

Chapter 9

Command area development

9.1 General

Culturable command area of 491200 ha, with annual utilisation of 3048 Mm³, is proposed to be irrigated from the Pennar (Somasila) - Palar – Cauvery (Grand Anicut) 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 Pennar (Somasila) - Palar – Cauvery (Grand Anicut) link canal lies in the four basins/sub-basin viz. i) Pennar delta sub-basin ii) Streams between Pennar and Palar basins iii) Palar basin and iv) Streams between Palar and Cauvery. The command area is spread over 2 districts of Andhra Pradesh and 6 districts of Tamil Nadu state and Pondicherry (U.T) as detailed in Table 9.1.

Table 9.1
Details of Command Area

Sl. No	District	Taluk/mandals
1	Nellore	1) Chejarla, 2) Podalakur, 3) Kaluvaya, 4) Dakkili, 5) Venkatagiri
2	Chittoor	1) Srikalahasti, 2) Yerpedu, 3) Vijayapuram, 4) Nindra, 5) Nagalapuram, 6) Pitchattur
3	Tiruvallur	1) Uthukottai, 2) Tiruttani, 3) Tiruvallur, 4) Ponneri
4	Vellore	1) Arakkonam
5	Kancheepuram	1) Sriperumbudur, 2) Kancheepuram, 3) Chengalpattu, 4) Thirukalukundram, 5) Uthiramerur, 6) Madurantakam, 7) Cheyyur
6	Tiruvannamalai	1) Cheyyar, 2) Vandavasi
7	Villupuram	1) Tindivanam, 2) Vanur, 3) Gingee, 4) Villupuram, 5) Ulundurpettai, 6) Kallakurichchi
8	Cuddalore	1) Panruti, 2) Cuddalore, 3) Vridhachalam, 4) Tittagudi, 5) Chidambaram
9	Pondicherry	1) Pondicherry

The geographical area lying under the link canal is 873789 ha. Excluding the land under forests, scrubs and barren land, the culturable command area available for irrigation is 599010 ha. After excluding the existing command area under tanks, other sources, etc. an area of 491200 ha can only be irrigated annually and hence this area is considered as culturable command area under the link canal. The particulars in the proposed command area are 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	8.74
2.	Gross command area	8.30
3.	Culturable command area	5.99
4.	Currently irrigated area under all sources (i.e. tanks/canals/other sources)	1.00
5.	Balance CCA available for new irrigation	4.99
6.	CCA considered under this link canal	4.912

9.1.2 Topography and Soils

The Pennar (Somasila)- Palar – Cauvery (Grand Anicut) link canal forms the upper boundary on the western side of the proposed command area. The Kandaluru – Poondi Canal forms the lower boundary in the initial reach upto RD 160 km. Then, the eastern coastal line forms the eastern boundary upto the Vellar river crossing. The FSL of the link canal running from north to south varies from 95.420 m at its entry on the north to 60.859 m at its exit at Grand Anicut across Cauvery river. The ground in the command area slopes down from the link canal to the north till it crosses the ridge of Pennar basin, thereafter it slopes towards east coast upto Bay of Bengal. The topography of the command area generally slopes down to the east coast. Forest areas lying in eastern slopes of Eastern ghats forming isolated patches of reserved forest are lying within the command area. The entire area is criss - crossed by many major, medium and small natural drains. The available soils in the proposed command area are mainly red/brown sandy clay loam soils, black clay soils, red loamy soils, slates, phyllites, schists soils, and alluvial soils. The black clay & brown clay soils, red sandy soils are more predominant and

the other soils cover only smaller areas. The soils are shallow in the initial reaches of the command area, 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 data available, the forest area in the command is 33571 ha, and the culturable command area is 599010 ha. The gross sown area is 485928 ha, (within the culturable command area of 599010 ha) which is 81% of the culturable command area. The double cropped area i.e. cropped both in kharif and rabi seasons is 72514 ha, while the cropped area is 413414 ha.

The mandal / taluk wise data on land utilisation for the year 2001-02 was collected from the concerned offices of the Department of Statistics, Govt. of Andhra Pradesh, Tamil Nadu and Pondicherry (U.T). The break-up of the existing land use particulars were worked out proportionately for the proposed command area under 6 nos. of direct sluices and 16 branch canals of Pennar (Somasila)- Palar – Cauvery (Grand Anicut) link canal.

9.1.4 Cropping Practices

The agriculture in the proposed command area is mainly rainfed at present. The principal crops grown in the area are paddy, jowar, maize, ragi, pulses, cotton, vegetables and chillies.

Taking into consideration, the prevailing agricultural practices, soil and other characteristics of the area, the cropping pattern to be followed for the proposed command area has been devised, which is dealt in detail in the Chapter on "Irrigation Planning".

9.1.5 Groundwater Resources

The proposed command area lies in Nellore, Chittoor districts of Andhra Pradesh state and Tiruvallur, Kancheepuram, Vellore, Tiruvannamalai, Villupuram, Cuddalore districts of Tamil Nadu state and Pondicherry (U.T). The ground water potential in the command, estimated on pro rata basis from the district-wise groundwater resources as on January 2003 published by CGWB, is furnished in Table 9.3.

Table 9.3
Ground Water Potential in the Proposed Command Area

District	Area of the district (km ²)	GCA within command (km ²)	Estimated potential (Mm ³)	Provision for drinking water & other uses (Mm ³)	Utilisable Ground water resources for irrigation (Mm ³)	Net draft Mm ³	Balance available for exploitation (Mm ³)
Nellore	13160	759	175	26	134	160	15
Chittoor	14988	329	35	5	29	10	25
Tiruvallur	3424	913	297	20	15	282	15
Vellore	6077	256	41	2	0	58	Nil
Kancheepuram	4433	2546	715	31	200	515	200
Tiruvannamalai	6191	252	59	1	0	63	Nil
Villupuram	7217	1858	437	14	0	484	Nil
Cuddalore	3678	1725	734	15	215	518	216
Pondicherry	294	101	66	10	N.A.	45	21

Source: Report on Dynamic Ground Water Resources of Tamil Nadu as on January 2003 published by CGWB & PWD Govt. of Tamil Nadu and Ground water details of 1995 by CGWB for Andhra Pradesh state.

The fluctuations in the ground water levels as observed in the pre monsoon and post monsoon seasons by the Central 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

Sl. No.	Name of the observation well	Taluk	Depth of ground water level below GL in 'm'		Year
			Pre monsoon	Post monsoon	
1	Kanakammachatram	Tiruttani	4.94	6.70	2002
2	Tiruvalangadu	Tiruvallur	8.20	10.10	2002
3	Tiruvallur	Tiruvallur	7.23	7.89	2002
4	Andersonpet	Kancheepuram	3.40	3.70	2002
5	Uthukottai	Uthukottai	N.A.	6.80	2002
6	Palavakkam	Tirukalukundram	5.35	8.30	2002
7	Periyapalayam	Ponneri	4.62	4.40	2002
8	Sriperumbudur	Sriperumbudur	13.8	8.44	2002
9	Sendamangalam	Ulundurpettai	3.29	1.63	2002
10	Chettiarpettai	Ulundurpettai	2.00	1.57	2002

11	Kancheepuram	Kancheepuram	8.69	6.55	2002
12	Walajabad	Kancheepuram	7.36	5.57	2002
13	Chengalpattu	Chengalpattu	N.A.	1.22	2002
14	Mamandur	Chengalpattu	6.74	1.90	2001
15	Uthiramerur	Uthiramerur	6.37	-	2002
16	Madurantagam	Madurantagam	8.17	5.27	2002
17	Acharapakkam	Madurantagam	3.78	3.84	2002
18	Kolathanallur	Cheyyur	7.08	5.75	2002
19	Chunamedu	Cheyyur	2.77	1.92	2002
20	Arakonam	Arakonam	6.67	-	2001
21	Melmakottur	Vandavasi	10.10	4.39	2002
22	Vandavasi	Vandavasi	6.82	6.27	2002
23	Tindivanam	Tindivanam	4.71	3.41	2002
24	Vilangampadi	Tindivanam	7.25	3.25	2002
25	Kiliyanur	Vanur	6.98	4.00	2002
26	Tiruchitrabalam	Vanur	8.45	6.40	2002
27	Mugaiyur	Cheyyur	10.19	-	2002
28	Arasur	Tirukoilur	N.A.	5.82	2001
29	Ulundurpettai	Ulundurpettai	5.22	0.52	2002
30	Villiyannur	Pondicherry	16.63	6.20	2002
31	Reddichavadi	Pondicherry	2.74	1.65	2002
32	K.P.kottai	Panruti	20.19	17.34	2002
33	Kopuvarur1	Neyveli	10.60	5.55	2002
34	Kopuvarur2	Vridhachalam	4.60	3.85	2002
35	Kurinjiipadi	Neyveli	N.A.	3.14	2002
36	Neyveli	Neyveli	4.97	3.65	2002
37	Vadalur	Neyveli	N.A.	7.70	2002
38	Sattamangalam	Vridhachalam	2.30	0.97	2002
39	Vridhachalam	Vridhachalam	10.55	8.35	2002
40	Veppur	Vridhachalam	N.A.	4.82	2002

The Central Ground Water Board has carried out 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 for irrigation will add to the groundwater regime in the proposed command area by way of infiltration, canal seepage and return flow from irrigation. Ground water estimation methodology (1997) suggests the recharge as 30% of water applied for non-paddy area and 50% for paddy area. In case of Pennar (Somasila)- Palar – Cauvery (Grand Anicut) link canal, the transmission losses have been worked out to be

557 Mm³ and the utilisation for the enroute irrigation is 3048 Mm³. Since the formations (predominantly sedimentary) in the present link are different to that of Polavaram – Vijayawada link (alluvial), the following percentages for recharge has been considered tentatively. The recharge values, therefore, works out to be:

Recharge from transmission losses @ 20%	114.00 Mm ³
Recharge from water applied for irrigation @ 20%	609.60 Mm ³
Total quantum of recharge	723.60 Mm ³

9.2 Socio-economic Aspects

The socio-economic aspects of the command area discussed hereunder are based on the district-wise statistics of the Nellore, Chittoor, Tiruvallur, Kancheepuram, Vellore, Tiruvannamalai, Villupuram, Cuddalore districts and Pondicherry (U.T.) falling in the command area.

9.2.1 Population and Major Occupations

The command area is spread over 5 mandals of Nellore district; 6 mandals of Chittoor districts of Andhra Pradesh state and 4 taluks of Tiruvallur district; 7 taluks of Kancheepuram district; 1 taluk of Vellore district; 2 taluks of Tiruvannamalai district; 6 taluks of Villupuram district; and 5 taluks of Cuddalore districts of Tamil Nadu State and Pondicherry (U.T.). The population of the command area as worked out on proportionate area basis from the taluk-wise population census 2001 is 46.80 lakh of which the urban population is 28.41 lakh and rural population is 18.39 lakh. Thus, the proposed command area is predominantly urban. The occupational distribution of the population for Nellore, Chittoor, Tiruvallur, Kancheepuram, Vellore, Tiruvannamalai, Villupuram, Cuddalore districts and Pondicherry (U.T.) is furnished in Table 9.5.

Table 9.5
Occupational distribution of the population

Sl. No	Occupational category	Percentage of population						
		Nellore	Chittoor	Tiru- vallur + Kanchee -puram	Vell- ore	Tiruvan- namalai	Villupur -am + Cudda- lore	Pondi- cherry
1	Main workers	37	38	36	38	43	40	25
2	Marginal workers	9	15	2	2	3	3	10
3	Non-workers	54	47	62	60	54	57	65
4	Cultivators	19	38	16	23	39	34	3
5	Agricultural labourers	44	35	34	33	40	45	20
6	No. of cultivators (in lakh)	2.27	5.29	2.74	2.69	3.44	6.76	0.09
7	No. of agricultural labourers (in lakh)	5.36	4.90	5.69	3.79	3.57	8.78	0.53

The mandal-wise / taluk-wise percentage of the agricultural workers to the total workers for all the taluks of the proposed command area are given in Table 9.6.

Table 9.6
Mandal wise / Taluka wise Distribution of Workers
(as per 1991 census)

Sl. No	District / Mandal / Taluk	Percentage of Total Labourers		
		Cultivators	Agricultural Labourers	Others
I	Nellore District			
1	Chejarla	33	44	23
2	Podalakur	26	47	27
3	Kaluvaya	29	53	18
4	Dakkili	40	44	16
5	Venkatagiri	20	34	46
II	Chittoor District			
6	Srikalahasti	21	36	42
7	Yerpedu	39	41	20
8	Vijayapuram	31	59	10
9	Nindra	27	61	13

10	Nagalapuram	21	64	15
11	Pichattur	26	59	16
III Tiruvallur District				
12	Uthukottai	22	63	15
13	Tiruvallur	16	55	29
14	Tiruttani	27	44	29
15	Ponneri	13	49	38
IV Kancheepuram District				
16	Kancheepuram	16	33	51
17	Sriperumpudur	12	32	56
18	Chengalpattu	21	36	43
19	Uthiramerur	34	45	21
20	Cheyyur	29	58	13
21	Madurantagam	31	52	18
V Vellore District				
22	Arakkonam	26	43	31
VI Tiruvannamalai District				
23	Cheyyar	35	42	23
24	Vandavasi	40	43	18
VII Villuppuram District				
25	Tindivanam	38	42	20
26	Vanur	31	47	22
27	Gingee	49	41	11
28	Villupuram	26	51	22
29	Ulundurpettai	48	42	10
30	Kallakurichchi	44	44	12
VIII Cuddalore District				
31	Panruti	25	38	37
32	Cuddalore	15	44	41
33	Chidambaram	21	51	28
34	Vridhachalam	40	40	21
35	Tittagudi	47	42	11
IX Pondicherry				
36	Pondicherry	1	2	97

The classification of the farmers of the command area according to the land holdings is presented in Table 9.7.

Table 9.7
Classification of Farmers Based on Land Holdings

Sl. No.	Category of farmers	Size of land Holding	Percentage
1.	Marginal	Below 2 ha	92.05
2.	Small	2 to 4 ha	5.94
3.	Medium	4 to 10 ha	1.82
4.	Large	Above 10 ha	0.19
		Total	100.00

9.2.2 Land Tenure

Agriculture is the mainstay of the population of Nellore, Chittoor districts of Andhra Pradesh state and Tiruvallur, Kancheepuram, Vellore, Tiruvannamalai, Villupuram, Cuddalore districts of Tamil Nadu state and Pondicherry (U.T) where the proposed command area is spread. The land ownership status of the households of these districts is furnished in Table 9.8.

Table 9.8
Land Ownership Status of House Holds (1991 census)

Sl. No.	District	No. of households	No. of land holdings	Percentage
1.	Nellore	548166	376265	68.6
2.	Chittoor	N.A.	N.A.	
3.	Tiruvallur+ Kancheepuram	1008250	560463	55.6
4.	Vellore	617386	396196	64.2
5.	Tiruvannamalai	435946	407082	93.4
6.	Villupuram+ Cuddalore	1040133	822040	79.0
7.	Pondicherry (U.T)	N.A.	N.A.	

9.2.3 House Hold Income

Major portion of the population of the command is dependent on agriculture. Among the population engaged on agriculture, nearly 42% 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 levels of household income are marginal in case of many households. The introduction of irrigation in the proposed command area could be expected to boost the household income. This is discussed in detail under section 9.7.

9.2.4 Availability of Agricultural Labour

About 42% of the work force available in the proposed command area is agricultural labourers and they 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 proposed crops. 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 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 crops 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. 4 & no. 45 connecting Chennai and Bangalore and Chennai and Tiruchchirappalli and broad / metre gauge railway lines connecting all the state/district head quarters viz. Chittoor, Kancheepuram, Tiruvallur, Vellore, Villupuram, Cuddalore and Pondicherry (U.T) pass near/through the command area. A good network of major district roads and other roads connecting the taluk

head quarters and other smaller towns already exists in the command area.

b) Marketing Facilities

There are 36 big towns including the district headquarters of Tiruvallur, Kancheepuram, Villupuram, Cuddalore and the Union Territory of Pondicherry which lie inside/in the vicinity of 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, good number of outlets for the supply of the agricultural inputs like seeds, fertilizers and pesticides to the farmers to meet their requirements is already in existence in the command area.

c) Financial Institutions

There are about 200 financial institutions in and around the command area which include 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 about 120 hospitals and 200 public health centres within/nearby the proposed command area of this link project.

9.5 Command Area Development Works

a) Land Development

The terrain of the proposed command area is mostly plain 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 made to 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 leveling works.

c) Field Drainage to Prevent Water logging

The command is about 5 km away from the seacoast in its lower portion and though the pre- monsoon groundwater table is about 3.00 m below the ground level, the average post- monsoon water table is around 2.00 m below the ground level. However, any rise in the water table in the command area will have to be thoroughly watched after introduction of irrigation. Further, 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 layed 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 195 to 1875 TMT. A direct benefit of Rs. 19332 per ha from the proposed command area is estimated against Rs. 5220 per ha in the present un-irrigated condition. The increase in income is Rs. 14112 per ha.

From an annual irrigation of 491200 ha, an additional employment of about 44 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 increase in agricultural activities.

After introduction of irrigation, the income from agricultural and allied industries will increase and standard of living of 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.