

COMPETING INTERESTS IN WATER RESOURCES - A RURAL
AND URBAN SCENARIO IN ANDHRA PRADESH, INDIA

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ABSTRACT

Increased demographic pressure results in the fast emergence of acute water scarcity for both drinking and agricultural purposes. Surface and ground water resources show widespread signs of degradation and depletion even as demands for water continue to multiply. Water scarcity is a constraint on meeting the human needs and protection of the environment particularly in arid and semiarid regions. India is geologically covered by vast tracts of hard rocks and scarcity of water in these regions naturally leads to competing interests in water resources. Irrigation, drinking water and industry and other sectors are considered as the three distinct and important sectors of water use. As water resources dwindle competition is mounting not only among the various water use sectors but also within each of the sectors turning water scarcity as a potential source of conflict. As a result each sector attempts to draw its share of water demand at the expense of other sectors. The occurrence of such competing interests for water resources is witnessed among the various sectors as irrigation versus drinking water sectors, irrigation versus industrial and other sectors,

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drinking water versus industrial sectors and also within each of the irrigation, drinking water and industrial sectors in both rural and urban environments. In the present paper, the related issues on the competing interests for water resources in the aforementioned water use sectors in the rural and urban context of Andhra Pradesh, India are discussed. It is concluded that the remedy to the problems, conflicts and competing interests for water resources among the various sectors discussed in the paper lies in planning and implementing better water management strategies, co-operation among the water users and consumers, improvements in the water conveyance and distribution mechanisms of irrigation water, bringing a change in the traditional thinking of farmers to suit modern requirements and educating them on the water management in the practice of appropriate methods of water application on the field, adopting artificial recharge of rain water falling in the cities to conserve more water, enactment and strict implementation of water laws to control large scale abstraction and over exploitation of ground water and enforcement of provisions of the existing pollution control acts on such industries which pollute the surface and ground water resources.

INTRODUCTION

Andhra Pradesh is the fifth largest state of India. It lies between 12° to 20° N latitudes and 76° to 84° E longitudes. It has an area of nearly 1.07 lakh Sq.M (2.77 lakh km^2) occupying 8.4 % of India and a population of about 66.5 millions. The eastern part is a fertile coastal plain with deltas of rivers Godavari and Krishna. Beyond the plain lie the Eastern Ghats and part of the rocky Deccan Plateau from 492 to 1968 ft. (150 to 600 m) above sea level which is also a drought prone area. Hyderabad city, the capital of Andhra Pradesh is situated on Deccan plateau. The location map of Andhra Pradesh is presented in Fig. 1.

The per capita annual availability of water in India is about 2877 cyds (2200 m^3) which is approximately one fourth of the world average. The important river basins Godavari and Krishna in Andhra Pradesh have



Fig.1. Location Map of Andhra Pradesh

the annual water resources potential of 3900 TM cft (110.5 km^3) and (78.1 km^3) 2758 TMCft which on the per capita basis work out to 2650 cyds (2026 m^3) and 1716 cyds (1312 m^3) respectively. This indicates that the per capita annual availability of water in Godavari basin is nearer to the country's per capita availability of water than in the case of Krishna basin for which it is much lower than that figure. Hence the competing interests for water under Krishna river basin are more noticeable than in the case of Godavari basin.

Water scarcity is generally more severe in arid and semi arid regions particularly when they are covered with hard rocks and are devoid of major irrigation systems. Problem of scarcity of water in these regions naturally led to competing interests for water and is posing many associated social and environmental problems. Broadly speaking the important and vital sectors which make use of water may be divided into three, namely, irrigation, drinking water and industrial and other sectors.

Competing interests can be identified to exist

1. within the same sector and
2. among the different sectors

In the context of interstate competing interests for water resources Cauvery river and Krishna river water disputes in India are the best examples related to interests within the irrigation sector. Provision of drinking water to Chennai (formerly Madras) city from the river Krishna has agitated the farmers of the chronic drought prone Rayalaseema region of Andhra Pradesh. This is an example of competing demands for water between the irrigation and drinking water sectors. Many a time the industrial sector is in conflict with the drinking water sector by way of polluting the precious ground water and surface water sources. The industrial areas of Patancheru and Saroornagar in the capital city of Hyderabad, Andhra Pradesh stand testimony to this grave situation. Thus competing interests among the various sectors as well as within the same sector are ever increasing and causing conflicts of national and international concern apart from regional and local disputes creating much tension in the society. The competing

interests in the various sectors of water use in rural and urban contexts of Andhra Pradesh are discussed in the next few paragraphs. Fig.2 shows the block diagram of competing interests among the different sectors.

Competing Interests of Water Resources in Rural Context

Competition within the irrigation sector: Even today about 70 % of population of India live in villages and their main occupation is cultivation. Since 65% of total land area of the country and 80 % of peninsular India is occupied by hard rocks (Pathak, 1984) naturally water for agriculture and their allied activities require major share among other uses. Today in India 83 % of available water is used for agricultural purposes (Mohile, 1996). Andhra Pradesh being predominantly agricultural state, the above situation in Andhra Pradesh is not much different.

Since ancient times, large number of tanks and wells were constructed in various parts of India including Andhra Pradesh and they are utilised for irrigation purposes. As the population grew from time to time increase in food production is necessitated which in turn resulted in bringing more and more land under irrigation. Consequently large scale irrigation projects and deep tube wells are constructed. Therefore conflicts and competition in irrigation through tanks, wells and canals are discussed below.

In all these irrigation systems one common problem that is encountered is the non availability of sufficient water to tailenders as compared to the users in the upstream reaches of the canal. Thus there is always a competition for water between these users. The problem is mainly due to poor management of water in the field, conveyance losses and non co-operation among the users. The water should be judiciously utilised and conserved by drawing only the required amounts by the users at the upstream and tail end reaches of the canal.

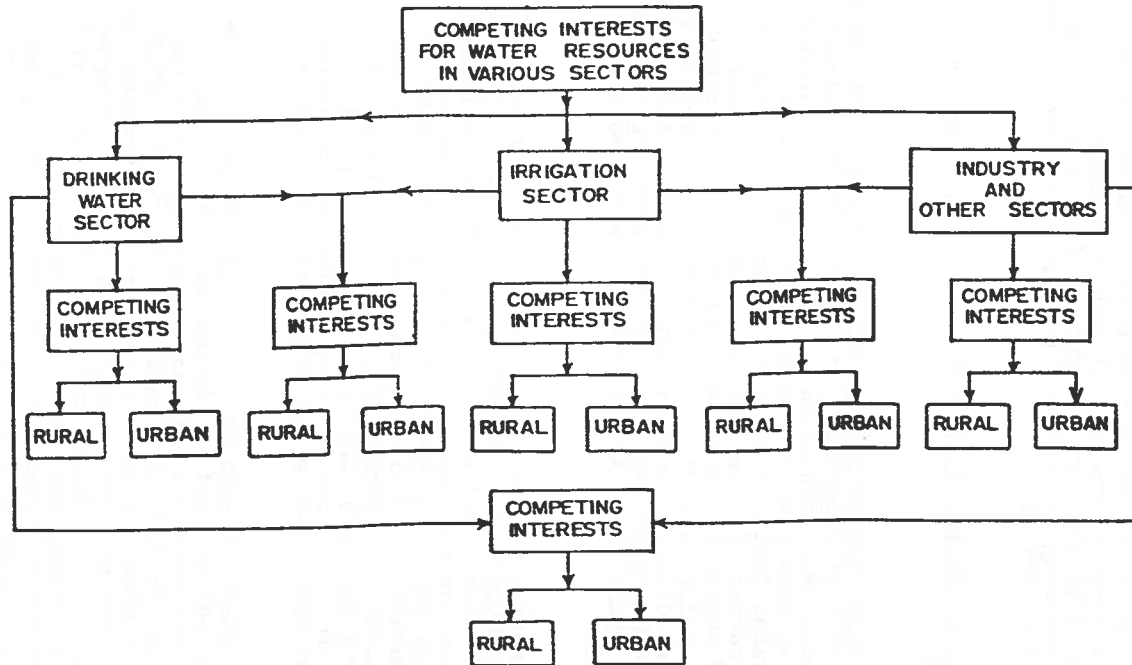


Fig. 2. Block Diagram of Competing Interests for Water Resources in Various Sectors

The remedy to this problem lies to a large extent in lining of the main canals and pipe conveyance at the field levels in the case of canal, tank and high yielding bore well irrigation systems. In the case of low yielding bore wells particularly in the arid and semi arid regions, adoption of sprinkler and drip irrigation methods are highly beneficial. Some of the important and highly seepage prone canals have been lined in India but the sprinkler and drip irrigation systems are not widely practised though the government is extending more than 50 % subsidy for creating necessary infrastructure facilities to these systems. This scenario is due to high investment costs and low agricultural returns. Lack of awareness and entrepreneurship on the part of farmers is one of the main reasons for the above situation. At least the cultivation of irrigated dry crops in the water scarce arid to semi-arid hard rock regions will solve the above problem to certain extent. This is because many bore wells in hard rock areas have limited quantum of water usually yielding around 1500 gallons per hour (6820 lph) or even less than that discharge. Under these bore wells a traditional farmer used to grow paddy hardly irrigating an acre or so. But it is seen that the same amount of water can irrigate 3 to 4 acres (1.2 to 1.6 hectares) of land when irrigated dry crops are grown. This calls for a change in the traditional thinking of the farmers to suit modern requirements. Hence farmers are to be educated on the water management (Venkateswara Rao,1996)

Competition between Irrigation and Drinking Water Sectors: Though the quantum of water requirement is relatively small drinking water sector competes with irrigation sector in rural India. Since agriculture consumes nearly 90 % of available water resources it is felt in the fifth Stockholm Water Symposium, 1995 that its share can be reduced by 30 % by adopting better water management practices to meet other demands like drinking water. For example while recommending a deep bore well for irrigation purposes in the vicinity of a village drinking water requirements of a village should also be taken into account as many a time it is observed that deep bore well pumping nearby a village has dried up the open wells as well as shallow borewells using hand pumps for drinking water in the villages.

Competition between Irrigation and Other Sectors:

Competing interests are observed between the irrigation and other sectors in the utilisation as well as maintenance of water levels of canal and tank irrigation systems. Certain water levels are to be maintained in the canals to meet inland navigation demands and from water quality considerations. In the case of tanks entire water cannot be used due to the demands of the fisheries department for the survival of fish culture. These restriction on the maintenance of water levels impose limitations on the amounts of water available for irrigation needs. The case history of Prakasam Barrage on river Krishna at Vijayawada town in Andhra Pradesh makes an interesting study in this context.

The prakasam barrage is provided with regulator gates and scour gates. The condition of the barrage has become precarious for want of regular maintenance posing danger not only to irrigation of 13.5 lakh acres (5.46 lakh hectares) in the century old Krishna delta but also 1260 MW power generation at Vijayawada Thermal Power Station situated 7.5 miles (12 km) upstream of the barrage. The thermal power station requires 2000 cusecs (56.63 cumecs) of water for cooling purposes which is provided from the barrage by gravity flow by maintaining water level of 12 ft. (3.657 mt). throughout the year. This resulted in the corrosion and jamming of regulator gates and scour gates as there is no water regulation at the barrage for want of maintaining 12 ft of water level for thermal power station. Irrigation officials feel that the power station has to make its own arrangements to pump water for its cooling purposes and state electricity board officials contend that it would be prohibitively costly to pump 2000 Cusecs of water over a height of 12 ft continuously. This will naturally increase the cost of power generation and hence the unit cost of power supply (The Hindu, 1996).

Competition within the Drinking Water Sector: Even today in many villages community differences on caste basis still continue to exist. The people of higher castes do not allow the poor and the underprivileged lower caste people in the village to draw water from the same well. If the other open wells in the village go dry or do not exist this unfortunate

section of the people have to go to distant places to fetch water for their drinking purposes.

Competing Interests in Water Resources in Urban Context:

Competition within the Drinking Water Sector: In the urban context the competition is mostly between the drinking water versus other sectors as large quantities are required for an ever increasing thickly populated mega city. With the exception of a few, most of the cities in India are provided with only interrupted municipal water supply. The situation is more critical for cities located in hard rock terrains. For example, Hyderabad, the capital of Andhra Pradesh is one such city where water is supplied only for a couple hours per day during the monsoon and winter seasons. The situation becomes more severe as summer approaches and the water supply will be restricted to alternate days releasing water for about an hour or so. Hence tapping of ground water has become inevitable in almost all residential buildings and industrial establishments in and around Hyderabad city. This situation is not much different in other major towns of Andhra Pradesh.

An important observation in cities like Hyderabad is that the people living in multistoried apartments, the affluent sections of the society who have constructed their luxurious bungalows on the hill tops and the star hotels get their water from suburban areas by transporting water by tanker throughout the day. This has resulted in completely absence of the water table in the open wells at the nearby villages, for example, Shamshabad area near Hyderabad where one has no other alternative to get water except through sinking of borewells. On account of this situation small and marginal farmers are deprived of water for their agricultural activities as the open wells are no longer useful. Consequently they are either becoming agricultural labourers under a big landlord or migrating to the city for employment and contributing to the slums of the city.

The solution to this problem lies in the artificial recharge of the rainwater falling within the city and conservation of more water for daily purposes. Competing interests within the drinking water sector of the urban environment can be clearly noticed with the growth of the multistoried apartments. For a well developed colony where independent houses with one layer or two layer population exist, local ground water available at relatively shallow depths is generally adequate for the domestic needs of the residents. But with the rising up of multistoried apartments in the same colony or in its vicinity, water table is depleted due to deep pumpage by the apartment dwellers. The residents of adjacent houses have to either deepen their existing wells or get water transported from outside. In the absence of stringent ground water legislation excessive abstraction of ground water and consequent lowering of ground water table becomes a recurring feature.

Drinking Water Sector versus Industrial Sector: It has been mentioned earlier that in the urban environment the industrial sector is in conflict with the drinking water sector by way of polluting the precious ground water and fresh surface water sources. In Hyderabad city, Patancheru and Saroornagar industrial areas are the classic examples in this direction. In Patancheru area an ephemeral stream Nakkavagu supplies water to the adjacent lands and is used as an effluent stream to provide drinking water in the shallow open wells to the surrounding population prior to the industrialisation of the area. After the establishment of a number of chemical industries in the area untreated or partially treated effluents are being discharged into the stream there by completely polluting the surface water as well as ground water. The result is that cultivation along the stream was given up and drinking water wells were abandoned (Sudhakar, 1995).

In Saroornagar area of Hyderabad a pharmaceutical factory has injected its effluents into the aquifer by forming a number of ditches in the ground and filling them with the untreated or partially treated effluents. This has caused pollution of ground water beyond proportions and led to the migration of some of the residents of the area to other parts of the city. Now a pipeline is laid by the factory to discharge its effluents to the nearby Musi river. But

already much damage has been done to the groundwater resources. Only large scale pumping and artificial recharge can only bring the situation to normal conditions (Yadaiah, 1992).

The above examples amply demonstrate that although there are legislative provisions to control if not totally prevent the pollution, gross violation of the pollution control act by the industries and their apathy towards the well being of the society defeats the very purpose of the act. Thus the competition for fresh water in the city environment is increasing day by day. Recently the Andhra Pradesh government has formulated some draft regulations to check and control groundwater extraction by borewells in the urban conglomerations and to pass it into an act. In spite of the existence of pollution control act and other water laws that may be enacted later, some times political considerations play a vital role to hinder the implementation of the provisions of the acts.

CONCLUSIONS

Competing interests in water resources are identified between the various sectors and within the same sector in rural and urban contexts of Andhra Pradesh, India. Better water management for irrigation will bring down the competition for water within the irrigation sector as well as other sectors such as drinking water. Drinking water priorities should be taken into account while creating infrastructure facilities for irrigation water in the context of rural environment. Transporting of ground water to the cities from suburban areas has to be seriously viewed as there is the danger of water table being lowered in the suburban areas and giving rise to environmental problems. Drilling of deep bore wells within the city without the creation of proper recharge facilities for storm runoff will render many existing and relatively shallow well structures infructuous. Strict adherence to the provisions of existing laws or laws to be enacted in respect of the ground water utilisation should be practised by the city dwellers while it is imperative for the industries to scrupulously adopt the preventive and

control measures of pollution of water sources as per the existing provisions of the pollution control act. Political interests should not come in the way as an impediment for the Government to strictly implement the provisions of the law concerning pollution control and water management.

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