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Water – where are we leading ourselves to?

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Once again as the summer approaches we frantically search for various means to get few buckets of potable water. Year after year different government and non-governmental agencies involve directly or indirectly in mobilizing various resources to meet the water needs of the people, albeit with marginal short-term success. As fresh water forms a small fraction of the planet's hydrosphere (less than 3% of the total volume) its use needs a critical planning by the human society especially as natural and anthropogenic factors are considerably affecting the global as well as local water system. The global water system under natural conditions is a complex amalgam of pools and dynamics linked through complex interactions defined by the physics, biogeochemistry and biology of the planet and as such we need to understand a series of interacting components that are both natural and man-made. It is noticed that the fresh water cycles are under rapid transformation. Major anthropogenic forces and their impacts transforming the present day global water system could be subdivided into seven branches viz. 1) climate change, 2) basin scale water balance changes, 3) river flow regulation, 4) sediment fluxes, 5) chemical pollution, 6) microbial pollution and 7) bio-diversity changes (Vörösomarty et al. 2004)

In our country, significant changes are noticed due to almost all these factors, even though global changes seem to be directly connected with the first. When I look at various factors the major concern is the irregular river flow regulation, that has caused significant changes in the river basin dynamics. The way artificial recharging structures are planned and executed without understanding the basin dynamics needs an immediate quality control monitoring mechanism as the planning and executing authorities invariably believe in producing quantity oriented figures at the expense of quality. This is evident from what we have witnessed in Andhra Pradesh during the last couple of years in the form of large scale erection of artificial recharging facilities (without following area specific design characteristics based on a systematic synthesis of Geomorphology, Hydrology, Structural Engineering and socio-economic considerations). This activity, unfortunately, has drained not only our finances but also the inflows into age old dependent surface water bodies through natural rivulets and drains. It is extremely essential to bridge the conceptual and practical gaps that arise from differences in nomenclature, quantitative and descriptive approaches. Even though we agree that the state of water resources at local and even national scales is often a highly visible policy concern a comprehensive internationally accepted policy procedures that can be executed under a quality control mechanism have to be taken up without any further delay to arrest irreversible damage to our surface and subsurface water regimes. At the same time I am not advocating non-exploitation of our water sources attributing probable linkage between global and local water systems, as commonly emphasized by experts from the western world. I only stress the need to overcome the chaotic situation introduced under the pretext of development. In this context it is relevant to bring into focus the state of many of our rivers and rivulets. The discharge in many rivers has been heavily altered (In A.P itself almost all the rivers that used to feed Rayalaseema have become defunct or significantly altered. Ex; Bahuda, Cheyyair, Tungabhadra, Pennar and even Krishna. It is the case even in Telangana and Andhra) with the aim of stabilizing or redirecting flows to optimize water supply. Such hydraulic manipulation includes major surface water diversions and ground water extraction for irrigation, impoundment, channel dredging and wetland drainage without understanding the linkage between surface and subsurface water regimes. Many basins have been dramatically transformed with the rivers showing a complete or nearly complete loss of perennial discharge to the oceans. Even though arresting the river flows into sea to meet inland needs could be excused (if the environmental degradation is avoided while designing and executing the storage and distribution channels), we need to keep in mind the probable influence of such an exercise in the long run on the land and ocean ecologies.

In the southern states where majority of the river systems are tinkered considerably by the over dependant farming community withdrawal has considerably exceeded river flow. It is clearly established that in these states ground water mining has already introduced an irreversible damage to the subsurface water regime. Added to this the coastal

salinity intrusion, creation of artificial dry river systems with severed connections to the ocean have created problems of far recharging consequence.

In nutshell we are in a chaotic situation. We need new ideas and creative solutions to overcome the created problems. Anxiety and stress felt by the common man and the government should ignite survival instincts and help us to gear up to tackle the turmoil. Unfortunately we are unable to visualize the gravity of the situation. So, it is high time we take measures (even if they are harsh) by taking the common man into confidence. For this educating/ training modules for all the concerned need to be built, giving importance to area specific information and needs.

Some of the solutions could be (I am aware of the practical problems in implementing them).

I. For urban conglomeration:

a) Identify the surface water bodies that are feeding the urban population and ensure longevity of such structures by eliminating water inflow obstructions built in the catchment areas in the name of artificial recharging facilities.

b) Evict encroachments that have clogged/damaged the water bodies. In other words rehabilitate all the tanks that have been existing prior to urban construction boom.

c) Regularly desilt such water bodies and ensure pollution free environment.

d) Identify high yielding deep bore wells and distribute water from such sources for the use of adjacent dwellings. This, even if opposed by the bore well owners, would ensure equitable distribution of ground water to one and all.

II. For irrigation purposes at village levels:

a) Avoid to the extent possible crops that need more water or at least introduce alternate irrigation practices that need limited water, like sprinkler and drip.

b) Control over pumping of subsurface water resources by strictly introducing devices into the pumping and distributory systems to automatically control water usage beyond permissible limit.

c) Introduction of saline resistant cropping options in the coastal regions that are prone to saline water intrusion. Identify the often affected saline water intrusion zones and arrest such intrusions by erecting subsurface filter beds that arrest inflows from sea while allowing seaward flows.

d) Arrest the large scale mining of river sand beds. This mining has converted number of rivers into free flowing structures resulting in loss of water as run off without charging the adjacent wells.

e) Strict quality control in planning, designing and erecting artificial recharging structures like check dams, subsurface dykes, percolation tanks etc. As a first step a monitoring system has to be evolved that can ensure quality control both in planning and executing these works usually taken up as time bound programs.

f) Since human species have a moral duty to protect bio-diversity, through a sufficient water to maintain flora and fauna it is extremely essential to either allocate a defined quantity of water or atleast divert once used water (after treatment) for this purpose by developing parks in each and every village as a part of developmental program.

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REFERENCE

Vörösomarty et al. 2004. Humans Transforming the Global Water System. E.O.S, v.85 No. 48.