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# Statistical Analysis to Estimate the Temporal Variability in Area and Production of Coconut Crop in Districts of Karnataka

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**Abstract -In India, Karnataka stands second in area (419 thousand hectare) and third in production (1492 thousand million nuts) of coconut. In Karnataka, Tumkur is the largest producer of coconut with the production of 9945.66 lakh nuts (2010). An attempt is made to study the area, production and productivity of coconut crop in districts of Karnataka. The analysis is based on secondary data taken from Directorate of Economics and Statistics, Karnataka for the period 1982-2009. The results establish an increasing shift of coconut cropped area (130.14%), production (203.65%) and productivity (112.71%) for the period 1982-2009. Three models viz., Linear, power and exponential were fitted for comparison based on R2 value reveals that 5 districts indicating power model and 9 districts showing exponential model for area. Three districts with power model and 6 districts with exponential model as best fit for coconut production.**

**Keywords - Sustainable agriculture, Regression analysis, co efficient of determination, Multiple regression, Temporal variability.**

## I. INTRODUCTION

Botanically, the coconut palm is a *monocotyledon* and belongs to the order *Arecaceae*, family *Palmae* and the specie is known as ***Cocus nucifera Linn***. Since from ancient times, coconuts are ceremonially associated with worship of Gods and Goddess in Hindu religion. Coconut, in its natural form, decorated with gold or silver formed a part of offerings on many religious occasions and social gatherings.

The coconut crop is grown in 12.9 million hectare of land which constituted about 0.7 per cent of net crop area of the world. About 57.9 billion nuts were produced (India stat.com 2010). India contributes about 15.46 per cent in area and 21 per cent in terms of production of coconut in the world. The major coconut crop acrege is concentrated in the states of Kerala, Karnataka and Maharashtra. Karnataka stands second in area (419 thousand hectare) and third in production (1492 thousand million nuts). In Karnataka, Tumkur is the largest producer of coconut with the production of 9945.66 lakh nuts.

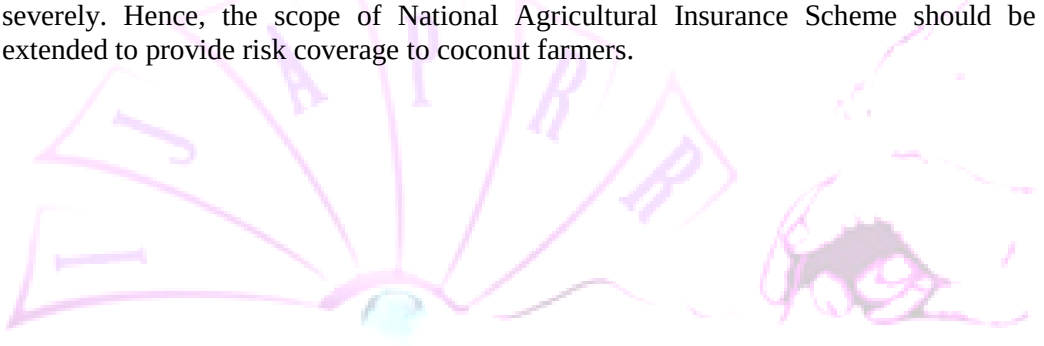
Approximately 60 per cent of the coconut produced in the state is utilized as raw nuts for domestic culinary purposes, social cultural and religious purposes. About 25 per cent of the nuts are converted into edible ball copra, desiccated coconut powder and the remaining 15 per cent is utilized as tender coconut for drinking purpose. Prominently, around 60–70 per cent of the arrival of coconut is exported to other states i.e. Uttar Pradesh, Punjab, Maharashtra, Rajasthan, Madhya Pradesh, Jammu & Kashmir, etc., About 60 per cent of coconut production in Karnataka is used in domestic items and remaining is dried as copra, most of the copra arriving to the markets is dispatched to other state, where the Karnataka copra is in great demand. The coconut utilized for commercial product preparation is only to the extent of 35-40 per cent, while 55-60 per cent is consumed for food and beverage purposes (Coconut Development Board).

The trade in tender coconut in the state is very popular, as tender coconuts have fairly good demand in most of the cities apart from the demand from the upcountry buyers. It has been observed that along the busy state highways and national highways like Bangalore – Mysore, Bangalore – Pune, etc., temporary retail sales outlets for tender coconut have been established at different points to meet the demand of tourist and other travellers. The coir industry is an important cottage industry in the rural areas of the state, providing gainful employment to many villagers. There are 330 units registered with coir board manufacturing coir products in Karnataka which are located in Bangalore, Hassan and Mandya. Out of these 330 units, 50 units are fibre extraction units, 30 units make curved ropes and 30 units make yarn, remaining units are manufacturing coir products.

Decreasing the cost of production of nut is the most important criteria for increasing competitiveness. Cost effective management practices such as organic recycling of coconut biomass and other farm wastes or converting them into vermi-compost, addition of need based inputs at the appropriate level and time, adopting drip irrigation by providing subsidy for it, soil moisture conservation, basin management with organic mulching or growing green manures and incorporating them, need based plant protection measures using bio-control agents are also to be adopted for substantial growth in production and to increase the productivity of coconut.

The integrated pest and disease management approach allows pest and disease management without any adverse impact on ecological sustainability of the Agro ecosystem. It is necessary that a massive and concerted programme be launched involving research and extension backed by suitable subsidy schemes. It is recommended that a massive programme should be launched to weed out the old unproductive and diseased coconut palms and replanting seedling of improved hybrid varieties of coconut palms as a measure of rehabilitation.

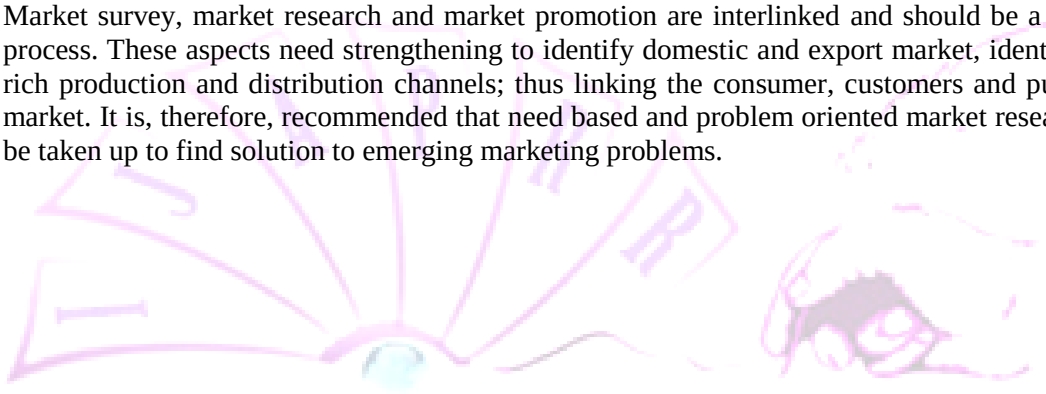
Adverse weather condition and the problem of disease infestation are the two major risk factors affecting coconut production and productivity which result in low income among farmers. In the absence of any effective mechanism for risk cover, the economy of coconut plants suffers severely. Hence, the scope of National Agricultural Insurance Scheme should be effectively extended to provide risk coverage to coconut farmers.



Conventional trade in coconut product including nuts and copra are characterized by the involvement of intermediary at different levels of marketing due to which the farmers suffers a long. Thus, there is necessity of a system that mediates between *"the farm and the firm"*. Adoption of farm level processing, involving farmer's groups/societies/ associations should be encouraged. Bigger units of copra making should be set up. Introduction of state of art warehousing facilities and access to robust prices risk management instruments such as "Future contracts for coconut, coconut oil, copra and oil cake" should be encouraged.

Marketing data about a product line from both external and internal sources and assembles the data, thus helping in marketing decision making as it comprises of collection and storage of data, analysis, and interpretation of data and the dissemination of intelligence. Thus, competitive data base market intelligence system should be developed to generate advance estimation of coconut production, copra with a view to generate reliable and consistent estimates.

Market promotion is one of the key aspects for a better scales outlet and better price. Market survey, market research and market promotion are interlinked and should be a continuous process. These aspects need strengthening to identify domestic and export market, identification of rich production and distribution channels; thus linking the consumer, customers and public to the market. It is, therefore, recommended that need based and problem oriented market research should be taken up to find solution to emerging marketing problems.



The consumers for organic foods are increasing and organic sales are growing by 20 per cent. Since consumer of organic food look for absence of pesticides/herbicides/synthetic fertilizer, coconut is the best option to satisfy all these preferences. Since coconut is largely raised in all the coconut growing areas under natural farming it can be marketed as organic product.

The demand for diversified and value added product of coconut is increasing in India and abroad very rapidly, In spite this potential, its valuable wealth resources have not been exploited to its optimum potential. Many circumstances have contributed to diffidence in the value added sector of coconut viz., prices of raw materials, technologies, fear of competition and non-attachment of quality standards, end product price uncertainty, lack of investments are some of the factors which are hampering the growth of coconut into diversified and value added product. Therefore, it is recommended that the Government may play an active role in promoting the diversification of usage of coconuts and its value added products like coconut cream, spray dried coconut cream powder, coconut vinegar etc., by providing:

a) Institutional support system which will offer knowledge base as,

   i) Quality Concepts

   ii) Technology linkage

   iii) National and International Production and Processing Standards.

b) Programmes for technology improvement, absorption, quality up gradation, investment generation and product improvement.

c) Providing financial support and appropriate incentives in the form of soft loans cut down taxes, working capital and capital subsidy.

d) By providing adequate funds at liberal terms for processing and storage facilities for copra.

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Farmers growing coconut now a day's face many problems like fluctuating prices of coconut, even though the area under coconut and the production have been increasing over the years and farmers tend to take risk. The study related to aspects like whether increasing in production is due to increase in area or yield, and the factors responsible for changes in area and yield, which in turn contributed to the increase in output supply.

In view of the importance of coconut in the economy as a whole and especially in the districts of Karnataka, the present study was under taken.

## II. METHODOLOGY

**To estimate temporal variability in area and production of coconut crop in districts of Karnataka**.

Apart from the problem of inducing a steady rise in the level of cropped area and production, there are two major problems encountered concerned with agricultural development.

1. Agricultural area and production fluctuates from year to year. The problem is considered in comparisons over time period.

2. There exists a wide disparity in agricultural area and production over the period among different districts. This problem of district disparity or variation is studied on the basis of cross-sectional comparison with state average at given period of time.

The study provide useful information on the structure of agricultural area and production. Often many of the studies are based on the aggregate agricultural area/production of district and consider total area and production of state and years.

In order to evaluate temporal variability for area and production of coconut crop the concept of regression analysis was employed. The model for regression used in the present research study is established below.

Regression analysis carried out for each of the study period considering the state average (y) and each district (X) area and production over the period of time.

## III. RESULTS AND DISCUSSION

To estimate temporal variability production of crops among districts of Karnataka, analysis of different models and coefficient of determination has to be done as follows,

**Table 4.1.6. Comparison of districts with production of Coconut crop**

| **District Classification on Production** | | |
|---|---|---|
| **Years** | **≤ mean** | **>mean** |
| **1982-1990**<br>**(Period-I)**<br>**(19Districts)** | **Bijapur, Dharwad, Gulbarga, Kodagu, Kolar, Raichur (6 Districts)** | **Bangalore urban, Bangalore rural,** Belgaum**,** Bellary**, Chikmagalur, Chitradurga, Dakshina kannada, Hassan, Mandya, Mysore, Shimoga, Tumkur, Uttara Kannada (13 Districts)** |
| **1991-2000**<br>**(Period-II)**<br>**(26 Districts)** | Bagalkote, Belgaum, Bellary, **Bijapur, Dharwad**, Gadag, **Gulbarga**, Haveri, **Kodagu, Kolar**, Koppal, **Raichur (12 Districts)** | **Bangalore urban, Bangalore rural,** Chamarajnagar, Davanagere**, Chikmagalur, Chitradurga, Dakshina kannada, Hassan, Mandya, Mysore, Shimoga, Tumkur, Uttara Kannada,** Udupi, **(14 Districts)** |
| **2001-2009**<br>**(Period-III)**<br>**(27 Districts)** | Bagalkote, Belgaum, Bellary, Bidar, **Bijapur**, **Dharwad**, Gadag, **Gulbarga**, Haveri, **Kodagu**, **Kolar**, Koppal, **Raichur (13 Districts)** | **Bangalore urban, Bangalore rural,** Chamarajnagar**,** Davanagere**, Chikmagalur, Chitradurga, Dakshina Kannada, Hassan, Mandya, Mysore, Shimoga, Tumkur, Uttara Kannada,** Udupi **(14 Districts)** |
| **1982-2009** | Bagalkote, Belgaum, | **Bangalore urban, Bangalore rural,** |

| | | |
|---|---|---|
| **(Overall)**<br><br>**(27 Districts)** | Bellary, Bidar, **Bijapur, Dharwad**, Gadag, **Gulbarga**, Haveri, **Kodagu**, **Kolar**, Koppal, **Raichur**<br>**(13 Districts)** | Chamarajnagar**,** Davanagere**, Chikmagalur, Chitradurga, Dakshina Kannada, Hassan, Mandya, Mysore, Shimoga, Tumkur, Uttara Kannada,** Udupi<br>**(14 Districts)** |

**NOTE:** Bold letters indicating similar districts compared with the state average.

**Table 4.1.7. Trend in Area of coconut crop in Districts of Karnataka for the overall period 1982-2009: Estimates of linear, Power and exponential trend**

| No. | Districts | Linear | Power | Exponential | $R^2$ (Linear) | $R^2$ (Power) | $R^2$ (Exponential) |
|---|---|---|---|---|---|---|---|
| 1. | Bagalkote | Y=1232-90.83X | $Y=1325X^{-0.51}$ | $Y=1387e^{-0.14x}$ | 0.567 | 0.401 | 0.623 |
| 2. | Banglore urban | Y=5980-174.7X | $Y=7645X^{-0.41}$ | $Y=4170.e^{-0.02x}$ | 0.286 | 0.324 | 0.138 |
| 3. | Banglore rural | Y=871.6+259.2X | $Y=1486\ X^{0.412}$ | $Y=1987\ e^{0.04x}$ | 0.692 | 0.621 | 0.845 |
| 4. | Belgaum | Y= 1388+16.47X | $Y=21.98X^{0.880}$ | $Y=55.10e^{0.083x}$ | 0.637 | 0.875 | 0.753 |
| 5. | Bellary | Y=832.3+22.34X | $Y=565.9X^{0.261}$ | $Y=802.3e^{0.022x}$ | 0.432 | 0.751 | 0.474 |
| 6. | Bidar | Y=46680+1564 X | $Y=41698\ X^{0.178}$ | $Y=50309\ e^{0.02x}$ | 0.413 | 0.454 | 0.507 |
| 7. | Bijapur | Y=226.1+1.952X | $Y=116.6X^{0.273}$ | $Y=188.8e^{0.012x}$ | 0.015 | 0.218 | 0.043 |
| 8. | Chamarajnagar | Y=5763+589.8X | $Y=5950X^{0.263}$ | $Y=6153.e^{0.064x}$ | 0.73 | 0.642 | 0.757 |
| 9. | Chikmagalur | Y=19098+614.0X | $Y=17073X^{0.197}$ | $Y=20072e^{0.021x}$ | 0.904 | 0.797 | 0.925 |
| 10. | Chitradurga | Y=24376+746.6X | $Y=19997X^{0.225}$ | $Y=24948e^{0.022x}$ | 0.829 | 0.868 | 0.815 |
| 11. | Dakshina Kannada | Y=19895-118.5X | $Y=19088X^{-0.02}$ | $Y=19868e^{-0.00x}$ | 0.093 | 0.016 | 0.116 |
| 12. | Davanagere | Y=13073-102.6X | $Y=13005\ X^{-0.02}$ | $Y=13080\ e^{-0.00x}$ | 0.345 | 0.196 | 0.349 |
| 13. | Dharwad | Y=891.3-12.93X | $Y=817.3X^{-0.09}$ | $Y=899.0\ e^{-0.02x}$ | 0.119 | 0.037 | 0.194 |
| 14. | Gadag | Y=296.7+33.30X | $Y=302.1X^{0.295}$ | $Y=318.9e^{0.009x}$ | 0.891 | 0.821 | 0.895 |
| 15. | Gulbarga | Y=26178+1798X | $Y=29176X^{0.211}$ | $Y=34780\ e^{0.02x}$ | 0.235 | 0.241 | 0.293 |
| 16. | Hassan | Y=31883+1071.X | $Y=28920X^{0.196}$ | $Y=33690e^{0.022x}$ | 0.935 | 0.780 | 0.957 |
| 17. | Haveri | Y=910.5+30.00X | $Y=746.8X^{0.213}$ | $Y=839.6e^{0.037x}$ | 0.092 | 0.296 | 0.177 |
| 18. | Kodagu | Y=246.9+48.16X | $Y=320.6X^{0.408}$ | $Y=429.5e^{0.048x}$ | 0.792 | 0.679 | 0.896 |
| 19. | Kolar | Y=1280+33.71X | $Y=871.0X^{0.279}$ | $Y=1237\ e^{0.022x}$ | 0.454 | 0.748 | 0.460 |
| 20. | Koppal | Y=532.0+9.427X | $Y=397.7X^{0.105}$ | $Y=4418\ e^{0.029x}$ | 0.013 | 0.064 | 0.035 |
| 21. | Mandya | Y=9569+375.2X | $Y=8356X^{0.252}$ | $Y=10163e^{0.025x}$ | 0.940 | 0.845 | 0.956 |
| 22. | Mysore | Y=9918+343.7X | $Y=8787X^{0.206}$ | $Y=10469e^{0.022x}$ | 0.607 | 0.546 | 0.613 |
| 23. | Raichur | Y=254.2+1.104X | $Y=276.6X^{-0.04}$ | $Y=258.3e^{-0.00x}$ | 0.006 | 0.007 | 0.002 |
| 24. | Shimoga | Y=9673+134.8X | $Y=2751X^{0.339}$ | $Y=4264e^{0.026x}$ | 0.263 | 0.650 | 0.377 |
| 25. | Tumkur | Y=27969+3467X | $Y=29285X^{0.377}$ | $Y=38462e^{0.044x}$ | 0.929 | 0.735 | 0.961 |
| 26. | Udupi | Y=6088+696.6X | $Y=3971X^{0.329}$ | $Y=5299.e^{0.083x}$ | 0.705 | 0.740 | 0.595 |
| 27. | Uttara Kannada | Y=4712+78.11X | $Y=4511X^{0.104}$ | $Y=4819.e^{0.012x}$ | 0.786 | 0.572 | 0.827 |

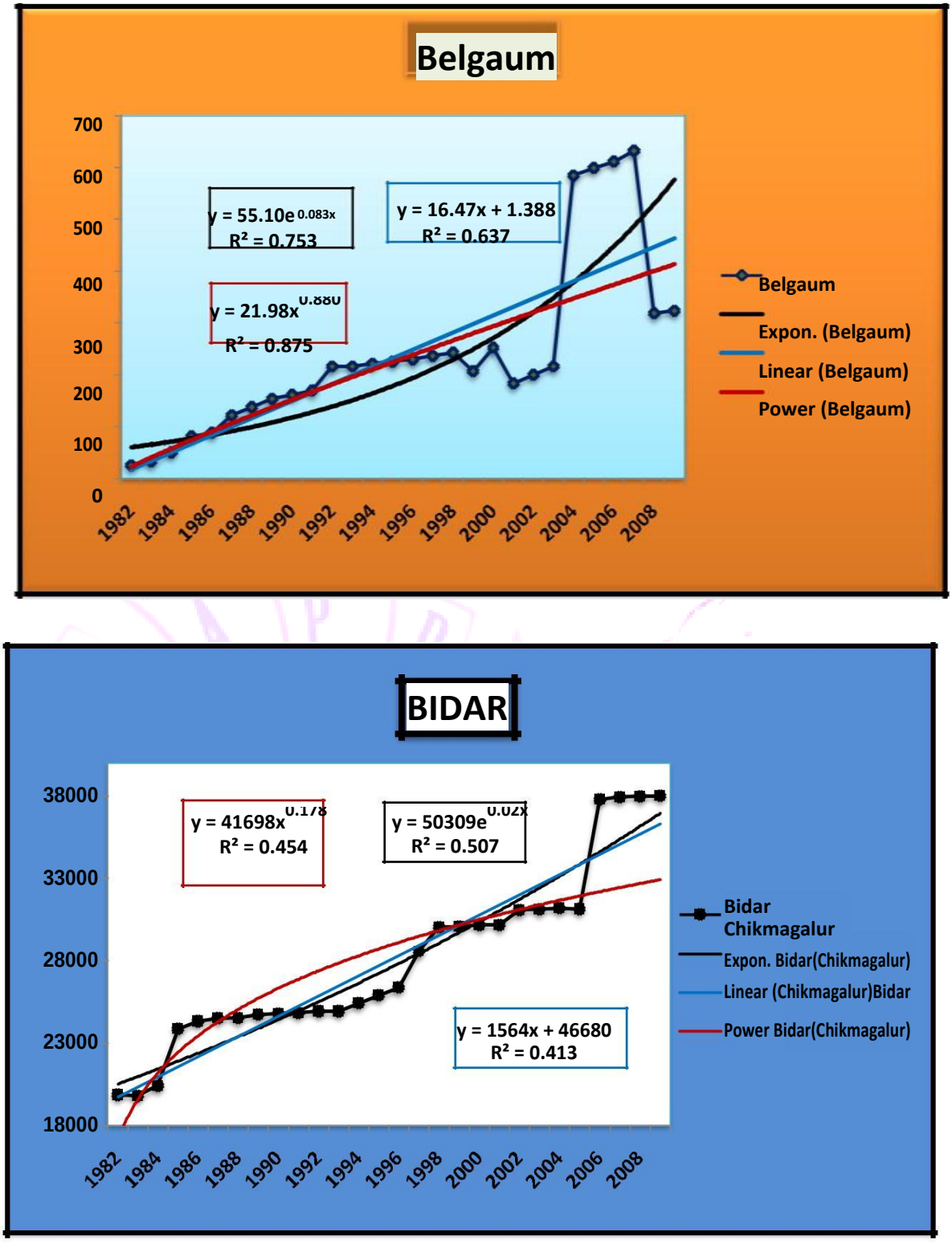



**Figure 4. Regression equation based on area during the year 1982-2009 of Belgaum and Bidar**

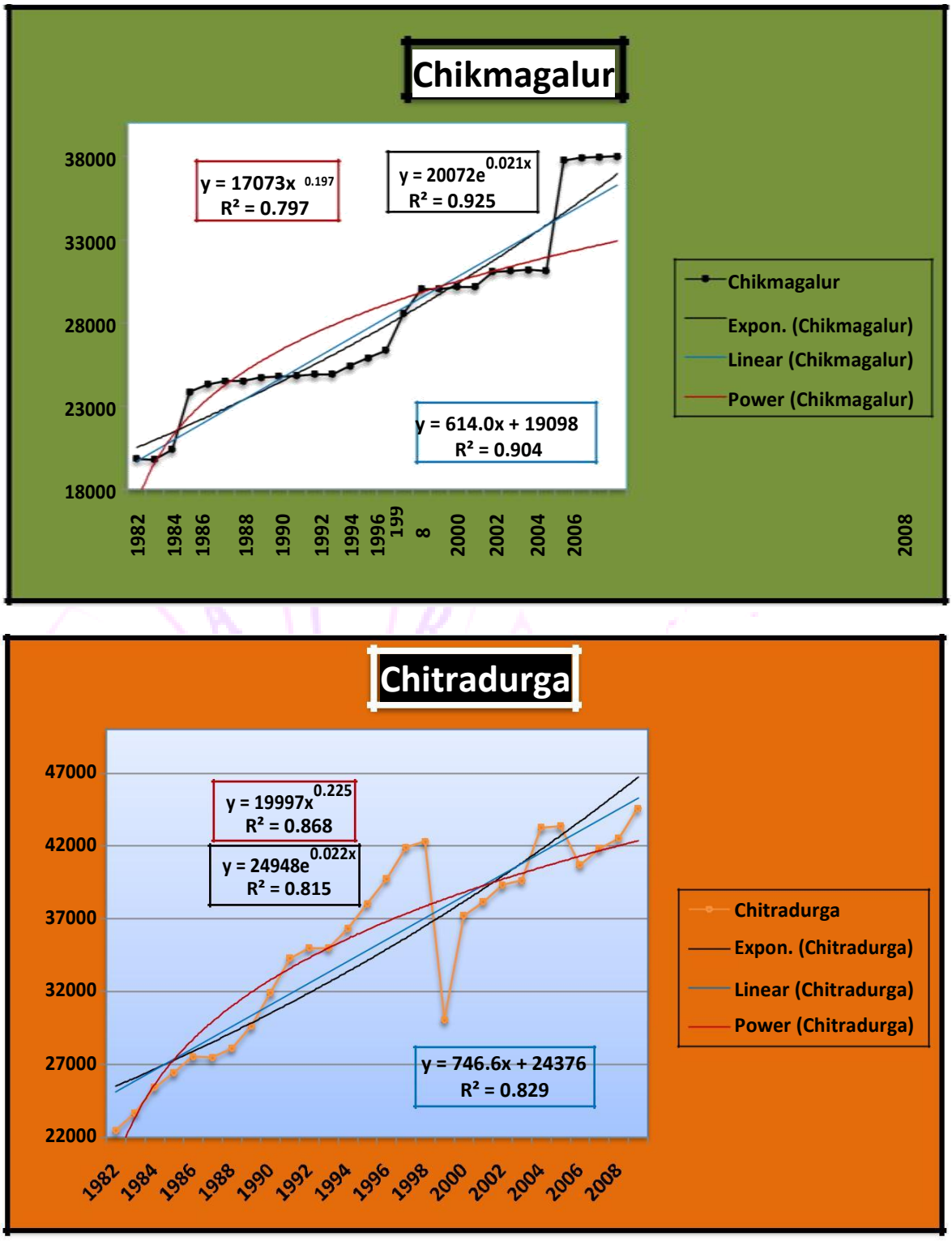



**Figure 5: Regression equation based on area during the year 1982-2009 of Chikamagalur and Chitradurga**

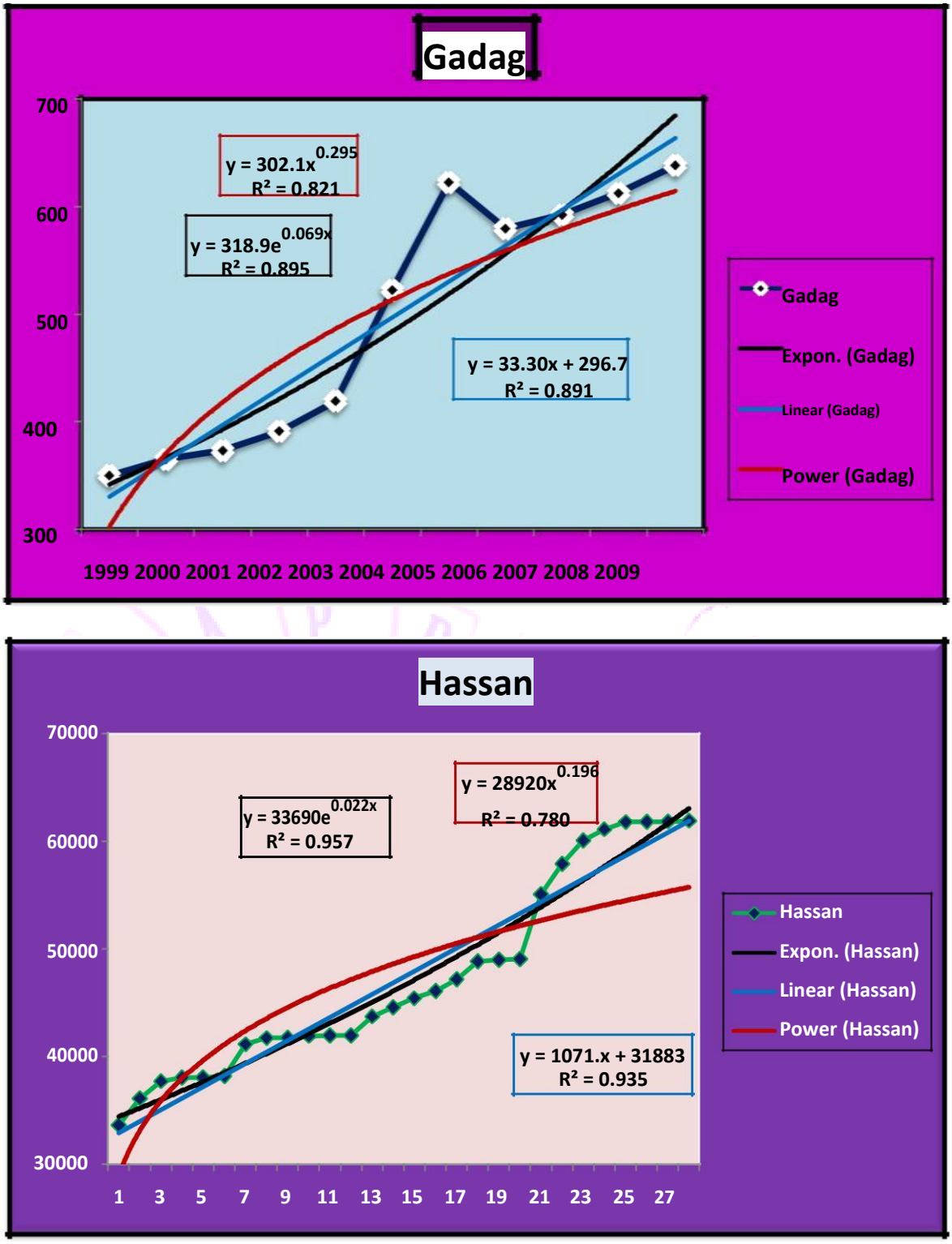



**Figure 6: Regression equation based on area during the year 1982-2009 of Gadag and Hassan**

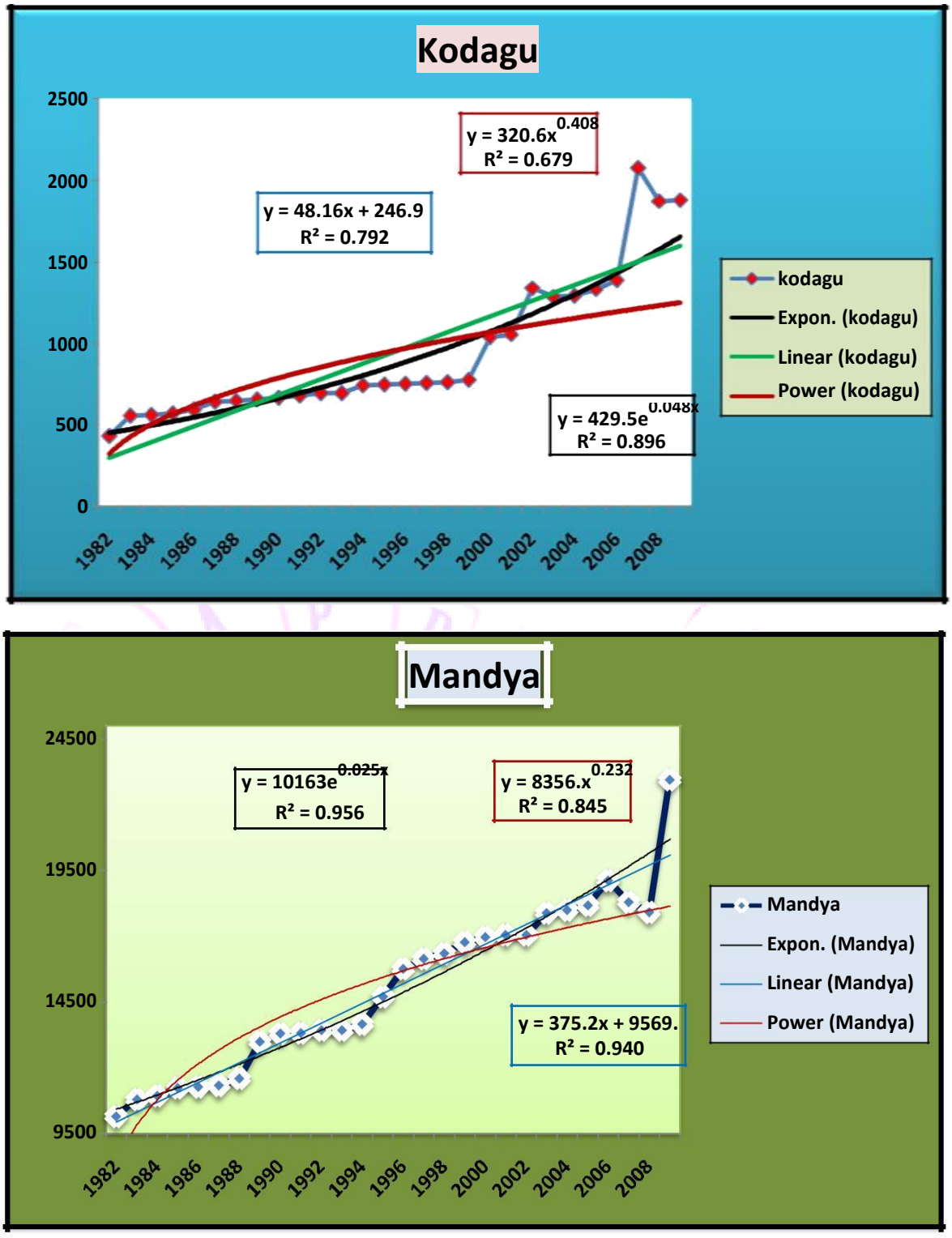



**Figure 7: Regression equation based on area during the year 1982-2009 of Kodagu and Mandya**

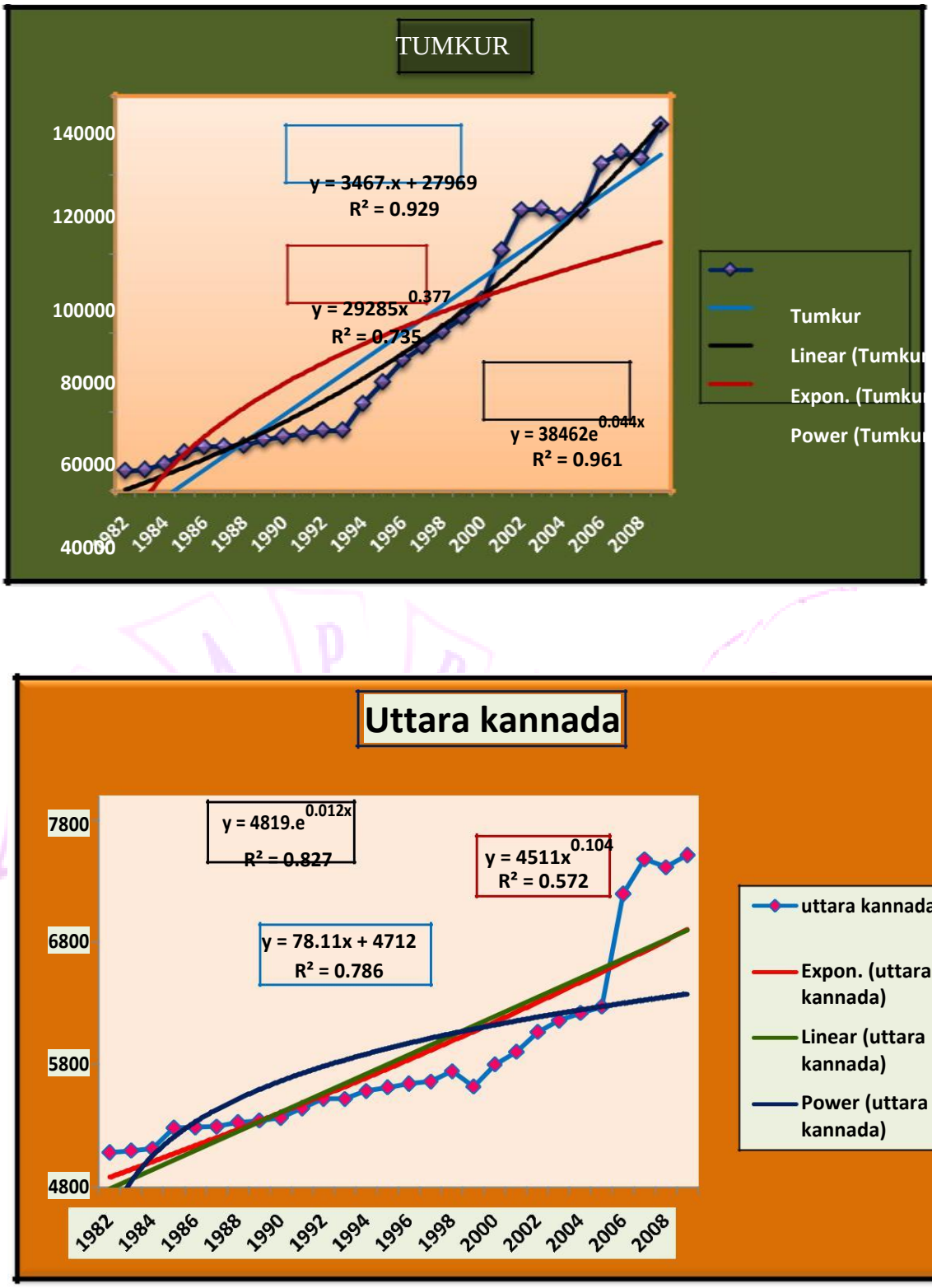



**Figure 8: Regression equation based on area during the year 1982-2009 of Tumkur and Uttara Kannada**

**Table 4.1.8. Trend in production of coconut crop in districts of Karnataka for the Overall period of 1982-2009: Estimates of linear, Power and exponential trend.**

| No. | Districts | Linear | Power | Exponential | $R^2$ (Linear) | $R^2$ (Power) | $R^2$ (Exponential) |
|---|---|---|---|---|---|---|---|
| 1. | Bagalkote | Y=5720-392.7X | $Y=5979X^{-0.45}$ | $Y=6152e^{-0.12X}$ | 0.489 | 0.335 | 0.504 |
| 2. | Banglore urban | Y=7540+224.6X | $Y=6098X^{0.207}$ | $Y=7430e^{0.022X}$ | 0.170 | 0.283 | 0.220 |
| 3. | Banglore rural | Y=871.6+259.2X | $Y=1486\ X^{0.412}$ | $Y=1987\ e^{0.04X}$ | 0.692 | 0.621 | 0.845 |
| 4. | Belgaum | Y=-55.28+78.24X | $Y=93.39X^{0.899}$ | $Y=233.5e^{0.087X}$ | 0.709 | 0.883 | 0.788 |
| 5. | Bellary | Y=3843+124.0X | $Y=2651\ X^{0.297}$ | $Y=3764e^{0.025X}$ | 0.545 | 0.806 | 0.564 |
| 6. | Bidar | Y=46680+1564X | $Y=41698\ X^{0.178}$ | $Y=50309\ e^{0.02X}$ | 0.413 | 0.454 | 0.507 |
| 7. | Bijapur | Y=1058+12.55X | $Y=546.8X^{0.289}$ | $Y=886.7e^{0.015X}$ | 0.027 | 0.242 | 0.062 |
| 8. | Chamarajnagar | Y=11084+3555X | $Y=18282X^{0.307}$ | $Y=17112\ e^{0.092X}$ | 0.565 | 0.316 | 0.567 |
| 9. | Chikmagalur | Y=144386+1848X | $Y=44569X^{0.179}$ | $Y=50801e^{0.020}$ | 0.306 | 0.297 | 0.376 |
| 10. | Chitradurga | Y=15701+2303X | $Y=13385X^{0.133}$ | $Y=15646e^{0.011X}$ | 0.200 | 0.200 | 0.843 |
| 11. | Dakshina kannada | Y=80470+30.07X | $Y=77451X^{0.009}$ | $Y=80982e^{-0.00X}$ | 0.001 | 0.001 | 0.003 |
| 12. | Davanagere | Y=68021-806.9X | $Y=72939X^{-0.09}$ | $Y=67849e^{-0.01X}$ | 0.060 | 0.190 | 0.077 |
| 13. | Dharwad | Y=4227-55.69X | $Y=3828X^{-0.06}$ | $Y=4218e^{-0.02X}$ | 0.098 | 0.026 | 0.156 |
| 14. | Gadag | Y=1366+172.5X | $Y=1423X^{0.310}$ | $Y=1498e^{0.073X}$ | 0.916 | 0.821 | 0.919 |
| 15. | Gulbarga | Y=26178+1798X | $Y=29176\ X^{0.211}$ | $Y=34780\ e^{0.021X}$ | 0.235 | 0.241 | 0.293 |
| 16. | Hassan | Y=19988+3082X | $Y=18106X^{0.121}$ | $Y=20265e^{0.012X}$ | 0.659 | 0.694 | 0.698 |
| 17. | Haveri | Y=4215+1778X | $Y=3499X^{0.233}$ | $Y=3916e^{0.043X}$ | 0.138 | 0.342 | 0.231 |
| 18. | Kodagu | Y=900.9+261.4X | $Y=1502X^{0.424}$ | $Y=2016\ e^{0.050X}$ | 0.711 | 0.640 | 0.867 |
| 19. | Kolar | Y=6584+88.09X | $Y=4809X^{0.178}$ | $Y=6331e^{0.010X}$ | 0.108 | 0.142 | 0.050 |
| 20. | Koppal | Y=2288+108.1X | $Y=1789X^{0.237}$ | $Y=1956\ e^{0.048X}$ | 0.069 | 0.087 | 0.107 |
| 21. | Mandya | Y=46772+1579X | $Y=42712X^{0.189}$ | $Y=50316e^{0.020X}$ | 0.435 | 0.476 | 0.523 |
| 22. | Mysore | Y=27758+1872X | $Y=30254X^{0.212}$ | $Y=35670e^{0.024X}$ | 0.246 | 0.250 | 0.307 |
| 23. | Raichur | Y=1123+11.22X | $Y=1225X^{-0.02}$ | $Y=1120e^{0.0027X}$ | 0.027 | 0.001 | 0.002 |
| 24. | Shimoga | Y=15174+587.7X | $Y=9968X^{0.323}$ | $Y=14979e^{0.025X}$ | 0.219 | 0.439 | 0.268 |
| 25. | Tumkur | Y=22931+16996X | $Y=21602X^{0.300}$ | $Y=27307e^{0.035X}$ | 0.795 | 0.722 | 0.898 |
| 26 | Udupi | Y=18027+4357X | $Y=17675X^{0.345}$ | $Y=22052e^{0.093X}$ | 0.721 | 0.737 | 0.708 |
| 27. | Uttara kannada | Y=20730+574.5X | $Y=20615X^{0.133}$ | $Y=22141e^{0.017X}$ | 0.508 | 0.372 | 0.601 |

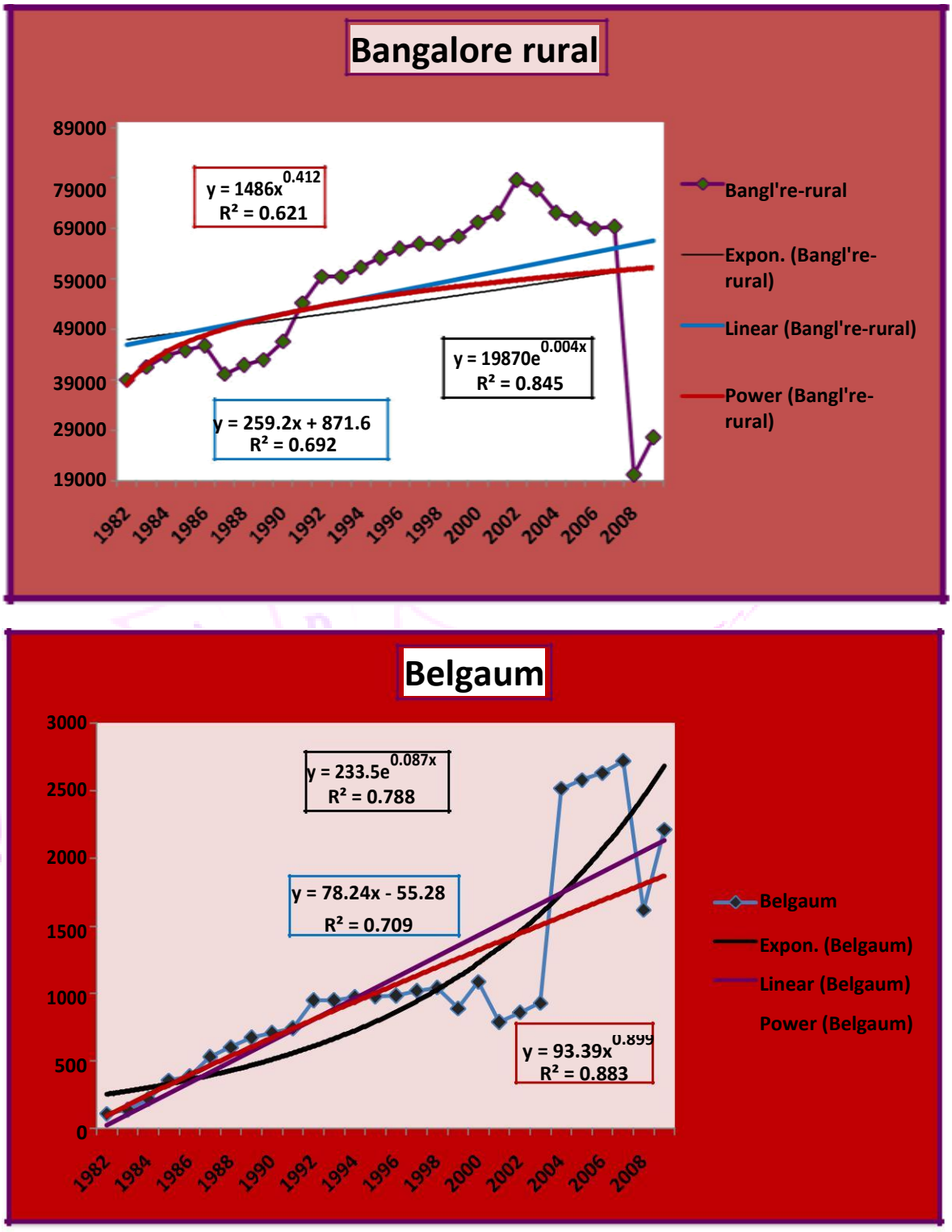



**Figure 9: Regression equation based on Production during the year 1982-2009 of Bangalore rural and Belgaum**

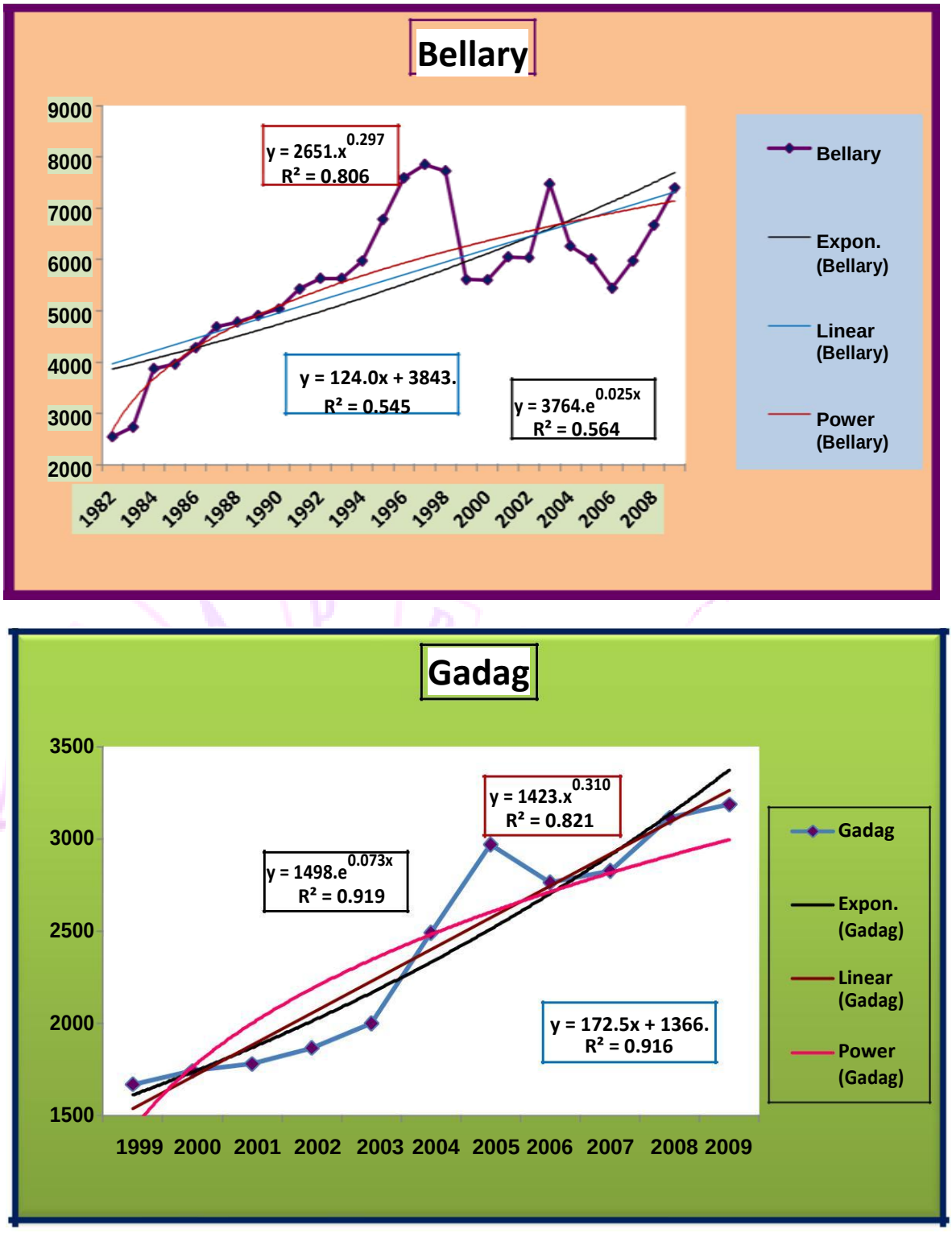



**Figure 10: Regression equation based on Production during the year 1982-2009 of Bellary and Gadag**

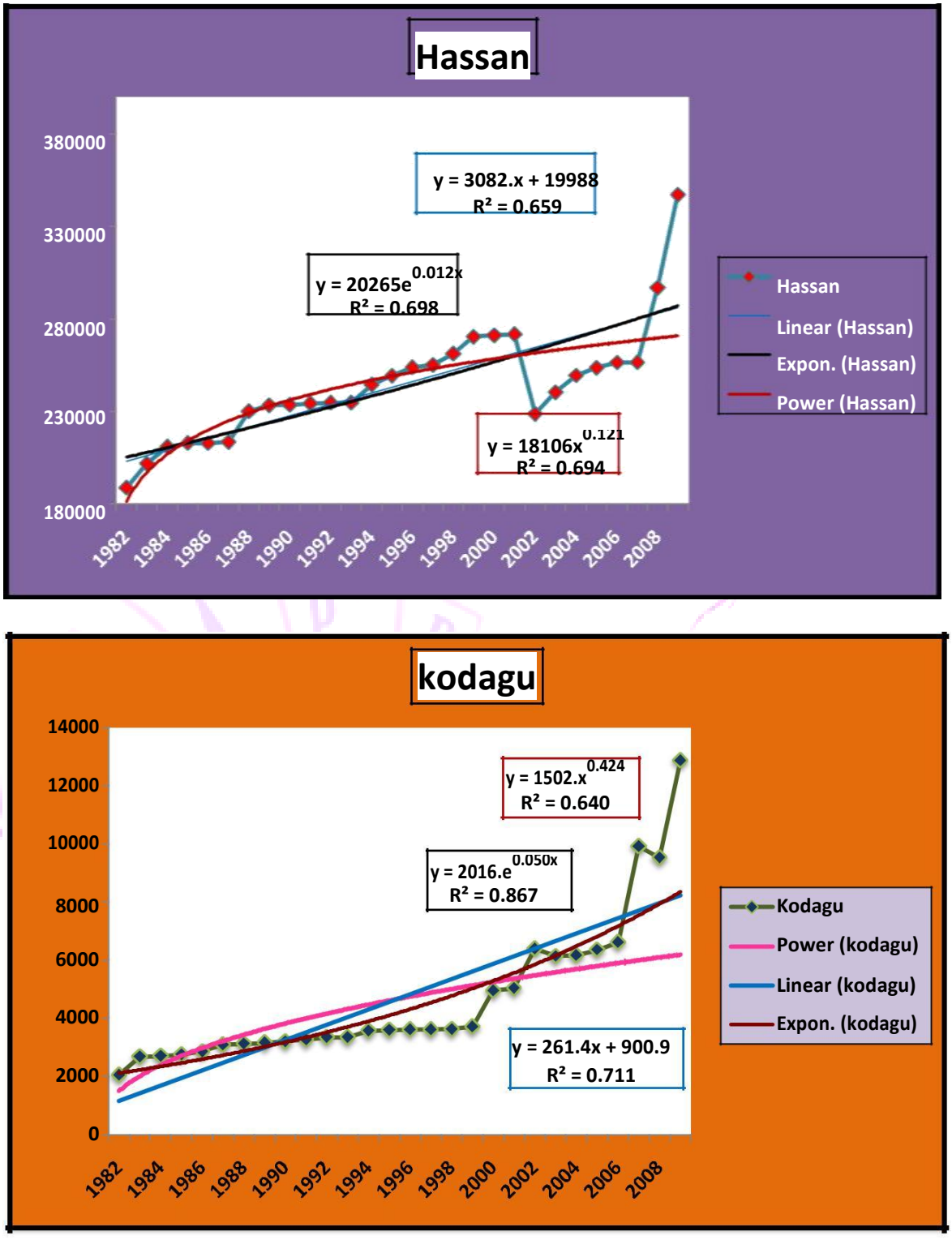
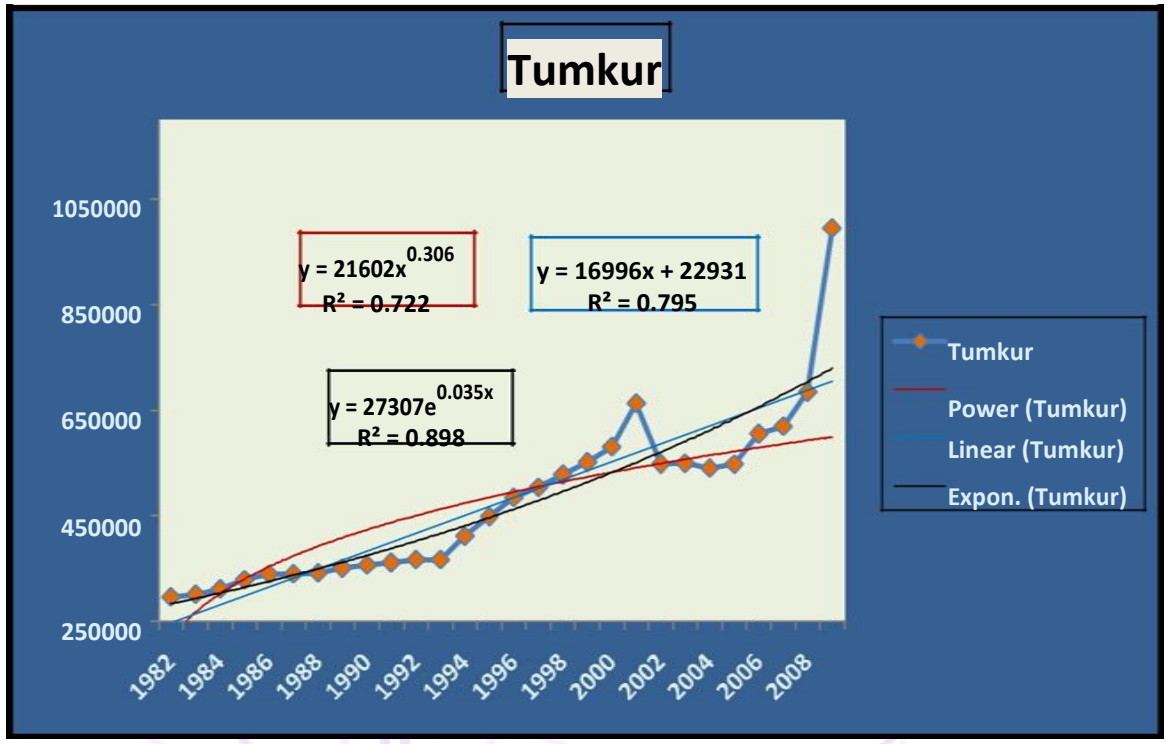



**Figure 11: Regression equation based on Production during the year 1982-2009 of Hassan and Kodagu**



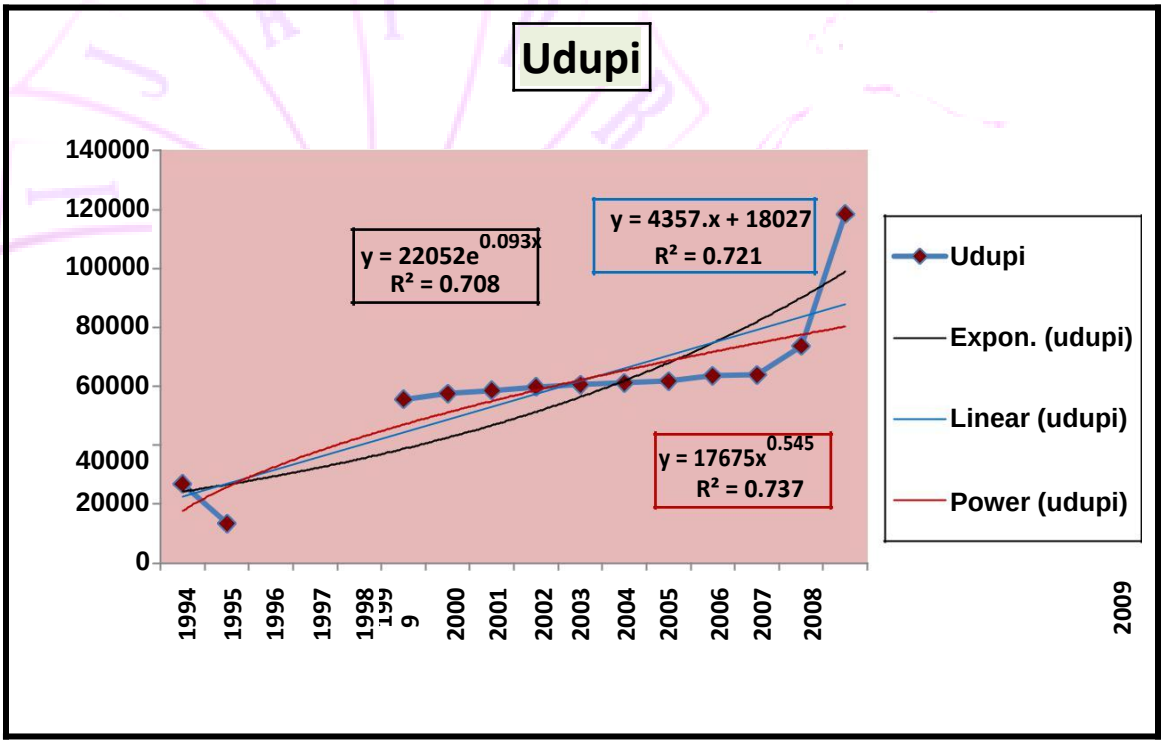




**Figure 12: Regression equation based on Production during the year 1982-2009 of Tumkur and Udupi**

district with respect to area and production to study the growth trends.
The model showing the highest $R^2$ value was considered as a best fit.

The comparison was made between models based on $R^2$ value with more than 0.80 which considered to be the best fit. The result reveals for 5 districts (Belgaum, Bellary, Chitradurga, Koppal and Udupi) indicating power model found to be the best fit for area under coconut crop. Further, 9 districts (Bidar, Chamarajnagar, Chikmagalur, Gadag, Hassan, Kodagu, Mandya, Tumkur and Uttara Kannada) showing exponential model found to be the best fit for area under coconut crop (Figure-4 to 8).

Further, the result reveals that 3 districts (Belgaum, Bellary and Udupi) found with power model be the best fit for production under coconut crop. While, 6 districts (Banglore-rural, Chitradurga, Gadag, Hassan, Kolar, and Tumkur) found with exponential model be the best fit for production under coconut crop (Figure-9 to 12).

**Regression analysis on area of coconut crop for the period 1982-2009.**

Table 4.3.1 to table 4.3.4 reveals the regression analysis carried out for the coconut area for the periods 1982-2009.

Table 4.3.1 shows that the contributions towards the area of coconut crop for the overall period of 1982-2009 possess maximum $R^2$ of 97.1 per cent in Tumkur district followed by 96.2 per cent in Chitradurga district and 95.6 per cent in Hassan district.

The analysis reveals that, the area measured over the period of 1982-2009 found to be highly significant at ($P<0.01$) for 15 districts, and 4 districts such as Bagalkote, Dakshina Kannada, Dharwad and Shimoga district found to be significant ($P<0.05$). The findings of t- test also established significant regression co-efficient and best fit of regression model as revealed in F-test.

**Regression analysis on area of coconut crop for the period 1982-1990.**

From the table 4.3.2 depicts that, during 1982-1990, regarding the area of coconut crop the maximum $R^2$ of 95.5 per cent in Hassan district followed by Tumkur district (95.1%) and Chitradurga district (94.5%). However, the least $R^2$value noticed in the districts of Raichur district (0.9%) and Banglore-urban district (0.360).

The analysis reveals that, for the period of 1982-1990, the area measured found to be highly significant (P<0.01%) for 15 districts. The t-test established significant regression co-efficient and best fit of regression model as revealed in F-test.

**Table 4.3.1 Regression analysis on Area of Coconut Crop for the period 1982-2009**

| No. | Districts | a | b | $SE_b$ | t | F | $R^2$ |
|---|---|---|---|---|---|---|---|
| 1. | Bagalkote | 401942 | -44.05 | 21.49 | 2.04* | 4.20* | 0.318 |
| 2. | Bangalore Urban | 331584 | -12.994 | 5.07 | 2.56* | 6.55** | 0.201 |
| 3. | Bangalore Rural | 256637 | 3.45 | 1.81 | 1.90 NS | 3.62NS | 0.147 |
| 4. | Belgaum | 198460 | 367.45 | 53.77 | 6.83** | 46.69** | 0.642 |
| 5. | Bellary | 95591 | 165.16 | 43.93 | 3.75** | 14.13** | 0.352 |
| 6. | Bidar | 374710 | 526.0 | 37.00 | 0.14 NS | 0.02 NS | 0.003 |
| 7. | Bijapur | 280923 | 22.90 | 117.46 | 0.19 NS | 0.03 NS | 0.001 |
| 8. | Chamarajnagar | 275100 | 10.38 | 2.94 | 3.51** | 12.38** | 0.579 |
| 9. | Chikmagalur | -101299 | 13.85 | 0.94 | 14.69** | 216.0** | 0.892 |
| 10. | Chitradurga | -68140 | 10.07 | 1.10 | 9.13** | 83.51** | 0.962 |
| 11. | Dakshina Kannada | 461799 | -9.61 | 4.35 | 2.20* | 4.87* | 0.157 |
| 12. | Davanagere | 625840 | -20.40 | 16.63 | 1.22 NS | 1.50 NS | 0.143 |
| 13. | Dharwad | 365392 | -111.48 | 44.15 | 2.52* | 6.37* | 0.196 |
| 14. | Gadag | 258892 | 227.07 | 46.80 | 4.85** | 23.54** | 0.723 |
| 15. | Gulbarga | 422613 | -141.18 | 140.78 | 1.00 NS | 1.00 NS | 0.052 |
| 16. | Hassan | -110166 | 8.36 | 0.35 | 23.83** | 568.32** | 0.956 |
| 17. | Haveri | 322133 | 45.415 | 27.89 | 1.62 NS | 2.64 NS | 0.227 |
| 18. | Kodagu | 136649 | 158.67 | 14.45 | 10.97** | 120.53** | 0.822 |
| 19. | Kolar | 77235 | 118.35 | 28.87 | 4.09** | 16.79** | 0.392 |
| 20. | Koppal | 352799 | 32.04 | 36.44 | 0.87 NS | 0.77 NS | 0.079 |
| 21. | Mandya | -64671 | 23.40 | 1.38 | 16.86** | 284.54** | 0.916 |
| 22. | Mysore | 46188 | 16.11 | 2.78 | 5.78** | 33.49** | 0.562 |
| 23. | Raichur | 261705 | 93.67 | 137.6 | 0.68 NS | 0.46 NS | 0.017 |
| 24. | Shimoga | 185679 | 15.24 | 6.38 | 2.38* | 5.70* | 0.179 |
| 25. | Tumkur | 83029 | 2.60 | 0.08 | 29.68** | 881.2** | 0.971 |
| 26. | Udupi | -248178 | 43.38 | 4.25 | 10.19** | 103.92** | 0.920 |
| 27. | Uttara Kannada | -269667 | 95.18 | 9.78 | 9.72** | 94.62** | 0.784 |

*Significant at 5% level, **Significant at 1% level, NS: Non-significant.

**Table 4.3.2. Regression analysis on Area of Coconut Crop for the period: 1982-1990.**

| No | Districts | a | b | $SE_b$ | t | F | $R^2$ |
|---|---|---|---|---|---|---|---|
| 1. | Bangalore urban | 209564 | -1.98 | 1.00 | 1.98 $^{NS}$ | 3.93$^{NS}$ | 0.360 |
| 2. | Belgaum | 176363 | 234.30 | 36.03 | 6.50** | 42.27** | 0.857 |
| 3. | Bellary | 143733 | 64.49 | 8.99 | 7.17** | 51.42** | 0.880 |
| 4. | Bijapur | 167418 | 174.2 | 22.91 | 7.60** | 57.8** | 0.892 |
| 5. | Chikamagalur | 75149 | 5.36 | 0.852 | 6.29** | 39.66** | 0.849 |
| 6. | Chitradurga | 80823 | 4.36 | 0.394 | 11.07** | 122.6** | 0.945 |
| 7. | Dakshina Kannada | 19456 | 9.88 | 1.29 | 7.62** | 58.18** | 0.892 |
| 8. | Dharwad | 147187 | 73.06 | 14.75 | 4.95** | 24.51** | 0.777 |
| 9. | Hassan | 26245 | 4.47 | 0.695 | 6.43** | 41.35** | 0.955 |
| 10. | Kodagu | 106163 | 156.10 | 31.49 | 4.95** | 24.57** | 0.778 |
| 11. | Kolar | 143125 | 43.32 | 4.27 | 10.14** | 102.89** | 0.936 |
| 12. | Mandya | 67187 | 11.41 | 2.21 | 5.15** | 26.61** | 0.791 |
| 13. | Mysore | 17311 | 15.59 | 1.47 | 10.58** | 111.98** | 0.941 |
| 14. | Raichur | 205446 | -25.30 | 96.03 | 0.26 $^{NS}$ | 0.069 $^{NS}$ | 0.009 |
| 15. | Shimoga | 153914 | 10.18 | 1.51 | 6.70** | 45.01** | 0.865 |
| 16. | Tumkur | 3907.8 | 3.92 | 0.33 | 11.66** | 135.9** | 0.951 |
| 17. | Uttara kannada | -377311 | 109.72 | 13.25 | 8.27** | 68.4** | 0.907 |

*Significant at 5% level, **Significant at 1% level, NS: Non-significant.

**Regression analysis on area of coconut crop for the period 1991-2000.**

From the table 4.3.3, the result found to be that for the period 1991-2000 maximum $R^2$ established in Hassan district (84.2%) followed by Tumkur district (83.7%) and Chitradurga district (83.1%) regarding the area of coconut crop.

However it was found that, the area measured for the study period of 1991-2000, F-test indicate a highly significant ($P<0.01$) for 9 districts indicating the model is best fit and t-test established significant results of regression co-efficient.

**Regression analysis on area of coconut crop for the period 2001-2009.**

From the table 4.3.4 the result found to be that for the period of 2001-2009 established maximum $R^2$ of 87.9 per cent in Hassan district followed by Tumkur district (84.6%) and Chitradurga district (80.7%) contributing to the area of coconut crop.

However it was found that, the area measured for the study period 2001-2009, F-test established a highly significant ($P<0.01$)for 10 districts. The findings of the t-test established significant regression co-efficient and best fit of regression model as revealed in F-test and

**Regression analysis on production of coconut crop for the period 1982-2009.**

Table 4.3.5 shows that the contribution towards the production of coconut crop for the overall period of 1982-2009 possesses maximum $R^2$ of 89.8 per cent in Tumkur district followed by 86.9 per cent in Hassan district and 77.2 per cent in Chitradurga district.

**Table 4.3.3. Regression analysis on Area of Coconut Crop for the period: 1991-2000.**

| No | Districts | a | b | $SE_b$ | t | F | $R_2$ |
|---|---|---|---|---|---|---|---|
| 1 | Banglore urban | 208971 | 24.71 | 5.46 | 4.51** | 20.41** | 0.718 |
| 2 | Banglore-rural | 239656 | 1.84 | 0.82 | 2.23 NS | 4.98 NS | 0.384 |
| 3 | Belgaum | 52312 | 977.5 | 241.91 | 4.04** | 16.32** | 0.671 |
| 4 | Bellary | 170071 | 74.13 | 37.73 | 1.96 NS | 3.85 NS | 0.325 |
| 5 | Bijapur | 256373 | 34.31 | 67.42 | 0.50 NS | 0.62 NS | 0.031 |
| 6 | Chikamagalur | -6813 | 10.16 | 2.12 | 4.77** | 22.77** | 0.740 |
| 7 | Chitradurga | 112455 | 4.22 | 1.121 | 3.77** | 23.96** | 0.831 |
| 8 | Dakshina kannada | 279720 | -0.52 | 2.34 | 0.22 NS | 0.05 NS | 0.006 |
| 9 | Dharwad | 277462 | -8.92 | 28.02 | 0.31** | 0.10 NS | 0.012 |
| 10 | Gulbarga | 326149 | 79.42 | 109.2 | 0.72 NS | 0.52 NS | 0.062 |
| 11 | Hassan | 134083 | 8.92 | 1.85 | 4.80** | 23.10** | 0.842 |
| 12 | Kodagu | 116856 | 198.54 | 64.5 | 3.07** | 9.46* | 0.542 |
| 13 | Kolar | 829728 | 537.6 | 112.5 | 4.77** | 22.82** | 0.740 |
| 14 | Mandya | 21454 | 16.43 | 2.73 | 6.00** | 36.05** | 0.818 |
| 15 | Mysore | 223792 | 3.022 | 3.57 | 0.84 NS | 0.71 NS | 0.081 |
| 16 | Raichur | 246018 | 114.72 | 109.98 | 1.04 NS | 1.08 NS | 0.134 |
| 17 | Shimoga | 209576 | 6.96 | 4.31 | 1.61 NS | 2.60 NS | 0.245 |
| 18 | Tumkur | 127324 | 2.02 | 0.315 | 6.41** | 41.20** | 0.837 |
| 19 | Uttara kannada | -1150024 | 5.27 | 1.52 | 3.47** | 14.3** | 0.748 |

*Significant at 5% level, **Significant at 1% level, NS: Non-significant.

**Table 4.3.4 Regression analysis on Area of Coconut Crop for the period: 2001-2009.**

| No | Districts | a | b | $SE_b$ | t | F | $R_2$ |
|---|---|---|---|---|---|---|---|
| 1 | Bagalkote | 413095 | -49.33 | 9.34 | 5.28** | 27.88** | 0.799 |
| 2 | Bangalore Urban | 421302 | -16.25 | 22.97 | 0.70 NS | 0.50 NS | 0.066 |
| 3 | Bangalore Rural | 396265 | -0.89 | 1.083 | 0.82 NS | 0.68 NS | 0.089 |
| 4 | Belgaum | 357440 | 59.83 | 34.76 | 1.72 NS | 2.96 NS | 0.297 |
| 5 | Bellary | 457614 | -59.59 | 56.01 | 1.06 NS | 1.13 NS | 0.139 |
| 6 | Bidar | 374710 | 526 | 3700 | 0.14 NS | 0.02 NS | 0.003 |
| 7 | Bijapur | 385468 | -17.28 | 104.3 | 0.16 NS | 0.02 NS | 0.003 |
| 8 | Chamarajnagar | 310378 | 7.28 | 2.36 | 3.08* | 9.49* | 0.575 |
| 9 | Chikamagalur | 221250 | 4.71 | 1.27 | 3.69** | 13.68** | 0.661 |
| 10 | Chitradurga | 88367 | 17.07 | 1.63 | 10.47** | 32.20** | 0.807 |
| 11 | Dakshina Kannada | -275872 | 42.04 | 7.68 | 5.47** | 29.93** | 0.810 |
| 12 | Davanagere | 595671 | -17.25 | 11.56 | 1.49 NS | 2.22 NS | 0.241 |
| 13 | Dharwad | 71138 | 729.2 | 303.1 | 2.40* | 5.78* | 0.452 |
| 14 | Gadag | 292090 | 170 | 41.6 | 4.08** | 16.68** | 0.704 |
| 15 | Gulbarga | 467256 | -121.17 | 41.85 | 2.89* | 8.38* | 0.544 |
| 16 | Hassan | 110565 | 4.6 | 0.644 | 7.13** | 50.94** | 0.879 |
| 17 | Haveri | 366369 | 13.25 | 25.12 | 0.52 NS | 0.27 NS | 0.038 |
| 18 | Kodagu | 306926 | 49.87 | 13.63 | 3.65** | 13.38** | 0.656 |
| 19 | Kolar | 448378 | -33.94 | 26.16 | 1.29 NS | 1.68 NS | 0.193 |
| 20 | Koppal | 382662 | -1.36 | 28.88 | -0.04 NS | 0.02 NS | 0.003 |
| 21 | Mandya | 238732 | 7.739 | 3.46 | 2.23 NS | 4.97 NS | 0.415 |
| 22 | Mysore | 320759 | 3.34 | 2.02 | 1.65 NS | 2.62 NS | 0.280 |
| 23 | Raichur | 379972 | 6.064 | 48.75 | 0.12 NS | 0.01 NS | 0.002 |
| 24 | Shimoga | 893468 | -75.2 | 62.07 | 1.21 NS | 1.46 NS | 0.173 |
| 25 | Tumkur | 155213 | 1.94 | 0.313 | 6.21** | 38.58** | 0.846 |
| 26 | Udupi | -203598 | 20.31 | 5.84 | 3.48** | 17.53** | 0.771 |
| 27 | Uttara Kannada | 203286 | 26.67 | 6.18 | 4.31** | 18.60** | 0.726 |

*Significant at 5% level, **Significant at 1% level, NS: Non-significant.

**Table 4.3.5. Regression analysis on production of Coconut Crop for the period: 1982-2009**

| No | Districts | a | b | $SE_b$ | t | F | $R_2$ |
|---|---|---|---|---|---|---|---|
| 1. | Bagalkote | 129192 | -22.99 | 44.94 | 0.51 NS | 0.26 NS | 0.028 |
| 2 | Bangalore Urban | 1147253 | -7.802 | 3.206 | 2.43** | 5.92** | 0.185 |
| 3 | Bangalore Rural | 1294252 | -3.679 | 3.3 | 1.11 NS | 1.24 NS | 0.055 |
| 4 | Belgaum | 779038 | 220.60 | 49.53 | 4.45** | 19.83** | 0.432 |
| 5 | Bellary | 240071 | 139.60 | 25.98 | 5.37** | 28.89** | 0.526 |
| 6 | Bidar | 879392 | 32.48 | 7.33 | 4.42** | 19.59** | 0.449 |
| 7 | Bijapur | 865985 | 123.53 | 84.6 | 1.46 NS | 2.13 NS | 0.075 |
| 8 | Chamarajnagar | 732169 | 14.87 | 2.17 | 6.84** | 46.87** | 0.738 |
| 9 | Chikmagalur | 450399 | 7.91 | 1.01 | 7.81** | 61.07** | 0.701 |
| 10 | Chitradurga | 209361 | 4.27 | 0.88 | 4.82** | 23.29** | 0.772 |
| 11 | Dakshina Kannada | 506299 | 6.30 | 2.78 | 2.26* | 5.12* | 0.564 |
| 12 | Davanagere | 388376 | 13.07 | 6.47 | 2.02 NS | 4.08 NS | 0.311 |
| 13 | Dharwad | 1079961 | -20.14 | 35.61 | 0.56 NS | 0.31 NS | 0.012 |
| 14 | Gadag | 615856 | 249 | 115.27 | 2.16* | 4.67* | 0.341 |
| 15 | Gulbarga | 767336 | 94.92 | 23.39 | 4.05** | 16.46** | 0.387 |
| 16 | Hassan | -847486 | 7.64 | 0.57 | 13.18** | 23.9** | 0.869 |
| 17 | Haveri | 1129257 | 16.14 | 53.23 | 0.30 NS | 0.09 NS | 0.010 |
| 18 | Kodagu | 610087 | 86.18 | 10.46 | 8.23** | 67.79** | 0.722 |
| 19 | Kolar | 576103 | 56.40 | 20.5 | 2.75* | 7.56* | 0.225 |
| 20 | Koppal | 1042002 | 58.75 | 59.19 | 0.99 NS | 0.98 NS | 0.098 |
| 21 | Mandya | 198426 | 11.81 | 1.107 | 10.66** | 13.69** | 0.713 |
| 22 | Mysore | 642685 | 6.80 | 0.95 | 7.15** | 51.18** | 0.663 |
| 23 | Raichur | 938670 | 56.91 | 91.31 | 0.62 NS | 0.38 NS | 0.014 |
| 24 | Shimoga | 559336 | 19.67 | 3.23 | 6.08** | 37.03** | 0.587 |
| 25 | Tumkur | 817010 | 7.86 | 0.59 | 13.32** | 11.06** | 0.898 |
| 26 | Udupi | 291739 | 13.82 | 1.26 | 3.24** | 19.37** | 0.729 |
| 27 | Uttara Kannada | 75474 | 32.30 | 4.30 | 7.50** | 56.25** | 0.683 |

*****Significant at 5% level, **Significant at 1% level, NS: Non-significant.

The analysis revealed that, the production measured for the period 1982-2009 found to be highly significant at (P<0.01) for 16 districts. The findings of t- test established significant regression co-efficient and best fit of regression model as revealed in F-test.

**Regression analysis on production of coconut crop for the period 1982-1990.**

From the table 4.3.6 depicts that, During 1982-1990, regarding the production of coconut crop the maximum $R^2$ established in Hassan district (95.8%) followed by Chitradurga district (93.9%) and Tumkur district (91.5%)

The analysis revealed that, for the period 1982-1990, the production measured found to be highly significant (P<0.01) for 14 districts and one district (Mysore) found to be significant (P<0.05) and 2 districts Banglore urban and Raichur possess non-Significant findings The depicted t-test established similar significant result among the districts as revealed in F-test.

**Regression analysis on production of coconut crop for the period 1991-2000.**

From the table 4.3.7, the result found to be that for the period of time 1991-2000 established maximum $R^2$ in Hassan district (63.4%) followed by Tumkur district (58.5%) and Chitradurga district (44.8%) regarding the production of coconut crop.

However it was found that, the production measured for a study period 1991-2000, F-test established a highly significant (P<0.01) for 1 district such as Tumkur and the districts such as Chitradurga and Hassan found significant (P<0.05). T-test established significant results of regression co-efficient and best fit of regression model as in F-test.

**Table 4.3.6. Regression analysis on production of Coconut Crop for the period: 1982-1990**

| No | Districts | a | b | $SE_b$ | t | F | $R^2$ |
|---|---|---|---|---|---|---|---|
| 1 | Bangalore urban | 783321 | -1.45 | 0.80 | 1.82 NS | 3.29 NS | 0.320 |
| 2 | Belgaum | 662951 | 195.38 | 34.16 | 5.71** | 32.70** | 0.823 |
| 3 | Bellary | 545392 | 48.56 | 8.25 | 5.88** | 34.59** | 0.831 |
| 4 | Bijapur | 629127 | 133.70 | 19.30 | 6.92** | 48.02** | 0.872 |
| 5 | Chikamagalur | 296541 | 7.65 | 1.51 | 5.05** | 25.57** | 0.785 |
| 6 | Chitradurga | 303883 | 2.76 | 0.26 | 10.4** | 109.5** | 0.939 |
| 7 | Dakshina kannada | 77675 | 8.534 | 1.18 | 7.22** | 52.24** | 0.881 |
| 8 | Dharwad | 553457 | 56.35 | 11.64 | 4.83** | 23.40** | 0.769 |
| 9 | Hassan | 93810 | 3.019 | 0.46 | 6.50** | 42.33** | 0.958 |
| 10 | Kodagu | 409364 | 117.36 | 25.61 | 4.58** | 20.99** | 0.749 |
| 11 | Kolar | 538125 | 16.07 | 3.47 | 4.63** | 22.80** | 0.729 |
| 12 | Mandya | 249374 | 8.91 | 1.56 | 5.68** | 32.31** | 0.821 |
| 13 | Mysore | 442802 | 7.38 | 2.70 | 2.72* | 7.44* | 0.515 |
| 14 | Raichur | 780196 | -27.23 | 74.15 | 0.37 NS | 0.14 NS | 0.018 |
| 15 | Shimoga | 580570 | 10.48 | 1.84 | 5.68** | 32.32** | 0.821 |
| 16 | Tumkur | 28808 | 14.41 | 1.65 | 8.68** | 75.43** | 0.915 |
| 17 | Uttara kannada | 1350305 | 83.08 | 11.71 | 7.09** | 50.29** | 0.877 |

*****Significant at 5% level, **Significant at 1% level, NS: Non-significant.

**Table 4.3.7. Regression analysis on production of Coconut Crop for the period: 1991-2000**

| No | Districts | a | b | $SE_b$ | t | F | $R^2$ |
|---|---|---|---|---|---|---|---|
| 1 | Bangalore -urban | 1071724 | -5.87 | 3.63 | 1.62 NS | 2.61 NS | 0.246 |
| 2 | Bangalore-rural | 877994 | 1.79 | 9.96 | 0.18 NS | 0.03 NS | 0.004 |
| 3 | Belgaum | 688506 | 334.90 | 191.28 | 1.75 NS | 3.06 NS | 0.277 |
| 4 | Bellary | 618549 | 61.38 | 35.97 | 1.70 NS | 2.91 NS | 0.266 |
| 5 | Bijapur | 820900 | 107.12 | 56.23 | 1.90 NS | 3.62 NS | 0.312 |
| 6 | Chikamagalur | 815354 | 2.576 | 7.76 | 0.33 NS | 0.11 NS | 0.013 |
| 7 | Chitradurga | 682457 | 1.53 | 0.54 | 2.82* | 8.28* | 0.448 |
| 8 | Dakshina kannada | 671922 | 3.69 | 2.29 | 1.61 NS | 2.60 NS | 0.245 |
| 9 | Dharwad | 817800 | 39.46 | 23.68 | 1.66 NS | 2.77 NS | 0.257 |
| 10 | Gulbarga | 856863 | 39.47 | 37.02 | 1.06 NS | 1.13 NS | 0.124 |
| 11 | Hassan | 659957 | 11.33 | 2.49 | 4.54** | 10.28* | 0.634 |
| 12 | Kodagu | 822727 | 46.75 | 84.06 | 0.55 NS | 0.30 NS | 0.037 |
| 13 | Kolar | 613209 | 39.98 | 37.85 | 1.05 NS | 1.11 NS | 0.122 |
| 14 | Mandya | 781909 | 2.983 | 5.18 | 0.57 NS | 0.33 NS | 0.039 |
| 15 | Mysore | 609086 | 7.39 | 4.12 | 1.79 NS | 3.20 NS | 0.286 |
| 16 | Raichur | 885892 | 98.15 | 96.26 | 1.02 NS | 1.04 NS | 0.115 |
| 17 | Shimoga | 705117 | 10.09 | 4.81 | 2.09 NS | 4.38 NS | 0.354 |
| 18 | Tumkur | 889916 | 0.983 | 0.29 | 3.36** | 11.32** | 0.585 |
| 19 | Uttara kannada | -1639247 | 98.42 | 67.27 | 1.46 NS | 2.14 NS | 0.211 |

*Significant at 5% level, **Significant at 1% level, NS: Non-significant.

**Regression analysis on production of coconut crop for the period 2001-2009.**

From the table 4.3.8, the result found to be that for the period of time 2001-2009 established maximum $R^2$ in Hassan district (95.4%) followed by Tumkur (94.5%) and Chitradurga district (90.3%) regarding the production of coconut crop.

However, it was found that, the production measured for a study period 2001-2009, F-test established a highly significant ($P<0.01$) for 17 districts. The findings of the t-test established significant results of regression co-efficient and best fit of regression model as in F-test.

**Table 4.3.8. Regression analysis on production of Coconut Crop for the period: 2001-2009**

| No | Districts | a | b | $SE_b$ | t | F | $R_2$ |
|---|---|---|---|---|---|---|---|
| 1 | Bagalkote | 1334512 | -29.66 | 576.04 | 0.53 NS | 0.28 NS | 0.038 |
| 2 | Bangalore Urban | 451646 | 76.97 | 19.11 | 4.02** | 16.21** | 0.698 |
| 3 | Bangalore Rural | 1900895 | -10.66 | 2.48 | 4.30** | 18.46** | 0.725 |
| 4 | Belgaum | 1172187 | 37.12 | 123.99 | 0.29 NS | 0.09 NS | 0.012 |
| 5 | Bellary | 203314 | 226.8 | 124.38 | 1.82** | 3.32 NS | 0.322 |
| 6 | Bidar | -480558 | 13973 | 3652 | 3.82** | 14.64** | 0.409 |
| 7 | Bijapur | 1065297 | 165.6 | 252.4 | 0.65 NS | 0.43 NS | 0.057 |
| 8 | Chamarajnagar | 738422 | 14.77 | 2.341 | 6.31** | 39.84** | 0.850 |
| 9 | Chikmagalur | 727619 | 1.95 | 0.50 | 3.90** | 14.60** | 0.752 |
| 10 | Chitradurga | 142511 | 6.84 | 0.84 | 8.11** | 65.85** | 0.903 |
| 11 | Dakshina Kannada | 340447 | 4.29 | 1.08 | 3.97** | 12.20** | 0.744 |
| 12 | Davanagere | 63582 | 21.5 | 5.72 | 3.75** | 14.13** | 0.668 |
| 13 | Dharwad | -349807 | 739.6 | 93.67 | 7.89** | 62.34** | 0.899 |
| 14 | Gadag | 518048 | 283.1 | 155.81 | 1.81 NS | 3.30 NS | 0.320 |
| 15 | Gulbarga | 187713 | -173.8 | 178.21 | 0.98 NS | 0.95 NS | 0.119 |
| 16 | Hassan | 749113 | 7.46 | 0.61 | 12.1** | 146.40** | 0.954 |
| 17 | Haveri | 1275668 | -5.99 | 68.3 | 0.09 NS | 0.008 NS | 0.001 |
| 18 | Kodagu | 546658 | 90.59 | 21.97 | 4.12** | 17.00** | 0.708 |
| 19 | Kolar | 834039 | 54.98 | 36.32 | 1.51 NS | 2.29 NS | 0.246 |
| 20 | Koppal | 1101622 | 44.83 | 72.86 | 0.61 NS | 0.379 NS | 0.051 |
| 21 | Mandya | 496914 | 2.39 | 0.68 | 3.52** | 18.80** | 0.863 |
| 22 | Mysore | 872054 | 1.75 | 0.42 | 4.17** | 14.10** | 0.754 |
| 23 | Raichur | 1205670 | 23.78 | 129.81 | 0.18 NS | 0.034 NS | 0.004 |
| 24 | Shimoga | 717023 | 3.84 | 0.87 | 4.41** | 15.70** | 0.788 |
| 25 | Tumkur | 854326 | 17.99 | 5.59 | 3.22** | 15.61** | 0.945 |
| 26 | Udupi | 279301 | 6.18 | 1.29 | 4.79** | 16.50** | 0.743 |
| 27 | Uttara Kannada | 330688 | 25.78 | 6.08 | 4.23** | 17.94** | 0.719 |

*Significant at 5% level, **Significant at 1% level, NS: Non-significant

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