

## Chapter 8

# Irrigation Planning, Socio - economic Aspect and Command Area Development

### 8.1 Irrigation Planning

One main and one branch canal is proposed under the link project to cover the entire area. The link canal takes off from the end of 9 km long tunnel from Achankovil Kal Ar reservoir. The canal takes off at FSL 187.0 m and runs for 50.68 km before joining Alagar Odai, a tributary of Vaippar river. The command extends in the districts of Tirunelveli, Tuticorin and Virudhunagar of Tamil Nadu covering mainly Vaippar basin. The district wise area benefited is given below:

#### District – wise Command Area

District	Annual Irrigation (ha)
Tirunelveli	50,005
Tuticorin	628
Virudhunagar	40,767
Total	91,400

#### 8.1.1 Existing / proposed irrigation facilities in the command areas

Tanks, wells and other minor schemes comprise the major source of irrigation in the command area. There are about 432 tanks in the command area. Vembakottai Reservoir Project is the only medium irrigation project in the command. Even this project, at present, is only supplementing the irrigation requirement of the areas under tanks and has no separate command area of its own. The area irrigated under tanks as a whole is available. The utilisation under these tanks was arrived at by assuming a duty of 200 ha / Mm<sup>3</sup> and 71.43 ha / Mm<sup>3</sup> for dry and wet crops respectively, as is prevailing in the existing storage projects. The area irrigated by wells has assessed roughly from the taluk-wise statistics. The area irrigated and the water utilised by different sources of irrigation are as follows:

## Source - wise Area Irrigated

Source in the project command	Gross command area ha	Culturable command area Ha	Gross irrigated area Ha	Quantity of water utilised/ to be utilised (Mm <sup>3</sup> )	Kharif ha	Rabi ha	Hot weather ha	Two seasonal ha	Perennial ha
Canals	N.A	N.A	Nil	Nil	Nil	Nil	-	-	-
Tanks	N.A	N.A	7980	98.15	N.A	2220	-	5760	-
Wells	N.A	N.A	13286	66.43	N.A	3696	-	9590	-
Others	N.A	N.A	32	0.16	N.A	9	-	23	-
<b>Total</b>			<b>21298</b>	<b>164.74</b>	-	<b>5925</b>	-	<b>15373</b>	-

## 8.2 Existing cropping pattern

### 8.2.1 Existing area under rainfed cultivation

The total area available for cultivation in the command is 1,20,531 ha, of which 56233 ha of net area is being cultivated at present. The gross irrigated area in the command is 21,298 ha. Thus while about 1/3<sup>rd</sup> of the cultivated area is getting irrigation benefits, the remaining area is solely dependent on rainfall. In addition, about 50,000 ha of area that can be cultivated remain barren at present, presumably due to lack of irrigation facilities.

### 8.2.2 Area under each crop

The gross cropped area in the command area is about 59,060 ha, of which 36% is under food-crops and the balance under non-food-crops. Rice is the most predominant food crop and cotton takes that place among the non-food crops. The gross irrigated area in the command is around 21298 ha, 64% of which comprises food-crops and the balance non-food crops. Rice is the most predominantly irrigated crop under food-crops and cotton among the non-food crops. About 58% of the food-crops under gross cropped area, is under irrigation. However, only 21% of the gross cropped area under non-food crops is irrigated. Of the 21298 ha of gross irrigated area, area irrigated by surface water (tanks and other sources) account for only 7980 ha and the remaining area is irrigated by ground water (wells). Existing cropping pattern in the command area is given in Table 8.1.

**Table 8.1**

**Existing Cropping Pattern in the Command Area**  
(Average for the year 1989-90 to 1991-92)

Sl. No.	Crops		Gross cropped area	Gross irrigated area	Rainfed area
			(ha)	(ha)	(ha)
<b>I.</b>	<b>Food-crops</b>				
1.	Cereals				
	i)	Paddy	7568	7489	78
	ii)	Jowar	725	362	363
	iii)	Bajra	2377	161	2216
	iv)	Ragi	908	860	48
	v)	Maize	339	189	150
	vi)	Other cereals	343	14	329
2.	Pulses		6092	235	5857
3.	Spices and condiments		676	113	463
4.	Fruits and vegetables		1121	942	179
5.	Sugarcane		1084	1062	22
6.	Chillies		2241	2227	14
7.	Other food-crops		49	22	27
	Total food-crops		23423	13677	9746
<b>II.</b>	<b>Non-food-crops</b>				
8.	Coconut		843	778	65
9.	Other oilseeds		1463	64	1399
10.	Cotton		26641	6118	20523
11.	Groundnut		547	407	140
12.	Other non-food-crops		6143	254	5888
	Total non-food-crops		35637	7621	28016
	Total food & non-food crops		59060	21298	37762

*Source : Statistical Department, Govt. of Tamil Nadu*

### 8.2.3 Size of land holding

Statistics relating to the number and size of the land holdings in the command area is available only district-wise. On the basis of this district-wise statistics, particulars of land holdings computed for the command area in Vaippar basin are presented in Table 8.2.

**Table 8.2**  
**Land holding particulars of command area**

Sl. No.	Size of holding (ha)	Farmers (No.)	Area held by each category		
			Percentage to the total farmers	Area (ha)	Percentage of total area
1.	Below 0.5	152947	50.8	36972	12.4
2.	0.5 to 1.0	68499	22.8	46569	15.6
3.	1.0 to 2.0	45358	15.1	64113	21.6
4.	2.0 to 3.0	15720	5.2	37173	12.5
5.	3.0 to 4.0	7259	2.4	24968	8.4
6.	4.0 to 5.0	3803	1.3	17137	5.8
7.	5.0 to 7.5	4089	1.4	24897	8.4
8.	7.5 to 10.0	1603	0.5	13800	4.6
9.	10.0 to 20.0	1357	0.4	17983	6.0
10.	20.0 & above	339	0.1	14106	4.7
<b>Total</b>		<b>300955</b>	<b>100.0</b>	<b>297718</b>	<b>100.0</b>

## **8.3 Soil Surveys**

### **8.3.1 Soil Classification**

Based on the talukwise report of Soil Surveys and Land Use Organization of Government of Tamil Nadu, the soils in the command area can be classified as greyish brown clayey soils, yellowish brown to reddish brown soils and greyish brown to light brownish grey soils.

### **8.3.2 Land Irrigability Classification**

No surveys have been carried out for assessing the land irrigability of the command area. With regard to the suitability of the soils for irrigation, it can be said that shallow soils are unfit for irrigation. They may be put under permanent pastures or grasses to check the soil erosion hazards. Deep soils in each group may be considered for irrigation provided the slopes, drainage characteristics and depth of water table do not become limiting factors. Besides, appropriate land and water management practices have to be adopted to make the irrigated agriculture, a success.

## **8.4 Proposed irrigation**

There is no proposal for any irrigation schemes of significance in the command area of this link proposal. However, after introduction of irrigation

under this proposal the command area will have a seasonal irrigation as shown in Table 8.3.

**Table 8.3**  
**Proposed irrigation facilities under the projects command**

<b>Particulars</b>	<b>Area (ha)</b>
G.C.A	145569
C.C.A	101555
Kharif	44685
Rabi	38591
Hot Weather	- Nil -
Two seasonal	8124
Perennial	- Nil -
Intensity of irrigation	90%
Extent of stabilization	- Nil -

#### **8.4.1 Suggested cropping pattern**

Though the command provides scope for multiple cropping pattern, the proposed cropping intensity is restricted to 90% considering the limited quantity of water available for diversion. The proposed cropping pattern in the command area is at Table 8.4.

**Table 8.4**  
**Proposed Cropping Pattern**

<b>Name of the Crop</b>	<b>% of C.C.A</b>
Paddy	15
Jowar	7
Pulses	12
Oilseeds	15
Bajra	6
Cotton	15
Chillies	12
Vegetables	8
Total	90

#### **8.5 Crop Water Requirements**

The crop water requirements have been worked out based on climatological approach. The climatological data of the I.M.D observatory at Madurai lying at the Northern periphery of the command has been used for computing the Crop Water requirement. The gross irrigation requirement of crops has been worked out considering an irrigation efficiency of 55%. The gross irrigation requirement for the command area works out to 634.76 Mm<sup>3</sup> including transmission losses.

## **8.6 Water Planning**

### **8.6.1 Surface water**

#### **a) Availability of water and proposed utilisation under the project**

The availability of water at the dam site has already been dealt in Chapter on "Hydrology". After accounting for all the upstream utilisations, the yield available for diversion at Punnamedu, Achankovil Kal Ar and Achankovil pumped scheme works out to 286 Mm<sup>3</sup>, 279 Mm<sup>3</sup> and 215 Mm<sup>3</sup> respectively. Thus the total yield available at these dam sites put together will be 780 Mm<sup>3</sup>. Out of this, 120 Mm<sup>3</sup> is proposed to be released from Achankovil Kal Ar reservoir and 30 Mm<sup>3</sup> from Punnamedu reservoir into the river for downstream requirements which would ultimately help in combating salinity intrusion into Vembanad lake during lean season. A quantum of 10 Mm<sup>3</sup> is provided towards reservoir evaporation losses. A quantum of 634.76 Mm<sup>3</sup> at 85% success rate is proposed for diversion for irrigation.

#### **b) Live storage**

The live storage capacity of Punnamedu, Achankovil Kal Ar and Achankovil pumped scheme after 50 years sedimentation will be 114.6 Mm<sup>3</sup>, 184.6 Mm<sup>3</sup> and 26 Mm<sup>3</sup> respectively.

#### **c) Irrigation Efficiency**

An irrigation efficiency of 55% has been assumed for working out crop water requirement.

### **8.6.2 Ground Water**

Nearly 99% of the command area falls in Virudhunagar, Tirunelveli districts of Tamil Nadu. Both areas are chronically drought prone. Here, ground water occurs both under water table and semi-confined conditions in the weathered, jointed and fractured zones of crystalline rocks whereas phreatic conditions predominate porous and insignificant in lateral extent in Tirunelveli district. Open wells in general, form chunk of ground water extraction structures, the salient features of which are enumerated in the Table 8.5.

**Table 8.5**  
**Salient Hydro geological features**

Sl. No.	Hydrogeological parameters	Virudhunagar district	Tirunelveli district
1.	Depth of open wells (mbgl)	3-235	-
2.	Depth to water level (mbgl)	2-25	2-12.2
3.	Attitude of water table (mansl)	40-234	-
4.	Seasonal fluctuation (m)	2-8.81	0.2-4.2
5.	Yield of Dugwells (Mm <sup>3</sup> / day)	20-80	10-112
6.	Recuperation rate (m / ltr)	1.0	1.0-1.5
7.	Specific yield (fissured form %)	2	1.5-2.5
8.	Transmissivity (Mm <sup>3</sup> / day)	-	44-502
	<b>Chemical Quality of water</b>		
9.	Water type	Ca/mg Bicarbonate	-
10.	E.C Value (micro/mhos at 25°C)	1000	180-4690
11.	Total hardness (ppm)	85-660	60-1681
12.	Chloroide concentration (ppm)	46-717	-
13.	Floride	More than permissible limit in Srivilliputtur Taluk	-
14.	pH value	7-8.6	7.46-8.6

The higher values of chloride, hardness and electrical conductivity are observed to be present only in local parts. The chemical quality of ground water otherwise is suitable for both domestic and irrigation purposes. The quality of ground water in porous rocks along the coastal line shows high variation from potable to saline due to localized ground water mining.

The annual replenishable ground water resources and development scenario are presented in the Table 8.6.

**Table 8.6**  
**Ground water resources and development**

Sl. No.	District	Total Replenishable G.W. Resources M.ham/yr.	Provision for domestic, industries & other uses M.ham/yr.	Net ground water draft (1992) M.ham/yr.	Balance ground water potential M.ham/yr.	Level of ground water development %
1.	Virudhunagar	0.0806	0.0121	0.03278	0.03573	47.85
2.	Tirunelveli	0.1184	0.0178	0.05435	0.04626	54.02
	<b>Total</b>	<b>0.1990</b>	<b>0.0299</b>	<b>0.08713</b>	<b>0.08199</b>	<b>101.87</b>

It can be seen from above table that nearly half of the ground water resources are yet to be harnessed. Therefore, further intensification of irrigation is possible in the command in conjunction with ground water

resources. Besides, surface water irrigation will also contribute substantially to ground water recharge. Thus conjunctive use of surface and ground water resources in the command will be beneficial from productivity stand point as well as from sustainability of the irrigated agriculture.

## 8.7 Command Area Development

### 8.7.1 Command Area Details

#### a) Location

The command area of the project comprises 219 villages lying in Tenkasi, Sankarankovil, Sivagiri taluk of Tirunelveli District, Kovilpatti taluk of Tuticorin district and Rajapalayam, Srivilliputtur, Sattur taluks of Virudhunagar district.

#### b) Classification of lands

Village-wise statistics of land use data for the command area of the project are not readily available. From the taluk-wise data of the command area for the available period of last three years, it is seen that the cropped area in the area widely varies from year to year. The average land use pattern as computed from the taluk-wise statistics on prorated basis for the years from 1989-90 to 1991-92 is given in the Table 8.7.

**Table 8.7**  
**Landuse particulars of the Command Area**

Sl. No.	Category	Area ha.
<b>I.</b>	<b>Classification</b>	
1.	Forest	Nil
2.	Barren and uncultivable land	1601
3.	Land put to non-agricultural uses	23202
4.	Cultivable waste	3144
5.	Permanent pastures	238
6.	Land under misc. trees, crops	1122
7.	Current fallows	24126
8.	Other fallows	35903
9.	Net area sown	56233
10.	Area sown more than once	2827
11.	Total cropped area	59060
12.	Geographical area	145569
<b>II.</b>	<b>General</b>	
1.	Cultivable command area	101555
2.	Gross irrigated area	21298
3.	Irrigation intensity	25.4
4.	Cropping intensity	62.5



## **8.7.2 Climate of command area**

### **a) Average annual rainfall**

The command area receives weighted average annual rainfall of 772 mm. Out of this, 600 mm occurs during monsoon season i.e. from May to December and the rest during non-monsoon season. Monsoon is predominantly contributing over 82% of the annual rainfall.

### **b) Temperature**

The nearest observatory in the vicinity of the command is at Madurai maintained by Indian Meteorological Department. The average temperature observed at the Kavalur observatory varies from 37.5°C in the month of May to 29.7° in December.

### **c) Humidity**

The average relative humidity observed at Madurai observatory varies from 76% in the month of November to 55% in June.

### **d) Evapotranspiration (Eto)**

The average annual evapotranspiration observed at Madurai observatory is 1682.9 mm.

## **8.7.3 Irrigation**

### **a) Present source of irrigation**

Tanks, wells and other minor schemes comprise the major source of irrigation in the command area. Based on village wise, crop wise area irrigated details for the years 1989-90 to 1991-92 (average), the average gross area under irrigation is 21298 ha. Open wells with pumps for which groundwater is the source, account for 62% of gross irrigated area. There are no tube wells in the command. There are no major projects existing in the command. The existing medium Vembakottai reservoir on Vaippar, supplements the irrigation requirement under tanks and has no command of its own.

### **b) Methods of irrigation followed**

The existing irrigation in the command area is predominantly by wells and irrigation by flooding from plot to plot is being practiced. In the case of large

holdings, irrigation by Border Strip method is also followed. It is a general practice among the farmers to apply irrigation water right from the land preparation stage. During the crop period, number of applications varies from 3 to 10. Most of the farmers drain the excess water from the fields.

**c) Status of land development for irrigated areas**

i) Conditions of channels: The tank system in this command are interconnected by very old earthen (unlined) channels. These channels require proper maintenance every year to prevent growth of weeds and silting etc.

ii) Longitudinal slopes in the field : The land slopes in the field are gentle and there will not be any problems in carrying out irrigation practices.

iii) Status of field channels / drains: Existing irrigated areas have adequate field channels and drains.

**8.7.4 Socio Economic aspect**

**a) Population, major occupations, etc.**

The command area spreads over 234 villages in 7 taluks. The population in the command area as computed on pro-rata basis from the taluk-wise statistics of 1991 census works out to be 6.26 lakhs, of which 3.95 lakhs is rural. The occupational distribution of rural population as per 1991 census is presented in Table 8.8.

**Table 8.8  
Occupational distribution of rural population**

Sl.No.	Occupation	Percentage
<b>I</b>	<b>Agriculture Sector</b>	
1.	Cultivators	22.6
2.	Agricultural labourer	45.8
3.	Livestock, fishing & hunting, plantation, orchards & allied activities	1.4
	<b>Total Agricultural sector</b>	<b>69.8</b>
<b>II</b>	<b>Non-Agriculture Sector</b>	
4.	Mining quarries	0.2
5.	Household Industry	3.7
6.	Other house industry	15.7
7.	Construction	0.8
8.	Trade & Commerce	3.7
9.	Transport and communication	0.9
10.	Other services	5.2
	<b>Total non-agriculture sector</b>	<b>30.2</b>
	<b>Total (Agriculture + non-agriculture)</b>	<b>100</b>

## b) Classification of farmers

Statistics on land holdings are available only districtwise. The command of PAV Link project lies mostly in the Vaippar basin and the statistics relating to land holdings of Vaippar basin can be taken as representative of the command area. Farmers can be classified into 4 groups depending upon their size of land holdings viz. Marginal group, small farmers, medium farmers and big farmers. The group-wise percentage of the farmers in Vaippar basin are given below:

Marginal group	73.6%
Small farmers	15.1%
Medium farmers	10.3%
Big farmers	1.0%
Total	100.0%

## c) Land tenure

As per the socio-economic study carried out by National Council of Applied Economic Research (NCAER), most of the cultivators are land owners. Status of the land ownership is as follows:

Ownership status	% of house holds
No land	25.7
Land owners	67.5
Tenants	2.5
Both	4.3
Total	100.0

## d) Income

As per the socio-economic study carried out by the National Council of Applied Economic Research (NCAER), the average annual income (1991-92) of each household is Rs. 19,798/- and per capita income is Rs. 3,822/- as compared to the state average of Rs. 5,078/-. Average income of Agricultural labour household is @ Rs. 12,000/- per annum. Out of the total income, crop farming is contributing around 31.22% and allied activities, livestock and farm wages are contributing about 32.19% and the rest of the income is from non-

farm activities. Estimated average income of household from different activities are given in Table 8.9.

**Table 8.9**  
**Average household income in the command area**

S.No.	Activity	Income in Rs	% of total
1.	Crop farming	6180	31.22
2.	Allied activities	672	3.39
3.	Livestock	1468	7.41
4.	Farm wages	4237	21.4
5.	Non-farm wages	3636	18.37
6.	Self employment	2635	13.31
7.	Others	570	4.9
<b>Total</b>		<b>19798</b>	<b>100.00</b>

Estimated size of average house hold = 5 persons

Per capita income =  $19798/5 = \text{Rs. } 3959/-$

#### e) **Availability of Agricultural labour**

About 25.7% of the households do not have their own land and are fully dependent on agriculture as agricultural labour. In addition, about 11.89% of the households have only less than 0.5 ha, whose crop farming income is meagre and in practice they almost depend on farm wages only. As per 1991 census, 45.85% of the work force has been classified as agricultural labourers. As such availability of agricultural labour will be adequate even after introduction of irrigation. Present level of overall gainful employment of active manpower is 77.3%.

### **8.7.5 Infrastructure facilities**

#### a) **Railways and Roads**

The Metre gauge line connecting Virudhunagar and Shenkottai and Broad gauge line connecting Virudhunagar and Nagarcoil of Southern Railway are passing through the command. Total length of the Railway line passing through the command is 65.0 km (50 km Metre Gauge and 15 km Broad gauge).

The command area is served by a good network of roads. The National Highway No.7 connecting Bangalore and Kanniyakumari passes through the command area between Kovilpatti and Sattur towns. The State Highway connecting Tirumangalam and Shenkottai is also passing through the

command. Other important towns in the command like Sankarankovil, Rajapalayam, Srivilliputtur are also well connected by state Highways / Major District Roads. Most of the Villages are also connected to the Highway by reasonably good village roads.

### **b) Marketing facilities**

The command is having a number of marketing centers like Srivilliputtur, Sattur, Rajapalayam, Puliangudi, Sankarankovil, Kovilpatti, etc. Due to very good network of roads and railways, all the farm products can be easily brought to the nearest marketing centres and sold. Rajapalayam and Sankarankovil markets are very famous and a good number of merchants from all over India visit these centres for purchasing farm products. Rajapalayam is a main market centre for cotton and Sankarankovil is a famous chilly market centre.

### **c) Agro industries**

There are major cotton processing industries at Rajapalayam and Sankarankovil. There is one Sugar Factory (Dharani Sugar Mills) in the command. Small units of Oil & Flour Mills are existing at Tenkasi, Sankarankovil, Sivagiri, Srivilliputtur, Sattur, Kovilpatti, Kadayanallur etc. Small coconut fibre industries are also existing at Tenkasi, Kadayanallur and Rajapalayam. Small-scale units for processing spices are available at Sankarankovil and Sattur. Small-scale industries for manufacturing dairy products are existing in Srivilliputtur area.

### **d) Banks and Credit facilities**

Adequate network of Nationalised Banks and Co-operative Banks are existing in the proposed command area. The present strength of these institutions is as under:

1.	Nationalized Banks	26 Nos.
2.	Scheduled Banks	10 Nos.
3.	Gram Banks	11 Nos.
4.	Agricultural Co-operative Banks	114 Nos.
5.	Land Mortgage Banks	6 Nos.

Banks and Co-operative banks are located either in the village itself or within a range of 5.0 km in most of the villages of the command.

## **8.8 Topography and soils**

The information on topography and soils as contained in the taluk-wise soil survey reports (Published by Soil Survey and Land Use Organisation – Palayamcottai – Tamil Nadu) pertaining to the taluks lying in the command area is as under:

### **8.8.1 Topography**

The topography of the command is more or less flat. The terrain is practically plain except for small portions of isolated hillocks in Sattur taluk.

### **8.8.2 Land slope**

The command is having a gentle slope towards south east direction, the slope ranging from 1 in 250 to 1 in 450.

### **8.8.3 Soils**

Based on the information collected from taluk-wise soil reports of Soil Survey and Land Use Organisation of Govt. of Tamil Nadu, the soils in the command can be broadly classified as Greyish brown clayey soils, yellowish brown to reddish brown soils and Greyish brown to light brownish grey soils.

## **8.9 Ground water and drainage**

Since the command is in uplands and is being drained by a number of major and minor streams, there will not be any problem for drainage. However a provision of Rs. 375 per ha of the ayacut is made in the estimate towards developing drainage system in the command area. The density of the natural drainage is 0.186 km/km<sup>2</sup> of the command.

## **8.10 Agriculture**

Farming is the main economic activity of the proposed command area. The various aspects of crop cultivation viz. agricultural practices adopted and farmers attitude towards improved agricultural practices have been described in the following paras.

### **8.10.1 Agriculture practices**

Based on the sample survey conducted by National Council of Agricultural Economic Research (NCAER) in the command area, it is seen that the use of

high yielding variety seeds is more popular in the proposed command. The line sowing of rice is most common and mostly it is transplanted; use of manure is a common practice. Irrigation at the pre-sowing stage was reported by more than 80% of the rice cultivators. Post-sowing irrigation is applied to rice by the majority of cultivators in the command and the practice of removing of excess water from the rice fields is also followed by the farmers. Various methods of disease control are practiced by the rice growers in all areas. The modern agricultural technology has already become popular in the proposed command area. Adequate Agricultural Extension services are available in the region.

### **8.10.2 Farmers attitude towards improved agricultural practices**

Improved agricultural practices are being implemented under the guidance of Agriculture Department of Govt. of Tamil Nadu. Number of demonstration and observation plots are laid out to show the differences between the improved agricultural practices and the indigenous ones, and the farmers are encouraged to adopt these improved practices once the advantages are firmly established. Also crop competitions are being held at each block level among the farmers for important crops to boost up yield by scientific methods. The attitude of the farmers towards improved agricultural practices is positive and more farmers have started adopting these practices.

## **8.11 Identification of problems of the command area**

### **8.11.1 Physical Problems**

#### **a) Salinity/alkalinity**

The three soil groups identified in this command are potentially saline or alkaline. The problem is found to be more, where there is lack of sufficient drainage. Alkalinity was found to be prevalent in typic chromusters, occurring along the river banks of Vaippar. However, these soils in general showed more of calcium than sodium. Though these soils are potentially alkaline, due to the availability of calcium in greater proportion than sodium, the problem may not be that much severe. However in low lying areas, care should be taken in improving the drainage, besides choosing of suitable crops such as cotton, chillies, yam, ragi, sunflower etc. can also control the alkalinity problem. Under irrigated condition, green manure crops like dainchu can be grown and ploughed insitu to minimize the alkalinity.

#### **b) Soil Erosion**

Problems due to soil erosion are not reported in the command area. However water erosion occurs in the soils of Typic chromusters and Typic ustropepts in

the rainy season due to deep to moderately deep depth and water holding capacity of soils. Erosion control measures are to be carried out to minimize the erosion loss.

Wind and sheet erosion are also dominant in Typic ustorthents. It is preferable to have a cover cropping always in these tracts. Plantation of forest species such as Eucalyptus, Casuarina and other wind breakers are recommended in such areas.

#### **c) Water logging**

In general, there is no water logging problem in this command. However, low lying areas especially having the soils of Typic chromusters, are prone to water logging. Adequate drainage facilities are to be provided in such area for overcoming the water logging problem.

#### **d) Drainage**

The command area is well served by a number of medium and minor streams and as such drainage problem is not anticipated in the command. All the three soil types identified in the command have good drainage characteristics. However low lying areas, where typic chromusters soil is present, are to be provided with proper drainage facility.

### **8.11.2 Financial Problems**

#### **a) Socio-Economic conditions of the populace**

As per the 1990-91 census, about 70% of the rural population in the command area is dependent on agriculture sector for their livelihood. Though 72% of the household have their own lands, only 23% are mainly dependent on farm wages and income from livestock. The average estimated household income is about Rs. 20,000 for the year 1991-92. However, the house hold income of the agriculture labourers was about Rs. 12,000/- per annum (1991-92). The average household income of the cultivators having irrigation facilities is around Rs. 27365 per annum while the average income of the house holds without irrigation facilities is Rs. 15054/- per annum. It is evident from the above facts that those who are having irrigation facilities are better off than others. In general, 70% to 75% of the household income is being spent on consumptive items (various food items). During bad monsoon years, their incomes are insufficient even to meet the barest minimum needs. As such, most of the rural households borrow loans from various agencies like banks, credit societies and money lenders. As per the study conducted by National Council of Applied Economic Research (NCAER), New Delhi, majority



of the households (about 58%), borrow loans from various agencies and only a few of them are in a position to repay back in time. This shows the poor economic condition of the local population. In general, the literacy rate is high in this region as compared to country's average.

## **8.12 Land development works**

### **8.12.1 Present Status**

The status of the existing agriculture in the area indicates that out of the proposed command of 1,01,555 ha, about 56,233 ha is already under cultivation and as such most of the lands are already leveled and shaped which may at the most need minor remodeling to suit the canal irrigation system. Irrigation by tanks and wells is already in vogue in 30,000 ha. Thus, field channels and drainage are available to this extent. However, it may need remodeling to suit the project requirement. The farm roads are available in more than 55% of the command area, which is under cultivation at present. These may, however, need modernization to cope up with the post project requirements.

### **8.12.2 Schedule for land development**

Land development, being an integral part of the command area development, the schedule for the land development will also be worked out at the time of planning the detailed programme for Command Area Development at the project implementation stage.

### **8.12.3 Status of extension services**

The Agricultural Department of Govt. of Tamil Nadu has established a number of agriculture extension centres in this area and offers fertilizers, pesticides, seeds, etc., on subsidized rates for small and marginal farmers. These are also available in free market at each and every taluk headquarters and major panchayat towns. Availability of these facilities as ascertained by the National Council of Applied Economic Research (NCAER) through their study in the region is as under:

<b>Range</b>	<b>Seeds / Fertilizers outlets</b>	<b>Credit Agencies</b>
Within Village	13.3 %	33.3%
Upto 5 km	20.0%	40.0%
5 to 10 km	40.0%	20.0%
Above 10 km	26.7%	6.7%

As most of the villages (about 75%) are within the reasonable reach of these facilities, no extra effort is needed for development of the infrastructure facilities. Once the irrigation water is provided to the villages, it can be expected that these facilities will be developed by private / public sectors as an offshoot of the increased economic activities of the specific area.

## **8.13 Benefits**

### **8.13.1 Increase in yield**

With the introduction of irrigation in the command, the yield of food grains and other items is expected to increase from 76066 M.T/Year to 216001.9 MT annually.

### **8.13.2 Estimated cost of increased production**

The cost of production before and after the canal irrigation is estimated at Rs. 3375.337 lakhs and Rs. 8809.593 lakhs respectively. Thus, the estimated cost of increased production is assessed as Rs. 5434.256 lakhs.

### **8.13.3 Likely socio-economic impact**

#### **a) Increase in employment**

Considering the proposed annual irrigation of 91400 ha, an estimated 6.0 million mandays of extra employment can be expected to be created per annum in agricultural activities. Major part of the extra mandays will come under crop farming activity, which will help to generate higher income to the populace of the specific areas. With the introduction of irrigation, agricultural activities and other related non-farm activities will also increase, generating further employment opportunities.

#### **b) Agriculture based industries**

Because of the increase in food grain production, more rice mills and oil mills, more dairy farms due to increase in livestock, food mixture plants for livestock, small scale industries for manufacturing agricultural equipments etc. are likely to come up in the area, which in turn would give more impetus to the rural economy.

Irrigation increases the agricultural production and the per capita income of the population. Due to increase in economic activity because the agricultural based industries standard of living of the people rises and good cultural

practices could be developed in the society by eradicating poverty and ill-health. In general, socio-economic conditions of the population in these drought prone areas will improve and the developmental activities will ultimately be benefited for the overall development of the regions.

## **8.16 Flood control**

The Achankovil Kal Ar and Achankovil reservoirs will have a combined flood absorption capacity of  $7.960 \text{ Mm}^3$  between their FRL and MWL. The MWL of the reservoirs was fixed based on flood routing studies. This flood absorption storage will moderate the flood passing through the structures thereby lessening their impact downstream. In addition to this flood absorption capacity provided between FRL & MWL, the diversion of  $634 \text{ Mm}^3$  for irrigation will provide further safeguard from the impact of floods. The Punnamedu reservoir will however do not have any flood absorption capacity. The maximum flood discharge observed (by NWDA) at the structures during the recent 3 highest flood in 1992 are  $3000 \text{ m}^3 / \text{sec}$ ,  $1500 \text{ m}^3 / \text{sec}$  and  $1400 \text{ m}^3 / \text{sec}$  at Achankovil, Achankovil Kal Ar and Punnamedu respectively, while the designed flood is  $3339.72 \text{ m}^3 / \text{sec}$ ,  $1910.45 \text{ m}^3 / \text{sec}$  and  $2738.55 \text{ m}^3 / \text{sec}$ .