

REHABILITATION OF WATER RESOURCES

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ABSTRACT

During the hearing of “Public Interest Litigation”, on dated 18th July 2003, the Rajasthan High Court, issued an order to the Government of Rajasthan to constitute an Expert Committee to identify the catchment areas which have been used for construction, mining and other purposes; and to suggest measures for restoring the catchment areas to their original shape and use.

The Government of Rajasthan constituted a four member Expert Committee.

1	Mr. Y.C. Agrawal	Director (Minor Irrigation schemes), Investigation, Design & Research Unit Irrigation Department,	Jaipur	Convener
2	Mr. S.B.L. Mathur	Joint Director, Jodhpur Range, Watershed Development & Soil-Conservation Department,	Jodhpur	Member
3	Mr. S.S. Dhindsa	Chief Chemist, Public Health Engineering Department	Jaipur	Member
4	Mr. Rakesh Hirat	Superintending Mining Engineer	Udaipur	Member

The committee framed a tour programme to visit lakes, mining areas, tanks, ponds, embankments, drainage channels to appraise itself about the ground realities. The committee discussed the matter with the government officials, NGO's and local people. The State Remote Sensing Application Centre Jodhpur was requested for catchment characterization using satellite imageries. District Level Expert Committees were formed and report of obstructions in each district was received from these district level committees. At some places, proper drainage crossing in embankments, residential colonies and other construction activities have not been provided to allow free and uninterrupted flow of water in drainage channels. Untreated domestic waste, industrial waste and other wastes are coming in water storage bodies. Mining has adversely affected the water resources. All land shown as drainage channels like rivers, tributaries, small natural drainage channels etc. as on 15.8.1947 should be declared as Govt. land. Demarcation of catchment areas and drainage channels should be done. Obstructions in the free flow of water in drainage channels should be removed. The government should specify places for dumping various types of waste material. On the periphery of lakes, ponds, water bodies in urban and rural areas, a masonry or concrete drain should be constructed on periphery of the water body to prevent entry of domestic, industrial and other waste in the water body.

The Rajasthan Government has started implementing the orders of the Rajasthan High Court. Under the direction of the state government, all the concerning departments like Irrigation, local self government, revenue department, etc. have issued orders for taking action as suggested in the report.

INTRODUCTION:

A Civil Writ “Public Interest Litigation” D.B. 1536/2003, Abdul Rahaman v/s State of Rajasthan was filed in the Rajasthan High Court raising an issue of high public importance emphasizing on the need to protect tanks and ponds for proper and healthy environment to enable the people to enjoy a quality life which is essence of right of a citizen under article 21 of the Constitution of India. The Rajasthan High Court during hearing of “Public Interest Litigation” observed that it appears there has been indiscriminate utilization of the catchment areas for construction and mining purposes which has prevented lakes, reservoirs, rivers, ponds, etc. from receiving water even during the rainy season.

The Rajasthan High Court on dated 18th July 2003, directed the Rajasthan Government

- To undertake a general survey to identify the catchment areas which have been used for construction and mining purposes

- It was further directed that survey shall also be undertaken for the purpose of studying the effect of utilization of catchment areas for construction and mining purposes or for other purposes
- Further suggestion was sought for restoring the catchment areas to their original shape and use

Pursuant to the directions of the Rajasthan High Court dated 18th July 2003, an Expert Committee with the following composition was constituted by the Rajasthan Government vide Secretary to the Government, Irrigation Department, Rajasthan, Jaipur order dated 19th September 2003.

1	Mr. Y.C. Agrawal	Director (Minor Irrigation schemes), Investigation, Design & Research Unit Irrigation Department,	Jaipur	Convener
2	Mr. S.B.L. Mathur	Joint Director, Jodhpur Range, Watershed Development & Soil-Conservation Department,	Jodhpur	Member
3	Mr. S.S. Dhindsa	Chief Chemist, Public Health Engineering Department	Jaipur	Member
4	Mr. Rakesh Hirat	Superintending Mining Engineer	Udaipur	Member

The committee will

- Undertake a General Survey to identify the catchment areas which have been used for construction and mining.
- Study the effect of utilization of catchment areas for construction and mining or other purposes.
- Suggest measures for restoring the catchment areas to their original shape and use.

METHOD

The committee held a meeting on 20.9.2003 at Jaipur and discussed the matter in detail. Following decisions were taken in the meeting.

- To inspect the school constructed on Nadi as complained by Mr. Abdul Rahman in his D.B. Civil writ petition 1536/2003 Abdul Rahaman V/s State and others.
- To inspect the various lakes in Udaipur, Rajsamand and Ajmer.
- To meet Government officials and non – Government persons related to the subject.
- To inspect the mining area and to collect information of mining areas.

Accordingly the committee framed a tour programme to visit Jodhpur, Balia village of Didwana Tehsil district Nagaur, Udaipur, Rajsamand lake, mining areas in district Rajsamand and the tanks, ponds, embankments, drainage channels enroute, Ana Sagar Lake at Ajmer.

The committee members met at Jodhpur on 23.9.03 and went to Didwana to meet the SDM and other related officials. The committee members and SDM Didwana along with other related officials and Sarpanch of Balia village visited the 'Nadi' in question. The Sajra and Khasra of Balia village were also studied. The school building in question, nearby small hill, existing Nalla of the Balia village and other nearby area were also visited. It was seen that the Khasra Number 253 on which school has been constructed is shown in village Khasra as GairMumkinNadi. Other than school building, many other single story buildings were also there, on Khasra No. 253, which were said to be constructed earlier than school building in question.

The nearby small hill was also inspected. It was seen pits have been excavated (by the villagers of nearby area as intimated by Government officials and persons present there) for requirement of murum and other building material. The small nalla starting from small hill was also inspected up to the railway line where a bridge has been provided over the nalla to pass rainwater. *This nalla has not been obstructed and whenever rainwater will come, it will flow in nalla in a normal way. The land on which school is constructed is higher than nallalbed.* Presently no Nadi exists at the Khasra No. 253. The committee members return back to Jodhpur in the evening.

Next day on 24th September 2003, the committee met Shri R.K. Soni Additional Government Advocate, Jodhpur and Shri Rajendra Prasad Vyas, Additional Advocate General, Jodhpur who are related to this case. The committee also met the Shri Khem Raj Divisional Commissioner Jodhpur. The committee also met the following Government officers and discussed the matter with them.

- Additional Chief Engineer, Irrigation Zone, Jodhpur.
- Superintending Engineer, Irrigation Circle, Jodhpur.
- Executive Engineer, Irrigation Division, Jodhpur.
- Sh. N.K. Kalra, Project Director, State Remote Sensing Application Centre, Jodhpur.

- Executive Engineer, Mining Department, Jodhpur

During the discussion, officers were of the view that inflow in lakes, reservoirs, etc. has reduced in comparison to earlier years. Before the arrival of the water of Indira Gandhi Nahar Project (through lift canal) in Jodhpur, there was water scarcity problem in the city and also in villages in the Jodhpur district. There was a general view that it is difficult manually to study the obstructions in catchment areas in a comprehensive and correct manner. Therefore the help of *Remote Sensing Method* should be taken through the “*State Remote Sensing Application Centre Jodhpur*” under the Science and Technology Department, Government of Rajasthan. It was concluded that catchment characterization for all types of water bodies in the state will take a long time and will be costlier. Therefore the catchment characterization work of *all Major and Medium Projects (whose number is 100)* by Remote Sensing Technology should be taken up. The *Multipurpose resolution 23.5 metre data* from “*Indian Remote Sensing Satellite LISS – III sensor*” may be employed for it. The officials of the Revenue, Irrigation and other departments of the Government of Rajasthan may identify the obstructions in the catchment areas of the Minor Irrigation Projects and other small reservoirs.

It was further decided that

- Satellite data of LISS – III of Indian Remote Sensing Agency (NRSA) Department of Space, Government of India, Hyderabad for latest post monsoon period i.e. September - October 2003 will be used.
- Base maps in digital mode will be prepared taking site maps of Irrigation Department as reference
- Nature of obstruction in catchment / submergence area will be identified and delineated. If its occupancy is of sizable area, it may also be delineated and area will also be calculated.
- All details as mentioned in objective will be depicted.
- Outputs in hard copy (computer generated) will be generated on 1:50,000 scale for water bodies having catchment area up to 800 km² and beyond that the maps will be of 1:2,50,000 scale. “Details of obstruction prints” may be separately plotted as inset.

The project Director State Remote Sensing Application Centre Jodhpur indicated that the cost of the work would be around Rs. 22.70 lac. *In the evening committee proceeded to Udaipur.*

On 25th September 2003 the committee discussed the matter with Mr. P. Pandya, Secretary Urban Improvement Trust (UIT) Udaipur and Mr. Pathan, OSD, UIT Udaipur regarding the catchment area of lakes of Udaipur city. Then the committee met Shri D.D. Derashree, the Additional Chief Engineer, Irrigation zone, Udaipur and Shri I.S. Gaden Superintending Engineer, Irrigation Circle, Udaipur. The committee also held discussions with Mr. Anil Mehta member JheelSanrashanSamiti Udaipur. The committee visited the FatehSagar Lake with Mr. Anil Mehta, Shri I.S. Gaden and other officials of Irrigation & Mining Department. Then the committee met the other members of the *JheelSanrashanSamiti* including Mr. Jagat Singh Mehta former Foreign Secretary, Government of India. The committee met the Divisional Commissioner Udaipur in the afternoon.

During the visit of *FatehSagar Lake*, it was seen that a *hotel has been constructed in the bed of lake*. It was also brought to the notice of the committee that “*Katedari right*” have also been given to the private persons for the land in the bed of lake. This situation may be in the other lakes of the state also. *It was concluded by the committee members that such Khatedari rights must be withdrawn.* The committee observed that *some inlets of the FatehSagar Lake have been fully or partially blocked causing reduction in inflow of water in the lake*. It was also brought to the notice of the committee that untreated domestic waste, industrial waste and other waste are getting entry into water bodies of lakes / reservoirs *causing deterioration of quality of water*. The committee was of the opinion that *a drain should be constructed on the periphery of lake*, etc. to prevent entry of such waste materials into the lakes, etc. *This polluted water should be treated and released in the river/ nalla streams.* The Committee observed that width of inlet channels of lakes has reduced and is variable. It is necessary to *remove obstructions in the width of the inlet channels* and to define their width by providing suitable arrangements like masonry walls, pillars, etc. Wherever required, deepening of such inlet channels must be done.

On 26th September 2004, the committee proceeded by road to *Rajsamand* and visited *Rajsamandlake and mining leases of Kelwa block*. The committee also visited the processing units enroute and the *Gomti River crossing on Chhaparkhedi – Tasol road*. The slurry and discarded marble stone block / khanda were seen in river bed near banks and adjoining the causeway. It was seen that on Udaipur-Ajmer road near the river/nalla crossings, marble slurry and waste from processing units has been dumped in the river bed along both banks. The discussions were held with the mining Engineers, head of association of processing units and many mine owners.

In the way it was observed that *along the contours of the hills, dry stone masonry walls have been constructed* in most of the cases to check erosion of soil along steep hill slopes. These check walls cause hindrance in the free flow of rain water to the bottom of hills. The committee recommends that the “*Watershed and Soil*

Conservation Department” Government of Rajasthan, should prepare guidelines for construction of such contour guide walls to have minimum possible effect on free flow of rain water to the bottom of hills. Similarly it was observed that the Forest Department / local villagers have constructed masonry / dry stone masonry boundary walls on their lands, which obstruct the free flow of rain water. The Forest Department should prepare guidelines for such boundary walls to have minimum effect on free flow of rain water. The private land-owners must provide free passage of rain water across the boundary walls constructed along the periphery of their land.

The committee then reached and visited the **Raj Samand Dam**. The committee observed that *there is no water in Raj Samandlake this year.*

The committee visited the Road Causeway (about 10 km upstream of Raj Samand Dam) across Gomati River (which carries water into the Raj Samand Lake) on Chhaparkhedi – Tasol road. The marble processing units have dumped the rejected big marble stone blocks and marble slurry on both sides of the Causeway up to road level making the road Causeway ineffective. *Thus the water of Gomati River can not enter the Raj Samand Lake until the water level in the river is above road level.* This was the main reason that there was no water in Raj Samand Lake during the visit of committee on September 26, 2003.

Construction of Anicuts of great heights is another major reason. The committee recommended that the height of Anicuts should be restricted to 2 metres only above the deepest nalla bed level as per government orders and the Government must dismantle additional height.

The processing units have dumped the marble slurry and waste produced by them in the Gomati river bed along both banks and both sides of Chhaparkhedi – Tasol Road and other nearby drainage channels reducing their water carrying capacity.

From Udaipur to Raj Samand, the committee noticed that the waste material has been dumped in the bed along both banks of the drainage channels, which must be removed.

The discussions were held with the mining Engineers, head of association of processing units and many mine owners. The committee also visited the Kelwa cluster of Raj Samand district. Here mining operations for the marble are being done. The excavation work was being done above ground level. In most parts of the Rajasthan State, mining operations are being done for building stones, metallic and non- metallic minerals. In Kelwa cluster, the committee observed that the mining operation does not influence the nearby nalla of catchment area. Due to interference with the hills and the plain ground, the run off (of rain water) from the mining leases may be somewhat less than the area where there are no mining leases.

Where the mines / quarries have excavated below ground level, the rain water gets entry into these mines/ quarries and only after filling them, is able to flow in drainage channels downstream of such mines / quarries. This reduces the volume and speed of water reaching ponds, lakes, reservoirs, etc. Therefore committee recommends that the Government should construct ring bunds along the periphery of such mines / quarries and also excavate link drainage channels along periphery of mines / quarries to by pass mines/ quarries. If it is not possible, such mines / quarries must be closed and refilled by waste material / other material for unobstructed flow of rain water in drainage channels.

Where ever the mines / quarries are being excavated below ground level, after the rains, they are dewatered. This lowers down the water table in nearby wells, which have to be deepened and more power is required to lift water from such wells. Baran district of Rajasthan is worst affected with such problems.

It has been indicated by the Mining & Geology Department, Government of Rajasthan that the mining lease out area is below 1 percent of the geographical area of the Rajasthan State.

After visiting the Kelwa cluster of mines, we proceeded to Ajmer by road. During the journey from Udaipur to Ajmer, the committee observed that the culverts constructed across drainage channels have been made ineffective by filling earth in nalla on both sides of the road. This may be the position at other places in the Rajasthan State. The nalla on both sides of the road culvert was being filled with earth brought by tractors by a private party for business activity (for making show room) on National Highway No. 8 (Udaipur – Ajmer portion) at Km 203 near “Kunal Marbles”.

It is felt that land is not available for dumping the waste material obtained from mining activities / other activities. The land of drainage channels is government land and there is nobody to prevent them from dumping the waste material in drainage channels. The public and most of the government officials are not able to visualize the harm caused by such activities. It is therefore necessary that the severe punishment should be provided in the Indian panel Code for such activities. Till than, the government must issue suitable orders to force the defaulters to remove such waste material from drainage channels and prevent the defaulters from

dumping the waste material in drainage channels in future. It is also recommended that Government should specify some land in every Panchayat for dumping waste material.

At Ajmer, the committee visited the Ana Sagar Lake. Discussions were held with Mr. Rao, Secretary, Urban Improvement Trust (UIT) Ajmer and the Executive Engineer UIT Ajmer. Discussions were also held with Mr. Nathani Executive Engineer Irrigation Division, Ajmer and Mr. Saraswat Assistant Engineer Irrigation Division Ajmer. It was brought to the notice of the committee that the *Khatedari rights have been given to the private persons in the bed of the Ana Sagar Lake.* Also there are obstructions in the inflow channels and the outflow channels of the Lake, which are causing the problem. *It was also brought to notice that inflow from part catchment area of Ana Sagar Lake has been diverted to some other depression.*

The Ana Sagar Lake was overflowing nearly every year, which in recent years has not over flown. When the Ana Sagar Lake overflowed in the past, the surplus water caused problems to the inhabitants having property on either bank of the outflow channel. Also the water entered the residential colonies due to higher water level in Ana Sagar Lake.

It is essential that the obstructions in the inflow and outflow channels are removed and their capacity is increased. There is necessity to take up protection works for the residential colonies due to increased submergence area of the Ana Sagar Lake caused by higher water level in the lake.

The committee submitted its first report to the Government on dated 29 th September 2003. Thereafter the committee in its meeting decided that the District Level Expert Committees under the Chairmanship of District Collectors with Executive Engineer irrigation Division as Member Secretary may be formed to obtain report of obstructions from each district. The district level officers of revenue department and other departments involved in construction activities should be the member of such committees. Accordingly Secretary to the Government, Irrigation Department, Rajasthan, Jaipur requested the District Collectors to form the District Level expert Committees and to submit the information of obstructions in a prescribed format vide letter No. T-45/DMIS/1171-1216 dated 15.11.03.

A factual report was submitted to the Rajasthan High Court and was *considered by the court on dated 20.11.2003. The Court found the report as satisfactory* and ordered to submit the final general survey report in next hearing on 20 th January 2004.

The District Collectors formed District Level Expert Committees and they collected the desired information and submitted it to the State Level Expert Committee. The State Level Expert Committee analyzed the information. The district wise abstract of this information has been prepared. The detailed district wise information was also compiled. Total obstructions were identified as 4674 in 203.94 Km² area. Out of this the committee suggested not to remove 816 obstructions as they are having negligible effect. 1803 obstructions can not be removed. *Net obstructions to be removed have been suggested as 2055 having an area of 103.46 Km².*

The State Level Committee submitted its final report of the general survey of the catchment areas of the Rajasthan state on dated 5 th January 2004 to the Government of Rajasthan. The Government of Rajasthan through the officer-in-charge submitted the report to the Rajasthan High Court Jodhpur.

Rs. 22.70 lac has been transferred to the *State Remote Sensing Application Centre Jodhpur* in the month of February 2004 for catchment characterization of all Major and Medium Irrigation Projects of Rajasthan (100 No.).

RESULTS

Suggestions for restoring the catchment areas to their original shape and use

Looking to the site visit by the State Level Expert Committee in September 2003 and General Survey Reports received from the District Collectors and Chairmen District Expert Committee, following measures should be taken to restore the catchment areas to their original shape and use.

1. All land shown as drainage channels like nalla, rivers, tributaries etc. *as on 15.8.1947 should be declared as Govt. land.* Any conversions made after 15.8.1947 should be declared illegal. The relevant act and rules must be amended accordingly.
2. *Demarcation of catchment areas* should be done by constructing pillars at suitable spacing depending upon size of the catchment area with the help of GT sheet of scale 1:25,000 or 1:50,000 and/or “*Water Shed Atlas of Rajasthan*” prepared by the State Remote Sensing Application Centre, Jodhpur
3. Demarcation of drainage channels

- (i) In uninhabited areas this can be done by installing pillars at suitable spacing or by constructing side wall depending upon size of drainage channel and its importance.
 - (ii) In urban and rural areas, the demarcation of drainage channels must essentially be done by constructing side walls of appropriate height and thickness.
4. In the government owned lakes and other water bodies, the Khatedari rights of private persons in their submergence area should be brought under the ownership of the government.
 5. Engineering professionals and Patwaries should be inspected the drainage channels in the catchment areas. Wherever there are obstructions in nalla, it should be suitably removed by constructing culverts, deepening and widening of nallas etc.
 6. Wherever there are any construction activities, which may interfere with the flow of water in the drainage channels, no objection certificate must be obtained from the Irrigation Department.
 7. The Anicuts more than 2 m height above deepest nalla bed should be identified. The height more than 2 m should be dismantled.
 8. Wherever residential colonies have been constructed obstructing flow in drainage channels, the obstruction must be removed and nallas may be deepened /constructed.
 9. On the periphery of lakes, ponds, water bodies in urban and rural areas, a pucca drain should be constructed on periphery of the water body to prevent entry of domestic, industrial and other waste in the water body.
 10. For soil conservation work, suitable guidelines must be issued by the “Watershed & Soil Conservation Department” so that these works make minimum possible interference with the flow of water.
 11. The district administration should specify *places for dumping various types of waste material*. If any body is found to dump the waste material in other places, particularly drainage channels, then suitable punishment should be provided in the law.
 12. The government should use television, radio and newspapers to *create awareness* in this matter.
 13. Possibility should be explored to use marble slurry as construction material, for filling depressions etc as has been done for disposal of fly ash from Thermal Power Houses.
 14. The water quality of water bodies should regularly be monitored.
 15. Wherever over-burden or waste materials generated from mines and processing units, have been dumped obstructing flow of water in drainage channels; diversion drains and check walls must be constructed. For that purpose special condition should be incorporated in the lease /license agreement.
- The Rajasthan High Court issued an order on dated 2nd August 2004. The extract of the order are as below:
- We are happy to note that the State Government spared Rs. 22.70 lac for the purpose of survey to State Remote sensing Application Centre Jodhpur
 - Having given thoughtful consideration to the issue involved and the suggestions made by the Committee, we direct the State Government to consider the recommendations of the Committee referred to above and chalk out a plan to take the effective steps for restoring the catchment areas to their original shape.
 - It is made clear that the order will not prevent the State Authorities from drawing up or taking further steps more effectively to fulfill the objects of the directions issued by this court.
 - Three months time is granted for giving positive shape to the suggestions.

The Rajasthan Government has started implementing the orders of the Rajasthan High Court. Under the direction of the state government, all the concerning departments like Irrigation, local self government, revenue department, etc. have issued orders for taking action as suggested in the report.

DISCUSSIONS:

Effect of utilization of catchment areas for construction purposes

Many development activities since independence have been taken. It is felt that at some places, *proper drainage crossing* in embankments, residential colonies and other construction activities *have not been provided to allow free and uninterrupted water in drainage channels*. This has resulted in reduction in catchment areas of lakes, reservoirs, rivers, ponds etc and filling of water bodies in the state. Due to soil conservation works, watershed works & water harvesting structures, *the run off from the catchment areas has been reduced*. While

development works are necessary, it is advisable that these should be designed and constructed in a way that they do not interfere with free flow of rain water in natural drainage channels.

Untreated domestic waste, industrial waste and other wastes are coming in water storage bodies, causing the deterioration of quality of water. This causes the biological growth of various types. It is advisable that all waste water and material is properly placed and treated, so that it does not mix with water in natural drainage channels, or natural and artificial water reservoirs.

Effect of utilization of catchment areas for Mining and Other Purposes

Wherever the excavation in mining leases *goes below natural ground level*, the water from the adjoining area gets entry into the mine and fill it, thus reducing quantity of water reaching the water bodies like lakes, reservoir etc. *Wherever there are deep mines they are dewatered to do mining operations*. This lower down the ground water table and creates scarcity of water for drinking and agriculture. *The dumping of marble slurry and other waste into drainage channels causes reduction in their water carrying capacity* and thus reduces quantity of water reaching the water bodies. As on today the mining operations are adversely affecting water resources in a big way, as indicated above. This should be stopped. The government must prepare and enforce stringent measures so that mining waste is properly placed and treated. It should not be allowed to be dumped in natural drainage channels like rivers and in water storage reservoirs. The natural water streams should be diverted away from the mines at the cost of mine owners, so that water does not get entry in mines excavated below natural ground level.

Acknowledgements:

The author is thankful to the following for their contribution for their company, assessing the situation and suggestions.

1. Other three members of the committee
2. Government officials from different departments
3. Officials of the local self government
4. Officials of non government organizations
5. Local people who accompanied us during site visits

BRIEF PROFILE OF THE AUTHORS

“MrYogesh Chandra Agrawal graduated in Civil Engineering from the M.B. M Engineering College, University of Jodhpur, India in 1967. From 1968 to 2004, he worked for Water Resources Department, Government of Rajasthan, India specializing in planning, design, construction, management and studies of Dams, Canals and Drainage systems, Dam Safety, hard pan studies, bio drainage, Flood control, Expansive & Dispersive soils and Integrated Water resources Management. After retirement in 2004, he provided consultancy services to many multinational consultancy companies for WB, ADB, RUIDP, Government funded projects related to water resources and storm water drainage in India.”