



## Spatial Analysis of Sunflower Sown Area in Karnataka During 1992&2002

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### ABSTRACT

*Sunflower seeds are eaten by human being as roasted and salted seeds are very popular. Crude sunflower oil is excellent edible oil being relatively low in saturated fatty acids. The oil is also used as lubricant and for preparation of high quality soup. The oil cake remaining after oil extraction is a high quality protein source for livestock feeds, and sunflower is also used as an ornamental crop. Edible oilseeds cultivation in India is an integral part of agricultural system, as edible oilseeds are part of food item for the human population. The per capita annual consumption of edible oil in India has increased from 4.0kg in 1980-81 to 6.4 kg in 1996-97. The supply of vegetable oils has been rising annually at the rate of 5.96 % for consumption; even then it does not suffice the need. This has made India to import edible oils to the extent of 1.30 million tons during 1985-86. During the year 1992-93 India had 25560.36n thousand hectares of land under cultivation of several oilseeds together.*

**Keywords : Edible Oilseeds, sunflower, Sown area, Taluks, Percentage share.**

Sunflower as an oilseed crop 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. Its origin in 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, Uttara 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.

Sunflower seeds are eaten by human being as roasted and salted seeds are very popular. Crude sunflower oil is excellent edible oil being relatively low in saturated fatty acids. The oil is also used as lubricant and for preparation of high quality soup. The oil cake remaining after oil extraction is a high quality protein source for livestock feeds

### STUDY AREA:

The state of Karnataka is confined within 11.35° to 18.30° north latitude and 74.51° to 78.35° 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 8<sup>th</sup> 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 175 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. 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 know the taluka wise sunflower concentration in Karnataka during 2002. (As per S.S.Bhatia method)
- 1) To examine the taluka wise percentage share of sunflower sown area in Karnataka during 1992
- 2) To examine the taluka wise percentage share of sunflower sown area in Karnataka during 2002
- 3) To make the taluka-wise data of percentage share of increase of sown area under sunflower oilseed crop (When compared to 1992-93 to 2002-03)

### APPROACH AND METHODOLOGY:

The present study of oilseeds cultivation 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, 4) Joint Director, Department of Oilseeds, Bangalore, 5) University of Agriculture Science, Dharwad. The taluka wise percentage data of sown area under groundnut oilseed crop 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.
- 1) The taluka wise sown area in the form of percentage under sunflower oilseed is shown in the form of concentration map as per S.S Bhatia's method for the year 2002-03.
- 2) The taluka-wise data of percentage share of increase of sown area under sunflower oilseed crop (When compared to 1992-93 to 2002-03) is shown on the map.

### LOCATION QUOTIENT METHOD OF CROP CONCENTRATION: (AS PER S. S. BHATIA METHOD)

The location quotient technique has also been applied by geographers for the determination of regional character of cropping patterns. In this technique the regional character of crop distribution is investigated and determined, first by comparing the proportion of sown area under different crops and

ranking them, and secondly, by relating the crop density in each of the component areal units of the region/country to the corresponding density of the region/country as a whole. This approach makes it possible to measure the regional concentration of the crops objectively. It also helps to identify and differentiate areas that have some significance with regard to the crop distribution within the region.

The location quotient method may be expressed as under:

Index for the determination of crop concentration =

$$\frac{\text{Area of x crop in the component areal unit.}}{\text{Area of all crops in the component areal Unit}} \div \frac{\text{Area of x crop in the entire region/country}}{\text{Area of all crops in the entire region/country}}$$

By applying the above technique, if the index value is greater than unity, the component areal unit accounts for a share greater than it would have had if the distribution were uniform in the entire region, and therefore, the areal unit has a concentration of great agricultural significance. After ascertaining the index values for the crops in the component areal units, they are arranged in an ascending or descending order. The index scale is calculated by dividing the array into equal parts to distinguish the very high, high, medium, low and very low concentrations. In general, higher the crop concentration index, higher is the level of interest in the production of that crop.

The main advantage of the location quotient technique for the delineation of crop concentration lies in the fact that it enables the geographers and planners to understand the areas of specialization of different crops grown in a region at a given point of time. The continuous cultivation of a particular crop in a unit or region, however, leads to progressive reduction in yield. This depletion of soil happens because the crop exhausts certain nutrients from the soil. Consequently, the natural fertility of the soil steadily declines. Rotation of crops with diverse choice, permissible under the given environmental conditions, therefore, needs to be adopted to maintain the fertility of the soil. A scientific rotation of crops not only makes agriculture a more remunerative occupation, but it also makes the agro-ecosystem more resilient and sustainable.

#### SUNFLOWER CONCENTRATION IN KARNATAKA:

The map of concentration of sunflower cultivated area for the year 2002-03 shows the following 9 taluks under very high range viz Raichur, Manvi, Lingasur, Kustagi, Yalaburga, Koppal, Mundargi, and Ron belong to north Karnataka, while only one taluks i.e. Hiriyur belongs to south Karnataka.

There are 3 taluks viz Devadurga, Sindhanur, and Chitradurga, which have shown during 2002-03 as high concentration of area under sunflower.

The following 11 taluks viz Badami, Bagalkot, Bilagi, Ramadurga, Naragunda, Gadag, Shirahatti, Gangavati, Challakere, Shira and Gundlupet appear as midium concentrated under the area of sunflower cultivation. It can be also noted here that these 11 taluks have shallow black soils.

There are 28 taluks spread over the Karnataka as appear low concentration of area under sunflower cultivation.

There are 63 taluks, which appear as very low concentration in area under sunflower cultivation and there are spread across the Karnataka except in the Western Ghats and the coastal Karnataka and south west of Karnataka. Further it is to be noted here that these 61 taluks where sunflower is not cultivated at all and such taluks are in the western ghats, coastal Karnataka and few taluks are in the southern margins of Karnataka. (Table 1 Fig-1)

#### SUNFLOWER CONCENTRATION IN KARNATAKA DURING 2002-03(As per S.S.Bhatia method)

Table 1

Category	Range	No of Taluks
Very high	494.53 and above	9
High	309.6 to 494.52	3
Medium	184.94 to 309.59	11
Low	60.26 to 184.92	28
Very low	60.88 and below	63
	Total	114 Taluks

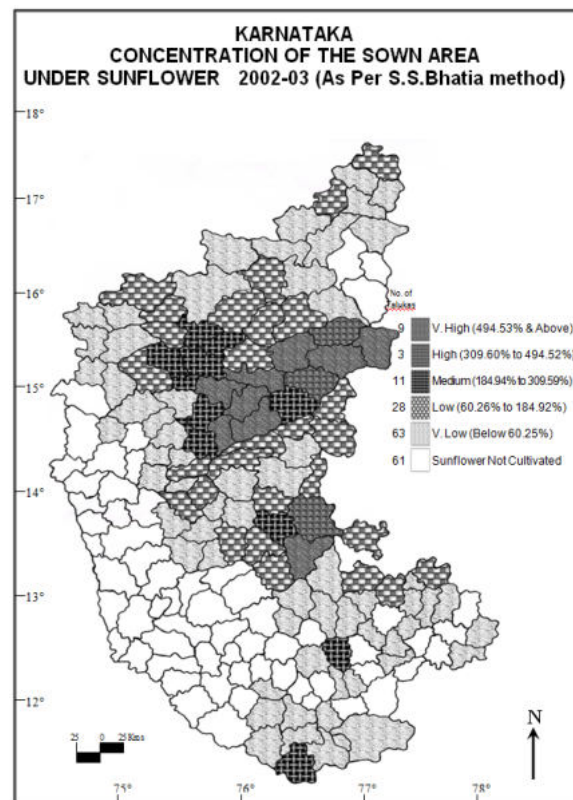


FIG 1

#### TALUKA-WISE PERCENTAGE SHARE OF AREA SOWN UNDER SUNFLOWER DURING 1992-93

During the year 1992-93 the state of Karnataka witnessed normal annual rainfall as a result of which the area sown under all the oilseed crops is higher than that of the area sown during 2002-03 which witnessed deficit annual rainfall 4. During 1992-93 out of 175 taluks of Karnataka 154 taluks had area under Sunflower cultivation, in the range of 0.56% to 84%. It is not at all cultivated in 21 taluks where heavy rainfall and hilly topography of western ghates are not favourable for sunflower cultivation.

During 1992-93 9 taluks had sown more than 2.59% area under sunflower cultivation appearing as very high share under sunflower cultivation. However, the maximum area under sunflower cultivation was to the extent of 4.84% in the taluk of Shorapur(51560 hectares). Out of 9 taluks of very high range of area under sunflower cultivation, one taluk i.e. Hiriyur belongs to South Karnataka while remaining 8 taluks belong to north Karnataka that too 5 taluks belong to Bijapur district, two taluks belong to Raichur district and one taluk belongs to Gulbarga district, where in all the 9 taluks black soil and irrigation have very well favoured to cultivate sunflower.

During 1992-93 10 taluks appeared as high range in sown area under sunflower cultivation, where the range of area under sunflower was 1.59% to 2.58%. These 10 taluks are Afezelpur, Jevargi, Shahapur, Devadurga, Lingasur, Hunagund, Ron, Sindhanur and Siraguppa of North Karnataka, while only one taluk i.e. chitradurga of south Karnataka where shallow and lite black soil and red soils are suitable to sunflower cultivation.

The medium range of sunflower cultivation is found in 15 taluks of Karnataka where the share of sunflower cultivation varies between 1.01% to 1.58%. Amongst 15 taluks 3 taluks belong to Bhima and Karanja river basin while 5 taluks viz Jamakhandi, Bagalkot, Badami, Yalaburga and Kustagi belong to Krishna and Malaprabha river basin, 5 taluks viz Mundaragi, Harapanahalli, Hadagali, H.B.Halli and Bellary belong to Tungabhadra river basin, one taluk Viz Kadur belong, to Vedavati river basin, and another one taluk Viz Gundlupet belongs to Kaveri river basin,

There are 12 taluks during 1992-93 which show low of area under sunflower cultivation i.e.0.57% to 1.00% out 12 taluks 9 taluks are in the northern maidan region of Karnataka while remaining 3 taluks are in southern region.

In the very low of area under sunflower cultivation 108 taluks are identified (vide map), where the area under sunflower cultivation is below 0.56%. Amongst 108 taluks 103 taluks are located almost western, south and Central Karnataka while remaining 5 taluks are in the district of Bidar, that too northern Karnataka. (Table-2 fig-2)

Taluka-wise Percentage share of area sown under Sunflower in Karnataka During 1992-93 Table 2

Category	Ranges	No of Taluks
Very High	2.59 and above %	9
High	1.59-2.59%	10
Medium	1.01-1.58%	15
Low	0.57-1.00%	12
Very low	below-0.56	108
Total		154 Taluks

#### TALUKA-WISE PERCENTAGE SHARE OF AREA SOWN UNDER SUNFLOWER IN KARNATAKA DURING 2002-03

Due to failure of South-West monsoon during 2002-03 the area under sunflower cultivation was reduced in various taluks of Karnataka, consequently there was no cultivation of sunflower in 61 taluks, while this number was only 21 in 1992-93.

Under very high range of sunflower cultivation 11 taluks are identified where the area under sunflower is ranging from 3.18% to 9.18%. out of 11 taluks 10 taluks viz Raichur, Kustagi, Koppal, Ron and Mundargi are in the northern Karnataka and only one taluk viz Hiriyur belongs to southern Karnataka, where black and mixed black soils and irrigation have favoured to sunflower cultivation.

Under high range 6 taluks are noticed where the area under sunflower varies from 1.88% to 3.17%. Out of them 4 taluks viz Gangavati, Gadag, Shorapur and Sindagi are in northern maidan while 2 taluks viz Challakeri and Chitradurga are in southern maidan.

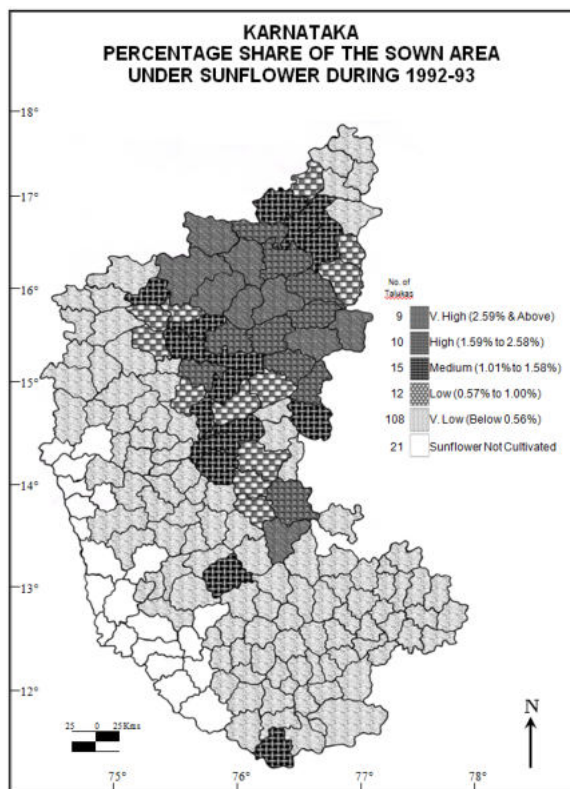


FIG 2

Under medium range of sunflower cultivated area, 5 taluks are identified, where the area ranges from 1.30 to 1.87% amongst 5 taluks 4 taluks belong to Northern Karnataka while one taluka viz Shira belongs to southern Karnataka.

Under low range of sunflower cultivation 22 taluks are identified where sunflower area ranges from 0.57 to 1.28%. Amongst 22 taluks 6 taluks viz Jagalure, Channagiri, Holalkere, Hosadurga, Pavagad and Gundlupet are in South Karnataka, while remaining 16 taluks are spread over in the northern Karnataka.

There are 70 taluks under very low of sunflower cultivation where they possess less than 0.56% of land under sunflower cultivation. These are located in except western Ghats, South Western part and a few taluks of extreme south east and north east part of Karnataka, where heavy rainfall and scarcity rainfall respectively are not conducive for sunflower cultivation. (Table-3 Fig-3)

#### Taluka-wise Percentage Share of sown area under Sunflower in Karnataka during 2002-03 Table No 3

Category	Ranges	No of Taluks
Very High	3.18 and above %	11
High	1.88 –3.17%	6
Medium	1.30- 1.87	5
Low	0.57 –1.29	22
Very Low	below 0.56%	70
Total		114 taluks

#### THE PERCENTAGE SHARE OF INCREASE OF THE SOWN AREA UNDER SUNFLOWER CULTIVATION WHEN COMPARED FROM 1992-2002:

The map reveals that seven taluks viz Soundatti, Bhadravati, Channagiri, Pavagad, Madhugiri, Koratagere and Shira as exceptionally high in terms of increase of area under sunflower cultivation when compared from 1992-2002, where these 7 taluks show more than 100% increase in the area.



The 3 taluks viz Lingasur, Yalaburga, and Koppal have shown 60.01% to 100% increase respectively in area under sunflower cultivation from 1992-2002 and appear as high increase on the map (vide map No 4)

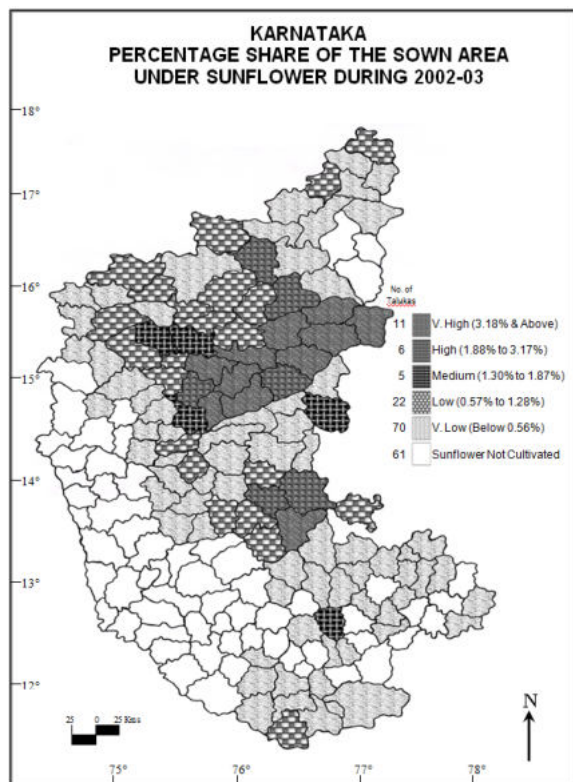


FIG 3

The 6 taluks viz Athani, Ramadurga, Ron, Gadag, Shirahatti and Hospet show 0.01% to 30% increase in the area of sunflower cultivation when compared to 1992-2002 and appear as low increase on the map (wide map No 4)

There are 155 taluks on the map that show no increase in the area of sunflower cultivation, where 61 taluks having no area under sunflower cultivation are also included. (Table-4 fig-4)

Percentage share of the increase of sown area under Sunflower when compared from 1992-2002

Table 4

Name of Taluks	Area in hectares 1992	Area in hectares 2002	Actual change	%
1.Koratagere	4	145	141	3525%
2. Pavagad	387	3798	3411	881%
3.Madhugiri	219	2069	1850	845%
4. Channagiri	847	3985	3138	370%
5. Shira	2018	6130	4112	204%
6. Soundatti	2745	5840	3095	113%
7. Bhadravati	16	33	17	106%
8. Koppal	9767	18627	8860	91%
9. Lingasur	25144	41512	16368	65%
10. Yalaburga	13525	22364	8839	65%
11. Belguam	29	46	17	59%
12. Kustagi	12146	17595	5449	45%
13. Gungavati	7007	9530	2523	36%
14. Gadag	8823	11506	2683	30%
15. Shirahatti	5926	7210	1284	22%
16. Ron	22278	26574	4296	19%

17. Hospet	1380	1625	245	18%
18. Ramadurga	7045	7770	725	10%
19. Athani	3499	3504	5	1%

The soils of Karnataka are sufficiently suitable for the cultivation of oilseeds. However, they need manuring, treatment and irrigation (when rain fails) so as to find successful cultivation of oilseed crops. Out of 64% of land under agriculture in Karnataka, about 12% is occupied by all

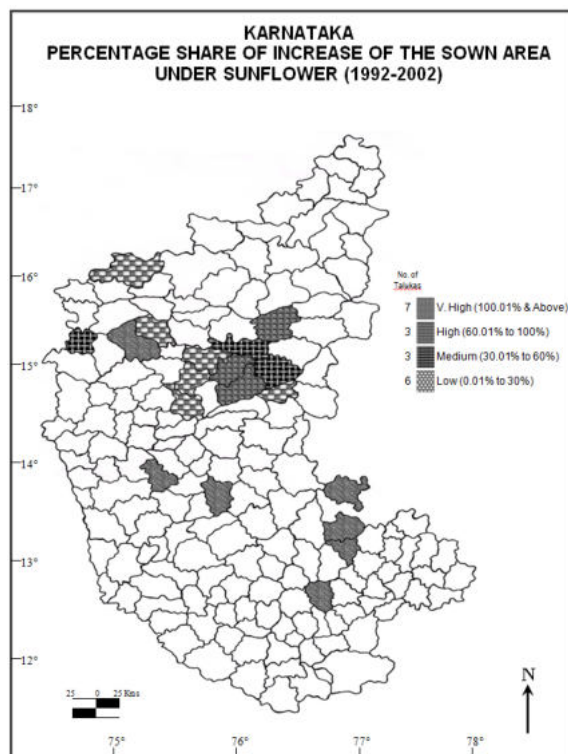


FIG 4

types of oilseeds and this can be further increased by way of cultivating 9% of land which is under cultivable waste. The objectives laid in the Technology Mission on oilseeds have to be continuously implemented, for which concerned departments of central government, State governments and Agriculture universities have to do their share unflinching. It is hoped that this piece of research endeavor carried out by this researcher will add to the knowledge of understanding of oilseeds cultivation in association with the agricultural system in Karnataka. The detailed narration of findings will certainly add to flourish the oilseeds cultivation of Karnataka when implemented in spirit and purpose.

During 1992-93 out of 175 taluks of Karnataka, the cultivation of sunflower was observed in 154 taluks. During 2002-03 the sunflower cultivation was observed in 114 taluks. The concentration map of the sunflower cultivated area during the year 2002-03 shows 9 taluks as very high concentration. Out of these 9 taluks 8 taluks are located in Tungabhadra river basin, while one taluk i.e. Hiriya belongs to Vedavati river basin. In these taluks the black soils and irrigation facilities have supported the farmers to cultivate sunflower under very high concentration. The map further shows 63 taluks as very low concentration of sunflower and another 28 taluks as low concentration. Therefore, these 63+28 taluks of low & very low concentration have to be considered for further growth of area under sunflower cultivation.

#### 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 1<sup>st</sup> rank to 19<sup>th</sup> 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.

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