

**Government of Karnataka**

**Watershed Development Department**

**Annual Report 2014-15**

**OUR VISION**

- To be counted among the most Professional. Pioneering, Innovative, Dedicated and Farmer- Focused Watershed Development Department in the nation
- To have sustainable development of land resources in the rainfed / degraded areas of rural Karnataka to enhance their productivity.
- To achieve the goal of sustainable development through participatory approach of stakeholders in watershed development programme and enhance livelihood opportunities of the people living in the rainfed / degraded areas.

**OUR MISSION**

Our mission is to develop, promote and implement through participatory approaches, a decentralized, cost Effective/productive, transparent and sustainable Watershed treatment package;

- to meet rural livelihood needs
- to enhance employment and income opportunities for the poor,
- to improve the productive potential of natural resource base,
- to reduce the poverty and natural resource degradation

## **INTRODUCTION**

India is one of the major agricultural countries with more than 65% 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. According to estimates of 2008 the agriculture sector contributed 17.2% of India's GDP, and providing employment to around 58.2 percent of the work force.

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% of the cropped area in Karnataka depends upon low and uncertain rainfall. The geographical area of the State is 190.50 lakh ha. of which 129.70 lakh ha. is available for watershed development. Upto the end of 2014-15, 65.49 lakh ha is already treated, and 64.21 lakh ha. is yet to be treated.

### **Importance of watershed development in Karnataka:**

The land resources of Karnataka, especially its dry drought prone lands, which comprises more than 79 % 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 rainfed environments, agricultural extension services, and access to markets, credit and input supplies in rain fed areas.

Karnataka has the highest proportion (79 %) 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.

#### **Area scenario for development on watershed concept in Karnataka**

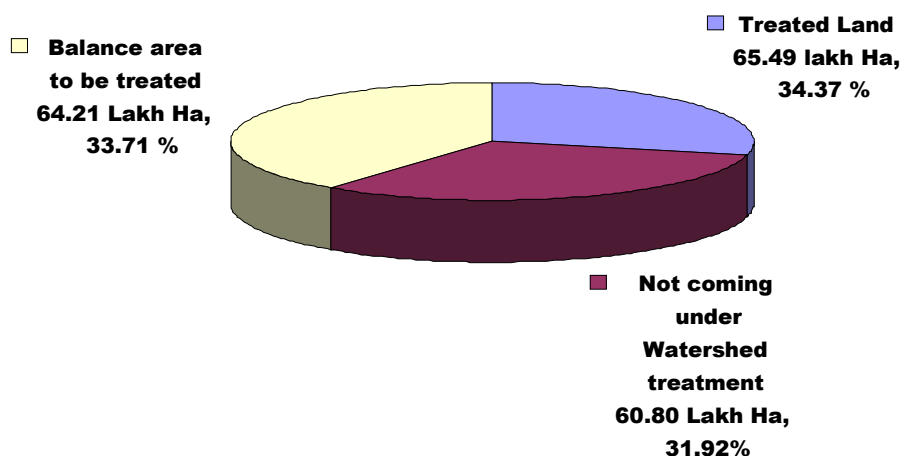
- Total geographical area : 190.50 lakh ha
- Total area available for treatment : 129.70 lakh ha
- Total area already treated : 65.49 lakh ha
- Balance area to be treated : 64.21 lakh ha
- Area not available for treatment : 60.80 lakh ha

### **Watershed Treatment Status in the State**

**Total Geographical Area : 190.50 Lakh Ha)**

**(Area available for Watershed Treatment 129.70 Lakh Ha.)**

**(As on March 2015)**



### **AIMS AND OBJECTIVES OF THE WATERSHED DEVELOPMENT PROGRAMMES**

1. Improving agricultural productivity.
2. Improving vegetative cover.
3. Increasing milk and horticulture production.
4. Increasing fodder and fuel availability.
5. Reducing soil erosion, runoff and nutrient loss.
6. Improve water availability at surface and ground.
7. Increasing household income.
8. Enhancing quality of life among local communities.
9. Local institutional development through community based organizations.
10. Ensuring institutional support by Watershed Development Department as facilitator and by NGOs for community organization and strengthening.

## **CHAPTER-I**

### **History of watershed Development:**

#### **A. Pre-Independence Era:**

Soil conservation and land development activities have been in practice, since the art of agriculture was initiated. Kings, Emperors and Rulers of the ancient India have taken up such activities like construction of village ponds, tanks and road side plantations. The British imperial Government took steps to control the problem of soil erosion and water conservation. The Royal Commission constituted by the Imperial Government suggested several measures to combat the severe droughts prevailing in the country. Recommendation for establishment of dry land research stations was the most important among other measures of the Government. Out of the Five Dry land research stations (DLRS) established in the country, three were established in Karnataka at Vijayapura, Hagari and Raichur. These centers have given paramount importance to soil and water conservation research and developed techniques for effective soil and water conservation in the semi-arid region.

#### **B. Post – Independence Era:**

##### **1. Phase-I. Conventional Soil and water Conservation period: ( up to 1970)**

During the 1<sup>st</sup> Five Year plan (1951-1956), scientists and planners were very much aware of the soil erosion problems existing in the country, but the scientific solutions to tackle these problems were not available at that time. Therefore, the Government had established nine Soil conservation research demonstration and training centers in the country during 1<sup>st</sup> and 2<sup>nd</sup> Five year plans and one such centre was established in Bellary (1954) in Karnataka. The focus was on development of soil and water conservation techniques to support farming in arid and semi-arid regions for effective soil erosion control and *insitu* moisture conservation. Mysore State Government passed an Acts and rules for land improvement during 1960s and further the Government of India also launched River Valley Projects in the year 1962.

The projects and programmes of soil and water conservation remained as Government programmes, without peoples participation and without integration of other sectors like horticulture, forestry and animal husbandry.

##### **2. Phase-II. Integrated Approach for Soil and water Conservation: ( 1970 to 1985)**

During 1970's rain fed agriculture was given importance and at the same time, the idea of multi-disciplinary approach to tackle the problems of dry land farming was also conceived. ICAR started All India Co-ordinate Research Project for Dry land Agriculture during 1971 and in Karnataka AICRP for Dry land was started in three places, namely GKVK-Bangalore, ARS-Vijayapura and CSWCRTI-Bellary. Later, the Operational Research Projects were established to disseminate the research results to the farmer's field. Govt. of India launched DPAP (1973-74) to tackle problems faced by those areas constantly affected by severe drought conditions with an objective of taking up drought proofing measures. Again, during 1977-78, DDP was started based on recommendation of National Commission on Agriculture in its reports (1974 and 1976), to mitigate the effect of desertification and adverse climatic condition on crops, human and livestock population.

During this period also, the Soil and water conservation activities were lacking people's participation, even though it attained momentum for integrated approach for watershed development.

### **3. Phase-III. Consolidation of Co-ordination / Integration and initiation of the concept of Peoples Participation: ( 1985 to 2000)**

The projects under phase 2 amply demonstrated potential of dry land technologies using integrated approach in watershed development. However, implementation suffered due to lack of co-ordination among different sectors. Therefore to address these problems of co-ordination, World Bank assisted projects like Kabbalanala Watershed Project (1984) was implemented, where the officers from Agriculture, Horticulture and Forest Departments were brought together under a single administrative leadership of Project Director. Government of Karnataka established four Dry Land Development Boards (DLDBs) at Revenue Divisions to implement the District Watershed Projects. A State Watershed Development Cell (SWDC) was also set up at State level headed by a Director, to co-ordinate the activities with policy makers and other development Departments in respect of technical, financial and administrative problems.

Projects like NWDP (1985) and NWDPRA (1992) were launched by GoI. Dr. Hanumantha Rao Committee (1993) was also constituted to identify the strategies to improve the implementation efficiency of Area Development Programmes like DPAP , DDP and IWDP. Dr. Hanumantha Rao's Committee recommended for providing responsibility to local peoples institutions, in planning, execution and maintenance of watershed projects (1995).

Watershed development approach has undergone a transformation to make it stronger. On one hand, the watershed development approach has been consolidated on the principle of integration and co-ordination, but on the other hand, the people's participation has not gained the expected momentum.

### **4. Phase-IV. Watershed Development Department(WDD): ( 2000 onwards)**

Soil and water conservation, a pre-requisite for the farming sector to flourish, started with a massive field bunding programme, which has undergone a horizontal and vertical transformation up to year 2000 and Karnataka State Dept of Agriculture (KSDA) was the nodal agency. The Watershed Development Department was started during the year 2000 to make the watershed development a more professional and to implement the watershed programmes on more co-ordinated and in an integrated manner. The concept of peoples participation was refined, redefined and strengthened by way of restructuring the guidelines for implementation of NWDPRA ( Jana sahabhagithva 2002) and Area Development Programmes like DPAP / DDP / IWDP ( Hariyali 2003) by GoI. Even though initially all the watershed development projects implemented by KSDA were transferred to WDD, the projects of ADP were also transferred to WDD, later in the year 2005.

### **Creation of Watershed Development Department in Karnataka:**

In the background of growing population in the State with a consequent increasing demand for foodgrains, was strongly felt for bringing large tracts of rain fed / dry land area (nearly 79%) under watershed treatment to increase productivity. Different Departments like the Agriculture, which was implementing different soil and water conservation programmes and watershed projects, the RD&PR implementing various rural development programmes having, watershed concept as a component through Panchayath Raj Institutions, the Horticulture, Forest, and Animal Husbandry Departments were also carrying out various watershed programmes. In addition, there is also a component of non-land based activities in watershed development and participation of NGOs and village committees. Therefore the GoK considered various aspects including commitment given in the context of an externally aided project and decided that better co-ordination in planning, implementation and supervision would be achieved by setting up a separate department of watershed with multi disciplinary

teams. With this prime aim, to develop watershed in an integrated and co-ordinated manner, the Government of Karnataka created Watershed Development Department vide order **AHD: 206:AML.94 (Vol-III) dated 31.12.1999** and it came into effect from **1.4.2000**. This Department is given the responsibility of coordinating the formulation, planning and execution of different activities of agriculture, soil conservation, afforestation, horticulture, livestock, pasture development and income generation activities etc., in an integrated manner on the watershed concept.

## **CHAPTER-II**

### **TREATMENT INTERVENTIONS**

#### **Social mobilization and capacity building:**

**People's participation and community organization is mandatory for Watershed Development Programmes**

#### **Participatory watershed Treatment:**

People's participation is the key to effective and sustainable watershed development programmes. This will not only ensure long term sustainability of the watershed development process through ownership of the programmes but also empower the watershed communities to initiate activities on their own and take optimal advantage of other ongoing developmental programmes. The participatory approach enhances implementation ability at the local level and create community infrastructure for micro-watershed projects.

One of the main objectives of watershed programmes in Karnataka is to strengthen the capacities of communities for participatory involvement in planning, implementation, social and environmental management, and maintenance of assets arising from local level development programmes. In watershed programmes, social mobilization process involves the following activities.

1. **Awareness creation:** The various awareness building activities like house visits, group meetings, grama sabhas, street plays, jathas, video-shows, wall paintings, animal health camps, hasiru habba, PRA exercises etc. are conducted at the village level with the assistance of NGOs.
2. **Entry point activities:** To meet the desire and felt needs of the community and to develop rapport with people, some of the infrastructural activities like drinking water and sanitation systems, community buildings, school buildings, cattle troughs etc. were taken up to initiate people participation in watershed development.
3. **Community Based Organizations (CBOs):** Community based organizations like Self Help Groups (SHG), User Groups (UGs) and Watershed Committees (WC) are formed at each micro-watershed. The Poor and vulnerable people are organized into SHGs and land owning farmers are organized into UGs. The watershed committee mainly consists of representatives of SHGs, UGs, and PRIs. Watershed Development Department gets support from NGOs for community organization and Capacity Building.



**Self Help Groups**



**User Groups**



**Executive Groups**

## **Soil and water Conservation measures**

The most serious forms of soil erosion in Karnataka are sheet, rill and gully erosion. The estimated annual soil loss is 4 to 10, 14 to 65, 30 to 40 tons per ha. in red, black and lateritic soils, respectively. Such soil loss apart from removing fertile top soil, reduce the rooting depth and adversely affect moisture storage and thereby the crop yields. The large quantity of eroded soil deposited in tanks, reservoirs, streams and river beds and reduce their storage and carrying capacities. Soil erosion depends on various factors like rainfall, soil type, vegetation and land use. Mechanical as well as vegetative measures are used for soil and water conservation. The important principles that are kept in view in planning erosion control measures are:



1. Time of concentration of run off water should be increased to allow maximum absorption.
2. Long slopes should be divided into several short ones to reduce the velocity of run off water to non-erosive value.
3. Rill formation should be prevented
4. Measures must be simple and have relatively low cost for easy adoption.

## **Land Management Practices**

### **1. Arable land treatment**



**1.1 Contour Bunds:** These are trapezoidal earthen or loose-boulder embankments

Constructed on contour. These bunds intercept runoff and hold the water for subsequent absorption and thereby conserve soil and moisture.

Waste weirs are normally provided by using loose stones properly embedded in soil to avoid scouring / under cutting and to drain the excess water accumulated against bund.

**1.2 Field bunds:** These are the earthen embankments constructed along the boundary lines of the individual farmers plot to conserve the soil and moisture in his plot itself.

**1.3 Trench-cum-pit method of bunding:** It is a newly evolved bunding type, where in the earthen embankments constructed with a 5 mtr length x 1 mtr width x 0.6 mtr depth trenches and by leaving 0.6 mtr in between trenches. More runoff water can be stored, thereby more water infiltrates into the soil and provides moisture for longer period to the development of vegetation.





**1.4 Contour strip** - Contour strip formed in the areas where rainfall is less, gentle slope with less infiltration. This is to increase the moisture infiltration rate. Within the two contour strips small size bunds with bund former are also made

**1.5 Boulder bunds:** This is a bund across the slope constructed by using locally available stones / boulders in the sand mixed soils and in the shallow soils. This is an alternative to the contour bund, where there is no enough soil to form bunds.

**1.6 Graded bunds:** These are trapezoidal earthen embankments constructed on grade across the major slope. These bunds are taken up in areas receiving annual rainfall of more than 750 mm, where runoff is high and surplussing is essential.

**1.7 Vegetative bund/ Vegetative check** - A live vegetative barrier on the contours is made which will decrease the velocity of rain water in turn soil erosion is controlled. These checks could also be formed in between the contour bunds also.

**1.8 Water ways** – These are formed along the slope for safe disposal of excess rain water from cultivable areas to nalas. Grass is also grown in the water ways to avoid further scouring

**1.9 Farm ponds:** Farm ponds are opened across the water ways by digging the soil. The excess rain water is harvested and the harvested water is used for various activities like giving protective irrigation to vegetables and orchards including drinking water to animals and birds.



## INTERBUND MANAGEMENT PRACTICES

- Fall ploughing.
- Land leveling to avoid local stagnation
- Vegetative barriers - Khus/Subabul/Dicanthium across slope at 10 to 15m interval
- Deep tillage
- Adoption of ridges and furrows, Beds across slope
- Small bund (0.18 sq. m) or (0.09 Sq.m) at 10m / 15m interval across slope
- Vertical mulching

## 2. Non-Arable Land Treatment

Treatment of non-arable land has been inevitable to reduce the runoff and to create water storage at field level. They help to distribute moisture uniformly on sloping land so that natural vegetation grows successfully and restores the bio-diversity.

**2.1 Contour Trench / 'V' ditches:** These are trenches / V-ditches dug on contour in non-arable lands of more than 3% slope to hold run off for conservation and reducing erosion. They are established for development of trees and grass species and are adoptable in areas with annual rainfall of up to 950 mm.



**2.2 Pits with Crescent - shaped bunds:** These consist of staggered rows of pits with crescent-shaped bunds for planting trees and are adoptable in non-arable lands having less than 3% slope in areas with annual rainfall of less than 950 mm.

**2.3 Catch pits:** These are large pits dug at rill points and in waterways to trap runoff water. They are adoptable in hilly lands with rock outcrops.





**2.4 Continued contour trenches:** Trenches are opened at a distance of 5 to 10 meters with 0.45 meter depth and 0.6 meters width in the areas where annual rainfall is less than 750 mm. The rain water is collected in the trenches and then the plants could be planted.

**2.5 Staggered contour trenches:** These are opened where there is undulating soil slope with humps.

**2.6 Graded contour trenches:** These trenches are made in the black soil areas where rainfall is more than 750 mm, for safe disposal of excess water and forest plants are planted.

**2.7 Water recharging pit:** The pit is opened in the uncultivable area in the direction of diversion channels / water ways or near by areas where there is flat lands. Dry stone pitching on the three sides of up stream side also be done.

**2.8 Diversion channel:** Diversion channel is formed to avoid the rain water that flows from pasture lands, hills areas, and forest areas into the cultivable area. A drain across the slope is opened for safe disposal of water.



District: Shimoga; Taluk: Shikaripura  
Lat: N14° 16' 11.09"; Long: E75° 26 ' 26.61"

### **3. Drainage line treatment**

#### **3.1 Upper reaches treatment**

**3.1.1 Vegetative checks:** Sod-forming grasses like *Cynodon dactylon*, *Digitaria* and *Dicanthium* are planted. In some cases trees and shrubs such as *Ipomoea cornea*, *Vitex nigundo*, agave, *Saccharum munja* and bamboo are also recommended.

**3.1.2 Vegetative filter strips:** These are made to reduce the velocity of rain water coming from hills, forest area across the slope at intercepting areas where cultivable and uncultivable areas joins. Once the vegetative strips are grown fully it will act as a barrier to check the flow of water from slopes and soil erosion is controlled. The different types of filter strips are sod strips, sodded earthen strips and shrub checks. The locally available Agaves, lavancha, Jatropa, Pongamia etc could be used as vegetative checks.



**3.1.3 Boulder checks:** These are porous checks across the gully constructed using boulders to check water velocity and to arrest silt.

**3.1.4 Rubble Checks:** Rubble check is constructed where the gully width is upto 10 meter and depth is 1 to 3 meters with a vertical interval of 2-2.5 meters. The catchments area considered is from 8 to 15 hectares. This will controls soil erosion and silt flow. Agaves row could also be planted on up stream and down stream side at a distance of 0.3 meters.



**3.1.5 Brush wood checks:** These are porous checks constructed across the gully with wooden pegs and brush wood and are adoptable in all areas.

**3.1.6 Gabions:** These are dams made of wire-woven baskets filled with stones placed in trench of suitable size across steep-sloped gullies to trap erosion debris during rains. They are adoptable in all areas of high slopes and high rainfall.

**3.1.7 Water recharge pit:** Pit is opened in the soils where there is less water infiltration rate. The pit is opened in the gentle slope nalas / gullies where the upper reaches are already treated so that there is less scope of siltation. These should be opened preferably adjacent to open walls or bore wells.



**3.1.8 sunken ponds:** The rain water flowing in gully will be collected in sunken pond so that the moisture percentage in the surrounding area is increased. The excavated soil is put as bund so that water storage is increased.

### **3.2 Middle reaches treatment:**

**3.2.1 Dry stone checks/ Rock filled dam:** These structures are constructed where there is no necessity of impounding more water and to avoid further scouring. These are constructed at the points where gullies join and of serious nature. The availability of stones should be within 40kms distance.

### **3.3 Lower reaches treatment:**

**3.3.1 Check dams:** These are stone masonry structures constructed across deep nala with the objective of controlling runoff water, reducing sedimentation of tanks and reservoirs, providing protective irrigation, drinking water for the cattle and wild life and to recharge underground water table.



Dist: Bellary; Taluk: Hadagalli  
Latitude- 15° 02' 570"; Longitude- 75° 56' 317"



Dist: D K; Taluk: Mangalore (Shirihady GP)  
Lat - 13 ; 59 ; 18.27199; Long - 75 ; 21; 26.798 4.31

**3.3.2 Vented dam:** Cement masonry work taken up in the high rainfall areas. The vents are provided to allow the water flow during the rainy season and store water after the rainfall ceases. Wooden Planks are provided to close the vents. The stored water is used for irrigation.

**3.3.3 Nala bunds:** This structure consists of homogenous earthen embankment constructed across the nalas and valleys in arable and non-arable lands to store run-off for recharging ground water and make water available for social and agricultural use at surface level.



District: Belgaum; Taluk: Hukkeri;  
LAT: N 16° 51' 431"; Long: E 75° 14' 110"



District: Belgaum; Taluk: Ramdurga;

**3.3.4 Percolation tank:** This is also Nala bund but with stone, cement masonry outlet to drain the excess water. This is opted where there is less scope for cut-out let.

### **Alternative Land use systems**

Alternative land use systems like silvi-pasture, horti-silvi-pasture, agro-forestry and agri-horticulture not only serve the purpose of conserving soil and moisture and arresting land degradation but also meet other demands of the rural community including off - season employment. These systems improve vegetative cover in the areas, bring about favourable changes in the microclimate, reduce run off and improve soil moisture and soil health. They could be used to help generate raw materials for various cottage industries apart from meeting the basic needs of the community.

## **FORESTRY**

Upto 20% of the project fund is usually earmarked for agro-forestry & afforestation by planting multi purpose tree species including models like block plantation & community land afforestation. Emphasis is given for planting of multi purpose tree species preferred by farmers for fuel, fodder, fruit, manure & other uses. Bio-fuel trees like pongamia & neem are being encouraged. The residual oil cake can also be used as good bio-fertilizer.

**AGRO-FORESTRY:** It is the system of growing multi purpose woody perennials along with annual agricultural crops. The multi purpose trees are planted on field boundaries and along the inner bunds, preferably those running east-west to avoid shading. A density of 100 plants per hectare is maintained. The multi purpose woody perennials selected should have economic value in terms of fodder, fruit, green manure, fuel, fiber and timber. The perennials should be maintained by lopping the side branches to reduce competition with companion crops.



**BLOCK PLANTATION (Afforestation & Reforestation):** Raising of forest tree plantations on lands which were not covered with forest and were reduced to scrub due to biotic interference. This may be undertaken to

1. Conserve Soil & Moisture in denuded barren lands, Ravines & other waste lands ,to meet the local demands for economic utilization of land
2. Landscape for recreation and conserving flora & fauna.

### **Multi purpose Tree Species**

<b>Fast Growing Species</b>	<b>Fruit trees</b>	<b>Timber trees</b>
<b>1. Acacia sp</b> <b>2. Ailanthus excelsa</b> <b>3. Albizo lebbek</b> <b>4. Azadirachta indica</b> <b>5. Cassuarina equisetifolia</b> <b>6. Dalbergia sisso</b> <b>7. Gliricidia sepium</b> <b>8. Grewilia robusta</b>	<b>1. Anacardium occidentale</b> <b>2. Annona species</b> <b>3. Artocarpus heterophyllus</b> <b>4. Emblica officinalis</b> <b>5. Tamarindus indica</b> <b>6. Ziziphus species</b> <b>7. Sapindus species</b>	<b>1. Tectona grandis</b> <b>2. Dalbergia sisso</b> <b>3. Madhuca species</b> <b>4. Pterocarpus species</b> <b>5. Terminalia species</b> <b>6.. Bamboos</b>



During 2014-15 totally 74.295 lakh plants have been planted by treating 69,708 lakh hectare of land. This year Rs.3495.94 lakh has been spent for forestry works.



## HORTICULTURE

**Dryland Horticulture:** Horticulture Sector plays an important role in the development of watershed area by the concept of dry land horticulture. The growing of suitable perennial dry land horticultural crops not only brings soil and water conservation insitu, but also makes best use of available moisture. This creates an eco-friendly environment in addition with generation of rural employment opportunities. The planting materials of suitable horticultural crops like fruit, flowers and perennial Vegetable crops are supplied and planted in the identified beneficiaries' lands. The beneficiary would start getting income from these crops after 2-6 years of planting depending upon the crop.



**Agri-Horticulture:** This is the practice of cultivating perennial fruit crops along with annual field crops and is particularly useful for marginal and small farmers. The fruit species are planted in the water-receiving areas of zing terraces, on boundary bunds & on the inner bunds with wide spacing so as to allow cultivation of annual agricultural crops.

Inter crops provide returns to farmers in the initial years, while perennial horticultural crops start yielding at later stages.

**Horti-Silvi-Pasture system:** This constitutes the practice of growing forest and horticulture tree species along the forage crops and is adaptable in all marginal and sub-marginal lands of both private and common lands. The selected tree species should have fruit/fodder/fuel/timber value based on the individual/community needs. High density planting of a mixture of species is done with appropriate planting techniques. The inter space is covered with forage legumes and grasses, preferably shade loving. The crops suitable for rainfed orchard should be deep rooted, perennial in nature, hardy and tolerant to vagaries of monsoon and adverse climatic condition and should have low water requirement to produce maximum bio-mass.

### **Home stead/School garden and vegetable minikit programs:**



It is one of the important programme, which is being implemented in watershed area. Vegetable minikit and suitable fruit crop saplings are distributed to all the section of farmers. The beneficiary's family members get nutritive food at least by consuming the produce of this minikit throughout the year. They also earn small portion of income by selling vegetables and fruits.

### **Bund sowing of Horticulture Seeds:**

The suitable horticulture crop seeds such as vegetable and fruit seeds are sown all along the bunds under this programme. This practice strengthens the bunds against rain and wind associated erosion. It not only brings additional income by selling the produce but also improves the nutrition status of the community by consuming the fresh produce in their daily diet.



### **Under Production System:**

A new concept of Production technology of Ultra High Density Orchard in Mango, Guava, Jambulina, Tamarind, Custard Apple & Cashew has been introduced to adopt in farmers field based on technical feasibility.

Drum irrigation & Water Bag kit installation programme has been undertaken to increase the survival of the Horticultural Plants during the scarcity of water.

During 2014-15 an area of 10904 hectare has been treated with various horticulture crops at the cost of Rs. 1833.00 lakhs under horticulture sector.



## **LIVESTOCK**

Animal Husbandry is an important activity in farming which helps in providing food security. In integrated farming, livestock rearing helps in organic farming and to enhance soil fertility. Livestock rearing depends on the type of feed and fodder. In order to prevent soil erosion by over grazing stall feeding is promoted in watershed areas by constructing cattle sheds.

In order to bridge the gap in fodder scarcity, fodder development and demonstrations are taken up in the watershed areas.



Animal Health Camps are conducted in each micro watershed twice in a year to improve fertility status of the animals and to prevent parasitic and communicable diseases in livestock.

Fodder development activity in the year 2014-15 has been taken up in 566 Ha. Producing around 16,980 tons of green fodder.

In the year 2014-15 a total of 110 Animal Health Camps have been conducted in different schemes. In these Animal Health Camps vaccination against communicable diseases, parasitic dosing and infertility treatment has been carried out. Mineral mixture has been distributed to improve health status of the animals and to enhance production. Demonstration of Enrichment of fodder and extension activities were also carried out at the time of conducting these Animal Health Camps.



## FISHERIES

Some of the Water Harvesting Structures constructed in the watershed programmes will have water storage for a longer period. Such storage structures are ideal for taking up fish culture. The Utilization of stored water for fish culture, it will improve the quality of water and making it more fertile (due to manuring). The activity results in better utilization of available resources and nutrients for production of animal protein without reducing the quantity of stored water. So, fish culture is taken up in the water harvesting structures to generate additional protein food and thereby extra income to the farmers.

Rs.35.00 lakhs budget provision is available under this programme for the year 2013-14 with the target of 1696 farmers training and development of fisheries in 1696 water harvesting structures. Rs. 25.71 lakhs spent up to end of March-2014. This scheme is not been implemented during 2014-15. But this activity was taken up in Integrated Watershed Management Programme (IWMP).



### **CHAPTER-III**

#### **Different Watershed Development Programmes / Projects in Karnataka: Components and Progress**

##### **1. Integrated Watershed Management Programme (IWMP):**

a)	Name of the Scheme and year of introduction	Integrated Watershed Management Programme (IWMP) Started in the year - 2009-10
b)	Budget head	<b>2402-00-102-0-30</b>
c)	If plan, the Central and State share is	This scheme was implemented since 2009-10 to 2014-15 on 90:10 basis as a Central and State share. But in 2015-16 onwards 50:50 share as Central & State share. ( Rs. 12000.00 unit cost/ha in plain areas, Rs. 15000.00 unit cost/ha in desert / hilly areas)
d)	Objective of the Programme	<ul style="list-style-type: none"><li>• To conserve soil, moisture and nutrients.</li><li>• To enhance recharge of underground water</li><li>• To improve vegetation by afforestation and dryland horticulture</li><li>• To increase availability of fodder and fuel.</li><li>• To enhance agricultural productivity</li><li>• To encourage live stock production</li><li>• Formation and strengthening of community based organizations</li><li>• Providing livelihood activities for the assets less persons.</li><li>• Encouraging production systems and micro enterprises and income generating activities.</li></ul>
e)	Estimated benefit and number of estimated beneficiaries from the programme (measurable output at the end of year)	Entry point activities are implemented in the project area. It helps in the development of good rapport with local community members. It also helps in soil, moisture and nutrients conservation and enhanced the recharge of underground water. Awareness programmes were also planned in the project area. All the community based organizations were given with the basic trainings. Soil conservation, forest, horticulture, animal husbandry, livelihood and production system activities are being implemented under the project. During 2014-15 an amount of Rs. 29820.00 lakhs has been utilised and an area of 222773 ha. has been developed.
f)	Financial (Rs. In lakhs)	Rs. 71111.1111 lakhs.



**Expenditure: (Rs.In lakhs)**

2012-13		2013-14		2014-15 (Revised)	
Release	Expenditure	Release	Expenditure	Release	Expenditure
47708.08	41969.78	63531.88	51003.20	40870.00	29820.00

**Note:** Release & Expenditure includes Opening Balance

**Physical Achievements :(Units – in Hectares))**

2012-13		2013-14		2014-15	
Target	Achievement	Target	Achievement	Target	Achievement
192308	311056	396825	386441	297005	222773

Integrated Watershed Management Programme is being implemented from the year 2009-10 in 29 districts and 164 taluks of state. There are about 571 projects are under implementation in the state.

Three external agencies have been selected as per the provisions of the KTPP Act, for Monitoring, Evaluation, Learning and Documentation of the Batch-I and Batch-II projects under Integrated Watershed Management Programme (IWMP) during 2010-11. They are M/s Consulting Engineering Services India (Pvt.) Ltd., Bengaluru, M/s Karnataka State Council for Science and Technology, Bengaluru and M/s Remote Sensing Instruments, Hyderabad. Agreements have been signed between the Agencies and the CEO, SLNA during January 2011.

The Agencies have been allotted Revenue Division-wise. M/s CES, Bengaluru has been allotted Bangalore and Mysuru revenue divisions, M/s KSCST, Bengaluru has been allotted Belgavi revenue division and M/s RSI, Hyderabad has been allotted Kalaburagi division.

The external agencies for Monitoring, Evaluation, Learning and Documentation for Batch-III, Batch-IV and Batch-V projects have been selected. M/s Remote Sensing Instruments, Hyderabad –Bengaluru and Kalaburagi revenue division and M/s Karnataka State Council for Science and Technology for Mysuru division.

**2. Karnataka Watershed Development Project – KWDP II (Sujala-III)**

KWDP-II is implemented in 11 backward districts namely Bidar, Gulbarga, Yadgir, Koppal, Gadag, Davanagere, Tumkuru, Chikkamagaluru, Vijayapura, Raichur and Chamarajanagar covering 931 micro-watersheds over an extent of 4.46 lakh hect. The Government of Karnataka has accorded sanction to implement the Project vide G.O No. AD164 AML 2011 dated 05.07.2012. Subsequently on 16.07.2012 the Project was negotiated between GOK, GOI and World Bank and the World Bank Board has approved the Project Credit No.5087 IN for Rs.514.40 crores. Out of the total project cost Rs. 142.12 crores pertaining to Horticulture component is implemented by Horticulture Department. Accordingly the Project Appraisal Document (PAD) was prepared. The Project is being implemented from 2013-14 to 2018-19.

KWDP-II (Sujala-III) is not a standalone Project. The project is implemented concurrently with IWMP areas. Accordingly Batch IV, V and VI IWMP areas are proposed as KWDP-II project areas in 11 Project Districts. The KWDP II aims at providing scientific planning tools and enabled institutions leading to development of participatory Micro watershed plans. Accordingly the integration modalities have been worked out and the process diagram developed to ensure hand in hand implementation of KWDP-II & IWMP

**Details of the scheme are as follows;**

a)	Name of the Scheme and year of introduction	Karnataka Watershed Development Project – KWDP II(Sujala-III) Started in the year : 2012-2013
b)	Budget head	2402-00-102-0-28 plan (EAP)
c)	If plan, the Central and State share is	Externally aided 70% - World Bank loan 30% - State fund,
d)	Objective of the Programme	The proposed Project Development Objectives (PDO) is to demonstrate more effective watershed management through greater integration of programmes related to rainfed agriculture, innovative and science based approaches, and strengthened institutions and capacities of stakeholders at different levels.
e)	Estimated benefit and number of estimated beneficiaries from the programme (measurable out put at the end of year)	Complete details in respect of number of beneficiaries will be given at the end of the project.
f)	Financing (Rs. In Lakhs)	Rs.8652.00 Lakh

**Expenditure: (Rs. In lakhs)**

2012-13		2013-14		2014-15	
Target	Achievement	Target	Achievement	Target	Achievement
10.00	9.28	1500.00	379.36	2663.00	2600.23

During the year 2012-13 preliminary works like preparation of Project Appraisal Document (PAD), Cost Tables, Project Implementation Plan, (PIP), Financial Management Manual (FM), Procurement Manual, and Procurement Plan were brought out. The MoU and contracts were made with 12 project partners.

- 1 National Bureau of Soil Survey and Land Use Planning (NBSSLUP)
- 2 Indian Institute of Science (IISc.), Bengaluru
- 3 University of Agricultural Sciences, Bengaluru
- 4 University of Agricultural Sciences, Dharwad
- 5 University of Agricultural Sciences, Raichur
- 6 University of Horticultural Sciences, Bagalkot
- 7 Karnataka State Remote Sensing Applications Centre (KSRSAC), Bengaluru
- 8 Karnataka State Natural Disaster Monitoring Cell (KSNDMC), Bengaluru
- 9 Karnataka Veterinary Animals and Fisheries Science University (KVAFSU), Bidar
- 10 Bengaluru University
- 11 ICRISAT
- 12 University of Agricultural and Horticultural Sciences, shivamogga

The NBSS&LUP has been assigned the role of Lead Project Partner to coordinate among project partner institutions.

### **Major Highlights**

- **Partner Summit workshop** was conducted at Bangalore by WDD for all the Project partners on 08.10.2013 along with World Bank officials.
- **Brain Storming workshops** were conducted at all project districts involving all Project District Officers along with Project Partners in the month of November 2013. A detailed presentation was made in respect of objectives of the KWDP-II (Sujala III) project and activities to be undertaken in the micro-watersheds.
- Research and Extension Cell (REC) meeting conducted on 26.7.2014 to review the Research proposals received from partner institutions and recommended 16 projects for consideration by Project Planning and Management Unit (PPMU).
- National level workshop conducted during 03<sup>rd</sup> to 05<sup>th</sup> Sept 2014 on the best practices adopted in Integrated Watershed Management Programme. Delegates from different states, Sujala Project partners and World Bank team members participated in the workshop.
- World Bank team visited Watershed Development Department from 03.09.2014 to 12.09.2014. The wrap up meeting with Additional Chief Secretary & Development Commissioner, Bengaluru with World Bank team was held on 11.09.2014.
- Project Technical Cell (PTC) meeting conducted on 20.10.2014 to review the progress of work by project partners.
- Project Review meeting conducted under the chairmanship of Additional Chief Secretary & Development Commissioner, Bengaluru on 28.10.2014.
- World Bank team visited Watershed Development Department during 07.11.2014 to 11.11.2014 and reviewed the work of the project partners. The Action taken on Aid memoire is enclosed in Annexure - A
- Training programme on procurement of goods and services for the Sujala III Project was conducted by WDD on 06.12.2014 for the project partners by the Procurement Cell.
- Internal unaudited financial reports (IUFIR) training programme was conducted by World Bank and WDD on 15.12.2014 for the project partners. 44 participants attended the training programme
- Three PEC Meetings were conducted (10.09.2013, 31.05.2014, 20.01.2015 and 04.02.2015)
- The Project Planning and Management Unit meeting was held on 17.10.2014 under the chairmanship of Principal Secretary, Agriculture. 16 research proposals finalised by the Research and Extension Cell (REC) and 4 were approved by the PPMU committee. PPMU also approved annual plan of the Sujala III Project.

### **Land Resource Inventory Field Work :**

Land Resource Inventory is under progress in 7 project districts at present. So far 123 Micro watersheds have been covered for their surface characteristics. A profile was opened at every point where the slope changes. The details of which are given below.

Sl No.	District	Institution	No of Micro-watersheds (MC)
			Surface features completed
1	Chamarajanagar	UAS Bengaluru	13
		NBSSLUP	23
2	Davanagere	UAS Bengaluru	6
3	Yadgir	UAS Raichur	9
		NBSSLUP	7
4	Kalaburagi	UAS Raichur	9
		NBSSLUP	9
5	Koppal	UAS Dharwad	2
6	Gadag	UAS Dharwad	10
		NBSSLUP	22
7	Bidar	UHS Bagalakote	2
		NBSSLUP	11
	<b>Total</b>		<b>123</b>

### Soil Sampling :

One soil sample is collected from each 250 metre grid point. The details are listed below;

Sl No.	District	Institution	Fertility Samples	
			Collected	Analysed
1	Chamarajanagar	UAS Bengaluru	504	325
		NBSSLUP	602	602
2	Davanagere	UAS Bengaluru	896	504
3	Yadgir	UAS Raichur	342	150
		NBSSLUP	0	0
4	Kalaburagi	UAS Raichur	894	0
		NBSSLUP	600	600
5	Koppal	UAS Dharwad	0	0
6	Gadag	UAS Dharwad	1806	922
		NBSSLUP	0	0
7	Bidar	UHS Bagalakote	1266	0
		NBSSLUP	0	0
	<b>Total</b>		<b>6910</b>	<b>3103</b>

The soil samples are air dried and prepared for analysis in the respective partner labs for pH, EC, Organic carbon, N, P, K, secondary and micro nutrients. The profile sample analysis is taken up now.

### GIS work :

#### Maps generated through GIS by Partner institutions

The following Thematic maps namely Land use, Slope, Soil texture, Gravel content, Bore well were generated from the micro watersheds surveyed. Details are as follows:

Sl. No.	District	Taluk	No. of MCs Completed (Surface site characteristics)	No. of Maps Generated
1.	Bidar	Aurad	3	16
2.	Chamarajanagara	Chamarajanagara	5	38
3.	Chamarajanagara	Gundlupet	17	85
4.	Gadag	Gadag	3	17
5.	Gadag	Shirahatti	5	17
6.	Kalaburagi	Kalaburagi	1	5
7.	Yadgir	Yadgir	7	15
	<b>TOTAL</b>		<b>41</b>	<b>193</b>

### **3. Watershed Development Training Centers.**

In the state two watershed training centers are established at Mysuru and Vijayapura. The important objectives of the centre is to train the WDD staff, personnel of NGO's and members of EC and SHG /UG/ JLG in technical, social and economical aspects.

a)	Name of the Scheme and year of introduction	Karnataka Watershed Development Training Center.
b)	Budget head	2402-00-109-0-02
c)	If plan, the Central and State share is	100% State plan
d)	Objective of the Programme	<ul style="list-style-type: none"> <li>• Imparting training to Officers and staff of WDD from time to time</li> <li>• Training to staff of NGOs.</li> <li>• Training to members of community based organizations (CBOs)</li> <li>• Exposure visits</li> </ul>
e)	Benefits intended to be accrued and number of beneficiaries from the programme (measurable output at the end of year)	Capacity building of the Department staff, NGO staff and CBO staff/members.
f)	Financing (Rs. In Lakhs)	Rs. 20.00 Lakhs

### **Expenditure (Rs.In lakhs)**

2012-13		2013-14		2014-15	
Release	Expenditure	Release	Expenditure	Release	Expenditure
30.00	22.42	30.00	16.49	10.00	4.23

The trainings were conducted as per schedule. No constraints. Exams were conducted to trainees after closure of trainings.

**Programme and progress achieved during 2014-15**

**The physical and financial targets and achievements under different schemes of Watershed Development Department during 2014-15 are given in Annexure-I**

**Annexure-1**

**Statement showing physical and financial target and achievement under different schemes for the year 2014-15 (Rs. in lakhs)**

Sl. No.	Name of the Scheme	Annual Allocation	Revised Target		Total	Releases	Cumulative achievement up to March-2015	% achievement for releases	Physical Target and Unit	Physical achievement	Remarks
			State Share	Central Share							
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>
	<b>State Sector</b>										
<b>1</b>	Watershed Devt. Dept. Est. 2402-00-102-0-15	<b>464.43</b>	<b>464.43</b>		<b>464.43</b>	<b>464.43</b>	<b>439.67</b>	<b>94.67</b>			
<b>2</b>	Watershed Training Centers 2402-00-109-0-02	<b>20.00</b>	<b>20.00</b>		<b>20.00</b>	<b>10.00</b>	<b>4.23</b>	<b>42.30</b>			
<b>3</b>	Training & Evaluation (SDP) 2402-00-800-0-09-133	<b>20.00</b>	<b>20.00</b>		<b>20.00</b>	<b>10.00</b>	<b>9.98</b>	<b>99.80</b>			
<b>4</b>	Rastriya Krishi Vikasa Yojane 2402-00-800-0-06	<b>3660.00</b>		<b>3660.00</b>	<b>3660.00</b>						This scheme was not implemented during 2014-15
<b>5</b>	Integrated Watershed Management Programme 2402-00-102-0-30	<b>71111.11</b>	<b>4360.61</b>	<b>39245.49</b>	<b>43606.11</b>	<b>40870.00</b>	<b>29819.74</b>	<b>72.96</b>	<b>297005 (Ha)</b>	<b>222773 (Ha)</b>	Expenditure & release included O.B.
<b>5</b>	Sujala Watershed Project (Sujala-III) 2402-00-102-0-28	<b>8652.00</b>	<b>3508</b>	<b>-</b>	<b>3508.00</b>	<b>2663.00</b>	<b>2600.23</b>	<b>97.64</b>			
	<b>State Sector Total</b>	<b>83927.54</b>	<b>8373.04</b>	<b>42905.49</b>	<b>51278.54</b>	<b>44017.43</b>	<b>32873.85</b>	<b>74.68</b>	<b>297005 (Ha)</b>	<b>222773 (Ha)</b>	



## CHAPTER-IV

### Organization Structure:

The Watershed Development Department is established with effect from 1.4.2000.

**1. State level:** This department is headed by the Commissioner, an I.A.S. Officer of super time scale, assisted by Director of Watershed, Joint Director (Administration) who is a senior K.A.S. Officer. Similarly for accounts, Chief Account Officer of the rank of Joint Controller of State Accounts. In addition a Chief Conservators of Forest, three Joint Directors of Agriculture, one Joint Director of Planning, one Joint Director of Horticulture and one Joint director of Animal Husbandry are assisting the Director in matters of Forestry, Horticulture, Agriculture and Animal Husbandry activities of Watershed Development Department.

**2. District level:** At the District Level, Joint Director of Agriculture is implementing the programmes of the watershed activities assisted by multidisciplinary staff from Agriculture, Forest, Horticulture & Animal Husbandry the overall control / supervision of Zilla Panchayath.

**3. Taluka level:** The Taluka Level Office is headed by the Assistant Director of Agriculture, who is responsible for implementation and monitoring of various schemes/ programme for the overall development of watershed. 176 Taluka Level Officers are functioning in the State.

#### 1. Details of the officers and staff working in Watershed Development Department and sub-ordinate offices.

Sl No	Cadre	Sanctioned Post	Filled Post	Vacant	Filled Post		Filled Post	
					Gents	Ladies	SC	ST
1	‘A’	21	20	01	16	04	03	01
2.	‘B’	20	09	11	04	05	–	01
3.	‘C’	53	43	10	22	21	7	–
4.	‘D’	15	13	2	8	5	4	–
<b>Total</b>		<b>109</b>	<b>85</b>	<b>24</b>	<b>50</b>	<b>35</b>	<b>14</b>	<b>2</b>

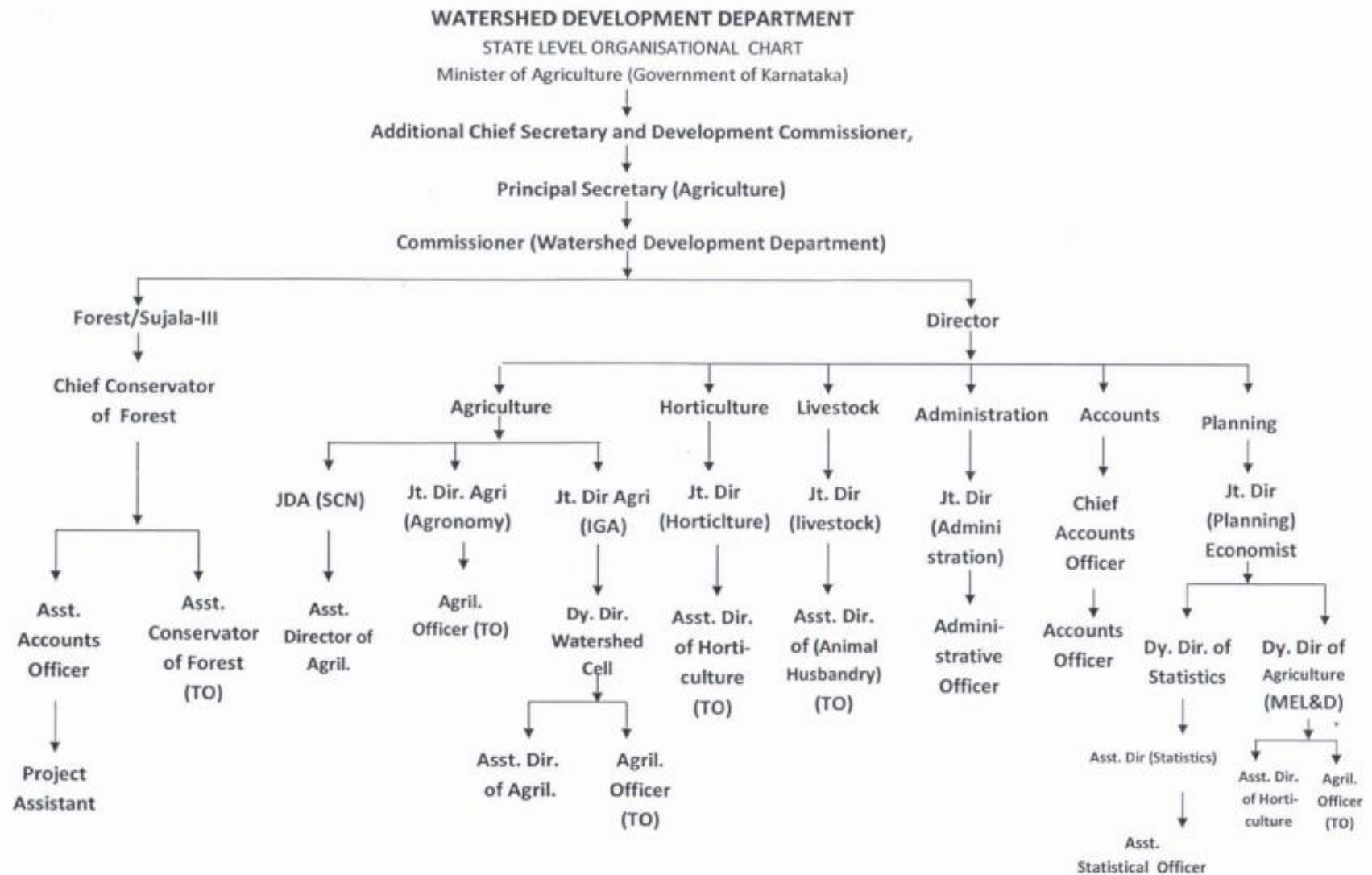
## 2. Outsource Staffs Details working under IWMP Project in 2014-15

Sl. No.	Designation	IWMP
1.	Technical Expert (IT)	1
2.	Technical Expert (Vijayapur & Mysuru Training Centre)	2
3.	Technical Assistant	1
4.	GIS Expert	1
5.	Programmer	1
6.	Accounts Assistant	1
7.	Assistant	3
8.	Documentation Expert	1
9.	Senior DEO	3
10.	Junior DEO	3
11.	Driver	7
12.	Group 'D'	1
	<b>Total</b>	<b>25</b>

## 3. Details of Outsource Staffs working under KWDP-II (Sujala-III) Project in 2014-15

SI No	Designation	IWMP
1.	Hydrologist	1
2.	Technical Expert	3
3.	Technical Officer	1
4.	Documentation Specialist	1
5.	MEL & D Expert	1
6.	Data Analyst	1
7.	First Division Assistant	1
8.	Ministerial Staff	1
9.	Typist	1
10.	Data Entry Operator	1
11.	Group 'D'	3
	<b>Total</b>	<b>15</b>

# Organization Chart



## GLIMPSE OF ACTIVITIES



**NATIONAL AWARD FOR BEST PRACTICES AT NEW DELHI, 2014 - 15**