



Spatio-Temporal Analysis of Sunflower Production Trends in Karnataka During 1992 & 2002

KEYWORDS

Production, productivity, range, area, taluks, sharing

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ABSTRACT *The oilseed crop of sunflower has been introduced in India in the nineteen sixties. Within a short time of its production, it has established itself as one of the important oilseed crops in horizontal and vertical expansion. Sunflower seeds are eaten by human being as roasted and salted seeds are very popular. A native of Mexico and South Western USA and extensively grown in USSR, it has now come to stay in India. It was introduced into Spain by early explorers and merchants before the middle of sixteenth century. Sunflower is an oil seed as well as ornamental crop. The major sunflower producing countries of the world are the Soviet Union, USA, Argentina, Romania, Spain, Yugoslavia, Turkey and South America. In India, sunflower is grown in Andhra Pradesh, Bihar, Karnataka, Maharashtra, and Orissa, Rajasthan, Tamilnadu, Uttar Pradesh and West Bengal and rest of the states have very negligible area. Under this crop Maharashtra and Karnataka are identified as the major states in production.*

INTRODUCTION:

Sunflower being day neutral has wider range of adoptability. It is cultivated successfully in temperate, tropical and sub-tropical climates. It requires warm and humid climate during vegetative growth period and bright sunny days during flowering and maturity period. Sunflower requires fairly high temperature during its lifetime to produce maximum yields. A temperature of 28^o to 32.^o C. is ideal for the cultivation of sunflower. But, it requires cool climate during germination and seeding growth. The Sunflower grows well in an area receiving annual rainfall of 750-1000 mm and 90 - 95 % relative humidity as ideal for its cultivation. High humidity accompanied with cloudy weather and rainfall at the time of flowering results in poor seed set. Sunflower is fairly resistant to drought. It cannot tolerate water logging. Sunflower is commonly grown as a dry land crop but crop responds to irrigation very well. Moisture stress during 20 days before and 20 days after flowering is most critical. Adequate moisture in the soil is to be assured during bud and initiation between 20 and 25 days, button after 35 and 40 days flowering after 55 and 60 days, and seed development after 75 and 80 days. Depending on the soil type and season 6 to 10 irrigations are needed for successful raising of the crop. Sunflowers can grow on a variety of soils having drainage facilities. But, it grows well in loamy soil during Kharif season and in clay soil during rabi and spring season. The optimum range of soil pH for this crop is 6.5 - 8.5. Field should be thoroughly prepared by two ploughing followed by disc harrowing and leveling. In heavy soils the crop can be grown on ridges and furrows so, as to avoid water stagnation. Being photo insensitive, the crop can be grown all around the year. It is recommended to be sown in July during Kharif season, September second fortnight to end of October in Rabi and during January for summer crop. Early sowing is advantageous in case irrigation facility is available.

STUDY AREA:

The state of Karnataka is confined within 11.35^o to 18.30^o north latitude and 74.51^o to 78.35^o east longitudes. The Karnataka state extends about 750 km from north to south about 400 km from east to west. The total land area of Karnataka is 119791 sq km. It accounts for 5.83% of the total area of India (32.88 lakhs sq km) and ranks 8th among Indian states in terms of geographical area. As per 2011 census, the state's total population is 61130704, sharing 5.05% of India's population of 1,21,01,93,422. Karnataka state has 30 districts consisting of 176 taluks and 27481 inhabited villages. Karnataka has 66.02% of rural population. While 33.98% is urban population. Out of total population 36.63% are main workers. The

literacy rate in Karnataka is 67.84%, while sex ratio is 964 per 1000 males. The chief soil types found in the Karnataka state can be grouped under rich black soils, red soils, laterite and mixed coastal soils. In Karnataka state net sown is 10393336 hectares which is 54.55% of total geographical area (19049836 hectares). About 14.66% land is used for forest, about 10.04% land is not available for cultivation, about 8.22% land is uncultivated and 9.17% land is as a fallow.

OBJECTIVES:

- 1) To examine the taluka wise percentage share of sunflower production in Karnataka during 1992
- 2) To know the productivity/yield of the nine oilseed crops in Karnataka during 2002-02
- 3) To examine the taluka wise percentage share of sunflower production in Karnataka during 2002
- 4) To make the taluka-wise data of percentage share of increase of sunflower production (When compared to 1992-93 to 2002-03)
- 5) To examine spatio temporal analysis of sunflower production in Karnataka

APPROACH AND METHODOLOGY:

The present study of oilseeds production in Karnataka is a part of agricultural geography. The data for two periods i.e. 1992-93 and 2002-03 is considered for the analysis of 175 taluks. The published data is obtained from the following offices:

- 1) District Statistical Office, Dharwad, 2) Department of Economics and Statistics Govt. of Karnataka, Bangalore, 3) Director, Department of Agriculture, Bangalore.

The taluka wise percentage share of the data of groundnut production is shown on the map by five groups viz very high, high, medium low and very low, with the help of mean and standard deviation method.

TALUKA-WISE PERCENTAGE SHARE OF THE SUNFLOWER PRODUCTION IN KARNATAKA DURING 1992-93:

The ten taluks viz Bijapur, Bagewadi, Indi, Muddebihal, Sindagi, Shorapur, Raichur, Manvi, Hiriyur and Kadur taluks have shared each one more than 2.55% of the total production of sunflower in Karnataka and appear on the map as very high producing. Out of 10 taluks 2 taluks are located in south Karnataka.

The following 14 taluks viz Afegelpur, Jevargi, Shahapur, Lingasur, Devadurga, Hunagund, Sindhnur, Shirahatti, Bellary,

H.B.Halli, Hadagali, Harapanahalli, Chitradurga and Gundlupet share 1.60% to 2.54% of the total production of sunflower in Karnataka and appear on the map under high range of sunflower production.

TALUKA-WISE PERCENTAGE SHARE OF THE SUNFLOWER PRODUCTION IN KARNATAKA DURING 1992-93

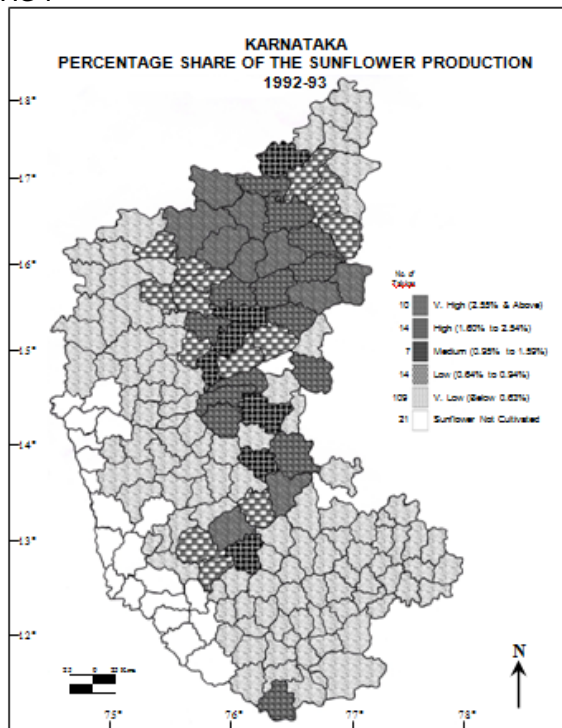
Table No. 1

| category | Range | No of Taluks |
|-----------|----------------|--------------|
| Very high | 2.55 and above | 10 |
| High | 1.60 to 2.54 | 14 |
| Medium | 0.95 to 1.59 | 7 |
| Low | 0.64 to 0.95 | 14 |
| Very Low | below 0.63 | 109 |
| Total | | 155 Taluks |

The following 7 taluks viz Aland, Kustagi, Yalaburga, Mundaragi, Kudalagi, Challakeri, and Arasikere, Share 0.95% to 1.59% of the total sunflower production of Karnataka and appear on the map as medium range production areas.

The following 14 taluks viz Gulbarga, Chitapur, Yadgir, Jamakhandi, Badami, Bagalkot, Bilagi, Ramadurga, Gadag, Koppal, Gangavati, Hosadurga, Chikkamagalore and Belur share 0.64% to 0.94% of production range of sunflower in Karnataka and appear on the map as low production areas. There are as many as 109 taluks distributed over the Karnataka share less than 0.63% of the total production of sunflower of Karnataka and thus the appear on the map as very low production areas. (Table-1 and Fig-1).

FIG 1



TALUKA-WISE PERCENTAGE SHRE OF SUNFLOWER PRODUCTION IN KARNATAKA DURING 2002-03

The map shows following 6 taluks viz Lingasur, Manvi, Raichur, Yalaburga, Ron and Hiriyyur as very high share of sunflower production, where Lingasur taluk has as high as

8.08% Production (17642 tonnes), Manvi taluka shares 5.54% (12103 tonnes), Raichur taluk shares 4.54% (9926 tonnes), Yalaburga taluk shares 4.27% (9326 tonnes), Ron taluk shares 5.36% (11719 tonnes), and Hiriyyur taluk shares 5.03% (10985 tonnes).

The high range of sunflower production is found in the following 7 taluks namely Devadurga, Sindhnur, Kustagi, Koppal, Gadag, Mundargi, of North Karnataka and Chitradurga of South Karnataka where the production share ranges from 2.32% to 3.76%.

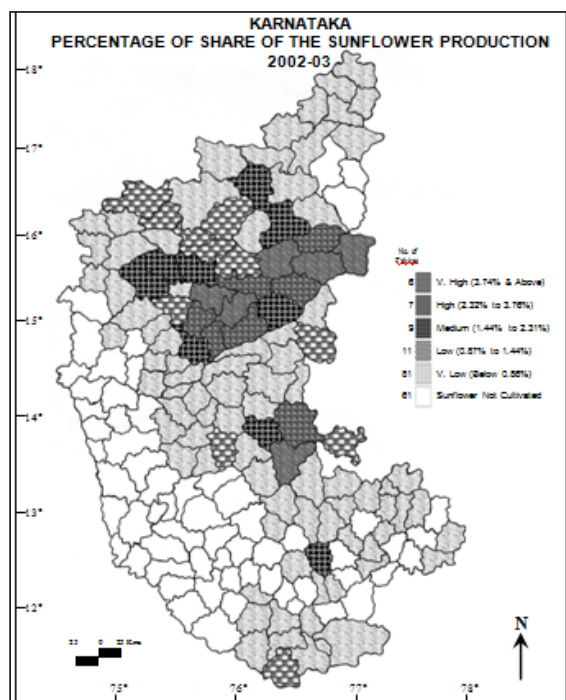
TALUKA-WISE PERCENTAGA SHARE OF THE SUNFLOWER PRODUCTION IN KARNATAKA DURING 2002-03.

Table : 2

| categories | Ranges | No of Taluks |
|------------|----------------|--------------|
| Very high | 3.74 and above | 6 |
| High | 2.32 to 3.76 | 7 |
| Medium | 1.44 to 2.31 | 9 |
| Low | 0.87 to 1.44 | 11 |
| Very low | below 0.87 | 81 |
| Total | | 114 taluks |

The medium range of sunflower production during 2002-03 is observed in the following 9 taluks viz Sindagi, Shorapur, Bagalkot, Ramadurga, Soundatti, Shirahatti, and Gangavati of north Karnataka, while Challakere and Shira of South Karnataka where the production ranges from 1.44% to 2.31%. The low production of sunflower is observed in the following 11 taluks, of which 3 taluks i.e. Channagiri, Pavagad, and Gundlupet are in south Karnataka, while the following 8 taluks i.e. Ballary, Navalagund, Bagalkot, Bilagi, Hunagund, Jamakhandi, Athani and Bagewadi are in North Karnataka. The range of sunflower production in these 11 taluks is in the range of 0.87% to 1.44%. In the category of very low production 81 taluks are observed and these are well distributed in the entire Karnataka except western Ghats, Coastal region and South-western part of Karnataka. In these 81 taluks the range of sunflower production is below 0.86% (Table -2 and fig-2)

FIG 2



PRODUCTIVITY OF SUNFLOWER

The productivity of sunflower per hectare land in Karnataka during 2002-03 was 509Kg, where the total area under sunflower cultivation was 452063 hectares. The area under sunflower cultivation shares 34.47% of the total area (1311324 hectares) of all oilseeds together, where production of sunflower in Karnataka it was 20.14% of the total oilseeds production (1083490 tonnes).

During 1992-93 the productivity of sunflower per hectares land in Karnataka was 418Kg, where as the total area under sunflower cultivation in Karnataka was 1067586 hectares, where it has produced 445908 tonnes of sunflower production. The share of sunflower production out of the total production of all oilseeds production was 24.96%. The actual production of all oilseeds together in Karnataka during 1992-93 was 1785853 tonnes, where the total area under all oilseeds together was 2732337 hectares.

PRODUCTION AND PRODUCTIVITY OF DIFFERENT OIL-SEED CROPS (SUNFLOWER) DURING 1992-93 and 2002-03 Table- 2

| S.No | Name of the oilseeds | Production 1992-93 | % | Productivity Kg/ha 1992-93 | Production 2002-03 | % | Productivity Kg/ha 2002-03 |
|------------------------|----------------------|--------------------|--------------|----------------------------|--------------------|--------------|----------------------------|
| MAJOR OIL-SEEDS | | | | | | | |
| 1 | Groundnut | 1137899 | 63.71 | 937 | 709902 | 65.51 | 1070 |
| 2 | Sunflower | 445908 | 24.96 | 418 | 218249 | 20.14 | 509 |
| 3 | Safflower | 91926 | 5.14 | 567 | 50247 | 4.63 | 811 |
| 4 | Sesamum | 48962.5 | 2.74 | 410 | 19660 | 1.81 | 432 |
| 5 | Soya-bean | 28448 | 1.59 | 688 | 58870 | 5.43 | 1098 |
| MINOR OIL-SEEDS | | | | | | | |
| 6 | Linseed | 7832 | 0.42 | 181 | 7696 | 0.71 | 388 |
| 7 | Castor | 18339 | 1.02 | 758 | 16109 | 1.48 | 1347 |
| 8 | Niger | 5079 | 0.28 | 193 | 2152 | 0.19 | 193 |
| 9 | Mustard | 1460 | 0.08 | 263 | 605 | 0.05 | 266 |
| | Total | 1785853.5 | 99.98 | 490.55 | 1083490 | 99.95 | 859 |

TALUKA-WISE PERCENTAGE SHARE OF INCREASE OF SUNFLOWER PRODUCTION WHEN COMPARED FROM 1992&2002:

The map shows 7 taluks viz Soundatti, Dharwad, Channagiri, Pavagad, Madhugiri, Koratagere and Shira taluks as having exceptionally very high increase of sunflower production when compared from 1992-2002. Here range is from 168.59% to 1377.88%.

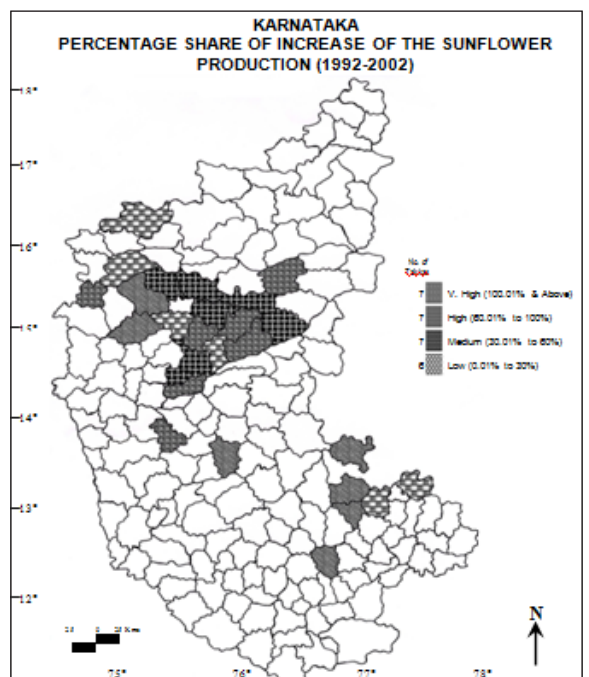
The map reveals increase in the sunflower production in the following 7 taluks viz Lingasur, Koppal, Yalburga, Gadag, Haveri, Belguam and Bhadravati under high increase of production ranging from 60.01% to 100%. The following Seven taluks namely Badami, Ramadurga, Ron, Kustagi, Gangavati, Shirahatti, and Savanur appear as medium increase in the sunflower production with 30.01% to 60%.

Under low range of increase of sunflower production i.e. less than 30% the following 6 taluks are observed: Athani, Gokak, Navalagund, Mundaragi, Bagepalli, and Gouribadanur. Thus 27 taluks in all, appear on the map as having positive increase of sunflower Production when compared from 1992-2002. Thus under 87 taluks there is decline of sunflower production when compared to 1992-2002.(table 3and Fig-3)

TABLE : 3

| Taluks | Production 1992 in tonnes | Production 2002 in tonnes | Actual change | % |
|------------------|---------------------------|---------------------------|---------------|----------|
| 1.Madhugiri | 104 | 1537 | 1433 | 1377.88% |
| 2.Pavagad | 183 | 2822 | 1865 | 1019.12% |
| 3.Koragagere | 19 | 108 | 89 | 468.42% |
| 4. Shira | 957 | 4554 | 4163 | 435% |
| 5. Channagiri | 562 | 2638 | 2099 | 373.48% |
| 6. Soundatti | 1312 | 3541 | 2229 | 169.89% |
| 7. Dharwad | 121 | 323 | 204 | 168.59% |
| 8.Belguam | 14 | 28 | 14 | 100% |
| 9.Badravati | 11 | 21 | 10 | 90.90% |
| 10.Koppal | 407 | 7767 | 3694 | 90.69% |
| 11.Haveri | 1018 | 1789 | 771 | 75.73% |
| 12. Lingasur | 10485 | 17642 | 7157 | 68.25% |
| 13.Yalburga | 5640 | 9326 | 3686 | 65.35% |
| 14.Gadag | 3088 | 5074 | 1986 | 64.31% |
| 15.Shirahatti | 2074 | 3179 | 1105 | 53.20% |
| 16. Ron | 7797 | 11719 | 3922 | 50.30% |
| 17. Kustagi | 5065 | 7337 | 2272 | 44.85% |
| 18.Savanur | 239 | 336 | 97 | 40.58% |
| 19 Ramadurga | 3367 | 4708 | 1314 | 39.87% |
| 20.Gangavati | 2922 | 3974 | 1052 | 36.00% |
| 21.Badami | 3627 | 4775 | 1148 | 31.65% |
| 22. Athani | 1627 | 2124 | 449 | 26.80% |
| 23. Mundaragi | 5344 | 6732 | 1388 | 25.30% |
| 24. Navalagund | 1865 | 2285 | 420 | 22.52% |
| 25. Gokak | 1530 | 1645 | 115 | 7.51% |
| 26.Bagepalli | 561 | 584 | 23 | 4.09% |
| 27. Gouribidanur | 894 | 927 | 33 | 3.69% |

FIG 3



PROBLEMS OF SUNFLOWER PRODUCTION:

Grashoppers and capitulum borer are the important pests of sunflower. Dusting with BHC 10% is effective against these pests. The important diseases of sunflower are leaf-rust, alternaria leaf-spot, and root-rot, leaf-rust and the alternaria leaf-spot can be controlled with a 0.1% spray of either Dithane m-45 or Dithane Z.78, whereas the root-rot is controlled by drenching the soil with either brassical or wet cesan.

CONCLUSION:

The Sunflower during 202-03 is cultivated in 114 taluks of Karnataka. It is not at all cultivated in remaining 61 taluks, as they are not suitable for Sunflower cultivation due to excess rainfall or scanty rainfall. Amongst 114 taluks, sunflower is cultivated from 1st rank to 19th rank in different manner. It is cultivated as first ranking crop in six taluks viz Ron, Koppal Yalaburga, Kustagi, Lingasur and Hiriyur, In these taluks the clay loam, black soils and well drained highly fertile soils and adequate irrigation have supported the farmers to cultivate

Sunflower as first ranking crop. Karnataka has favourable conditions for the cultivation of sunflower in 154 taluks(1992-93), 114 taluks(2002-03) where it is cultivated in very high percentage to very low percentage. If rain fails in some taluks and if irrigation has provided in such taluks then sunflower cultivation can be high yielding and farmers can feel secured and assured to cultivate sunflower on higher acreages. In this regard all the 114 taluks can be considered for further thrust on the development of sunflower cultivation. The average yield is 1,500 to – 2000 kg per hectore, the major problems, which this crop has been facing in recent years, is the decline in its yield –from over 800 kg per hectore until 1978-79 to less than 400 kg per hectore currently, for which the off-quoted causes are; non availability of quality seeds, repeated cultivation of sunflower crop on the same piece of land, negligence in terms of impacts including irrigation, soil nutrients and plant protective measures, indiscriminate crop calendar and damage by birds. There is need to evolve a scientific package to solve these problems.

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