Chapter 4

AGRICULTURE AND ALLIED ACTIVITIES

Introduction: Agriculture is the mother of all culture and the progenitor of human civilization. The recorded history provides ample proof for rich heritage of Indian agriculture. The agriculture that flourished during Aryan and the Indus valley civilization dating back to 3000 B.C., stands testimony to Indian culture through agriculture. Agriculture provides the main economic support to the State. The importance Karnataka had given to agriculture is indicated by the statement of famous Kannada poet Sarvajnya who says that *meti vidye* (agricultural science) is superior to *koti vidye* (millions of other sciences).

***Ancient Agriculture*:** During the Vedic period (4500-1000 B.C.,) the *Arthashastra*, which is a part of *Atharvanaveda*, covers on agriculture, amidst other things, including cultivation of lands. The Kautilya's *Arthashastra* has also covered on law, land legislation, etc., in agriculture. The Tamil poet Thiruvalluvar in 1033 A.D. has stated that "*They alone live, who live by tilling the soil and all others but follow in their train and eat only the bread of dependence*". Thus agriculture has received greater attention in India from ancient period. Some rulers of the past in India recognized the need for development of agriculture. Here, mention may be made of the period when Chinese traveller Fahien visited India during 390-411 A.D. at the time of Chandragupta II (Vikramaditya) and another Chinese traveller Huein Tsung who visited India during 630-644 A.D., at the time of Sriharsha's regime. Both have given a praising account on the glory of Indian agriculture.

In historical times, Karnataka was famous for its rice, ragi and jowar crops and rice was a major export from its coastal ports. Spices like pepper, cardamom, cinnamon, nutmeg, ginger *etc.*, were also grown in plenty, some of them being wild crops. Literary and epigraphical sources speak of its rich rice fields and plantations of coconut, areca and plantains. Ibn Batuta, in 1347, says that the coastal area had very rich rice fields and in their centre were houses surrounded by a garden of flower plants and fruit trees. "*These dominions are well cultivated and very fertile*" says Domingo Paes who visited Vijayanagara Empire during the first part of the 16th century.

The Portuguese introduced maize, tobacco, groundnut, potato, chillies and tomato from the New World and Karnataka could get the knowledge of these new crops early due to its proximity to Goa, and further Goan Christian farmers migrated to Karnataka in good number, especially to the coastal and Malnad area. Buchanan held in 1800 that the rice grounds here were more "*neatly cultivated*" than in Malabar.

Agriculture During British Period : The British introduced long fibred American cotton in India and especially in Bombay Karnataka. The Cotton Boom of the American Civil War days (1860's) gave an unprecedented fillip to cotton cultivation. Coffee plantations were raised on a large scale by the British during the 19th century.

The British Imperial Government recognised the vast potentiality of Indian Agriculture and took various steps for improvement. In India, a separate Agriculture Department was established in 1871, bifurcating from the Revenue Department. Lord Curzon, Viceroy of India, persuaded and caused for the setting up of Imperial Agricultural Research Institute, at Pusa, Bihar, in 1905. This was later shifted to New Delhi. After independence, it is renamed as Indian Agriculture Research Institute. Here, teaching, research and extension education in agriculture has been integrated and has been tackling the problems of national importance. The UGC has recognized it as deemed University. Five Agriculture Colleges and some research stations were started in 1905 in India during the British period. The Imperial Council of Agricultural Research was set up in 1929 as an autonomous apex body responsible for organizing and management of education, research and extension in all branches of Agricultural Sciences. Further, as per the recommendations of the Royal Commission on Agriculture, it was reorganized.

The Agricutural expert and Chief of Rothamsted Agriculture Experiement Station, England Sir John Russel was invited during 1936-37 who provided the blue print for the overall Agriculture Development in India. Dry farming research was initiated, besides several commodity committees like cotton, sugarcane, coffee, tea, rubber, spices etc., were established. This was mainly to exploit the potentiality of commercial crops. Nevertheless, needed stress was not accorded for the food grain production.

Though the rulers of Karnataka paid much attention to irrigation, especially tanks, irrigated area did not exceed five percent before the major irrigation works were taken up after independence. After Independence the Indian Government embarked on various activities to strengthen agricultural education by setting up agricultural colleges in every State, research stations to strengthen research on various crops and allied subjects and also to strengthen agricultural extension and development.

In 1949, the Education Commission under the Chairmanship of Dr.S.Radhakrishnan, recommended the establishment of Rural Universities to meet the Agriculture challenges in terms of education, research and extension. The Joint Indo – American Committee (1955-60) recommended establishment of these institutions on the pattern of "*Land Grant Colleges*" in USA. Thus, the first Agriculture University was set up at Pantnagar, U.P in July 1960, which was inaugurated by Pandit Jawaharlal Nehru, the then Prime Minister of India. Later, Kothari Education Commission (1964-66) emphasized to set up at least one Agricultural University in each State. University of Agricultural Sciences, Bengaluru was started in the year 1966, the University of Agriculture Sciences, Dharwad in the year 1986 and the University of Agricultural Sciences at Raichur. Later University of Agricultural and Horticultural University was started in Shivamogga.

Agriculture in Karnataka

Sir Mark Cubbon (Commissioner, 1834-1861) having realized the potentiality of agriculture in the then Princely State of Mysuru, in his pioneer efforts in 1836 took steps towards scientific agriculture and set up the agriculture society in Mysuru. In 1857. Visternew was appointed as Superintendent, Bengaluru Botanical Garden (Lalbaugh). He took various measures to improve horticultural activities. In 1862, Signorde Vichi introduced new mulberry varieties, silkworm strains and added new dimensions in sericulture in Mysuru. In 1869, Mr.Von Somerin, as Conservator of Forests gave the beginning to scientific forestry in Mysuru.

It is our bounded duty to remember with gratitude Rajarishi Sri Nalwadi Krishnaraja Wadeyar, the then Maharaja of Mysuru (1894-1940). He having realized potentials of Agriculture took up various developmental activities systematically and put Karnataka first in India in various aspects of agriculture. In 1899 he appointed Dr.Lehman (a German chemist) who set up a Soils Laboratory and the multi-disciplinary agricultural laboratory in 1901. Dr.Lesile C.Coleman (a Canadian Scientist) was also appointed in 1905 as Scientist to take up entomology and pathology research. In 1907, Coleman took over the charge of Lehman. During 1912, a separate Department of Agriculture was started bifurcating from the Revenue and other Departments based on the recommendations of Dr.Leslie Coleman who was also appointed as first Director of Agriculture in July 5, 1913. He takes the credit of starting the four years Diploma Course in agriculture at Hebbal, Bengaluru on 5th July 1913, being the first in Asia. Later in 1916, he started agricultural school at Chikkanahalli (Tumakuru) and later at Anekal (Bengaluru), Somanahalli (Mandya) etc., He also started several research stations, at Thirthalli (Areca nut), Balehonnur (Coffee), V.C.Farm, Mandya (Sugarcane, Paddy, Ragi) and Babbur (Oil seeds), to cater to the needs of local agricultural problems. The research station at Mandya was probably the first centre in India, established for irrigated ecosystem in 1930. Dr.Coleman prepared a master plan to start agriculture degree college before he retired in 1937. He visited Mysuru state again in 1950 at the invitation of the then Mysuru Maharaja Sri Jayachamarajendra Wodeyar and prepared comprehensive agriculture developmental plan for the state. In 1946, agricultural colleges were started at Hebbal and Dharwad which later graduated into University of Agriculture Sciences in 1966.

As much as the farmers of Karnataka, Department of Agriculture owe a debt of gratitude to Dr.Coleman for his vision and determination for the overall development of agriculture education, research and development of Karnataka.

Agricultural Development under Five Year Plans: When the State came into being in November 1956, the Second Five Year Plan was already under implementation. Therefore, the new State had no opportunity to formulate a comprehensive agriculture development plan as part of the second Five Year Plan. All that the State could do was to put together the plan schemes that came in piece-meal from the integrating areas and implement them as successfully as possible. This was done with a fair degree of success. In the meantime, Third Five Year Plan was formulated which was implemented from 1961 to 1966. Due care was bestowed on formulating comprehensive schemes, keeping in view the needs of the new state. For all practical purposes, it could be said that the Third Five Year Plan was in fact the First Five Year Plan for the new State.

Agricultural development in the State could be divided broadly into four phases. The first phase from 1956 to 1966 when the developmental activities were confined to traditional measures like expanding of cultivated area, increasing the irrigational sources, popularizing the use of chemical ferilizers and improved agricultural practice like Japaneese method of rice cultivation, use of improved seeds etc. with a view to increase agricultural production as quickly as possible. The second phase between 1966 to 1980 when the new technology, particularly the hybrids and the high yielding varieties made a significant contribution to increased agriculture production, particularly cereals with more emphasis on intensive cultivation than on extensive cultivation as in the previous decade. And the third phase from 1980 to 1995 when special attention was paid on the under privileged sections of the farming population like the small and marginal farmers , farmers belonging to scheduled castes and tribes, and more specifically on the dry land farmers. During the fourth phase period (from 1995) the State Government brought out its own Agricultural Policy during 1995 giving emphasis from adaptation to the changed scenario owing to globalization and liberalization of International trade and to achieve integrated growth and also to achieve high growth rate in agriculture and allied sectors.

Agricultural Policy of Karnataka

A large portion of the land falls under semi-arid conditions facing severe agro-climatic and resource constraints. Interestingly, coexisting with this are a few patches of high value-high-tech agriculture. This emerged only during last two decades and has a sporadic presence in the State. Consequently, Karnataka's agriculture is at the same time diversified and segmented in many ways. Karnataka is one of the few States with the lowest proportion of their area under irrigation. Majority of farmers here have no other option but to grow low value crops. Under such speckled situation, agricultural sector of the State is growing moderately despite severe climatic and strong resource constraints. However, it is a matter of deep concern that even though agriculture directly impacts the overall growth and distribution performance in the State economy, it has not been attracting investments in the recent past. It is rightly feared that the sector may confront another strong lingering of stagnation Realising this, the State Government is seized of this problem and has decided to give a close policy look to deal with it.

Karnataka has always taken a lead ahead of the other States in India; in many respects as far as Agricultural Policy initiatives are concerned. The State did not lag behind any other State in preparing a document assessing the situation emerging out of Agreement on Agriculture under the WTO. The State also recognizes the increasing distress in the farm sector at an alarming rate and the stagnation of net income flow in the farm sector.

The first imperative of the Agriculture Policy is to provide opportunities for the farmers to enhance their net income to a respectable level. This can be achieved through various ways. Increasing aggregate production is the first and foremost need. This surely is a necessary condition, but not a sufficient condition, as markets and prices play very crucial role in deciding the net income flow to the farm household. Therefore, this policy document keeps at the forefront improving net farm income of the farmer as the prime goal, In order to achieve this, the policy document touches the aspects of crop planning, production, technology, marketing and prices as foremost components.

In order to achieve consistent income flow that records a growth rate significantly higher than the growth rate in the Consumer Price Index for Agricultural Labourers and for rural areas, it will be essential to place the target of agricultural

growth rate at 4.5 per cent per annum. The 4.5 per cent growth rate in gross value of agricultural production will set the net income increase by about three per cent per annum for the farm household, this should be sufficient to take care of increasing prices of inputs, as well as the changes in the terms of trade between agriculture and non-agricultural sectors.

The philosophy of the present Agricultural Policy lies in the concept of 'Pancha Sutra' that was announced by the State in its budget 2006-07 for accelerated growth in agriculture. The five components of Sutra are; (i) to protect and improve soil health, (ii) Conservation of natural resources, with special emphasis on water and micro irrigation, (iii) Timely availability of credit and other inputs to the farmers, (iv) Integrate post harvest processing with the production process, and (v) Reducing the distance between '*Lab to Land*' in transfer of technology.

This is a 'Farmer Centric' policy; therefore the process of development begins at the farm. It further covers the role of the State in terms of budgetary support and macro-economic adjustments, production and technology, sector, environmental friendliness of the farmer, land issues, agro-processing, associated trade and value addition to the farm products, removal of distortions in domestic market, and finally strengthening of the allied agricultural sector and linkages.

First, this policy envisages achieving a growth rate of 4.5 per cent per annum during the next decade. It is expected that this growth rate will help to increase the net income of the farmer. It will also help to bridge the income differentials between the agricultural sector and the non agricultural sectors. Second, the policy focuses on the bypassed regions, as well as bypassed groups of farmers in the process of development adopted. Third, hither to the technological change has been '*supply driven*' rather than '*demand driven*'. The distance between the 'Lab to land' has always created a lag in reaching the technology at the doorsteps of farmers. Fourth, natural resources are under stress, whether it is soil, water or the other biological resources. It is very essential to conserve the resources and at the same time, provide better production environment. Lastly, access to factor market and quality of the inputs supplied to the farmers.

AGRICULTURAL CENSUS 2010-11

Agricultural census is conducted in all the States and Union Territories in the Country, at the instance of Ministry of Agriculture and Co-operation, Government of India, which provides cent per cent financial assistance for every Agricultural Census. It is a quinquennial census conducted once in five years since its inception in 1970-71. So far, Nine Agricultural Censuses have been conducted, the latest being the 2010-11 census.

The importance of Agricultural Census is to know the structure and characteristics of agricultural holdings operated by cultivators. Besides, data on land use, sources of irrigation, cropping pattern and dispersal of operated area are also collected on sampling basis. As a follow up of Agricultural Census, Input Survey is conducted, with the main objective of collecting the data, that relate to number of parcels, multiple cropping, land use pattern, use of chemical fertilizers, organic and inorganic manure, agricultural implements and agricultural credit availed by cultivators. The number and size of operational holdings were collected for both male and female operational holders separately. Before the commencement of the Agricultural Census, the year 2005-06 was declared as '*Land Records Year*' with a view to update all the records (RTC) by the Revenue authorities, which are required for correct and authentic information on land holdings to be reflected during the conduct of the census.

The main findings of the Agriculture census 2010-11 are listed here (only state findings):

1. The total number of operational holdings in the State is 78.32 lakhs as per 2010-11 Agricultural Census, compared to 75.81 lakhs of previous census 2005-06, this has registered an increase of 3.3 per cent (Table 4.01).

2. Of the 78.32 lakhs holdings, the male dominated holdings are 63.33 lakhs accounting for 80.86 per cent of the total number of holdings, while, the female accounted for 14.86 lakh holdings (18.97 per cent) and the remaining 0.13 lakh holdings are owned by institutions, which account for a mere 0.19 per cent.

3. Among the five major size classes of holdings, the marginal holdings (less than one hectare) account for a maximum share of 49.1 per cent of the total number of holdings, followed by small holdings (one to two hectares) 27.3 per cent,

semi-medium holdings (two to four hectares) 16.2 per cent, medium holdings (four to ten hectares) 6.5 per cent and large holdings (10 hectares and above) 0.9 per cent, being the least.

4. The total area operated under all operational holdings in the current census is found to be 121.62 lakh hectares, a marginal decrease by 1.8 per cent as compared to the previous census 2005-06 figure of 123.85 lakh hectares (Table 4.02).

5. The area operated by male operational holders is 101.90 lakh hectares, which constitute 83.78 per cent of the total area operated, while the area operated by female operational holders is 18.92 lakh hectares, constituting 15.61 per cent and the remaining 0.74 lakh hectare, operated by institutional holdings, constitute just 0.61 per cent.

6. As regards, the area operated by different size classes of holdings, semi-medium size class holdings has the highest percentage of area operated i.e., 27.9 per cent, closely followed by small class with 24.8 per cent, medium size class with 23.9 per cent, marginal size class with 15.2 per cent and the large size class with 8.2 per cent, which has the least share.

7. The average size of operational holdings has come down marginally, from 1.63 hectares in 2005-06 census to 1.55 hectares in 2010-11 census by 0.08 hectare, which is mainly due to sub-division and fragmentation of land holdings that this trend is common in every Agricultural Census (Table 4.03).

8. The average size of operational holdings, in the case of male is found to be 1.61 hectares as compared to 1.28 hectares of female operational holders.

9. One notable feature is that the average size of holdings increases with increase in size classes. The marginal size class showed the minimum of 0.48 hectare of average size holdings, followed by small size class holdings 1.41 hectares, semi medium size class 2.68 hectares, medium size class 5.69 hectares and large size class 14.71 hectares, being the maximum.

10. Among the social groups, the total number of holdings of scheduled caste group was found to be 9.14 lakhs, which showed an increase of 3.6 per cent over the previous census figure of 8.82 lakhs. So also in case of scheduled tribe group the number of holdings, which are 4.73 lakhs as per 2010-11 census has increased by 7.7 per cent, as compared to 4.39 lakhs in 2005-06 census.

11. The area operated by scheduled caste operational holders is found to be 10.74 lakh hectares in 2010-11 census when compared to 2005-06 census figure of 11 lakh hectares there by registering an decrease of 2.4 per cent. In case of scheduled tribe operational holders, the area operated decreased from 7.25 lakh hectares in 2005-06 census to 7.05 lakh hectares in 2010-11 census decrease by 2.8 per cent.

12. The average size of operational holdings by scheduled caste according to 2010-11 census is 1.18 hectares, which is dropped marginally by 0.07 hectare as compared to 1.25 hectares in 2005-06 census. So also in case of scheduled tribe, it has come down by 0.16 hectare i.e., from 1.65 hectares in 2005-06 census to 1.49 hectares in 2010-11 census.

13. The other social group held 64.33 lakh holdings with an operated area of 103.09 lakh hectares, with 1.60 hectares of average size of operational holdings in 2010-11 census. Whereas in 2005-06 census, which has been indicated as a lower number of 62.45 lakh holdings, while the operated area showed a marginal increase of 104.87 lakh hectares resulted in a slightly higher average size of operational holding of 1.68 hectares.

14. Among the different types of holdings, obviously the Individual type holdings had the maximum share of 99.13 per cent of the total operational holdings, while the Joint type accounted for 0.70 per cent and the Institutional type holdings accounted for negligible 0.17 per cent, as per 2010-11 Agricultural Census.

15. The area operated by types of holdings is also synonymous, since 98.55 per cent of the total area operated is by Individual type holdings, 0.85 per cent of area operated is by Joint type and the remaining 0.6 per cent by the Institutional type as per 2010-11 Agricultural Census.

16. The average size of Individual type of holdings as per 2010-11 census is 1.54 hectares, that of Joint type of holdings is 1.85 hectares and for Institutional type of it is 5.78 hectares. But in 2005-06 census, wherein the average size of the Individual type of holdings was 1.63 hectares, Joint type of holdings was 1.57 hectares and Institutional type was 4.87 hectares. It may be

observed that the average size of the Institutional type of holdings in both the censuses were higher as compared to Individual type and Joint type of holdings, because of fewer number of holdings coming under Institutional category.

17. During the first Agricultural Census 1970-71, the number of operational holdings, which was 35.51 lakhs, has increased over 121 per cent compared to the Ninth Agricultural Census 2010-11 figure of 78.32 lakh holdings.

18. The trend in area operated since the first Agriculture Census 1970-71, shows slight decrease of 0.1 per cent during 1976-77 census. Increasing trend was observed during the subsequent three censuses 1980-81, 1985-86 and 1990-91 and once again in 1995-96 census, it fell marginally by 1.7 per cent and increase by 1.6 and 0.6 percent during 2000-01 and 2005-06 census respectively. And it marginally fell by 1.8 per cent during 2010-11 census. Pertaining to the area operated during the first census 1970-71 is 113.68 lakh hectares, and increased to 121.61 lakh hectares during 2010-11 census with an increase of about 6.98 percent.

19. The trend of average size of operational holdings was gradually decreasing at every census period. It may be noted that the average size of operational holdings, which was 3.20 hectares in the first Agricultural Census 1970-71 has decreased to 1.55 hectares during 2010-11 census, indicating shortfall of 52 percent.

Table 4.01; Trends in number of operational holdings according to major size classes of Agricultural Censuses 1970-71 to 2010-11.

Size Class	1970-71	1976-77	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2010-11
1	2	3	4	5	6	7	8	9	10
Marginal	1081	1274 (17.8)	1489 (16.9)	1792 (20.3)	2262 (26.2)	2610 (15.4)	3252 (24.6)	3655 (12.4)	3849 (5.3)
Small	840	888 (5.8)	1057 (19.0)	1293 (22.3)	1586 (22.7)	1707 (7.6)	1909 (11.8)	2014 (5.4)	2138 (6.2)
Semi medium	788	818 (3.8)	918 (12.2)	1035 (12.7)	1163 (12.4)	1204 (3.5)	1259 (4.6)	1278 (1.5)	1267 (-0.9)
Medium	623	632 (1.4)	662 (4.7)	646 (-2.4)	636 (-1.5)	594 (-6.6)	569 (4.2)	555 (-2.6)	511 (-7.9)
Large	219	199 (-9.11)	183 (-8.0)	153 (-16.4)	129 (-15.7)	106 (-17.8)	90 (15.1)	79 -(11.11)	67 (-15.2)
Total	**3551**	**3811 (7.3)**	**4309 (13.1)**	**4919 (14.1)**	**5776 (17.4)**	**6221 (7.7)**	**7079 (13.8)**	**7581 (7.11)**	**7832 (3.3)**

Note: Figures within brackets indicate percentage variation over preceding censuses.
Source: Agricultural census 2010-11, part 1.

Table 4.02; Trends in area of operational holdings according to major size classes of Agricultural Censuses 1970-71 to 2010-11.(Number in 000' hectares)

Size Class	1970-71	1976-77	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2010-11
1	2	3	4	5	6	7	8	9	10
Marginal	549	638 (16.2)	733 (14.9)	866 (18.2)	1072 (23.7)	1248 (16.4)	1492 (19.5)	1651 (10.7)	1851 (12.1)
Small	1221	1319 (8.0)	1543 (17.0)	1888 (22.4)	2308 (22.2)	2480 (7.5)	2742 (10.6)	2876 (4.9)	3020 (5.0)
Semi medium	2205	2288 (3.7)	2572 (12.5)	2880 (11.9)	3200 (11.2)	3298 (3.1)	3429 (4.0)	3468 (1.4)	3393 (-2.2)
Medium	3792	3858 (1.7)	4018 (4.1)	3881 (-3.4)	3770 (-2.9)	3490 (-7.4)	3317 (5.0)	3206 (-3.3)	2904 (-9.4)
Large	3601	3254 (-9.6)	2880 (-11.5)	2364 (-17.9)	1971 (-16.6)	1593 (-19.2)	1327 (16.7)	1184 (-10.9	994 (-16.1)
Total	**11368**	**11357 (-0.1)**	**11746 (3.4)**	**11879 (1.1)**	**12321 (3.7)**	**12109 (-1.7)**	**12307 (1.6)**	**12385 (0.6)**	**12161 (-1.8)**

Note: Figures within brackets indicate percentage variation to the preceding censuses.
Source: Agricultural census 2010-11, part 1.

Table 4.03; Trends in area of operational holdings according to major size classes of Agricultural Censuses 1970-71 to 2010-11.(Number in 000' hectares)

Size Class	1970-71	1976-77	1980-81	1985-86	1990-91	1995-96	2000-01	2005-06	2010-11
1	2	3	4	5	6	7	8	9	10
Marginal	0.51	0.50	0.49	0.48	0.47	0.48	0.46	0.45	0.48
Small	1.46	1.49	1.46	1.46	1.46	1.45	1.44	1.43	1.41
Semi medium	2.80	2.80	2.80	2.80	2.75	2.74	2.72	2.71	2.68
Medium	6.09	6.11	6.07	6.01	5.93	5.88	5.83	5.79	5.69
Large	16.43	16.35	15.45	15.45	15.28	15.02	14.74	14.79	14.71
Total	**3.20**	**2.98**	**2.41**	**2.41**	**2.13**	**1.95**	**1.74**	**1.63**	**1.55**

Source: Agricultural census 2010-11, part 1.

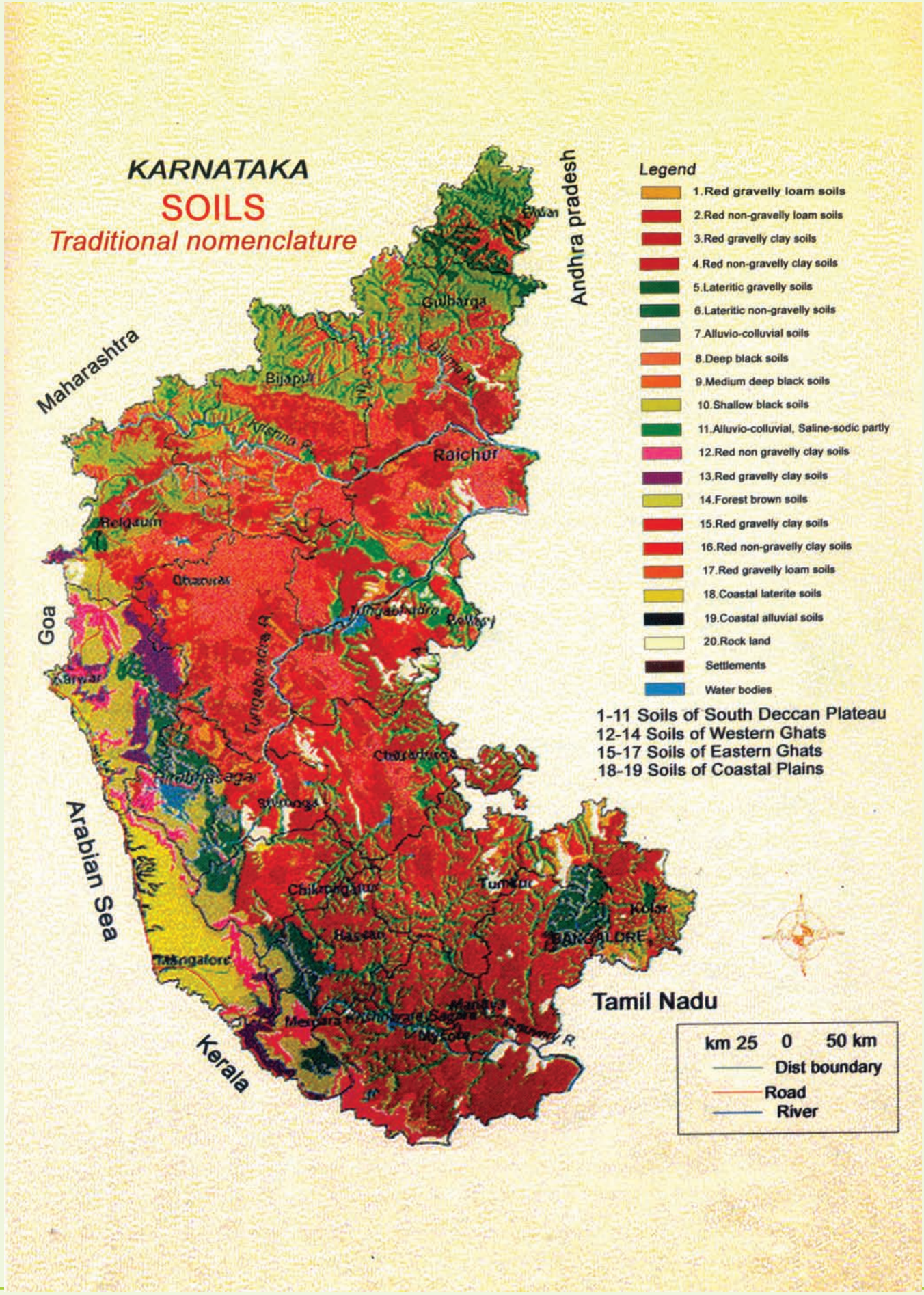
Climate: Climate plays a decisive role in determining the prospects of agriculture. Karnataka receives majority of its rainfall from South-west monsoon winds. The rainfall is usually concentrated in the months of June-September. This helps for the growth of Kharif crops. Southern districts of Karnataka also receive rainfall from retreating North-East monsoon winds in the month of October and November which aids the sowing of Rabi crops. But the amount of rainfall received is less when compared with South-West monsoon winds.

Agro-climatic Zones: The planning commission of India has divided the country into 15 agro climatic zones for the purpose of evolving a best strategy to improve agricultural productivity. Out of 15 zones, Karnataka falls in Zone X (southern plateau and hilly region) and Zone XII (west coast plain and ghat region). The state in an exercise between the Department of Agriculture and the University of Agricultural Sciences came up with 10 agro-climatic zones based on the following criteria (a) Rainfall pattern, quantum and distribution (b) Soil types, texture, depth and physico-chemical properties (c) Elevation and topography and (d) Major crops and vegetation. The ten gro-climatic regions of Karnataka are: North Eastern Transition Zone, North Eastern Dry Zone,Northern Dry Zone,Central Dry Zone,Eastern Dry Zone,Southern Dry Zone,Southern Transition Zone,Northern Transition Zone, Hilly Zone and Coastal Zone. The characteristics of different zones are presented in Table 4.04 and names of the taluk and districts coming under different zones are presented in Table 4.05.

Table 4.04; Agro-Climatic Zone

Sl No.	Region	Rainfall range in mm	Elevation	Soil
1	North Eastern Transition (7 taluks)	829.5 to 919.00	800-900 in major areas 450-800 parts of 6 taluks	Shallow to medium black clay soils in major areas. Red lateritic soils in remaining areas.
2	North Eastern Dry Zone (11 taluks)	633.22 to 806.6	300-450 in all taluks	Deep to very deep black clay soils in major areas. Shallow to medium black soils in minor pockets
3	Northern Dry Zone (35 taluks)	464.5 to 785.7	450-800 in 26 taluks in remaining taluks 800 to 900.	Black clay medium and deep in major areas, sand loams in remaining areas.
4	Central Dry Zone (17 taluks)	455.5 to 717.4	800-900 in major areas in remaining areas 450-800	Red Sandy loams in major areas shallow to deep black soil in remaining areas.
5	Eastern Dry Zone (25 taluks)	679.1 to 888.9	800-900 in major areas in remaining areas 900-1500	Red loamy soils in major areas, clay lateritic soils in remaining areas.
6	Southern Dry Zone (19 taluks)	670.6 to 888.6	800-900 in major areas 450-800 in remaining areas	Red sandy loams in major areas and in remaining areas, pockets of black soils.
7	Southern Transition Zone (13 taluks)	611.7 to 1053.9	800-900 in major areas partly 900-1500 and in 6 taluks 450-800	Red sandy loams in major areas and in remaining areas, red loamy soils
8	Northern Transition (14 taluks)	618.4 to 1303.2	800-900 in major areas 450-800 in remaining areas	Shallow to medium black clay soils and red sandy loamy soils in equal proportion.
9	Hilly Zone (22 taluks)	904.4 to 3695.1	800-900 in major areas in 4 taluks 900-1500 and in 6 taluks 450-800	Red clay loamy soils in major areas.
10	Coastal Zone (13 taluks)	3010.9 to 4694.4	Less than 300 in major areas in remaining 450-800	Red lateritic and coastal alluvial

Source3: Agricultural diary 2013, Department of Agriculture, Bengaluru.


KARNATAKA
SOILS
Traditional nomenclature
Andhra pradesh
Maharashtra
Goa
Arabian Sea
Kerala
Tamil Nadu
Gulbarga
Bijapur
Raichur
Belgaum
Dharwar
Karwar
Bellary
Chitradurga
Shimoga
Chikmagalur
Tumkur
Kolar
Hassan
BANGALORE
Mangalore
Legend
1.Red gravelly loam soils
2.Red non-gravelly loam soils
3.Red gravelly clay soils
4.Red non-gravelly clay soils
5.Lateritic gravelly soils
6.Lateritic non-gravelly soils
7.Alluvio-colluvial soils
8.Deep black soils
9.Medium deep black soils
10.Shallow black soils
11.Alluvio-colluvial, Saline-sodic partly
12.Red non gravelly clay soils
13.Red gravelly clay soils
14.Forest brown soils
15.Red gravelly clay soils
16.Red non-gravelly clay soils
17.Red gravelly loam soils
18.Coastal laterite soils
19.Coastal alluvial soils
20.Rock land
Settlements
Water bodies
1-11 Soils of South Deccan Plateau
12-14 Soils of Western Ghats
15-17 Soils of Eastern Ghats
18-19 Soils of Coastal Plains
km 25 0 50 km
Dist boundary
Road
River

DISTRIBUTION OF LAND HOLDINGS (OPERATIONAL) BY SIZE

Unit : Holdings- in Numbers Area - in Hectares

Year/ Distict	Marginal (Below 1 Ha)		Small (1-2 Ha)		Semi-Medium (2-4 Ha)	
	Number	Area	Number	Area	Number	Area
1	2	3	4	5	6	7
2005-06	**3655882**	**1651491**	**2013198**	**2875807**	**1278210**	**3468133**
2010-11	**3848834**	**1850946**	**2138208**	**3020002**	**1266829**	**3393035**
2010-11						
1. Bagalkote	69742	40352	75345	109374	54041	146968
2. Bangalore	56150	22220	14435	19950	7029	18813
3. Bangalore (R)	130770	50653	31102	42601	13096	34454
4. Belgaum	215525	123462	156810	222975	104873	284241
5. Bellary	105046	58679	82809	118364	56559	153172
6. Bidar	80616	44813	96617	136829	54252	143285
7. Bijapur	51150	32900	119792	176792	105009	283834
8.Chamarajnagar	134251	59542	52943	74113	20240	52683
9.Chikkaballapura	140975	60423	45637	62820	20395	53847
10.Chikmagalur	128613	61160	56022	77115	27051	71198
11.Chitradurga	109177	59138	90370	127587	60063	158777
12.D. Kannada	153155	58357	37460	50800	13621	35958
13.Davangere	135246	69322	84521	117138	45905	121683
14.Dharwad	36383	21675	49355	71641	35123	96310
15 Gadag	35514	21316	60153	87828	43614	118666
16 Gulbarga	81912	50690	147493	216606	111563	300728
17 Hassan	285669	146209	102151	140715	36892	96712
18 Haveri	78001	42777	80346	114388	43907	117015
19.Kodagu	28272	14066	17017	23872	13501	36892
20.Kolar	159140	67350	49321	67975	21712	57598
21.Koppal	66901	38113	75113	106893	53588	143896
22 Mandya	299197	138126	69130	90335	23626	59280
23.Mysore	260109	125363	86446	118014	32181	82984
24.Raichur	101422	58167	111859	160079	78519	212769
25.Ramanagara	209458	77494	41191	56293	16413	42450
26.Shimoga	125128	63754	55708	76742	24299	64286
27.Tumkur	197263	108983	113436	159940	71070	192432
28.Udupi	158750	51551	25316	34886	11856	31783
29.Uttara Kannada	143624	44165	30964	42666	13756	36620
30.Yadagiri	71675	40126	79346	114671	53075	143701

Source: Directorate of Economics and Statistics, Agriculture census 2010-11

DISTRIBUTION OF LAND HOLDINGS (OPERATIONAL) BY SIZE (concld..)

Unit : Holdings- in Numbers Area - in Hectares concld..

Year/District	Medium (4-10 Ha)		Large (More than 10 Ha)		Total	
	Number	Area	Number	Area	Number	Area
1	8	9	10	11	12	13
2005-06	554128	3206228	79455	1183062	7580873	12384721
2010-11	510745	2903686	67573	993788	7832189	12161457
2010-11						
1. Bagalkote	25395	145501	3208	44922	227731	487117
2. Bangalore	2775	14957	226	3405	80615	79345
3. Bangalore (R)	3580	19580	319	4746	178867	152034
4. Belgaum	47736	271491	5991	90121	530935	992290
5. Bellary	26756	152633	3965	54678	275135	537526
6. Bidar	17401	98904	2099	27944	250985	451775
7. Bijapur	57398	336421	8854	120385	342203	950332
8.Chamarajnagar	4436	23786	326	5018	212196	215142
9.Chikkaballapura	6676	37051	779	12215	214462	226356
10.Chikmagalur	9837	55471	1954	48433	223477	313377
11.Chitradurga	26795	152834	4172	62441	290577	560777
12.D. Kannada	4340	24220	521	9080	209097	178415
13.Davangere	15541	85639	1464	19904	282677	413686
14.Dharwad	19399	113256	2965	40096	143225	342978
15 Gadag	21237	122518	2948	39937	163466	390265
16 Gulbarga	47329	272051	7200	97462	395497	937537
17 Hassan	9744	53812	1225	26052	435681	463500
18 Haveri	14539	81390	1558	21348	218351	376918
19.Kodagu	7832	45380	2259	47651	68881	167861
20.Kolar	6162	33844	520	7156	236855	233923
21.Koppal	20272	114645	2228	29901	218102	433448
22 Mandya	3645	18664	168	3026	395766	309431
23.Mysore	6518	34535	472	7634	385726	368530
24.Raichur	35765	205342	4468	59430	332033	695787
25.Ramanagara	4111	22366	275	3963	271448	202566
26.Shimoga	7947	44059	926	13457	214008	262298
27.Tumkur	29132	163534	3527	51499	414428	676388
28.Udupi	4113	22952	450	8445	200485	149617
29.Uttara Kannada	4208	22935	270	3580	192822	149966
30.Yadagiri	20126	113915	2236	29859	226458	442272

Source: Directorate of Economics and Statistics, Agriculture census 2010-11

LAND UTILISATION

Unit : in hectares

Year/District	Area according to village papers	Forest	Not available for cultivation		
			Land put to non-agricultural uses	Barren & Un-cultivable land	Total
1	2	3	4	5	6
2009-10	19049836	3071833	1386419	787512	2173931
2010-11	19049836	3071833	1430363	786627	2216990
2010-11					
1. Bagalkote	658877	81126	28832	24810	53642
2. Bangalore	217410	5055	115530	4911	120441
3. Bangalore (R)	229519	11322	39978	11124	51102
4. Belgaum	1344382	190424	69663	44342	114005
5. Bellary	813196	97017	110291	53477	163768
6. Bidar	541765	27707	22006	19127	41133
7. Bijapur	1053471	1977	36027	29059	65086
8.Chamarajnagar	569901	275610	24611	21434	46045
9.Chikkaballapura	404501	49704	31933	34302	66235
10.Chikmagalur	722075	200485	43125	28322	71447
11.Chitradurga	770702	73719	51243	25403	76646
12.D. Kannada	477149	128476	65483	58780	124263
13.Davangere	597597	89918	38992	20533	59525
14.Dharwad	427329	35235	22572	3985	26557
15 Gadag	465715	32614	10481	11628	22109
16 Gulbarga	1094120	35316	38420	35113	73533
17 Hassan	662602	58775	78877	30365	109242
18 Haveri	485156	47454	33037	5793	38830
19.Kodagu	410775	134597	24200	31010	55210
20.Kolar	374966	20620	45677	28870	74547
21.Koppal	552495	29451	39003	16627	55630
22 Mandya	498244	24765	60906	21519	82425
23.Mysore	676382	62851	75758	45018	120776
24.Raichur	835843	18167	20563	20084	40647
25.Ramanagara	355912	69946	26225	24339	50564
26.Shimoga	847784	276855	88708	13312	102020
27.Tumkur	1064755	45177	84504	67539	152043
28.Udupi	356446	100102	39602	11595	51197
29.Uttara Kannada	1024679	813595	34514	16234	50748
30.Yadagiri	516088	33773	29602	27972	57574

Source: Directorate of Economics and Statistics, Annual Season & Crop Report

LAND UTILISATION (contd..)

Unit : in hectares

Year/District	Other uncultivated land excluding fallow land			
	Permanent pastures & other grazing land	Land under Misc.trees & Groves	Cultivable waste	Total
1	7	8	9	10
2009-10	913551	288295	412831	1614677
2010-11	912385	285986	414397	1612768
2010-11				
1. Bagalkote	3429	274	2035	5738
2. Bangalore	5674	7453	3783	16910
3. Bangalore (R)	3879	12498	3898	20275
4. Belgaum	24807	3046	11465	39318
5. Bellary	5472	3606	24839	33917
6. Bidar	13964	10915	19382	44261
7. Bijapur	9575	1316	5502	16393
8.Chamarajnagar	22750	4741	7637	35128
9.Chikkaballapura	59510	6482	6143	72135
10.Chikmagalur	88585	21257	19404	129246
11.Chitradurga	88740	11317	21612	121669
12.D. Kannada	19059	31733	30669	81461
13.Davangere	19538	4955	8525	33018
14.Dharwad	3571	202	2669	6442
15 Gadag	2592	273	1010	3875
16 Gulbarga	25855	1131	9417	36403
17 Hassan	32943	6963	14142	54048
18 Haveri	12209	2290	2989	17488
19.Kodagu	13884	21034	9106	44024
20.Kolar	39418	7009	6397	52824
21.Koppal	14675	210	2568	17453
22 Mandya	32049	3382	41955	77386
23.Mysore	46808	5871	21407	74086
24.Raichur	19816	13684	10712	44212
25.Ramanagara	24662	3950	1178	29790
26.Shimoga	163463	26868	16311	206642
27.Tumkur	76453	21033	62642	160128
28.Udupi	10625	46966	38165	95756
29.Uttara Kannada	16625	4806	6450	27881
30.Yadagiri	11755	721	2385	14861

Source: Directorate of Economics and Statistics, Annual Season & Crop Report

LAND UTILISATION (Concld..)

Unit : in hectares

Year/District	Fallow land			Net area sown	Area sown more than once	Total cropped area
	Current Fallows	Other fallows	Total			
1	11	12	13	14	15	16
2009-10	1301361	483927	1785288	10404107	2469201	12873308
2010-11	1199134	426458	1625592	10522653	2539510	13062163
2010-11						
1. Bagalkote	36014	9971	45985	472386	136337	608723
2. Bangalore	19417	5216	24633	50371	1853	52224
3. Bangalore (R)	10482	11204	21686	125134	5967	131101
4. Belgaum	155784	6971	162755	837880	261771	1099651
5. Bellary	62941	13374	76315	442179	139690	581869
6. Bidar	34189	33751	67940	360724	63243	423967
7. Bijapur	86996	5685	92681	877334	160623	1037957
8.Chamarajnagar	11365	12886	24251	188867	36578	225445
9.Chikkaballapura	18576	4737	23313	193114	21769	214883
10.Chikmagalur	17051	4792	21843	299054	30684	329738
11.Chitradurga	41182	24094	65276	433392	90522	523914
12.D. Kannada	6377	5827	12204	130745	26423	157168
13.Davangere	14036	5421	19457	395679	98047	493726
14.Dharwad	41376	6903	48279	310816	201215	512031
15 Gadag	2097	563	2660	404457	148469	552926
16 Gulbarga	22242	2624	24866	924002	137755	1061757
17 Hassan	16692	26686	43378	397159	108266	505425
18 Haveri	11697	5748	17445	363939	58169	422108
19.Kodagu	3932	3497	7429	169515	15049	184564
20.Kolar	31819	8682	40501	186474	16807	203281
21.Koppal	80104	-	80104	369857	130585	500442
22 Mandya	24938	36030	60968	252700	47507	300207
23.Mysore	43087	37615	80702	337967	210638	548605
24.Raichur	172659	50051	222710	510107	152538	662645
25.Ramanagara	15611	20798	36409	169203	6326	175529
26.Shimoga	10158	25263	35421	226846	40375	267221
27.Tumkur	116912	31542	148454	558953	72791	631744
28.Udupi	1353	8325	9678	99713	18371	118084
29.Uttara Kannada	7232	13073	20305	112150	12269	124419
30.Yadagiri	82815	5129	87944	321936	88873	410809

Source: Directorate of Economics and Statistics, Annual Season & Crop Report

Table 4.05: The names of the districts and taluks under different zones

Zone No. and Name	District (No. of Taluks)	Name of Taluks
1.North Eastern Transition Zone	Bidar (5) and Kalaburagi (2)	Aland, Bhalki, Basvakalya, Bidar,Chincholi,Humnabad, Aurad.
2. North Eastern Dry Zone	Gulbara (5)Yadgir (3) & Raichur(3)	Afzalpur, Chitapur, Kalaburagi, Jewargi, Sedum, Shahapur,Yadgir, Shorapur, Raichur, Deodurga, Manvi
3.Northern Dry Zone	Koppal (4): Gadag(4),Dharwad (1), Belgaum (5), Vijayapura (5), Bagalkot (6), Ballari (7), Davanagere (1), Raichur (2)	Gangavathi, Koppal, Kushtagi, Lingasugur, Sindhanur, Yelburga, Badami, Bagalkote, Bagewadi, Bilgi,Vijayapura, Hungund, Indi, Jamkhandi, Mudhol, Muddebihal, Sindhagi, Ballari, Hagaribommanahalli, Harapanahalli, Hadagali, Hospet, Kudligi, Sandur, Siruguppa, Ron, Navalgund, Naragund, Gadag, Mundargi, Ramdurga, Gokak, Raibag, Soundatti, Athani.
4.Central Dry Zone	Chitradurga (6), Davanagere (3), Tumkuru (6), Chikkamagalur (1), Hassan (1)	Challakere, Chitradurga, Davanagere, Harihara, Hiriyur, Hosadurga, Holalkere, Jagalur, Molkalmuru, Arasikere, Kadur, Madhugiri, Pavadaga, Koratagere, C.N.Halli, Sira, Tiptur.
5.Eastern Dry Zone	Bengaluru Rural(4), Ramanagar (4) Bengaluru Urban (4) Kolar (5), Chikkaballapur (6), Tumkuru (2)	Gubbi, Tumkuru, Anekal, Bengaluru South, Bengaluru North, Channapatna, Devanahalli, Doddaballapur, Hosakote, Kanakapura, Magadi, Nelamangala, Ramanagar, Bagepalli, Bangarpet, Chikkaballapur, Chintamani, Gudibanda, Gowribidanur, Kolar, Malur, Mulbagal, Sidalaghatta, Srinivasapur, Bengaluru east.
6.Southern Dry Zone	Mysuru (4), Chamarajanagar (4), Mandya(7), Tumkuru (2), Hassan (2)	K.R.Nagar, T.Narasipur, Mysuru, Kollegal, Nanjangud, Turuvekere, Kunigal, Nagamangala, Srirangapatna, Malavalli, Maddur, Mandya, Pandavapura, K.R.Pet, Channarayanapatna, Hassan, Chamrajanagar, Yelandur, Gundlupet.
7.Southern Transition Zone	Hassan (4), Chikkamagalur (1) Shivamogga (3), Mysuru (3), DAvanagere(2)	H.D.Kote, Hunsur, Periyapatna, H.N.Pura, Alur, Arkalgud, Belur, Tarikere, Bhadravathi, Shivamogga, Honnali, Shikaripura, Channagiri.
8. Northern Transition Zone	Belgaum (4), Dharwad (3), Haveri (6), Gadag (1)	Hukkeri, Chikodi, Bailhongal, Belgaum, Haveri, Shiggaon, Shirahatti, Kundagol,Savanur, Hubli, Dharwad, Byadgi, Hirekerur, Ranebennur.
9. Hilly Zone	Uttar Kannada (6), Belgaum (1), Dharwar(1), Haveri(1) Shivamogga (4), Chikkamagalur (5), Kodagu (3), Hassan (1)	Sirsi, Siddapura, Yellapura, Supa, Haliyal, Mundgod, Khanapur, Soraba, HOsanagar, Sagar, Thirthahalli, Koppa, Sringerei, Mudigere, Narasimharajapur, Chickmagalur, Kalaghatagi, Hangal, Sakleshpur, Virajpet, Somwarpet, Madikere.
10.Coastal Zone	Udupi (3), Dhakshina Kannada (5), Uttara Kannaga (5)	Karwar, Kumta, Honnavar, Bhatkal, Ankola, Bantwal, Udupi, Belthangadi, Karkala, Kuindapura, Mangalore, Puttur, Sulya.

Source3: Agricultural diary 2013, Department of Agriculture, Bengaluru.

CROPPING PATTERN

Major crops grown are grouped as cereals, pulses, oilseeds and cash crops. Agricultural crops are grown in three seasons viz. Kharif (71 lakh ha.), Rabi (33 lakh ha.) and summer (six lakh ha.) in an area of about 110 lakh hectares. Cereals, Pulses, Oilseeds, Cotton, Sugarcane and Tobacco account for 49 per cent, 25 per cent, 15 per cent, five per cent, five per cent and one per cent respectively of the total agricultural cropped area.

Paddy is one of the major cereal crops of the State. It is predominantly grown in Shivamogga, Dakshina Kannada, Udupi, Uttara Kannada, Raichur, Koppal, Mysuru, Dharwad, Gadag and Haveri districts. It was grown in 14.15 lakh ha during 2011-12. Area under this crop increased from 13.53 lakh ha (1997-98) to 14.15 lakh ha. It is cultivated in all the three seasons i.e. Kharif, rabi and Summer.

Jowar is another major cereal crop grown largely in northern districts. Kalaburgi, Raichur, Koppal, Belagavi, Dharwad, Gadag, Haveri, Ballari, Davanagere and Bidar districts account for nearly 90 per cent of the area under the crop. About 11.38 lakh ha was under this crop during 2011-12. It is predominantly grown in Rabi season.

Ragi is largely grown in southern districts of the State. Predominant ragi growing districts are Bengaluru Rural, Tumakuru, Hassan, Chitradurga, Mysuru, Chamarajnagar, Kolar and Mandya. About 6.85 lakh ha of area was under this crop during 2011-12. Maize and bajra occupied 13.52 lakh ha and 2.87 lakh ha respectively during 2011-12. Farmers are showing marked interest in the cultivation of maize which is evident from figures of 2011-12. These two crops are largely grown in northern districts of the State. Wheat, another important food crop, is grown in the rabi season.

It is also largely grown in northern districts of the State. About 2.21 lakh ha of area was under this crop during 2011-12.

Red gram (tur) is one of the major pulse crops grown in the Kharif season in the State. Kalaburgi, Raichur, Koppal and Bidar districts accounted for 70 per cent of the area under this crop in the State. It is mainly grown in rain fed areas. About 7.68 lakh ha of area was under this crop during 2011-12. About 30 per cent of area under pulses was covered by Red gram crop.

Bengal gram is one of the important pulse crop grown in the rabi season. Kalaburgi, Bidar, Vijayapura, Bagalkot, Dharwad, Gadag, Haveri and Belagavi districts accounted for 86 per cent of area under this crop in the State. About 7.97 lakh ha of area was under this crop during 2011-12.

Groundnut is an important crop of the State largely grown in Tumakuru, Chitradurga, Davanagere, Kalaburgi, Dharwad, Gadag, Haveri, Raichur, Koppal, Bagalkot and Vijayapura districts. These districts accounted for 69 per cent of the area under this crop. About 6.78 lakh ha was under this crop during 2011-12. About 48 per cent of the area under oilseeds was covered by groundnut only.

Sesamum is another oilseed crop of the State grown in the Kharif season in rain fed condition only. Kalaburgi, Bidar, Koppal and Raichur accounted for 58 per cent of area under this crop. About 0.62 lakh ha was under this crop during 2011-12. Sunflower is an important oilseed crop grown in Vijayapura, Bagalkot, Raichur, Koppal, Kalaburgi, Ballari, Dharwad, Gadag, Haveri, Davanagere and Chitradurga districts. These districts accounted for 84 per cent of the area under this crop. This crop was grown in 3.76 lakh ha during 2011-12.

Safflower is another important oilseed crop grown in the rabi season in rain fed areas. Vijayapura, Bagalkot, Kalaburgi, Dharwad, Gadag, Haveri, Belagavi, Koppal and Raichur districts had a major share under this crop. Cotton is an important fibre crop of the State. Dharwad, Gadag, Haveri, Ballari, Belagavi, Koppal and Raichur districts are the principal growing areas. About 5.7 lakh ha of area was under this crop during 2011-12. The cropping pattern details are presented in Table 4.06.

Rainfed Farming

The first challenge posing the agriculture sector in Karnataka is to mainstream the vast drought prone/rainfed area. In India, out of 142 million ha of arable lands, 60 per cent (5.2 million ha) is rainfed. Karnataka has the second largest area under rainfed agriculture after Rajasthan in the Country with around 120 lakh hectares. Crop yields in rainfed areas are quite low (one to oneand half tonnes per hectare).

Current rainwater use efficiency in rainfed agriculture varies between 35-45 per cent. Rainfed/ dryland areas confront harsh environment and economic hardship. The basic problem of rainfed areas is one of a vicious cycle that starts with low water availability, degradation of natural resource base because of poor management which ultimately results in low productivity.

This, in turn, leads to over-exploitation of the existing natural resources and causes further degradation. The vast potential of rainfed agriculture could be unlocked by using available scientific technologies including improved cultivars. Crops like jowar, ragi, maize, groundnut, sunflower, pulses, oilseeds and some horticulture crops can be grown by adopting scientific strategy. The vast opportunities existing in dryland areas can be harnessed for improving rural livelihoods.

Calendar of agricultural operations in respect of principal crops and crop-wise critical growth period details are presented in table 4.07 and 4.08 respectively.

Threshing Yard

Table 4.06: Cropping pattern (in lakh hectares)

Sl No.	Crops	Year							
		1960-61	1970-71	1980-81	1990-91	2000-01	2010-11	2011-12	2012-13
1	Rice	10.28	11.7	11.14	11.73	14.84	15.39	14.15	13.19
2	Jowar	29.69	22.24	19.91	21.55	17.82	12.42	11.38	13.05
3	Ragi	9.96	10.65	10.57	10.56	10.23	7.88	6.85	6.92
4	Maize	0.11	0.63	1.57	2.5	6.69	12.87	13.52	12.97
5	Bajra	5	5.62	5.64	4.25	4.62	3.00	2.87	2.75
6	Wheat	3.27	3.43	3.22	1.98	2.66	2.55	2.21	2.5
7	M.Millets	4.44	5.43	3.68	1.59	0.71	0.24	0.24	0.27
	Total Cereals:	**62.75**	**59.70**	**55.73**	**54.16**	**57.57**	**54.44**	**51.22**	**51.65**
1	Tur	2.96	3.04	3.36	4.63	5.83	8.91	7.68	6.79
2	Bengalgram	1.58	1.63	1.4	2.29	3.69	9.59	7.97	10.5
3	Horsegram	8.52	6.19	7.09	3.53	2.95	2.21	1.8	2.18
4	Blackgram		0.94	0.57	0.96	1.46	1.27	0.92	1.02
5	Greengram		1.2	1.53	2.91	4.51	4.01	2.93	1.59
6	Cowpea & other pulses		0.87	0.78	1.14	1.15	1.09	0.99	0.98
7	Avare		0.56	0.59	0.75	0.88	0.83	0.68	0.72
	Total Pulses:	**13.06**	**14.43**	**15.32**	**16.21**	**20.47**	**27.91**	**22.97**	**23.78**
	Total Foodgrains:	**75.81**	**74.13**	**71.05**	**70.37**	**78.04**	**82.35**	**74.19**	**75.43**
1	Groundnut	9.15	10.27	7.9	12.12	10.63	8.48	6.78	5.85
2	Sesamum	0.64	0.87	1.18	1.43	0.98	0.87	0.62	0.43
3	Sunflower	-	-	0.38	8.96	4.78	4.09	3.76	5.38
4	Castrol	0.42	0.38	0.26	0.22	0.3	0.19	0.16	0.12
5	Niger	0.25	0.21	0.55	0.53	0.44	0.23	0.21	0.16
6	Mustard	0.09	0.04	0.03	0.05	0.08	0.04	0.03	0.05
7	Soyabean	-	-	-	0.24	0.63	1.68	1.91	2.03
8	Sunflower	1.44	1.59	1.58	1.68	0.93	0.55	0.5	0.35
9	Linseed	0.48	0.63	0.63	0.28	0.17	0.11	0.07	0.1
	Total Oilseeds:	12.47	13.99	12.51	25.51	18.94	16.24	14.04	14.47
	Annual Crops:								
1	Cotton	9.84	11.42	10.12	5.96	5.52	5.48	5.7	5
2	Sugarcane	0.72	1.04	1.54	2.72	4.17	4.23	4.3	4.04
3	Tobacco	0.39	0.38	0.52	0.46	0.71	1.25	1.15	1.02
	Total of above	**99.23**	**100.96**	**95.74**	**105.02**	**107.38**	**109.55**	**99.38**	**99.96**

Source: DE&S, Bengaluru

Table 4.07: Calendar of Agricultural operations indicating the period of sowing and harvesting in respect of principal crops in Karnataka state

Sl. No.	Name of the crops	Period of		Other seasons in which grown
		Sowing	Harvesting	
	KHARIF			
1	Rice-Autumn	May - September	October - January	]Summer
2	Rice-Winter	August - November	January - April	]
3	Jowar	May - July	September - December	Rabi, Summer
4	Bajra	June - August	September - November	Summer
5	Maize	May - August	September - December	Rabi, Summer
6	Ragi	May - August	September - December	Summer
7	Small Millets	June - August	September - December	Summer
8	Tur	June - July	December - February	
9	Other Pulses (Kharif)	May - August	October - December	Rabi
10	Tobacco	April - September	September - January	
11	Groundnut	June - August	September - December	Summer
12	Castor Seed	April - August	September - February	Summer
13	Sesamum	April - June	August - September	
14	Cotton	May - July	December - April	Rabi
15	Niger seed	June - July	September - October	
16	Sunflower	June - August	September - December	
	RABI			
1	Jowar	September - October	January - March	Kharif Summer
2	Maize	October - December	January - March	Kharif Summer
3	Wheat	October - December	January - March	
4	Gram	October - December	January - March	
5	Other Pulses (Rabi)	September - February	November - April	Kharif
6	Cotton	August - September	February - April	Kharif
7	Safflower	October - November	January - March	
8	Linseed	October - November	January - March	
9	Rape & Mustard	October - November	January - March	
10	Sunflower	October - November	January - March	
	SUMMER			
1	Rice	January - March	April - July	Kharif
2	Ragi	January - March	April - July	Kharif
3	Groundnut	December - March	April - July	Kharif
4	Maize (Hybrid Varieties)	December - March	April - July	Kharif, Rabi
5	Bajra (Hybrid Varieties)	January - March	April - July	Kharif
6	Jowar (Hybrid varieties)	January - March	April - July	Kharif, Rabi
7	Small Millets(like Irrigated Navane)	January - March	April - July	Kharif
8	Sunflower	January - March	April - July	
1	**Sugarcane**	June - July	August - September	14 months crop
		June - July	November - February(Adsali)	18 months crop
		December - February	December - February(Eksali)	12 months crop
		October - December	November - December(Eksali)	12 months crop

Source: Agriculture in Karnataka- A profile 2012, Dept. of Agril GOK

Table 4.08: Crop-Wise Critical Growth Period, Average Duration and Water Requirement

Crop	Critical growth stages	Average crop duration (days)	Water requirement (mm)
Rice	Tiller initiation, flowering and milky stage	90-130	900-2500
Wheat	Crown root initiation, flowering, joining, milky and tillering	135	400-450
Pulses	Flower initiation and pod filling	90-120	250-300
Groundnut	Pegging and pod formation	105	450-600
Sugarcane	Emergence, tiller formation and elongation	330	1400-3000
Banana	Early vegetative phase, bunch initiation and flowering	300	3000
Cassava	Rooting, early tuberization and tuber development	300	400-750
Maize	Silking and cob development	100	400-600
Sorghum (Jowar)	Knee-height stage, flowering and grain filling	100-120	250-300
Cotton	Commencement of sympodial branching, flowering, boll formation and boll bursting	165	600-700

AGRICULTURE INPUTS

Fertilizer: Fertilizer forms the major agricultural input to increase the production and productivity. According to agricultural scientists, different types of fertilizers like NPK, urea etc. should be used in a balanced proportion to maintain the productivity of the soil. Consumption of NPK in chemical fertilizers during the last 4 years is presented in table 4.09. The state government also maintains a buffer stock of fertilizers to overcome the scarcity of fertilizers at crucial periods.

Table 4.09: Consumption of NPK in Karnataka (in tonnes)

Years	N	P	K	Total
2009-10	962898	629855	465726	2058479
2010-11	1016208	696173	398049	2110429
2011-12	1215931	786763	332852	2335547
2012-13	891691	389638	249869	1531198
2013-14(Likely achvt for kharif only)	573634	257316	138469	969419

Due to the high cost of chemical fertilizers, the development and use of organic manures assumes great importance. Bio-fertilizers like Rhizobium, Blue green algae, Azatobacter and Azospirillum are being popularised among farming community. Organic farming has gained popularity among the farming community in recent times due to its environment friendly farming practices and increased production.

SEEDS: Seed us an important component in crop husbandry. The State Agricultural Universities are basically responsible for the production and supply of breeder seeds of different crops. There are 53 seed farms in the State. Of these, 42 seed farms are under the control of Department of Agriculture and 11 under Zilla Panchayat. The foundation seeds produced in the departmental farms were being handed over to the Karnataka State Seed Corporation for processing and further multiplication. The role of the private seed industry has been well recognised and they have been provided with all the facilities. Many multi-national Companies are also engaged in seed production. There are two seed testing laboratories, one at Hebbal and another at Dharwad. There is one more seed testing laboratory at Lalbagh, Bengaluru under the control of the Horticulture department.

Production and distribution of Certified/Quality seeds in the State from 2009-10 to 2013-14 is given below (Table 4.10).

Table 4.10: Production and distribution of certified/quality seeds (in Quintals)

Particulars	2009-10	2010-11	2011-12	2012-13	2013-14 (Target)
Production	1087450	1128258	828040	1023172	1112162
Distribution	1414089	1292765	1214596	1270340	1562172

Source: Economic survey of Karnataka 2013-14

Agricultural Implements –Farm Mechnization: Use of implements is one of the important components in agriculture. It helps the farmers to over come the problem of scarcity of Agricultural Labourers. The Centrally Sponsored Scheme of Farm Mechanization Programme was being implemented under Macro Management Mode of Agriculture (Work Plan) since 2001-02 upto 2012-13. Under this scheme, 25 per cent subsidy is provided as per the assistance norms indicated by Government of India. From 2003-04 as per the State Government announcement, the rate of subsidy was increased to 50 per cent with the State share of 25 per cent in addition to the Central share of 25 per cent. From 2008-09 Central fund under Macro Management Mode of Agriculture (Work Plan) is used as a matching grant to State fund. After exhausting the Central fund, the entire 50% subsidy for farm machineries is borne by the State fund. From 2013-14, the Macro Management Mode of Agriculture (Work Plan) will not be implemented as per the Govt. of India Guidelines.

Farm Mechanization Programme is also implemented as Karnataka Farm Mechanization Mission under *Rashtriya Krishi Vikas Yojana*. The total allocation for Farm Mechanization Programme for the Year 2013-14 is Rs.29252.90 lakhs. 50 per cent subsidy is provided for the general category farmers and 90 per cent subsidy is provided for the farmers belonging to Scheduled Caste and Scheduled Tribe farmers. The main objective of the scheme is to popularize mechanized farming in order to reduce drudgery in farm operations, labour use, to save time and to cover more area in short span of time. Mechanized farming helps to increase efficiency in farming operations and ultimately results in higher production and productivity. The details of expenditure incurred during the last three years under Farm Mechanization programme are given in Table 4.11.

Table 4.11- Farm Mechanization Programme in Karnataka (Rs in Lakh)

Scheme	2010-11	2011-12	2012-13
Farm Mechanization (Under all Schemes)	10920.00	12642.03	11871.74

Source: Economic survey of Karnataka 2013-14.

ORGANIC FARMING: Organic farming is a technique to build up soil fertility for sustainable production, mainly using local and natural resources and with least external inputs. Production and protection of crops mainly depend on indigenous wisdom modified to latest scientific techniques. Organic farming aims at reducing the cost of production and helps farmers to get more returns. Organic agriculture includes all agriculture systems that promote the environmentally, socially and economically sound production of food and fibers. These systems take local soil fertility as a key to successful production. Organic farming is chemical free agriculture. Hence, organic farming is a holistic approach.

In the process of attaining higher levels of food production to keep pace with population growth during the past four decades, emphasis was laid on intensive agriculture practices. Thus, on one hand we achieved self sufficiency in food production but on the other hand soil became sick, underground water depleted, environment polluted, cost of production increased and this led to presence of chemical residues in food products causing hazards to human beings and animals besides rendering the soils problematic due to soil salinization, alkalization, water logging. Micro nutrient deficiency and decline in soil organic matter content has resulted in reduced water holding capacity, destruction of soil structure, decline in beneficial soil flora and fauna.

In Karnataka more than 75 percent of the cultivated area is still under rain-fed condition. The State is encountering drought conditions frequently in the recent times. Hence to address all these problems and to stabilize and increase the agriculture production especially in rain-fed and drought prone areas, Government of Karnataka has brought out **State Policy on Organic Farming** during March 2004 to promote Organic Farming in the state.

Main objectives of the Policy are to enhance soil fertility and productivity of soils, reduce the cost of production, improve farmers' income through production of quality produce, increase the food security by encouraging the traditional crops, reduce the debt burden of farmers and enable to achieve sustenance and self respect, make environment safe and pollution free besides protecting health of human beings and animals, increase rural employment opportunities, facilitate farmers' Self Help Groups for most of their requirements, and equip farmers to effectively mitigate the impact of droughts. Among the various

objectives of the policy, equipping the farmers to effectively mitigate the drought situation in rain fed and drought prone areas is one of the major objectives.

The **strategies adopted by the state for promotion of Organic Farming** in the State are Integrated and holistic approach for the promotion of Organic Farming in the State, Integration of different Developmental programmes and implementation under "*Single Window Approach*", Implementation of programmes through Farmers' Associations/ Farmers' Clubs/ Farmers' Companies/ Farmers Co-operatives/ Self Help Groups/ Non- Government Organisations, Area approach/ Commodity approach/ Crop approach, Encouragement for Bio-mass production, Bio-diversity and Mixed Farming, Soil and Water conservation practices including rain water harvesting, Assistance for organic inputs, Assistance for value addition, on-farm processing, storage, marketing, Assistance for organic produce processing industry and export promotion, Conversion and certification of Organic farms, Research and Development in Organic Farming, Training, extension, study tours, publicity and propaganda, Organic Farming syllabus in primary/ secondary education, Eco-tourism.

Model organic farming village/site programme: As a first step towards promotion of organic farming in the State and as envisaged in Organic farming policy, Model organic village / site programme is being implemented in the state since 2004-05. In the first phase the programme was implemented at district level and later on it was extended to taluk level and from the year 2011-12 the programme has been extended to other Hoblis of all the 176 taluks of the state and is presently under implementation. Under this programme an area of 100ha. is being converted to Model Organic Farm (which would take a minimum of three years to develop as an ideal organic site). Since several NGOs are pioneered in popularizing Organic Farming amongst the farming community in the State, the programme is being implemented in association with the NGOs.

Organic Mission Programmes: To give maximum thrust to organic farming, the State government during 2008-09 constituted a state level organic farming mission empowered committee. The committee includes 14 progressive farmers as members including the chairman and nine senior officials of the state government. Under organic mission programme, 174 registered organic farmers associations have been selected in 172 taluks. Through these associations 300 farmers (beneficiaries) have been identified in each taluk and a total of 52,200 farmers have been brought under the programme and around 71,000 ha area is under conversion to organic cultivation. Later on around 35,200 additional new farmers are being brought under the organic mission programme.

DEVELOPMENT PROGRAMMES:

Karnataka Seed Mission: Seed is an important and crucial agricultural input. The Karnataka Seed Mission Scheme is being implemented in the State since 2008-09 under RKVY. Important components like achieving crop productivity through seed replacement rate, identifying seed requirement and production and infrastructure facilities have been included to strengthen Certified Seed Production and Certified Seed distribution programmes in the state. The objectives of the scheme are: To achieve enhancement in agricultural productivity through increased SRR and Comprehensive Development of all facts of seed sector in Karnataka through a mission mode approach, To make Karnataka a Global Destination for seed production, To identify gaps in seed requirement, production and infrastructure for quality seed production and marketing, To have formers centric approach in varietal development, seed production and marketing.

National Food Security Mission: *The National Food Security Mission* (NFSM), a centrally sponsored scheme launched in 2007-08 is in operation in 480 districts of 18 important rice,wheat and pulses growing states in the country. Its objective is to increase production of rice, wheat and pulses by 10millions, 8 millions and 2 millions respectively. In Karnataka NFSM was launched under two components namely NFSM(Rice) and NFSM(Pulses). Belagavi, Dakshin Kannada, Hassan, Raichur, Shivamogga, Udupi and Uttara Kannada comes under NFSM(Rice) while NFSM(Pulses) is implemented in all the districts. For speedy implementation of the pulse development, accelerated pulses production programme is being implemented from 2010-11 under NFSM (Pulses).

Rashtriya Krishi Vikas Yojana (R.K.V.Y): This scheme was launched in 2007-08 as an important programme of 11th five year plan. States are allocated funds to improve their agriculture and allied activities. For the year 2011-12, an amount of Rs.595.90 crore was allocated and funds were utilized for implementation of the schemes related to Agriculture, Horticulture, Animal Husbandry, Fisheries, Agricultural Marketing, Sericulture, University of Agricultural Science (Bengaluru, Dharwad and Raichur), Karnataka State Seeds Corporation and other Departments/Institution. During 2013-14 an amount of Rs.794.68 crore has been sanctioned for implementation of various schemes & sub-schemes of RKVY (Table 4.12).

Table 4.12: Allocation of Funds Under RKVY during 2012-13(In crores)

Sl. No.	Title	Allcoation
1	Normal RKVY	716.40
	Sub-Schemes	22.28
2	Oil Palm Development Programme	9.00
3	Vegetable Clusters	13.50
4	Nutri Cereals-INSIMP	20.00
5	Rainfed Area Development Programme	13.50
6	National Mission on Protein Supplements	794.68
	Total	

Source: Economic survey of Karnataka 2013-14.

An amount of Rs.312.89 crore has been earmarked for 2013-14 to agriculture department for implementation of the following schemes. Details are shown in Table 4.13.

Table 4.13: Allocation of funds under RKVY during 2013-14.

Sl. No.	Name of the Project	Budget approved
	Normal RKVY	
1	Karnataka Farm Mechanization Mission	70.00
2	Bhoo Chetana	55.00
3	Karnataka Seed Mission	56.10
4	Improving livelihoods in Karnataka through CGIAR initiative	25.50
5	Popularisation of Direct seed rice (DSR/SRI technology)	5.00
6	Agro Processing and Post-Harvest Technology	30.00
7	Organic Farming-on site activities	12.50
8	Additional Expenditure of INSIMP during 2012-13	5.39
9	Mechanized transplanting of Rice	3.00
10	Strengthening of Seed farms including swabeejabhivrudi	30.00
11	Administrative cost	6.90
	Special Scheme	
12	Initiative for Nutritional Security through Intensive Millets Promotion Programme (INSIMP)	13.50
	Grand Total	**312.89**

Source: Karnataka Economic Survey 2013-14

Integrated Scheme for Oilseeds, Oil Palm and Maize (ISOPOM): ISOPOM is a Centrally Sponsored Scheme for the development of Oilseeds, Pulses, Oil Palm and Maize implemented since 2004-05(10th five year plan). The main objective of ISOPOM is to increase production and attain sustainability in these crops. w.e.f. April 2010 Pulses have been included under NFSM. The sharing pattern between centre and state is in the ratio 75:25. In Karnataka the Scheme is being implemented in all the 30 districts. Under this Scheme, the provision of 50 per cent subsidy is extended to distribute certified seeds, inputs which are necessary for Block Demonstration, IPM and FFS Demonstrations viz., Rhizobium/ PSB, NPV, Gypsum/Pyrites and micronutrients, water convey pipes, Plant Protection chemicals and Plant Protection equipments.

Bhoo Chetana: Bhoochetana is a novel mission mode, science based project implemented by Government of Karnataka since 2009-10 to increase the productivity of selected rainfed crops by 20 per cent in four years. Initially it

was implemented in 16 districts and now has been extended to all the 30 districts of the state. ICRISAT, Watershed Development Department and three State Agriculture Universities are consortium partners.

For the year 2012-13, *Bhoochetana* programme will cover the target area of 50 lakh hectare in rainfed area and 5 lakh hectare in irrigated area(irrigated paddy and sugarcane). About 42 lakh farmers have been registered under this programme. Along with technical message, required micronutrients, Gypsum, Biofertilizers and other inputs are made available to farmers at cluster village level at 50 per cent subsidy in 747 *Raitha Samparka Kendras*, 4,953 cluster villages with the services of 9,711 Farmer facilitators and 48,500 lead farmers. About 8,900 Farmer Field Schools were conducted successfully for transfer of production technology to farmers. It is proposed to capitalise on the success of the first phase of the *Boochetana* project and convert into *Boochetana* phase -2. *Boochetana* phase-2 will be implemented for five years (2013-14 to 2017-18). All 30 districts of the State will be covered. Department of Agriculture is the nodal department.

Suvarna Bhoomi Yojane: *Suvarna Bhoomi Yojane Scheme* is being implemented from the year 2011-12. The objective of this scheme is to give incentive to farmers to shift from low income crops to high income crops namely, Pulses, Oil seeds and Bt cotton. The incentive is also extended to other activities namely, Bio fuel, Horticulture, Apiculture, Sericulture and Organic Farming. 10 lakh small and marginal farmers including two lakh SC and one lakh ST farmers will be given Rs. 10,000 for maximum of two acres in two equal instalments of Rs. 5,000 each through banks to take up the proposed activity and thereby improving the economic status of those small and marginal farmers. The incentives are given only for rainfed area farmers and the catchment area farmers are not eligible to get the incentives of this scheme. An amount of Rs.1,000 crore is allocated for this scheme.

Initiative For Nutritional Security Through Intensive Millets Promotion Programme (INSIMP):

This new initiative was started by GOI during 2011-12 to demonstrate the improved production and post-harvest technologies for millets in an integrated manner. Considering the fact that millets are the major food crops in Karnataka covering an area of 23 lakh ha but the current yield is less than the potential, this programme becomes significant to fill the gap. During 2011-12, in Kharif season this programme was implemented in 15 districts i.e., Bengaluru(U), Bagalkot, Belagavi, Ballari, Chitradurga, Davanagere, Haveri, Tumakuru, Vijayapura, Chamarajanagara, Raichur, Dharwad, Gadag, Koppal and Gulburga in Jowar, Bajra, Ragi, Foxtail Millet and Little Millet covering an area of 47,360 hectares and 47,896 farmers. In Rabi season the programme was implemented in five districts i.e., Bidar, Chitradurga, Gadag, Dharwad and Koppal in Rabi Jowar crop covering area of 11,000 hectares and 10,900 farmers.

INSIMP programme was effectively implemented in the state through supply of free input kit and seed minikit to the farmers, five days Training regarding production technologies, steps taken for setting up of 300 post-harvest technologies centers at 20 Krushi Vignana Kendras and private enterpreneures and seven millet melas organised for creating awareness on millet nutrition by three state agricultural universities. Govt. of India has provided budget outlay of Rs.26.57 crore under RKVY for the year 2011-12 and Rs. 25.94 crore expenditure has been made under this Scheme. Allocation for the year 2013-14 is Rs.13.50 crore.

Raitha Samparka Kendra (RSK): The Department of Agriculture under "*Raitha Mitra Yojane*" established 747 *Raitha Samparka Kendras* (RSKs), one per Hobli to provide services and information at single point required by the farmers. These are the knowledge centres for the farmers that provide information on inputs, farm practices and market intelligence. Based on the various agro climatic zones of the state, the new food production technologies and skills are being implemented in the farmers' field aiming to increase the state food production levels under this scheme. Bi-monthly and fortnightly, primary and secondary training sessions, are built in the system to continuously upgrade and update the professional skills of the extension workers.

Facilities available at RSK include, Seed sample testing (Rs five per sample), Soil sample testing (Rs three per sample), Rentals for the space to stock and sale agricultural inputs by the public sector and private sector companies (Rs 100 per month), Rentals for the space used for demonstration

purpose by the public sector and private sector companies (Rs 300 per plot for a period of four months), Rentals for promotional activities conducted in the premises of the RSK's by the public sector and private sector companies (Rs 100 per day per event). Service charges for sale of seeds and other inputs are collected at the RSK.

***Agricultural Technology Management Agency (ATMA)*:** Agricultural Technology Management Agency is an autonomous body with a focal point for integrating research and extension activities and decentralizing day to day management of the public agricultural technology system.

The ATMA at district level would be increasingly responsible for all the technology dissemination activities at the district level. It would have linkage with all the line departments, research organizations, non-governmental organizations and agencies associated with agricultural development in the district. Research and Extension units within the project districts such as *Zonal research stations* (ZRS) or substations, *Krishi Vigyan Kendras* (KVKs) and the key line Departments of Agriculture, Animal Husbandry, Horticulture and Fisheries etc., would become constituent members of ATMA. Each *Research Extension*(R- E) unit would retain its institutional identity and affiliation but programmes and procedures concerning district -wise R- E activities would be determined by ATMA Governing Board to be implemented by its Management Committee (MC).

There are committees like *INTER-DEPARTMENTAL WORKING GROUP (IDWG)* at State level, District ATMA steering committee at district level, ATMA implementation committee at taluk level and farmers advisory committees at state, district and taluk level for implementation of this scheme.

The Scheme is being implemented in the State since 2005. The revised Scheme shall focus on the key extension reforms as objectives of the Scheme. The objectives are Providing innovative and restructured technologies by an autonomous agency through institutions at State/District/ Block levels, Encouraging multi agency extension strategies involving Public/Private Extension service providers, Ensuring an integrated, broad-based extension delivery mechanism consistent with framing systems approach, Adopting group approach to extension in line with identified needs and requirements of the farmers in the form of the CIGs and FIGs, Facilitating convergence of programmes in planning, execution and implementation, Addressing gender concerns by mobilizing farm women into groups and providing training to them and Moving towards sustainability of extension services through beneficiary contribution.

Relief Schemes: The government of Karnataka provide Rs.One lakh as relief to the families of the farmers committing suicide on account of the heavy burden of loan. Budgetary provision of Rs.100 lakh provided during 2013-14 and Rs.54 lakh has been distributed up to end of December 2013.

Government also provide Rs.one lakh as a relief to farmers/agricultural labourers due to accidental death from snake bites, fall from trees and other accidental death while doing agricultural activities and up to Rs.10,000 for loss of fodder/hay from fire accidents. A budget provision of Rs.500 lakh has been provided during 2013-14 and Rs.499.68 lakh has been distributed up to the end of October 2013.

Kisan Call Centres: Agriculture sector needs constant and continuous back end support to make it a profitable and sustainable field. Kisan call centres have helped to fulfil this necessity in the country. In view of the fast development of communication network in the Country Government of India dedicated *Kisan Call Centres* with Toll free telephone no.1800-180-1551 to the nation on 21st Jan. 2004, to enable the farmers for easy and instant access of information on the problems related to the crops, seeds, fertilizers, pesticides commodity prices, veterinary etc. The Kisan Call Centre consists functionaries at three levels. Level-I includes the basic call centre interface, with high quality bandwidth telecom and local language proficient Agriculture graduates. At Level-II Subject Matter Specialists located in State Agricultural Universities, Agricultural Department, Horticulture department, Animal Husbandry Department, Marketing Department, Indian Institute of Horticultural Research, Central Silk Board etc answer the calls diverted by the level-I functionaries. Level-III includes the Management Group to ensure ultimate answering and resolution of all the farmer's queries which

are not resolved at Level-II. In Karnataka Kissan call centre is located in Bengaluru (The Karnataka State Co-operative, Agriculture and Rural Development Bank premises, Tippu Sultan Palace Road, Chamarajpet, Bengaluru-18).

Raita Sahayavani Kendra (Farmers Helpline Centre): The Department of Agriculture has started a farmers help line called "*Raita Sahayavani Kendra*" to provide information regarding agriculture and allied subjects to farming community in local lanaguage. With this objective, farmers are facilitated to make toll free calls vide Phone No.1800 425 3553. This centre functions from 7.00 am to 9.00 pm on all days on rotation basis under two shifts. Two subject matter specialists are entrusted to receive and provide information to the farmer. On an average 50 calls are received per day.

***Krishi Vigyan Kendras*:** The Indian Council of Agricultural Research (ICAR), New Delhi has started the *Krishi Vigyan Kendras (KVKs)* in all the districts of the country for Conducting "On-farm testing" for identifying technologies in terms of location specific and sustainable land use systems, Organize training to update the extension personnel with emerging advances on regular basis, Organizing short and long term vocational training courses in agricultural and allied vocations for the farmers and rural youth with emphasis on "**Learning by doing**" for higher production on farms and generating selfemployment and to Organize front line demonstration on various crops to generate production data and feedback information as mandate. Presently thirtyone KVKs are functioning in Karnataka under various agricultural and horticultural universities.

***Minimum Support Price (MSP)*:** Minimum Support Prices for various crops are fixed by the Government of India on the recommendation of Commission for Agricultural Costs and Prices. Procurement of commodities is undertaken by *Food Corporation of India, NAFED, KOF* etc. in the event of price crash below MSP. Minimum Floor Price Scheme is operated in Karnataka for perishable agriculture commodities like onion, potato, tomato and green chillies. The agricultural Marketing Department arranges the procurement of these commodities through HOPCOMS in districts/taluks after the sanction of cabinet sub-committee.

***Karnataka Krishi Mission (KKM)*:** For the comprehensive development of agriculture and allied activities, "*Karnataka Agriculture Mission*" is formulated under the chairmanship of Honourable Chief Minister. The objectives of the KKM are to induct new ideas, sensitize and develop new plans, projects and programmes for agriculture and agriculture related universities and line departments related to agriculture, streamlining and coordinating the functions of line departments viz., agriculture, horticulture, animal husbandry and veterinary services, sericulture and fisheries etc., including agriculture and agriculture related universities in the State to provide technical information and services from a single window, bring new policies and guidelines which can improve the farm productivity to the level 4.5 percent per annum and also increase the income level of farmers by convergence of line departments, drafting new programmes for sustainable agriculture, conservation of natural resources like land, water and improving the fertility of soil and water use efficiency, promotion of organic farming, intensify training to the farmers in modern agriculture including marketing, to provide infrastructure for seed storage,water harvesting and water use efficiency, processing and value addition to the farmers through commodity groups, promoting integrated farming approach to increase the income of the farmers even under rainfed conditions, guiding universities for professional and para-professional human resources for changing situations in agriculture, providing utmost priority for seed production in field and horticulture crops, planting material, animal poultry and fish breeds and seed production, establishment of market extension departments in UAS, Bengaluru, Dharwad, Raichur and Shivamogga, University of Horticultural sciences, Bagalkot, and Karnataka veterinary animal and fisheries sciences university, Bidar with coordination of Govt line departments, establishing of pilot centres of reclaiming saline and alkaline soils for improving productivity of crops at a required time and initiating survey to identify farmers who have done extremely well to generate more income, more than Rs. two lakh/ acre under rainfed conditions and more than Rs. 50000/acre under rainfed to bring their practices to mainline research of the agricultural universities for validating and recommending through line departments for adoption by all other farmers.

Agri Business in Karnataka: Karnataka has taken the initiative in developing sustainable agribusiness through the '*Integrated Agribusiness Development Policy*' which covering agriculture and allied sectors (like horticulture, fisheries, animal husbandry, sericulture and food processing) both in infrastructure and industrial segments. This policy is expected to address key concerns affecting the agricultural growth and allied sectors like improving productivity, minimizing postharvest losses, enhancing postharvest processing and value addition, enhancing value realization through better marketing channels, sustainable practices in production, processing, branding and, marketing. Government of Karnataka has taken progressive steps in identifying land banks for sustained industrialization and infrastructure development of the State. Investors are welcome to locate their units and infrastructure facilities either in earmarked industrial parks, SEZs or industrial estates so as to leverage on cluster advantages. Karnataka is leading interms of production of horticulture crops. Its varied agro-climatic regions and a cosmopolitan centre like Bengaluru provides it with immense opportunities for developing agri-business in the state.

Crop Insurance: First crop insurance scheme was presented to the parliament by Dr.Rajendra Prasad, as the First Minister for Agriculture of independent India in 1948. Subsequently, the Government of India in March 1970, prepared a draft of the model scheme. An Expert Committee chaired by Dr Dharm Narain examined its feasibility. The Committee did not favour introduction of crop insurance. However, General Insurance Corporation of India offered the scheme of crop insurance in 1972 on its own. In 1976 Prof Dandekar suggested an alternative approach linking crop insurance with crop loan. This was initially introduced in three states in 1978 on a pilot basis. Later on a Pilot Crop Insurance scheme with modifications was launched as *Comprehensive Crop Insurance Scheme (CCIS)* throughout the country in 1985. The scheme was voluntary in nature in the initial phase but was made compulsory for institutional loanees but failed to provide the needed protection to the vulnerable. Followed by this, *Rashtriya Krishi Bima Yojana (RKBY)* was launched formally in 1999. The participation in RKBY was compulsory for farmers growing notified crops and availing crop loans from formal credit institutions. However, non-borrower farmers growing notified crops were also eligible to opt for the Scheme on voluntary basis.

Rashtriya Krishi Bima Yojana (RKBY):
Rashtriya Krishi Bima Yojana is being implemented in the state since Kharif 2000 by the State Government with the co-ordination of Central Government. The objectives of this scheme is to provide financial support and reimburse the insured amount to the farmers in case of loss of notified crops due to natural calamities, pests and diseases, to encourage farmers to adopt latest technology and use quality seeds and also stabilize the Agricultural income during the scarcity related years. Subsidy to an extent of 10 per cent is provided on premium paid by small and marginal farmers.

Crops under rainfed and irrigated conditions notified in all the three seasons at hobli level are as follows: Paddy, maize, jowar, ragi, bajra, navane, saave, blackgram, tur, greengram, horsegram, soyabean, sunflower, sesamum, castor, groundnut, cotton, wheat, Bengal gram, linseed, sunflower, safflower, potato and onion. Progress of the scheme is presented in Table No.4.14.

Table 4.14:Progress made since inception of the Scheme under Rashtriya Krishi Bima Yojana

Year	No.of farmers enrolled (Lakh No.s)	Premium collected (Rs.in crores)	No.of beneficiaries (Lakh Nos)	Crop Insurance claims (Rs. In crores)
2000-01	3.68	11.16	0.23	3.27
2001-02	6.77	15.76	3.51	136.13
2002-03	10.30	41.92	6.02	303.91
2003-04	18.65	44.06	12.44	509.08
2004-05	9.63	39.88	1.51	30.50
2005-06	9.71	48.53	1.31	45.37
2006-07	13.40	47.39	6.16	206.68
2007-08	6.37	36.98	0.66	28.72
2008-09	13.42	45.69	3.52	149.64
2009-10	11.02	41.83	5.08	183.58
2010-11	7.18	36.41	0.59	46.88
2011-12	13.69	35.51	5.29	139.90
2012-13	5.45	23.91	1.82	126.86
Total	**129.24**	**469.03**	**48.14**	**1910.52**

Source: Dept. of Agril GOK

Weather based Crop Insurance Scheme:
The objective of this scheme is to provide protection against the notified crop loss due to floods, famine, storm, frost, temperature and change in relative humidity which occur due to weather aberations. This scheme is implemented in 17 districts of the state during kharif 2013. They are Bengaluru (Rural), Bagalkote, Belagavi, Ballari, Bidar, Vijayapura, Chikkamagaluru, Davanagere, Dharwad, Gadag, Hassan, Haveri, Kolar, Koppal, Raichur, Ramanagara and Yadagiri. The different crops notified are Ragi (Rainfed), Maize (Rainfed), Jowar (Rainfed),Tur (Rainfed), Blackgram (Rainfed),Greengram (Rainfed), Soyabean (Rainfed), Sunflower (Rainfed), Groundnut (Rainfed), Onion (Rainfed, Irrigated), cotton (Rainfed and irrigated),Potato (Rainfed and irrigated),Chillies (Rainfed and irrigated),Grapes and Banana, the crops are notified at hobli level. Progress is shown in table No.4.15.

Table 4.15: Progress made since inception of the Scheme under Rashtriya Krishi Bima Yojana

Year	No.of farmers participated	Premium collected (Rs.in crores)	No.of beneficiaries (Lakh Nos)	Crop Insurance claims (Rs. In crores)
2007-08	43790	1.42	0.35	5.24
2008-09	28627	1.38	0.22	3.89
2009-10	108229	5.71	0.71	16.38
2010-11	58477	4.77	0.32	2.92
2011-12	156296	9.22	1.22	10.03
2012-13	212188	18.08	2.06	43.54
Total	**607607**	**40.58**	**4.88**	**82.00**

Source: Dept. of Agril GOK

Modified National Agricultural Crop Insurance Scheme: Central Government has introduced some of the modifications in *Rasthriya Krishi Bima Yojana* and it is called as *modified Rashtria Krishi Bima Yojana.* This modified scheme is being implemented in Kalaburgi, Shivamogga, Tumakuru and Uttara Kannada districts. Crop loss due to localized natural calamities such as hailstorm and landsliding, is estimated on individual basis. The crop loss is reimbursed as per the guidelines of the schemes. In coastal areas, the crop is left on the ground for two to three days for drying after the harvest of the crop. If there is a loss of crop due to storm during this period, the loss considered and the insured amount will be according to the norms of the scheme.

The important crops are notified at Grama Panchayat level under this scheme, the crops notified are Rice (Irrigated and Rainfed), Maize (Irrigated and Rainfed),and Groundnut (Rainfed), Jowar (Irrigated and Rainfed), Raji (Irrigated and Rainfed), Bajra (Rainfed), Navane (Rainfed), Savae (Rainfed), Blackgram (Rainfed), Greengram (Rainfed), Horsegram (Rainfed) , Soyabean (Rainfed),Sunflower (Irrigated and Rainfed),Sesamum (Rainfed), Castor (Rainfed), Cotton (Irrigated and Rainfed), Chillies(Irrigated and Rainfed), and Onion (Rainfed) crops have been notified at Hobli level. Progress of the scheme is given in table No.4.16.

Table 4.16: Progress made since inception of the Scheme under modified Rashtriya Krishi Bima Yojana

Year	No.of farmers enrolled (Lakh No.s)	Premium collected (Rs.in crores)	No.of beneficiaries (Lakh Nos)	Crop Insurance claims (Rs. In crores)
2010-11	0.09	0.20	2735	2.42
2011-12	1.76	16.43	55996	22.45
2012-13	2.29	30.00	54445	50.03
Total	4.14	46.63	113176	74.90

Source: Dept. of Agril GOK

"*KRISHI KARMAN*" award: Karnataka State was awarded "*KRISHI KARMAN*" award for having achieved its highest ever production of Coarse Cereals during 2010-11. Though the area under coarse cereals had been declining, the State has maintained a higher productivity level in last one decade irrespective of the frequent droughts. The area under all the coarse cereals (Jowar, Bajra, Maize, Ragi and minor millets) has declined from 40 lakh hectares in 2000-01 to 36.50 lakh hectares during 2010-11, but the production has reached 78.45 lakh tonnes from 59 lakh tonnes with one and half time jump in the productivity per hectare (i.e. from 15.5 quintals to 21.7 quintals). Karnataka is leading producer of Maize in the

Country.

At the same time, overall production of food grains has increased to 139.86 lakh tonnes during 2010-11 which is higher than the earlier record production of 120.49 lakh tonnes during 2007-08. Further, production of pulses has gone up from mere nine lakh tonnes (2000-01) to 15.65 lakh tonnes (2010-11) with just an addition of about 7.4 lakh hectares in the area under pulses (from 20.47 lakh ha. in 2000-01 to 27.91 lakh ha. in 2010-11).

Apart from highest production of Coarse Cereals, the State was recognized for effective promotion of agricultural technologies and services adopted by the farmers which resulted in significant production gains. Notable initiatives of the State Government included "*Bhoo-Chetana*" programme for improving crop productivity in rain fed area; improving seed replacement rate; strengthening extension work through farmers' facilitators; promoting public private partnership in adoption of hybrid Maize, up scaling Raitha Samparka Kendras to ensure timely supply of inputs.

Krishi Prashasthi Programme: Phenomenal increase in agriculture production in the state during the last three decades is due to the active participation and efforts of farmers. In order to recongnise such farmers, who have done outstanding work in different aspects of agricultural production, awards are given under "**Krishi Prashasthi Scheme**" at the State, District and Taluk levels. The programme is being implemented since 1992-93. The programme envisages the award of three prizes at these three levels for selected crops. The prize amount for different competition levels for each crop is as follows. (Table 4.17). The progress is given in table No.4.18.

Table 4.17: The Prize Amount Details

(Amount in Rs.)

Sl No.	Prizes	State Level	District Level	Taluk Level
1	First	30,000	15,000	10,000
2	Second	15,000	10,000	5,000
3	Third	10,000	5,000	3,000
	Total	**55,000**	**30,000**	**18,000**

Source: Department of Agriculture, GOK.

Table 4.18: Details of progress of Krishi Prashasti programme.

(Rupees in lakhs)

Year	Total No.of winners (Farmers)	Total prize amount
1992-93	423	68.10
1993-94	493	86.90
1994-95	536	101.50
1995-96	647	125.25
1996-97	145	31.85
1997-98	613	115.20
1998-99	657	125.50
1999-00	539	99.50
2000-01	558	39.44
2001-02	531	37.32
2002-03	432	30.18
2003-04	455	32.36
2004-05	294	23.46
2005-06	186	15.18
2006-07	178	13.72
2007-08	400	27.63
2008-09	473	32.40
2009-10	447	30.13
2010-11	514	35.31
2011-12	493	34.60
Total	**9014**	**1105.53**

Source: Department of Agriculture, GOK.

Krishi Pandit Prashasthi Programme: Krishi Pandit Prashasthi programme is being implemented since 2001-02. Main objective of the programme is to recognise the farmers at state level who are contributing for the welfare of the farming community through their innovations and constructive work in the field of agriculture. Such persons are being awarded with cash prize. The first prize is Rs.1,00,000/-, second prize is Rs.50,000/- and third prize is Rs.25,000/-. The important four fields recognised for the cash prize are 1.Effecient use of water, 2. Organic farming, 3. Development of farm implements and 4. Integrated farming system and Diversification of crops. The progress is as below (Table No.4.19)

Table 4.19: Details of the progress of Krishi Pandit Prashasthi programme

(Rupees in lakhs)

Sl No.	Year	Award Winners (Farmers)	Total prize amount
1	2001-02	6	3.75
2	2002-03	6	3.75
3	2003-04	9	4.50
4	2004-05	9	4.50
5	2005-06	7	5.50
6	2006-07	22	7.00
7	2007-08	23	5.75
8	2008-09	20	5.25
9	2009-10	20	6.75
10	2010-11	26	7.00
11	2011-12	22	6.00
	Total	**170**	**59.75**

Source: Department of Agriculture, GOK.

HORTICULTURE

Horticulture is a significant and upcoming sector in Karnataka. Horticulture has proved to be the best diversification option for agricultural land use, because of assured and the remunerative returns to the farmers. The diverse agro-climatic conditions prevailing in the state are quite congenial for growing different Horticulture crops successfully, almost throughout the year, the usefulness of Horticulture has been specially felt in scanty rainfall and drought prone areas of the State, as several perennial Horticulture crops provide an effective drought proofing against the odds of the nature and assure the farmers satisfactory returns even during the years of deficit rainfall. This is the reason why horticulture crops are fast replacing agriculture crops in dry tracts of the state. Another important benefit that the farmers can avail is related to value addition of several horticulture produce, which offers very good scope for meeting the needs of different strata of consumers. With the onset of protected cultivation and consequent high quality produce, the horizons of export have greatly been expanded, offering unlimited scope to hi-tech farmers in the state, Of late, in response to the increasing awareness for nutritional security, consumption of protective food such as fruits and vegetables has greatly increased and this has helped to hike the production process. The aesthetic needs of the people are also warranting for expanding the demands for flowers and their products, resulting in an incredible boost for floriculture, be traditional or hi-tech. With all these developments that are taking place, the horticulture in the state has opened new vistas of hopes and bright future for the farmers of the state.

Historical Background

The growth of Horticulture in the state has a thrilling historical background, which reveals several interesting facts, milestones of achievements and pride legacies. Although some Horticulture crops were grown in the State since time immemorial, their cultivation on commercial scale started just two and a half century before, the first acknowledgeable credit for initiation of cultivation of Horticulture crops in the state undoubtedly goes to Hyder Ali and Tipu Sultan. During 1760, Hyder Ali started a small royal orchard near Bengaluru Fort, which was called by the name Lalbagh. After him, Tippu Sultan improved this garden by making systematic layouts and undertaking comprehensive planting programme. He collected several important native and exotic species of flowers, fruits, vegetables and the plants obtained from several far off places such as Malacca, Isle of France, Oman Arabia, Persia, Turkey, Zanzibar, France and other European countries. At Srirangapatna, his capital, he had established another garden of fame by the same name as Lalbagh, in which also he had introduced several ornamental and horticulture plants. At Ganjam, near Srirangapatna, he had developed a vast Fig orchard, Several of the fruits species, which Tipu Sultan had introduced then, eventually became the commercial crops of the then Mysuru province, and to quote a few are: Fig, Mulberry (for sericulture), Grapes, Pomegranate, Rose, several European vegetable crops etc.

After the fall of Tipu Sultan in the year 1799, the Lalbagh was taken over by the English and as far as can be traced, it was owned by a military botanist, Major Waugh and remained in his possession until 1819.Then he gifted this garden to the Marques Warren Hastings, the Governor General of the East India Company, who in turn appointed Dr. Wallich, the Superintendent of the Royal Botanical garden, Calcutta, as the in charge Deputy Superintendent of the Lalbagh Botanical gardens. This arrangement continued till 1831. On the British usurpation of the province of Mysuru in 1831, Lalbagh passed into the hands of Sir Mark Cubbon, the Chief Commissioner of Mysuru. In 1839, the affairs of the Lalbagh Botanical Gardens were transferred to the Agri-Horticultural Society, Calcutta. The Society ceased to exist in 1842 and the Garden once again came under the management of the Chief Commissioner until 1856.

In August 1856, Lalbagh was made the Government Botanical Garden, becoming entirely a government establishment. A committee with the Secretary to the Commissioner, the Superintendent, Bengaluru Division and Dr.Kirkpartick, was set up to take measures to preserve all the interesting botanical species; and to make the garden attractive. Much work was done in the next two years. After a lapse of two years, in 1858, Sir William Hooker, Director of the Royal Botanical Gardens, selected Mr.Kew, as the Superintendent of the Lalbagh Botanical Garden.

The real developmental works in Lalbagh started from the year 1874, when John Cameron took charge of the garden. Vigorous and systematic introduction and expansion of the garden took place during his tenure. From original area of 45 acres, Lalbagh was expanded to 100 acres by the turn of the 19th century. The renowned Glass House was constructed during his period in 1889. The credit of starting commercial cultivation of several fruits, vegetables and plantation crops, undoubtedly goes to John Cameron. His long term of office from 1874 to 1908, is regarded as the '**Golden Period**' of plant introductions at Lalbagh.

G.H.Krumbiegal assumed the charge of Lalbagh in 1908. He did memorable works in Lalbagh, as well as Mysuru State. Like his predecessor, he also introduced several plant species, including Rome Beauty Apple. He beautified Lalbagh with large number of native and exotic species and gave special impetus to the creation of Park and Gardens in Bengaluru and Mysuru cities, including the famous Brindavan Gardens at Krishnaraja sagara reservoir, near Mysuru. He also started the Mysuru Horticulture Society, in 1912 and through this Society, Started regular Flower Show at Lalbagh. He also opened the Bureau of Economic Plants and Horticulture Training School. He served the Department for memorable 25 Years and retired in the year 1932.

H.C.Javaraya took the charge of Lalbagh and Horticulture Development in the Mysuru state in 1932. He was trained in the Royal Botanical Garden at Kew, London. He took up the all-round development of Horticulture in the State. With the establishment of the Fruit Research Station at Hesarghatta, Bengaluru, in 1938, he was able to conduct many adaptive research trials related to various fruit crops. The first Horticulture farm was started at Maddur in 1942 to demonstrate the cultivation of Horticulture crops and production of vegetable seeds and planting material for the farmers.

In 1963, consequent to the formation of the separate Department of Horticulture, several schemes were transferred from Agriculture Department to this newly created department. *Horticulture Produce Co-operative Marketing Society (HOPCOMS)* and *Nurserymen's co-operative society* were established. Horticulture farms and nurseries were established and developed as progeny orchards and demonstration centres for new crops and adoption of new horticulture technology. Seed testing, soil testing and plant protection laboratories were started at Lalbhag, Bengaluru. Several parks and gardens were laid out in different cities and towns of the State. The area of Lalbagh Botanical Garden was expanded to 240 acres and planted with additional native and exotic species of plants. Principles and practices of Rainfed horticulture technologies were demonstrated in most of the horticultural farms. This inspired the farmers of the State to practice Rainfed horticulture on vast rainfed and drought prone tracts of the State. The importance of mixed cropping and inter cropping in horticulture areas got special attention of the farming community as these cropping systems assured minimum financial returns. Karnataka is the first State in the entire Country to have a separate Horticulture

Department, and many other States, at later years, followed the example of Karnataka.

Karnataka occupies a prominent place in the Horticulture map of the country. It has registered a rapid growth in the last decade. The State Government has undertaken several initiatives to bolster the growth in this sector. The major initiatives include a) area expansion programme b) providing micro irrigation c) providing assistance to farmers d) disease and pest management e) mechanization f) postharvest management and marketing and g) providing infrastructure facilities. With the successful implementation of these programmes, area and production of horticultural crops have increased over a time. The Horticulture crops which were grown in an area of 15.80 lakh ha with a total production of over 124.00 lakh tones at the end of VIII plan period has been extended to an area of 19.02 lakh hectares and recorded production of 152.13 lakh tones during the year 2010-11. The total income generated from the horticulture sector accounts to over 40 per cent of the total income derived from the combined agriculture sector. This accounts for 17 per cent of the GDP of the state.

Horticulture provides excellent opportunities in raising the income of the farmers even in the rainfed tracts. A significant shift towards horticulture is evident in the state with an increase in area and production. Horticulture provides higher unit productivity and offers great scope for value addition and this sector is taking inroads throughout the length and breadth of the state. Karnataka having the highest acreage under dry farming in the country next only to Rajasthan, has a great potential to grow high value but less water demanding horticultural crops.

Major Horticulture Crops: Karnataka is a progressive state in the field of modern horticulture in the country. The diverse agro-ecological conditions prevailing in Karnataka has made it possible to grow different types of horticultural crops such as fruits, vegetables, flowers, spices, plantation crops, root and tuber crops, medicinal and aromatic crops etc. Karnataka ranks 3rd in India in terms of total area under horticulture and 6th in terms of total horticultural production, which accounting for 7.4 per cent of national production during 2010-11. It has the 2nd largest production of flowers (loose) in the country, accounting for 19.8 per cent of the total production. It is also the 5th largest producer of fruit, accounting for 8.4 per cent of the national Production. In terms of vegetables, Karnataka is the 6th largest producer in the country, accounting for 6.2 per cent of the total produce. It ranks 4th in the production of spices in India, accounting for 8.6 per cent of the national production. It stands 3rd in plantation crops in India, accounting for 14.8 per cent of the national production. Karnataka is also the largest producer of coffee in the country.

Karnataka is known for production of almost all the fruits produced elsewhere in the country, except apples. Even apples were once cultivated around Bengaluru on commercial scale in the last century. At present, the state is leading in the production of Pomegranates, Fig, Jack, Papayas and Melons. Also, Karnataka is the home of several minor fruits and wild fruits. Further, the fruits grown in the state are being sent to various markets in India and even abroad.

Since beginning, Karnataka is spearheading in the field of cultivation of commercial flowers, in the entire country. The area under traditional flowers in the State is about 28,000 hectares and the total production is of the order of about 1.96 lakh tons per annum. The major traditional flowers grown in Karnataka are as follows: Chrysanthemum, Marigold, Crossandra, Open Roses, Jasmine, Aster, Tuberose, Gaillardia and Champaka etc.

Although the commercial flowers occupy hardly 1.47 per cent of the total area under horticulture crops in the State, they generate an annual revenue of over 500 crores. This speaks of the high remunerative nature of the commercial flower corps. The average size of holding of the traditional flower crops is hardly half an acre. As many as 50,000 farm families are totally depending on flower trade.

The emergence of cultivation of flowers under protected environment is of very recent origin in the State. It started in the early nineties. The first flower that was subjected to protected cultivation was Rose, which is even today the leading cut flower produced in the State. The other cut flowers such as gerbera, carnations, green house chrysanthemums, anthuriums and orchids are also under hi-tech cultivation. In all, there are 30 big units (companies) and 200 small units (farmers) involved in the production of hi-tech cut flowers. The total value of these hi-tech cut flowers

is about Rs.50 crores per annum. Hi-tech flower cultivation in India first started in Karnataka during 1960s itself, M/s. Indo American Hybrid Seeds, Bengaluru, started producing flowers in green houses. Perhaps, this is the beginning of hi-tech floriculture in India. This success story paved way for large-scale hi-tech flower production started during 1990s. Even now, Karnataka is leading in hi-tech flower production in the entire country, with a share of about 40 per cent of the total production.

The commonly grown major vegetable crops of the state are Onion,Potato, Tomato, Chillies, Brinjal, Bhendi, Carrot, Radish, Beans, Gourds,Leafy vegetables, etc. area and production of principal fruit crops in the State are given in table 4.20

The Department of Horticulture has the credit of laying out and maintaining several beautiful parks and gardens in the State. The state has a long proud legacy of creating parks and gardens of high fame, since the early days. Bengaluru is regarded as the '*Garden City*', because of the profusion of beautiful parks and gardens sprawling across its length and breadth. In the city of Mysuru also, a large number of parks and gardens of exquisite beauty have been laid out by the Department. The world famous Bhrindavan garden at Krishanrajasagara, near Mysuru, is known for its enchanting beauty world over. Similarly, in many other cities and towns of the state, a large number of parks and gardens have been established and the people of the state are enjoying the beauty of these gardens.

There are two hill stations maintained by the Department of Horticulture in the State. One is Nandi Hill Station in Chikkaballapur district and the other one is Krishnarajendra Hill Station at Kemmannagundi, in Chikkamagalur district. These two locations have an elevation of 4,850 and 4,900 feet from MSL, respectively. These two hill stations have been beautified by the Department of Horticulture, through creation of lush lawns, planting of enchanting annual and perennial flowering and foliage plants and tree species. Required facilities for the pleasant stay of visitors have also been created in both the hill stations.

The Government of Karnataka, Department of Horticulture has established a State-of-the-Art Biotechnology Centre in the new millennium at Hulimavu Horticultural Farm, Bengaluru. This Centre is the first of its kind in the Country under public sector aiming at integrating many spheres of biotechnology exclusively for the cause of horticultural development. The activities of the centre were dedicated to the nation on 20th January 2001.

The main objective of the center is to adopt eco-friendly biotechnological approaches for generating useful inputs and essential services to facilitate overall development of horticultural sector in the state. In this endeavor, facilities and expertise in the areas of conservation and documentation of rare and endangered horticultural varieties including medicinal and aromatic plants, plant propagation, organic horticulture, plant nutrition, sanitary and phytosanitary, quality control, disease diagnosis and human resource development, have been established at this centre.

The Tissue Culture Laboratory at Bio-centre Hulimavu is the only public sector unit of its kind in the entire country. The state of the art facilities have been created here for the production of Tissue Culture plants of Banana, Vanilla, Ornamental foliage plants, Orchids, Anthuriums and a score of Aromatic and Medicinal plants. The built in production capacity of this lab is about one million plantlets per year. The Tissue Cultured Banana plants produced in this lab have become extremely popular among the farmers of Karnataka.

Karnataka has the richest source of horticultural diversity. Nanjanagud banana, Mysuru betelvine, Udupi jasmines, Coorg oranges are a few examples of Karnataka's rich genetic diversity. The ecosystems of Western Ghats and deciduous forests of Karnataka are rich in medicinal plant biodiversity with more than 2,500 species of plants.

But many of these species are in the verge of extinction due to perceptional changes for maximizing production, mono cropping, destructive harvest and susceptibility to pest and diseases. In order to preserve these land races for posterity, the centre has taken up the challenges of conserving and developing the rare and endangered germplasm under both in vitro and in vivo conditions. More than 500 species of medicinal and aromatic plants, 150 varieties of fruits and flowering plants have been introduced and documented at the generic level by adopting DNA marker technology. More than 80 species

of medicinal and aromatic plants of which rare species like *Crataeva nervula, Entada puseathea, Garcinia xanthochymus* and *Garcinia morella* and endangered species like *Persea macarantha, Symplocos racemosa, Gnetum ula, Myristica malabarica,* etc. are conserved and documented. Similarly 85 species of fruits and ornamental plants are added to the germplasm bank of the biocentre.

An exclusive sales outlet for the organically produced fruits and vegetables has been opened at Lalbagh, Bengaluru, wherein the producers can sell their safe products to the consumers. The products sold here carry the brand name "*Jaivik*" and have created great demand among the organic produce lovers of Bengaluru. The Bio-Centre, Hulimavu, which is monitoring this sales outlet, is planning to open another still bigger "*Jaivik*" produce outlet in Lalbagh, to cater to the needs of ever increasing number of consumers, who have developed awareness and inclination towards safe food.

The activity of establishing horticulture farm was intensified after the creation of separate Horticulture Department. At present, totally 415 such horticulture Farms and Nurseries under the Horticulture Department are functioning, spread over all parts of the State.

***National Horticulture Mission (NHM)*:** It is a centrally sponsored scheme launched during 10th five year plan (2005-06 and 2006-07).It provided cent per cent assistance to the State missions. From 11th Five Year plan onwards (from 2007-08), the Central Government and State Government assistance is fixed at 85:15. This scheme is now being implemented in all the 30 districts in the State.

The main objective of introducing the NHM scheme was achieving the all-round development of Horticulture by integrating backward and forward linkages. Its approach is "*end to end*", starting from the production of planting material and finally ending with value addition and marketing/ export of produce. The major strategies set for the development of Horticulture through NHM in the State were enhancing both production and productivity of major Horticulture crops, doubling the production, increasing quality of the produce, rejuvenation of the unproductive orchards, rain water harvesting, organic farming, induction of INM and IPM, rejuvenation programmes providing postharvest support, improving marketing, enhancing the technical knowledge and Nutrient management skills of farmers, extension officials and entrepreneurs through an array of HRD programmes.

During the year 2013-14, the annual physical target is 10,038 ha and financial target is Rs.1,781.79 lakh for establishment of new horticulture crops like Fruits crops, Plantation crops, Spice crops, Flower crops and Aromatic crops. About 8,647 ha area has been covered with a financial assistance of Rs. 1,522.13 lakh. The total approved Annual Action Plan for the year 2013-14 is Rs.140 crore. During 2013-14 more emphasis is given for Plantation infrastructure, protected cultivation component as well as Post Harvest Management component.

Coconut Development Board (CDB): The Coconut Development Board is providing cent per cent financial assistance for the Integrated Development of Coconut Industry in the State. The activities that are being implemented are, 1) laying out of demonstration plots and their maintenance 2) distribution of plant protection chemicals, organic manures, chemical and bio-fertilizers for improvement in production and productivity of coconut 3) production of Tall x Dwarf hybrids coconut seedlings. In the year 2012-13, out of total financial allocation of Rs. 1,041.25 lakh, Rs.1,048.12 lakh has been released from the CDB and State Government, out of which Rs.1,035 lakh were spent. In 2013-14, out of total financial allocation of Rs. 1,110 lakh, an amount of Rs.991.65 lakh has been released, out of which Rs. 654.39 lakh were spent till the end of December-2013.

National Medicinal Plants Mission: Under the National Medicinal plants Mission, action has been taken to expand the area under different medicinal plants.The medicinal plants covered under this scheme in the state include ashwagandha, tulsi, guggal, coleus, amla, gloriana, asparagus, konch, aloevera, bhumi amlaki etc., For the year 2013-14, to implement the programmes like area expansion of medicinal plants, development of nurseries, postharvest management, establishment of processing units, an annual Action Plan for an amount of Rs. 216.71 lakh has been approved by Government of India.

Table 4.20: Area and Production of Principal fruit crops
(Area in Hectares, production in Metric tonnes)

Crops	1980-81		1990-91		2000-01		2007-08	
	Area	Produ	Area	Produ	Area	Produ	Area	Produ
Mango	45478	254677	76955	657973	119172	1098547	134567	1223258
Banana	37405	960125	38280	1132804	53377	1217169	70472	1793284
Citrus Fruits	30630	294048	33195	299009	15524	326324	13513	295680
Gauva	6931	66538	11299	141212	9087	157102	6871	134783
Sapota	7670	135759	13267	243989	20216	193737	26199	283590
Grapes	5008	100160	5972	131176	8509	150334	14310	258814
Pineapple	2255	78925	2965	103530	4873	272475	2877	177431
Pomogranate	1418	6806	4438	13145	10803	112241	13858	134109
Jack	7266	174384	10527	247258	7855	236524	6166	244409
Papaya	5761	230440	1221	178497	4889	332858	5214	389540
Ber	907	3442	2239	17013	1023	26580	408	13077
Fig	36	360	123	158	352	2868	1389	13262
Rose apple	149	894	357	1651	0	0	0	0
Lichi	9	95	13	27	0	0	0	0
Annoneceous Fruit	1614	16140	3406	29192	2031	15975	1913	14839
Butter Fruit	87	131	110	106	0	0	0	0
Others	3372	33720	6895	62113	3022	21878	2136	24495
Total	155996	2358644	211262	3258853	260733	4164612	299893	5000571

2008-09		2009-10		2010-11		2011-12(E)(P)		2012-13(E)(P)	
Area	Produ	Area	Produ	Area	Produ	Area	Produ	Area	Produ
140490	1607595	153875	1694051	162648	1762531	172407	1808283	182751	1980380
75892	1890785	104436	2132320	87238	2239540	91600	2351517	96180	2469093
15651	274249	15122	312541	17824	388993	18359	400663	18909	412683
6882	132699	7168	138810	6944	132461	7083	135110	7225	137812
27541	309740	29313	359828	28909	355896	30644	377250	32482	399885
15461	278560	17356	317643	16286	278912	16848	288121	17431	297680
2909	180515	2857	177238	2228	130007	2295	133907	2364	137924
14996	140682	13187	138488	14688	147312	15129	151731	15582	156283
5995	235144	5825	213817	5421	204204	5584	210330	5751	216640
5117	419951	5830	419254	5829	422509	6062	439409	6305	456986
621	13713	392	10647	860	25065	860	25065	860	25065
1498	13643	1179	12907	1167	13099	1179	13230	1190	13362
0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0
1899	14405	1653	13868	1706	12892	1740	13150	1775	13413
0	0	0	0	0	0	0	0	0	0
2641	22526	2054	21245	1980	19949	2020	20348	2060	20755
317593	55.4207	360245	5962657	353728	6133370	371807	6428114	390866	6737961

***Micro Irrigation Facility*:** The department of Horticulture is providing subsidy for drip irrigation, sprinkler irrigation and drip demonstrations for all horticulture crops, except coffee, tea, rubber and oil palm under the scheme of micro irrigation since 2006-07. The assistance is available for a maximum area of five ha per beneficiary family for both drip and sprinkler irrigation. Under drip irrigation, 80 per cent subsidy is provided for the first two ha and 50 per cent for the remaining three ha. In 2013-14 for all categories of farmers in drip irrigation, 90 per cent subsidy is provided for the first two ha and 50 per cent for the remaining three ha. The subsidy for the sprinkler irrigation is 90 per cent.

Under drip demonstration component, the State/Central government institutes, farmers of non government organisation/progressive farmers can avail assistance of upto cent per cent for a maximum area of 0.5 ha. Details of the progress are shown in table 4.21

Table 4.21 : Progress achieved under micro irrigation

Period	Physical (In.Hectares)		Financial (Rs. inlakh)	
	Target	Achievement	Target	Achievement
During 11th Plan period	192733	156896	57088.60	44487.40
2012-13	64572	51687	19459.57	19323.41
2013-14 upto October 2013	55557	28967	22564.64	9269.64

Source: Economic survey of Karnataka 2013-14

Disease and Pest Management: The Department of Horticulture, through its plant protection programmes, provides bio-pesticides, botanicals, chemicals, pheromone traps and lures to control the pests and diseases of horticulture crops. In addition, pest surveillance is undertaken in different districts to predict the outbreak of pest and diseases and, create awareness in the management of pests and diseases like eriophyidmite, black-headed caterpillar, stem bleeding, tomato leaf curl virus, bacterial blight and koleroga of areca nut.

During 2012-13, Rs.146.57 lakh was spent against Rs. 150 lakh for parasite production, bacrimeria production, chemicals distribution, pest surveillance and publicity. During 2013-14 Rs.1,495.76 lakh has been allocated for parasite production, assistace for chemical purchase and good management practices in pomegranate.

Strengthening of Departmental Laboratories under RKVY: This is implemented in Tumakuru, Chitradurga, Mysuru, Davanagere, Hassan and Chamarajanagar Districts. During 2011-12, 4 laboratories are developed with the total financial allocation of Rs.80 lakh and during 2012-13, 4 laboratories were developed with the total financial allocation of Rs.40 lakh.

Areca Research Station at Sringeri : The 'Yellow Leaf Disease' has been a limiting factor for cultivation of Arecanut in Sringeri, Koppa and Narasimharajapura taluk of Chikkamagaluru District. In this context, an exclusive "Areca Research Station" has been established at Sringeri as proposed in the 2008-09 budget to help the areca growers with scientific recommendation for the management of the disease.

An amount of Rs.200 lakh during 2008-09, Rs.80 lakh during 2009-10 , Rs.50 lakh during 2010-11 and 2011-12 and 2012-13 was provided to Horticulture University, Bagalkot for this purpose. Further, an amount of Rs.25 lakh has been released during 2012-13 and Rs.48.30 lakh during 2013-14 out of which an amount of Rs.46.20 lakh has been spent upto December 2013. Research activities are under progress in yellow leaf decease affected gardens, besides taking survey of yellow leaf decease affected areas.

Comprehensive Horticulture Development: The development of horticulture in the state are ridden with many problems and shortcomings like low value addition, poor marketing facilities and improper crop management practices. In order to achieve comprehensive development in the Horticulture sector, a scheme called Integrated Development of Horticulture with a budget outlay of Rs.305 crore has been announced in the year 2012-13 budget speech.

The component of Promotion of Crop Clusters will be implemented in all 176 taluks of all the 30 districts of the State. During 2012-13, an amount of Rs.15,000 lakh has been enmarked, out of which Rs.20153.92 lakh has been released. Area under horticulture crops were expanded in an area of 134.44 ha, with an expenditure of Rs.17155.40 lakh.

Postharvest infrastructure and Management: Karnataka is one of the Horticulturally progressive State in India. Due to its ideal Agro-climatic conditions and enterprising farming community, almost all types of horticultural produces are produced in Karnataka. Since, fruits and vegetables are highly perishable, efficient Post Harvest Management has become an absolute necessity.

It is also important for effective exploitation of export potential of fruits and vegetables. In Karnataka, only one per cent of the total production of fruits and vegetables are processed into different products.

About 25-30 per cent of the produce is lost due to improper Post Harvest Management. To avoid the post harvest losses a chain of cold storages, processing and marketing facilities need to be created. Among Post Harvest Management practices like pre-cooling, cold storages and refrigerated transport are most important. Karnataka has 82 cold storages, of which 74 are in private, four are in co-operative and four are in public sector. To make the existing storages facilities economical and to encourage establishment of new cold storage in private/co-operative sector.

The Government of Karnataka has been implementing a programme called "*Processing and value addition for Horticulture crops*". It includes activities related to grape dehydration, red chilli powdering, vanilla processing, winemaking unit and desiccated coconut powder units. Since horticulture produce like fruits, vegetables and flower are perishable, it is important to provide proper post harvest management practices for these produce. Karnataka has 82 cold storages, of which 74 are in private, four are in co-operative and four are in public sector.

To make the existing storages facilities economical and to encourage establishment of new cold storages in private/co-operative sector, electricity subsidy of One Rupee is provided for every unit of electricity consumed by the cold storage units.

The fruits and vegetables that are readily stored are potato, grapes, tamarind, citrus, pomegranate, pineapple, chilli, apple and cut flowers. Details of progress of activities for post harvest management are given in Table 4.21.

Table 4.21 Physical and financial achievement under post Harvest management

Year	Annual Physical (No.of processing units)		Annual Financial (Rs in lakh)	
	Target	Achievement	Target	Achievement
2007-08	13	13	100.00	99.87
2008-09	162	72	200.00	174.79
2009-10	39	39	100.00	98.94
2010-11	22	20	871.48	621.34
2011-12	12	13	500.00	299.58
2012-13	19	19	150.00	145.93
2013-14 up to December-2013	20	2	200.00	25.18

Source: Economic survey of Karnataka 2013-14.

Processing of Fruits and Vegetables: Government of Karnataka is considering fruit and vegetable processing sector as a thrust area for development. The Government has been implementing a programme called "*Processing and value addition for Horticulture crops*". It includes activities related to grape dehydration, red chilli powdering, vanilla processing, wine making unit and desiccated coconut powder units.

With growing urbanization and increasing quality consciousness, the market for processed fruit and vegetable is expected to grow rapidly. Therefore, there is enormous potential for developing agro products. At present there are 1,533 licensed processing units in the State with annual production of two lakh tons of processed products. The processed fruits are Mango, Grapes, Pineapple, Papaya, Guava and others. The major vegetables processed are Tomato, Potato, peas, Gherkins and others. *Agri Export Zones (AEZ)* have been created in Karnataka. The concept of AEZ, attempts to date a comprehensive look at a particular produce/produce located in a contiguous area for the purpose of leading to final exports. Such AEZs have been created for Gherkins, Rose Onion and Floriculture.

The Government of Karnataka proposes to establish *Food and Agriculture Technology Parks (FATP)* at six locations i.e. at Malur, Bagalkote, Belagavi, Chitradurga, Maddur and Jewargi. Out of six *Food and Agriculture Technology Parks,* sanction has been given by Government of India for two parks one at Malur and another at Bagalkote.

These Parks are established at a total cost of Rs.10 crores each. The main objective of establishing Food and Technology Parks is to promote agro and processing industries in cluster in area where there is predominant production of processable agriculture and Horticulture Products. These parks will also provide the required infrastructural and common facilities which are essential for sustenance of the industries. Quality assurance laboratories, Ware housing including cold storages, common effluent treatment plants etc. Another important aspect of the Food and Technology Parks is creating awareness among the farmers and producers of Agriculture and Horticulture products about the advantages of cultivating/ growing right variety of primary products which are amenable for processing and thus ensure that the twin objectives of assuring a better return to the farmers and assured supply of raw materials to the processors are achieved. Development of Agro Food Parks is expected to give a boost to the Horticultural sector in and around the area of Agro Parks.

Marketing and Other infrastructure facilities: The Department of Horticulture acts as the facilitator for creation of infrastructure facilities for marketing of fruits and vegetables in the state. The Department of Agricultural Marketing is facilitating the marketing of agricultural/horticultural produces in the state. The Department of Agricultural Marketing recently established '*Raithra Santhe*" wherein the growers/ farmers can bring their fruits and vegetables to the market and sell them directly to the growers .The Department of Agricultural Marketing handles the notified Fruits and Vegetables in the State through APMC'S.

The other marketing infrastructure in the State are the Department promoted HOPCOMS–a Co-operative society for marketing of horticultural produce in Bengaluru which handles a quantity of 100 Metric tons of fruits and vegetables per day, the Department promoted District Horticultural Societies in all the Districts to market Fruits and Vegetables. At present 19 District Horticultural societies are functioning in the state. A project for strengthening of HOPCOMS in nineteen districts through Karnataka Horticulture Federation has been approved under RKVY with an outlay of Rs. 26.50 crore. Out of this Rs.10crore has been utilised under the programme.

The Department of Horticulture have initiated to modernize the fruits and vegetable market in the State through *National Dairy Development Board (NDDB)* in Bengaluru. The Department also initiates to start Modernized Fruits and Vegetable market in Mysuru, Hubli-Dharwar and Vijayapura. The Marketing section of the Horticultural Department monitor the prices of important horticulture crops and publish the prices book annually for the use of departmental officers/officials and also submits the proposals to the Government whenever the prices of these commodities falls in the market to intervene and purchase of these commodities.

The Government is giving importance to marketing and processing of Agricultural and Horticultural Crops to avoid Post Harvest Losses. The initiative of Government of Karnataka in this direction has led to establishment of a gigantic Horticultural Marketing Complex at Kannamangala by NDDB at a total cost of Rs.150 crores.

Satellite mapping of Horticulture crops with the help of ISRO to develop a Horticultural data Bank: Data base is essential to take up developmental programmes. The data on area and production of Horticulture crops brought out by various departments/organizations do not match with each other. At the time of taking policy decision, the data base plays a crucial role. Therefore, the Department proposes to take up one time survey for perennial horticultural crops and also to use the services of ISRO to employ the latest and sophisticated methods to map the area under different Horticultural crops in the state. This would help in proper and real estimation of area under horticultural crops in the state. This would further lead to more scientific estimation of yield and production of Horticultural crops in the state.

Wine Policy and Establishment of Karnataka Grape Wine Board: The Karnataka Grape Wine Board has been set up for implementing the programmes under the Wine Policy which envisages to promote wine varieties of grapes and to encourage wine industries in the state since 2007. During the year 2010-11, a Share Capital of Rs.25 lakh and an amount of Rs.25 lakh for Wine Festival has been released to the Karnataka Wine Board. During 2011-12, an allocation of Rs.150 lakh was made under this scheme, out of which Rs.100 lakh have been released as Share Capital and Rs.50 lakh for Wine Festival to the Karnataka

Wine Board. During the year 2012-13, a budgetary provision of Rs.10 lakh has been made towards share capital to be given to the Wine Board. In 2013-14, a provision of Rs.350 lakhs has been made out of which Rs.317.50 lakhs has been allocated as share capital and Rs.32.50 lakhs for developmental activities. An amount of Rs. 262.50 lakhs has been released upto December, 2013 with a financial achievement of Rs. 257.50 lakhs.

Mango Development Board: Karnataka is one of the leading states in the Country in mango production. The regional climate has favoured the cultivation of various varieties of mangoes in the State. Mango Development Board has been established during 2010-11 to promote and streamline the production, processing, marketing and export of mangoes in the State. The Mango Development Centre is developed at Kolar and Chikballapura at a total cost of Rs. 19 crore under the RKVY. The Board is looking after the activities of these resource centres. During 2010-11, an allocation of Rs. 1000 lakh was earmarked for this purpose and an amount of Rs.515 lakh was spent. During 2010-11 the Karnataka State Mango Development and Marketing Corporation Limited, has been incorporated on 19-01-2011 under the Companies Act 1956. During the year 2010-11, an Initial Corpus Fund of Rs.511.16 lakh has been provided to this Corporation by the Department of Horticulture. During the year 2011-12, a budget of Rs.500 lakh was earmarked, out of which Rs.375 lakh was released to the Department. Out of the released amount, Rs.275 lakh has been given as Corpus Fund and Rs.100 lakh as Development Fund to the Mango Corporation.

During 2012-13, a budgetary allocation of Rs.500 lakhs is made, out of which Rs.400 lakh as Corpus Fund and Rs.100 lakh as Development Fund.Upto the end of september 2012, a budget of Rs.250 lakh has been released and the programme is under progress. Market promotion activities and Mango Melas have been organized at Bengaluru, Dharwad, Ramanagaram and Mysuru.

Biotechnology: The Biotechnology Centre of the Department of Horticulture is taking up activities like germplasm conservation, tissue culture, mushroom development, production of bio-fertilizer and bio- pesticides, soil, water and leaf analysis, DNA finger printing etc. In 2013-14, a total of 8.85 lakhs tissue culture plants were produced by utilizing Rs.132.43 lakhs and 210.3 tonnes of biofertilizers and biocontrol agents and 39 tonnes vermicompost were produced under the scheme of Development of Departmental Laboratories upto December 2013.

Training programmes and demonstrations were arranged at this centre to promote cultivation and consumption of mushroom, to create awareness of Organic farming, use of medicinal plants, kitchen garden etc. A total of 12,630 spawn bottles, 50.25 kg. mushrooms and 785 kg. mushroom compost were produced upto September 2013. Under Extension and Training Programme 7 training programmes were organized to train about 288 farmers/Public/Students. Quality control laboratory is set up for testing and analysis of bio inputs at this centre. A total of 1261 and 215 water, soil and leaf samples were analyzed for macro nutrients and micro nutrients respectively, six samples of active ingredients of medicinal and aromatic plants, 84 samples of quality testing of organic manure, 80 samples of residue analysis, 209 samples for heavy metal contents and 76

Phytosanitary samples were analyzed upto September,2013. Further, under the scheme of Development of Departmental Laboratories upto September, 2013, a total of 1260, 577 and 417 water, soil and leaf samples were analyzed in Shivamogga, Vijayapura and Belagavi districts, respectively. A total of 3000 mushroom spawn bottles were produced in Mysuru district. Under this scheme, Rs.250 lakh was released; out of which Rs.200.24 lakh have been spent upto September, 2013.

Agricultural Marketing: Sophisticated agricultural marketing system ensures fair price for the farmers and also reduces the post-harvest losses and wastage. Karnataka has 155 *Agricultural Produce Market Committees (APMCs)* to facilitate and regulate the marketing of agricultural commodities in the State. The APMCs are managed by an elected managing Committee. The Secretary and supporting staff are Government Servants working in the APMCs.

In an attempt to modernise the marketing system computerized E-tendering system has been introduced under RKVY Scheme. Farmers

have benefited largely from this system as the transaction is transparent and it gets over in a shorter time. E-trading facility has been already implemented through NCDEX platform in 26 APMCs i.e. 1) Kalaburgi, 2) Tiptur, 3) Tumakuru, 4) Arasikere, 5) Vijayapura, 6) Bagalkot, 7) Ballari, 8) Haveri, 9) Yadgir, 10) Chitradurga, 11) Challakere, 12) Gadag, 13) Mysuru, 14) Raichur, 15) Dharwad, 16) Hubballi 17) Shivamogga, 18) Yallapura 19) Koppal, 20) Bhadravati, 21) Bailahongala 22) Bidar, 23) Chamarajanagara, 24) Channagiri, 25) Ranebennur and 26) Sagar. The day-to-day transactions of APMCs including management of accounts, property, daily transaction, developmental works, permits and administration works have been computerized with the help of management software developed by the KEONICS. Of total APMCs, 78 have adopted this management software during the year 2009-10. Government of Karnataka implements the Floor Price Scheme. In order to prevent farmers from the distress sale of their agriculture produce. Paddy and coconut crops come under this scheme.

Under the Rural Infrastructure development fund scheme Rs.2.45 crore was released for the development of 7 rural markets. Out of these, 6 works in APMCs Gokak, Yalaburga, Lingasugur, Tumakuru, Gangavathi, Maddur are completed in the year 2011-12. The Government of India has introduced the rural godown scheme from the year 2001-02 to help the farmers to store their commodities scientifically in godowns and to sell the same when the prices rise. Under the scheme, construction of 450 godowns in the rural areas coming under 11 APMCs jurisdiction has been taken up. Works have been completed.

The Government has accorded administrative approval for establishing Rice Technology Park with the State-of-the-Art technology for processing, grading, packing, branding, marketing and export of rice in Karatagi of Gangavathi taluk at an estimated cost of Rs.3,719 lakh. During 2011-12, budget allocation of Rs.500 lakh has been made to operationalise the scheme. Land acquisition to an extent of 139 acres39 guntas has been completed. Acquisition process is under progress for the acquisition of additional required land. Establishment of Tur technology park at Kalaburgi, maize technology park at Ranibennur, and Coconut technology park at Tiptur are in progress. Government provides 25 per cent subsidy for investment by the private entrepreneurs for the establishment of agricultural produce wholesale markets. Under the National Horticulture Mission there is a provision for availing 25 per cent subsidy. During the year 2009-10, 18 Market Committees have taken up schemes at a cost of Rs.5,648.13 lakh. Out of this 17 works are completed and one work is under progress.

Raitha Sanjeevini Insurance Scheme: Under this farmers who meet with an accidental death or are permanently disabled while being involved in farming / marketing activities are provided a compensation ranging from Rs.1,500 to Rs.50,000. From 2009-10 to 2012-13, an amount of Rs.12.45 crore was given as compensation to 2860 farmers. During 2012-13, 227 farmers were given compensation and Rs.one crore was spent for the purpose. In 2013-14, 193 farmers are given compensation and Rs.86.54 lakh was spent for this purpose.

Janashree Bima Yojane : The janashree Bima Yojane is an insurance scheme implemented with the help of Life Insurance Corporation of India for the welfare of licensed weighmen, hamals and cartmen working in APMCs. Under the Scheme, for accidental death or permanently disability, an amount for Rs.75,000 and for natural death Rs.30,000 is given as compensation.

An amount of Rs.44,58,989 was given to 141 families from 2009-10 to 2012-13. In 2013-14 an amount of Rs.13,79,994 was paid as compensation to 46 families. Further, through this scheme two children (who are students of 9th to 12th standards) of the registered persons are eligible to get scholarships at the rate of Rs.100/- per month.

Global Agri-business and food processing: Global Agribusiness Meet was held in December 2011with an aim to attract private investment from National and International firms in the field of technologies in food processing/packaging, post- harvest technologies, education & research, marketing, infrastructure development, Agri logistics etc., so as to achieve high growth in agriculture and allied sectors and enable farmers to earn higher income. Progress achieved up to November 2013 is given in Table 4.22

Table 4.22: Progress Achieved- Global Agri-business Meet

Sl. o.	Particulars	Nos.	Investment Rs.Crore
1	Total No.of Investment MOUssigned during the Meet and sub sequently	65	60942.47
2	Total No. of Finance MOUssigned during the Meet and sub sequently	3	50500.00
3	Total No. of projects submitted to Karnataka Udhyog Mitra	35	11244.37
4	Total No. of projects approved by Karnataka Udhyog Mitra	28	10743.74

ANIMAL HUSBANDRY AND VETERINARY SCIENCES

Livestock rearing plays a very vital role in rural economy in supplementing family income from agriculture and also providing employment. Farmers are dependent on animal husbandry activities to utilise agricultural by-products and crop residues to convert them into animal products with good returns. The Chalukyas and the Rashtrakutas In historical times donated cows in thousands (*gosahasra*) and the gosasa stones are found in hundreds to commemorate this act. These cows were donated to villagers all over their empire to encourage animal husbandry. There was "*benne chavadi*", a department to collect ghee at the Mysuru Court. Haider Ali made efforts to promote Amritmahal bullock breed which were excellent draught animals.

Livestock Census 2007: Karnataka offers a favourable climate for livestock rearing and allied activities. The share of animal husbandry in GSDP of agriculture and allied activities was 26 per cent during 2011-12. The share of Animal Husbandry in GSDP of Agriculture and Allied activities was 26 per cent in 2011-12. The share of Karnataka in all India livestock and poultry population was 5.83 per cent and 6.48 per cent, respectively. The density of livestock in the State was estimated at 172 per sq.km and 61131 per lakh human population. In 2012-13, the production of milk in the State was 5.7 million MT and the per capita daily availability is 254 gms. The livestock and poultry statistics is shown in Table 4.23. India ranks first in the world and Karnataka State ranks eleventh among Indian States in milk production. In 2012-13, the production of milk in the State was 5.7 million MT and the per capita daily availability was 254gms.The production of milk at the all India level was 127.9 million MT and per capita daily availability was 291 gms in 2011-12. Details of the production of milk, meat, wool and eggs are shown in Table 4.24.

Table 4.23: Livestock and Poultry Statistics (No. in crore)

Particul ars	Livestock Cens us			
	1997	2003	2007	%age change in 2007 over 2003
Cattle	1.08	0.95	1.05	9.50
Buffalo	0.44	0.40	0.43	7.59
Goat & Sheep	1.29	1.18	1.57	33.66
Other Lives tock	0.26	0.30	0.24	-21.88
Tot al Lives tock	3.07	2.83	3.29	15.96
Poultry	2.14	2.44	4.24	73.55

Source: Economic survey of Karnataka 2013-14.

Table 4.24- Livestock and Poultry Production

Item	Unit	2009-10	2010-11	2011-12	2012-13	2013-14 (uptoDec 2013)	Percentage changein 2012-13over 2011-12
Milk	'000T	4821	5113	5448	5718	4492	4.96
Meat@	Tonnes	119247	123910	139553	166059	127439	18.99
Wool	Tonnes	7165	7179	7779	8020	5351	3.09
Eggs	No.in crore	291	307	347	368	301	6.05

Source: Economic survey of Karnataka 2013-14.

LIVESTOCK AND POULTRY (in Numbers)

Year/District	Livestock									Total Poultry
	Cattle	Buffaloes	Sheep	Goat	Rabbit	Pigs	Dogs	Others*	Total (2to9)	
1	2	3	4	5	6	7	8	9	10	11
2007	10507325	4329076	9565696	6157134	9841	279763	1996872	37544	32883251	42433692
1. Bagalkote	305150	253536	673162	430105	243	23848	60190	1436	1747670	1121898
2. Bangalore	127439	11254	80108	41097	1276	4522	124163	1140	390999	1453513
3. Bangalore (R)	164718	28672	141695	94575	400	2027	40485	53	472625	4110696
4. Belgaum	598467	859421	899707	609902	1954	24819	127152	6307	3127729	1341480
5. Bellary	391299	207595	655832	272467	161	14234	44436	682	1586706	3646806
6. Bidar	277328	176759	84642	189001	48	18613	27203	3309	776903	752673
7. Bijapur	279785	191538	336015	452329	38	27146	73690	762	1361303	346406
8.Chamarajnagar	273798	28469	133197	114861	156	1005	18427	480	570393	278702
9.Chikkaballapura	236510	48439	420267	166265	585	7344	60845	164	940419	1095950
10.Chikmagalur	386138	98279	96278	74679	280	2460	73556	188	731858	1476846
11.Chitradurga	341011	193260	931885	368730	37	4663	64701	8238	1912525	1774227
12.D. Kannada	396609	15119	307	25749	1000	5332	221401	3	665520	1322880
13.Davangere	395123	223601	333461	153940	170	6493	48679	109	1161576	2054012
14.Dharwad	219686	99878	57105	72373	266	2627	40696	261	492892	437657
15 Gadag	158629	80186	313380	172543	86	4307	32957	475	762563	177936
16 Gulbarga	516753	118740	101973	411412	56	25256	57139	927	1232256	487433
17 Hassan	633163	191380	201133	132165	38	2489	67373	643	1228384	1243001
18 Haveri	311822	119864	265527	150542	301	5869	48547	833	903305	645106
19.Kodagu	119422	26801	705	7196	526	26148	66013	25	246836	320137
20.Kolar	240469	49771	366488	88167	305	2982	50989	177	799348	3437134
21.Koppal	245046	108918	474231	199461	159	13323	36168	317	1077623	3542392
22 Mandya	349977	168925	382561	244323	194	6878	37338	57	1190253	1625674
23.Mysore	616794	66265	257019	197020	157	2921	49704	296	1190176	3292560
24.Ramanagara	266192	40304	222037	167647	170	2871	24274	251	723746	876689
25.Raichur	411445	213058	560996	382253	94	16295	54487	256	1638884	374446
26.Shimoga	579254	191147	25191	61680	316	4070	102310	221	964189	1721443
27.Tumkur	589226	241907	1067709	517763	121	7718	90119	9164	2523727	1265978
28.Udupi	318509	26696	59	2730	423	1311	121346	2	471076	1101159
29.Uttara Kannada	366949	118669	2702	11994	277	900	93403	35	594929	681698
30.Yadagiri	390614	130625	480324	344165	4	11292	39081	733	1396838	427160

* Others include horses, mules, donkeys and camels

Note : Quinquennial Census 2007

Source: Department of Animal Husbandry and Veterinary Services.

Veterinary Institutions

The spread of Veterinary services has resulted in the improvement of animal health. Karnataka has a network of 4,112 Veterinary Institutions, comprising of 371 veterinary Hospitals, 1,943 Veterinary Dispensaries, 1,181 Primary Veterinary Centres, 229 artificial insemination centres and 174 mobile veterinary clinics and 214 other veterinary Institutions. During 2010-11 and 2011-12, 114.21 lakh and 111.52 lakh cases were treated for various diseases respectively. During 2012-13, 111.58 lakh cases were treated for various diseases. During 2010-11 & 2011-12, 387.97 lakh and 559.47 lakh vaccinations were given for various diseases respectively. In 2012-13, 522.45 lakh vaccinations were given for various diseases as precautionary measure. Government of India has declared the State as a disease- free zone from rinderpest. The same type of eradication programme has been taken up for Foot and Mouth disease.

Cattle Development: Cattle breeding programme for milch animal production and conservation of indigenous breeds i.e., *Hallikar,Amrutmahal, Khilar* and *Deoni* for drought purposes is carried out through artificial insemination and embryo transfer technology. Indigenous breeds are developed by selective breeding in the livestock farms located at kunikenahalli in Tumakuru, Ajjampura in Chikkamagaluru and Bankapura in Haveri districts. Frozen semen from the centers at Hessaraghatta and Dharwad is supplied for breeding purposes. In 2011-12 and 2012-13, 31.37 lakh and 25.08 lakh artificial inseminations were done, resulting in to birth of 7.69 lakh and 6.46 lakh calves respectively during these two years. Further, 6.49 lakh and 7.15 lakh castrations were also performed respectively during these two years. In 2013-14, 12.16 lakh artificial inseminations were done giving birth to 3.16 lakh calves and 2.90 lakh castrations were performed upto September, 2013.

There are eleven livestock farms under the control of the Department of Animal Husbandry and Veterinary Services, of which some are composite in nature. Composite livestock farms are engaged in production of superior germplasm, fodder seeds and imparting training to farmers. The details of livestock farms are given here.

1. State Livestock Breeding and Training Centre, Hesaraghatta – Jercycattle breeding, bull-calf production, frozen semen production, farmer's training, fodder and fodder seed production.
2. Livestock Breeding Farm, Hesaraghatta - Cross breeding and bull calf production, fodder development, Pig and Rabbit rearing.
3. Jercy Cattle Breeding Station, Kudige, Kodagu District - Jercy Cattle breeding, bull-calf production, farmer's training, fodder development and pig development.
4. Livestock Breeding farm, Koila, Dakshina Kannada District - Cross breed calf production, Surti buffalo production, fodder development, pig production and farmers training.
5. Hallikar Cattle Breeding Station, Kunikenahalli, Tumakuru District - Hallikar Cattle Breeding, bull-calf production and distribution and fodder development.
6. Amritmahal Cattle Breeding Station, Ajjampur, Chikkamagaluru District -Amritmahal cattle Breeding, bull-calf production and distribution, Rabbit production and distribution and fodder development
7. Khillar Cattle Breeding Station, Bankapur, Haveri District - Khillar Cattle Breeding, fodder development, bull-calf production and distribution. Rabbit production and distribution.
8. Jercy Cattle Breeding and Training centre, Dharwad UAS Campus - Jercy Cattle Breeding, bull-calf production, farmer's training, fodder development and frozen semen production.
9. Buffaloes Breeding Farm, Tegur, Dharwad District - Surthi Buffalo breeding, bull-calf production and distribution, fodder production.
10. Livestock Breeding and Training Centre, Munirabad, Raichur District - Jercy Cattle Breeding, fodder development, farmer's training, frozen semen production and distribution.
11. Live stock Breeding and Training Centre, Karikuppi, Ballari District - Cross Breed bull-calf production, fodder production, fodder development and farmer's training.

National Project for Cattle and Buffalo Breeding (upto Sep 2012): The National Project for Cattle and Buffalo Breeding is a 100% centrally

sponsored programme and is implemented through Karnataka Live Stock Development Agency for strengthening of Animal Breeding Services. Because of effective implementation of this programme, the number of productive cattle and buffalo has increased and the number of unproductive, non- descript cattle and buffalo have decreased as per the latest Livestock census. Semen production centers, bull mother farms and Artificial Insemination Centers in the state have been provided with necessary infrastructure like buildings, equipments, high pedigreed bulls and liquid nitrogen storage and transport facilities for production of quality frozen semen.

Rural unemployed youth have been trained for 4 months in Artificial Insemination and provided with equipments to carryout Artificial Insemination service at farmers door step. For the current year, around 167 Rural youth were trained upto September, 2013 and 834 Para Veterinarians are undergoing training in modern trends of Artificial Insemination.

Sheep and Wool Development

Karnataka Sheep and sheep products development Board was established in 1975 to oversee the welfare of sheep and sheep farmers in the state and was converted to *Karnataka sheep and wool development corporation (KSWDC)* with effect from 5-12-2001. The main objectives of KSWDC include 1.Sheep rearing and management, 2.Breed Improvement of Sheep, 3.Mechanical shearing of Wool, 4.Collection, grading and processing of wool and 5.Manufacturing & Marketing of Wool and woolen products.

KSWDC is implementing various state government programmes like health Coverage of sheep, Breed improvement of sheep, Mechanical wool shearing programme, Subsidy schemes for sheep farming and training programmes. The central government programmes undertaken by KSWDC include Integrated Wool Development Programme and *Kendriya Bhed Palak Vima Yojana.* There are six sheep breeding farms functioning under KSWDC. The largest farm is located at Challakere where crossbred rams are produced.

KSWDC is implementing the scheme in co-ordination with the Central Wool Development Board, Jodhpur. Under the scheme, a project area of 50,000 sheep will be selected and programmes will be implemented for the integrated development of sheep in the project area for a period of 4 years. Sheep rearers in the project area are supplied with cross bred rams, medicines and free training camps in scientific sheep husbandry. Progress achieved is shown in table 4.25.

Table 4.25: The progress achieved by KSWDC(Rs in lakhs)

Physi cal		Financial	
Target	Achievement	Target	Achievement
1356	489	156.50	57.00

Source: Economic survey of Karnataka 2013-14.

Poultry

Karnataka Co-operative Poultry Federation (KCPF) at Bengaluru is functioning since 1995. Presently, 80 primary poultry cooperative societies are affiliated to the federation which receives grant- in-aid from the State Government. Karnataka is the first State in the Country to bring Karnataka Poultry and Livestock Feed {Regulation of Manufacture and Sale) Order, 1987 under section-3 of Essential Commodities Act, 1955. This was given effect from 7th March 1988. All feed manufacturers and dealers should obtain the License for manufacture of feed for sale and distribution of Poultry and Livestock feeds. The quality feed should be as per standards specified by the Licensing Authority as per the advice of the expert committee. 23 poultry farms are functioning under the technical guidance of the department. The major developmental activities are breeding and rearing of Giriraja parent stock and supplying chicks to the farmers and rearing centers of the department.

There are 32 poultry institutions in the State the details of which are as follows:

1. The State Poultry Breeding and Training Centre at Hesaraghatta, Bengaluru;
2. Three Regional Poultry Breeding and Training Centres at Malavalli, Gangavathi and Haveri ;
3. Eight District Poultry Rearing and Training centres at Kalaburgi, Davanagere, Kudige, Bidar, Vijayapura, Gundlupet, Mangalore and Kolar;
4. Thirteen Poultry Rearing centres at Tumakuru, Shivamogga, Raichur, Kumta, Kundapur,

Chikkamagaluru, Ponnampet, Hassan, Ramanagaram, Tirumakudal Narasipur, Holenarsipura, Koila and Kurikuppe;

5. Five Intensive Poultry and Egg Marketing Centres at Bengaluru, Mysuru, Dharwad, Belagavi and Kalaburgi are merged with Karnataka Cooperative Poultry Federation;
6. One Livestock and Poultry Feeds' Quality control wing at Bengaluru and
7. One Registration and Hatcheries wing in Bengaluru.

Piggery Development

In Karnataka, five Pig Breeding Stations are located one each in Hessaraghatta in Bengaluru District, Kudige in Kodagu District , Koila in Dakshina Kannada District, Bangarpet in Kolar District and Kalasa in Chickmagalur District. Among other activities, these stations are engaged in production and distribution of pure breed piglets to beneficiaries of various socio- economic programmes and, training and extension services in modern pig rearing. There are 550 small, medium and large scale modern piggery units established in the State with the financial assistance from various banks. Under RKVY, the Department of Animal Husbandry and Veterinary Services has chosen 12 districts viz., Bengaluru Urban, Bengaluru Rural, Ramanagar, Kolar, Mandya, Tumakuru, Kodagu, Hassan, Dakshina Kannada, Udupi, Chikkaballapur, and Chikkamagaluru to form a Pig Breeding Association Under the Co-operative Society Act to establish good quality pork and marketing facility.

Rabbit rearing

Four rabbit rearing farms are functioning in the State. These farms maintain and breed New Zealand White, California White and Grey giant breeds of rabbits. The bunnies are being sold to interested farmers.

Dairy Development

Dairy development activities under "**Operation Flood**" programme pertain to providing guaranteed and remunerative market to the rural milk producers and supply of hygienic milk and milk products to the Urban consumers. *Karnataka Co-operative Milk Producers Federation Ltd (KMF)* has been designated as implementing agency for Operation Flood Project. Financial assistance for capital investments in the district Milk Unions flows from National Dairy Development Board. The main objective of KMF is the co-ordination of various phases in production of milk and milk products like procurement, processing, marketing and distribution. The technical input is provided by KMF through milk unions to the farmers of *Dairy Co-operative societies (DCS).*

The Federation has 22 Dairy processing plants with a capacity of 43.85 lakh litres a day. The state has 45 chilling centres with 19.30 lakh litres of chilling capacity. There are five product dairies equipped to produce 100 MT's of milk powder per day and five cattle feed plants with ISO 9001/2000 certification for quality production and supply of cattle feed to producers. There are 12,122 diary co-operative societies functioning and 22.25 lakh farmers are enrolled as members.

FISHERIES

Karnataka State (erstwhile Mysuru State) emerged as a maritime State in 1956 with the reorganization of the States. An independent Department of Fisheries was set up during 1957. Since then, the Department of Fisheries has been consistently striving for development of fisheries and of fishermen by implementing various developmental schemes in both Marine and Inland fisheries Sectors.

The Fisheries Sector plays an important role in the socio-economic development of State, in view of its contribution to the food basket, nutritional security, large foreign exchange earnings, employment generation and income.

Fishery resources and Potential:

Marine: Out of 30 districts in Karnataka, only three districts viz. Dakshina Kannada, Udupi and Uttara Kannada are having marine resources. The total coastal length of Karnataka is 300 km out of which 42 km. in Dakshina Kannada district, 98 km in Udupi district and 160 km in Uttara Kannada district. The state has rich continental shelf of 27,000 square km with an *Exclusive Economic Zone (EEZ)* of 87,000 square km having a resource potential of 4.25 lakh metric tonnes of fish production per annum. The details of the continental shelf area, annual catchable potential

of important fish and marine fisheries resources in Karnataka are as follows.

Continental Shelf area in different Bathymetric Division of Karnataka

Depth range	Division of continental shelf based on depth range(Area in square km)			
Division	0-10 Fathoms	10-40 Fathoms	40-100 Fathoms	0-100 Fathoms
12/74	172	858	429	1459
13/74	1200	6689	258	8147
14/74	1200	2830	0	4030
13/73	0	1715	3945	5660
14/73	0	3259	4459	7718
Total	**2572**	**15351**	**90901**	**27014**

Source: "Demersal Fisheries Resources ofo the South-West Coast of India" by Exploratory Fisheries Project, Government of India.

Inland: There are 27 inland districts in the State in addition to three marine districts i.e., Dakshina Kannada, Udupi and Uttara Kannada which are having lesser inland resources. Karnataka has 5.60 lakhs ha. of freshwater sources consisting of 2.93 lakhs ha. of ponds, tanks and 2.67 lakhs ha.of reservoirs. In addition to this, 5813 km of river stretch and about 3,187 km of irrigation canals provides innumerable opportunities for inland fishing. Details are shown in table 4.25.

Table 4.25: Inland Fisheries Resources in Karnataka

Type	Area/Length
Major Tanks	2.40 lakh ha
Minor Tanks	0.53 lakh ha
Reservoir	2.72 lakh ha
Rivers	5813 km
Canals	3187 km
Brackish water areas	0.08 lakh ha
Production Potential	4.02 lakh MT

Source: Economic survey of Karnataka 2013-14.

Production: The total fish production in Karnataka was around two lakh tonnes in the early eighties and reached a peak of over 5.46 lakh tonnes in 2011-12. The State's fish production accounts for about 5.8 % of India's total fish production. The current level of per-capita fish availability in the State is 6.8 kg. Karnataka ranks 5th position in the marine fish production and 9th position in the inland fish production in India. Details of fish production is given in table 4.26.

Table 4.26: Details of Fish Production in Karnataka (MTs)

Year	Marine	Inland	Total
2008-09	218137	143717	361854
2009-10	248728	159324	408052
2010-11	340571	186008	526579
2011-12	347383	199053	546437
2012-13	130210	125000	255210

Source: Economic survey of Karnataka 2013-14.

Fishing community: In coastal areas fisheries sector provides wide scope for fishing and value addition activities particularly in terms of export potential. As such this sector is attracting both skilled and unskilled workers. Over the years, there is increase in the coastal fisherfolk population inducing more and more people into fishing and allied activities. Employment status and opportunities in marine fisheries sector of Karnataka has increased over the years in spite of growing mechanization and increasing replacement of labour-intensive fishing technologies. The size of fisherfolk in Karnataka population in the State is given in Table 4.27.

Table 4.27: Fisherfolk in Karnataka (in lakhs)

Sector	Total Number of Fishermen	Number of fishermen actively involved/ employed
Maine	3.11	1.51
Inland	5.61	1.37
Total	**8.72**	**2.88**

Source: Economic survey of Karnataka 2013-14.

Marine Fisheries

The State has 300 km of coastline, and 27,000 square km of continental shelf area, rich in pelagic

fisheries resources. Out of the Indian Exclusive Economic Zone (EEZ) of 2.02 million square km, Karnataka has a share of 87,000 square km. Traditionally, Karnataka coast is known as mackerel coast. The marine fisheries resource potential of the State is estimated at 4.25 lakh metric tonnes, of which 2.25 lakh metric tonnes from inshore zone up to a depth of 70 metres and remaining 2.0 lakh metric tonnes from the off shore/deep sea zone.

The pelagic fishery wealth of Karnataka coast, mainly comprising mackerel and oil sardine, used to be traditionally harvested by operating giant shore seine known as Rampani. But this method has now become almost obsolete. The mechanization of fishing operation was initiated with the introduction of 30 ft. to 43 ft. trawlers in 1960s for exploiting inshore demersal fishery including shrimps. Introduction of purse seines in 1970s enhanced the area of fishing operation and pelagic fish landings. Motorization of traditional crafts, like gill-netters and long liners and encouragement of off shore fishing beyond 50metres depth using bigger vessels for a duration of 7-8 days, have effectively increased the range and effort of fishing operation. Further, financial institutions have extended the required loan facilities for acquiring fishing boats, which has helped in enhancing the fleet strength.

In the recent years, fishermen have been trained in operation of sophisticated electronic equipment's in fishing and navigation. Fishing by mechanized boats during monsoon has been prohibited under the provisions of Section 3 of the Karnataka Marine Fishing (Regulation) Act, 1986. According of Government order No. AHF 126 SFM 2005 dated 25-06-2005 The prohibition period is 57 days from 15th June to 10 August along the coasts of Dakshina Kannada and Udupi districts and, 45 days along the coast of Uttara Kannada district from 10th June to 29th July.

Assistance is provided in the form of supply of VAT exempted diesel to reduce the fishing cost and purchase of modern fishing and navigational aids such as fish finders, radio- telephone equipment etc., for offshore fishing vessels for easy navigation and identification of fish in deeper waters. Application of remote sensing technology is also being used to identify potential fishing zones along the coast which help in saving fuel and time to fishermen.

Major Programmes in Marine Fisheries:

The State has given importance for the development of infrastructure facilities like fishing harbours, landing centres, auction halls, setting up of ice plants, cold storages, freezing plants and frozen storages, construction and improvement of fishery link roads etc. Karnataka has eight fishing harbours located at Karwar, Tadri, Honnavar, Bhatkal, Gangolli, Malpe, Belikeri and Mangalore and 19 fish landing centers at intervening centers.

Construction of fishing harbour at Gangolli is being taken up. Fish landing centres at Kodibengre, Hejamadikodi have been recently constructed. The construction of fish landing centres at Belekeri and Alvekodi with central assistance is under progress. Extension of wharf at Mangalore and Karwar fishing harbours is being constructed with central assistance. Under 'Sea Bird' naval project, Karwar, construction of fishing at Amdahalli at an estimated cost of Rs. 1,032.00 lakh has been initiated.

However, an administrative approval has been obtained from the Government for construction of fish landing centre at Koderi at an estimated cost of Rs. 3000 lakh and an expenditure of Rs.2378.85 lakhs have been incurred. Sanction has been accorded by GoI for construction of Mangalore fishing harbor III stage at an estimated cost of Rs. 5760 lakh and Malpe fishing harbor III stage at an estimated cost of Rs. 3715 lakh and the State government has also given administrative approval for the same. Till now the expenditure of Rs.1028.29 lakh and Rs.1839.26 lakh have been incurred respectively for these projects.

To rejuvenate ice plants, subsidy at the rate of Rs.1.00 per unit of electricity consumed by these plants has been introduced in the coastal areas. A new scheme on purchase of life saving equipments such as life buoys and life jackets has been started in 2011-12, with 75% subsidy. As per the latest data, there were 163 ice plants with a capacity of 2,463 metric tons of ice per day, 29 cold storages with a capacity of 2,370 metric tons, 14 freezing plants storage plants with a capacity of 117 metric tons per day, 14 frozen storages with a capacity of 1,728 metric tons, 8 canning plants with a capacity of 528 metric tons and 17 fish meal plants with a capacity of 174 metric tonnes in marine districts.

Inland Fisheries

The state has vast potential for inland fishing. The total potential is estimated to be 4.02MT per year. During 2011-12, 5012.73 lakh fish seed (fry) has been produced. 2788 department tanks were developed by stocking 1771.60 lakh fingerlings. Similarly 2,228 Gram panchayat and minor tanks have been developed by stocking 328.99 lakhs fingerlings. About 1.99 lakh MT of inland fish has been produced.

As per latest data there were 67 ice plants with a capacity of 762 metric tonnes per day, 24 cold storage plants with storing capacity of 345 metric tonnes per day and, one frozen storage plant with a storage capacity of two metric tonnes per day. During the period between 1956 and 1966 the foremost activities in the Inland sector were to import fish seed, mostly riverine major carp fry collections, from West Bengal. Fish seed production and rearing farms have been set up in the government sector with a view to develop the much needed infrastructure for producing the required quantities of fish seed for stocking in tanks, ponds and reservoirs of the State.

The major programmes initiated under inland fisheries development include assistance for construction of fish ponds, stocking of grass carp seeds, construction of ponds in water logged areas, development of fish sanctuaries and intensive fish culture development through fish farmers development agencies, etc. From 2009-10 onwards, a new scheme on providing 50% subsidy for purchase of fish seed and supply of fishery requisite kits worth Rs.5,000 (free of cost) was introduced. New fish seed farms at Nugu in Mysuru district and Karanje in Bidar district are established to produce and supply of quality fish seed. An ornamental fish production and rearing centre called Aquapark is also being established at Hesaraghatta, Bengaluru Urban district to promote ornamental fisheries.

In order to develop the much needed infrastructure for producing the required quantities of fish seed for stocking in tanks, ponds and reservoirs, fish seed production and rearing farms and taluk - level nurseries have been set up by the Department of Fisheries. At present, there are 55 fish seed production / rearing farms under the control of the State's Department of Fisheries' and Zilla Panchayats' and 72 Taluk level nurseries in the State. To meet increased demand for fish seed, the Government has also encouraged the establishment of private fish seed production and rearing farms by providing subsidies. At present, there are 72 fish seed production and rearing farms in the private sector. The State requires atleast about Rs. 40 crore fingerlings of fish seed to develop 50% water resources for fish culture.

Tank Fisheries Development: Tank fishery development plays a strategic role in providing employment and income to rural people. The fishery rights of the tanks with achkut of more than 40 hectares vest with the fisheries department. These water bodies are disposed of either by lease or tender cum auction. Tanks upto 40 hectares achkut areas have been transferred to the respective Gram Panchayats.

Leasing policy: A comprehensive policy for disposal of tanks, reservoirs and rivers has been formulated. As per these amendments, the tanks are leased in the following order of priority: a) Jalasamvardhana Yojana Sangha, b) Karnataka Co-operative Fisheries Federation, Mysuru, c) Societies that have obtained membership of the Federation, d) Registered fisheries co-operative societies, e) Unemployed fisheries graduates f) Registered water users co- operative societies and other societies / institutions.

Fishermen Co-operative Society (FCS): The first fishermen co-operative society was registered in 1915 at Karwar. By 1956, Karnataka had 39 marine and 9 inland co-operative societies with one district level fish marketing federation at Mangalore. However there are 610 Fishermen Co-operative Societies in the State of which, 535 are functioning and 75 are defunct. One State Level Co-operative Fisheries Federation in inland and two District Co-operative Fish Marketing Federations are functioning in marine districts (Mangalore and Karwar) in the State. To assist the activities of these Co-operatives, share capital, fishery requisites loan and managerial subsidy are being provided. There are 1,77,436 members in all FCS

Co-operative Marketing Federations: There are two District Co-operative Fish Marketing Federations, one in Dakshina Kannada District and another in Uttara Kannada District. These Federations are engaged in fish marketing and production of ice for supply to fishermen, sale

of diesel and lubricants, besides sale of fishery requisites to the members. These federations are also implementing NCDC funded Integrated marine Fisheries development project.

Fisheries Corporation: The Karnataka Fisheries Development Corporation was established during 1971 under the Indian Company's Act, 1956. The authorized share capital is Rs. 6.00 crores. The Corporation is engaged in activities like ice production, cold storage, freezing plant, and frozen storage for fishermen and processors, besides marketing of frozen fish through its cold chain.

Karnataka Co-operative Fisheries Federation (KCFF): Karnataka Co-operative Fisheries Federation was formed with the object of development of Fisheries in tanks and reservoirs through Fishermen Cooperative Societies, who are members of the federation by stocking quality fingerlings and marketing of fish through retail-outlets and upliftment of socio-economic conditions of inland fishermen.

The reservoir fisheries development project with NCDC assistance was implemented in the districts of Mysuru, Chamarajanagar, Mandya and Hassan at a total cost of Rs.428.30 lakh. NCDC funded "*Integrated Inland Fisheries Development Project*" is being implemented at a cost of Rs.13.40 crore in the districts of Raichur, Ballari, Shivamogga, Dharwad Davanagere and Haveri through KCFF, Mysuru.

Fish Farmers development agencies: Under the centrally sponsored scheme on development of fresh water aquaculture, 13 Fish Farmers Development Agencies covering 17 districts have been established in the State for development of fisheries in ponds, minor tanks and derelict waters. Under this scheme unemployed youths are trained in fish culture and fisheries activities and suitable water bodies are leased to them for fisheries development. The beneficiaries are assisted to obtain loan from the financial institutions for purchase of fish seed, feed, manure and fishery requisites and renovation of ponds, and are provided with subsidy.

Other Initiatives for the Fisheries development in the State:

Seed Development: Good quality fish seed is a pre requisite for development of inland fisheries and in order to increase the fish seed production of the State. Sanction has been accorded for construction of fish seed farms at Karanja, Bidar district and Nugu, Mysuru district at an estimated cost of Rs.2.50 crores during 2010-11. In Bidar district, near Karanja reservoir 10 acres and in Mysuru district, near Nugu reservoir 24 acres of land has been procured for establishment of fish seed production farms. During 2011-12 an allocation of Rs.250.00 lakhs was made and Rs.250.00 lakhs has been spent.

The major fish seed farms in the State which have been established to produce and supply quality fish seed are Bhadra fish seed production farm at Bhadra Reservoir Project, Shivamogga District, National fish seed production farm at Bhadra Reservoir Project, Shivamogga District, Tungabhadra fish seed production farm at Tungabhadra Dam, Ballari District, Hagaribommanahalli fish seed farm, Ballari District, Narayanapura fish seed farm, Vijayapura District, Shivapura fish seed farm, Koppal District, V.V.Sagar fish seed farm, Chitradurga District, Markonahalli fish seed farm, Tumakuru District, Kabini fish seed farm, Mysuru District and Hessarghatta fish seed farm, Bengaluru (Urban) District.

Establishment of Aquapark: For the first time in the State with an objective of promoting ornamental fish seed production and sale in and around Bengaluru with utmost priority, Government has accorded administrative approval for the establishment of Aquapark with ornamental fish seed production and rearing units at Hesaraghatta at a cost of Rs.200.00 lakhs. Works are under progress. During the year 2011-12 an allocation of Rs.150.00 lakhs has been made and Rs.149.62 lakhs has been spent. In 2012-13 an allocation of Rs.100 lakh was provided and Rs.99.95 lakh has been spent.

Fish Sanctuaries in Karnataka: River stretches are declared as fish sanctuaries for conservation of endangered and rare native fish species. Because of their unique and delicate ecosystem, any type of fishing is banned in these declared river stretches which helps to develop natural breeding of fish species. Details of fish sanctuaries in Karnataka declared by Department of Fisheries are given in table 4.28.

Table 4.28: Fish Sanctuaries in Karnataka

Sl No.	Place/Taluk/District	River	Length of protected area
1	"Vanhi Puskarani"(Ramanthapur) Arakalgud, Hassan	Cauvery	-
2	Ranganathittu, S.R.Patna, Mandya	Cauvery	5 km
3	Muttathi area, Malavalli, Mandya	Cauvery	-
4	Shishila, Belthangadi, D.Kannada	Kumaradhara	500m
5	Abhirama fish sanctuary, (Hariharapura), Koppa, Chickmagalur	Tunga	-
6	Dharmasthala, Belthangadi, D.Kannada	Nethravathi	1km
7	Kelkaru, Belthangadi, D.Kannada	Palguni	-
8	Marakatha, Sulya, D.Kannada	Yenekkai (Kumaradhara)	-
9	Seethanad, Karkala, Udupi	Seethanadi	-
10	Nakurgaya, Puttur, D.Kannada	Nethravathi	-
11	Nisargadhama, Kushalnagara, Kodagu	Cauvery	-
12	Uppukala, Sulya, D.Kannada	Kallaje	-
13	Bachanayakanagudi, Sulya, D.Kannada	Yenekkai (Kumaradhara)	20km
14	Thodkana, Sulya, D.Kannada	Chandragiri	500m
15	Thingale, Karkala, Udupi	Seethanadi	500m
16	Sringeri, Sringeri, Chikkamagaluru	Tunga	1km
17	Jammatagi (Hariharapura), Koppa, Chikkamagaluru	Tunga	500m
18	Chippalagudda, Thirthahalli, Shivamogga	Tunga	500m
19	Mattur-Hosahalli Shivamogga Taluk & Dist	Tunga	1.5km
20	Bhagavathi Chaya Kolla, Surapur tq Kalaburgi district	Krishna	-
21	Shivanasamudra, Malavalli, Mandya	Shimsha	1.4 km

Source: Economic survey of Karnataka 2013-14.

Brackish water shrimp farming: Karnataka has about 8,000 ha. of brackish water area, of which 4,200 ha are suitable for shrimp culture. In order to encourage scientific fish farming in these waters, two brackish water fish farmers development agencies (BFDA's) were established, one at Karwar and another at Brahmavara (presently in Udupi). These agencies are engaged in training of farmers in shrimp culture, selection of sites, and preparation of project reports for getting financial assistance from the banks. 25% subsidy is provided to the shrimp farmers to encourage scientific shrimp farming. Central and State governments equally share the cost.

Landing and Berthing Facilities: Under this scheme, construction and maintenance of fishing harbours and landing centres are taken up. Construction of fish landing centre at Kodibengre was taken up at a revised estimated cost of ₹. 179 lakh and an expenditure of ₹. 153.97 lakh has been incurred so far and civil work is completed. In addition, fish landing centre at Alvekodi in Uttara kannada district at an estimated cost of Rs. 223.99 lakh is constructed. Fish landing centre at Koderi, Byndoor at an estimated cost of ₹. 3000 lakh is under construction.

NABARD Assistance under RIDF: Construction of 11 roads and 2 bridges have been completed at a total estimated cost of ₹. 192.51 lakhs under NABARD-assisted RIDF-IV and V. Administrative approval was accorded for construction of 16 roads and 2 bridges at a total cost of ₹. 370.12 lakh under RIDF-VII and completed at an expenditure of ₹. 347.81 lakh. Administrative approval was accorded for construction of 5 bridges and 24 roads at a total cost of ₹. 1056.83 lakh under RIDF VIII. Of the proposed activities, work related to 24 roads and 4 bridges were completed at the expenditure of ₹. 827.66 lakh. Further works have been taken up at Kodikanyana (estimated cost ₹. 300 lakh), Gangolli fisheries jetty (estimated cost ₹. 300 lakh), Belikeri (estimated cost ₹. 300 lakh), Balambara (estimated cost ₹. 260 lakh) and Karwar net mending shed (estimated cost ₹. 3 lakh). The construction of Jetty at Gangavali fish landing centre has been started.

During 2011-12, administrative approval was accorded for construction of jetty at Hangarkatte at a cost of ₹. 310 lakh under NABARD-assisted RIDF-14 and construction of jetty at Gangolli at a cost of ₹.300 lakh and 'T' head jetty at Kodikanyana at a cost of ₹.300 lakh under NABARD-assisted RIDF-15. A proposal for ₹.422.50 lakh has been sent to Government of India for NABARD-assisted RIDF-18 during 2012-13. Similarly in 2013-14, under different works ₹.1800 lakh has been earmarked and ₹.83.59 lakhs has been spent upto September 2013.

Motorisation of traditional Fishing Crafts: The Centrally Sponsored Scheme of Motorisation of Traditional Fishing Crafts was introduced in the State during 1987-88 and so far, 3189/- traditional crafts have been motorised. Under this scheme, for each outboard motor, half of the unit cost is provided as subsidy subject to a maximum of ₹. 30000/-. This subsidy amount is shared equally by State Government and Central Government. The rest of the amount is borne by the beneficiaries with assistance from financial institutions. 287 beneficiaries have been covered during the year 2011-12, 284 in 2012-13. In 2013-14 ₹.89.20 lakh budget have been provided for the implementation of the scheme.

Dredging of Fishing Harbou₹: In the State, under centrally sponsored scheme and other schemes major fishing harbours and small landing centres have been constructed and after construction due to lack of periodic dredging and other natural reasons (such as less inflow of water) some of these harbours and landing centres have severe problem of siltation. To solve the problem of siltation, dredging of harbours has been taken up. In

2011-12, GOI sanctioned works of dredging at Udyavara river, Mangalore Alivey-Kandathapalli, Kodibengre, Bhatkal and Hangarakatte. An allocation of ₹.1000 lakhs was made for dredging during 2012-13, works were started in few places but no expenditure has been incurred. In 2013-14 ₹.1000 lakhs has been provided and ₹.19.85 has been spent upto September, 2013.

Maintenance of Coastal Link Roads: There are 181 fisheries link roads with a length of 276.51 Km in the three coastal districts of the State. During 2012-13, an allocation of ₹.400 lakhs was made and additional allocation of ₹.200 lakhs was also provided for development and maintenance of these fisheries link roads. An expenditure of ₹.598.55 lakhs has been incurred. In 2013-14 ₹.600 lakhs has been earmarked for this project.

Fishermen Welfare Schemes

Distress Relief Fund: Distress Relief Fund was started in order to provide relief to fishermen/their dependents in case of death/permanent disability while fishing. The relief amount which was ₹.25000 per head during 2006- 07 has been increased to ₹.50000 per head. In 2011-12 under this scheme ₹.100 lakhs allocation was provided and the total amount has been spent. In 2012-13, relief worth ₹.36.66 lakhs was given to 69 beneficiaries in all death cases, ₹.0.10 lakhs for medical expenses to 2 fishermen, ₹.2.435 lakhs for loss of property to 37 fishermen from distress relief fund. In 2013-14 an amount of ₹.50 lakh has been earmarked.

Group Accident Insurance Scheme: Under this Centrally Sponsored Group Accident insurance Scheme, the premium amount of ₹.30 per fisherman, shared equally by State and Centre has been paid to the *National Federation of Fisheries Co- operative Ltd.,* New Delhi towards insurance coverage of 150,000 fishermen of the State. In 2012- 13 ₹.22.50 lakhs has been paid to FISH COFED, New Delhi towards premium and ₹.37 lakhs has been distributed as relief in 38 cases. In 2013-14 ₹.25 lakhs budget has been provided and an expenditure of ₹.24 lakhs has been incurred till date. (Table 4.29)

Table 4.29: Group Insurance scheme

Year	No of cases settled	Amount claimed (₹. In lakh)
2007-08	35	17.00
2008-09	12	6.00
2009-10	25	12.50
2010-11	31	24.00
2011-12	56	43.11
2012-13	38	37.00
2013-14(upto Sept. 2013)	19	19.00

Source: Economic survey of Karnataka 2013-14.

Matsya Ashraya Scheme: In the State there is a great demand for houses from 28,000 houseless fishermen in the State. Since the funds provided by the GOI for the housing programme was insufficient, Government of Karnataka in the year 2006-07, started Matsya Ashraya III phase to construct houses at a unit cost of ₹.40,000/- per house. In 2011-12 the unit cost has been raised to ₹.60,000/- per house. During the years 2011-12 and 2012-13, under *Matsyashrya* scheme 2000 houses and under CSS scheme 1000 houses were sanctioned and partial amount has been released and works are under progress. In 2013-14 the unit cost has been enhanced to ₹.1.20 lakh and ₹.1,200 lakhs budget has been provided.

CSS Savings-cum-Relief Scheme for Marine Fishermen : Under this Scheme, ₹.75 per month will be collected from marine fishermen for a period of 8 fishing months in a year. A total amount of ₹.600 thus collected from each fisherman will be matched with ₹.600 by the State and Central Governments and the total of ₹.1,800 thus collected will be distributed during 3 lean months to the beneficiaries equally at ₹.600 per month. In 2012-13 an allocation of ₹.300 lakhs was made under this component. But since the beneficiary contribution was ₹. 185.86 lakhs, ₹. 371.72 lakhs was released including additional allocation through re-appropriation. The entire amount was utilised to distribute the relief to 30836 beneficiaries. In 2013-14 the Government has sanctioned ₹. 400 lakhs and ₹. 392.60 lakhs has been incurred as on September, 2013. (Table 4.30)

Table 4.30: Savings cum relief scheme for marine fishermen

Year	No.of beneficiaries	Amount disbursed (₹. In lakh)
2007-08	17372	103.14
2008-09	18112	207.07
2009-10	14716	176.04
2010-11	21066	252.78
2011-12	25721	308.66
2012-13	31223	371.72
2013-14(as onSept.)	32742	392.90

Source: Economic survey of Karnataka 2013-14.

Supply of Fishery Requisite Kits: In 2009-10, to improve the livelihoods of the traditional and poor fishermen, "Supply of Fisheries Kit" was introduced by the Department. Under this scheme a kit consisting of fishing net, coracle and other fishery requisites are given to coastal or inland fishermen involved in traditional capture fisheries. The unit cost of each kit would be ₹. 5,000/- and it would be provided as cent per cent subsidy to the beneficiary. This would improve the economic condition of the poor fishermen and help them to lead their life.

6. Assistance to fishermen for purchase of life jackets and life buoys: Fisherman often go to the sea without any safety equipment's. In the inland sector also there is no practice of carrying any safety equipments. Fishermen being financially backward have lot of other priorities and so do not spend money to buy lifesaving equipment's resulting in loss of life. Therefore in order to encourage these fishermen to purchase bare minimum safety equipment's such as life buoys and life jackets this new scheme has been introduced. Under this scheme, provision has been made to provide for the purchase of life jackets and life buoys at 75% subsidy to a maximum of ₹.3000/ head. During 2011-12 an allocation of ₹.100.00 lakhs was made and the entire amount has been spent.

SERICULTURE

Karnataka is one of the leading silk producing states in the country. Mysuru silk is synonymous with splendour and grandeur. Nearly 70 per cent of the country's mulberry silk production is in Karnataka itself. Rearing of silkworms and commercial production of cocoons and silk in Karnataka dates back to the 18th century, when sericulture was patronised by the rulers of the erstwhile Mysuru State. The architect of Mysuru Sir M.Vishweswariah made sericulture an important component of rural development. Channapatna taluk soon developed as a centre of silk production in the state.

Sericulture is practised both under rain-fed and irrigated conditions. The main silk producing regions in the State are the talukas of Channapatna, Kanakapura and Magadi in Bengaluru Rural district; Kollegal taluka of Chamrajnagar district and Ramanagaram district. Because of the introduction of new technologies, sericulture,

which was earlier confined to a few districts, has now spread to other areas. Other low production districts include Tumakuru, Chitradurga and Chamarajnagar, Shivamogga, Davangere. For details refer chapter-5.

Watershed Development Department : India is one of the major agricultural countries with more than 70 per cent of the population depending on it. Indian agriculture is dependent on monsoon which is not uniform over the years. Nearly three fourths of the cultivable land in India is dependent on monsoon, which is contributing nearly 42 per cent of the total production from agriculture. The productivity of any crop mainly depends on two natural resources-land and water in addition to management practices. Therefore the conservation up-gradation and utilization of these two natural resources on scientific principles is essential for the sustainability of rainfed agriculture. The watershed concept for development of rainfed agriculture is gaining importance over the years and it amply demonstrated that watershed developmental tools are very effective in meeting the objectives and mission.

Karnataka has been given an important place for Watershed Development because 75 per cent of the cropped area in Karnataka depends upon less and uncertain rainfall. The geographical area of the State is 190.50 lakh ha. Of which 116.90 lakh ha is available for watershed development.

Importance of watershed development in Karnataka

The land resources of Karnataka especially its dry drought prone lands, which comprises more than 79 per cent of the total arable area, have been poorly managed by the resource poor farmers of the state. Soil loss due to erosion coupled with reduced water resources has led to a situation of rapid soil fertility deterioration, declining/stagnating crop yields, depletion of underground water sources, deforestation, denudation, destruction of natural pasture and diminishing biomass production. Exploring the full potential of rain fed agriculture to meet the food, fodder and fuel requirement of the state population, is the only alternative, however, this will require investing in suitable soil and water conservation technologies, crop breeding targeted to rain fed environments, agricultural extension services, and access to markets, credit and input supplies in rain fed areas.

The potential for increasing the irrigable area and enhancing productivity from irrigated lands has its limitations. The total irrigation potential from all sources, including inter basin transfers, is estimated at around 50 per cent of the total cropped area of 104.89 lakh hectares by the Karnataka State land use board. The remaining land has to depend on rain fed farming forever. Therefore if the state has to conserve and develop natural resources in rain fed areas to improve their production and productivity, their development on watershed basis is inevitable. Development of rain fed areas is important because more than 44 per cent of its agricultural production comes from dry lands.

Karnataka has the highest proportion (79 per cent) of drought prone area among all major states in the country and in absolute terms it has the second largest area of dry land in the country after Rajasthan. In addition, Karnataka also has the second lowest (154.2 M ha M/Yf) replenishable ground water resources among major states after Rajasthan.

Watershed is a geo-hydrological unit of all land and water within the confines of drainage divide which contributes runoff to a common point. It is a land area that captures rainfall and conveys the overland flow and runoff to an outlet in the main flow channel. Watershed development refers to the conservation regeneration and the judicious use of all the resources-natural (like land, water plants, animals) and human-within the watershed area. Watershed Management tries to bring about the best possible balance in the environment between natural resources on the one side and man and animals on the other. It is the man who is primarily responsible for degradation of the environment. Regeneration and conservation can only be possible by promoting awakening and participation of the people who inhabit the watersheds.

Objectives of Watershed Development Programmes are to Improve the productive potentials of selected watersheds and their associated natural resource base, sustainable alleviation of the Poverty, develop and strengthen community based institutional arrangements for sustainable natural resource management, improve skills and employment opportunities for non-farm sectors and involvement of village communities in participatory planning, implementation, social

and environmental management, maintenance of assets and to operate in a more socially inclusive manner.

Aims of the Programmes are improving agriculture productivity, improving vegetative cover, increasing milk and horticulture production, increasing fodder and fuel availability, reducing soil erosion, runoff and nutrient loss, improve water availability at surface and ground water, increasing household income, enhancing quality of life among local communities, local institutional development through community based organisations, ensuring institutional support by Watershed Development Department as facilitator and by NGOs for community organization and strengthening.

University of Agricultural Sciences (UAS)., Bengaluru

USA, Bengaluru started in the year 1966 and has a campus of 1777 Acres. It has six colleges spread over six campuses in its jurisdiction of 15 Southern Districts of the State. The new Agriculture College has been established at Hassan. There are 21 Research Stations, four Extension Education Units and nine Krishi Vignana Kendra's spread over six Agro Climatic zones. Animal sciences were bifurcated from University of Agricultural Sciences, Bengaluru and transferred to Karnataka Veternary, Animal and Fisheries Sciences University established at Bidar from 2005-06. Pro-chancellor of the Agriculture University is H.E.Governor of Karnataka and chancellor is Hon'ble Minister for Agriculture, Government of Karnataka.

University of Agricultural Sciences (UAS)., Dharwad

The University of Agricultural Sciences, Dharwad was started in the year 1986 and has 575 Hectares of land. It is carrying out teaching, research and extension activities in agriculture and allied sciences. Pro-chancellor of the Agriculture University is H.E.Governor of Karnataka & Chancellor in Hon'ble Minister for Agriculture, Government of Karnataka.

The teaching programmes are carried out through 8 colleges at 6 campuses in the jurisdiction of the University. Under-graduate degree programmes in agriculture are offered at Dharwad, Raichur, Vijayapura and Bheemarayanagudi. The degree programme in Agricultural Engineering, Horticulture, Forestry are offered at Raichur, Arabhavi and Sirsi campuses respectively. The degree programmes in Rural Home Science and Agricultural Marketing and Cooperation are offered at Dharwad Campus. The University is offering Master degree programmes in 30 subjects and Ph.D in 17 subjects at various campuses. The Post-graduate programmes are offered at Dharwad, Raichur, Sirsi and Arabhavi campuses.

University of Agricultural Sciences (UAS)., Raichur

University of Agricultural Sciences (UAS)., Raichur was started in the year 2009. It is carrying out teaching, research and extension activities in agriculture and allied sciences. The needs of the forming community of the Hyderabad- Karnataka region is being addressed by this University. Extension activities have been carried out through six Krishi Vignana Kendras and four Agriculture extension and education centres. Training, demonstrations, field days, Study tours for the farmers and farm women are the importance agricultural extension programmes. These are being carried out by the University in order to induce the farming community in adopting the new agricultural technology developed by the university.

The university has been awarded with "E-world 2012" award for its application of information technology in agriculture. Information on weather forecaste management of pest and diseases, agricultural market prices, training programmes, is being made available over mobile phone to the registered farmers of the region. About 12000 farmers are benefited under this scheme. E-solution for agricultural pest and diseases has been developed by the university and made available to the farmers on the field through Tablet-PC.

University of Agricultural and Horticultural Sciences (UAS)., Shivamogga

This University was established on 21-09-2012. The UAS Bengaluru and Horticultural University, Bagalkot have transferred all the different institutions coming under UAS Shivamogga during March-2013. This includes one Agricultural college at Shivamogga, one forestry college at Kodagu, one Diploma Vidyalaya at Kattalageri, two horticulture colleges one at Chickmaglur and another at Chitradurga. The new universities started working independently from April-2013.

The jurisdiction of the university is seven districts i.e. Shivamogga, Davanagere,Chitradurga, Udupi, Dakshina Kannada, Kodagu and Chickmagalur.

University of Horticultural Sciences, Bagalkot

University of Horticultural Sciences, Bagalkote has been established with the main objective of advanced research in Horticulture, education and extension activities for the welfare of farmers and people as a whole. New Horticultural Colleges have been established in Bidar, Bagalkote, Kolar, Mysuru, Sirsi, Hiriyur and Koppal districts.

Karnataka State Seeds Corporation Limited(K.S.S.C)

History **:** The corporation was established in the year 1973 under the Name & Style of "*Karnataka State Agro Seeds Corporation Limited*", a subsidiary organization of Karnataka Agro industries Corporation Limited. The Government of Karnataka have participated in the National Seed Project-II during 1979. Under the National Seed Project, the subsidiary organization was made as Independent Corporation under the present name and style of "*Karnataka State Seeds Corporation Limited*". Today the Corporation is one of the successfully run organizations of the Government of Karnataka.

Aim **:** The aim of the Corporation is to emerge as an industry leader in the State, in seed sector, with a continuous pursuance of excellence in quality and effective distribution services, with an eye on right product, right time, right price, right place of supply. *Vision*: The Vision of the Corporation is to be a leading agency for accelerating agriculture productivity and production and for improving the viability of agriculture as a vocation.

Karnataka State Seed Certification Agency (K.S.S.C.A)

Karnataka State Seed Certification Agency is an autonomous institution established in the year 1974 under the provisions of Section-8 of Seeds Act, 1966. The main objective of the Certification Agency is to ensure the quality of various crop seed produced under seed certification programme and to make them available to the farming community in time. Seed certification in our country is voluntary and not compulsory and only the varieties' notified by the Govt. of India are eligible for certification. As there is no budgetary support from the State Government, this institution is running on the service charges collected for various certification works rendered by the Agency.

The Governing Board of Karnataka State Seed Certification Agency comprises of Principal Secretary, Agriculture and Horticulture, Department, GOK, as Chairman and Eight Ex-Officio, Four nominated Members, Managing Director, KSSC Ltd, as Special Invitee and Director, KSSCA as Member –Secretary.

Seed Certification Agency has its Head Office at Bengaluru, with two zonal offices each headed by officers of the cadre of Deputy Director at Bengaluru & Dharwad. Ten divisional offices controlled by the Assistant Director with Head Quarters at Bengaluru, Mysuru, Davanagere, Ballari,Dharwad, Haveri, Gadag, Bagalkote, Gulburga, Raichur and 25 Seed Certification officer centers spread over the entire State.

IRRIGATION

The ancient rulers of Karnataka undertook construction of a large number of tanks and paid maximum attention to irrigation. But in later period Vijayanagar rulers did put up a dam across the Cauvery in 1347 near Talakadu, impounded the waters of Kumudvati rivulet to create Masur Magada (which is over 400 acres in area), dug many canals from the Tungabhadra near the capital and tapped maximum quantity of water for irrigation from rivers. We hear of a hydraulic engineer (Jalasutradhari) in one of their records. The Mysuru ruler Kanthirava Narasaraja Wodeyar's Bangaradoddi Canal (17th century) drawn from the Cauvery is famous. Chikkadevaraya raised Chunchanakatte dam, a brick work during the same century.

Excavating tanks or their repair was held as a meritorious duty. So wide and systematic was the tank network all over, that one of the Commissioners of Mysuru, Bowring says the following of it : "*As the country is generally undulating, and intersected by numerous valleys threaded by natural water courses, it occurred to the natives many centuries ago, to dam up the supply thus furnished, in order to irrigate their fields in the dry season, and in this way, as population increased additional land was brought under the plough, a chain of such tanks was formed, gradually increasing in size and capacity as the line was prolonged*". He further adds. "*In*

many instances, advantage has been taken of the gorges in hills to throw up colossal embankments, which have withstood with fair success, the floods of centuries". The arrangement was a chain of tanks, in a single catchment's area. Every reservoir in the chain received surplus water from the one at the upper level, and thus there was no wastage to point out.

During the pre-independence era, the British and Mysuru State Government took up some notable irrigation works such as Krishnarajasagar, Sagarakatte Dam, Dhudpal veir near Gokak, Vanivilas Sagar, Marconahalli and Anjanapur. There has been a gradual increase in the gross irrigated area in the state. The gross irrigated area as percentage of total cultivated area has doubled from 16 per cent in 1980-81 to 34 per cent in 2011-12. The gross irrigated area has increased from 16.76 lakh ha in 1980-81 to 41.37 lakh ha in 2010-11. The net irrigated area in the state is 34.40 lakh hectare in 2011-12. Out of this about 17.01 lakh ha comes under well irrigation (including borewells details are shown in table 4.31). The cumulative irrigation potential under major, medium and minor irrigation(surface water) is anticipated to go upto 39.50 lakh ha in 2013-14. Overall from all the three irrigation projects, 1.46 lakh hectares of additional potential is anticipated during 2013-14. Table 4.32 and Table 4.33 present Trends and Irrigation potential created in Karnataka respectively.

Table 4.31: Source wise Irrigation- 2011-12 (in lakh hectares)

Source	Irrigated Area		Share of Total Net Irrigated Area(%)
	Gross	Net	
Canals	14.73	11.78	34.24
Tanks	1.96	1.78	5.17
Wells	4.75	4.23	12.30
Tube/Bore Wells	15.40	12.78	37.15
Lift Irrigation	1.17	0.90	2.62
Other Sources	3.36	2.93	8.52
Total	**41.37**	**34.40**	**100**

Source: Economic Survey of Karnataka 2013-14.

Table 4.32: Trends in Irrigated Area in Karnataka (Area in lakh hectares)

Year	Gross Cultivated Area	Gross Irrigated Area	Net Irrigated Area	Gross Irrigated Areaasa %of Gross Cultivated Area
1980-81	106.60	16.76	13.62	16
1990-91	117.59	25.98	21.13	22
2000-01	122.84	32.71	26.43	27
2001-02	116.70	30.89	26.83	26
2002-03	115.32	28.41	27.05	25
2003-04	114.50	27.02	28.38	24
2004-05	128.07	33.28	29.06	26
2005-06	130.27	36.32	29.70	28
2006-07	124.38	36.03	29.46	29
2007-08	128.93	37.89	31.32	29
2008-09	123.68	39.42	32.38	32
2009-10	128.73	40.96	33.91	32
2010-11	130.62	42.79	34.90	33
2011-12	120.59	41.37	34.40	34

Source: Economic Survey of Karnataka 2013-14.

Table 4.33: Irrigation Potential Created - Area in lakh hectares (Cumulative)

Source	2011-12	2012-13	2013-14 (Anticipated)
Major and Medium Irrigation	25.56	27.43	28.51
Minor Irrigation (Surface water)	10.28	10.61	10.99
Total	35.84	38.04	39.50

Source: Economic Survey of Karnataka 2013-14.

Micro irrigation: With growing scarcity of water resources and challenges of climate change, the adoption of proven cost reducing micro-irrigation technology in agricultural activities becomes a necessity. Under the centrally sponsored scheme on micro irrigation 75% subsidy is provided to the farmers for purchase of drip and sprinkler irrigation units. As per the GOI guidelines, 40% of GOI share is matched with 35% of GOK share for big farmers and for small and marginal farmers 50% of GOI share is being matched with 25% of GOK share.

Hydrology Project-II: Hydrology Project Phase-II is a World Bank Aided Project and Government of India has included the state of Karnataka for participating in the hydrology Project Phase-

II. It has allocated a provision of ₹. 23.53 crores for the purpose. This has again been divided into two components. Surface Water Component (₹. 9.09 Crores) and Ground Water Component (₹.14.44 Crores). Hydrology Project-II is a follow up action project of World Bank Aided Hydrology Project-I, wherein infrastructure for collection of data was established. The data so collected is now proposed for utilization in the new Hydrology Project-II. The overall project development objective is to extend and promote the sustained and effective use of Hydrological system by all potential users concerned with water resources planning and management thereby contributing to productivity and cost-effectiveness of water related investments. The main components are institutional strengthening, which includes consolidation of Hydrology Project-I activities, awareness raising, and knowledge sharing and implementation support and vertical Extension, which includes development of Hydrological design aids, Development of Decision Support implementation of Purpose driven studies.

Accelerated Irrigation benefit programme (AIBP): For the early completion of some of the ongoing irrigation projects, which were lingering due to shortage of funds for many years, the Government of India launched the Accelerated Irrigation benefit programme, during 1996-97. Since then, 15 projects in the State are being implemented by using Central assistance. The cumulative expenditure incurred under AIBP projects till September 2013 is ₹. 4641.12 crore and the anticipated expenditure for the year 2013-14 is ₹. 700 crore. Details are furnished in table 4.34.

Table 4.34: Accelerated Irrigation Benefit Programme (in ₹.crores)

Name of Project	CA received (Cumulative)	Remarks
UKP Stage- I Phase –III	1380.67	Completed
UKP Stage-II	1655.73	Completed
Ghataprabha	544.82	Completed
Malaprabha	404.09	Completed
Karanja	189.03	Foreshore LIS &R&R works in nearing completion
Guddadamallapura	57.24	Nearing Completion
Bhima LIS	156.60	Under progress
Varahi	68.54	Under progress
Maskinala	3.22	Completed
Hirehalla	64.24	Completed
Gandorinala	116.94	Completed
Srirameshwara LIS	-	Under progress
Upper Mallamari	-	
Chadrampalli	-	ERM projects in Kalaburagi District (New)
Total	**4641.12**	

Source: Economic Survey of Karnataka 2013-14.

PM's Special package: (SUJALA-II) : During 2006-07, the Special Rehabilitation Package was launched by the Government of India to mitigate the distress of farmers in selected 31 districts of the Country from where large numbers of Suicide cases by the farmers were reported. In Karnataka, the 7 districts viz Belagavi, Vijayapura, Shivamogga, Chikkamagalur, Chitradurga, Hassan and Kodagu were identified as drought prone districts. The cumulative expenditure incurred under PM's Special Package till September 2013 is Rs. 942.39 crore and anticipated expenditure for the year 2013-14 is ₹. 2380.54 crores.

Special Development Plan (SDP): In order to develop 114 backward taluks identified by Dr. Nanjundappa Committee report schemes like Jalasiri (Construction of water harvesting structures), Special Component Plan for SDP and non SDP taluks (development of land belonging to Schedule caste farmers), Tribal Sub Plan for SDP and non SDP taluks (Development of land belonging to scheduled tribes farmers), and Development of Saline and Alkaline waterlogged area are implemented in the State. Financial progress of ₹.809.28 crore has been achieved.

District-wise details of Minor irrigation tanks in Karnataka

	District	Tanks under T.D.B < 4 ha.	Tanks under Z.P 4 -40 ha	Tanks under M.I >40ha	Total tanks	No. of Wells (1975)
1.	Bengaluru	98	395	67	560	7,674
2.	Bengaluru Rural	435	890	206	1,513	25,782
3.	Turnkur	441	1,200	381	2,022	33,427
4.	Kolar	1,489	2.461	336	4,286	48,919
5.	Chitradurga	8	133	166	307	12,812
6.	Davanagere	76	255	89	420	4,219
7.	Shivamogga	2,303	3,414	327	6,044	1,077
8.	Mysuru	557	565	99	1,221	2,650
9.	Chamarajnagar	2	87	64	153	5,497
10.	Mandya	224	692	50	966	5,961
11.	Hassan	2,502	2,933	174	5,609	1,826
12.	Chikkamagaluru	1,122	1,624	122	2,868	1,737
13.	Kodagu	434	679	33	1,146	65
14.	Dakshina Kannada	13	129	2	144	14,565
15.	Udupi	88	443	4	535	15,273
16.	Ballari	39	101	61	201	5,885
17.	Koppal	0	20	44	64	5,071
18.	Raichur	332	223	53	608	4,849
19.	Kalaburagi	76	311	134	521	13,429
20.	Bidar	0	15	80	95	11,309
21.	Bagalkot	0	0	49	49	10,913
22.	Vijayapura	0	0	92	92	27,487
23.	Gadag	0	4	23	27	4,038
24.	Dharwad	408	496	107	1,011	754
25.	Haveri	721	1,139	262	2,122	4,567
26.	Uttara Kannada	2,258	932	87	3,277	18,905
27.	Belgaum	117	490	210	817	43,264

Medium Irrigation Projects Under the Control of Minor Irrigation

Name of the Project		District	Year of	Cost in Rs. lakhs	Atchkat (in ha)
I	**South Zone**				
1)	Gundamgere,	Bengaluru (R)	1980	28	405
	DoddabllapurTq				
2)	Kanva, Channapatna Tq	Bengaluru (R)	1946	35	2,076
3)	Gayathri, Hiriyur Tq	Chitradurga	1963	40	2,005
4)	Narayanapura	Chitradurga	1961	34	1,924
	Challakere Tq				
5)	Sangenahalli, JagalurTq	Davanagere	1958	43	648
6)	Ambligola, ShikaripurTq	Shivamogga	1964	116	2,955
7)	Anjanapur, ShikaripurTq	Shivamogga	1936	21	6,736
8)	Mangala, Kunigal Tq	Tumkuru	1970	60	850
9)	Marconahalli, Kunigal Tq	Tumkuru	1940	35	4,560
10)	Sonnaikanahalli	Tumkuru	1957	21	405
	Kunigal Tq				
B.	**North Zone**				
11)	Areshankar	Vijayapura	1957	22	1,255
	Basavana Bagewadi Tq				
12)	Kalaskop, Bagalkot Tq	Bagalkot	1960	25	1,143
13)	Nagathana, Vijayapura Tq	Vijayapura	1961	15	650
14)	Ramenahalli, Sindagi Tq	Vijayapura	1958	42	1,943
15)	Chitwadgi, Kushtagi Tq	Koppal	1971	41	890
16)	Dharma, Mundagod Tq	Uttara Kannada	1964	133	5,668

Completed Major and Medium irrigation projects

	Project	Basin	Year of completion	Utilisation in time	Irrigation in ha
A	**Major Projects**				
1.	Cauvery Anicut Channels	Cauvery	1900	57.70	77,172
2.	Krishnarajasagar	Cauvery	1944	61.20	79.312
3.	Nugu	Cauvery	1959	7.7	10,526
4.	Ghataprapha I & II	Krishna	1980	32.45	1,39,383
5.	Tunga Anicut	Krishna	1956	11.50	8,704
6.	Vani Vilas Sagar	Krishna	1908	8.2	9,190
7.	Vijaynagar Channels	Krishna	1600	12.05	12,210
	Total (1) Krishna Basin			86.70	2,06,991
	(2) Cauvery Basin			126.60	1,67,010
	Major Projects Total			**213.30**	**3,74,001**
B.	**Medium Projects**				
1.	Ambligola	Krishna	1964	1.40	2,955
2.	Anjanapur	Krishna	1936	2.50	6,736
3.	Areshankar	Krishna	1957	0.38	1,255
4.	Bachanki	West-flowing	1974	0.52	1,776
5.	Bhadra Anicut	Krishna	1923	3.10	4,466
6.	Byramangala	Cauvery	1945	1.00	1,619
7.	Chandrampalli	Krishna	1972	1.90	5,223
8.	Chikkahole	Cauvery	1969	0.70	1,650
9.	Chithwadgi	Krishna	1971	0.26	891
10.	Dharma	Krishna	1964	2.20	5,668
11.	Gayathri	Krishna	1963	0.45	2,305
12.	Gokak Canal	Krishna	1897	1.40	5,757
13.	Gundal	Cauvery	1980	1.40	4,048
14.	Hagari Bommanahalli	Krishna	1978	2.00	2,966
15.	Hathikoni	Krishna	1973	0.50	2,145
16.	Hebbala	Cauvery	1972	0.40	1,214
17.	Jambadahalla	Krishna	1968	0.70	1,538
18.	Kalaskop	Krishna	1960	0.33	1,143
19.	Kanakanala	Krishna	1975	0.40	2,064
20.	Kanva	Cauvery	1946	1.20	2,076
21.	Kolchi Weir	Krishna	1953	0.53	1,275
22.	Mangala	Cauvery	1970	0.60	850
23.	Marconahalli	Cauvery	1941	4.00	4,560
24.	Nagathana	Krishna	1961	0.08	650
25.	Nallur Amanlkere	Cauvery	1987	0.40	1,300

26.	Narayanapur	Krishna	1961	0.60	1,624
27.	NarihaUa	Krishna	1979	0.90	1,512
28.	Rajolibanda	Krishna	1960	1.20	2,380
29.	Bamanahalli	Krishna	1958	0.44	1,943
30.	Soudagar	Krishna	1987	0.26	1,417
31.	Suvamavathy	Cauvery	1984	3.60	2,833
32.	Teetha	Palar	1987	0.36	1,214
	Total (a) Krishna basin			21.53	59,913
	(b) Cauvery basin			13.20	20,150
	(c) West flowing			0.52	1,776
	(d) Palar			0.36	1,214
	Medium Projects Total		35.61	35.61	79,053
	Major and Medium Projects			248.91	4,53,054

Source : Irrigation in Karnataka, 1999-2000, Irrigation Department, Government of Karnataka.

Financial and potential progress of on-going Major and Medium Irrigation Projects

		Financial (₹. in crores)		Potential (in ha)	
SI. No.	Name of the Project	Latest cost	Expendi-ture upto March 2000	Ultimate potential	Potentioal created upto March 2000
A	**Krishna Basin**				
I.	**Major projects**				
1.	Upper Krishna I & II	9,066.21	5,329.84	6,22,020	3,07,181
2.	Hippargi	524.21	37.75	59,690	
3.	Ghataprabha III	871.00	425.13	1,78,064	48,487
4.	Malaprabha	703.71	559.96	2,18,191	1,76,074
5.	Bennithora	195.42	164.15	20,236	8,302
6.	Bhadra	170	167.43	1,05,570	1,05,570
7.	Tungabhadra LBC	319.09	259.30	2,44,381	2,44,199
8.	Tungabhadra RB HLC	79.48	50.29	80,910	70,439
9.	Dudhganga	110.00	12.57	19,668	-
10.	Markandeya	134.53	21.32	32.375	-
11.	Ramthal lift	114.05	.	22,260	-
12.	Bhima flow	185.18	0.49	42.170	-
13.	Bhima Lift	153.00	5.00	24.282	-

14.	Upper Tunga II	832.46	39.40	94,700	-
15.	Singatlur	123.00	19.06	20.241	-
	Total Major	**13,581.34**	**7,091.69**	**17,84,758**	**9,60,252**
II.	**Medium Projects**				
16.	Amarja	97.50	89.74	8,903	6,639
17.	Lower Mullamari	115.00	101.77	9,713	2,611
18.	Hirehalla	120.81	112.90	8,103	-
19.	Maskinala	38.50	32.78	2,833	-
20.	F.C. to Ranikere	9.49	9.49	3,328	283
21.	Gandhorinala	153.00	26.16	8,094	.
22.	Itagi Sasalwad	12.15	0.53	5,700	-
23.	Upper Mullamari	19.92	19.65	3,279	3,279
24.	Basapur	14.02	1.05	2,276	
25.	Hodirayanahalla	11.87	0.47	-	-
26.	Kagna	51.91	- .	7,689	-
27.	Harinala	30.60	19.38	4,370	-
Total Medium		**14,256.11**	**7.505.61**	**18,48,866**	**9,73,064**
B.	**Cauvery Basin**				
I.	**Major Project**				
1.	KRS Modernisation	390.00	248.14	2,125	-
2.	Harangi	373.00	292.72	53.538	42,682
3.	Hemavati	2,100.00	1,431.49	2,83,596	1,89,194
4.	Kabini	480.00	356.24	87,900	41,083
5.	D. Devaraj Urs Canal	255.00	230.28	32,376	395
6.	Yagachi	239.79	115.43	21,450	1,995
	Total Major	**3.837.70**	**2.674.30**	**4.80.985**	**2.75,349**
II.	Medium Projects				
7.	Manchanabele	67.50	66.31	3,845	1,288
8.	Votehole	47.50	40.29	7,487	7,487
9.	Arkavati	106.50	57.26	6,232	"

10.	Chiklihole	17.35	17.14	1,184	526
11.	Iggalur	70.00	44.29	4,047	3,369
12.	Kamasamudra	18.00	16.28	3,104	800
13.	Hutchnakoplu	19.80	10.89	2,300	-
14.	Uduthorehalla	144.01	102.55	6,273	-
15.	Taraka	51.00	26.66	7,090	7,090
16.	Nanjapur	28.40	2.15	4,050	-
	Total Medium	570.15	383.82	45.612	20.560
	Total Cauvery Basin	**4,407.85**	**3,058.12**	**5,26,597**	**2,95,909**
C.	**Godavari Basin**				
	I. Major				
	1. Karanja	340.00	252.17	35,614	15,580
	II. Medium				
	2. Chulkinala	65.70	59.21	4,047	4,047
	3. Manjara Lift	93.21	-	2,752	-
D.	**Other Basins**				
	I. Major				
	1. Varahi	122.50	21.28	15,702	-
	II. Medium.				
	2. Mahadayi	180.76	-	-	-
	Total Major	17,881.54	10,039.44	21,37,059	12,51,181
	Total Medium	1,518.89	856.95	1,16,519	33,372
	Grand Total	**19,400.43**	**10,896.39**	**24,33,578**	**12,84,553**

Source Irrigation in Karnataka, 1999-2000, Irrigation Department, Government of Kamataka.