

Chapter 5: Water, irrigation and power

I. Issues in access to water

Inadequate water supply is one of the most significant problems facing most farmers in Andhra Pradesh. There are only a few districts where levels of irrigation are high (especially surface irrigation) and rainfall is also adequate. In most parts of the state, ensuring water for crop cultivation has become not only a constant concern but also a major source of increased expenditure. Historically, canal irrigation has been very unevenly distributed across the state. In addition, the decline of surface water sources (especially tanks) because of neglect and other factors has led to greater reliance on the exploitation of groundwater, which entails substantial costs on individual cultivators, in the form of digging borewells, etc.

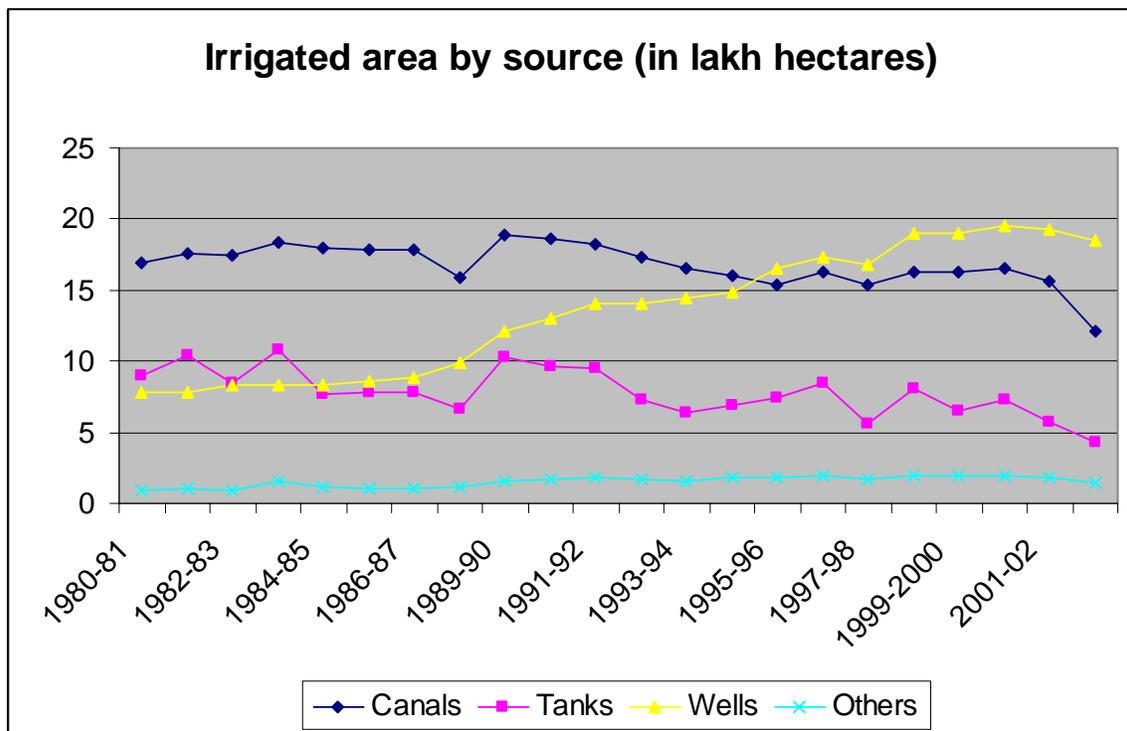
The problem has been aggravated by the spate of droughts in recent years, as rainfall has been substantially less than normal over most years in the past five-year period, and has also been untimely, with the southwest monsoon in particular arriving later and being concentrated in certain period, with longer inter-spell dry periods. The impact of a series of continuous droughts cannot be underestimated. It has affected surface and groundwater sources. Tanks have not filled and have silted up. Of course, there are other problems with tanks: in many areas, tanks have fallen into disuse because of lack of care, disruption of feeder channels, breakdown of village or community control, low investment and corruption among local officials.

Micro-watershed programmes have failed because of inadequate rainfall, along with the facts that the investment has been spread across too many areas and so has typically been inadequate for each watershed, and that there may have been some diversion of funds due to corruption. Groundwater levels have been falling due to the combination of poor rainfall and over-exploitation, with the

latter cause being more significant. While farmers opt for borewells because they reduce uncertainty, across the state the Commission came across farmers whose borewells had run dry, and who were indebted because of the high costs of digging additional borewells in the desperate search for groundwater. Indeed, the costs associated with borewells count among the most important causes of cultivators' indebtedness. The Commission has observed that there are large inequities between farmers who have access to canal water and others who are dependent upon private borewell irrigation.

The chart below shows how wells (especially borewells) have become the dominant source of irrigation in the state, displacing canal irrigation and tanks, both of which have declined in terms of absolute area covered. These reflect undesirable patterns of water use, which are also likely to lead to future problems in terms of water availability.

Chart 5.1: Irrigated area by source



Source: AP Economic Survey 2003

The decline in area under tank irrigation is likely to be even more than is recorded in the official figures.

Table 5.1: Ratio of Ground Water to Surface Irrigation Across Regions

Regions	Normal Rainfall (mm)	Proportion of ground water to surface water (in terms of area covered)	
		1974 – 75	1999 – 00
North Coastal Andhra	1111.0	0.1	0.1
South Coastal Andhra	981.0	0.2	0.3
Coastal Andhra	1024.0	0.1	0.3
Rayalaseema	689.0	0.7	2.4
South Telengana	817.0	0.4	2.8
North Telengana	1036.0	0.4	2.7
Telengana	939.0	0.4	2.8
State	942.0	0.3	0.9

Source: S. Subrahmanyam (2002).

In addition, there are very large differentials in access to assured irrigation across districts in the state. A remarkable feature of the state is that districts with higher normal rainfall are also those more likely to have higher levels of assured irrigation. The table below show the extent of irrigation and rainfall in the different districts. It is evident that several districts are substantially below the state average of 40 per cent irrigated area, which is also generally perceived to be the minimum extent required for the stabilisation of agriculture. Of these, some districts are also those with the lowest extent of normal rainfall. Anantapur stands out in this regard, as having the lowest extent of irrigation as well as the lowest annual rainfall. But other districts such as Kurnool, Cuddapah, Mahbubnagar and

Rangareddy also have low rainfall and grossly inadequate irrigation facilities. Districts like Adilabad have more rainfall but very low spread of irrigation. Further, districts where cultivators rely disproportionately on groundwater have provided less certain irrigation because of the lack of replenishment of groundwater and the declining water tables in many areas. At the same time, assured water in the command areas does not encourage water conservation, especially with a flat charge per acre for water use.

It is evident that the conjunctive use of surface water and ground water must be promoted in a systematic way which will conserve both, and allow for wider access to more cultivators. Also, it is important to rectify the existing imbalance between districts and regions as to availability of irrigation.

Table 5.2: Irrigated area by district

District	Per cent		
	Per cent area irrigated	Per cent under surface water irrigation	Normal rainfall per year (mm)
Anantapur	14	3.6	521
Adilabad	14	4.7	1046
Mahbubnagar	20	2.3	754
Kurnool	20	10.1	630
Rangareddy	25	1	812
Medak	32	4.1	959
Vishakhapatnam	35	23.1	1085
Prakasam	35	16.9	752
Cuddapah	36	6	695
Khammam	40	22.2	1045
Nalgonda	40	16.9	742
Chittoor	41	6	908
Vizianagram	44	38.2	1161
Warangal	57	14.3	1049
Guntur	58	49	890
Srikakulam	59	52	1086
East Godavari	64	50	1160
Krishna	64	53.4	1029
Nizamabad	65	18.7	1089
Karimnagar	66	24.7	953
West Godavari	75	45.2	1076
Nellore	77	44.8	981
Total AP	40	20.4	925

Source: Groundwater Department, GoAP, 2002

Live rivers contribute only around 8 per cent of the surface water sources, with the remainder coming from canals and tanks. However, the availability of surface water has declined significantly in recent years, as evident from Chart 1. Therefore, access to surface water has become even more limited than earlier. There are several important problems with respect to surface water irrigation sources:

- the uneven spread of large irrigation schemes, such that most of the state does not have access to river or canal water;
- the historical neglect of particular areas, especially the districts of Anantapur, Kurnool, Cuddapah, Chittoor, Rangareddy and Mahbubnagar;
- the neglect of large/medium tanks and other traditional water sources, especially in Telengana which previously had an extensive and well connected system of tanks and ponds;
- in the canal irrigated areas, inadequate allocation for Operation and Maintenance (O&M) and management problems leading to low recovery of water charges;
- lack of incentives for saving water.

The most serious problems with respect to irrigation relate to the growing difficulties of accessing sufficient groundwater, the high costs for farmers associated with reliance on borewells, the tendency towards over-exploitation of groundwater which prevents adequate recharge and causes existing wells to go dry. The growing use of groundwater is inextricably linked with the cropping pattern, and reflects the shifts in cropping pattern towards more water-intensive crops even in areas without assured irrigation, which therefore requires accessing water through digging borewells. While farmers cannot be faulted for trying to shift towards more apparently profitable crops, and towards cash crops (especially when they have cash outlays to make such as purchased inputs and debt repayments) it is true that this system breeds a collective irrationality because of which all farmers are worse off.

It is incongruous that groundwater effectively has become privatised even though the externalities in its use are, if anything, even greater than for surface water. When one farmer digs a borewell on his/her own property, effectively a social resource is being extracted and the availability of groundwater for other farmers in the neighbouring area is thereby reduced. At the same time, farmers who are doing so are undertaking substantial expense towards digging borewells, etc. without adequate knowledge of the water resources available. In many areas the Commission visited, farmers complained that their borewells had gone dry, and several had incurred large debts for digging more borewells in the desperate search for water.

In this context, the implementation of the WALT Act has had mixed effects. On the one hand, it has had some positive effects in that it probably reduced over-exploitation of groundwater in conditions when the cumulative effect of inadequate rainfall and past overuse had made it absolutely to control and regulate such use. But it does not really control the extraction of groundwater since those who are in possession of functioning wells can continue to overexploit the groundwater. And the implementation of the Act has also affected the ability of many small farmers to access groundwater, thereby providing disproportionate benefits to those who already have functioning borewells. Therefore it is necessary to think of a different system which will ensure more equitable access. The most obvious solution is to go for the public control of groundwater resources with water charges to all farmers who have access, along similar lines as for canal water.

It is also worth noting that micro-watershed schemes, which have been encouraged with substantial resources over the past decade, do not appear to carry much credibility with the farmers. For example, in Anantapur, it was pointed out to the Commission that the district has had hundreds of watershed programmes being implemented, without any significant effect on the water table or on water availability. The basic reason for the apparent failure of many such

schemes is that the climatic conditions were unfavourable – that is, the low levels of rainfall simply did not rain enough to allow for significant water replenishment in many of the watershed areas. However, another problem is that many of these schemes were handed over to contractors and the local community had very little control over them or over the resources that had been provided, and therefore leakages were substantial. However, the evidence is mixed. There are some success stories where NGOs participated as implementing agencies. While the state government will continue to spend a substantial amount of money on these schemes under Centrally sponsored schemes, the past practice has been to spread the resources thinly to cover a larger number of watershed, instead of spending intensively on a fewer watersheds, which may be more effective. Such works can be taken up under the employment guarantee scheme as well.

The state government has provided free power for agricultural users, which has provided relief to farmers in a period of agrarian crisis. However, the Commission received a number of complaints regarding the power supply, including erratic supply, supply for too few hours at night, irregular voltage with high fluctuations causing transformers to burn. There were also numerous requests to regularise the new connections which have come up since the free power policy was announced. Agricultural workers also requested free power for their domestic consumption, up to 50 units per month. Clearly, many of these are valid requests. It should be noted, however, that if the state government does implement the policy of public takeover of borewells, then the free power supply would become redundant since the government would cover all the costs of providing water, and levy an appropriate water cess for all water users.

II. Recommendations

For surface water resources:

1. There must be an emphasis on equity in the spatial distribution of surface water resources as far as possible. Therefore, in order to bridge the existing inequities, the immediate priority in new irrigation schemes must be to provide resources for irrigation-deficient and low-rainfall areas which have been neglected in the past.

2. The conjunctive use of surface water and ground water must be stressed. For this, the state government must develop a water policy which treats all these resources together in an equitable way, and draw up schedules of water use.

3. Top priority must be given to the cleaning, repairing, maintenance and development of tanks and ponds. This must be done in mission mode on an urgent basis, possibly using labour resources that will be made available under the Employment Guarantee Scheme of the central government. The plan must be to restore existing tanks and develop new tanks without jeopardising supplies to the old tanks. Further, feeder channels to many tanks have been cut or destroyed; these must be restored. Wherever possible, water from large irrigation schemes should be made available for feeding existing tanks. There should be an inventory of traditional water bodies which must be continuously updated.

4. There is need for careful evaluation of large irrigation projects with assessment of **all** future costs, including correct estimation of the impact upon local populations, likely displacement, and related costs such as those of power generation for particular projects. In addition, large projects must be chosen only after balancing the relative needs of different regions and giving neglected regions first priority. It should be noted that major irrigation projects may be important for some dryland areas, but these projects have high costs and long

gestation periods. Wherever possible, options should be explored to have more small irrigation projects (instead of more expensive very large projects), which will involve lower costs and reduce displacement.

5. Water management and efficiency of water use are important concerns across the state, and even in areas with assured water supply in the command areas. The centrality of this must be emphasised, because even if all the potential under major, medium and minor irrigation is exploited, agriculture in the state will continue to have water problems even after 20 to 30 years unless water management and efficiency are not improved. For this, the following should be undertaken:

- Some additional resources of the state government must be directed towards developing, disseminating and providing incentives for water conservation techniques.
- **The water cess collection should be based on volumetric measurement of the water used, rather than on the area under cultivation.** Further there should be escalating rates after a certain basic volume. This will help to conserve water use. Tamper-proof meters should be supplied for this purpose in the command areas.

6. In the canal irrigated areas, the carry over storages as decided by various tribunals should be maintained by the state government, and based on that the operational plan for release of water for irrigation must be known to farmers well before each crop season.

7. It is important to ensure the participation of farmers and their representatives in the water management systems that affect them. The Andhra Pradesh Farmers Management of Irrigation Systems Act, 1997 (APFMIS Act) made the formation of Water Users' Associations mandatory for the management of irrigation. This was designed to bring greater accountability in irrigation department as well as a sense of ownership of the management systems among

farmers. More than 10,000 Water Users' Associations have been formed. However, it is generally felt that the working of these associations is not satisfactory, so efforts must be made to improve their legitimacy and functioning, and to involve all the stakeholders including women farmers.

For groundwater:

For immediate action:

1. While in the medium term the state government should aim for public control over groundwater, in the interim, there must be active involvement of the agricultural extension services and the District Water Management Agencies in recharging groundwater with rainfed water and in techniques of water conservation.
2. The government should immediately begin the process of registration of all borewells in the state.
3. Extension services must also focus on reviving and developing crops and cultivation practices suitable for rainfed agriculture and adverse irrigation conditions.
4. With regard to micro-watershed programmes, the focus should be on ensuring adequate resources to cover completely the watershed taken up, even though this may imply fewer such projects. This is important to ensure success in at least some projects.
5. In allocating resources towards such schemes in future, it is important to ensure that contractors are avoided, and that the local farmers and community are able to exercise some control, either through panchayats or through the

watershed committees. Watershed works can also be taken up under the Employment Guarantee Scheme.

Medium term proposal:

1. It has already been noted that groundwater use is currently irrational because it had effectively been privatised. Therefore, in the medium term **the state government should aim for the public takeover of groundwater resources. All the existing borewells would have to be taken over, after paying appropriate compensation to the current owners. All new borewells would be dug by and be owned by the state government. The AP Irrigation Development Corporation (APIDC) should be revived and could made into the nodal agency for the management of groundwater. Thereafter, water would be provided from the borewells on payment of water cess on the basis of volumetric measurement through tamper-proof meters, at the same rates as those applicable for command area farmers.** The local management of the water would have to be managed by an appropriate local agency. This would regulate the use of groundwater, provide more democratic access, and reduce the costs incurred by farmer for digging of borewells.

It should be noted that WALTA 2002 already makes the provision for such control in its Clause 6. (a) and (b) which specify that the Authority set up by the state government shall perform the following functions: “promote water conservation and enhancement of free cover in the state, and regulate the exploitation of ground and surface water in the state”.

For power supply:

1. Efforts should be made to increase power supply for agricultural purposes for a longer period every day. There should be systematic efforts to reduce problems

of erratic supply and irregular voltage, to ensure continuous and stable supply for a minimum of nine hours, preferably in the daytime.

2. The state government may consider a scheme of regularising the existing rural connections up to a certain date and declaring all future connections to be invalid unless registered by the appropriate authority.

3. The state government should make efforts to improve the quality of the power equipment supplied to farmers through appropriate regulation. Extension services should assist farmers in the proper use of such equipment.

4. Transmission & Distribution losses and inefficiency can be reduced with better management practices in the power sector, including more democratic and accountable functioning of the generating and distributing agencies. It is usually the case that the residual use is attributed to agriculture since this sector does not have meters.

5. Free power up to 50 units per month should be provided to all rural domestic users in BPL households.