# Chapter – 9
# Command Area Development

## 9.1 General

The Godavari (Inchampalli) – Krishna (Nagarjunasagar) link canal proposes to divert 16426 $Mm^3$ of the surplus water from the river Godavari for the benefit of command areas in the Warangal plateau, Nalgonda and Khammam districts of Andhra Pradesh and for further transfer to water short Krishna, Pennar, Cauvery, Vaigai and Gundar basins. It envisages providing irrigation to areas in Warangal plateau under Kakatiya Canal Stage – II of Sri Ram Sagar Project Stage – II and a part of upland areas in Nalgonda district under Srisailam Left Bank Canal utilizing 1427 $Mm^3$ of water.

The culturable command area and annual irrigation under Kakatiya Canal Stage II of Sri Ramsagar project stage -II is 255264 ha and 178055 ha respectively and the corresponding utilization is 684 $Mm^3$. In case of Srisailam Left Bank Canal, the entire culturable command area comprising 109250 ha is proposed to be taken over by the link utilising 743 $Mm^3$ of water. Govt. of Andhra Pradesh has proposed to provide irrigation to 109250 ha of endemically drought prone upland areas of Nalgonda district by lifting 743 $Mm^3$ of water from Nagarjunasagar reservoir through Alimineti Madhava Reddy Lift Irrigation Scheme (AMRLIS). This area has originally been proposed under Srisailam Left Bank canal. The area lies in the Warangal, Nalgonda and Khammam districts of Andhra Pradesh. The details are presented in chapter on "Water and Irrigation Planning".

### 9.1.1 Location and Status of Land in the Command Area

The proposed command area under the Inchampalli – Nagarjunasagar link lies in the basins of Godavari and Krishna and is spread in the mandals of Warangal, Nalgonda and Khammam districts of Andhra Pradesh as detailed in Table 9.1.

**Table 9.1**
**Mandals Falling in the Command Area**

| Sl. No. | District | Mandals falling in the command area |
|---|---|---|
| 1. | Warangal | Maripeda, Dantalapally (Narsimhulapet), Thorrur, Koda- Kandla, Raiparthy, Nellikudur, Parvathagiri and Wardhannapet. |
| 2. | Nalgonda | Mothkur, Thungathurthy, Thirumalagiri, Nuthankal, Jajireddigudem, Suryapet, Penpahad, Athmakur (M), Mothey, Chivvemla, Nakrekal, Kethepally, Kattangur, Nalgonda, Kanagal, Thipparthy, Gurrampode, P.A.Pally, Nidmanoor, Peddavoora, Anumula, Thripuraram, Vemulapalli, Nereducherla, Garidepally, Chilkur, Nadigudem and Munagala. |
| 3. | Khammam | Kusumanchi, Tirumalayapalem, Khammam, Mudigonda and Nelakondapalli |

Gross command area under the Kakatiya Canal Stage – II canal is 314308 ha of which 178055 ha is considered suitable for sustainable irrigation as per the Govt. of A.P. proposals whereas the gross command area under SLBC project is about 189438 ha of which 109250 ha is considered suitable for irrigation.

**Table 9.2**
**Particulars of the Proposed Command Area**

**Units: ha**

| Sl.No. | Particulars of the command area | Area |
|---|---|---|
| 1. | Gross geographical area | 503746 |
| 2. | Gross command area | 503746 |
| 3. | Culturable command area | 411872 |
| 4. | Annual irrigaton | 287305 |

The gross command area is 314308 ha under Kakatiya Canal Stage –II based on the brief note prepared by irrigation department, Govt. of AP in January, 2002. The GCA of SLBC is worked out to 189438 ha.

### 9.1.2 Topography and Soils

The proposed Inchampalli – Nagarjunasagar Link canal passes through the command areas proposed under Kakatiya Canal Stage – II of SRSP project and Srisailam Left Bank Canal. The topography in the command

area is undulating and the land use is mixed with dry and wet cultivation and occasionally with the small forest patches. The topography is generally plain with some undulations near the Musi reservoir and mostly agricultural land. The undulating part of command area is occupied in patches by reserve forests. The entire area is criss – crossed by many small and medium natural drains. The command area is gently slopping towards southeast direction. Sandy soils, red earth soils and loamy soils are more predominant and other soils cover only smaller patches in the command areas. The soils are shallow on hill slopes. The land in the area is generally fertile and the crop yield is likely to increase substantially under irrigation.

### 9.1.3 Cropping Practices

The agriculture in the proposed command area is mainly rain fed at present. The principal crops grown in the area are paddy, maize, jowar, bajra and pulses under food crops. Groundnut, chillies, cotton and tobacco come under non-food crops.

### 9.1.4 Ground Water Resources

The proposed command area lies in the districts of Nalgonda, Warangal and Khammam districts of Andhra Pradesh. The ground water potential of the gross geographical area of the command is estimated on prorata basis from the district-wise ground water resources, published by CGWB and is furnished in Table 9.3.

**Table 9.3**
**Groundwater Potential in the Proposed Command Area**

Units: $Mm^3$

| Sl. No | District | Area of the Dist. ($Km^2$) | G.C.A. ($Km^2$) | Estimated potential | Provision for drinking water and other uses | Utilizable ground water resources for irrigation | Net draft | Balance available For Exploit-ation |
|---|---|---|---|---|---|---|---|---|
| 1. | Nalgonda | 13676 | 3700 | 539 | 81 | 413 | 125 | 334 |
| 2. | Warangal | 12836 | 833 | 109 | 16 | 83 | 31 | 61 |
| 3. | Khammam | 15809 | 504 | 60 | 9 | 46 | 5 | 46 |
| | **Total** | **42321** | **5037** | **708** | **106** | **542** | **161** | **441** |

Source: Ground water resources of India – 1995 published by CGWB.

The fluctuations in the groundwater levels as observed in the pre-monsoon and post monsoon seasons by the Andhra Pradesh State

Ground Water Board in various observation wells in and around the proposed command area are given in Table 9.4.

**Table 9.4**
**Fluctuation in the Ground Water Levels (Year 2002)**

| Sl.No | Name of the observation well | Mandal | Depth of ground water level below Ground Level (m) | |
|---|---|---|---|---|
| | | | Pre monsoon | Post monsoon |
| 1. | Dantalapally | Narasihulapet | 10.70 | 10.86 |
| 2. | Kodakandla | Kodakandla | 18.51 | 20.00 |
| 3. | Marripeda | Marripeda | 12.17 | 11.36 |
| 4. | Nellikudur | Nellikudur | 7.38 | 8.30 |
| 5. | Parvathagiri | Parvathagiri | 16.05 | 13.47 |
| 6. | Raiparthy | Raiparthy | 9.80 | 8.34 |
| 7. | Thorrur | Thorrur | 13.94 | 10.40 |
| 8. | Wardhannapet | Wardhannapet | 13.51 | 10.80 |
| 9. | Khammam | Khammam | 2.46 | 0.91 |
| 10. | Kusumanchi | Kusumanchi | 13.55 | 13.44 |
| 11. | Mudigonda | Mudigonda | 3.38 | 3.84 |
| 12. | Tirumalayapalem | Tirumalayapalem | 17.20 | - |
| 13. | Garidepally | Garidepally | 3.70 | 1.28 |
| 14. | Kattangur | Kattangur | 9.93 | 11.31 |
| 15. | Maddirala | Nuthankal | 15.80 | 14.78 |
| 16. | Thungathurthy | Thungathurthy | 7.28 | 5.38 |
| 17. | Tipparthy | Tipparthy | 10.40 | 11.97 |

Source: The Director, Andhra Pradesh State ground water board, Hyderabad.

The Central Ground Water Board has done pilot study on the hydro-geological surveys on Godavari (Polavaram) – Krishna (Vijayawada) link canal project proposed by NWDA for assessing the possible changes / effects on ground water scenario in the command area due to introduction of surface water irrigation. As per their report 20% of transmission losses and 40% of the water applied will add to the ground water regime in the proposed command area by way of infiltration, canal seepage and return flow from irrigation. In case of Godavari (Inchampalli) – Krishna (Nagarjunasagar) link canal the transmission losses worked out to be 562 $Mm^3$ and the utilization for the en route irrigation is 1427 $Mm^{3.}$. Therefore, the total recharge component to the existing ground water body in the command area is estimated to be 683 $Mm^3$. Presuming that 10% of total recharge will go as base flow and leakage to confining aquifer, the net addition to the dynamic resource

will be 615 $Mm^3$. With the introduction of canal system there will be further increase in the area irrigated through ground water due to recharge from surface water irrigation. Further the inflows will improve the ground water both quantitatively and qualitatively. The additional water available will be useful to form a strategy on conjunctive use of both surface & ground water.

## 9.2 Socio – economic Aspects

The socio – economic aspects in the command area discussed below are based on the mandal- wise statistics of Nalgonda, Warangal and Khammam districts falling in the command area. The mandal- wise general statistics of the area for the year 1997-98 and 2000-2001 are considered.

### 9.2.1 Population and Major Occupations

The command area is spread over 28 mandals of Nalgonda district, 8 mandals of Warangal district and 5 mandals of Khammam district of the Andhra Pradesh State. The population of the command area as worked out on proportionate area basis from the mandal wise population census 2001 is 13.5 lakh of which the urban population is 2.30 lakh and rural population is 11.2 lakh. Thus the proposed command area is predominantly rural. The occupational distribution of the population for the Nalgonda, Warangal & Khammam districts is furnished in Table – 9.5.

**Table 9.5**
**Occupational Distribution of the Population**

| Sl.No. | Occupational category | Percentage of population | | |
|---|---|---|---|---|
| | | Nalgonda District | Warangal District | Khammam District |
| 1. | Cultivators | 15 | 15 | 12 |
| 2. | Agricultural labour | 20 | 19 | 21 |
| 3. | Transport,Storage and Communication | 1 | 1 | 1 |
| 4. | Marginal workers | 3 | 3 | 3 |
| 5. | Others | 9 | 10 | 9 |
| 6. | Non workers | 52 | 52 | 54 |

### 9.2.2 Land Holdings

It is seen from the statistics that the farmers holding land in marginal and small categories are in the majority having about 65% of the total holding in the command. About one-fourth of farmers hold land under medium category. Remaining farmers hold above 10 ha of land. The classification of the farmers of the command area according to the land holdings is presented in Table 9.6.

**Table 9.6**
**Classification of Farmers Based on Land Holdings**

| Sl.No. | Category of farmers | Size of land holding | Percentage |
|---|---|---|---|
| 1. | Marginal | Below 2 ha | 36.15 |
| 2. | Small | 2 to 4 ha | 28.68 |
| 3. | Medium | 4 to 10 ha | 25.17 |
| 4. | Large | Above 10 ha | 10.00 |
| | Total | | 100% |

### 9.2.3 Land Tenure

Agriculture is the main stay of the population in the proposed command area. The land ownership status of the households in the command area is furnished in Table 9.7.

**Table- 9.7**
**Land Ownership Status of the Households**

| Sl.No. | District | No. of households in lakhs | No. of land holdings in lakhs | Percentage |
|---|---|---|---|---|
| 1. | Warangal | 5.87 | 4.99 | 85% |
| 2. | Nalgonda | 5.85 | 4.79 | 82% |
| 3. | Khammam | - | 3.16 | - |

### 9.2.4 Household Income

Despite non-availability of canal irrigation facilities in the command area, major portion of the command area is under cultivation; and which mainly depend on rainfall and to some extent on groundwater through wells and deep bore wells. Based on 2001 census, about 16% of

population is the cultivators in the command. Major portion of the population of the command is dependent on agriculture and other associated services. Among the cultivators owning lands also, the marginal farmers holding less than 2 ha are in majority. From the above, it is observed that the present level of household income is very low in case of many households. Introduction of irrigation in the proposed command area is absolutely necessary to increase the crop production and as well as the household income.

### 9.2.5 Availability of Manpower for Agriculture

About 40% of the work force available in the proposed command area are agricultural labourers and would be adequate even after introduction of the irrigation.

## 9.3 Identification of Problems in the Command Area

### a) Physical

No significant physical problems are foreseen in the command area. The soils in the command area are suitable for growing the crops proposed. As the area is well drained by the existing natural drainages and the ground water table fluctuates sufficiently below the root zone of the crops, the drainage and water logging problems are not anticipated after the introduction of canal irrigation.

### b) Financial problems

No financial problems could be foreseen. The farmers are already in the field of agriculture. With the introduction of assured irrigation supplies under the link project, more inputs have to be put into achieve greater yields. This may call for more finances. Since the present policy of the government both at central and state levels is aimed at growing more food and achieving self sufficiency by providing every conceivable assistance to the farmers. The locally available banks and other financial institutions could be expected to be geared up to provide the increased timely financial assistance to the farmers.

## 9.4 Infrastructure Facilities

### a) Railways and Roads

The command area is well connected by roads and railways. The National Highway No. 9 and a broad-gauge railway line connecting the

districts head quarters viz. Warangal, Nalgonda and Khammam pass through the command area. The highway connecting Warangal and Khammam also passes through the command area. A good network of major district and other roads connecting the mandal head quarters and other smaller towns is already available in the command area.

### b) Marketing Facilities

There are three big towns in the command area having good marketing facilities with communication network for transport. These places do have enough facilities to sell their agricultural food and non-food produce. Besides this, a good number of outlets for the supply of the agricultural inputs like seeds, fertilizers and pesticides to the farmers to meet their requirements are already in existence in the command area.

### c) Financial Institutions

There are 151 financial institutions in and around the command area, which includes the Nationalized Banks, Commercial, Co-operative and Rural Banks. These institutions provide the financial assistance to the farmers for meeting their agricultural expenses, purchase of livestock, acquisition of new lands, improvement of land and drainage and other necessities.

### d) Medical Facilities

In order to provide the health care services to the public, there are 44 public health centers and government hospitals in and around the proposed command area.

## 9.5 Command Area Development Works

### a) Land Development

The terrain of the proposed command area is partly rugged and partly plane. The land levelling and its preparation to receive the irrigation supplies may have to be taken up with active participation of the beneficiary farmers. The cost of levelling and the preparation of land could be made to be borne by the farmers themselves, and for land development banks can provide the required loans to be recovered in easy instalments.

## b) Field Channels

Field channels will have to be constructed through the entire ayacut of the canals to carry the irrigation supplies to the fields. Again active participation of the farmers for the work is called for, which could be planned simultaneously with the land levelling works.

## c) Field Drainage to Prevent Water Logging

The command area is already on higher elevations and the post monsoon ground water is below 5 m or more, hence no water logging is anticipated in the command area after the introduction of canal irrigation. The topography is undulating with several small local streams, and finally joining bigger streams. Hence it forms good field drainage system, which would allow the excess water, if any, to flow without causing stagnation of water avoiding possibilities of water logging in the command area. Thus, the ground water table would be well below the root zone of crops. Besides, adequate size of C.D. works are proposed to be provided along the canal at the drainage crossings to pass the flood waters and canal seepages etc.

## d) Farm Roads

The existing road network to reach various parts of the command is sufficient. However, after introduction of irrigation, some new farm roads will be required to be constructed and old village roads will have to be realigned for better accessibility to the villages and agricultural fields.

## e) Other Facilities

In addition to the above development works, marketing and ware housing facilities, credit facilities from banks, easy availability of agriculture inputs, and consolidation of land holdings will have to be thoroughly planned and developed / organized for proper command area development. It is also pertinent to develop other facilities concerning the health, education, protected drinking water supply, communications, etc. for the general betterment of the living standards of the population of the command area.

## 9.6 Assessment of Likely Economic Impact

With the introduction of irrigation in the command area the total produce is expected to increase from 0.76 lakh tonnes to 4.0 lakh tonnes under the Kakatiya Canal Stage – II. In case of command area under the Srisailam Left Bank Canal, the expected crop yield would be about 2.74 lakh tonnes against the existing 0.82 lakh tones.

From the annual irrigation of 287305 ha, an additional employment of about 16 million man days are expected to be created in agricultural activities. Due to increase in production of food grains and oil seeds, more rice mills and oil mills are likely to come up in the area. Further, higher production of fodder crops will result in an increase in livestock. As a result of this, dairy farms are likely to come up, which will further increase the income of the households in this area.

After the introduction of irrigation, the income from agricultural and allied industries will increase and living standards of people in the area is expected to improve substantially with the anticipated increase in per capita income. Tremendous socio-economic development with improvement in literacy, communications, economic activities, public health, protected drinking water, employment potential etc. in the area could be foreseen. In short, the link scheme could be a boon to the people of the command area.