traders during the peak period. These two markets were followed by Talikoti and Bijapur markets with 33.34 per cent of the total number of traders in Talikoti market accounting for 93.06 per cent and 46.67 per cent of the total number of buyers in Bijapur market accounting for 98.74 per cent. In the two markets of Raichur district, the market power inequality was less compared to that in the other four markets. The total value of transaction in these two markets viz., Gangavati and Raichur was shared by a large number of big firms (each with transaction of more than Rs. 1 lakh).

During the lean period similar to that in peak period, the markets in Dharwad district indicated the highest inequality with L values for Ranebennur and Gadag markets being 0.62 and 0.52 respectively. The Bijapur market showed the same extent of inequality as was observed during peak period, while Talikoti market indicated the least inequality ($L = 0.25$) among the study markets studied.

As far as concentration of market power with respect to sunflower marketing was concerned, a mixed pattern was noticed over the periods and across the markets. Gadag market exhibited highest inequality in the distribution of total value of transaction during peak period, wherein only 10 per cent of

the total number of traders, operating in the 1 lakh and above size group, controlled nearly 50 per cent of the total value of transaction, followed by Bijapur and Talikoti markets which had the same concentration of buyer's market power ($L = 0.49$). The least concentration of market power was noticed in Raichur market where about 60 per cent of the firms operating in the last size group (1 lakh and above) controlled about 98 per cent of the total transaction during peak period. This was evident by the lowest value of Lorenz coefficient of inequality ($L = 0.39$) for Raichur market among the four markets considered for the analysis. During lean period, the Talikoti market exhibited highest inequality ($L=0.59$) wherein only 10 per cent of the total number of firms purchased the commodity worth 53.52 per cent of the total value of transactions. More or less equal concentration of market power was noticed in Gadag and Raichur markets during lean period, with difference between the two in terms of the number of firms operating in different size categories. In Gadag market, entire quantity transacted was controlled by a large number of small firms operating in the first two categories (i.e., up to Rs 10,000 and Rs. 10,000 to Rs. 25,000), whereas, Raichur market revealed the usual tendency of big firms controlling bulk of the total transaction. Bijapur market revealed the lowest concentration

of market power ($L = 0.36$) among the study markets. The Lorenz curve indicating concentration of groundnut and sunflower trade with buyers during peak and lean period are shown in figures 4.29 to 4.32.

4.4 Pattern of Market Arrivals and Prices of Oilseeds

4.4.1 Trends in Arrivals and Prices of Oilseeds

The results of the orthogonal polynomial regression for the analysis of trends in arrivals and prices of the reference crops in the selected markets are presented in Tables 4.16 to 4.19 and figures 4.33 to 4.43.

The arrivals of different oilseeds showed mixed trends, while the trend pattern of prices were almost identical for all the oilseeds, in all the study markets. In Bijapur and Talikoti markets, arrivals of groundnut showed marginal fluctuations during the initial period, while substantial increase was observed from 1983-84 onwards. In Gadag and Ranebennur markets, patterns of groundnut arrival over the years were almost identical, where as Raichur market showed a marginally increasing trend during the study period. However, the rate of change in groundnut arrival over the years was statistically non-significant in these three markets. In Gangavati market, groundnut arrivals showed a slightly

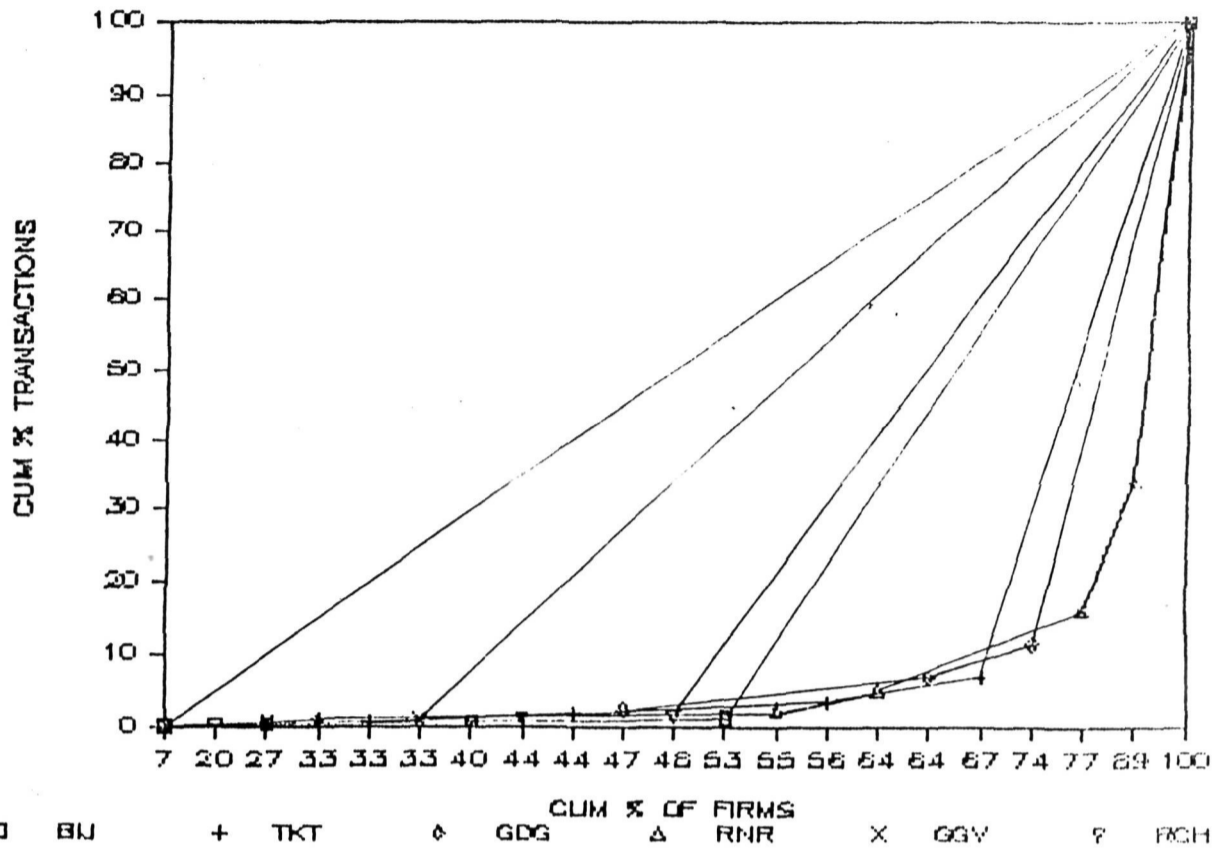


Fig 4.29: Groundnut Trade Concentration with Buyers During Peak Periods.

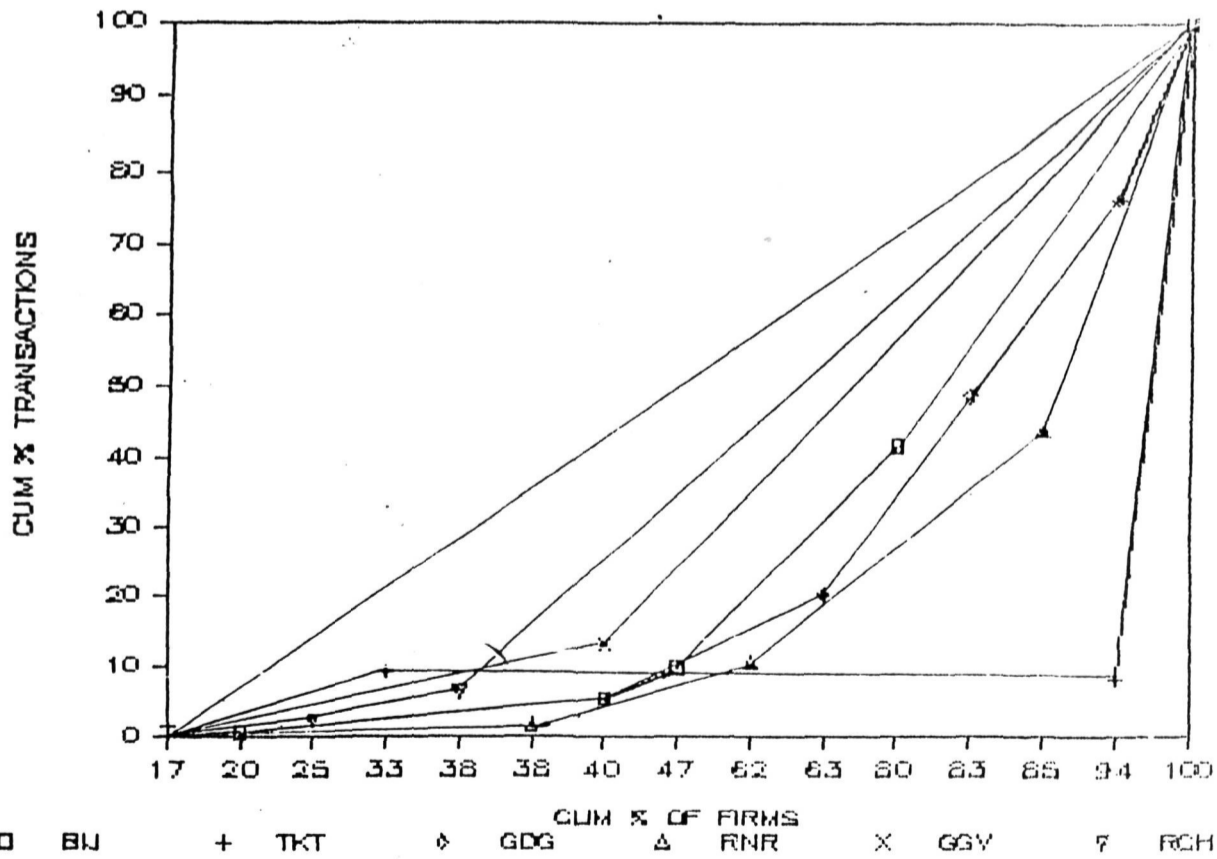


Fig 4.30 : Groundnut Trade Concentration with Buyers During Lean Periods.

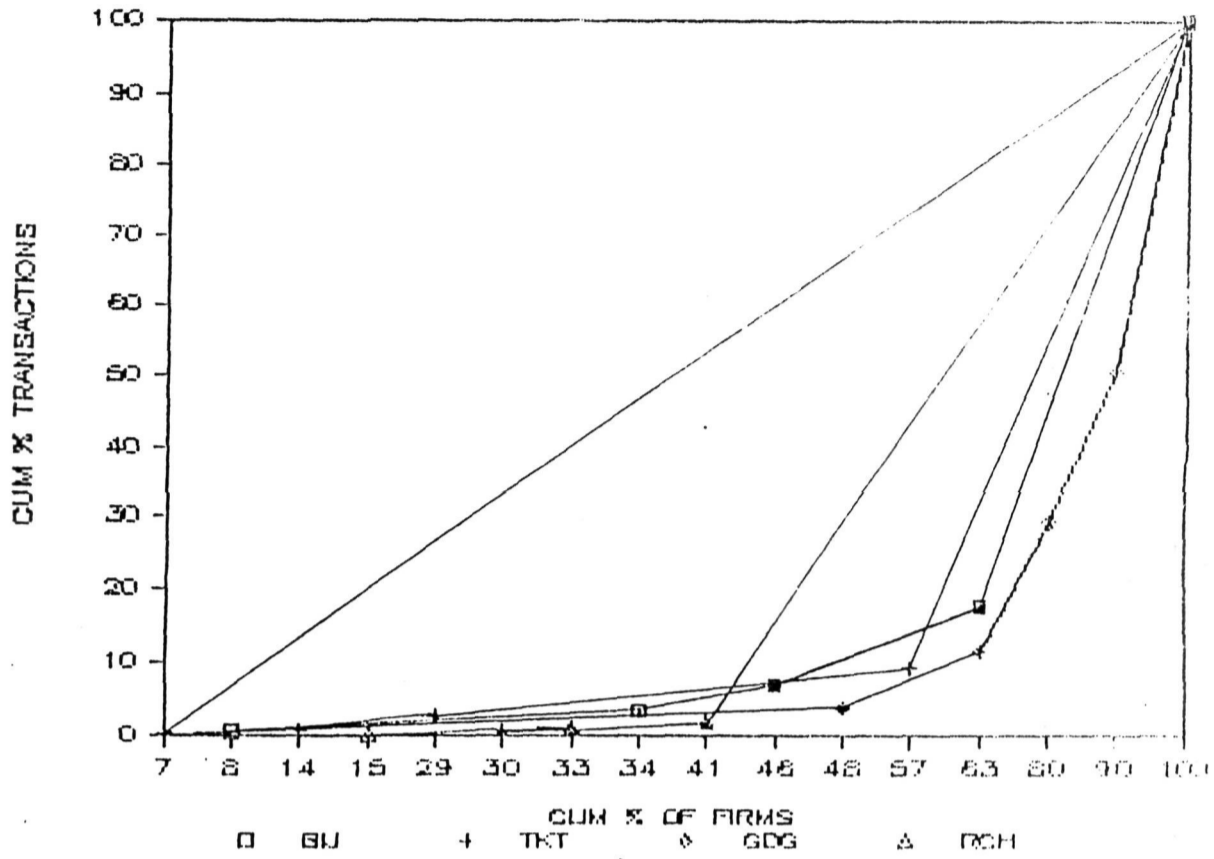


Fig 4.31: Sunflower Trade Concentration with Buyers During Peak Period.

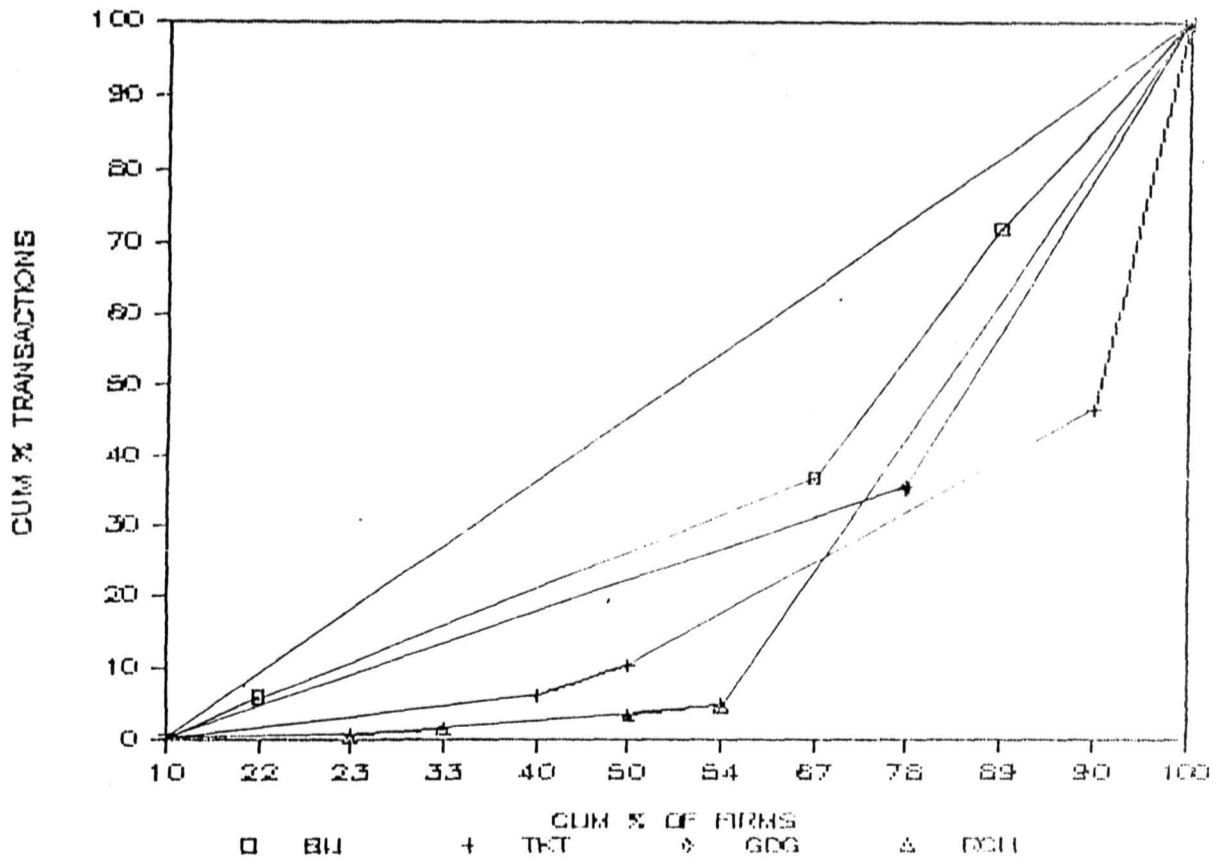


Fig 4.32 : Sunflower Trade Concentration with Buyers During Lean Period.

Table 4.16 : Estimated Trend Functions For Groundnut Arrivals and Prices in Selected Markets (1965-66 to 1990-91).

Markets	Intercept	x	x ²	x ³	x ⁴	R ²	F Value
1. Bijapur	82371.23	989.14 (2.754)**	ARRIVALS 667.43** (3.109)**	24.96** (2.358)*	-	0.52**	7.90
2. Talikoti	29127.54	1335.00** (10.602)	596.19** (7.923)	15.27** (4.430)	4.66** (3.062)	0.91**	51.04
3. Gadag	267441.10	31.35 NS (0.042)	-	-	-	0.01 NS	0.01
4. Ranebennur	135321.50	406.44 NS (0.841)**	-	-	-	0.03 NS	0.71
5. Gangavati	59587.19	-877.90** (4.598)	396.07** (3.471)	-	-	0.59**	16.60
6. Raichur	358558.90	1983.10 NS (1.440)	-	-	-	0.08 NS	2.07
<u>PRICES</u>							
1. Bijapur	363.96	13.94** (17.54)*	2.670** (5.616)**	-	-	0.94**	169.64
2. Talikoti	351.46	13.59* (21.013)*	2.932* (7.589)**	0.045** (2.583)**	-	0.96**	168.61
3. Gadag	335.15	12.26* (21.164)*	1.944* (5.612)**	0.043* (2.714)	0.016* (2.366)	0.96**	123.09
4. Ranebennur	282.57	1094.00* (18.329)**	2.222* (6.196)**	-	-	0.94**	185.53
5. Gangavati	349.54	12.93* (15.959)**	2.900* (5.995)**	0.048* (2.164)	-	0.93**	98.44
6. Raichur	328.07	11.84* (17.525)	2.68 (6.655)	-	-	0.94**	175.71

Note : Figures in parantheses are t values

* Significant at 1% level

NS Non-significant

Table 4.17 : Estimated Trend Functions For Safflower Arrivals and Prices in Selected Markets (1965-66 to 1990-91).

Markets	Intercept	x	x ²	x ³	x ⁴	R ²	F Value
<u>ARRIVALS</u>							
1. Bijapur	49271.85	-761.20 (3.849)	-	-	-	0.38**	14.82
2. Talikoti	3123.54	-47.59NS (1.697)	-	-	-	0.11NS	2.88
3. Gadag	20156.00	-264.45NS (1.450)	-	-	-	0.08NS	2.10
4. Gangavati	241.92	-10.56 (2.36)**	-	-	-	0.18*	5.45
5. Raichur	17195.92	-650.88** (2.491)	-	-	-	0.20*	6.20
<u>PRICES</u>							
1. Bijapur	312.42	12.38** (16.41)**	2.400** (5.330)**	0.046* (2.230)**	0.022* (2.452)	0.94**	77.14
2. Talikoti	306.61	12.01** (21.824)**	2.401** (7.302)**	0.038* (2.538)	0.014* (2.194)	0.96**	135.22
3. Gadag	303.81	11.65** (19.451)**	2.043** (5.708)**	0.034* (2.086)	0.015* (2.141)	0.95**	104.96
4. Gangavati	9.46	13.85 (9.108)**	2.759 (13.036)**	-	-	0.80**	46.09
5. Raichur	279.73	9.42 (16.543)	1.856 (5.456)	-	-	0.93**	151.72

Note : * Figures in parantheses are t values
 * Significant at 1% level
 NS Non-significant

Table 4.18 : Estimated Trend Functions For Sesamum Arrivals and Prices in Selected Markets (1965-66 to 1990-91).

Markets	Intercept	x	x ²	x ³	x ⁴	x ⁵	R ²	F Value
<u>ARRIVALS</u>								
1. Bijapur	2310.62	-27.08 NS (1.368)	-	-	-	-	0.07 NS	1.87
2. Talikoti	2296.50	-4.18 NS (0.157)**	-	-	-	-	0.01 NS	0.03
3. Gadag	4943.69	100.55** (2.554)**	-	-	-	-	0.21**	6.52
4. Gangavati	712.07	39.60 (5.469)	29.85** (7.167)	1.377** (7.220)	0.395** (4.694)	0.259** (3.382)	0.89**	33.78
5. Raichur	12022.96	-178.15 NS (1.968)	-118.32 (2.188)	-	-	-	0.27*	4.33
<u>PRICES</u>								
1. Bijapur	537.69	21.07** (23.00)**	4.316** (7.856)**	0.100** (3.989)	0.030** (2.772)	0.020* (2.035)	0.97**	123.79
2. Talikoti	512.42	18.83** (16.82)**	2.877** (4.300)**	-	-	-	0.93**	150.73
3. Gadag	428.23	15.11** (17.47)**	2.300** (4.454)**	-	-	-	0.93**	162.57
4. Gangavati	475.12	18.43** (14.103)**	4.024** (5.153)**	0.076* (2.130)	-	-	0.91**	76.67
5. Raichur	485.77	17.674** (15.626)	2.914** (4.312)	-	-	-	0.92**	131.39

Note : Figures in parantheses are t values
 ** Significant at 1% level
 * Significant at 5% level
 NS Non-significant

Table 4.19 : Estimated Trend Functions For Arrivals and Prices of Sunflower in Selected Markets (1980-91 to 1990-91).

Markets	Intercept	x	x ²	x ³	x ⁴	R ²	F Value
<u>ARRIVALS</u>							
1. Raichur	200205.50	3626.60**	5501.30NS	2633.33*	-	0.80**	9.16
		(4.454)	(1.887)	(2.020)			
2. Gangavati	1811.73	749.84**	201.68**	-	-	0.78**	14.16
		(4.255)	(3.196)				
<u>PRICES</u>							
1. Raichur	556.00	44.71**	6.38**	-	-	0.86**	25.06
		(6.577)	(2.619)				
2 .Gangavati	522.00	44.06**	6.16*	-	-	0.85**	22.38
		(6.232)	(2.431)				

Note : Figures in parantheses are t values

* Significant at 1% level

NS Non-significant

** Significant at 5% level

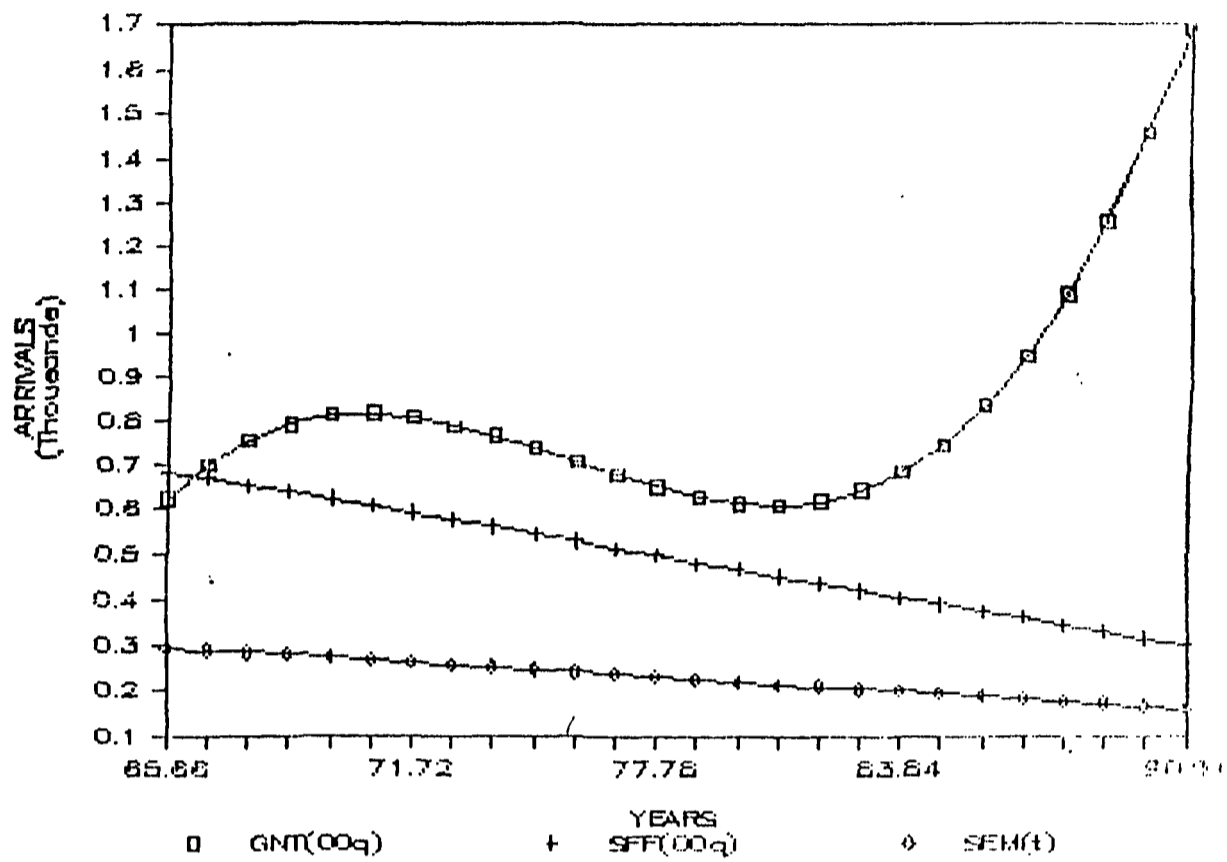


Fig 4.33 : Trends in Oilseeds Arrivals in Bijapur Market.

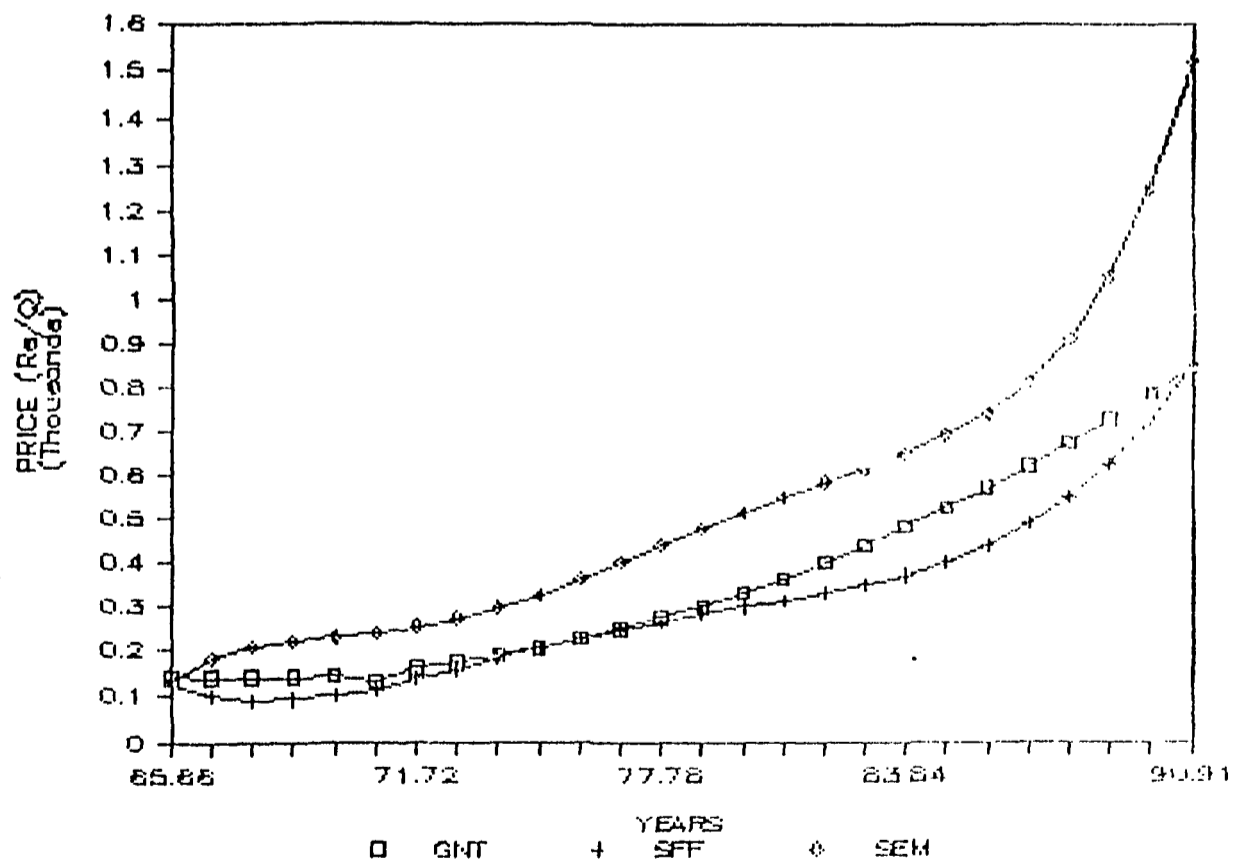


Fig 4.34 : Trends in Oilseeds Prices in Bijapur Market.

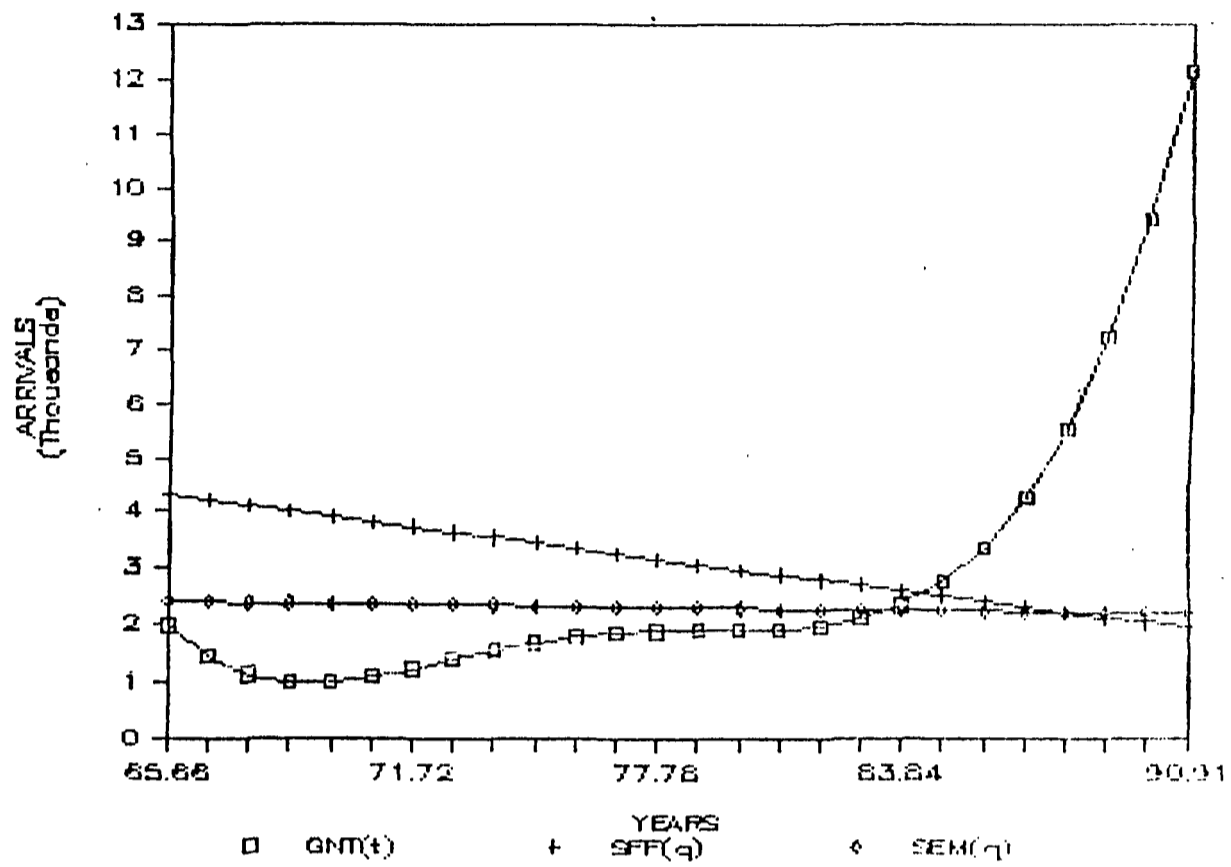


Fig 4.35 : Trends in Oilseeds Arrivals in Talikoti Market.

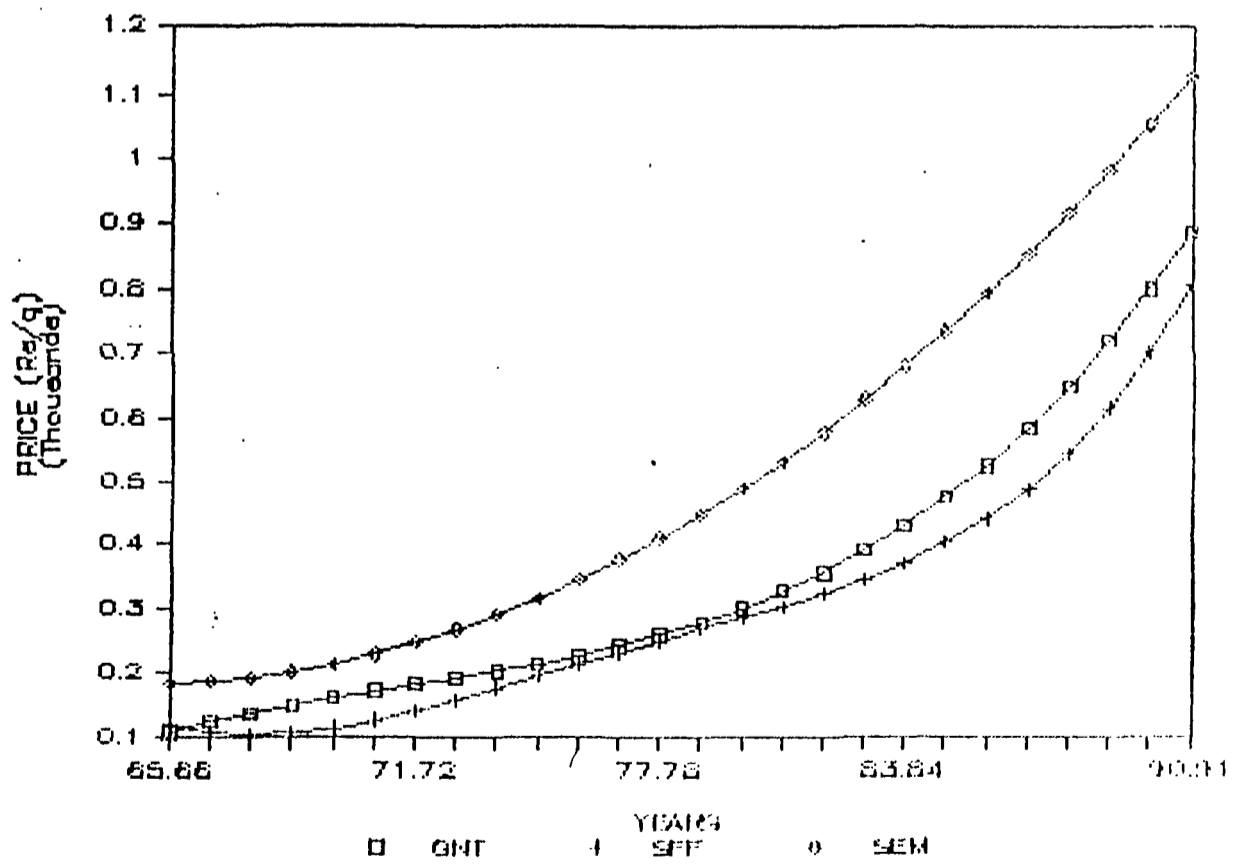


Fig 4.36 : Trends in Oilseeds Prices in Talikoti Market.

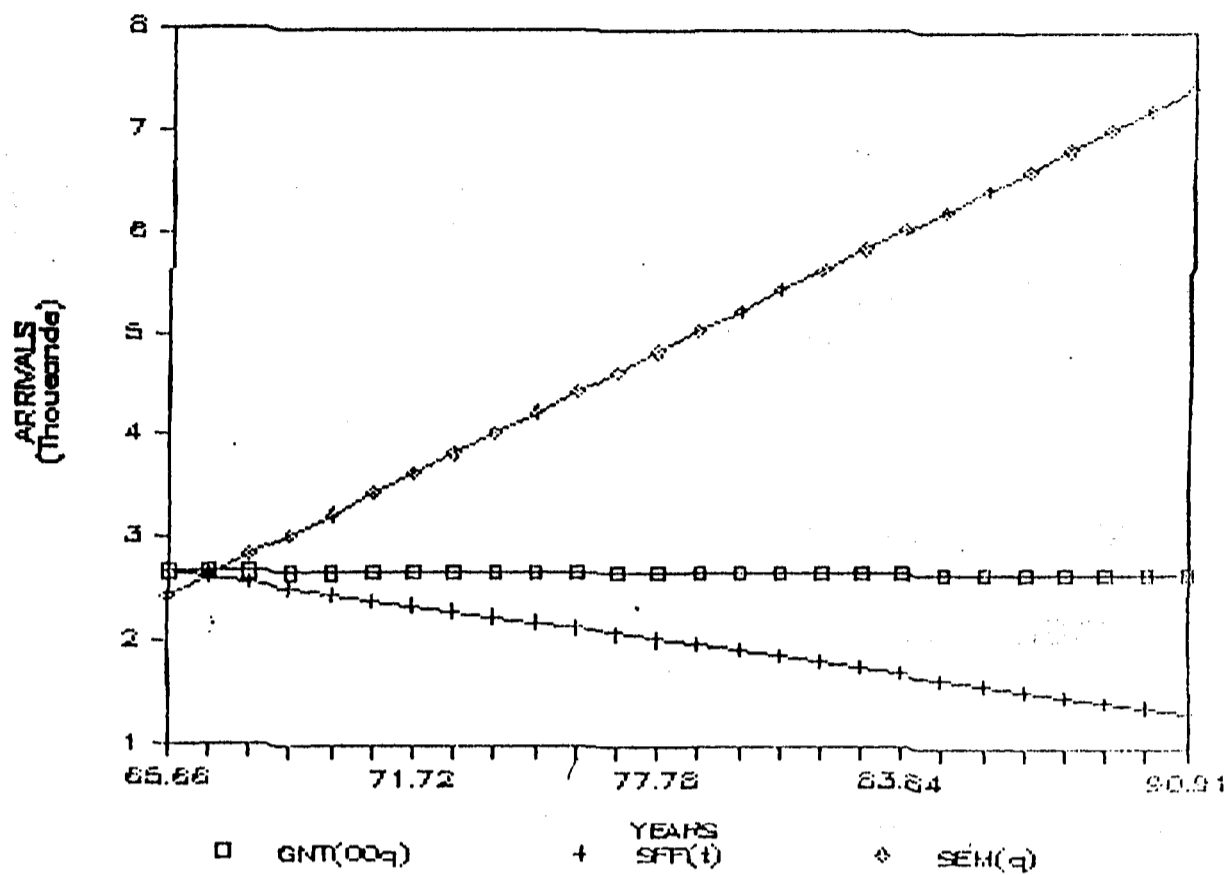


Fig 4.37 : Trends in Oilseeds Arrivals in Gadag Market.

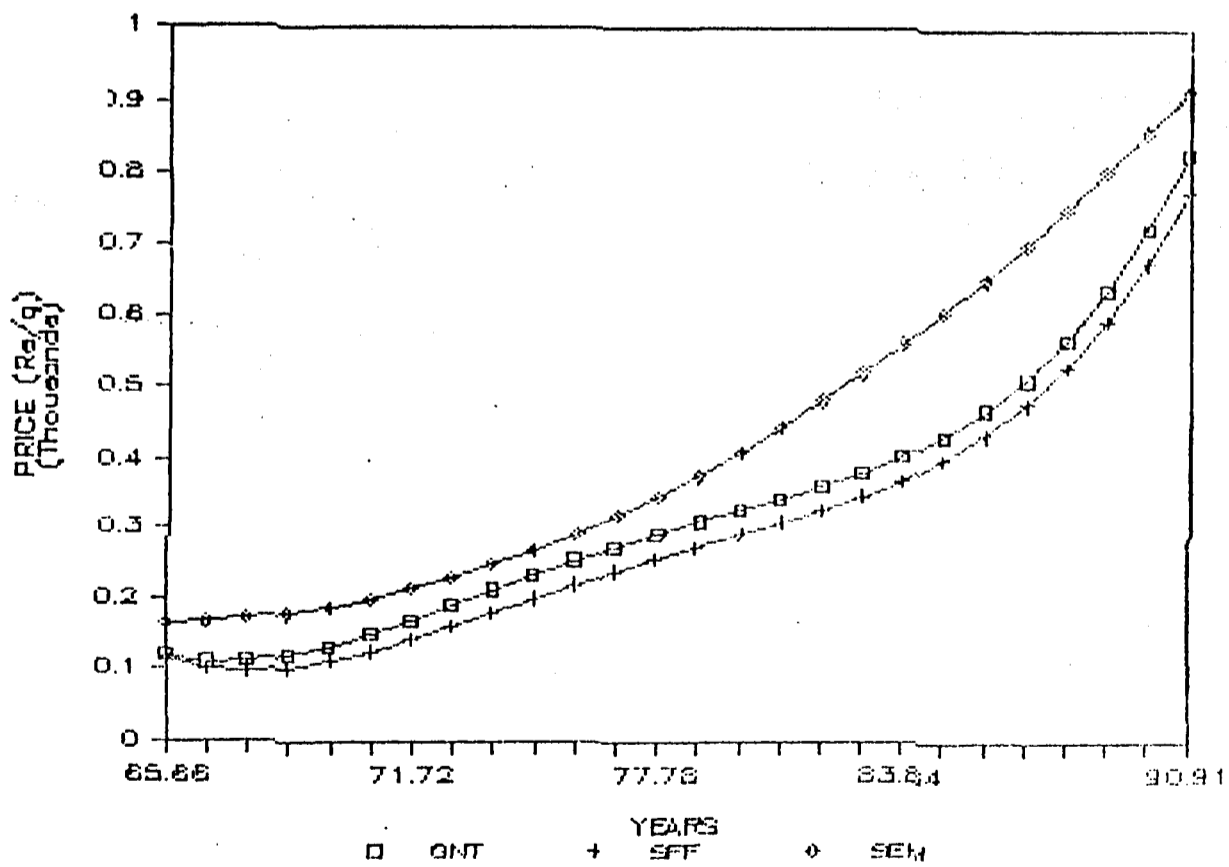


Fig 4.38: Trends in Oilseeds Prices in Gadag Market.

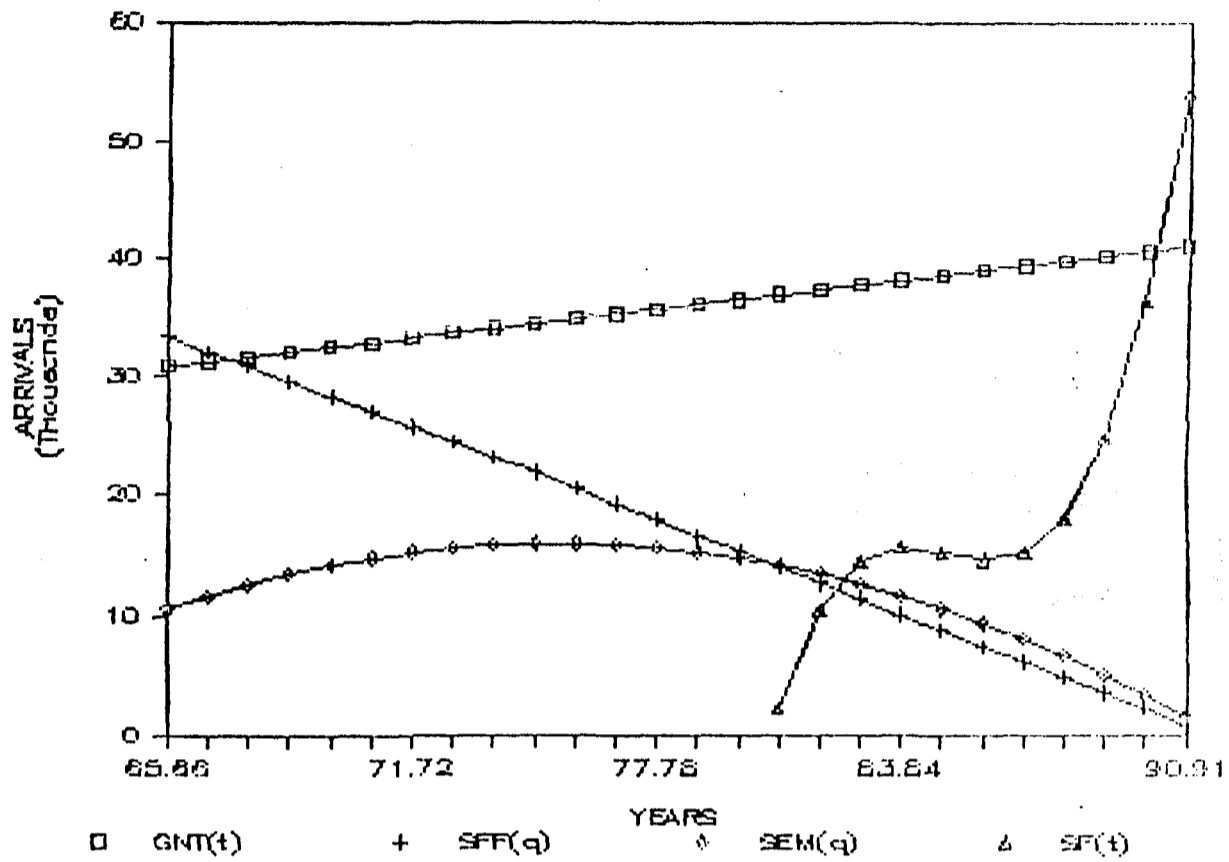


Fig 4.39 : Trends in Oilseeds Arrivals in Raichur Market.

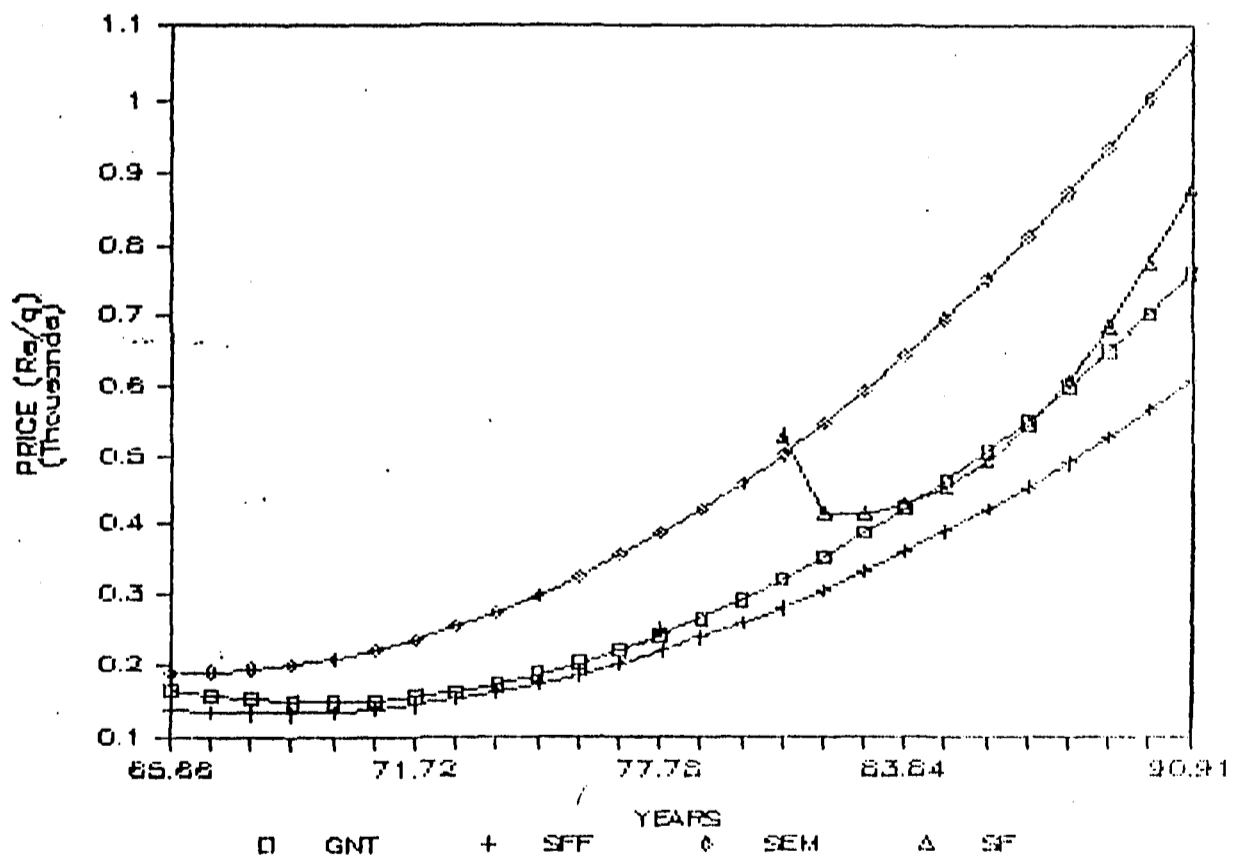


Fig 4.40 : Trends in Oilseeds Prices in Raichur Market.

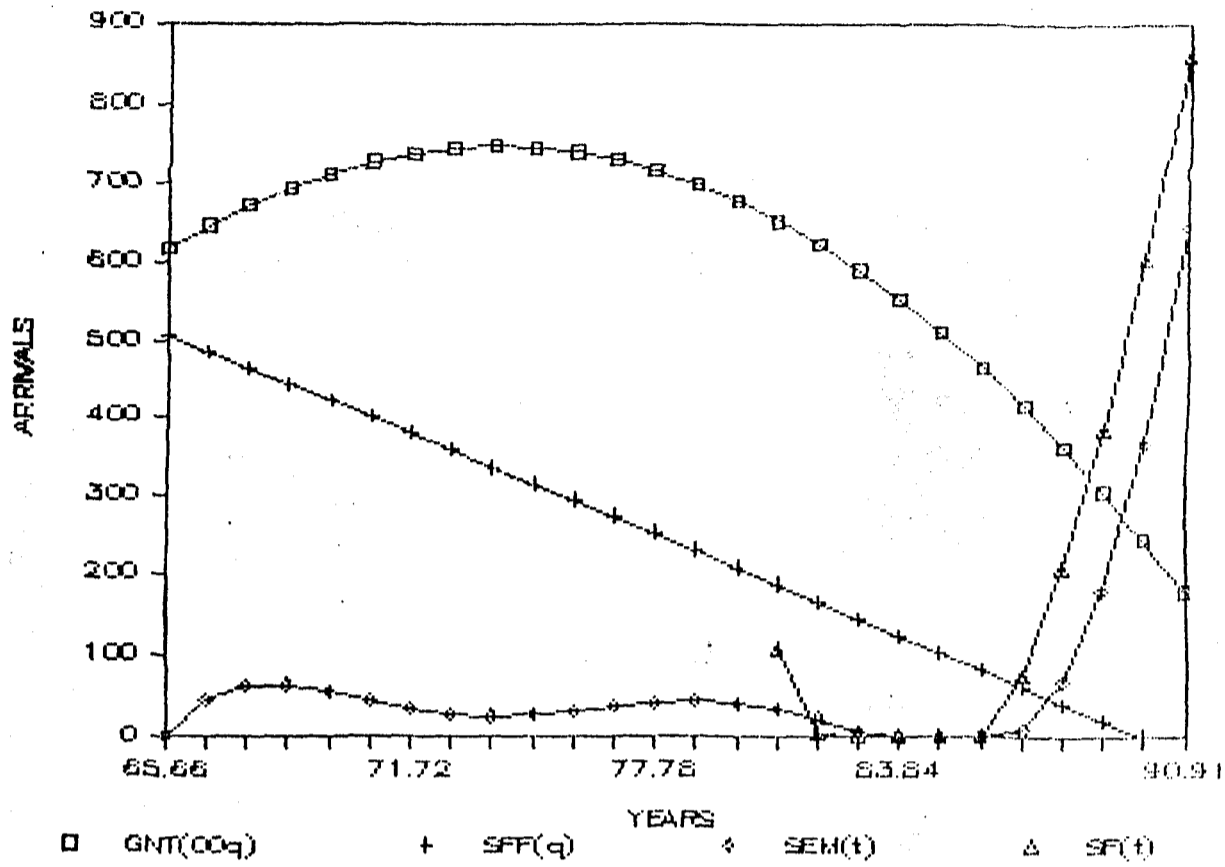


Fig 4.41 : Trends in Oilseeds Arrivals in Gangavati Market.

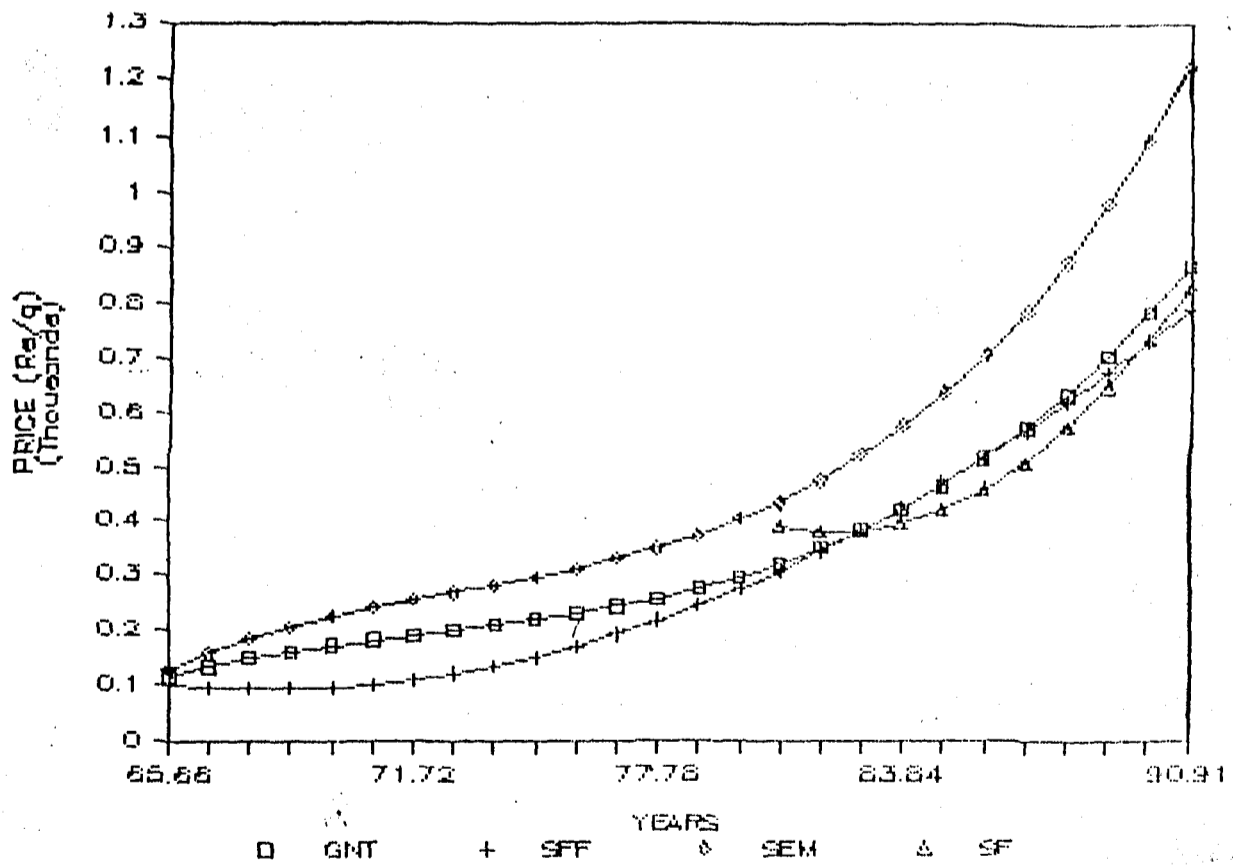


Fig 4.42 : Trends in Oilseeds Prices in Gangavati Market.

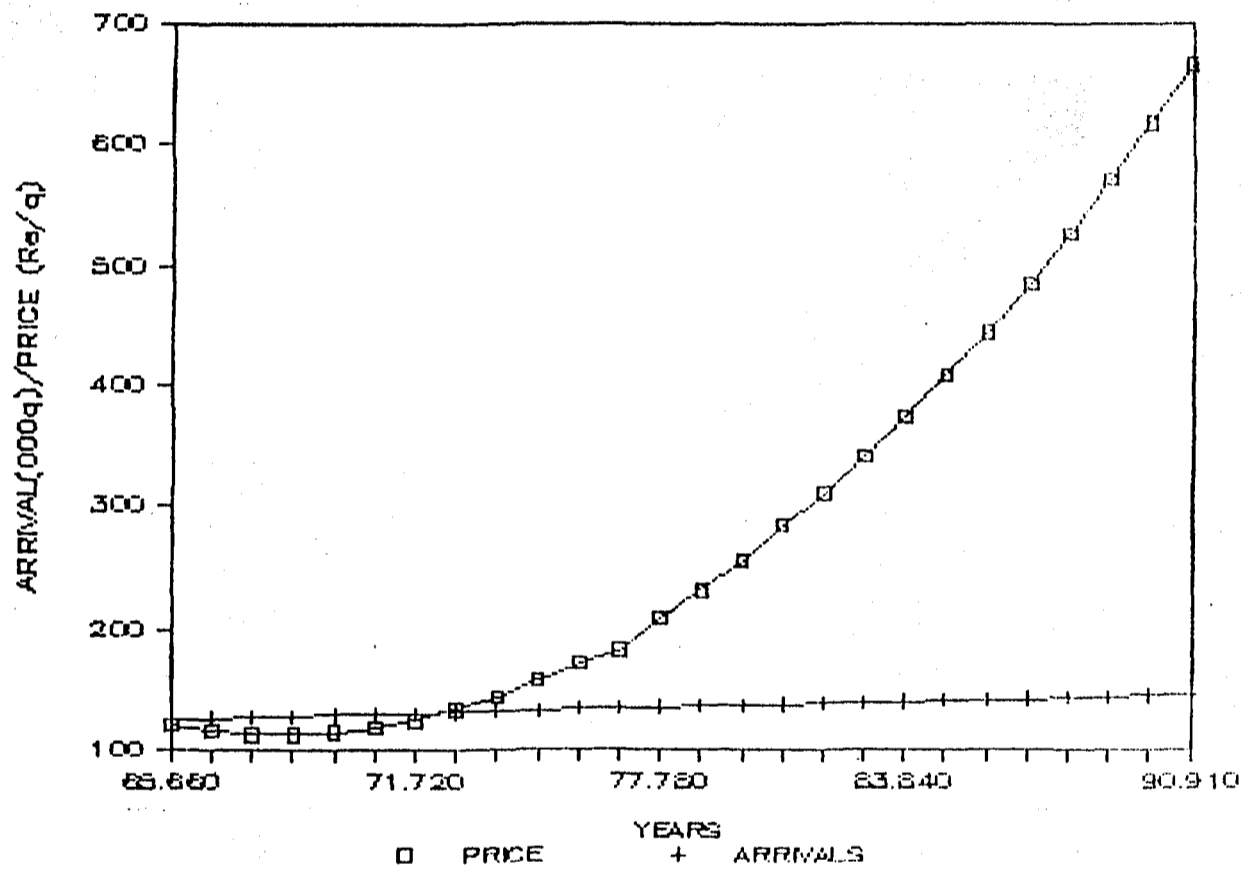


Fig 4.43 : Trends in Arrivals and Prices of Groundnut in Ranebennur Market.

increasing trend during the initial years and a substantially decreasing trend in the later part of the study period.

With respect to safflower, a continuous decline in arrivals was noticed in all the markets. Similarly the arrivals of sesamum showed a declining trend in all the markets barring Gadag and Gangavati. A positive linear trend in the arrivals of this crop was noticed in Gadag market. In Gangavati market it did not show a significant change till 1985-86 but increased at a faster rate thereafter.

As far as price trend pattern was concerned, a continuous upward movement was seen in all the markets for all the crops. However, the rate of change was higher and faster only for sesamum as compared to those of other oilseeds. The trend analysis for arrivals and prices of sunflower was carried out only for Raichur and Gangavati markets in view of non-availability of adequate data for the remaining markets. With a few exceptions in the initial years, a continuous steep rise in arrivals and price was noticed in both the markets. However, the rate of increase in arrivals was sharper than that of price.

It could be summed up from the trend functions and figures that the oilseeds arrival have not followed any definite

pattern. However, the price showed a continuous upward movement in all the markets and for all the crops.

4.4.2 Seasonal Indices of Arrivals and Prices of oilseeds

Seasonal indices of market arrivals and prices of oilseeds are presented in Tables 4.20 to 4.23 respectively for groundnut, safflower, sesamum and sunflower.

Groundnut

The Table 4.20 indicates higher indices of market arrivals of groundnut immediately after post harvest in almost all the study markets. Wherever groundnut was grown as rainfed crop, the higher indices were noticed during October to January and wherever it was grown as rabi/summer crop, the higher indices were noticed during April to June. Accordingly, in Bijapur, Talikoti and Gadag markets, for the months of October-November, the computed seasonal indices were high. The highest index for Bijapur and Talikoti markets was observed for the month of November and December for Gadag market. In Ranebennur and Raichur markets, two peak periods were noticed. These periods followed the post harvest months of kharif and summer crops. The monthly seasonal indices were found to be higher for September-October and April through June in Ranebennur market, while in Raichur market, the first peak period was November and

Table 4.20 : Seasonal Indices of Monthly Arrivals and Prices of Groundnut in Selected Markets (1965-66 to 1990-91)

Months	Bijapur		Talikota		Gadag		Ranebennur		Gangavati*		Raichur*	
	Arrival	Price	Arrival	Price	Arrival	Price	Arrival	Price	Arrival	Price	Arrival	Price
July	45.11	104.65	12.88	94.51	20.82	108.88	33.44	110.51	61.27	116.84	41.94	104.82
August	38.41	104.63	4.62	109.42	20.09	109.25	18.50	108.28	17.84	116.21	60.75	95.19
September	51.25	98.75	5.44	86.59	92.26	91.38	165.76	86.03	16.52	103.73	95.08	96.63
October	130.36	90.02	111.51	90.41	181.28	102.45	229.02	88.55	30.05	98.73	83.01	90.52
November	257.82	93.37	405.53	97.04	164.34	87.94	62.33	103.01	39.56	96.74	132.79	106.37
December	230.34	97.53	328.62	100.86	207.24	96.34	18.79	111.54	22.57	84.03	89.37	104.08
January	168.78	99.13	166.13	103.58	194.48	100.16	11.12	111.75	33.81	93.85	81.12	100.61
February	76.43	99.14	41.88	100.81	104.86	98.49	1.82	102.62	9.07	98.14	35.42	98.22
March	45.74	99.92	39.51	99.54	61.58	101.27	5.27	97.96	34.18	96.14	97.66	96.99
April	45.32	101.66	32.22	102.25	44.90	100.87	139.88	91.48	455.51	100.44	227.33	100.24
May	49.51	102.57	15.64	107.05	59.52	100.71	352.24	88.90	315.18	97.07	194.34	105.10
June	60.91	104.61	35.95	107.93	48.62	102.23	161.84	99.37	164.43	98.07	61.17	101.22
Correlation Coefficient	-0.66		-0.09		-0.54		-0.78		-0.03		0.28	

* values are computed for a period from 1979-80 to 1990-91

the second peak period was April-May. However, Gangavati market exhibited only one peak period covering the months of April, May and June.

In respect of price indices of groundnut, lower values were observed during peak arrival months and higher values during lean arrival months of March and August in Bijapur, Talikoti and Gadag markets. However, in Ranebennur, Gangavati and Raichur markets, such pattern was not noticed.

In general, the indices of prices were not fluctuating as much as indices of arrivals. Slightly higher indices of price were noticed during heavy arrival months and vice-versa. In Bijapur, Ranebennur and Gadag markets, the heavy arrivals led to a decline in the prices as was evident from the negative correlation coefficient of high magnitude.

Safflower

Safflower is mostly grown as a rabi crop and harvested in the months of March-April. The monthly indices of arrivals were found to be higher in the months of March, April and May (Table 4.21) in all the markets without any exception. The value for the April being the highest.

Table 4.21 : Seasonal Indices of Monthly Arrivals and Prices of Safflower in Selected Markets (1965-66 to 1990-91)

Months	Bijapur		Talikota		Gadag		Raichur*	
	Arrival	Price	Arrival	Price	Arrival	Price	Arrival	Price
July	68.11	102.13	32.28	98.26	73.12	102.23	48.10	116.05
August	51.17	102.06	24.88	105.29	59.89	104.10	34.48	126.60
September	37.64	104.50	6.46	91.37	32.99	100.86	44.62	109.37
October	20.61	101.69	12.36	103.48	28.84	102.91	53.30	65.47
November	17.71	102.67	13.48	102.99	29.62	103.41	8.77	64.76
December	9.13	103.59	9.84	89.49	19.74	104.25	17.19	52.96
January	17.17	99.80	17.24	102.20	17.07	104.58	5.12	74.33
February	82.60	93.34	64.80	92.89	37.74	97.56	19.91	67.77
March	313.09	90.58	477.20	105.46	271.29	93.87	192.79	94.93
April	302.28	96.18	382.85	109.05	397.13	92.36	446.29	155.51
May	173.51	100.10	108.39	109.07	150.09	95.38	210.28	158.85
June	106.99	103.33	51.17	90.43	85.44	98.46	119.13	133.37
Correlation Coefficient		-0.70		0.49		-0.84		0.69

* values are computed for a period from 1979-80 to 1990-91

Price indices were higher during lower arrival months in Bijapur and Gadag markets, while such an observation could not be made in respect of Talikoti and Raichur markets.

Sesamum

Sesamum is another important oilseeds crop grown as kharif crop in the study area. The indices of arrivals of sesamum also showed a seasonal character (Table 4.22). The higher indices for arrivals were noticed during October to January in Bijapur and Talikoti markets, September-November in Gadag market and during August-February in Raichur market. Contrary to expectation, the periods of high arrival indices were associated with the high price indices in all the markets except Gadag which was clear from high positive correlation coefficients between arrivals and prices. Thus, the observed pattern of arrival and price indices, belied the general belief of negative relationship between arrivals and prices.

Sunflower

Table 4.23 reveals the higher arrival indices for the months from November to March in Bijapur market, October to April in Talikoti market and from October to February in Gadag market. In Gangavati and Raichur markets, two peak periods were noticed. The higher arrival indices were observed for the

Table 4.22 : Seasonal Indices of Monthly Arrivals and Prices of Sesamum in Selected Markets (1965-66 to 1990-91).

Months	Bijapur		Talikota		Gadag		Raichur*	
	Arrival	Price	Arrival	Price	Arrival	Price	Arrival	Price
July	1.35	67.54	4.87	66.41	18.04	101.59	6.00	63.72
August	7.18	31.04	2.99	73.79	14.96	98.02	112.02	103.05
September	277.83	153.94	9.13	74.60	21.87	117.47	277.99	99.26
October	717.83	163.11	175.94	113.58	182.65	92.65	219.88	105.91
November	124.50	195.17	446.11	130.20	331.38	100.34	107.51	111.83
December	32.86	150.57	347.28	130.16	365.35	98.22	187.58	143.39
January	5.63	120.46	122.34	125.70	137.82	98.53	148.21	133.99
February	20.45	88.66	32.17	125.04	52.35	99.89	101.21	128.90
March	2.39	88.04	36.19	106.02	32.17	98.14	18.57	96.98
April	3.89	56.42	5.05	73.91	21.24	94.25	7.60	71.77
May	3.69	42.49	11.48	91.83	9.12	98.15	8.36	61.31
June	2.38	42.55	6.43	88.77	13.03	102.73	5.07	79.86
Correlation Coefficient	0.54		0.73		-0.21		0.64	

* values are computed for a period from 1979-80 to 1990-91

Table 4.23 : Seasonal Indices of Monthly Arrivals and Prices of Sunflower in Selected Markets (1986-87 to 1990-91)

Months	Bijapur		Talikota		Gadag		Gangavati*		Raichur*	
	Arrival	Price	Arrival	Price	Arrival	Price	Arrival	Price	Arrival	Price
July	52.93	110.57	8.69	78.79	12.26	110.73	21.63	78.90	41.89	103.68
August	55.57	109.80	18.95	107.14	18.75	108.31	1.03	7.16	13.24	92.48
September	59.41	105.66	19.44	101.91	42.59	102.60	25.67	39.79	6.76	104.76
October	61.27	96.87	105.77	103.73	144.75	98.56	113.08	147.41	25.97	96.82
November	116.99	100.86	152.91	104.49	141.28	96.89	197.19	146.17	110.13	104.36
December	169.60	98.37	220.91	100.28	274.54	95.58	216.32	145.63	213.29	104.18
January	197.35	96.40	231.52	113.52	264.71	95.90	82.35	107.62	190.16	98.57
February	137.26	95.51	101.03	109.45	142.90	97.57	39.45	86.37	147.89	99.35
March	115.23	95.28	135.35	101.93	74.78	99.62	32.82	121.15	101.36	98.02
April	87.37	87.47	105.42	101.12	38.36	97.96	286.49	128.05	93.59	97.77
May	96.51	92.86	58.29	100.39	29.78	97.11	121.41	109.10	141.75	98.74
June	50.49	110.34	41.72	77.23	15.27	99.16	62.56	82.65	113.96	101.26
Correlation Coefficient	-0.50		0.51		0.64		0.72		0.23	

* values are computed for a period from 1979-80 to 1990-91

months of October, November and December after kharif harvest and during April and May after rabi/summer harvest in Gangavati market, whereas in Raichur market the two periods of November to February and May to June indicated the high values of arrivals.

With regard to price indices, higher values were observed during lower months of arrivals and vice versa in Bijapur and Gadag markets which was confined by the negative correlation coefficients. However, in the rest of the markets, the higher arrivals pushed up the prices as was evidenced by the positive correlation coefficients.

The seasonal indices of arrivals and prices of oilseeds in the study markets are shown graphically in figure 4.44 to 4.53.

4.4.3 Relationship Between Arrivals and Prices of Oilseeds

To ascertain the relationship between the prices and market arrivals of selected oilseeds, simple linear regression equations were fitted for all the selected markets separately and the results are presented in Table 4.24.

A highly significant negative relationship between groundnut market arrivals and prices was noticed in Gadag and Gangavati markets, while Talikoti market showed highly

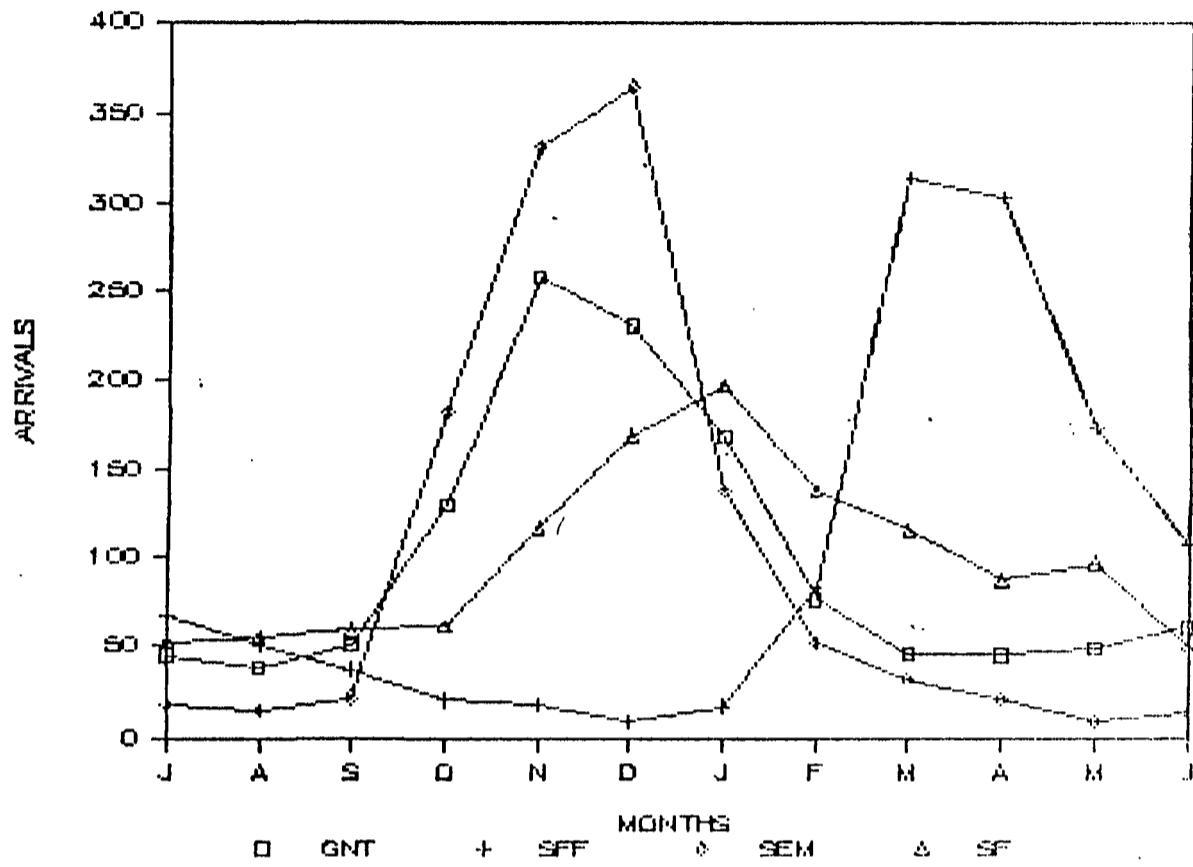


Fig 4.44: Seasonal Indices of Oilseeds Arrivals in Bijapur Market.

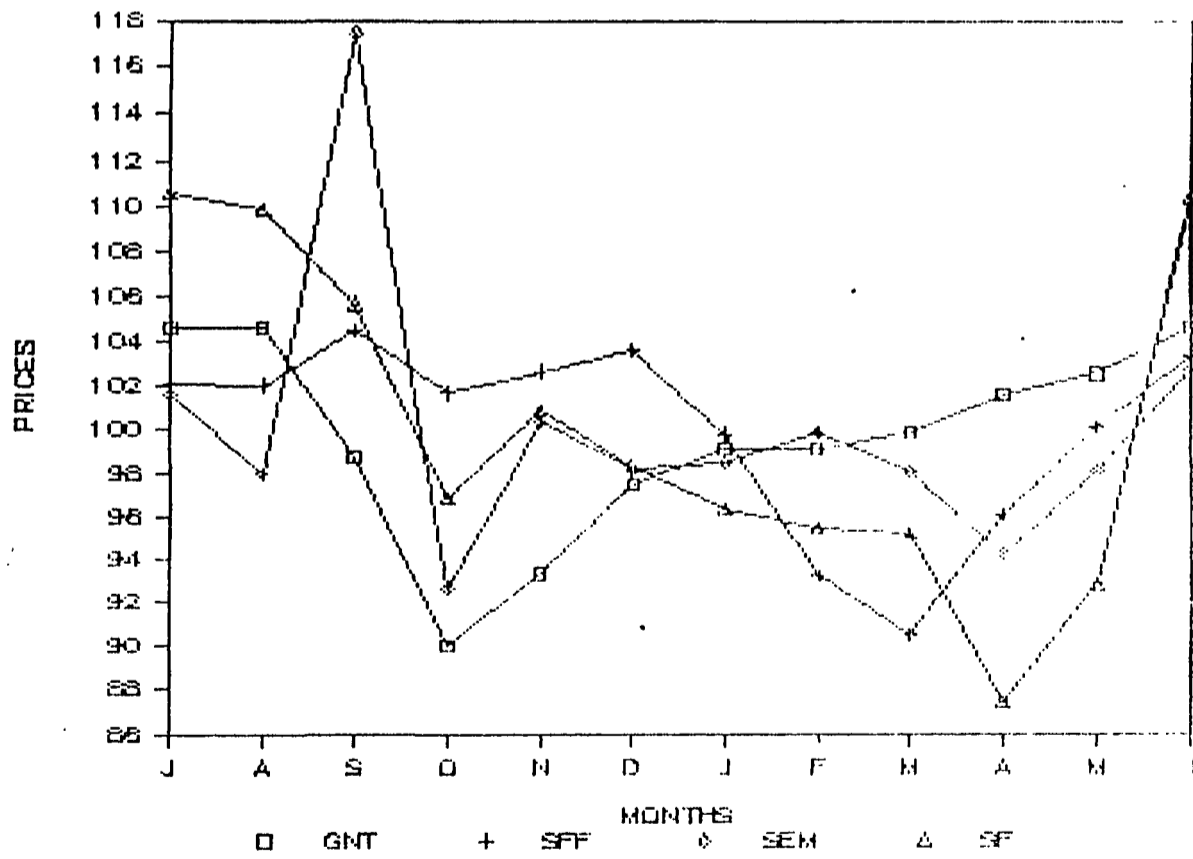


Fig 4.45: Seasonal Indices of Oilseeds Prices in Bijapur Market.

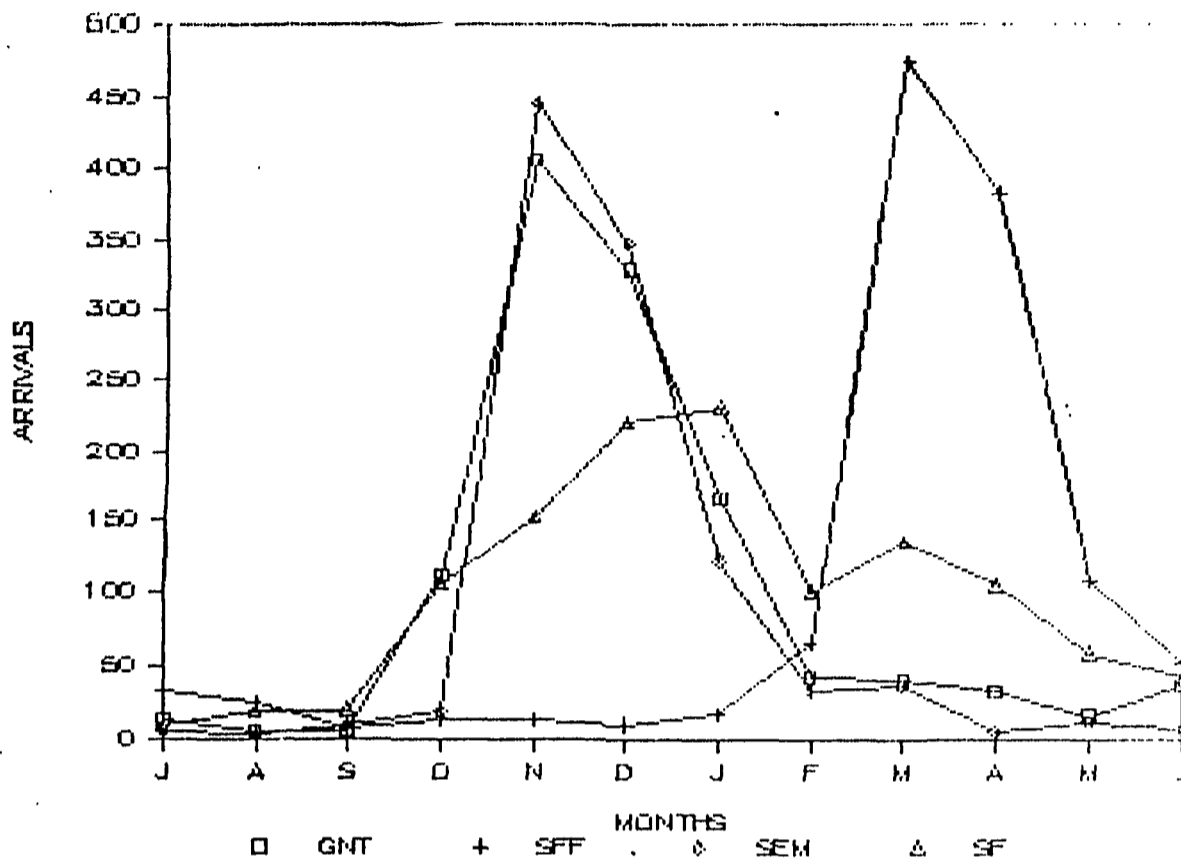


Fig 4.46: Seasonal Indices of Oilseeds Arrivals in Talikoti Market.

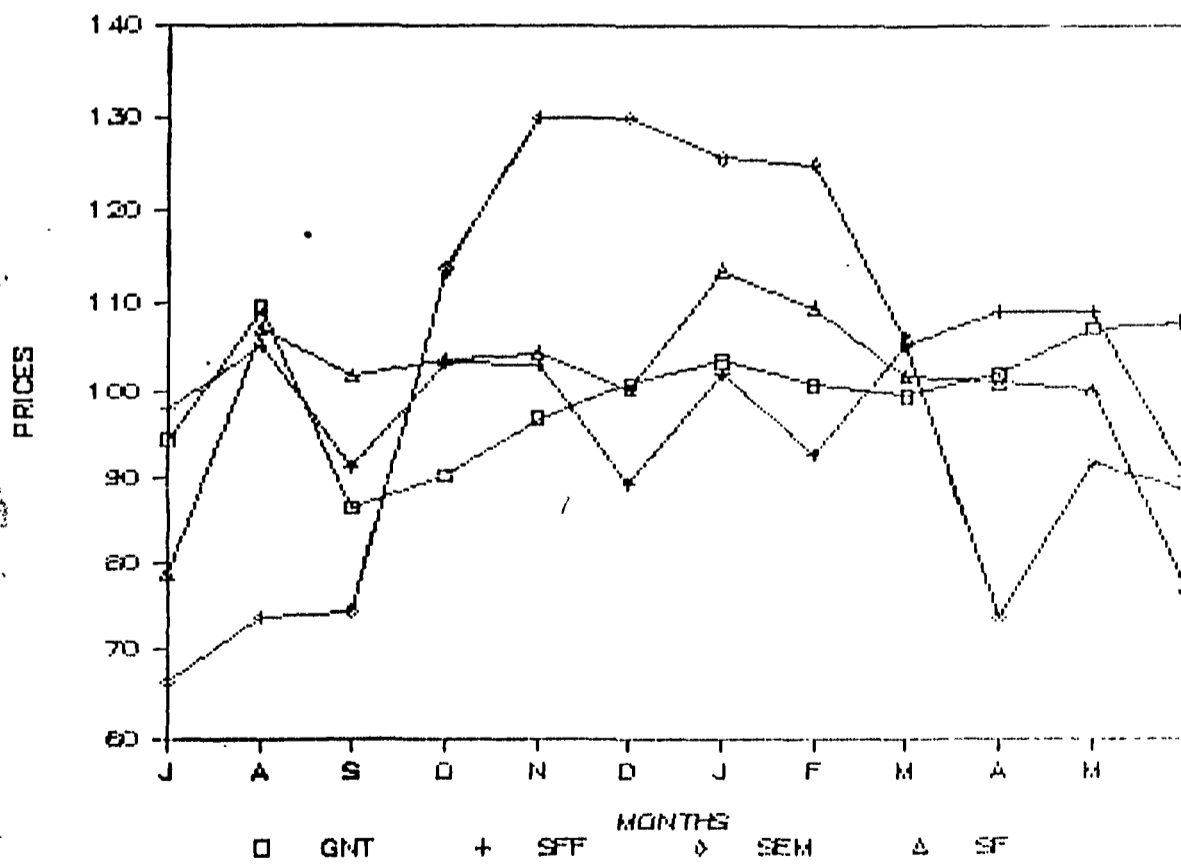


Fig 4.47: Seasonal Indices of Oilseeds Prices in Talikoti Market.

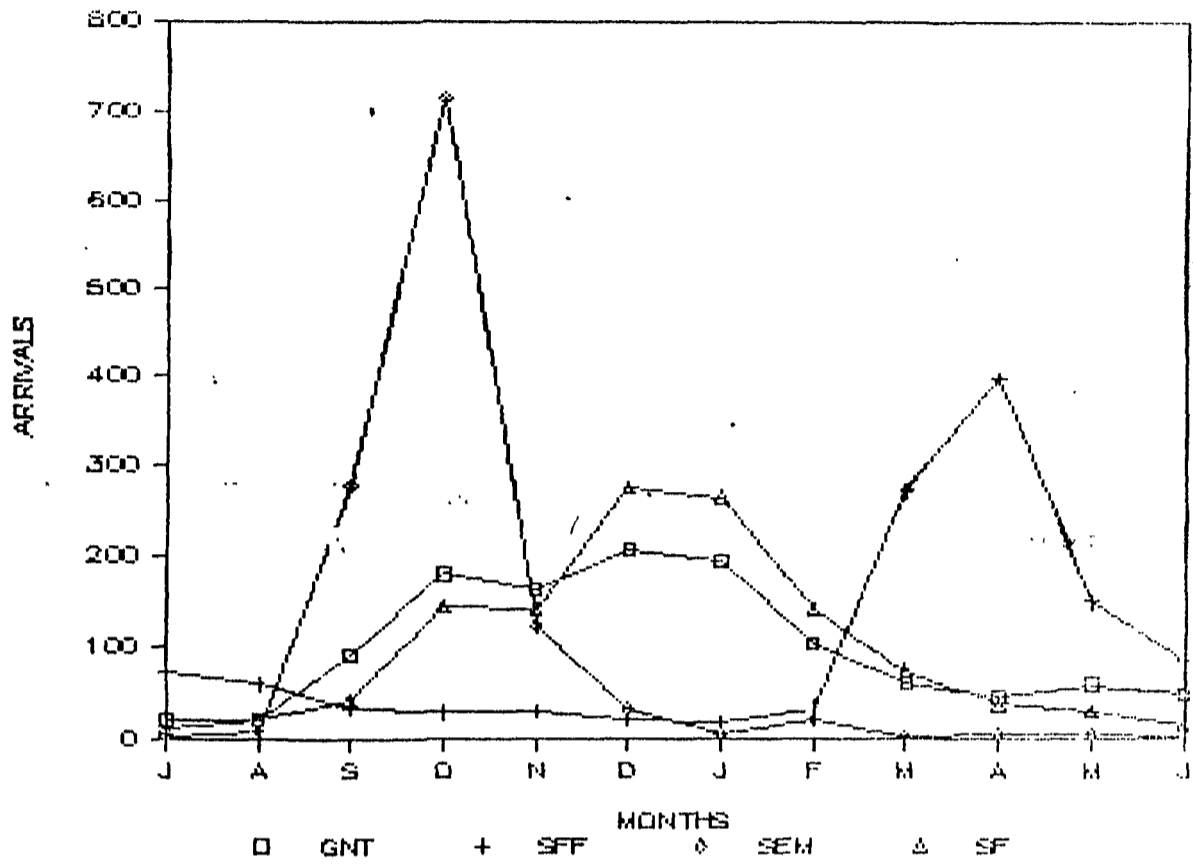


Fig 4.48: Seasonal Indices of Oilseeds Arrivals in Gadag Market.

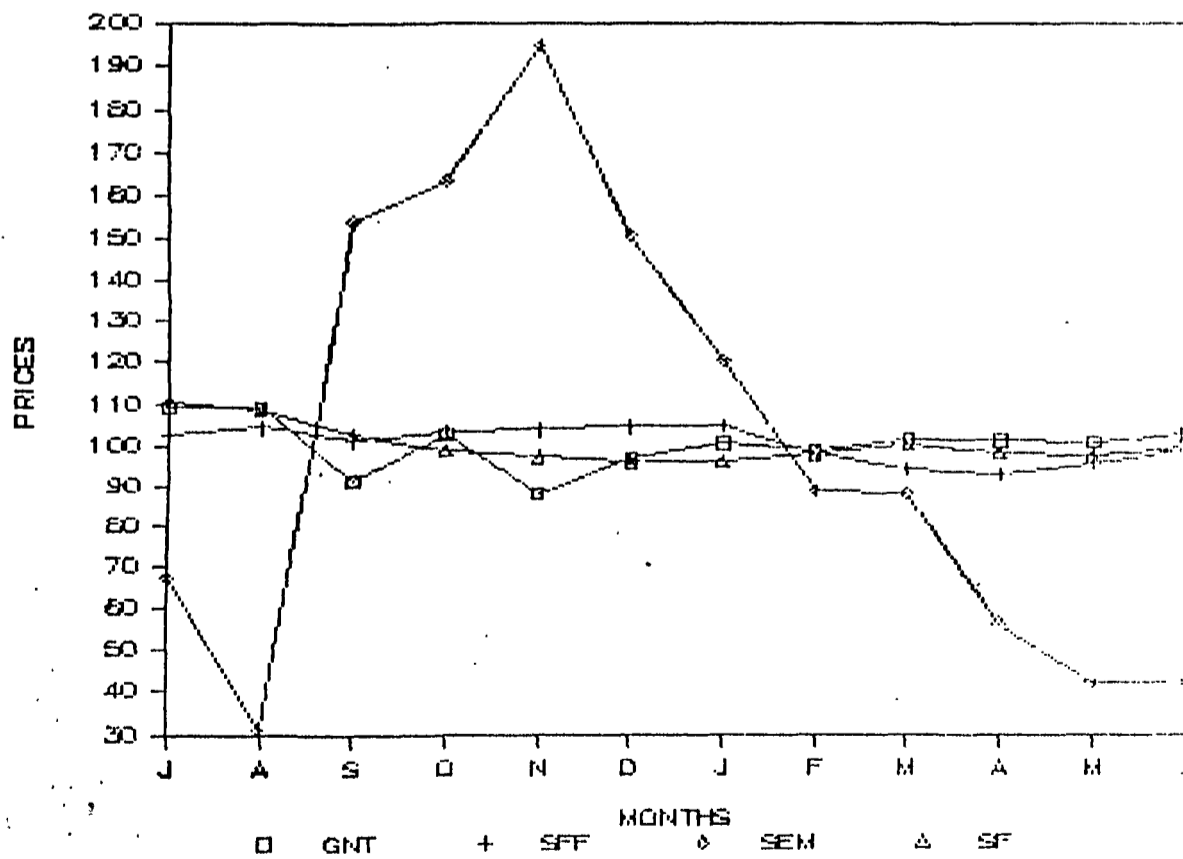


Fig 4.49: Seasonal Indices of Oilseeds Prices in Gadag Market.

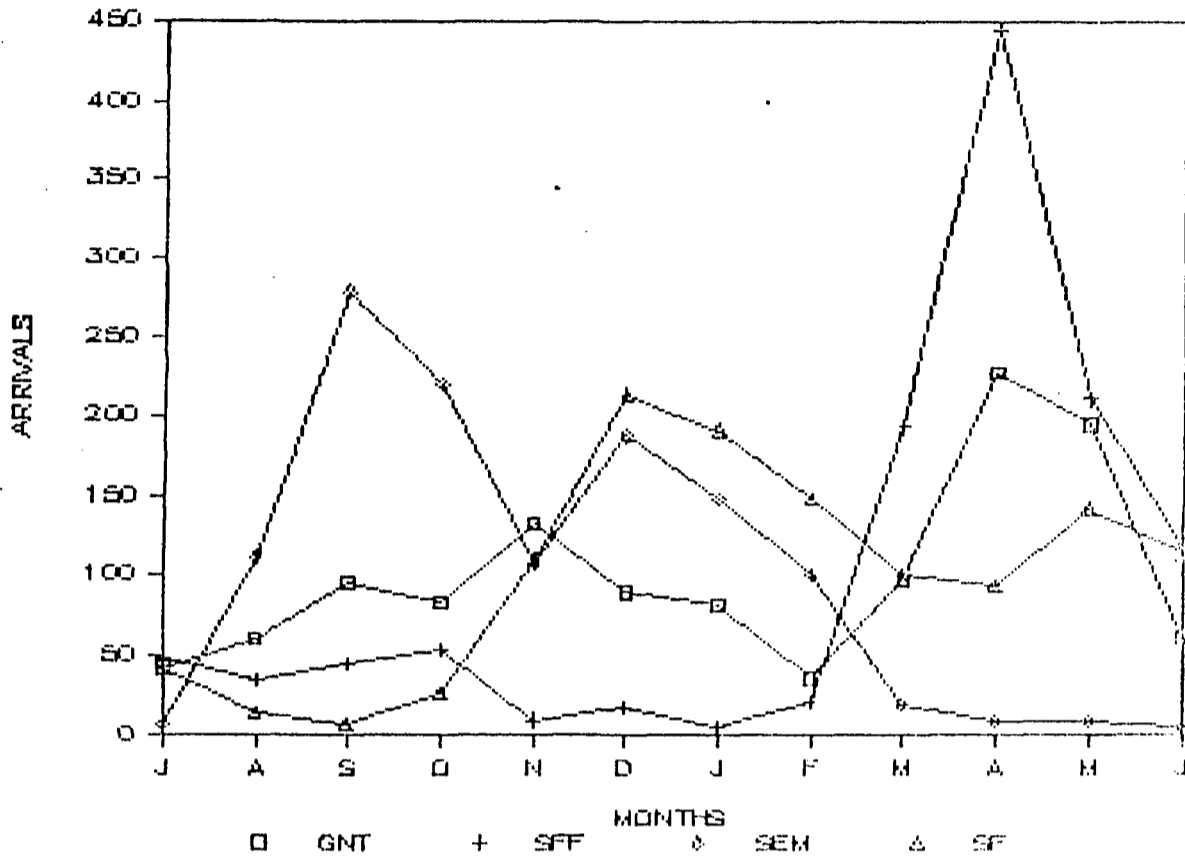


Fig 4.50: Seasonal Indices of Oilseeds Arrivals in Raichur Market.

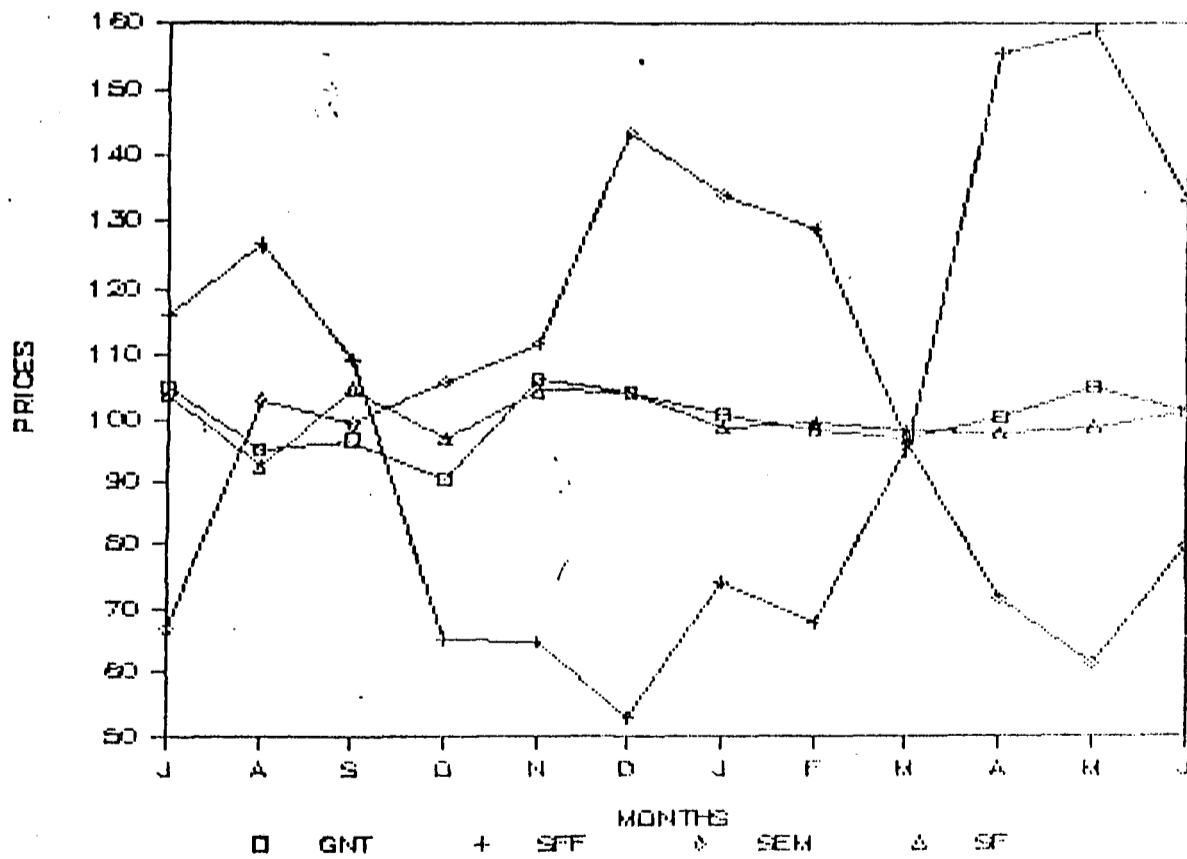


Fig 4.51 : Seasonal Indices of Oilseeds Prices in Raichur Market.

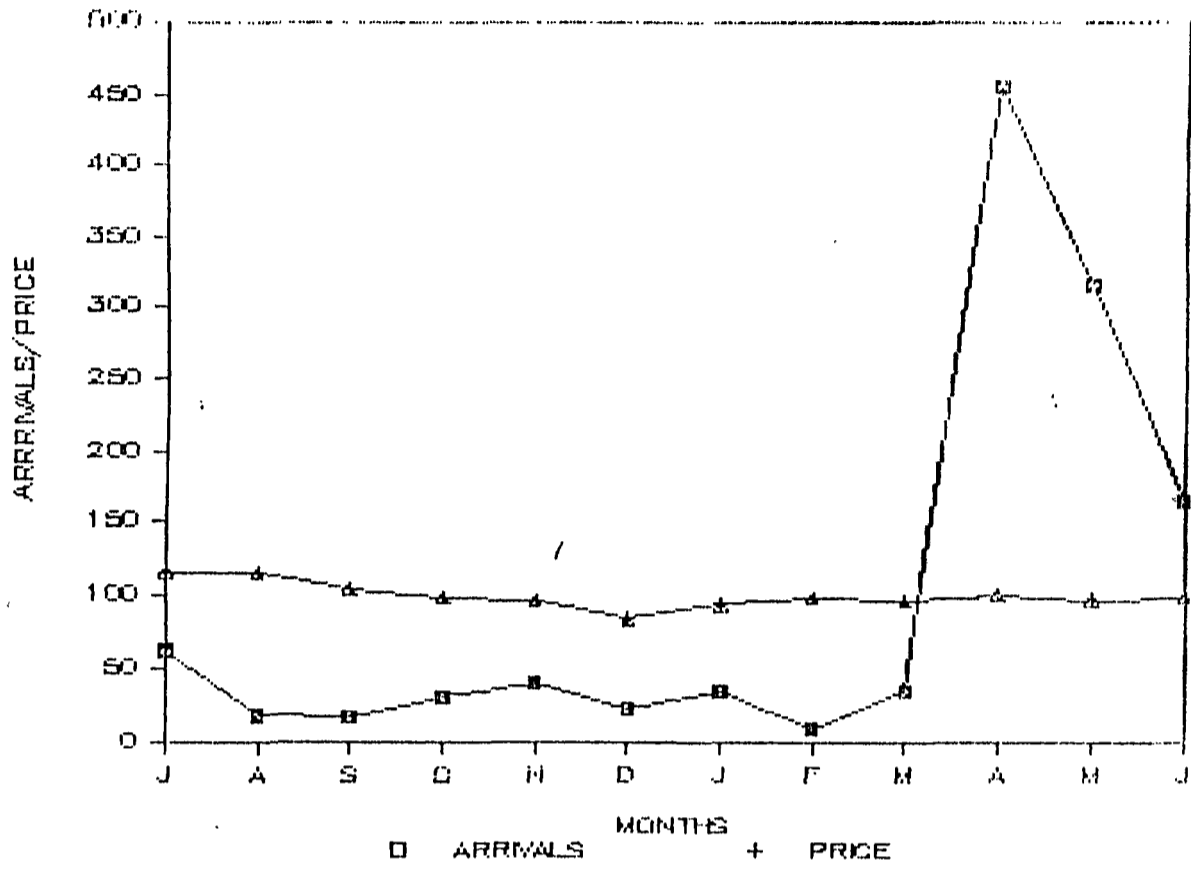


Fig 4.52: Seasonal Indices of Groundnut Arrivals and Prices in Rahebenur Market.

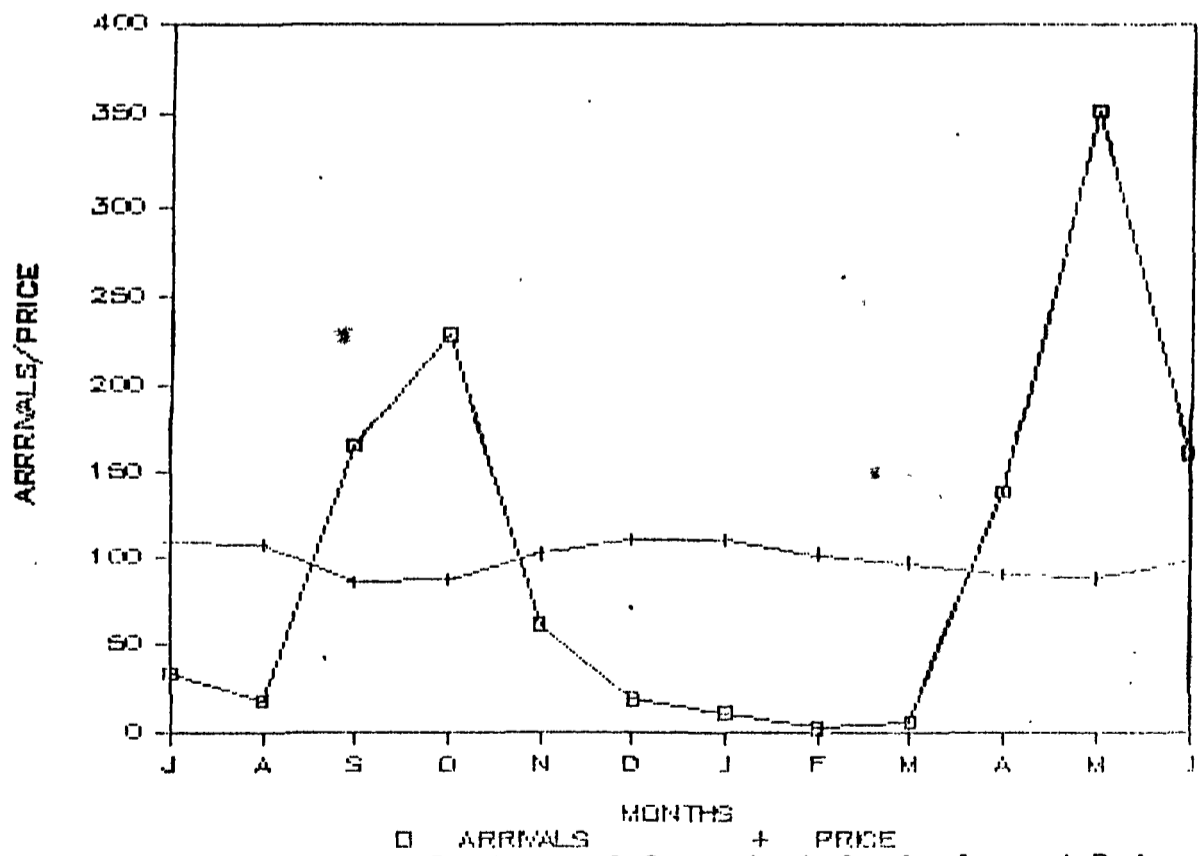


Fig 4.53 : Seasonal Indices of Groundnut Arrivals and Prices in Gangavati Market.

Table 4.24 : Regression Equations between Annual Market Arrivals and Average Prices of Oilseeds in Selected Markets

Market	No. of Obs.	Groundnut			Safflower			Sesamum			Sunflower		
		a	b	R ²	a	b	R ²	a	b	R ²	a	b	R ²
1 Bijapur	37	337.88	-0.00041 ^{NS} (0.00018)	0.13	440.52	-0.0032 ^{**} (0.00075)	0.35	498.03	-0.023 [*] (0.0093)	0.15	-	-	-
2 Talikoti	26	152.90	0.0068 ^{**} (0.00078)	0.76	404.39	-0.031 ^{NS} (0.01715)	0.12	540.24	-0.012 ^{NS} (0.0316)	0.006	-	-	-
3 Gadag	35	457.64	-0.00055 ^{**} (0.00017)	0.25	301.47	-0.0031 ^{NS} (0.0024)	0.05	187.62	0.0313 [*] (0.0141)	0.13	-	-	-
4 Ranebennur	38	292.17	-0.0007 ^{**} (0.0005)	0.05	-	-	-	-	-	-	-	-	-
5 Gangavati	31	668.37	-0.006 ^{**} (0.0017)	0.3	-	-	-	-	-	-	447.79	0.04 ^{**} (0.0085)	0.72
6 Raichur	33	47.49	0.00069 ^{NS} (0.00028)	0.16	298.25	-0.004 ^{**} (0.0014)	0.22	561.33	-0.012 ^{NS} (0.0069)	0.096	270.42	0.0013 ^{**} (0.0001)	0.89

Note : 1. Figures in parantheses indicate standard error.

2. Number of observations for sunflower in Gangavati - 11, Raichur - 18.

3. ** Significant at 1% level

4. * Significant at 5% level

5. NS Non-significant

significant positive relationship. In safflower, the relationship between arrivals^{and} prices was negative in all the markets studied, but it was significant only in Bijapur and Raichur markets. In the case of sesamum the statistical significance was established for the impact of arrivals on prices which was negative in Bijapur and positive in Gadag markets. The rest of the markets exhibited non-significant relationship between the two variables. The sunflower market arrivals had a positive and highly significant relationship with prices for both, Raichur and Gangavati markets.

In general, the association observed between the arrivals and prices of the oilseed crops in the study markets was negative in respect of groundnut, safflower and sesamum and positive in respect of sunflower.

4.4.4 Correlation Co-efficients Between Arrivals and prices of Oilseeds

The correlation coefficient between monthly market arrivals and prices of four oilseeds in the selected markets for peak, lean and overall periods was computed and compared to evaluate the pattern of association between them. The results of the analysis are presented in table 4.25.

Table 4.25 : Correlation Coefficient between Arrivals and Prices of Oilseeds in Selected Markets during 1980-81 to 1990-91

Market	Period	Ground nut	Safflower	Sesamum	Sunflower
1 Bijapur	Peak	0.263*	-0.267	0.147	0.672**
	Lean	0.507**	-0.134	0.059	0.204*
	Overall	0.298*	-0.072	0.047	0.329*
2 Talikoti	Peak	0.355*	-0.126	-0.330	0.800**
	Lean	0.550	-0.009	0.078	0.650**
	Overall	0.443	-0.059	-0.058	0.670**
3 Gadag	Peak	-0.251*	-0.008	-0.119	0.125
	Lean	-0.041	-0.073	0.170	0.218
	Overall	-0.096	0.009	0.007	-0.022
4 Ranebennur	Peak	-0.218	-	-	-
	Lean	0.022	-	-	-
	Overall	-0.206	-	-	-
5 Gangavati	Peak	-0.510**	-	-	-
	Lean	0.236*	-	-	-
	Overall	0.075	-	-	-
6 Raichur	Peak	-0.296*	-0.260	0.027	0.720**
	Lean	-0.093	0.160	0.096	0.179
	Overall	-0.131	0.071	0.053	0.560

Note : ** Significant at 1% level
* Significant at 5% level

In groundnut, significantly positive association between arrivals and prices was noticed in Bijapur and Talikoti markets during all the periods, while in Gadag, Gangavati and Raichur markets significantly negative relationship was noticed particularly during peak period. In Ranebennur market, though the correlation coefficient was negative, it was non-significant.

For safflower, the pattern of association between arrivals and prices was negative for all the periods in Bijapur and Talikoti markets, only during peak and lean periods in Gadag market and only during peak period in Raichur market. None of the coefficients were significant.

The correlation coefficients for sesamum arrivals and prices were positive in Bijapur and Raichur markets and negative in Talikoti market for peak and overall periods. In Gadag market, negative association was observed between sesamum arrivals and prices during peak period and positive association during lean and overall periods. A significant negative relationship between arrivals and prices was noticed only in Talikoti market during peak period. In rest of the markets, the observed association was statistically non-significant.

For sunflower, positive association between arrivals and prices was noticed in all the markets during all the periods with the lone exception of Gadag market during overall period. A highly significant association between the two variables was noticed in Talikoti market during all the periods, Raichur and Bijapur markets during peak and overall periods.

A mixed pattern of association between arrivals and prices of oilseeds was observed in the study area. Bijapur and Talikoti markets showed significantly positive association between arrivals and prices of groundnut and sunflower during three periods considered. In Gadag and Raichur markets negative and positive relationship between arrivals and prices of groundnut and sunflower respectively. In Ranebennur market, negative association between arrivals and prices of groundnut was observed during peak and overall periods and positive association during lean period. In Gangavati market, significant negative relation was noticed during peak period and positive association during lean and overall periods.

The association between the groundnut arrivals and prices was invariably negative for all the periods both in Gadag and Raichur markets. The similar pattern of association was observed in these two markets in respect of sunflower arrivals

and prices with the only exception of overall period in Gadag market.

4.4.5 Variations in Arrivals and prices of Oilseeds

Coefficient of variation in market arrivals and prices of four oilseeds for peak, lean and overall periods from 1980-81 to 1990-91 were computed and are presented in Table 4.26.

For groundnut, price variation ranged from 27 per cent to 43 per cent in most of the cases. The coefficient of variation in arrivals was more during lean period in five markets and overall period in one market. Relatively, lower variation in arrivals was noticed during peak period in all the markets with the exception of Ranebennur market.

For safflower, the coefficient of variation in price ranged between 24 and 37 per cent in most of the cases except in Raichur market during lean (79.84%) and peak (70.26%) periods. With regards to arrivals, low variation in arrivals was observed during peak period in all the markets barring Talikoti market, where fluctuations of high magnitude were noticed for overall period and for peak period.

In sesamum, Talikoti and Raichur markets showed respectively lowest and highest variations in prices among all

Table 4.26 : Coefficient of Variations in Arrivals and Prices of Oilseeds in Selected Markets.

Market	Groundnut			Safflower			Sesamum			Sunflower		
	Arrival	Price	Arrival	Price	Arrival	Price	Arrival	Price	Arrival	Price	Arrival	Price
1 Bijapur	Peak	66.96	32.77	48.59	37.11	91.17	35.20	82.27	22.02			
	Lean	90.05	29.56	96.45	34.00	151.22	37.87	77.05	22.09			
	Overall	90.05	30.60	122.65	35.11	161.54	37.03	69.43	22.16			
2 Talikoti	Peak	83.12	33.39	221.93	35.48	115.08	29.62	149.26	23.75			
	Lean	204.93	32.52	162.82	30.29	188.88	22.33	173.21	19.92			
	Overall	144.74	32.74	327.60	32.64	199.50	27.21	172.38	21.68			
3 Gadag	Peak	55.95	31.43	81.89	35.14	94.36	30.85	55.25	21.63			
	Lean	97.79	29.88	120.05	33.12	237.93	33.48	85.32	21.45			
	Overall	88.21	30.35	187.91	33.53	205.39	33.79	107.52	21.75			
4 Ranebennur	Peak	102.57	31.02	-	-	-	-	-	-			
	Lean	184.87	27.21	-	-	-	-	-	-			
	Overall	176.40	29.19	-	-	-	-	-	-			
5 Gangavati	Peak	66.15	27.91	-	-	-	-	-	-			
	Lean	128.57	43.38	-	-	-	-	-	-			
	Overall	161.71	39.90	-	-	-	-	-	-			
6 Raichur	Peak	67.70	31.48	202.14	24.49	115.70	42.45	68.79	24.17			
	Lean	90.52	28.54	257.69	79.84	271.61	67.47	147.29	20.97			
	Overall	75.29	30.72	355.58	70.26	178.63	56.04	94.21	23.36			

the markets in all the periods. High variation in arrivals of sesamum was noticed during lean period in Gadag and Raichur markets and for the overall period in both Talikoti and Gadag markets. During peak period, most of the markets revealed a low variation in the price levels.

Among all the oilseed crops under study, sunflower revealed the lowest price variation between markets and periods under consideration and it ranged between 19 per cent and 24 per cent. The coefficient of variation of arrivals of sunflower was found to be low during peak season in all the markets excepting Bijapur and high during slack season in all the markets but Gadag.

From the foregoing presentation of the results it could be summed up that the coefficients of variation for prices were found to be lower in all the markets for all periods compared to those for market arrivals. The crop-wise coefficients of variation in prices revealed that variation in sunflower price was lower compared to other three crops. With regard to arrivals, sesamum and safflower showed wider fluctuations. In general, coefficients of variation in arrivals was found to be high during lean period in all the crops and markets with some exceptions.

4.4.6 Market Integration

It is generally observed that the price determined for oilseeds in the selected regulated markets is influenced mainly by the price of edible oils at Bombay terminal market and other neighbouring markets. The extent to which the selected markets are integrated among themselves and with Bombay market in oilseeds price formation was analysed with correlation statistic. The zero-order correlation coefficients between weekly groundnut and sunflower oil prices in Bombay terminal market and their wholesale prices in selected markets are presented in Table 4.27.

The correlation coefficients between weekly wholesale prices of groundnut oil and pods for the selected market pairs were positive and ranged between 0.63 and 0.91. The correlation coefficient between Bombay market and selected markets turned out to be more than 0.80 except with Raichur market.

It is evident from the correlation matrix that five of the six markets, with Raichur being the exception, were integrated with the terminal market of Bombay. The integration among the study markets was also established by the results. However, the degree of integration between the markets located in the

Table 4.27 : Zero-Order Correlation Matrices

Markets	Bombay groundnut oil prices v/s wholesale price of groundnut.				Sunflower oil price V/S wholesale price of sunflower seeds							
	Bombay	Bijapur	Talikoti	Gadag	R.bennur	G.vati	Raichur	Bombay	Bijapur	Talikoti	Gadag	Raichur
Bombay	1.000	0.897	0.912	0.878	0.804	0.814	0.733	1.000	0.876	0.801	0.821	0.753
Bijapur		1.000	0.700	0.755	0.794	0.661	0.606		1.000	0.719	0.771	0.659
Talikoti			1.000	0.751	0.750	0.870	0.634			1.000	0.665	0.916
Gadag				1.000	0.642	0.674	0.734				1.000	0.723
Ranebennur					1.000	0.637	0.683					-
Gangavati						1.000	0.820					-
Raichur							1.000					1.000

Note : R.bennur - Ranebennur G.vati - Gangavati

same district was generally more as indicated by higher values of correlation coefficient.

More or less similar pattern was noticed in the case of sunflower. The correlation coefficient between Bombay sunflower oil price and wholesale sunflower price of selected markets was as high as 0.8 except in the case of Raichur market (0.75) and thus indicated a greater integration, while the coefficients of correlation among the study markets themselves indicated, in general, a lesser degree of integration.

4.6 Marketing of Oilseeds by Sample Farmers

4.6.1 Utilization of oilseeds By Sample Farmers.

The oilseeds produced by farmers are utilized for different purposes viz., for seeds, for consumption and as marketable surplus. The extent of utilization for different purposes depends upon the size of holding, size of the family and financial position of the farmer. Generally, the marketable surplus of oilseeds is higher than that of foodgrains. The utilization of two major oilseeds viz., groundnut and sunflower in the study market area was analysed based on the primary information generated from the sample farmers transacting in each of the markets and the results are presented in Table 4.28 and Figure 4.54 and 4.55.

Table 4.28 : Utilization of Oilseeds by Sample Farmers (Qty .in qtls.)

Market	Groundnut				Sunflower			
	Production	Consumption	Seeds	Marketable Surplus	Production	Consumption	Seeds	Marketable Surplus
1. Bi japur	552	11 (1.99)	66 (11.96)	475 (86.05)	983	24 (2.45)	330 (3.05)	929 (94.50)
2. Talikoti	899	20 (2.23)	126 (14.01)	753 (83.76)	800	21 (2.63)	33 (4.12)	746 (93.25)
3. Gadag	526	14 (2.66)	75 (14.26)	437 (83.08)	477	14 (2.94)	21 (4.40)	442 (92.66)
4. Ranebennur	669	16 (2.39)	73 (10.92)	580 (86.69)	332	7 (2.11)	5 (1.51)	320 (96.38)
5. Gangavati	982	11 (1.12)	101 (10.28)	870 (88.60)	372	15 (4.03)	7 (1.88)	350 (94.09)
6. Raichur	1408	24 (1.70)	154 (10.94)	1230 (87.36)	846	23 (2.72)	40 (4.73)	783 (92.55)

Figures in parantheses indicate percentage in total production

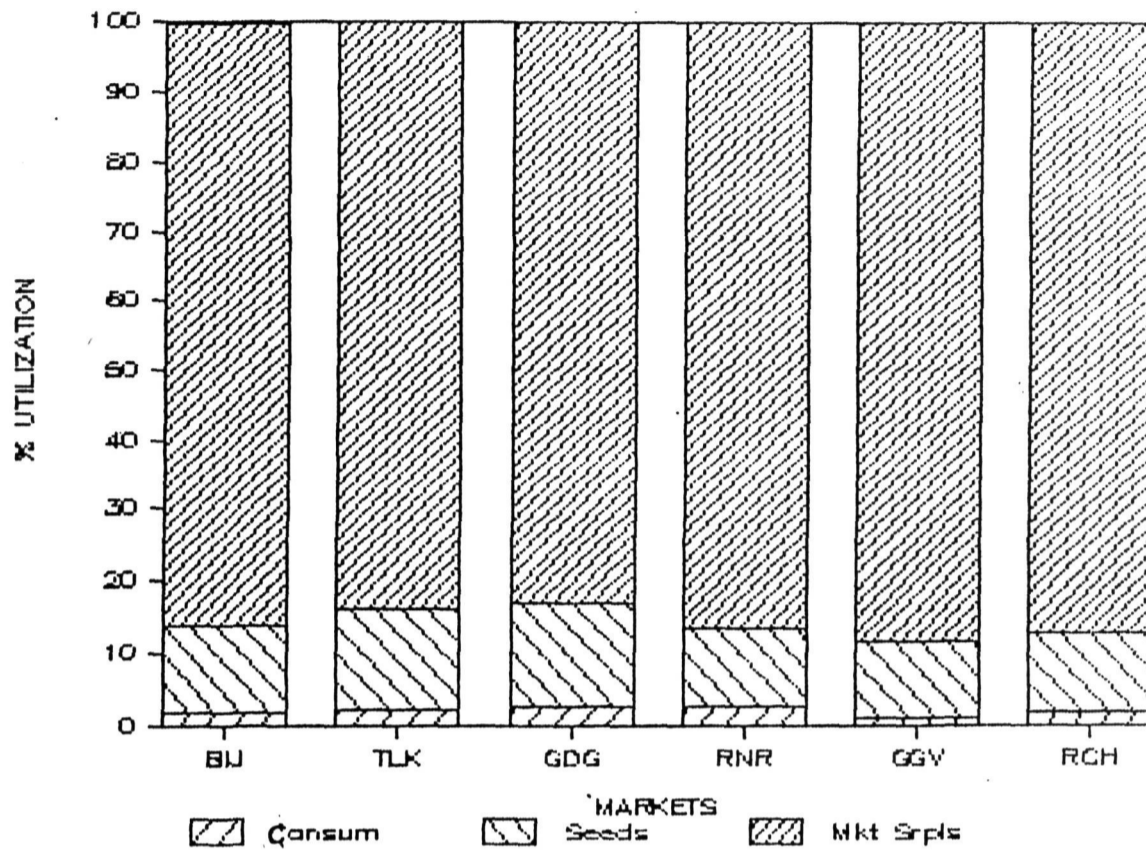


Fig 4.54 : Groundnut Utilization Pattern by Sample Farmers.

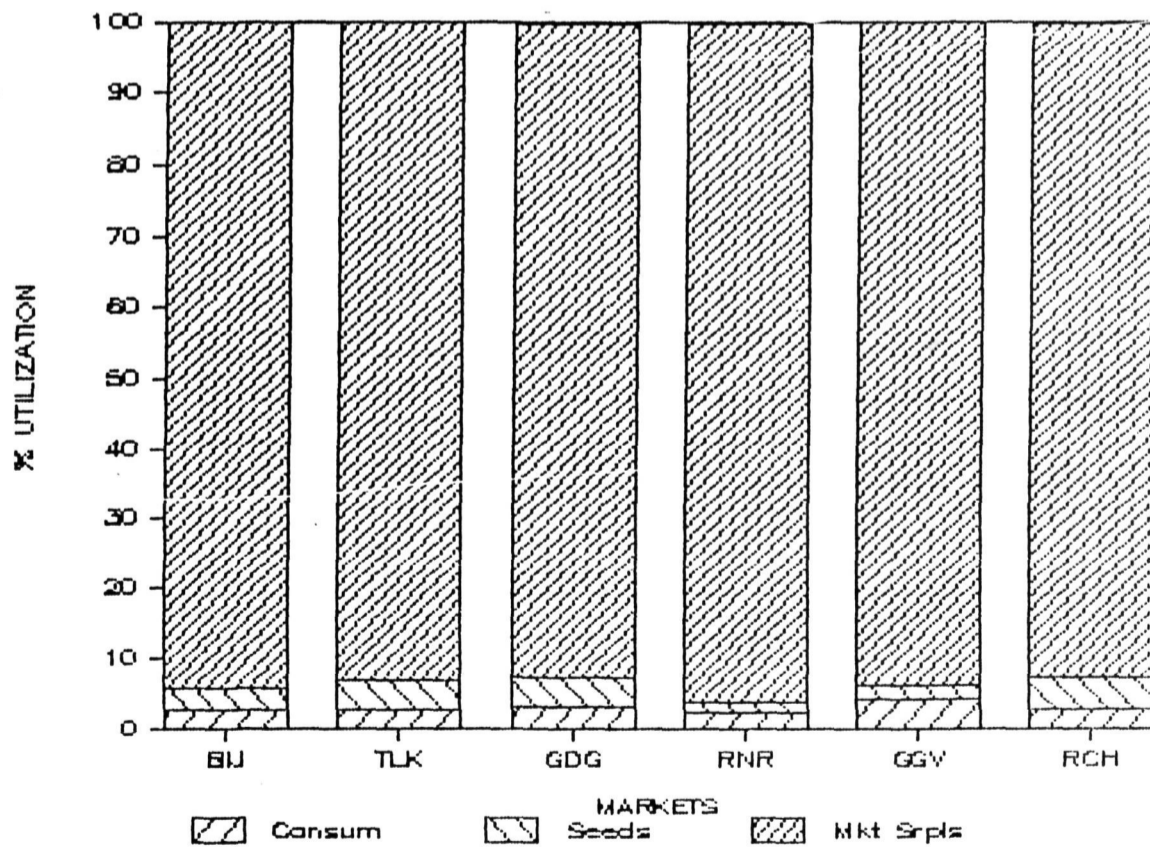


Fig 4.55: Sunflower Utilization Pattern by Sample Farmers.

The proportion of oilseeds produce utilized as seeds and for consumption varied from place to place and from crop to crop. In the case of groundnut, the farmers of Gangavati market area were found to have the highest marketable surplus (88.60%), while, the quantity utilized for consumption was the lowest (1.12%), followed by Raichur. In Bijapur and Ranebennur markets, the utilization of groundnut for seeds, consumption and marketing purposes was more or less equal. The marketable surplus of groundnut of farmers transacting in Gadag^{market} was found to be lowest (83.08%), most of the produce being retained for seeds and consumption purpose. More or less similar pattern was observed in the case of Talikoti market.

With regard to sunflower, the marketable surplus was found to be higher than that of groundnut in all the markets. The proportion of marketable surplus was found to be highest in Ranebennur market (96.38%) and lowest in Raichur market. The quantity utilized for seeds and for consumption was respectively about 2 to 4 per cent over all the markets. The Gangavati market farmers retained highest proportion (4.03%) of sunflower for consumption purpose, while in the case of seeds the farmers in the hinterlands of Raichur, Gadag, Talikoti and Bijapur markets retained about 3 to 4 per cent of the produce. The Ranebennur and Gangavati farmers retained

lowest (<2%) proportion for seeds among all the farmers in the study area.

4.6.2 Disposal Pattern of Oilseeds.

The oilseeds produce available to the farmers as marketable surplus (quantity left after retaining for seeds and consumption) is disposed of through different market functionaries. The month of sale of the produce varied from market to market and from farmer to farmer. It was generally observed that the arrivals of oilseeds to the markets are high immediately after harvesting months. The disposal pattern of two major oilseeds viz., groundnut and sunflower by the sample farmers in the selected markets was analysed and the results are presented in Table 4.29.

The quantities of groundnut and sunflower arrivals to the markets was mainly concentrated during a few months of the year. Heavy arrivals of these two oilseeds were noticed in the months of October, November, December and January which followed the kharif harvest of these crops. The arrivals in the months of April and May followed the rabi/summer harvests. In Bijapur, Talikoti and Gadag markets, majority of the producer-seller disposed of their marketable surplus during November and December months, while in Ranebennur, Gangavati and Raichur markets, the produce was sold in the months of

Table 4.29 : Disposal Pattern of Oilseeds by Sample Farmers (Qty. in qtls)

Months	Groundnut							Sunflower						
	Bijapur	Talikoti	Gadag	Ranebennur	Gangavati	Raichur	Bijapur	Talikoti	Gadag	Ranebennur	Gangavati	Raichur		
July	-	-	-	-	-	-	-	-	-	-	-	-		
August	-	-	-	-	-	-	-	-	-	-	-	-		
September	-	-	38	70	-	-	-	-	14	19	-	-		
			(8.69)	(12.07)					(3.18)	(5.94)				
October	3	-	76	53	-	140	9	-	23	50	-	22		
	(0.63)		(17.39)	(9.14)		(11.38)	(0.97)		(5.20)	(15.62)				
November	205	27	155	37	256	104	318	359	80	58	14	157		
	(43.16)	(36.23)	(35.47)	(6.38)		(29.42)	(34.23)	(48.12)	(18.09)	(18.12)	(4.00)	(20.05)		
December	45	111	15	-	53	48	165	196	285	-	193	181		
	(9.47)	(14.74)	(3.43)		(6.09)	(3.90)	(17.76)	(26.27)	(64.48)		(55.14)	(23.12)		
January	9	-	183	16	-	194	43	-	15	58	-	239		
	(1.89)		(35.02)	(2.76)		(15.77)	(4.63)		(3.39)	(18.12)		(30.52)		
February	7	-	-	-	-	18	261	-	20	-	-	55		
	(1.47)					(1.46)	(28.09)		(4.53)			(7.02)		
March	-	259	-	44	-	-	-	191	5	19	-	-		
		(34.39)		(7.88)				(26.61)	(1.13)	(5.94)				
April	206	110	-	59	469	548	133	-	-	116	143	110		
	(43.38)	(14.62)		(10.17)	(53.91)	(44.56)	(14.32)			(36.26)				
May	-	-	-	294	92	178	-	-	-	-	-	19		
				(50.69)	(10.58)	(14.47)						(2.43)		
June	-	-	-	7	-	-	-	-	-	-	-	-		
				(1.21)										
Total	475	753	437	580	870	1230	929	746	442	320	350	783		
	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)	(100.00)		

Figures in parantheses indicate percentage to total

April and May. Among the markets that received heavy arrivals after kharif harvest, Bijapur market showed highest arrivals (43.16%) in the month of November followed by Talikoti and Gadag markets. The groundnut growers sold most of their marketable surplus (50.69%) in the month of May in Ranebennur market and 53.91% and 44.56% respectively in Gangavati and Raichur markets in April. Sunflower was grown in the study area all through the year as early kharif, late kharif, rabi and summer crop. As a result, the disposal of this crop by the sample farmers extended over 4 to 6 months of the year. The producer-seller of sunflower in Bijapur market disposed of their produce in the months of November (34.32%), December (17.76%), February (28.09%) and April (14.32%), which together accounted for 94.40 per cent of the marketable surplus of the farmers. The marketable surplus of Talikoti farmers was spread over three months viz., November (48.12%), December (26.27%) and March (25.61%). In Gadag market, major portion of the marketable surplus was sold in the month of December (64.48%) followed by November (18.12%), while in Gangavati market about 96 per cent of the marketable surplus was disposed off only in the months of December (55.14%) and April (40.86%).

The disposal pattern of sunflower in Raichur market was more or less similar to that observed in Bijapur market with

an exception for the month of February. The major portion of the sunflower produce of the sample farmer arrived in Raichur market in the months of November (20.05%), January (30.52%) and April (14.05%). These four months accounted for about 88 per cent of the marketable surplus disposed off by the farmers.

A perusal of the table reveals that, irrespective of the crop and the markets, a major portion of the marketable surplus of the selected oilseeds of the sample farmers arrived to the market mostly in the months of November and December which followed the kharif harvest and for April and May which followed rabi/summer harvest of these crops.

4.6.3 Preference of Marketing channels By Sample Farmers.

In the present study, producers of groundnut and sunflower opted for three channels for disposal of their marketable surplus (Fig. 4.56 to 4.60). These preferences are presented in Table 4.30. For disposal of groundnut produce, the majority of the farmers preferred channel I (through commission agents), followed by channel II (through co-operative marketing society) and channel III (selling to village trader at village or nearby mandis). The maximum (80%) number of producers opted for channel I in Ranebennur market to dispose of 75 per cent of their marketable surplus,

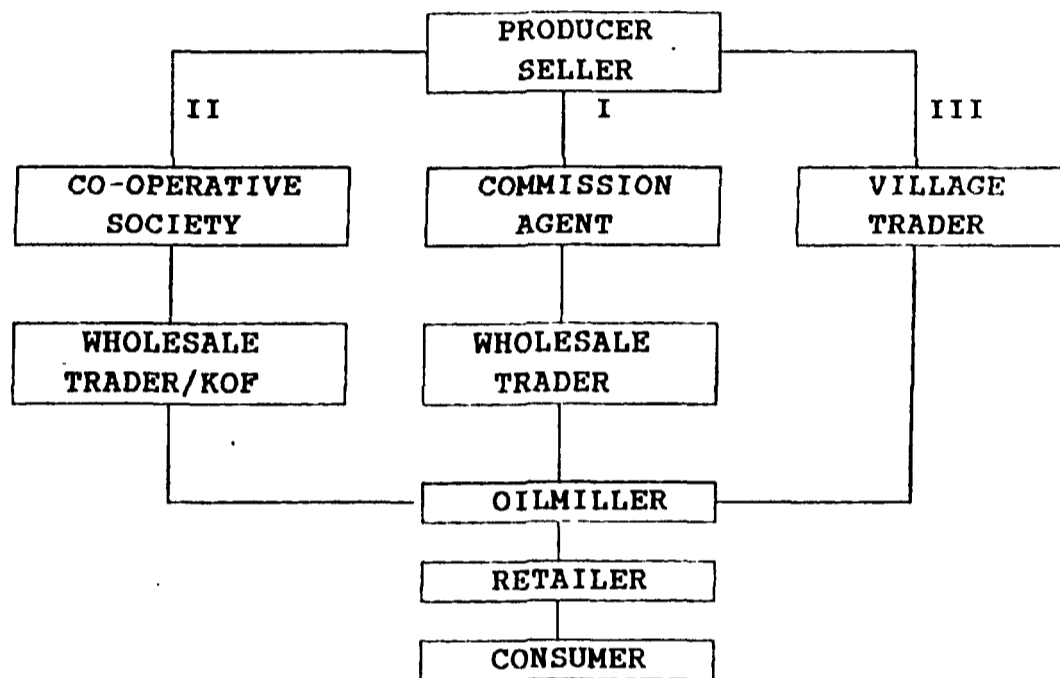


Fig 4-56 OILSEEDS AND OILS MARKETING CHANNELS

Table 4.30 : Preference of Marketing Channels by Sample Farmers in Oilseeds Marketing (Qty.in qtls.)

Markets	No./ Qty.	Groundnut			Sunflower			Total	
		I	II	III	I	II	III		
1. Bijapur	No.	22.00 (55.00)	10.00 (25.00)	8.00 (20.00)	40.00 (100.00)	22 (55.00)	6 (15.00)	12 (30.00)	40 (100.00)
	Qty.	390.00 (82.10)	64.00 (13.47)	21.00 (4.42)	475.00 (100.00)	668 (67.95)	98 (9.97)	217 (22.08)	983 (100.00)
2. Talikoti	No.	25.00 (62.50)	12.00 (30.00)	3.00 (7.50)	40.00 (100.00)	20 (50.00)	5 (12.50)	15 (37.50)	40 (100.00)
	Qty.	530.00 (70.38)	163.00 (21.66)	60.00 (7.96)	753.00 (100.00)	425 (53.12)	135 (16.88)	240 (30.00)	800 (100.00)
3. Gadag	No.	23.00 (57.50)	15.00 (37.50)	2.00 (5.00)	40.00 (100.00)	26 (65.00)	6 (15.00)	8 (20.00)	40 (100.00)
	Qty.	273.00 (62.47)	135.00 (30.89)	29.00 (6.64)	437.00 (100.00)	214 (44.86)	120 (25.16)	143 (29.98)	477 (100.00)
4. Ranebennur	No.	30.00 (75.00)	6.00 (15.00)	4.00 (10.00)	40.00 (100.00)	22 (57.22)	8 (10.54)	10 (32.23)	40 (100.00)
	Qty.	435.00 (75.00)	96.00 (16.55)	49.00 (8.45)	580.00 (100.00)	190 (57.23)	35 (10.54)	107 (32.23)	332 (100.00)
5. Gangavati	No.	28 (70.00)	10 (25.00)	2 (5.00)	40 (100.00)	28 (70.00)	4 (10.00)	8 (20.00)	40 (100.00)
	Qty.	408 (46.89)	310 (35.64)	152 (17.47)	870 (100.00)	200 (53.76)	37 (9.94)	135 (36.30)	372 (100.00)
6. Raichur	No.	27 (67.50)	10 (25.00)	3 (7.50)	40 (100.00)	24 (60.00)	6 (15.00)	10 (25.00)	40 (100.00)
	Qty.	740 (60.16)	3369 (30.00)	121 (9.84)	1230 (100.00)	470 (55.55)	169 (19.98)	207 (24.47)	846 (100.00)
Over all	No.	155 (64.58)	63 (26.25)	22 (9.17)	240 (100.00)	142 (59.17)	35 (14.58)	63 (26.25)	240 (100.00)
	Qty.	2776 (63.89)	1137 (26.17)	432 (9.94)	4345 (100.00)	2167 (56.88)	594 (15.59)	1049 (27.53)	3810 (100.00)

Figures in parantheses indicate percentage to total

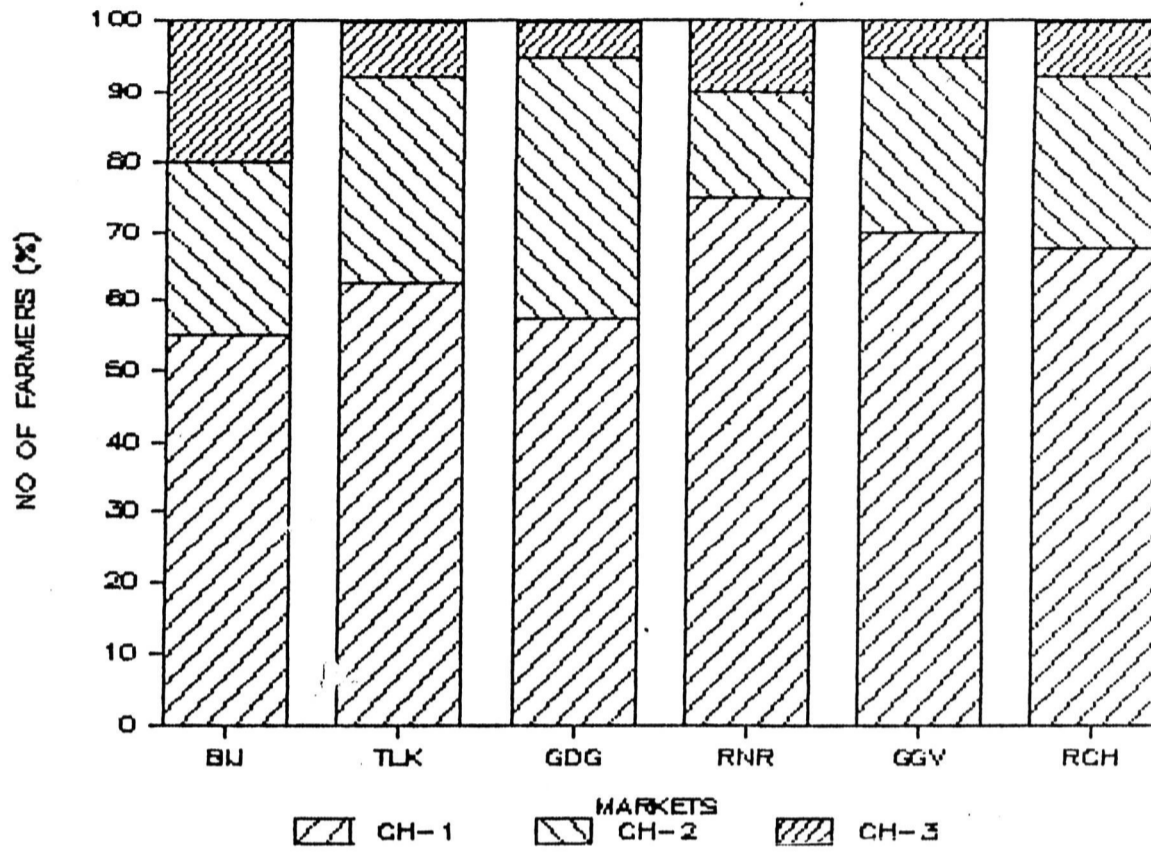


Fig 4.57: Proportion of Groundnut Farmers Preferring Different Channels.

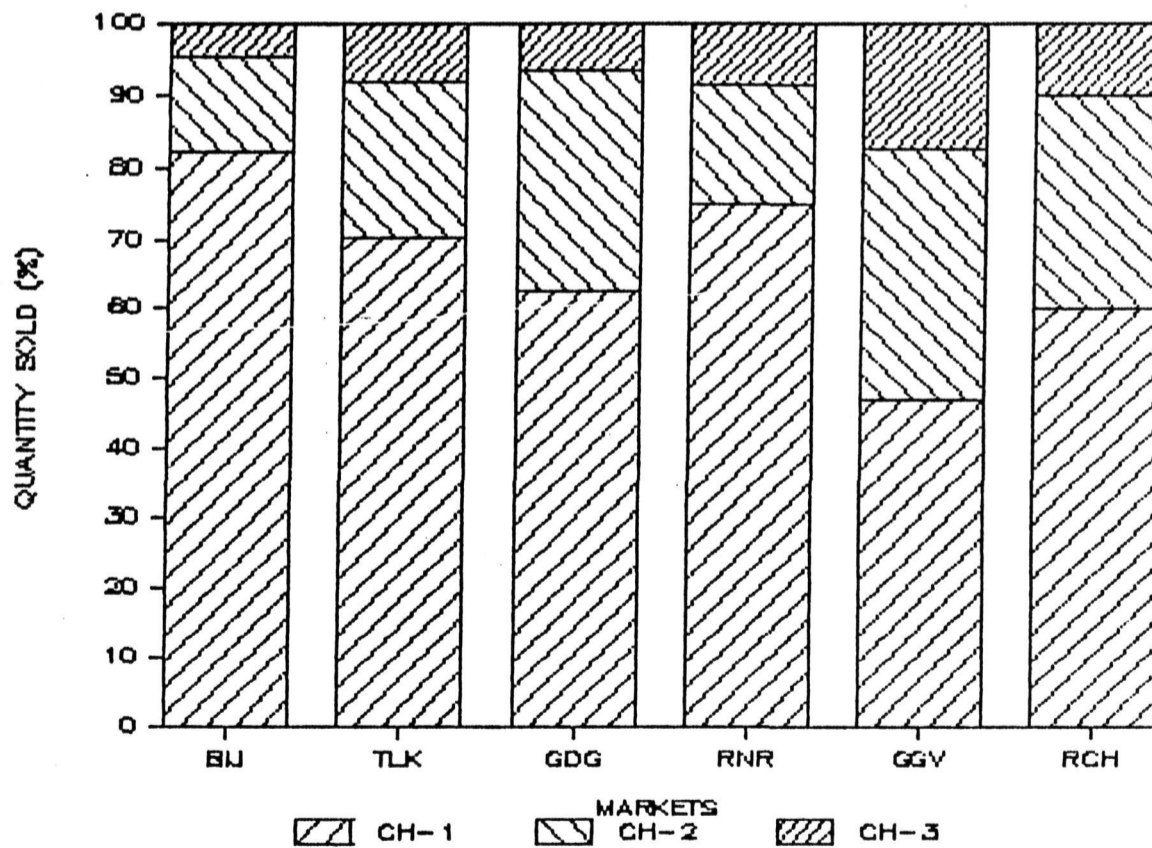


Fig 4.58: Proportion of Groundnut Sold Through Different Channels.

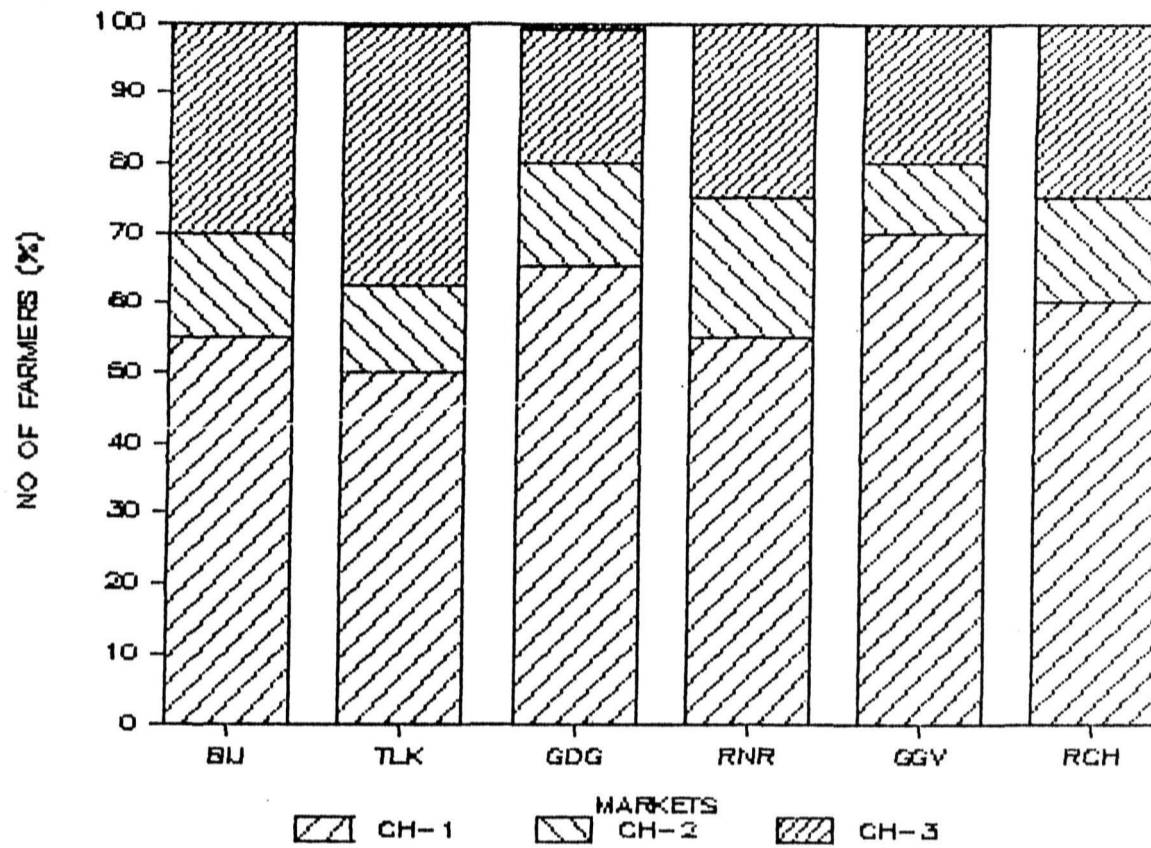


Fig 4.59: Proportion of Sunflower Farmers Preferring Different Channels.

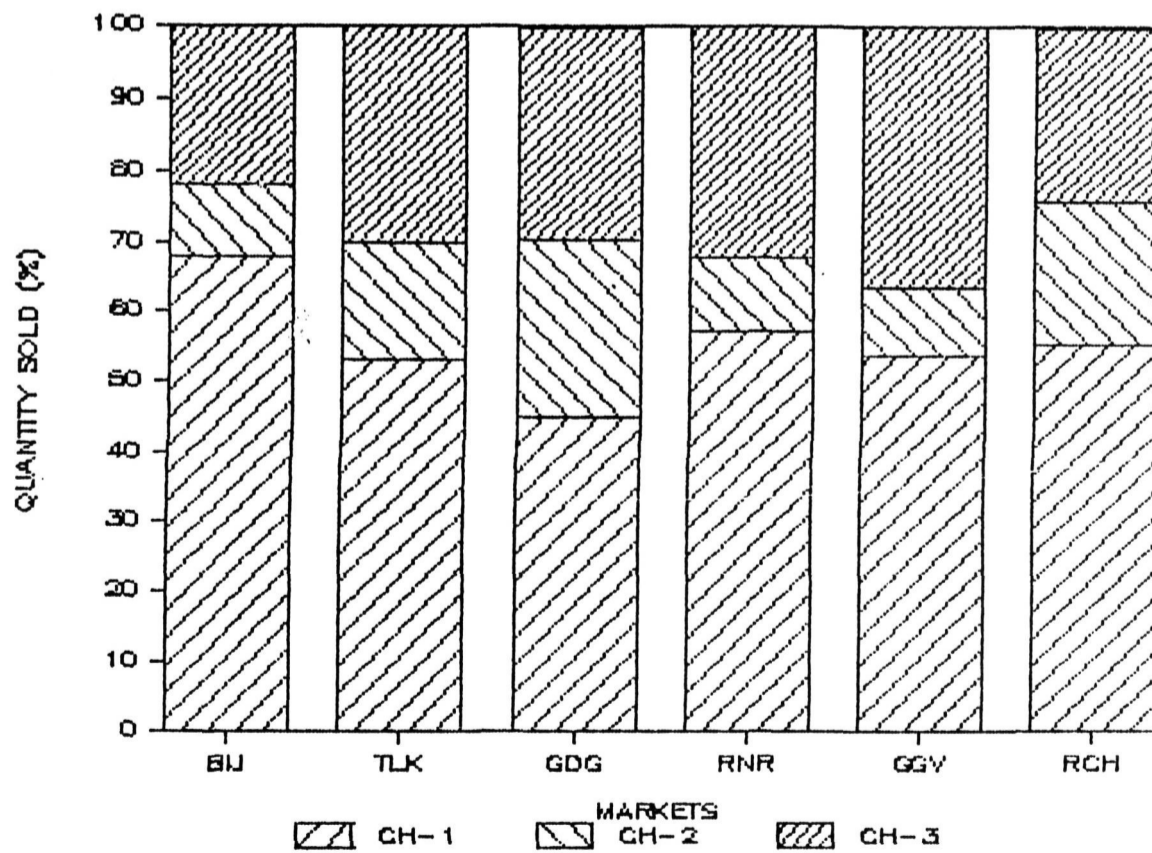


Fig 4.60: Proportion of Sunflower Sold Through Different Channels.

while 55 per cent of the producers opted this channel in Bijapur market to sell the produce which was highest (82%) among the study markets. In Gangavati market, 70 per cent of the sample producers sold only about 47 per cent of their produce. Channel II was most popular in Gadag market, where 37.50 per cent of the producers opted for this channel to dispose 30.89 per cent of their produce and least popular in Ranebennur market, where only 15 per cent of the producers disposed 16.55 per cent of the produce. As far as Channel III was concerned, its popularity was maximum in Bijapur and Gangavati markets, from the view point of the number of farmers opting and the quantity of groundnut sold (17.47%) respectively. In rest of the markets the proportion of the number of farmers preferring and the quantity sold through channel III was only about 10 per cent or even less, in some cases.

In disposal of sunflower, majority of the producer-sellers preferred channel I followed by channel III and channel II. In Gangavati market, as high as 70 per cent of the sample farmers sold about 54 per cent of the total available surplus through channel I, while in Talikoti market, about 50 per cent of the producers disposed of 53.12 per cent of the quantity. Channel III was the next best channel for surplus in terms of the proportion of farmers who opted as

well as quantity sold. It was most popular among Talikoti ¹⁷¹ farmers and least popular among Gadag and Gangavati farmers. The channel appeared to be least preferred by the producers. In Bijapur market, 15 per cent of the producers preferred this channel to dispose only 9.97 per cent of their sunflower output, while in Gadag and Raichur markets the same proportion of farmers disposed respectively about 25.16 per cent and 19.98 per cent of their sunflower output. Among the markets, this channel was attached least importance by the Gangavati market farmers.

The overall picture of the Table 4.30 revealed that irrespective of the oilseed crop and markets, channel I was most popular in all the markets in terms both of proportion of the farmer who chose it and quantity sold, followed by channels II and III in groundnut marketing and channels III and II in sunflower marketing.

4.6.4 Marketing Cost incurred By Sample Farmers.

The cost incurred by the producer-seller in marketing of two major oilseeds viz., groundnut and sunflower are presented in Table 4.31. The cost incurred in channel I was found to be 2 to 3 times higher than that in channel II. No cost was incurred by the sample farmers in channel III, since the marketable surplus of oilseeds was disposed off at the

Table 4.31 : Cost Incurred by Sample Farmers Under Different Channels of Oilseeds Marketing (Rs./qtl.)

Items of cost	Groundnut						Sunflower					
	Bijapur	Talikoti	Gadag	Ranebennur	Gangavati	Raichur	Bijapur	Talikoti	Gadag	Ranebennur	Gangavati	Raichur
<u>Channel - I</u>												
1. Packing	2.25 (5.80)	2.25 (4.79)	2.25 (5.88)	2.25 (6.04)	3.00 (7.36)	1.50 (3.13)	2.00 (5.11)	2.00 (4.30)	2.00 (5.44)	2.00 (5.39)	2.00 (5.11)	1.50 (3.27)
2. Loading & Unloading	1.20 (3.09)	1.50 (3.19)	1.20 (3.13)	1.20 (3.23)	1.20 (2.94)	1.20 (2.50)	0.90 (2.30)	1.00 (2.15)	1.50 (4.08)	1.50 (4.05)	0.90 (2.30)	1.00 (2.18)
3. Transportation	15.00 (38.69)	12.00 (25.53)	14.55 (38.04)	12.60 (33.80)	15.00 (36.82)	21.75 (45.36)	14.00 (35.80)	10.00 (21.53)	11.00 (29.96)	10.80 (29.13)	12.00 (30.65)	18.00 (39.27)
4. Commission paid	18.82 (48.54)	29.40 (62.55)	18.00 (47.06)	20.44 (54.89)	19.70 (48.34)	21.60 (43.79)	20.70 (52.94)	1.86 (68.57)	19.62 (53.44)	20.92 (56.43)	22.00 (56.19)	22.60 (49.29)
5. Personal expenses	1.50 (3.88)	1.85 (3.94)	2.25 (5.88)	0.75 (2.01)	1.85 (4.54)	2.50 (5.22)	1.50 (3.85)	1.60 (3.45)	2.60 (7.08)	1.85 (5.00)	2.25 (5.75)	2.75 (5.99)
Total	38.77	47.00	38.25	37.24	40.75	47.95	39.10	46.46	36.72	37.07	39.15	45.85
<u>Channel - II</u>												
1. Packing	2.25 (12.33)	2.25 (14.28)	2.25 (15.40)	2.25 (15.73)	2.25 (17.05)	1.50 (8.24)	2.00 (13.42)	2.00 (14.95)	2.00 (15.85)	2.00 (14.98)	2.00 (15.15)	1.50 (9.40)
2. Loading & Unloading	1.20 (6.57)	1.50 (9.53)	1.20 (8.22)	1.20 (8.39)	1.50 (11.37)	1.20 (6.59)	1.20 (8.05)	1.00 (7.47)	1.00 (7.92)	1.20 (8.99)	1.00 (7.58)	1.20 (7.52)
3. Transportation	13.00 (71.24)	10.25 (65.08)	9.00 (61.64)	9.60 (67.14)	8.00 (60.60)	12.80 (70.33)	10.50 (70.47)	9.00 (67.26)	8.00 (63.39)	8.40 (62.92)	9.00 (68.18)	12.00 (75.24)
4. Personal expenses	1.80 (9.86)	1.75 (11.11)	2.15 (14.74)	1.25 (8.74)	1.45 (10.98)	2.70 (14.84)	1.20 (8.06)	1.38 (10.31)	1.62 (12.84)	1.75 (13.11)	1.20 (9.09)	1.25 (7.84)
Total	18.25	15.75	14.60	14.30	13.20	18.20	14.90	13.38	12.62	13.35	13.20	15.95

Note : 1. Figures in parantheses indicate percentage to total cost
2. No commission paid in channel II
3. Channel III does not have marketing cost

village. The per-quintal cost incurred in marketing of groundnut was found to be highest in Raichur market (Rs. 47.95) and lowest in Ranebennur (Rs. 37.24) while the highest marketing cost for sunflower was in Talikoti (Rs. 46.46) and lowest in Gadag (Rs. 30.72). Of the total cost of marketing in channel I, commission and transportation expenses constituted maximum. These two components together worked out to about 85 per cent of the total cost. With respect to other cost components, no significant variation was noticed. In sunflower marketing, the proportion of different components in total marketing cost were found to be more or less similar to those observed in groundnut. Among the different cost components in channel II, cost on transportation was found to be highest, which accounted for 66 per cent of the total cost. Bijapur market farmers incurred highest transportation cost (Rs. 13/qtl), while Gangavati market farmers incurred the lowest (Rs. 8/qtl) on transportation. The cost incurred in sunflower disposal was relatively lower than the cost incurred on groundnut by the sample farmers. The total cost incurred in sunflower marketing ranged between Rs. 18.20 and Rs. 13.20 per quintal in Bijapur and Gangavati markets respectively. In case of sunflower marketing, transportation again had its prominence among the total marketing costs and accounted for more than 63 per cent of the total cost.

A significant difference was noticed between the costs incurred over the two channels of marketing. In channel I, the cost incurred on commission was prominent, followed by transportation cost, while in channel II, no farmer incurred cost on commission in any of the selected markets and transport cost was the only major cost.

4.6.5 Cost incurred By Traders in Oilseeds Transaction.

The cost incurred by traders involved in groundnut and sunflower marketing are presented in Table 4.32.

A perusal of the table reveals that no significant difference was seen over the markets with respect to cost incurred by the wholesale trader in groundnut and sunflower transaction in the selected markets. The important components of cost were purchase/sale tax and commission, while the remaining items occupied relatively small proportion in the total cost. Wholesale traders of Bijapur market incurred highest cost of Rs. 66.80 per quintal and lowest cost of Rs. 59.45 per quintal was incurred by Gangavati traders. In the total cost of groundnut transaction, the cost components of tax, commission and market fee accounted for nearly 90 per cent in Bijapur and Gangavati markets, while the rest of the components i.e., transportation, loading and unloading and general maintenance accounted only for 10 per cent of the

Table 4.32 : Cost Incurred by Traders in Oilseeds Transaction (Rs./qtl.)

Items of cost	Gorundnut						Sunflower					
	Bijapur	Talikoti	Gadag	R.Bennur	G.Vati	Raichur	Bijapur	Talikoti	Gadag	R.Bennur	G.Vati	Raichur
WHOLESALE TRADER												
1. Market fee	10.00 (14.97)	9.50 (15.09)	9.80 (15.19)	9.10 (15.05)	8.90 (14.97)	9.30 (14.81)	10.50 (15.50)	9.85 (15.19)	10.20 (15.38)	9.40 (15.51)	9.30 (15.15)	9.60 (14.86)
2. Commission paid	20.00 (29.94)	19.00 (30.18)	19.60 (30.39)	18.20 (30.11)	17.80 (29.94)	18.60 (29.62)	21.00 (30.99)	19.70 (30.38)	20.40 (30.77)	18.80 (31.02)	18.60 (30.29)	19.20 (29.72)
3. Tax	30.00 (44.91)	28.50 (45.27)	29.40 (45.58)	27.30 (45.16)	26.70 (44.91)	27.90 (44.43)	31.50 (46.49)	29.55 (45.57)	30.60 (46.16)	28.20 (46.53)	27.90 (45.44)	28.80 (44.58)
4. Transportation	2.25 (3.37)	2.25 (3.57)	2.10 (3.26)	2.25 (3.72)	2.40 (4.04)	2.75 (4.38)	1.50 (2.22)	2.25 (3.46)	1.50 (2.26)	2.00 (3.30)	2.10 (3.42)	2.60 (4.02)
5. Labour (L & UL)	2.25 (3.37)	1.20 (1.92)	1.20 (1.86)	1.80 (2.98)	1.20 (2.02)	2.10 (3.34)	1.50 (2.22)	1.20 (1.85)	1.50 (2.26)	1.00 (1.66)	1.50 (2.44)	1.60 (2.48)
6. General maintenance	2.30 (3.44)	2.50 (3.97)	2.40 (3.72)	1.80 (2.98)	2.45 (4.12)	2.15 (3.42)	1.75 (2.58)	2.30 (3.55)	2.10 (3.17)	1.20 (1.98)	2.00 (3.26)	2.80 (4.34)
Total	66.80	62.95	64.50	60.45	59.45	62.80	67.75	64.85	66.30	60.60	61.40	64.60
VILLAGE TRADER												
1. Packing	2.25 (11.97)	2.00 (12.42)	2.50 (14.97)	2.50 (14.70)	2.50 (15.92)	2.00 (10.10)	3.00 (15.79)	2.50 (16.13)	3.00 (16.90)	3.00 (18.40)	3.00 (18.46)	3.00 (15.75)
2. Labour	1.90 (10.10)	1.75 (10.87)	2.20 (1.17)	2.50 (14.70)	2.50 (15.92)	2.50 (12.63)	2.50 (13.16)	2.50 (16.13)	2.00 (11.27)	2.50 (15.34)	2.50 (15.38)	2.85 (14.96)
3. Transportation	10.00 (53.19)	8.50 (52.79)	7.75 (46.41)	8.50 (50.00)	7.00 (44.58)	10.50 (53.03)	9.00 (47.37)	7.00 (45.16)	8.00 (45.07)	7.00 (42.94)	7.00 (43.08)	9.00 (47.24)
4. General maintenance	4.65 (24.74)	3.85 (23.92)	4.25 (25.45)	3.70 (20.60)	0.70 (23.58)	4.80 (24.24)	4.50 (23.68)	3.50 (22.58)	4.75 (26.76)	3.80 (23.22)	3.75 (23.08)	4.20 (22.05)
Total	18.80	16.10	16.70	17.00	15.70	19.80	19.00	15.50	17.75	16.30	16.25	19.05

Note : 1. Figures in pranteses indicate percentage to total
2. R.Bennur - Ranebennur, G.Vati - Gangavati
3. L & UL : Loading and unloading

total cost. In the other four study markets also, almost similar pattern of cost distribution was observed.

In sunflower transaction, wholesale trader incurred marginally higher cost than that incurred in groundnut. The cost incurred in Bijapur market was highest (Rs. 67.75 per quintal) while in Ranebennur market it was Rs. 60.60. The major components of cost were tax, commission and market fee which together accounted for more than 90 per cent of the total cost. Among the different items of cost, the tax component alone accounted for about 44 to 46 per cent of the total cost followed by commission (29 to 30%) and market fee (14 to 15%).

The cost incurred by the village trader was lower than that of wholesale trader in both groundnut and sunflower in the selected markets. The cost incurred for groundnut was found to be highest in Raichur market (Rs. 19.80 per quintal) and lowest in the case of Gangavati market (Rs. 15.70 per quintal). Among the total cost incurred on groundnut transaction, the transportation cost alone accounted for 50 per cent, followed by general maintenance cost (24%). For sunflower the expenses incurred on different components were almost similar to those of groundnut. The village merchants of Bijapur and Raichur markets incurred slightly higher cost

on sunflower transaction as compared to cost incurred by the trader in other four study markets.

To facilitate computation of margins in oil and cake realised from one quintal of oilseeds (groundnut/sunflower), only the total cost incurred in processing of one quintal of oilseeds by the oilmiller and the total cost incurred by the oil retailer from the point of purchase of oil and its disposal was considered.

4.6.6 Marketing margins Under Different channels of Oilseeds Marketing.

The margins under different channels of groundnut and sunflower marketing are presented in table 4.33. In the first channel of groundnut marketing, the share of the producer in the oil-miller's rupee was found to be higher in Gadag and Bijapur markets (88%), in rest of the markets it was about 87 per cent. In sunflower marketing, the share of the producer in the oil-miller's price was found to be slightly higher than that realised in groundnut. The market-wise observation revealed that the share of the producer in the oilmiller's price was found to be highest (89.22%) in Bijapur and Gadag market and lowest in Ranebennur market (87.92%). The net price realised by the farmers was found to be highest in Bijapur market for both groundnut (Rs. 961.23/qtl.) and sunflower (Rs.

Table 4.33 : Marketing Margins Under Different Channels of Oilseeds Marketing (Rs/qttl.)

Sl. No.	Particulars	Groundnut					Sunflower						
		Bijapur	Talikota	Gadag	Ranebennur	Gangavati	Raichur	Bijapur	Talikota	Gadag	Ranebennur	Gangavati	Raichur
Channel - I													
1.	Net price received by the producer	961.23	903.00	941.75	872.76	849.25	902.05	1010.90	938.28	983.28	902.93	890.85	914.15
	Cost incurred by the producer	38.77	47.00	38.25	37.24	40.75	47.95	39.10	46.46	36.72	37.07	39.15	45.85
2.	Price paid by wholesale trader	1000.00	950.00	980.00	910.00	890.00	950.00	1050.00	985.00	1020.00	940.00	930.00	960.00
	Cost incurred by wholesale trader	66.80	62.95	64.50	67.05	64.85	64.00	67.75	63.65	66.30	66.00	62.60	62.20
	Profit of wholesaler	15.20	14.05	14.50	18.95	17.15	14.00	15.25	14.35	15.70	21.00	19.40	13.80
3.	Price paid by oilmiller	1082.00	1037.00	1059.00	996.00	972.00	1028.00	1133.00	1063.00	1102.00	1027.00	1012.00	1036.00
4.	Producer's share in oilmiller's purchase price (%)	88.84	87.07	88.93	87.62	87.37	87.75	89.22	88.29	89.22	87.92	88.00	88.24
5.	Marketing margin as % of oilmiller's purchase price	11.16	12.93	11.07	12.38	12.63	12.25	10.78	11.71	10.78	12.08	11.97	11.76
Channel - II													
1.	Net price received by the producer	1001.75	924.25	965.40	879.70	906.80	911.80	1015.10	996.62	1022.38	915.90	926.80	964.05
	Cost incurred by producer	18.25	15.75	14.60	15.30	13.20	18.20	14.90	13.38	12.62	14.10	13.20	15.95
2.	Price paid by wholesale trader	1020.00	940.00	980.00	925.00	920.00	960.00	1030.00	1010.00	1035.00	930.00	940.00	952.00
	Cost incurred by wholesale trader	66.80	62.95	64.50	67.05	64.85	64.00	67.75	63.65	66.30	66.00	62.60	62.20
	Profit of wholesaler	15.20	14.05	14.50	17.95	13.15	10.00	14.25	15.35	10.70	16.00	16.40	10.80
3.	Price paid by oilmiller	1102.00	1021.00	1054.00	1010.00	998.00	1034.00	1112.00	1089.00	1112.00	1012.00	1019.00	1025.00
4.	Producer's share in oilmiller's purchase price (%)	90.91	90.52	91.59	89.76	90.86	90.81	91.27	91.52	91.94	90.50	90.95	91.64
5.	Marketing margin as % of oilmiller's purchase price	9.09	9.48	8.41	10.24	9.14	9.19	8.73	8.48	8.06	9.50	9.05	8.36
Channel - III													
1.	Net price received by the producer	905.00	860.00	900.00	825.00	820.00	860.00	950.00	915.00	925.00	875.00	850.00	885.00
	Cost incurred by village trader	905.00	860.00	900.00	825.00	820.00	860.00	950.00	915.00	925.00	875.00	850.00	885.00
	Cost incurred by village trader	18.80	16.10	16.70	17.00	15.70	19.15	19.00	15.50	17.75	16.50	16.35	19.05
	Profit of village trader	96.20	78.90	78.30	85.00	85.30	85.85	89.00	78.50	96.25	89.50	84.65	92.95
3.	Price paid by oilmiller	1020.00	955.00	995.00	927.00	921.00	965.00	1058.00	1009.00	1039.00	981.00	951.00	997.00
4.	Producer's share in oilmiller's purchase price (%)	88.72	90.05	90.45	88.99	89.03	89.12	89.79	90.68	89.02	89.19	89.38	88.76
5.	Marketing margin as % of oilmiller's purchase price	11.28	9.95	9.55	11.11	10.07	10.88	10.31	9.32	10.98	10.81	10.62	11.24

* No cost incurred by the producer in Channel - III

1010.90/ctl.) and Gangavati farmers realised the lowest net price for both groundnut (Rs. 849.25/ctl) and sunflower (Rs. 890.85/ctl). The proportion of marketing margin in the oilmiller's purchase price ranged from 10.78 per cent in Bijapur and Gadag markets to 12.93 per cent in Talikoti market.

In general the producer's share in the oilmiller's purchase price of oilseeds was found to be higher in channel II compared to channels I and III in all the study markets. It ranged between 91.59 per cent in Gadag market and 89.76 per cent in Ranebennur market in groundnut. A similar situation was noticed in sunflower marketing. These markets (Gadag and Ranebennur) exhibited respectively highest and lowest producer's share in the oil-miller's purchase price.

In channel III, the share of the producer in the oil-miller's price was more or less similar to that observed in channel I, in some cases it was even higher than channel I. The net prices realised by the producer in channel III for both the oilseeds were significantly less than that noticed in channel I. In Gangavati market, net per quintal prices received by the farmers for groundnut and sunflower were only Rs. 820 and Rs. 850 respectively. The net price realised by the farmers of Bijapur market was found to be highest- Rs. 905

for groundnut and Rs. 950 for sunflower, among the study markets.

An attempt was also made to study the price spread in marketing of oils and cakes realised from one quintal each of groundnut and sunflower under different channels. It could be seen from the Table 4.34 that, in channel I, the share of the producer in the consumer's price was found to be highest in Gadag (78.22%) and lowest in Gangavati (73.21%) for groundnut, whereas in sunflower, the highest share of the producer in the consumer price was observed in Bijapur (79.35%) and lowest in Gangavati market. In channel II, the producer's share was relatively higher compared to channels I and III for both the oilseeds. In Bijapur and Gadag markets, farmers secured highest share of the consumer's price (80%), for groundnut oil and cake, while Ranebennur market farmers received lowest share (76.36%) among the study markets. For sunflower, Raichur and Gangavati farmers received respectively highest (84.42%) and lowest (76.15%) share of the consumer price. This share was almost equal in Talikoti and Gadag markets (~81.5%).

In channel III, the share of the producer in the consumer's price was found to be lowest irrespective of the crop and the markets. In this channel Gadag market farmers

Table 4.34 : Marketing Margins Under Different Channels of Oil & Cake Marketing (Rs./qt.)

Sl. No.	Particulars	Groundnut					Sunflower					
		Bijapur	Talikoti	Gadag	Ranebennur	Gangavati	Raichur	Bijapur	Talikoti	Gadag	Ranebennur	Gangavati
Channel - I												
1.	Oilmillers purchase price	1082.00	1037.00	1059.00	996.00	972.00	1028.00	1133.00	1063.00	1102.00	1027.00	1036.00
	Cost incurred by oilmiller	28.40	30.00	33.50	30.40	35.00	28.12	19.20	22.00	26.50	28.20	22.80
	Profit of oilmiller	69.60	53.00	53.50	71.60	83.00	67.88	51.80	70.00	58.50	65.80	69.20
2.	Retailers purchase price	1180.00	1120.00	1146.00	1098.00	1090.00	1124.00	1204.00	1155.00	1187.00	1121.00	1128.00
	Cost incurred by retailer	22.40	21.60	20.30	17.28	24.00	16.80	28.00	19.80	27.20	23.00	18.90
	Profit of retailer	33.60	32.40	37.70	36.72	46.00	31.20	42.00	46.20	40.80	48.00	35.10
3.	Price paid by consumer	1236.00	1174.00	1204.00	1152.00	1160.00	1172.00	1274.00	1221.00	1255.00	1192.00	1182.00
4.	Producer's share in the consumer's rupee (%)	77.76	76.92	78.22	75.76	73.21	76.97	79.35	76.84	78.34	75.67	77.34
5.	Marketing margin as % of consumer's price	22.24	22.43	21.88	24.24	26.79	74.03	20.65	23.16	21.59	24.33	19.95
Channel - II												
1.	Oilmillers purchase price	1102.00	1021.00	1054.00	1010.00	998.00	1034.00	1112.00	1089.00	1112.00	1012.00	1025.00
	Cost incurred by oilmiller	28.40	30.00	33.50	30.40	35.00	28.12	19.20	22.00	26.50	21.20	22.80
	Profit of oilmiller	49.60	59.00	58.50	57.60	57.00	61.88	72.80	44.00	47.50	64.80	40.20
2.	Retailers purchase price	1180.00	1110.00	1146.00	1098.00	1090.00	1124.00	1204.00	1155.00	1186.00	1098.00	1088.00
	Cost incurred by retailer	22.40	21.60	20.30	17.28	24.00	16.80	28.00	19.80	27.20	18.00	18.90
	Profit of retailer	33.60	32.40	37.70	36.72	46.00	31.20	42.00	46.20	40.80	42.00	35.10
3.	Price paid by consumer	1236.00	1164.00	1204.00	1152.00	1160.00	1172.00	1274.00	1221.00	1254.00	1158.00	1142.00
4.	Producer's share in the consumer's rupee (%)	80.96	79.40	80.18	76.60	78.17	77.79	79.68	81.62	81.53	79.09	84.42
5.	Marketing margin as % of consumer's price	19.04	20.60	19.82	13.64	21.83	22.21	20.32	18.38	18.47	20.91	15.58
Channel - III												
1.	Oilmillers purchase price	1020.00	955.00	995.00	927.00	921.00	965.00	1058.00	1009.00	1039.00	981.00	997.00
	Cost incurred by oilmiller	28.40	30.00	33.50	30.40	35.00	28.12	19.20	22.00	26.50	21.20	22.80
	Profit of oilmiller	2131.60	125.00	117.50	140.60	134.00	130.88	126.80	124.00	120.50	95.80	68.20
2.	Retailers purchase price	1180.00	1110.00	1146.00	1098.00	1090.00	1124.00	1204.00	1155.00	1186.00	1098.00	1088.00
	Cost incurred by retailer	22.40	21.60	20.30	17.28	24.00	16.80	28.00	19.80	27.20	18.00	18.90
	Profit of retailer	33.60	32.40	37.70	36.72	46.00	31.20	42.00	46.20	40.80	42.00	35.10
3.	Price paid by consumer	1236.00	1164.00	1204.00	1152.00	1160.00	1172.00	1274.00	1221.00	1254.00	1158.00	1142.00
4.	Producer's share in the consumer's rupee (%)	73.22	73.88	74.75	71.61	70.68	73.38	74.56	74.94	73.76	75.56	77.49
5.	Marketing margin as % of consumer's price	26.78	26.22	25.25	28.39	29.32	26.62	25.44	25.06	26.24	24.44	22.59

gained relatively higher share (74.75%) of the consumer's rupee in groundnut oil and cake and Raichur farmers (77.49%) in sunflower oil and cake (77.49%). In Bijapur and Talikoti markets, the shares of the producers in the consumer's rupee were almost equal for both the commodities. The Gangavati market farmers received the lowest share of consumer's rupee in marketing of groundnut (70.68%) as well as for sunflower oil and cake (69.84%) among the study markets.

From the Tables 4.33 and 4.34, it could be concluded that, irrespective of the crop and the market selected for disposal of oilseeds, channel III was found to offer a lower share to the producer in the consumer price. In the process of oilseed, oil and cake marketing, the oil-miller secured the maximum share in the consumer's rupee followed by village trader and wholesale trader. From the point of view of the farmer, channel II was found to be beneficial, wherein the share of the producer in the consumer's price was highest in both the crops in all the study markets.

DISCUSSION

V DISCUSSION

The results of the investigation are discussed in the present chapter. The main focus here is to throw light on some of the causes responsible for the important results noted in the previous chapter. It also attempts at an evaluation of the results and their policy implications.

5.1 Growth Performance of Oilseeds

5.1.1 Growth Performance of Oilseeds

The growth performance of the area, yield and production of oilseed crops across the study area and over time period along with the factors responsible for the same are discussed in the following sections.

Groundnut

It was apparent from Table 4.1 that the growth rate of area, yield and production during pre-green revolution period was invariably negative in the entire study area except in Dharwad district for area growth. The rate of decline was found to be highest in Bijapur district followed by Raichur district and the State as a whole. In Dharwad district, the groundnut area increased at the rate of 5.27 percent per annum. During post-green revolution period, an improvement in growth of area, yield and production was noticed in Raichur district and State level while negative growth was observed in Bijapur district. However, Dharwad district revealed mixed

results. the rate of growth in production was higher than that in area and yield during post-green revolution and overall periods in Raichur district and at State level. However, the rate of decline in production of groundnut was more than area and yield in Bijapur district. The decline in growth of area, yield and production of groundnut during pre-green revolution period in the study area was mainly attributable to the shift in area towards other crops, mainly foodgrains and lack of adequate irrigation facilities. Since groundnut was mainly grown under rainfed condition in the study area, the allocation of acreage mainly depends upon the rainfall received in the month of june. It was, however, more distressing to note that the decline in the area, yield and production was a common phenomenon for all the periods in respect of Bijapur district which was due to the erratic distribution of rainfall particularly during sowing and growing months of the crop. It is worth mentioning here that this district is frequently affected by drought. This phenomenon along with high cost of seeds (30 to 40 per cent of total cost of cultivation, Dinakar, 1990) has rendered the production of groundnut a risky one and forced the cultivators to shift the area under groundnut to the short-duration drought resistant crops like bajra during kharif season. With regards to area growth during pre-green revolution period, the

district of Dharwad which had a distinction of very high positive growth (5.27%) in area during pre-green revolution period indicated a decline during post-green revolution and overall periods. This is mainly attributable to the shift of area under groundnut to high yielding varieties of jowar and cotton crops particularly during early and mid 70's. In Raichur district, an improvement in the area, yield and production was observed during post-green revolution and overall periods over that in pre-green revolution period as a result of the expansion in area under irrigation in the district.

The State experienced higher growth rates in area, yield and production of groundnut for post-green revolution period as compared to overall period which was mainly due to the remarkable growth performance of the crop observed in the study district of Raichur as well as other districts like Chitradurga and Tumkur. Among the study districts as well as the State, Raichur showed the highest growth rates of area, yield and production of groundnut for overall period which, obviously was the result of the expansion of area under groundnut during summer when yields are much better than that in the kharif season.

The literature of growth rates also replete with evidence of both negative growth and positive growth. Pareira (1976) documented a negative growth of the crop for pre-green revolution period and positive growth for post-green revolution period. Similar results were reported by Ninan (1989), Naik and Mohanty (1991) and Tripathi and Ballah (1991), Umesh (1992).

Safflower

Safflower is another important oilseed crop grown during rabi season mainly under rainfed condition. The growth performance of area, yield and production during the entire pre-green revolution period revealed negative and highly significant growth rates for all the cases with an exception of Dahrwad district. As for as post-green revolution and overall periods were concerned, highly significant and positive growth rates were noticed with respect to area, yield and production in the entire study area without any exception. It was interesting to note that the Bijapur district excelled over other districts as well as the state by achieving the highest growth rates in production (16.32%) and yield (15.90%). The reason for this growth performance of safflower production particularly during post-green revolution period was the introduction of improved cultivars (A - 1) during

1969. The growth rates of area, yield and production during overall period marginally declined. As already mentioned the post-green revolution period growth rates were able to off set the adverse situation during pre-green revolution period to a considerable extent.

The best performance of safflower crop in terms of area, yield and production growth among the selected oilseeds need to ^{be} viewed in the light ^{of} its capacity to compete with rabi crops like jowar, cotton and wheat under drought condition as well as assured irrigation facilities. In Bijapur and Raichur districts which fall in the drought prone belt, the crop is observed to thrive well on account of its capacity to tap the moisture from the low soil profiles with the help of its deep root system, a feature which other crops do not possess. Similarly, the crop serves as a good choice as a sequence/relay crop after harvest of the short duration cereals/legumes or other oilseeds like sesamum in assured rainfall areas (Patil and Wali, 1991). This crop is opted by the farmers also for the reasons like low cost of cultivation and high quality edible oil.

Sesamum

Sesamum is an another important kharif crop mainly raised under rainfed condition. The pattern of growth was more or

less similar to that of safflower barring some exceptions. The growth of area was negative in the entire study area during pre-green revolution period, which was highest in Dharwad district (-8.25%). However, the production growth for Raichur and the State as a whole, inspite of negative area growth, turned out to be mildly positive as a result of stronger positive growth in yield levels. During post-green revolution and overall period, the entire study area depicted positive growth in area, yield and production except Bijapur district in respect of area. The intensity of growth in production was invariably higher than that of yield in all cases. This clearly indicates that increase in the production of sesamum was mainly due to the expansion of area rather than yield improvements. The poor growth rate of yield can be attributed mainly to the absence of improved/high yielding varieties, cultivation of the crop on marginal lands and sensitivities of the crop to climate variations like heavy rainfall or drought during early and capsule development stage (Patil and Wali, 1991). It was interesting to note that, inspite of such problems, the area, yield and production of sesamum have exhibited significant growth particularly during post-green revolution period which was prompted mainly by the recent spurt in the prices of oilseeds in general and sesamum in particular and low cost of cultivation. It can be well

mentioned here that among all the oilseeds, it is only sesamum that fetched higher price in the market.

Sunflower

Sunflower was introduced in India in 1969 as an important oilseed crop. The intensive cultivation of this crop started only from mid 70's. It was apparent in the Table 4.1 that sunflower attained a substantial growth in area and production in the entire study area. However, the rate of area growth was sharper than the production growth and the yield witnessed a ^{negative} growth. Compared to other oilseeds there was a sudden spurt in the expansion of area under this crop owing to the following factors-very high prevailing market prices, the thermo and photo insensitive nature of this crop which renders it ideally suited for year-round planting in diverse crop growing situations and systems, low cost, ease of production and short duration of the crop, availability of varieties (hybrids) with diverse duration which enables the crop to fit well in intercropping and double cropping systems, wider adaptability to different agro-climatic regions, soil types, drought tolerance and rapid revivability after prolonged period of drought and, high seeds multiplication ratio (1:80) (Shankar Goud et.al., 1991)

The crop has attained almost its high peak in area expansion within a very short time span. However, it was perplexing to note that the yield growth rate was declining in the entire study area without any exception inspite of the availability of range of hybrids. This situation was attributed mainly to a large scale cultivation of open pollinated varieties which have low productivity as compared to hybrid cultivars. In Karnataka, Morden, an open pollinated variety was extensively cultivated under rainfed farming in both kharif and winter seasons while hybrid cultivars are mostly cultivated in summer season (Giriraj 1991). Often crop productivity suffers due to attack of insect pests also at various stages of its growth. The other reason, probably the strong one, as observed by the investigator, for declining productivity of sunflower, due to the extensions the crop on marginal and sub-marginal lands in subsequent years of its introduction.

Total Oilseeds

Total oilseeds area and production comprised of area and production of nine oilseeds grown in the State. However, the four crops selected for the study occupied a major share and as a result, the growth performance of the area, yield and production of total oilseeds was dictated by these four

oilseeds. It is evident from the Table 4.1 that the growth rates of area, production and yield of total oilseeds follow the growth pattern of four oilseeds discussed above barring few exceptions. The growth in area, yield and production of total oilseeds was negative during pre-green revolution period in the study area excepting the area growth in Dharwad district. A significant recession of production of total oilseeds in Bijapur and Raichur was mainly the result of severe decline in area and yield. Such a situation was mainly due to non-availability of credible seeds and consequent failure of crops and farmers allotted area under other crops.

During post-green revolution period and overall period, increasing trend in area, yield and production was noticed in all the cases except overall period yield Dharwad district. The growth in total oilseeds area and production was statistically significant in most of the cases while yield growth of total oilseeds was significant only during overall period in Bijapur and Raichur districts, and at the State level. The positive growth pattern of oilseeds particularly during post-green revolution period was mainly due to increase in prices and Government efforts to increase oilseeds production. It is disheartening to note that the yield levels

even during post-green revolution and overall periods have not shown any significant growth as evidenced by non-significant, though positive, yield growth rates in most of the cases.

From overall percievance of the Table 4.1 across the crops, space and overtime, it was evident that oilseeds have been gaining importance in the recent years. The growth in production of oilseeds was achieved mainly due to expansion of acreage and additional irrigated area rather than due to improvement in yield levels as already stated. In other words, the technologies developed for major oilseed crops have not made a significant dent in increasing oilseeds production. The farmers usually attempt to improve productivity by following only a few simple practices like use of improved variety, appropriate seed rate and spacing to the neglect of other important practices like seeds treatment, balance of fertilizer dosage and plant protection schedule (Giriraj, 1991). Also, about 80-85% of oilseeds cultivation under rainfed condition predisposes the farmers to a risk factor for adoption of recommended technologies. Besides, non-availability of quality seeds of high yielding varieties in sufficient quantities in the right time, low investment capacity of bulk of the oilseed farmers, predominant cultivation of oilseeds under rainfed and input starved

conditions ^{resulted} in poor yield levels.

5.1.2 Components of Changes in Oilseeds Production

Individual crop growth rates of area, yield and production help the planners and policy makers in formulating plans and strategies. But an understanding of how the interrelation of the time series variable of area, yield and production are interrelated and their inter-causative effects is also needed to proceed in the right direction while deciding plans and strategies.

In order to isolate the relative contribution of area, yield and their interaction to changes in production of individual as well as total oilseeds in the study area, decomposition analysis was carried out. The result presented in Table 4.2 revealed that the production of oilseeds suffered invariably over study area from the negative effect of area and yield during pre-green revolution period. The decline in the area and yield was mainly due to low importance attached to oilseeds even in the State and Central plans. The selected districts were traditionally foodcrops growing areas where groundnut was the only major oilseed crop, other oilseeds being raised either as mixed or border crops with major cereals.

The result for the post-green revolution period revealed that the quantum of output of individual as well as total oilseeds increased due to an increase in area rather than yield. On the contrary, the foodcrops lost their area mainly to oilseeds in recent years but registered a significant growth^{of} production in recent years on account of significant growth in yield levels (Benakatti, 1991).

The contribution of area and their interaction to change in production of different oilseeds over the space and time is discussed below.

Groundnut production experienced drastic reduction during pre-green revolution period in the entire study area, barring Dharwad district wherein a significant growth in area (5.27%) led to an expansion in the production. Otherwise the shrinkage of output was mainly the effect of a decline in yield. During post green revolution period, an expansion in output was caused mainly by yield increments in Dharwad and Bijapur districts; area increase in Raichur district; and both area and yield expansions at the State level.

Safflower is an important rabi oilseed grown as a inter/border crop with wheat, rabi jowar or bengalgram. The pre-green revolution period experienced, in general, a

negative growth both in area and yield which led to a decrease in output. During post-green revolution period, there was a spectacular increase in the area under wheat and rabi jowar on account of the introduction of improved varieties. The area under safflower, which is grown as a inter crop with these two crops thus naturally co-expanded resulting in increased production. Another important reason was the introduction of an improved variety (A-1) during 1969 in the northern districts of Karnataka whose yield performance was far higher than the earlier varieties. This explained the observed larger contribution of yield as compared to area, to changes in safflower output.

Sesamum was another kharif oilseed crop raised mainly on marginal and submarginal lands to meet the requirements of domestic consumption in the northern parts of Karnataka. Due to increase in market value of this crop in recent years, its area has been increased. During pre-green revolution period, the yield component made substantial contribution to the changed output compared to area and interaction effects. During post-green revolution and overall periods, area expanded substantially without simultaneous efforts to improve its productivity. As a result, area had a

major contribution, in general, in the changes of its output over the period.

Sunflower is a prominent oilseed crop introduced very recently. Within a short span of time it has become very popular among the farming community, attracting many agro-industries to take up its seed production on a commercial scale. Its wide acceptability was because of its manifold advantages over other crops. This crop can be raised all through the year. It is a unique short duration crop having both improved and hybrid varieties and not requiring much cost for its cultivation. With all these features, the crop has attained a growth of about 210 per cent within a decade (1978-79 to 1989-90). The most disheartening situation revealed by the findings was that the yield growth in the entire study area was negative. The production of this crop was mainly due to expansion of area.

The change in total oilseeds production was mainly dictated by the production pattern of four major oilseeds discussed above. During pre-green revolution period, total oilseeds production had fallen mainly due to negative effect of both area and yield in the entire study area with the lone exception of Dharwad district. During post-green revolution period and overall periods, the findings of this study regarding

significant changes in output due to expansion of the area are in conformity with the earlier study in the study area (Gangawar and Rai, 1988). The poor yield performance in all the three periods clearly brought out that the negligence of oilseeds sector during earlier plans.

5.2 Factors Influencing Oilseeds Production

The results of the principal components analysis presented in the previous chapter revealed that the factors influencing production of different oilseeds varied from crop to crop and district to district. The variables highly associated with the production of selected oilseeds and the factors responsible for this association are discussed here under in detail.

Groundnut

Groundnut has been a major oilseeds crop, grown in the study districts for many years. It is mainly grown under rainfed condition in all the three districts. In recent years with the expansion of irrigation facilities in Raichur district and some pockets of Bijapur and Dharwad districts, its cultivation has been extended to irrigated tracts especially during summer season. Due to the technological advancement in the agriculture sector especially during mid 60's, a spectacular change in the cropping pattern was

noticed. The benefits of green-revolution were enjoyed mainly in the case of the cereals like jowar, paddy, wheat and rice in the study districts to the neglect of oilseeds. As a result the acreage of groundnut was almost stagnant. With respect to groundnut area, no significant change was noticed during the study period. This situation naturally led to a stagnation in production. The first three principal components revealed the underlying variables associated with groundnut production in the study districts (Table 4.6). In Bijapur district, the variables associated with first component was groundnut production, July rainfall, groundnut area and net sown area. The variables associated with second component were prices of groundnut and cotton, total oilseeds area and gross cropped area irrigated. The only variable associated with third component was June rainfall. In Dharwad district, most of the variables-groundnut production, prices of groundnut, cotton, chilli and kharif jowar ; yields of cotton and kharif jowar and gross cropped area irrigated-associated with first component. Total oilseeds area associated with second component. The variables associated with third component were groundnut yield and area. In Raichur district, with respect to first component, the situation was similar to that of Dharwad with a few exceptions. The variables associated with second component

were groundnut production, net sown area and gross cropped area. The third component was closely associated with June and August rainfall.

The negative association of prices of groundnut, cotton and kharif jowar observed for Bijapur district indicates that though the prices of these crops increased over the years, the area under groundnut as well as its production showed declining trend. Such a situation can be well understood in the light of the fact, firstly, that Bijapur is a rabi-crop dominant district when groundnut is not usually sown. That apart, during kharif season groundnut being a long duration crop, and requiring costlier inputs, is readily displaced by cereals like bajra, kharif jowar and green gram. The farmers are hence inclined to substitute bajra - a short duration, drought resistant and less input requiring crop for groundnut. Even the extension of irrigation in the district during recent years could not cause considerable increase in the area under the crop, since the increased irrigated area was occupied by the fruit crops like grape which has emerged as the most promising enterprise in the district of late.

In Dharwad district, groundnut production was positively associated mainly with its own price and prices of its competing crops viz., cotton, chilli and kharif jowar.

Consequent upon the introduction of high yielding varieties in cotton and hybrid jowar during 1970's and significant increase in their prices as well as chilli price, there was a marginal shift of groundnut area towards these crops which led to a stagnation or mild decline in groundnut production. In Raichur district, a significant increase in production as well as productivity was noticed which was larger than area expansion under groundnut. The production of groundnut in Raichur district was mainly associated with its price and area, gross cropped area irrigated, gross cropped area, and prices of the competing crops mainly paddy, cotton and kharif jowar. In Raichur which had highest irrigated area among the study districts, the crop was accommodated mainly during summer season with no discernible displacement from other crops. The productivity realised was also high leading to a significant increase in the production.

Safflower

The variables associated with safflower production in the first component were more or less identical in all the study districts. The highly associated variables noticed were prices of all the competing crops viz., wheat, bengalgram, cotton, rabijowar, area and yield of safflower. The sowing months (September-October) rainfall in Bijapur district and

yields of competing crops in Dharwad and Raichur districts were identified with the second component. The variables associated with third component were net sown area and gross cropped area in Bijapur district, October and September rainfall in Dharwad district and only October rainfall in Raichur district. Among the variables identified with first three components, the prominent ones were prices of safflower and its competing crops and yield of safflower. This was mainly due to the general rise in prices of these commodities in recent years. The safflower yield showed a close association with its production which was witnessed by an impressive growth rate in its yield particularly during post-green revolution period (Table 4.1). Besides prices and yield, rainfall received in the month of October was also observed to have a bearing on the acreage.

Sesamum

The pattern of association of variables with sesamum production was more or less identical in all the districts with a few exceptions. Prices of sesamum and its competing crops had close association with sesamum production. The component wise association of variables revealed that, apart from price of sesamum and its competing crops, total oilseeds area and gross cropped area irrigated were associated with the

first components and the rainfall during pre-sowing and crop growth (June to August) months with the second components of the study districts. In the case of third component, the highly associated variables were yields of sesamum and groundnut, June and July rainfall-in Bijapur district; net sown area and gross cropped area in Raichur district; and net sown area, gross cropped area and groundnut yield in Dharwad district.

Sunflower

The variables observed to influence sunflower production were quite high in number compared to those influencing other oilseeds because this crop was grown in all the seasons of the year. Sunflower competes with major kharif and rabi crops and to some extent, summer crops in the study districts. However, area under sunflower, prices of all competing crops, total oilseeds area, gross cropped area, and gross cropped area irrigated emerged as the variables having a high association with sunflower production. These variables were mostly identified with the first component. The rainfall variable of pre-sowing months of kharif and rabi season was mostly associated with either second or third component. July rainfall and groundnut yield identified with the second component and safflower yield identified with first component

had negative impact on sunflower production in Bijapur district. In case of Dharwad district, rabi jowar yield and June-August rainfall had negative impact, while in Raichur district, sunflower and rabi jowar yields had negative impact on sunflower production which were identified with first component.

The variables most closely associated with sunflower production in Bijapur and Dharwad districts were more in number compared to those in Raichur district. The association of variables presented in figure 4.22, 23 and 24 revealed that the area under sunflower, price of sunflower and its competing crops, total oilseeds area, gross cropped area irrigated and gross cropped area were concentrated around the sunflower production in Bijapur and Dharwad districts, while in Raichur district, only three variables viz., sunflower area, total oilseeds area and gross cropped area were highly associated with sunflower production.

The over-all view of the Tables 4.6, 4.7, 4.8 and 4.9 revealed that, yields and prices (techno-economic variables) of the selected oilseeds crops in the study area mostly associated with the first component which explained major variation. The sowing and growing months rainfall (agro-climatic variables) mostly associated with the second

component. The area variable under the selected oilseeds crops, net sown area, total oilseeds area, gross cropped area irrigated were associated either with the first, second or third component. The findings of the study revealed that the economic(prices) and technological(yields) factors explained major variation in the oilseeds production, followed by agro-climatic factors and land resources.

The above principal components analysis and also the combined effect of first two principal components has clearly brought out the underlying features of the oilseed production in the study area. In brief, it can be perceived that the techno-economic setting has played a major role in the production of oilseeds explaining the variation to the extent of 37 per cent, this was followed by second component of agro-climatic factors with the variation of 15 per cent. The results have importance with regard to policy dimension for promoting oilseed production, while the techno-climatic variables are to be tackled at policy levels and the agro-climatic dimensions are to be tackled by technocrats.

5.3 Market Structure For Oilseeds

The concentration of market power is an important element of market structure and determines the nature and competition and consequently the conduct and performance.

Therefore this aspect was tried in the selected markets.

A large number of market functionaries exist in the selected markets. However, the ones who influenced the degree of competition to a considerable extent in the markets are commission agents and wholesale traders. Most of the commission agents performed the job of wholesalers and vice versa was also true. Some functionaries performed the triple functions in oilseed trade as buyers, sellers and processors. The increase in the number of licensed functionaries over the years was due to the compulsory issue of the licenses irrespective of the quantity handled to the functionaries already operating in the market and hence this did not improve the market competition.

An attempt was made in this section to analyse the extent of market power concentrated with commission agents and wholesale traders in the marketing of two major oilseeds viz., groundnut and sunflower during peak and lean periods of arrival. The number of market functionaries namely commission agents and wholesale traders, who effectively controlled the trade, varied from market to market and crop to crop.

5.3.1 Market Power Concentration With Top Four Sellers

The results of the Table 4.10 revealed that Bijapur, Gangavati and Raichur markets exhibited atomistically

competitive nature, while other study markets viz., Talikoti, Gadag and Ranebennur exhibited slightly concentrated oligopolistic situation with respect to groundnut transaction, during peak period. However, during lean period, four markets excluding Bijapur and Talikoti showed slightly concentrated oligopolistic nature of competition. The varied degree of competition during different periods was mainly due to the number of sellers operating in the market and their financial soundness, which would influence the number of farmers prepared to sell through them and the number of traders prepared to purchase from them. The number of farmers who preferred to sell their produce through a particular commission agent (seller) in the market yard depended upon the facilities like credit, supply of inputs mainly seeds, fertilizers and pesticides during sowing months and prompt payment of sale proceeds immediately after the sale of the produce etc. extended by commission agents. It was found from the sample farmers as well as commission agents operating in the respective market yards that, in Raichur and Bijapur markets the arrival came from far off places since the market area included more than one taluka. Such being the case, the farmers were attracted by large number of big firms which helped by the way of extension of all possible help to the farmers. In Gangavati taluka which is fully irrigated, the

volume of demand for agricultural inputs is naturally large. Thus, a large number of commission agents, who were also big land lords, resorted to the business of input supply to the farmers on credit basis. This arrangement in addition to their routine work of commission agencyship helped to recover the credit from out of the sales proceeds of those farmers produce during the harvesting season. This led to a keen competition among the commission agents and hence reduced the share of the top four firms. During lean period, the quantity that arrived to the market was very meagre and was cornered by relatively few number of firms and as a result, the market concentration was more with a few firms. During this period, Bijapur and Talikoti markets exhibited moderately concentrated oligopoly while the rest of the markets showed slightly concentrated oligopolistic situation in groundnut marketing.

With regard to sunflower transaction, Gadag as well as Raichur markets exhibited atomistically competitive and slightly concentrated oligopolistic situation respectively during peak and lean periods, whereas Bijapur as well as Talikoti market exhibited slightly concentrated and moderately concentrated oligopolistic situation respectively during peak and lean periods. Such an observation could be made mainly

because the number of sellers who handled this commodity was less in Bijapur and Talikoti markets than in Gadag and Raichur markets, both during peak and lean periods. However, the concentration of market power was more during lean period compared to peak period as was noticed in the case of groundnut handling.

5.3.2 Market Power Concentration With Top Four Buyers

As was mentioned earlier, most of the buyers performed the function of sellers while some market functionaries like commission agent, wholesaler and oilmiller performed triple function as commission agents, wholesale traders and processors of oilseeds. Those firms which performed triple functions in oilseeds trade, mostly dominated in the markets due to economies of scale. The quantity of oilseeds purchased by a buyer depended upon whether the produce will be used for further processing or selling to other firms (oilmiller). The number of buyers who actually took part in the transaction was less than that of sellers. As a result, the concentration of market power was more with a few buyers than with the sellers who were large in number.

In the case of groundnut purchased during peak period, the top four firms accounted for more than 75 percent

of the total value of transaction in Bijapur, Talikoti, Gangavati and Raichur markets, reflecting highly concentrated monopsony situation, while in Gadag and Ranebennur markets, the nature of competition was moderately concentrated oligopsony type, wherein the top four firms controlled respectively 55.44 and 58.72 per cent of the total value of transactions. During lean period, highly concentrated monopsony situation was noticed in Talikoti, Ranebennur, Gangavati and Raichur markets; moderately concentrated oligopsony in Bijapur market and slightly concentrated oligopsony in Gadag market.

With regard to sunflower transactions, Bijapur and Raichur markets exhibited moderately concentrated oligopsonic situation and Talikoti market exhibited highly concentrated monopsonic situation both during peak and lean periods, whereas the nature of competition in Gadag market was of slightly concentrated oligopsony-type during peak period and moderately concentrated oligopsony-type during lean period.

The above findings relating to groundnut and sunflower transaction revealed that irrespective of the number of buyers who participated in the bidding, the top four firms controlled more than 75 percent of the groundnut trade and more than 50 percent of the sunflower trade in most of the

cases. This was mainly because of the location of a large number of oilmills in these markets, which purchased the major portion of the market arrivals of both groundnut and sunflower. In Ranebennur market, major portion of the arrivals was purchased by owners of decorticators, who were the leading purchasers of groundnut and sold the kernels to oil mills in neighbouring taluks/districts.

As far as the nature of competition was concerned, no significant difference was noticed between peak and lean periods because the leading firms operated all through the year in the markets to run the oilmills. In Gadag market, The Gadag Farmers Cooperative Processing Society, competed with private buyers which reduced the share of top private four firms. This was reflected in the moderately concentrated and slightly concentrated oligopsonic situation in this market.

5.3.3 Market Power Concentration With Different Size-Group of Sellers

The number of commission agents/sellers varied from as low as 125 in Talikoti market to as high as 360 in Gangavati market. The quantity of oilseeds handled by these firms during different periods depended on the number of oilseeds growers as well as the size of their marketable

surplus. The choice of the agency by the farmers was largely²¹¹ influenced by the facilities like credit, transport, storage, payment of sales proceeds, supply of inputs etc. extended to the farmer. Irrespective of the number of sellers in the study markets, their participation during peak and lean periods varied from market to market and crop to crop. The pattern of handling of groundnut and sunflower by sellers in the study markets during peak and lean periods is discussed in the following paragraphs.

Groundnut

The results regarding degree of market power concentration in groundnut marketing during peak and lean months of arrivals across the study markets are presented in Table 4.12. The Ranebennur and Gadag markets showed higher Lorenz coefficient of inequality as compared to other markets. This was clear from the findings that only 123 sellers out of a total number of 179 in Gadag market and only 109 sellers out of a total of 307 in Ranebennur market handled the entire quantity that arrived into the respective markets. With respect to the number of firms having major share in the quantity handled, only 13 sellers who accounted for just 11.93 percent of total number of firms (109) that operated during peak period in Ranebennur market handled as much as 60 percent

of the total arrivals. In Gadag market, nearly 62.95 per cent of the market arrival was controlled by only 17 sellers who were only 13.82 per cent of the total number of sellers operating in the market. The rest of the sellers handled only 38 to 40 per cent of the groundnut arrivals in the respective markets. Such a phenomenon was the result of operation of a few large sellers who could attract the farmers by extending various facilities like supply of inputs and credit to the farmers during pre-sowing and harvesting periods of the crop. These two markets were followed by Gangavati market in the order of the magnitude of Lorenz coefficient, which had the highest number of licensed sellers (360) among the study markets. However, the groundnut produce in the market was sold only through 138 sellers who accounted for 38.33 per cent of the total number of licence holders. Of the 138 firms involved in groundnut transaction, only 23 firms handled 53.59 percent of the total groundnut arrival, the rest of the sellers (83%) handling only 44 percent of arrivals. Here also, a few large firms operating in the large size (100 quintal & above) category handled the major part of the produce that arrived to the market by extending several facilities to the farmers, mainly through fertilizer and pesticides supply. In other three markets, the intensity of

concentration was comparatively less as was suggested by the relatively smaller value of Lorenz coefficient.

During lean period, the quantity that arrived to the market was small and was sold through a few firms who could assure better price and immediate payment of sale proceeds. The Gadag, Ranebennur and Gangavati markets exhibited almost the same level of inequality in the market power concentration with the sellers. In Bijapur and Raichur markets, the major share of the arrival (56.57%) was handled by about 15 to 20 per cent of the total number of firms operating during lean period. This was evident from higher coefficients of inequality in these markets during lean period compared to peak period. On the contrary, in the case of Talikoti market, the quantity of arrival was meagre and was shared equally among the 9 sellers who were involved in handling of the produce during lean period. The low value of Lorenz coefficient (0.36) for the market implied that there was relatively a lesser concentration of market power with few sellers.

Sunflower

The firms involved in sunflower selling were relatively fewer than those involved in groundnut selling with an exception of Talikoti and Raichur markets during lean period.

The involvement of maximum number of firms was noticed in Gadag market where entire market arrivals were handled by as many as 113 sellers who accounted for as many as 63.13 percent of a total number of sellers in the market. However, this market exhibited a slightly higher degree of inequality ($L=0.54$) as compared to other markets, with 52 percent of the arrival being controlled by just 18 firms who were only 15 percent of the total number of participating firms and the rest by nearly 85 percent of firms. In Talikoti and Raichur markets, the Lorenz coefficients of inequality were almost equal (0.45). The sunflower arrival to the market was mainly controlled by the firms in the last two categories (50 to 100 quintals, and more than 100 quintals) in Talikoti market while in Raichur market the last category of firms handled the major quantity of arrival. It is clear, therefore, ^{that} in three of the four markets, (excepting Gadag) the arrival was mainly shared by big firms.

During lean period, the market power concentration in sunflower transaction was slightly higher as compared to peak period, which was evident by higher value of Lorenz coefficients of inequality. The higher value of inequality ($L=0.57$) was observed in Talikoti market, wherein about 25 percent of the total number of sellers operating in the last two

categories handled more than 70 percent of the market arrivals. In Raichur and Bijapur markets also, the firms operating in the large size category controlled the major portion of the market arrivals. On the contrary, in Gadag market, the sunflower arrival was in very small lots as a result of which, about 98 percent of firms handled about 85 per cent of the arrivals in the first category (0 to 10 quintals) and it caused the value of Lorenz coefficient of inequality to be the lowest (0.13).

From the earlier paragraphs, it could be concluded that the concentration of market power varied across the crops, markets and over the period. Relatively higher degree of concentration was observed during lean period in some cases. The quantity of oilseeds disposed by the sellers varied from market to market during different periods. The maximum participation of sellers (about 60 to 68%) was observed in Gadag market followed by Raichur (57 to 60%), Talikoti (41%) and Bijapur market (40%) during peak period. In Ranebennur and Gangavati markets, though the number of licensed sellers was more, the maximum proportion of oilseeds was handled by only 35 to 38 percent of the firms. This implied that the oilseeds growers opted to dispose their produce through few dominant commission agents who extended required services to

them in Ranebennur and Gangavati markets. In other markets, farmers came from a wide geographical area i.e., even from outside the market area. For instance, Gadag market which covers only Gadag taluka attracts the produce from the neighbouring taluka of Ron, Savanur, Mundaragi etc. Similar was the case with Bijapur, Talikoti and Raichur talukas. Under such circumstances, many commission agents had ample scope to transact with the growers and share the market arrivals.

5.3.4 Market Power Concentration With Different Size-Group of Buyers

The licensed wholesale traders were more than the number of commission agents in four of the six study markets, namely, Bijapur, Talikoti, Gadag and Raichur markets, whereas in Ranebennur and Gangavati markets, the number of commission agents exceeded the total number of traders. Of the total number of licensed traders (also referred as buyers), hardly 5 to 6 percent participated in Bijapur market, 9 to 11 per cent in Talikoti market, 7 to 8 per cent in Raichur market and 5 to 6 per cent in Gangavati market during peak period. The situation was worse during lean period, in general, except for Ranebennur market which showed higher participation of buyers (36.66%) followed by Gadag market (12 to 22%). The nature of

market competition is indicated not by the number of licenced firms but by their actual participation in the bidding or purchase of commodity. The cropwise concentration of market power with buyers in different markets is discussed in detail in the succeeding paragraphs.

Groundnut Transaction

In table 4.14 the number of buyers and their value of groundnut transaction under different size-groups during peak and lean periods are presented. Gadag and Ranebennur markets showed higher degree of buyer's participation both in absolute and relative terms. It was interesting to note that these markets also exhibited higher value of Lorenz coefficient of inequality, the coefficients being 0.75 for Ranebennur market and 0.67 for Gadag market. It was apparent from these coefficients that, the groundnut trade was mainly concentrated with a few large buying firms. In these markets, in the category of 1 lakh rupees and above, only 11 to 25 percent of the total number of buyers purchased the commodity worth 66 to 89 percent of the total value of transaction. The reasons for such a concentration, particularly in Ranebennur market could be understood in the light that quantum of arrivals was more than what was required by the local crushers, thereby serving as a procurement place for purchasers from outside the market

area. Thus, the big traders in Ranebennur market took to purchase the commodity on behalf of the outsiders on commission basis. This naturally restricted the concentration with only a few firms and increased the inequality. With regards to Gadag market, there existed a large number of oilmills. Of the 46 oil processors two were co-operative units which purchased the commodity on large scale for crushing. Thus, buying activity was concentrated with a few firms as indicated by the control of 89 per cent of the total value of transaction by just 25.71 per cent of the buying firms.

In Talikoti market, only about 33.34 per cent of the firms actually involved in groundnut transaction, purchased almost the entire quantity (93.06%). The rest of the firms (66.66%) accounted for only 7 percent of the total value of transaction. This reflected the inequality in the distribution of trade and concentration of market power with only a few large buyers as suggested by high of value Lorenz coefficient (0.62). In Bijapur market also, more or less similar pattern was noticed with slightly lower coefficient of inequality (0.52). In this market, about 6 per cent of the total number of firms controlled 98.75 per cent of the total transaction.

In Gangavati and Raichur markets, the firms with high involvement in groundnut trade were mostly wholesaler-cum-oilprocessors who belonged to the large size category. They accounted for more than 50 percent (52% in Raichur and 66% in Gangavati) of the total number of firms participating in bidding and controlled about 99 per cent of the total value of transaction. Thus, a very close competition prevailed in the market among the big firms who were quite large in number for buying large quantity of produce to satisfy the crushing requirements of their mills. This resulted in more or less equal sharing of the produce among these firms as was reflected in low value of Lorenz coefficient of inequality.

With regards to concentration of market power with buyers in groundnut transaction during lean period, the situation observed was more or less similar to that observed during peak period barring a few exceptions. The extent of firms participation was relatively lower during this period mainly due to the small quantities of arrivals.

From the discussion above, it was apparent that groundnut trade was mostly controlled by big firms as generally expected. This was mainly due to the requirements of investment capacity, sound financial position exhibited by

these firms and their forward trade in oil with wholesalers of oil in the main terminal markets (Bombay, Adhoni) of the country.

Sunflower Transaction

The introduction of sunflower in the oilseeds economy of the State in recent years not only boosted the total oilseeds production but also was overwhelmingly accepted by the consumers, producers and trading community due to its added advantages over other oilseed crops. It is popular among the traders and oilmillers because of low cost of handling, low processing cost and low wastage and higher proportion of recovery of oil as compared to groundnut. Apart from this, it reduces the slack period of the processing units on account of its availability throughout the year, provides employment on a continuous basis and lessens the risk of bulk storage. Further, it can be crushed in the same solvent extractor or the expeller plants used for groundnut. In view of relatively high prices of other edible oils in recent years, sunflower oil has been accepted by major portion of the consumers particularly by poor and weaker sections owing to its low price.

The concentration of market power with buyers was examined only in four markets viz., Bijapur, Talikoti, Gadag

and Raichur. Ranebennur and Gangavati markets were excluded from the analysis for want of data and insignificant of arrivals of this crop.

As is apparent from Table 4.15, the number of firms taking part in sunflower purchases, ranged from as low as 14 in Talikoti to as high as 40 in Gadag market.

As far as concentration of market power was concerned, Gadag market exhibited higher concentration (0.66) followed by Bijapur and Talikoti (0.49) and Raichur (0.39) during peak period. This pattern was almost similar to that observed for groundnut. The probable reasons for this were the same as the ones given for groundnut trade.

During lean period, a slightly different pattern was noticed. Talikoti market exhibited higher inequality ($L = 0.58$) with only one firm accounting for 10 percent of the total number of buyers involved in sunflower purchases and controlling 53.33 per cent of the total value of transactions. It was mainly due to the oilmiller's requirement of seeds for crushing during lean period. In Gadag market, the transaction of sunflower was only in the first three categories. Only 4 firms which accounted for 31 percent of the total number of firms operating in the 3rd category (Rs. 10,000 to Rs.

25,000), purchased sunflower worth 64.56 per cent of the total value. The arrival of sunflower in small lots was responsible for such situation. In Raichur market, the concentration of trade was more with the few large buyers which was evident from the higher value of Lorenz coefficient (0.50) during lean period over peak period. Of the total 26 firms, 12 big ones controlled about 95 percent of total sunflower transaction in the market during lean period. In Bijapur market, only 9 firms who were mostly local oilmillers, participated in sunflower transactions. The majority of the firms operated in the middle two categories because of the availability of produce in smaller lots.

5.4 Pattern of Market Arrivals and Prices of Oilseeds

5.4.1 Trends in Arrivals and Prices of Oilseeds

The results of the orthogonal polynomial analysis carried out to study the trends in arrivals and prices for oilseeds in the selected markets revealed a mixed pattern. The market arrivals of oilseeds in all the markets witnessed wide variations, whereas the price movements were almost identical for all the crops and markets. In Bijapur and Talikoti markets, a continuous sharp increase in arrivals of groundnut, particularly for the last one decade was noticed as evident from the steep upward movement of the groundnut arrival curve (Figures 4.33 to 4.43), whereas in Gadag and Ranebennur

markets, the groundnut arrival was almost stabilized. Raichur market exhibited a continuous increase in arrivals of groundnut, while in Gangavati market the crop arrival pattern exhibited a mild increase initially and a continuous fall in later years. The comparison of trends of arrivals of groundnut for the study markets with the production trends for the respective districts yielded interesting results. Though the production of groundnut showed wide fluctuations in Bijapur district, the arrival of this crop in the Bijapur and Talikoti markets showed a steep rise particularly in recent years. This was mainly due to the arrivals of groundnut to these markets from outside the respective market areas. For instance, on account of improved irrigation facilities, the farmers of Surpur taluka in Gulbarga district, which is beyond the purview of these markets increased their production of groundnut during summer and sold it at Talikoti and Bijapur markets. The reasons for this, as expressed by the farmers of Surpur taluka were prevalence of high price and better trading methods practiced in Bijapur and Talikoti markets. In Dharwad district, the arrivals of groundnut in Gadag and Ranebennur markets were quite comparable with the district groundnut production. Raichur market exhibited a continuous increase in arrivals of groundnut, which almost followed the pattern of groundnut production^{of} the district. In Gangavati market there

was a marginal increase in the arrival during the initial years, started on declining over the rest of the study period. This might be due to shift of area from groundnut to paddy kharif owing to the availability of high yielding varieties of the latter. Further, the procurement of groundnut by the 'Oilseeds Growers Co-operative Societies' in the hinterland of Gangavati taluka itself has also been responsible for the declining arrivals of groundnut produce to the Gangavati market.

In the case of safflower, though a significant upward change in production was witnessed, the market arrivals had come down gradually in all the markets. Such a situation was the result of farmer's interest in growing the crop as a mixed crop mainly for requirements of high quality edible oil for self consumption for which they had the produce crushed in the village 'ghanis'. That apart, the farmers had sold their available surplus produce to the 'Gramodyog Co-operative Safflower Crushing Societies' established in the respective markets. With respect to sesamum, no significant changes in arrivals were observed in the study markets, with a few exceptions. The trends of markets arrivals almost followed the production trends of the crop in the study area.

The trend of arrivals of sunflower in all the study markets closely followed the production trends in the study districts. In the present study, sunflower market arrival and price trends were discussed only for Raichur and Gangavati markets, since the data for the remaining markets were insufficient to estimate the trend.

In general, declining trend in arrivals were noticed in respect of some oilseeds in some selected markets due to the stagnation or dwindling production of these oilseeds in the market hinterlands, the decline in production was due to non-availability of improved techniques specially seeds and also the vagaries of a monsoon. In this context, it is worth mentioning that the hinterlands of selected markets are mainly rainfed areas, where the production of oilseeds, like that of any other crop is adversely affected by uncertainties in rainfall.

With regards to trends in prices, a general rise in prices of all the selected oilseeds, in all the selected markets was witnessed. Similar pattern of price trend was noticed by Singh and Chandra (1975). This was mainly caused by increase in population leading to an increase in demand for edible oils, general inflationary pressure and failure of

production of these oilseeds to keep pace with the expanding demand for their products.

5.4.2 Seasonal Indices of Arrivals and Prices of oilseeds

To analyse the arrival pattern of oilseeds during different months of the year and their impact on prices, seasonal indices were computed adopting 12-month moving averages. The seasonal variations in arrivals and prices of oilseeds in the study markets are as follows.

Groundnut

In table 4.20 the seasonal indices of monthly arrivals and prices of groundnut in six selected markets are presented. It could be seen from the table that groundnut showed higher indices of arrivals immediately after harvest season in almost all the markets. In Bijapur, Talikoti and Gadag markets, higher indices of arrivals were observed for the months of October to January. The highest index for Bijapur and Talikoti markets was observed for the month of November and Gadag market for the month of December. This slight difference between the markets in the peak months of arrival was mainly because of the variety of groundnut crop grown. In Bijapur and Talikoti market hinterlands, bunch variety of groundnut covered more area. In Gadag market hinterland, spreading groundnut covered relatively larger area and comes

to harvest a little later as compared to bunch groundnut. In the hinterlands of these three markets groundnut was grown as a rainfed crop harvested from October to January. The disposal pattern of marketable surplus of groundnut was influenced by the urgency of cash needs and the prior commitments with the commission agents. Therefore, the period of market arrivals also stretched from October to January. The price indices were lower during peak months of arrival and higher during lean months.

In Ranebennur and Raichur markets, two peak periods of arrivals following the harvesting months of kharif and summer crops was noticed. The monthly seasonal indices of arrivals were found to be higher for September-October and April-June in Ranebennur market, while in Raichur market the first peak period was November and the second peak period was April-May. However, Gangavati market exhibited only one peak period covering the months of April, May and June. In Gangavati area, major portion of the cultivated land possesses irrigation facility and hence the paddy crop was mainly raised during kharif and was followed by groundnut as summer crop.

With regards to price indices, a clear pattern, in general, was missing in the study markets except in Bijapur and Gadag wherein highest arrivals led to lowest prices.

Absence of regular pattern in other markets was due to the flow of the produce into the markets all through the year; arrivals of one season being followed by the arrivals of the second season of the same year. Similar pattern of arrivals and prices of groundnut in Raichur market was noticed by Gurumallappa (1972) and Dinakar (1990) and in Ranebennur by Naik (1990).

Safflower

Safflower is an important rabi oilseed crop in the study area. The analysis of seasonal indices was carried out for Bijapur, Talikoti, Gadag and Raichur markets.

It could be observed from table 4.21 that the monthly indices of arrivals of safflower were found to be higher in the months of March, April and May in all the markets without any exception. These months coincided with the harvesting months of this crop. The index value of arrivals was found to be highest in the month of April in all the markets. This situation strongly supports the view that most of the farmers disposed their safflower produce immediately after harvest. With regard to price indices, they were higher during lower arrival months in Bijapur and Gadag markets, while such a pattern was not noticed in Talikoti and Raichur markets.

Sesamum

Sesamum is an important crop grown in the kharif season in the study area. The seasonal analysis was carried out for only four markets. The sesamum seeds are mostly used for preparation of sweets and other domestic consumption requirements. The demand for this produce for crushing purpose arises mainly from outside the market area. A perusal of Table 4.22 shows that the higher indices of sesamum arrivals were observed during October-January in Bijapur and Talikoti markets and September-October in Gadag and Raichur markets. The period of higher arrivals was found to be relatively longer in Raichur market where it stretched from August to February. The heavy arrival months, contrary to expectation were associated with higher price indices in all the markets. The arrival of this crop being highly seasonal, that is, the availability of the produce being confined to only a few months, the purchasers from outside entered the market in large numbers during post harvest months which had led to higher prices, inspite of heavy arrivals.

Sunflower

Sunflower is another predominant oilseed crop grown during all the seasons, as a kharif and rabi crop in rainfed area and as a late rabi and summer crop in irrigated

conditions. With respect to market arrivals, Bijapur, Talikoti and Gadag markets experienced one long peak period which extended between the post harvest months of both kharif and rabi crops, while Gangavati and Raichur markets showed two peak periods. Higher arrival indices were indicated for the months of November to March in Bijapur, October to April in Talikoti and October to February in Gadag market.. In Gangavati market higher arrival indices were observed during October to December after kharif harvest and April-May after summer harvest in Raichur market the corresponding periods were November to February and May-June. The long heavy arrival period of the crop revealed its suitability for different cropping sequence under diverse agro-climatic conditions.

As far as price indices were concerned, Bijapur and Gadag markets showed lower indices of prices during heavy arrival months of the crop, thus establishing an expected negative relationship between arrivals and prices. On the contrary, Talikoti, Gangavati and Raichur markets showed higher price indices during high arrival months indicating positive relationship between arrivals and prices of sunflower. The observed association between arrivals and prices was confirmed by the correlation coefficients. The reasons mentioned while discussing groundnut seasonal indices, hold even in this case.

5.4.3 Relationship Between Arrivals and Prices of Oilseeds

The regression coefficients estimated for different oilseeds across the markets (Table 4.24) revealed the impact of market arrivals on prices of oilseeds. These coefficients are consistent with the trends in arrivals and prices in most of the cases barring a few exceptions.

In the case of groundnut, increase in arrivals over the years indicated decline in prices in the markets of Bijapur, Gadag, Ranebennur and Gangavati, whereas in the case of Talikoti and Raichur markets increase in arrivals was accompanied by increase in prices. In Bijapur, Gadag and Ranebennur markets, an increase of 10,000 quintals in market arrivals reduced the price of arrivals by Rs. 4.10, Rs. 5.5 and Rs. 7.0 per quintal respectively. Gangavati market evidenced a greater negative impact of arrivals on prices compared to other markets, as indicated by a fall in the price by Rs. 60 per quintal of groundnut for an increase of 10,000 quintals in market arrivals. On the contrary, an increase of 10,000 quintals in market arrivals of groundnut in Raichur and Talikoti markets caused an increase in the price by Rs. 6.90 and Rs. 68.00 per quintal respectively which pointed out that the positive effect of arrivals was more in the latter market. Thus, a mixed pattern of arrival and price relationship was

observed in the case of groundnut. The factors which were responsible for the behaviour of trends in arrivals and prices of the crop also explained the observed impact of arrivals on prices.

In the case of safflower, an increase in market arrival had a negative impact on prices in all the markets. For an increase of arrival by 1000 quintals, the price declined by Rs. 3 to 4 per quintal in Bijapur, Gadag and Raichur markets, whereas in the case of Talikoti market, the arrival and price relationship was still sharper and for every 1000 quintal increase in arrivals, the price of safflower declined by Rs. 31 per quintal. In the case of sesamum, similar pattern of relationship between arrivals and prices was observed as in the case of safflower in all the markets except Gadag, wherein an increase of arrival by 100 quintals led to an increase of price by Rs. 3.1 per quintal.

In the case of sunflower, a significant rise in price, with increase in market arrival was evidenced in both Gangavati and Raichur markets. The Gangavati market showed greater response with an increase of market arrival by 1000 quintals pushing up the price by Rs. 40 per quintal, while the price rise caused by the equivalent increase in arrivals was only Rs. 13 per quintal in Raichur market.

5.4.4 Correlation Coefficients Between Arrivals and Prices of Oilseeds

With a view to ascertain the extent of association between market arrivals and prices during different months over the years (1980-81 to 1990-91) and also during peak and lean periods, the correlation coefficients were computed for different oilseeds in selected markets (Table 4.25).

The correlation coefficients computed between arrivals and prices of oilseeds revealed mixed results. The negative coefficients between arrivals and prices in most of the cases confirmed that major portion of arrivals comes to market immediately after harvest which depressed the price. However, in some cases, particularly in Bijapur for groundnut, sesamum and sunflower ; Talikoti market for groundnut and sunflower ; Raichur market for sesamum and sunflower this was not the case as the correlation coefficients were found to be positive. This implied that arrivals pattern in these markets did not influence the price. This is due to the flow of the produce all through the year, arrivals of one season being followed by the arrivals of the second season of the same year.

5.4.5 Coefficient of Variations in Arrivals and Prices of Oilseeds.

With^a view to assess the extent of variation between arrivals and prices of selected oilseeds, coefficients of variation were computed. Table 4.26 explored the extent of variation in prices and arrivals of oilseeds during three periods considered for the study markets.

The coefficients of variation for prices were found to be lower in all the markets for all periods compared to those for market arrivals. The crop-wise coefficients of variation in prices revealed that variation in sunflower price was lower compared to other three oilseed crops. With regard to arrivals, sesamum and safflower showed wider fluctuations. In general, the coefficient of variation in arrivals were found to be high during lean period in all the crops and markets with some exceptions.

From the results of the coefficients of variation in arrivals and prices of oilseeds in the study markets, it could be concluded that, the price variations between markets were very meagre despite wide variations in the arrivals, barring a few exceptions. From the differences in the inter market price variations for different periods, it could be inferred that the extent of variation was fairly low during peak months

as compared to lean and overall periods. This was due to the practice of the producers to dispose of the most of the produce immediately after the harvest regardless of the low price received, being compelled to do so by their pressing need for money as also, to some extent, the lack of dissemination of market intelligence among the farmers at frequent intervals. It thus clearly follows that the lean period arrivals came only from the farmers who were in a sound financial position and had a large marketable surplus. The varying number of such farmers with a large withholding capacity in different market areas was responsible for the higher variation during lean period. It may be mentioned here that to overcome the wide variation particularly in arrivals during lean period, efforts are warranted through the extension of storage and credit facilities. The storage facilities linked with credit in the process of marketing of the produce could yield beneficial results in this regard.

5.4.6 Market Integration

In the process of price formation, any single market cannot alone function as determiner of price since the actions of buyers and sellers in a market are always being influenced, to varying degrees, by the price signals in other markets.

It was gathered from the inquiry with the traders in the selected markets that the price formation for oilseeds was mainly based on the oil price in Bombay terminal market and other neighbouring markets. The degree to which selected markets are integrated among themselves and with Bombay market in oilseeds price formation was analysed and results presented in the form of a zero-order correlation coefficients matrix for prices in these markets (Table 4.27).

It was apparent from the table that, the correlation coefficients between prices in Bombay market and selected markets were found to be more than 0.80 except for that between Raichur and terminal market prices. It could be inferred from such observation that the selected markets were highly integrated with the terminal market. This was mainly attributed to the high and quick network of communication facilities. The lower degree of integration of Raichur market with the Bombay market (0.75) was mainly because the price formation in this market depended not only on Bombay market but also on Adhoni market which is the biggest terminal market in Andhra Pradesh; Raichur market being located on the border of Andhra Pradesh, its oilseed prices were naturally influenced to a large extent by the Adhoni market price. The findings of the study also suggested the integration between

the markets. However, the degree of integration between the markets located in the same district was generally more than that between the markets located in different districts mainly because of location of market at shorter distances within the district which may reduce transport cost and facilitate effective dissemination of market information.

5.5 Marketing of Oilseeds by Sample Farmers

5.5.1 Utilization of Oilseeds By Sample Farmers

The results of utilization of groundnut and sunflower grown by the sample farmers revealed differences not only between the markets but also between the crops. The marketable surplus of groundnut was found to be highest in Gangavati (88.60%) followed by Raichur market (87.36%), and lowest in Gadag (83.08%) and Talikoti (83.75%) markets. In Bijapur and Ranebennur markets, it was almost equal. The highest quantity of marketable surplus in Gangavati and Raichur markets might be due to the higher productivity levels of groundnut in these two market areas, where the crop was mainly raised during summer season. The productivity of groundnut was found to be higher during summer season (20 qtls./ha.) as compared to kharif season (4 to 5 qtls./ha.) (Giriraj, 1991). Farmers in these areas disposed almost the entire produce and purchased improved variety of seed for the next season because of assured return in irrigated conditions.

The lower quantities of marketable surplus with the Gadag, Talikoti and Bijapur market farmers were due to the lower quantity of output. In these market areas, this crop was mainly grown in kharif season under rainfed conditions and particularly the large farmers preferred to retain slightly higher quantity for the next sowing season to avoid the risk of purchasing the seeds at higher prices.

The marketable surplus of sunflower was invariably higher than groundnut in all the markets. The marketable surplus was always higher when sunflower was a mono-crop, in which instance the yield was also considerably high due to a good number of improved variety of seeds. The increased marketable surplus in Ranebennur market could be explained keeping in view the high acreage under seed production observed in the market area. Here, the farmers sold almost all or a higher proportion of their produce and purchased locally available improved seeds, sold by the seed producing farmers at a lower price. The proportion retained for consumption ranged from 2 to 4 percent over the 6 markets and the quantity retained was utilized as edible oil after being crushed in the local oilmills.

5.5.2 Disposal Pattern of Oilseeds.

The pattern of disposal of oilseeds by the sample farmers indicated seasonal character in all the study markets. A

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perusal of the Table 4.29 revealed that the disposal pattern of groundnut and sunflower was concentrated during a few months of the year. These months followed the kharif and summer harvesting months of these crops. In Gadag market, the sample farmers sold about 91.32 per cent of their groundnut marketable surplus in the months of October to January; Bijapur and Talikoti farmers sold about 51 to 52 percent of the groundnut produce in the months of November and December. In Ranebennur, Gangavati and Raichur markets, the major portion of produce (60%) was sold in the months of April and May. The arrival of groundnut from October to January in Gadag, Bijapur and Talikoti market reflected its predominance as a kharif rainfed crop. In Ranebennur, Gangavati and Raichur markets, heavy arrivals were noticed in the months of April and May which reflected the dominance of groundnut as a summer crop in these markets.

The disposal pattern of Sunflower was almost similar to that of groundnut with some exceptions. In Gadag, Talikoti and Gangavati markets, sample farmers marketed more than 60 per cent of their sunflower produce in the months of November and december, whereas in Bijapur and Raichur markets, about 80 per cent of the produce was disposed during November to February. In Ranebennur market about 88 percent of the

sunflower produce was spread over four months of October, November, January and April.

This seasonal pattern of disposal was the result of inadequacy of warehousing facilities, inability of the farmers to withhold stocks and incur additional costs on storage, unwillingness to take risk on the consequences of price fluctuations, the financial pressure to pay off dues of costs of cultivation and to meet personal consumption expenses and other transactional obligations. All these reasons were responsible for augmenting market arrivals immediately after the harvest.

5.5.3 Preference of Marketing channels By Sample Farmers.

The relative importance of different channels of marketing could be judged either by looking at their numerical strength or in terms of the quantity of marketable surplus disposed under each channel. Table 4.30 revealed that among the three channels identified, channel I was found to be most popular, through which more than half of the sample farmers disposed major portion of their marketable surplus. This was mainly due to the commitments of the farmers to repay the loans borrowed from commission agents for purchasing inputs during sowing season and to fulfill the family consumption needs. This channel was most popular among Ranebennur market

farmers where 75 percent of their marketable surplus was routed through this channel. In this market, there was a dominance of a few big commission agents-cum-wholesaler-cum-decorticators who controlled the major arrivals to the market and attracted the farmers by extending all possible facilities like advancing of loans and supply of seeds. In Bijapur market, about 55 percent of the producers were attached to this channel for disposal of about 82 percent of their groundnut marketable surplus. This was attributed to arrivals of produce from far off place to this market because of non-availability of better markets near by. In some cases, though the markets were near to the village the practices adopted there were not conducive to the farmers. In Gangavati market about 70 per cent of the producers mostly with small marketable surplus, sold their produce through commission agents due to the pre-commitments of repayment of previous loans. In this market area, groundnut was mainly grown under irrigated condition. Major portion of the produce of the large farmers was disposed through "Oilseeds Grower Co-operative Societies" located in the hinterlands of groundnut area. Among the study markets, more number of producers were attached to channel II in Gadag market where 'Gadag Cooperative Marketing Society' and 'Karnataka State Oilseeds Federation' competed with the private traders enabling the

farmers to get a competitive price. A small portion of the marketable surplus was disposed through channel III which mainly consisted of farmers having smaller quantities of marketable surplus and farmer from villages located in far off places lacking proper infrastructural facilities. This channel was more popular in Bijapur market which had four talukas under its regulation.

In sunflower marketing also channel I was found to be more popular among all the markets. This channel was more popular among Gangavati and Bijapur farmers in terms of the proportion of farmers and quantity sold respectively. In the other four markets the pattern of disposal was more or less similar to that observed in groundnut marketing. The reasons attributed for groundnut were also valid in the case of sunflower. Channel III was found to be more popular than channel II in sunflower marketing both in terms of number of farmers and the quantity marketed. The higher share of this channel compared to channel II was due to availability of traders at villages for immediate selling after harvest and in most of the cases the farmer grows sunflower as a mixed crop which resulted in smaller marketable surplus or lots. Another important reason for village sales as reported by some farmers was that, as the time elapsed after harvesting, the

weight of produce decreased substantially due to draige. Thus, immediate sales at marginally lower prices were beneficial to the farmers. In channel II, the oilseeds merchants mostly preferred to purchase sunflower outside the market yard to avoid tax which was to be borne by the purchaser. The low popularity of channel II was due to the preference of traders to purchase it through commission agents.

5.5.4 Marketing Cost incurred by Sample Farmers.

The analysis of marketing costs incurred by the producer-seller (Table 4.31) indicated significant differences not only in between different markets but also between different marketing channels through which the sales were effected. The cost incurred in channel I was found to be 2 to 3 times higher than that in channel II. In channel I, the cost incurred in marketing of one quintal of groundnut was found to be highest in Raichur (Rs. 47.95/qtl.) and lowest in Ranebennur market (Rs. 37.24/qtl.), while in the case of sunflower marketing, the markets having highest and lowest costs were Talikoti (44.46/qtl) and Gadag (Rs. 36.72/qtl) respectively. In the total cost of marketing in channel I, only two components viz., commission and transportation accounted for 85 percent of the total cost. The

transportation cost borne by the produce depended upon the distance covered from the hinterlands, while the commission charges depended upon the value of the sales receipt received by the farmer and other facilities availed by him from the commission agent. As per the recent amendment to the Karnataka State Agricultural marketing (Regulation) Act during 1988, the commission agents are supposed to collect commission charges from the buyers, but in reality a majority of the commission agents in all the markets collected commission charges ranging from 2 to 3 per cent of the value of the produce sold was collected from both the farmers as well as traders. This component accounted for nearly 50 per cent of the total cost incurred on groundnut marketing and it was still higher in the case of sunflower marketing. The transportation cost was found to be highest in Raichur (45.36%) following in Bijapur (38.69%) and Gadag (38.04%). This was a result of arrival of the produce from far-off places to these markets. A more or less similar pattern was observed in sunflower marketing with some minor differences.

In channel II, since the produce was routed through co-operative marketing societies, no cost was incurred by the sample farmer on commission, which reduced the cost incurred on marketing by half to one-third compared to channel I. The

cost incurred on transportation alone accounted for 65 to 70 per cent of the total cost and it varied from market to market depending upon the distance covered. A comparison of cost incurred by the sample farmers in channel I and II revealed a considerable difference. The illegal commission charges collected in channel I led to higher cost incurred (2-3 times) by the producers in channel I compared to that in channel II. The other components of costs except personal expenses, were more or less identical because these were the charges fixed by the respective market committees. The personal expense was the expenditure incurred by the producer which comprised of bus fares and refreshments and varied with distance travelled and quantity marketed.

5.5.5 Cost incurred By Traders in Oilseeds Transaction.

Two intermediaries were involved in groundnut and sunflower transaction, one operating in the market yard (whole sale Trader) (WST) and the other outside the market yard (village trader). The major components of cost incurred by the wholesale trader who operated in market yard were purchase/sale tax, commission charges and market fee. These three components together accounted for 85 to 90 per cent of the total cost incurred on oilseeds (groundnut/sunflower) transaction. No considerable difference was noticed between

the markets and crops, since these were levied at a fixed rate on the total value of the sales receipts of the commodity. For the transaction of oilseeds, whether it is groundnut or sunflower, the purchaser had to pay 2 per cent commission to the commission agents, 1 per cent as market fee and 3 per cent as tax on the value of oilseed transacted. The slight difference noticed between the crops and markets was due to the difference in prices. The other components of the cost i.e., labour (loading & unloading) ^{and} transportation are also fixed by the respective market committees on unit basis (per bag). The general maintenance cost comprised of shop rent, licence fee, salary paid to the permanent labour and other miscellaneous expenses incurred by the wholesaler in oilseeds transaction.

The cost incurred by the village trader who operate outside the market yard varied from crop to crop and market to market. These traders moved from village to village and rural market or mandis to purchase the oilseeds produce and disposed it generally either through oilmiller or in the nearby market yard. In the total cost of marketing, the transportation and general maintenance cost these two put together accounted for about 70 percent of the total cost. The cost towards market fee, commission and tax incurred by the wholesale trader in

the regulated market are not incurred by the village ^{trader}. It was expressed by some traders that, due to heavy taxes on oilseeds/oil business they preferred to purchase the produce outside the yard or off the record.

It could be concluded that in the oilseeds transaction, the wholesaler incurred a cost 2 to 3 times higher than that of the village traders. The ^{components} namely, tax, commission and market fee were the major cost items in the case of wholesale trader, while transportation and general maintenance were the prominent ones in the case of village traders.

5.5.6 Marketing margins under different channels of oilseeds marketing

The market-wise results in Tables 4.33 and 4.34 revealed a considerable variation in producer's share in the consumer's rupee in different channels. Among three channels identified, channel II was found to be more efficient compared to channels I and II. The higher producer's share in the consumer's rupee found in channel II was mainly due to low cost incurred (2 to 3 times less than channel I) as well as higher price received by the farmers. Though the purchase price of wholesaler was more or less identical in channel I and II, but the producer's share in the consumer's rupee was high in channel II which was the result of illegal commission charges collected by the

commission agents in the market yard in channel I. Channel III was found to be inefficient, as the farmer received lowest price for their produce.

A close observation of the tables (4.33 & 4.34) revealed that, from the point of view of farmers, channel II was found to be more efficient followed by channel I. A comparison of channels I and III revealed surprising results. The share of the producer in the consumer's rupee was found to be more or less equal in both the channels, but the net price received by the producer was higher in channel I than that in channel III. Among different channels, total marketing margin was found to be highest in channel III and lowest in channel II. Between the markets, highest marketing margin was noticed in Gangavati market for both the crops while the lowest was observed in Gadag market for groundnut. In the total marketing margin, the oilmillers and village traders profit margin were highest followed by retailers of oil and wholesalers of oilseeds. The profit margins of oilmiller were higher in channel III (where oilmillers and village traders were involved) compared to channel I & II. This showed that the oilmillers and traders were the main source of the exploitation of the producer-sellers. They could be eliminated, if the producers could bring their produce to the regulated markets and sell

the same through the commission agent or the co-operative society. Between the commission agents and the co-operative society, the co-operative society had to be preferred because it assured higher net price to the producers compared to commission agents. The social and family ties of the cultivators with the commission agents had to be snapped and quicker payments by the co-operative society had to be ensured soon after the sale, if a shift of the farmers from channel I to channel II had to be achieved.

SUMMARY AND

POLICY IMPLICATIONS

VI SUMMARY AND POLICY IMPLICATIONS

Oilseeds occupy an important position in our national economy accounting for about 10 per cent of the gross cropped area and five per cent of the gross national product. The oilseeds produced consist of both of edible as well as non-edible oils. India is ideally suited to grow a variety of oilseed crops. The country occupies a significant place among the major oilseeds producers in the world and enjoys the unique distinction of having a large base in oilseed sector, which include a wide variety of oil-yielding crops.

Although India ranks first with regard to area and production of major oilseeds in the world, its performance in terms of yield is dismal. This was a result of numerous physical, technological, economic and institutional constraints in increasing area and productivity of oilseeds. The lack of high yielding varieties suitable for dryland conditions, risk of crop failure due to erratic monsoon rains, lack of institutional credit facilities, lack of institutional mechanism for integrating production, processing and marketing of oilseeds are some of the major factors responsible for oilseeds economy. An efficient marketing system plays a crucial role in boosting the production. The present marketing structure of oilseeds and oils is largely controlled by the traders and oil-millers which reduces the producer's

share in the consumer's rupee. Added to the inherent difficulties prevailing in the production of oilseeds, the demand for edible oil has been increasing. Hence, for reducing the gap between supply and demand, the Government of India has resorted to the imports of edible oils which has costed our exchequer heavily.

To make the country self-sufficient in oilseeds, the Technology Mission on Oilseeds (TMO) has been set up by the government of India which has adopted a systems approach to the whole problem. By the turn of the century TMO aims at production levels of 26 million tones of oilseeds and recovery of 8 million tones of oil.

Karnataka is one of the five major oilseed-growing states in the country. In recent years, sufficient work has been done to improve oilseed production even though the marketing aspect has been neglected. Unless an appropriate and orderly marketing system is established to assure a remunerative price to the farmer, efforts to increase production itself would not result in sustained results. Hence an in-depth study of marketing of oilseeds becomes greatly relevant and will be of practical significance.

The present study is a modest attempt in this direction. It seeks to examine the trends and growth rates in area, production and productivity (yield) of oilseeds, factors

influencing production of oilseeds, the concentration of oilseeds marketing power and the pattern of arrivals and prices of oilseeds. The focus is on the oilseed growers with reference to the marketing of their produce in the selected markets.

The specific objectives of the study are :

- 1 To study the trend and growth in area, production and productivity of important oilseeds in the selected districts of Karnataka.
- 2 To identify the price and non-price variables influencing the production of oilseeds in selected districts.
- 3 To assess the nature and magnitude of competition in marketing of oilseeds through the degree of sellers and buyers concentration and their size distribution.
- 4 To analyse the behaviour of arrivals and prices of oilseeds in the selected markets.
- 5 To estimate the share of the producer in the consumer's rupee under different channels of oilseeds marketing and
- 6 To suggest ways and means to overcome the bottlenecks in production and marketing of oilseeds.

6.1 Methodology

6.1.1 Sampling procedure

Karnataka State was purposively selected, which is one of the major oilseeds growing States in the country. For a detailed analysis, four oilseed crops grown in the State namely, groundnut, sunflower, safflower and sesamum were selected, which accounted for 93 per cent of the total area and 96 per cent of the total production in the State for the triennium ending 1990-91. For an in-depth analysis of trend and growth rates in area, yield and production of oilseeds, three districts namely Bijapur, Dharwad and Raichur were selected. These three districts together accounted for 40 per cent of the total area under the four major oilseeds in the State.

To analyse the market structure for oilseeds and behaviour of arrivals and prices of oilseeds, two major oilseed markets in each of the selected districts were chosen.

For detailed information with respect to production, sale, prices, costs and channels of marketing, data were collected from 40 farmers selected at random at each of the study markets. In all, 240 farmers were chosen for this purpose. To study marketing costs, margins and channel of marketing, 60 commission agents, 60 wholesale traders, 30

village traders, 30 oil-millers and 30 retailers were chosen and interviewed.

6.1.2 Nature and sources of data

In the present study, both primary and secondary data were used. To study the trend and growth rates of oilseeds, district-wise time-series data on area, production and productivity of individual as well as total oilseeds were collected for the period 1955-56 to 1989-90 from the records maintained at the Directorate of Economics and Statistics, Government of Karnataka, Bangalore. The data on these variables in respect of sunflower were collected for the period for which they were available, that is 1978-79 to 1989-90.

To identify the price and non-price variables influencing production of oilseeds, the time series data relating to the area, production and yield of the selected oilseeds, their competing crops, monthly rainfall, farm harvest prices, gross and net cropped area and irrigated area were obtained from the records at the Directorate for the period 1960-61 to 1989-90. However, the data collected for ascertaining the influence of price and non-price variables on the production of sunflower was confined to the period 1978-79 to 1989-90.

For analysing the nature and the magnitude of competition in the oilseeds marketing, the data on quantity of groundnut

and sunflower handled by each market functionary-mainly commission agents and wholesale traders- were collected from the Tender Registers maintained in the selected regulated markets. For this purpose, transaction for two weeks-one each from peak and lean arrival months for the year 1990-91 have been considered.

The primary data for the present study were obtained from the sample farmers and market functionaries through personal interviews by using pre-tested and structured schedules.

6.1.3 Statistical techniques employed

The exponential growth function and orthogonal polynomial regression analysis techniques were employed to study the trend and growth rates of area, yield and production of oilseeds. In order to measure the relative contribution of area, yield and their interaction on production, the decomposition analysis was adopted.

The technique of principal components analysis was used to identify the price and non-price variables influencing the production of oilseeds. To study the market power concentration with commission agents and wholesale traders for two major oilseeds namely, groundnut and sunflower, the Lorenz co-efficient of inequality was adopted.

The orthogonal polynomial regression analysis was also adopted to examine the trends in arrivals and prices of

oilseeds in the selected markets. For computing seasonal indices, the time-series data relating to monthly arrivals and prices of selected oilseeds were subjected to twelve-monthly centered moving averages. Simple regression analysis was carried out to ascertain the response of price to a given change in arrivals. To assess the nature and magnitude of the association between arrivals and prices of selected oilseeds, the correlation analysis was employed. To study the variations in arrivals and prices of oilseeds, coefficient of variation and simple correlation were adopted. The tabular analysis was used to compute marketing costs and margins under different channels of oilseed marketing.

6.2 Results

6.2.1 Growth performance of oilseeds

The growth performance of groundnut with respect to area, yield and production revealed mixed results. Bijapur district recorded negative growth in area, yield and production in all the periods. Raichur district and State as a whole registered negative growth in area, yield and production during pre-green revolution period and positive growth rates during pre-green revolution and overall periods. In Dharwad district, negative growth in production was noticed in all the periods while highly significant increase in area and decrease in yield was noticed during pre-green revolution period.

The growth rates of area, yield and production of safflower across the study districts and at the State level over time were declining with the exception of Dharwad district, where yield and production indicated a mild increasing trend. The growth performance of safflower area, yield and production during post-green revolution and overall periods were found to be positive and highly significant.

The growth performance of area, yield and production of sesamum across the study area and over time revealed that the growth performance was found to be highest during post-green revolution period and overall periods, compared to pre-green revolution period.

Sunflower exhibited a substantial growth in area, but the yield growth rate showed a declining trend which led to a slow rate of growth in production compared to area growth. The growth in production was found to be highest (58.02 %) in Raichur district, more or less same in Bijapur and Dharwad district as well as at the State level.

The growth rates of area, yield and production of total oilseeds were negative during pre-green revolution period in all the districts and at the State level except area growth in Dharwad district, where it was found to be positive (3.23 %). During post-green revolution and overall periods, the growth rates in area, yield and production were positive and highly

significant in all the cases but for Dharwad district, where yield growth rate was negative (-0.49%).

The analysis of area, yield and their interaction in affecting production of individual as well as total oilseeds revealed that the area was found to have a negative impact on production of individual and total oilseeds in the study area except for Dharwad district during pre-green revolution period and positive impact in most of the cases during post-green revolution and overall periods. The yield and interaction effects recorded mixed results. In general, the increased output of oilseeds in the study area was a result of expansion of area under the crops rather than increments in yield.

6.2.2 Trends in area, yield and production of oilseeds

Bijapur district showed a continuous decline in groundnut area till 1979-80 and a mild increase thereafter, while in Dharwad district a continuous significant increase in groundnut area was noticed till 1964-65 and thereafter it almost stabilised. In Raichur district and at the State level the increase in area was noticed in the recent years. The area under safflower and sesamum over the years showed a stable trend. An impressive growth in area under sunflower was observed since introduction, which was evidenced by the continuous upward trend across the districts and at the State level.

The yield trend of oilseeds revealed mixed results. Groundnut yield in Raichur district and at the State level showed a rising trend while in Bijapur it had a continuous falling trend. It decreased at a faster rate in the pre-green revolution period and stabilised during post-green revolution period allowing for mild fluctuations. An upward trend in safflower yield, particularly in latter years was noticed in the entire study area. Sesamum crop exhibited a continuous mild increase in yield over space and time. The total oilseed yield trend was similar to the yield pattern of groundnut.

As far as the production performance of individual and total oilseeds were concerned, (the production trends of all oilseeds in the study area followed more or less their area trend pattern; groundnut in Bijapur district, sunflower in Raichur district and overall State were the exceptions.

6.2.3 Variables influencing oilseeds production

The results of the principal component analysis adopted to identify price and non-price factors influencing production of four oilseeds in three districts (Table 4.6 to 4.9) revealed that the first principal components explained most of the variation in the explanatory variables. The percentage of variation ranged from as low as 62.70 per cent in the case of groundnut in Dharwad district to as high as 76.30 per cent with respect to sunflower in the same district. The price and

yield variables were mostly associated with the first component in all the crops and districts, rainfall variable either with the second or third component. The association of area, net sown area and gross cropped area could be identified either with first or second or third component.

A graphical presentation of first component against the second component (Figures 4.13 to 4.24) revealed that clustering of variables reflect the extent of influence of the variable on the production.

6.2.4 Market structure for oilseeds

The concentration of market power is an important element of market structure and determines the nature and competition in the market. The market structure for oilseeds was studied based on the Bain's classification of markets.

6.2.5 Market power concentration with sellers

The market power concentration with top four sellers revealed mixed pattern (Table 4.10). Bijapur, Gangavati and Raichur markets exhibited atomistically competitive nature while Talikoti, Gadag and Ranebennur markets exhibited slightly concentrated oligopolistic situation during peak period with respect to groundnut transaction. However during lean period, except Bijapur and Talikoti, other four markets showed slightly concentrated oligopoly nature of competition. As far as sunflower handling was concerned, both Gadag and

Raichur markets were atomistically competitive during peak periods and slightly concentrated oligopoly situation during lean periods. Bijapur and Talikoti markets exhibited moderately concentrated oligopoly during peak and highly concentrated oligopoly during lean periods respectively. In general, the degree of concentration in terms of quantity handled during lean period was higher than during peak period.

6.2.6 Market power concentration with buyers

The analysis of market power concentration with buyers across the markets, periods and crops (Table 4.11) revealed that Bijapur, Talikoti, Gangavati and Raichur markets exhibited highly concentrated oligopsony situation while Gadag and Ranebennur markets exhibited moderately concentrated oligopsony situation during peak period in groundnut transaction. During lean period, highly concentrated oligopsony forces were evident in Talikoti, Ranebennur, Gangavati and Raichur markets. However, Bijapur and Gadag markets respectively exhibited moderately concentrated oligopsony and slightly concentrated oligopsony situations.

In the case of sunflower transaction, based on the share of top four firms in total volume of transactions, among all firms, Talikoti market could be characterised as highly concentrated oligopsony and Bijapur and Raichur markets as moderately concentrated oligopsony, both during peak and lean

periods. Based on the same criterion, Gadag market turned out to be moderately concentrated oligopsony during lean period and slightly concentrated oligopsony during peak period.

6.2.7 Size-distribution of sellers

Market structure for oilseeds was also studied based on the market share of different size groups of sellers. The extent of market power concentration was confirmed by computing the Lorenz coefficient of Inequality (L). It was evident from Table 4.12 that a few large firms handled a major portion of the arrivals of groundnut during peak period in Ranebennur and Gadag markets. In Bijapur and Raichur markets, relatively major portion of the arrivals was handled by the large sized firms. In Gadag, Ranebennur and Gangavati markets, the concentration of market power in lean period was similar to that observed in peak period with a few large firms participating in trade.

In the case of sunflower, almost similar situation of dominance of few large firms was observed over time with an exception of Gadag market during lean period. The market power in Talikoti market increased during lean period.

6.2.8 Size-distribution of buyers

A perusal of Table 4.14 revealed that in Gadag and Ranebennur markets, trade was mainly concentrated with few large buying firms. Talikoti and Bijapur markets also

exhibited a similar situation at a lower degree. In Gangavati and Raichur markets, the groundnut trade was concentrated with a considerable number of large size category buyers who were mostly wholesalers-cum-oilprocessors. A very close competition prevailed among the big firms which resulted in more or less equal sharing of the produce among these firms. With regard to concentration of market power among buyers during lean period, the situation observed was almost similar to that observed during peak period with a few exceptions.

In the case of sunflower transaction, Gadag market exhibited high concentration (0.66) followed by Bijapur and Talikoti (0.49) and Raichur (0.39) markets during peak period. During lean period, a slightly different pattern was noticed. Talikoti market exhibited higher inequality. Gadag market exhibited large number of small-size category of firms controlling major portion of the arrivals. In Raichur market, the concentration of trade was more with the few large buyers during lean period over peak period.

6.2.9 Trends in arrivals and prices of oilseeds

The results of orthogonal polynomial regression analysis revealed that trend of arrivals of oilseeds showed a mixed pattern. In Bijapur and Talikoti markets, the mild fluctuations of the initial years in groundnut arrivals developed into a substantial growth in later years. In Gadag

and Ranebennur markets, change in groundnut arrivals over the years was almost identical. Raichur market showed a slightly increasing trend, whereas Gangavati market showed a slight increasing trend for a few years in the initial periods and a significant declining trend in the latter part of the study period. A continuous decline in safflower arrivals was observed in all the markets. Similarly, sesamum arrivals showed a declining trend in all the markets except Gadag and Gangavati. In the case of sunflower, with a few exceptions in the initial years, a continuous, steep rise in arrivals and price was noticed in Gangavati and Raichur markets. As far as price trend was concerned, a continuous upward movement was observed in all the markets for all the crops.

6.2.10 Seasonal indices of arrivals and prices of oilseeds

Higher indices of market arrivals of all oilseeds was observed immediately after harvest in all the study markets. In Bijapur, Talikoti and Gadag markets higher values of indices were observed for the months of October-December for groundnut. Ranebennur and Raichur markets exhibited two peak periods, namely September-October and April-June. However Gangavati market exhibited higher indices during April-June. In respect of price indices of groundnut, lower values were observed during peak arrival months and higher values during lean arrival months in Bijapur, Talikoti and Gadag markets.

However, in Ranebennur, Gangavati and Raichur markets such pattern was not noticed.

In the case of safflower, the monthly indices of arrivals were found to be higher in the months of March, April and May in all the markets. The price indices were higher during lower arrival months in Bijapur and Gadag markets, while such pattern was not observed in Talikoti and Raichur markets.

The sesamum arrival indices exhibited seasonal character. The higher indices of arrivals were noticed during October-January in Bijapur and Talikoti markets, September-November in Gadag and August-February in Raichur markets. The high arrival period indices were associated with the high price indices of sesamum in all the periods.

For sunflower, higher arrival indices were observed for the months of November to March in Bijapur market, October to April in Talikoti market and October to February in Gadag. In Gangavati and Raichur markets, two peak periods were noticed. These periods followed the kharif and rabi/summer harvest of the crop. With regards to price indices, higher values were observed during low arrival months and vice-versa in Bijapur and Gadag markets. However, this pattern was not observed in other study markets.

6.2.11 Relationship between arrivals and prices of oilseeds

The results of the regression analysis revealed that the relationship between market arrivals and prices of groundnut was negative in Bijapur, Gadag, Ranebennur and Gangavati markets, while in Talikoti and Raichur markets a positive relationship was observed.

A similar negative relationship between market arrivals and prices in safflower and sesamum was observed in all the markets except Gadag and Gangavati markets for the sesamum crop. Another exception was the positive relationship in sunflower arrivals and prices in Gangavati and Raichur markets.

6.2.12 Correlation coefficients between arrival and prices of oilseeds

The association between market arrivals and prices of oilseeds reflected mixed results. Bijapur and Talikoti markets showed significantly positive association between arrivals and prices of groundnut and sunflower during all the three periods. Gadag and Raichur markets displayed respectively negative and positive relationship between arrivals and prices of groundnut and sunflower. In Ranebennur market, negative association between arrivals and prices of groundnut was observed during peak and overall periods and positive association during lean months. In Gangavati market

significant negative relationship was noticed during peak period and positive association during lean and overall periods.

6.2.13 Coefficients of variation in arrivals and prices of oilseeds

The coefficients of variation for prices were found to be lower in all the markets for all the periods compared to those for market arrivals. The crop-wise coefficients of variation in prices revealed that variation in sunflower was lower compared to the other three oilseeds. With regard to arrivals, sesamum and safflower showed wider fluctuations. In general, coefficients of variation in arrivals were found to be higher during lean period in all the oilseeds and markets with some exceptions.

6.2.14 Market integration

It was observed that, except Raichur, all markets were integrated with the terminal market of Bombay. The degree of integration between the markets located in the same district was generally more, while among the markets themselves a positive but weaker degree of integration was observed.

6.2.15 Utilisation of oilseeds by sample farmers

The oilseeds produced by the sample farmers was utilised mainly for seed, consumption and as marketable surplus. In Bijapur and Ranebennur markets, the proportion of groundnut

utilised for seeds, consumption and marketing purpose were same. The Gangavati farmers were found to have the highest marketable surplus (88.60 per cent), followed by Raichur market (87.36%). The utilisation of groundnut for different purposes was more or less alike in Gadag and Talikoti markets, where marketable surplus was found to be lowest (83%).

The marketable surplus of sunflower was found to be higher than that of groundnut in all the study markets. The proportion of marketable surplus was found to be highest in Ranebennur market (96.38%) and lowest in Raichur market (92.55%). The quantity utilised for seeds and consumption ranged between 2 to 4 per cent overall the markets.

6.2.16 Disposal pattern of oilseeds

The disposal pattern of groundnut and sunflower, by the sample farmers revealed that the quantity of arrivals of these oilseeds mainly concentrated during the months of October, November, December and January which followed the kharif harvest of these crops. The arrivals in the months of April and May followed the rabi/summer harvests.

6.2.17 Preference of marketing channels by sample farmers

The marketable surplus of oilseeds of the producer was routed either through traders available at the village or through commission agents at the regulated markets or through co-operative marketing societies or directly to the

oil-millers. In the selected markets, the oilseed growers adopted three channels for disposal of their marketable surplus. For disposal of groundnut, irrespective of market and quantity of marketable surplus, the majority of the farmers preferred channel I (through commission agents), followed by channel II (through co-operative marketing societies) and channel III (through village traders). In general, more than 55 per cent of the producers operated through channel I and more than 60 per cent of groundnut marketable surplus was sold through this channel in all the markets except Gangavati where quantity sold through this channel was only 46.89 per cent. Channel II was next best channel both in terms of number of farmers and quantity of marketable surplus sold. This channel attracted about 25 to 30 per cent of the producers and disposed about 13 to 35 per cent of marketable surplus, whereas channel III was least popular among groundnut growers as it received less than 10 per cent of the marketable surplus in all the study markets except Gangavati.

The majority of the sunflower producers preferred channel I but the second best channel in terms of number and quantity of sunflower disposal was channel III followed by channel II. On an average, channel I was preferred by more than half of the total number of producers, who sold more than 50 per cent of the marketable surplus in the study markets with the

exception of Gadag market. Channel III was preferred by 20 to 30 per cent of the producer-sellers for disposal of more or less the same proportion of marketable surplus with a few exceptions. This channel had a high farmer frequency in Talikoti market and high portion of sale of marketable surplus in Gangavati and Ranebennur markets. Channel II attracted only 10 to 15 per cent of producers and disposed of about 10 to 25 per cent of the marketable surplus.

6.2.18 Marketing costs incurred by sample farmers

The cost incurred in channel I was found to be 2 to 3 times higher than that in channel II. Of the total cost of marketing incurred in channel I, commission and transportation expenses were prominent and together accounted for 85 per cent of the total cost. There was significant variation with respect to other components. In the case of sunflower marketing the proportion of different components in total marketing cost were found to be more or less similar to those observed in groundnut.

Among the different cost components in channel II, cost on transportation was found to be highest, accounting for 66 per cent of the total cost. The other components of costs loading and unloading, and personal expenses together accounted for 30 to 35 per cent of the total cost. The considerable differences in cost between channels was due to

the additional cost incurred on commission in channel I. The differences in cost between the markets were mainly attributed commission charges and transportation costs. There was no marketing cost involved in channel III since the marketable surplus was sold ^{by} the farmers ~~at~~ village itself.

6.2.1⁹ Marketing costs incurred by traders in oilseeds transactions

The important components of cost incurred by the wholesaler in the market yard were purchase/sale tax, commission charges and market fee. These components together accounted to around 85 to 90 per cent of the total cost of transaction. The remaining items were transportation, loading and unloading, general maintenance and these accounted for only 10 to 15 per cent of the total cost. No considerable difference in the cost incurred by the wholesalers was noticed over the crops or over the markets. On an average, the cost incurred by the wholesale trader in transaction of one quintal of groundnut was Rs. 62 and in Sunflower it was Rs. 64.

The cost incurred by the village trader was lower than that of wholesale trader in both groundnut and sunflower in the selected markets. Among the total cost incurred in groundnut transaction, the transportation cost alone accounted for 50 per cent, followed by general maintenance, packing and labour charges. The village traders of Bijapur and Raichur

markets incurred slightly higher cost as compared to those in other four study markets.

6.2.20 Marketing margins under different channels of oilseeds marketing

Market-wise results of marketing margins in oilseeds revealed that the producer's share in the oilmiller's purchase price of groundnut was found to be higher in channel II compared to channel I in all the study markets. It ranged from 91.59 per cent in Gadag market to 89.76 per cent in Ranebennur market. A similar situation was noticed in the case of sunflower marketing. The share of the producer in the oilmiller's purchase price was more or less equal in channel I and III. But the net price realised by the producer in the oilmiller's purchase price was significantly less in channel III than that noticed in channel I.

The analysis of price spread in oils and cake marketing revealed that the proportion of farmer's return was higher in the final product in channel II irrespective of crop and the market. Channel III was found to be more inefficient and offered lower price to the farmers compared to other two channels. The analysis of margins in the activity of oilseeds, oils and cake marketing revealed that among the market functionaries the maximum margins realised by oil-miller followed by village trader and wholesaler.

POLICY IMPLICATIONS

The following policy implications can be drawn from the investigation of the research on production and marketing performance of oilseeds in Karnataka.

Production

1. The increase in output of oilseeds observed in the study area in recent years was mainly due to the expansion of area rather than improvements in yield levels. To increase production and reduce the productivity gaps, efforts have to be made towards increasing productivity through adoption of yield raising improved technology, enlarging irrigation base of oilseeds along with appropriate and efficient extension education to the cultivators.

2. Among the package of inputs, the paucity of good quality and certified seed material of oilseeds constitute a major constraint. High priority has to be given to streamlining the production and distribution of quality seeds.

3. One of the important factors for the low yield is the incidence of pests and diseases. There is a need to develop stable high yielding varieties which are resistant to pests and diseases. In the absence of

immediate solution to the problem, plant protection programmes should be extended.

4. Irrigation is another important input which could increase the per hectare yield of oilseeds. Yield of oilseeds under irrigated conditions is substantially higher (about two to three times) as compared to yield secured under rainfed conditions. Thus, measures should be taken to expand irrigated area under oilseeds particularly during summer season.

Marketing

1. The analysis of market structure for oilseeds revealed the dominance of few large traders performing multiple functions who controlled the major share of oilseeds in the market. This calls for intervention of co-operative organisations capable of performing similar functions for purchase of oilseeds at the market yards.

2. In the hinterlands of some markets, oilseeds are raised mainly under rainfed contours which resulted in wide fluctuations of market arrivals and prices. This suggested the need for proper warehousing facilities linked with credit facilities. Heavy arrivals of oilseeds after harvesting months lead to a declining prices, while short falls in arrivals have contrary effects on prices. If proper warehousing facilities are

developed and producer sellers are enabled to obtain credit against warehouse receipts, the seasonal fluctuations in arrivals with their consequential unfavourable impact on prices could be substantially reduced.

3. In markets with a wide area of operation, the transportation cost was found to be the major component of the total marketing cost, especially in the case of farmers coming from the distant places with small lots of the produce. The collection of the produce of the farmers at the village itself, by the co-operative marketing societies or the regulated markets committees, as is practiced by milk co-operatives, could help in mitigating this problem.

4. To ensure maximum transaction through formal channels, it is advisable to reduce the magnitude of tax and or to increase the exemption limits on volume of business transacted by the traders. This would ensure fair deal to the farmers also.

5. If the facilities provided by the traders to the producer-sellers in channel I are also extended by the co-operative marketing societies, besides ensuring the fair transaction, it is possible to make the channel II more popular and thereby help the producers to receive a

larger share of consumer's rupee. Therefore, the co-operatives should be strengthened to fulfill the task.

To translate the well stated objectives of the Technology Mission on oilseeds into actual field practices, it is necessary to have a holistic and comprehensive approach towards production, marketing and processing of different location specific oilseeds. Among the issues to be tackled, making available quality seeds, promoting adoption of cultivation packages, induction of co-operatives right from village procurement to processing of oilseeds, extension of facilities to farmers and reasonable tax structure to the traders are of importance.

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