

WATER HARVESTING IN COASTAL AND DELTAIC REGION

S. Panda

Research Associate, Water Management Project (SPV), C. R. Farm,
Bidhan Chandra Krishi Viswavidyalaya, P. O. Gayeshpur,
Nadia-741 234 (WB)

And

A. K. Ghosh

Addl. Chief Engineer (Water supply), M. N. Dastur & Company Ltd.,
Consulting Engineers, P-17, Mission Row Extension, Calcutta-700013

ABSTRACT

The year long experiences of the authors are presented here. They have experienced the problem of delineating a watershed in the coastal and deltaic regions. Ingress of sea water in rivers, channels and groundwater further intensifies the problem in developmental work. Waterharvesting in suitably designed ponds, mixed farming with agroforestry and fish farming may rule out the complexities to some extent. Indian deltaic regions form a very important geographical entity due to significant number of population and agricultural activity and this necessitates large scale industrial activities. So, sustainable water harvesting and utilisation policy should be formulated in view of complex geomorphological, hydrological factors and human activities in the concerned region.

INTRODUCTION :

The coastal and deltaic regions maintain a very delicate balance in sedimentological characteristics as well as in quality of water available from different sources. Geomorphologically a deltaic region converts a landscape which is flat and is under constant modification due to deposition of sediments as well as outflow of river water and ingress of sea water through tidal channels. Rainfall also plays a very important role in shaping the landform of deltaic region and in modifying the quality of water from various surface water bodies and ground water sources.

WATERSHED :

Watershed is that portion of the earth from where the rain water gets collected and gets mixed up with sediments eroded from the watershed and finally finds its way to the lowest point of the watershed. In hilly regions the watersheds may be marked with clarity but in deltaic and coastal region it is rather difficult to mark the watershed clearly. Further the typical dynamic geomorphological condition existing in the deltaic and coastal regions continuously modifies the watershed boundary.

Hydrologic and Geomorphologic Characteristics of Deltaic Region :

In most of the deltaic coastal regions it will be observed that the surface water resources flowing in the rivers and channels are saline due to ingress of sea water. Further unless suitable measures are taken the rainfall causes erosion of the landform and thus valuable soil gets eroded and carried out with the runoff. Thus the best method of soil and water conservation is making provisions for ponds with suitable bunds. The depth of the pond should be

selected on the basis of soil conditions prevailing in the region. Based on the soil permeability the most impermeable strata should be selected as the bottom strata and then a few steps have to be provided to avoid collapse of sides. Finally a few trees have to be provided on all sides of the bund to minimise soil erosion.

The geomorphological and hydrological conditions in the South 24 Parganas is rather complex. A number of streams and tidal channels crisscross the watershed. In addition the lowlands form a number of ponds which get filled up during rainy season. The total annual rainfall is 1750 mm. and the rainfall is mostly concentrated during the months June to September. The soil is infested with salinity alkalinity problem. The area can be developed only by practicing mixed farming which will include varieties of crop suitable for growth in saline land, fish farming as well as social forestry and other types of afforestation.

WATER AVAILABILITY AND QUALITY PARTICULARS

Availability of water and its utilisation is a very complex system particularly when sustainability of the resource over a longterm situation is considered. The overall supply of water in nature is constant but its availability varies from season to season. On the other hand water can be utilised for human purpose only when it is available at an optimum rate and it has a certain usable quality. In India deltaic regions are inhabited by a significant population and agricultural activity is also significant. Being close to coast these regions are also important so far as large scale industrial activities are considered. The overall system related to water resource in coastal and deltaic regions is complex and influenced by a variety of geomorphological and hydrological factors and also affected by human activities.

The variation in water quality for two deltaic regions in India

namely 1) Sunderban Area and 2) Godavari Delta are presented in Table—1 and 2.

The soils in the Sunderban area are mostly heavy textured soils (silty clay to clay loam). Due to its heavy nature the soils have very low hydraulic conductivity. These soils are gradually sloped towards the Bay of Bengal. The average G.L. of this area ranges between 1.2 and 3 m. with a flat topography and are protected from the ingress of sea water by constructing bunds and dykes.

The soils in the Godavari Delta is characterised by a small bed of sandy alluvium on the top and underlain by blackish soil and medium stiff or soft clay upto a depth of 50 m and this soil has very low hydraulic conductivity.

TABLE—I

SUNDARBON AREA

PLACE	SOURCE	PH	CONDUCTIVITY (-mhos/cm)
CANNING	POND	7.5	600
	PIEZOMETER	7.75	24800
	TUBEWELL	7.6	2500
GOSABA	POND	7.6	2600
	PIEZOMETER	7.9	30800
	TUBEWELL	7.5	2900
JAGATDAL	RIVER	7.7	45500
SAPTAMUKHI	RIVER	8.15	45500
MATLA Lower Canning	RIVER	8.0	41000

TABLE—2

GODAVARI DELTA

A. SURFACE WATER :

PLACE	PH.	CONDUCTIVITY (mhos/cm)
1. Cheriyanam (Godavari River)	8.3	5350
2. Pallamkurru (Godavari River)	7.5	20350
3. Balusutippa (Godavari River)	7.6	35310
4. Kottapalem (Godavari River)	7.7	37450
5. Balsutippa (Canal)	7.8	1070
6. Dontikurru (Canal)	7.7	246
7. Balusutippa (Tank)	8.0	6688
8. Military Peta (Tank)	8.1	449
9. Kandikuppa (Tank)	8.3	353
10. Gaddanapalli (Tank)	7.8	342

B. GROUND WATER (OPEN WELL) WITHIN 10 M FROM G. L.

1. Devaguptam	7.3	5243
2. Taoikona	7.4	3317
3. Gopavaram	7.3	1980
4. Bhimanapalli	6.8	428
5. Gollavelli	7.0	2729
6. Uppalaguptam	7.2	1049
7. Nkotapalli	7.0	2408
8. Katrenikona	7.4	1220
9. Sattemmachettu	7.2	1926

Table 1 and 2 show that there is wide variation of water quality from different water bodies. The surface water bodies like tank and pond are of reasonably better quality compared to the water available in rivers. The reason in both the cases is due to tidal effect of entry of saline water.

CONCLUSION

1. Significantly populated deltaic and coastal regions require sustainable water harvesting and utilisation policy to be formulated in view of complex geomorphological, hydrological factors and human activities and industrial development.
2. The dynamic nature of the overall hydrological and geomorphic conditions need constant monitoring of water quality in these regions.

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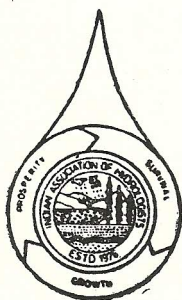
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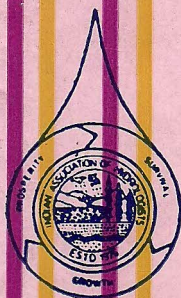
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