

Chapter 9

Command Area Development

9.1 General

Culturable command area of 168017 ha with annual utilisation of 908 Mm³ is proposed to be irrigated from the Nagarjunasagar - Somasila link canal. The development aspects of the proposed command area are discussed in the following sections:

9.1.1 Location and status of land in the command area

The proposed command area under the Nagarjunasagar - Somasila link canal lies in the basin area covered by the streams between Gundlakamma and Pennar and is spread in the Prakasam and Nellore 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	Prakasam	1. Kandukuru, 2. Gudluru, 3. V.V. Palem, 4. Ponnaluru 5. Zarugumalli, 6. S.Konda, 7. Ulavapadu, 8. Linga Samudram, 9. Kanigiri, 10. Pamuru 11. Veligandla, 12. P.C. Palli, 13. Podili, 14. K.K. Metla, 15. Marripudi.
2	Nellore	1.Varikunta padu, 2. Duttuluru, 3. Vinjamuru 4. Kondapuram.

Gross area that could be commanded by the link canal is about 3.76 lakh ha, of which only 2.03 lakh ha is considered suitable for sustained irrigation with moderate limitations as per the report of NRSA on soil and land irrigability classification. After excluding the land under forests, scrubs and barren land from the area, the area available for actual irrigation in the command area will be 1.68 lakh ha. The remaining area is either unsuitable for irrigation or has severe to very severe limitations for sustained irrigation use. The particulars in the proposed command area is given in Table 9.2.

Table 9.2
Particulars of the proposed command area

Sl. No.	Particulars of the command area	Area in lakh ha
1.	Gross geographical area	3.95
2.	Gross command area	3.76
3.	Culturable area	2.31
4.	Area suitable with few limitations for sustained irrigation	Nil
5.	Area suitable with moderate limitations for sustained irrigation use	2.03
6.	Area available for actual irrigation after excluding scrub, forest and barren land	1.68
7.	Currently irrigated area under all sources (i.e. wells/tanks/canals/ other sources)	0.45
8.	Annual irrigation by existing 4 medium irrigation projects	0.13

9.1.2 Topography and soils

The ground in the command area slopes down from the link canal to the east coast upto the Bay of Bengal. For a few kilometers adjacent to the link canal in the upper portion of the proposed command area, the topography is generally undulating and thereafter it gradually slopes down to the east coast. The undulating part of the command area is occupied in patches by reserve forests. The entire area is criss-crossed by many small and medium natural drains. The available soils in the proposed command area are mainly red sandy, red earth, black cotton, coastal sand and saline soils. The red sandy and red earth soils are more predominant and the other soils cover only smaller areas. The soils are shallow on hill slopes in the undulating upper part of the command, while they are moderately deep-to-deep in the lower gradually sloping portion of the command area. The lands in the area are generally fertile and the crop yield is likely to increase substantially under irrigation.

9.1.3 Existing land use

Agriculture is the mainstay of the people in the proposed command area. As per the report submitted by NRSA based on the 1992, 1994 and 1995 satellite data, the forest area in the command is 19890 ha, and the culturable area is 230808 ha. The net sown area is 205697

ha, which is 54.7% of the gross command area of 3.76 lakh ha. The double cropped area i.e. cropped both in kharif and rabi seasons is 55298 ha, while the cropped area in kharif is 198449 ha and that in the rabi season is 62546 ha.

The Mandal-wise data on land utilisation for the year 1994-95 has been extracted from the "Hand books of Prakasam and Nellore districts". The breakup of the existing land use/land cover under the 8 branch canals of Nagarjunasagar - Somasila link for irrigation of the proposed command area is shown in the "Chapter on Surveys and Investigation".

9.1.4 Groundwater resources

The proposed command area lies in the districts of Prakasam and Nellore of Andhra Pradesh in the basin area covered by the streams between Gundlakamma and Pennar. The groundwater potential of the gross geographical area of the command is estimated on pro rata basis from the district-wise groundwater resources – 1995 published by CGWB is furnished in Table 9.6.

Table 9.6
Groundwater potential in the proposed comma area

District	Area of the district in km ²	GCA km ²	Esti- mated Poten- Tial (Mm ³)	Provi- sion for Drinking Water and Other uses (Mm ³)	Utilisable Ground water resources for irrigation (Mm ³)	Unit Mm ³	
						Net draft (Mm ³)	Balance available for exploita- tion (Mm ³)
Prakasham	17141	3472	372	56	284	340	32
Nellore	13161	473	109	16	84	100	9
Total	30302	3945	481	72	368	440	41

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 Groundwater Board in various observation wells in and around the proposed command area are given in Table 9.7.

Table 9.7
Fluctuation in the groundwater levels

Sl. No	Name of the Observation Well	Mandal	Depth of groundwater level below GL in 'm'	
			Pre-monsoon	Post-monsoon
1	Kurichedu	Ongole	3.90	0.30
2	Kandukuru	Kandukuru	4.20	1.15
3	Chundi	V. V.Palem	5.90	3.30
4	Ponnaluru	Ponnaluru	5.70	1.25
5	K.Bitragunta	Zarugumalli	3.60	1.55
6	Thumadu	Zarugumalli	3.90	1.15
7	New Chinakanumulla	Singarayakonda	4.95	1.45
8	Ramayapatnam	Ulavapadu	3.75	2.50
9	Linga Samudram	Linga Samudram	5.30	1.35
10	Kanigiri	Kanigiri	5.50	3.35
11	Manumantanipeda	Manumantanipeda	4.95	2.60
12	Vemulapada	Manumantanipeda	5.45	2.90
13	Pamuru	Manumantanipeda	6.30	4.00
14	Batlaguduru	Pamuru	6.65	4.25
15	Veligandla	Veligandla	4.50	2.10
16	Buditpalem	Veligandla	4.00	2.50
17	C.S.Puram	C.S.Puram	4.50	1.30
18	CMM Palli	C.S.Puram	8.75	2.85
19	Pd. Alavalpadau	P.C.Palli	3.25	0.40
20	Pd. Irlapadu	C.S.Puram	7.55	1.95
21	Podili	Podili	2.50	2.20
22	Kandapalli	Podili	5.20	2.20
23	Uppalapadu	Podili	6.15	3.15
24	K.K.Metla	K.K.Metla	5.20	2.60
25	Chimata	Marripudi	4.25	1.25

The Central Ground Water Board has done a pilot study on the hydro-geological surveys on the Godavari (Polavaram) – Krishna (Vijayawada) link canal project proposed by NWDA for assessing the possible changes/effects on groundwater scenario in the command area due to introduction of surface water irrigation. As per their recommendations, 20% of the transmission losses and 40% of the water applied will add to the groundwater regime in the proposed command area by way of infiltration, canal seepage and return flow from irrigation. Incase of Krishna (Nagarjunasagar) – Pennar (Somasila) link canal, the transmission losses worked out to be 332 Mm³ and the utilisation for

the enroute irrigation is 908 Mm³. Since the rock formations in the present link are (hard rocks) different from those in the Polavaram – Vijayawada link (alluvial), the percentage for return flow needs to be modified. Ground water estimation Methodology (1997) suggests as 30% of water applied as recharge for non-paddy areas where ground water levels less than 10m. It is 50% for paddy areas. Since the link traverses hard rock area, it is considered that 25% of the water applied for paddy areas and 15% for non-paddy areas may be taken for preliminary assessment for ground water recharge. As per the proposed cropping pattern, 25% of the command will have paddy. The recharge values, therefore, work out to be:

Transmission losses @ 20%	66.40 Mm ³
Recharge from paddy fields@ 25%	56.75 Mm ³
Recharge from non-paddy areas @ 15%	102.15 Mm ³
Total quantum of recharge	224.90 Mm ³

Further refinement for assessment of recharge may be done at DPR stage. This additional water availability will be useful to form a strategy on conjunctive use of both surface & ground water.

9.2 Socio-economic aspects

The socio-economic aspects of the command area discussed here under are based on the mandal-wise statistics for the year 1994 – 95 of the Prakasam and Nellore districts falling in the command area.

9.2.1 Population and major occupations

The command area is spread over 15 mandals of the Prakasam district and 4 mandals of the Nellore 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 1991 is 6.50 lakh of which the urban population is 0.76 lakh and rural population is 5.74 lakh. Thus the proposed command area is predominantly rural. The occupational distribution of the population for the Prakasam and Nellore districts is furnished in Table 9.8.

Table 9.8
Occupational distribution of the population

Sl. No.	Occupational category	Percentage of population	
		Prakasam district	Nellore district
1	Main workers	48.00	43.00
2	Marginal workers	2.00	3.00
3	Non-workers	50.00	54.00
4	Cultivators	12.00	9.00
5	Agricultural labour	36.00	20.00
6	Number of cultivators	3.36 lakh	2.18 lakh
7	Number of agricultural labour	9.86 lakh	4.89 lakh

The mandal-wise percentage of the agricultural workers of the total workers for all the mandals of the proposed command area are given in Table 9.9.

Table 9.9
Mandal-wise distribution of workers

Sl.No.	Mandal	Percentage of total labour		
		Cultivators	Agricultural Labour	Others
Prakasam District				
1.	Kandukuru	37	47	16
2.	Gudluru	24	62	14
3.	V.V. Palem	33	57	10
4.	Ponnaluru	31	51	18
5.	Zargumalli	31	57	12
6.	S. Konda	13	51	36
7.	Ulavapadu	20	56	24
8.	Linga samudram	36	54	10
9.	Kanigiri	29	44	27
10.	Pamur	29	49	22
11.	Veligandala	38	49	13
12.	P.C. Palli	36	50	14
13.	Podili	27	46	27
14.	K.K. Metla	32	58	10
15.	Marripudi	38	54	8
Nellore District				
16.	V.K. Padu	37	39	24
17.	Duttaluru	32	37	31
18.	Vinjamur	32	37	31
19.	Kondapuram	37	47	16

Source: District hand books of Prakasam and Nellore Districts 1994-95

9.2.2 Land holdings

The classification of the farmers of the command area according to the land holdings is presented in Table 9.10.

Table 9.10
Classification of farmers based on land holdings

SI.No.	Category of farmers	Size of land Holding	Percentage
1.	Marginal	Below 2 ha	72.13
2.	Small	2 to 4 ha	16.95
3.	Medium	4 to 10 ha	9.24
4.	Large	Above 10 ha	1.68
		Total	100%

9.2.3 Land tenure

Agriculture is the mainstay of the population of the Prakasam and Nellore districts where the proposed command area is spread. The land ownership status of the households of the two districts is furnished in Table 9.11.

Table 9.11
Land ownership status of house holds

SI.No	District	No. of households	No. of land holdings	Percentage
1.	Prakasam	5.76 lakh	4.75 lakh	83%
2.	Nellore	4.32 lakh	3.67 lakh	85%

9.2.4 Households income

Major portion of the population of the command is dependent on agriculture. Among the population engaged on agriculture, nearly 70% are agricultural labour. Among the cultivators owning lands also, the marginal farmers holding less than 2 ha are in majority. From the above, it is clear that the present level of household income is marginal in case of many households. The introduction of irrigation in the proposed command area could be expected to boost the household income.

9.2.5 Availability of agricultural labour

About 50% of the workforce available in the proposed command area are agricultural labourers and would be adequate even after introduction of irrigation.

9.3 Identification of problems in the command area

a) Physical problems

There are no significant physical problems 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 groundwater table fluctuates sufficiently below the root zone of the crops, the drainage and water logging problems are anticipated to be minimal.

b) Financial problems

No financial problem 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 in to 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. 5 and a broad gauge railway line connecting the two district head quarters viz. Ongole and Nellore pass through the command area. The highway connecting Kurnool and Ongole 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 11 big towns including Ongole, the headquarter of Prakasam district, 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, 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 48 financial institutions in and around the command area which include the nationalised banks, rural and commercial banks and co-operative 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

There are 29 public health centres in and around the proposed command area.

9.5 Command area development works

a) Land development

The terrain of the proposed command area is mostly plane with small undulations, except in minor areas in the upper portion of the command area. 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 borne by the farmers themselves, and for land development banks can provide the required loans to be recovered in easy installments.

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 is very close to the sea coast in its lower portion and though the pre- monsoon level of groundwater table is about 5 m below the ground level. The average post- monsoon water table is around 2 m below the ground level. Hence, any rise in the water table in the

command area will have to be thoroughly watched after introduction of irrigation. However, to avoid the possibility of water logging in the command, it is necessary to resort to conjunctive use of surface and ground waters to enhance the irrigation intensity and also to bring down the groundwater level below the root zone of the crops.

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, consolidation of land holdings will have to be thoroughly planned and developed / organised 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 399 thousand to 556 thousand metric tonnes. A direct benefit of Rs. 19048 per ha of the proposed command area is estimated against Rs. 10447 per ha in the present un-irrigated condition. The increase in income is Rs. 8601 per ha .

From the annual irrigation of 168017 ha, an additional employment of about 8 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. Small-scale agro-industries under self-employment scheme will have brighter prospects due to the increase in agricultural activities.

After introduction of irrigation, the income from agricultural and allied industries will increase and standard of living of the people in the area is expected to improve substantially with the anticipated increase in the 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.