

MISSION KAKATIYA – FOR RESTORATION OF TANKS AND WATER BODIES IN TELANGANA

Deshpande Sridhar Rao¹, Veerabomma Ajay Kumar², and Menaka Devender³

ABSTRACT

Telangana state has emerged as 29th state of India with a total geographical area of 112,077 Sq.Kms. and is blessed with ample rainfall in monsoon from June to Sep. ranging from 900 mm to 1100 mm per annum (ADB 2015). Over 85% of the farmers in the state belong to the small and marginal category with an average land holding size of 1.11 ha (2.75 Acres). 63% of the farmers in Telangana depend on rain fed agriculture and more than 70% of cropped area is rain fed resulting in lower yields per unit area. Evidences reveal that Tank building activities started in Telangana in Pre Satavahana (271 BC to 30 BC) era. It attained excellence in Kakatiyas era. The legacy of Kakatiyas was carried forward by the Qutubshahis, Asafjahis who ruled Deccan Region. Millions of Hectares of land was brought into cultivation. Villages have become self-sustainable. Drought was a very rare occurrence in Telangana. Tanks have been life line for rural Telangana and a source of livelihood for various rural communities apart from farming community since ages. Further, tank in a village has been a cultural center. Many village festivals are celebrated at the tanks. Tanks which are the backbone for rural economy in Telangana were neglected and no comprehensive program to restore the existing Chain of tanks was taken up in the last few decades which worsened Irrigation sources in Telangana. After formation of Telangana State in 2014, new Government contemplated MK program, a comprehensive action plan for restoration of all Minor Irrigation Tanks & water bodies in the state in phased manner to bridge the gap between Irrigation Potential Created and Irrigation Potential Utilized (Govt. of Telangana 2015 & 2016). So far 20192 Tank works have been restored since launching of this program in March 2015 with an expenditure of 39795.30 Million Rupees. A gap ayacut of 5,58,554 Ha has been stabilized duly restoring the storage capacity to an extent of 227.66 M Cum (Manual 2015). Multifaceted Impacts of MK were observed in various independent studies conducted by NABARD, IWMI, Michigan and Chicago Universities, Ground Water Dept. & Fisheries Dept.. MK Program was acclaimed by eminent personalities and common people as well.

Keywords: Mission Kakatiya, Restoration of tanks, Objectives of Mission Kakatiya, Impacts of Mission Kakatiya, Significance of tanks, De-silting of tanks, Community Participation, Irrigation policy

1. INTRODUCTION

Telangana is centrally located in Deccan Plateau where we find lot of undulations, hillocks, rivers, rivulets, streams etc. and is blessed with ample rainfall ranging 900mm to 1100mm per annum. These geographical conditions invariably led to the construction of tanks to catch hold the rain water in monsoon season. Historical evidences reveal that Tank building activity started in Telangana in Pre Satavahana Era and it attained Excellency in Kakatiyas era. The legacy & vision of Kakatiyas was carried forward by the Kutubshahis, Asafjahis who ruled this region. Under these tanks Millions of Hectares of barren lands were brought into cultivation. Villages have become self-sustainable. Drought was a very rare occurrence in Telangana till the formation A.P state in 1956. Tanks have been life line for Telangana in terms of

^{1,2,3},Irrigation and Command Area Development Department Government of Telangana, Hyderabad, India.
E-mail: ceminorts@gmail.com

economy & cultural homogeneity. Tank irrigation has huge bearing on generation of rural employment, poverty reduction and agricultural growth. The sheer size of command area under tank irrigation, makes it a large center of agricultural production and provides a critical opportunity for commercial agriculture through market linkages.

2. REVIEW ON IRRIGATION POLICY OF ANDHRA PRADESH STATE

The Irrigation Policy of United State of AP had given rise to uneven development in the state. It emphasized irrigation under canals of major irrigation projects in coastal region where irrigation under tanks is largely insignificant. This irrigation policy resulted in the destruction of age-old water conservation systems with chain of tank networks which is best suited to the semi-arid and undulated regions like Telangana. The successive A.P Governments ignored the maintenance and development of tanks and allowed them to face natural extinction by way of siltation, breaches, encroachments, jungle growth etc. With the extinction of tank system, the self-sufficient villages of Telangana have turned into drought prone areas.

On one side Tank irrigation was neglected and on the other side canal irrigation was not developed in Telangana. Rightful share of Krishna and Godavari rivers was denied to Telangana. This continuous and policy based discrimination in Irrigation Sector turned Telangana Region into a grave yard of farmers and land of migration. 80% of farmer suicides occurred in AP State were from Telangana region and millions of people from 10 Telangana districts migrated to far off places in search of livelihood. Hence, harnessing of water resources has been one of the major concerns of Telangana Statehood Movement and people strongly felt that by creation of a new state of Telangana alone would fetch them water

3. EVOLUTION OF MK CONCEPT

Soon after formation of the state of Telangana, Govt actively formulated a flagship program of restoration of Tanks and water bodies. As a first step, Minor Irrigation Census was held in July 2014. About 46,500 water bodies have been found to be physically existing in 10 districts of Telangana. Tank Restoration program was named as “Mission Kakatiya” with a tag line “Our village – Our tank” with a vision to carry on the legacy of Kakatiyas. Later Government prepared a comprehensive action plan for MK in consultation with Irrigation Experts, Sociologists, NGO’s and Senior Journalists etc. and decided to take up 20% of tanks for restoration each year in all the districts simultaneously. This is how the concept of MK was initiated and evolved.

3.1 Objectives and Benefits of Mission Kakatiya

The objective of Kakatiya Mission is to enhance the development of agriculture based income for small and marginal farmers through sustainable irrigation resources by adopting a comprehensive program for restoration of tanks. Telangana State has 170 TMC allocation to Minor Irrigation in Godavari Basin and 90 TMC in Krishna Basin. Govt’s intension is to utilize entire 260 TMC allocations under the tanks and bring 25 L Ac. into cultivation under minor irrigation sector.

3.2 Benefits From the Restoration of Tanks

- (a) Expected gains from irrigated area expansion by covering gap ayacut .
- (b) Livestock improvements;
- (c) Improving ground water levels and water quality.
- (d) Power savings due to improved surface irrigation.

3.3 Works Taken up In MK Program

The following works have been taken up under the program.

- (a) Repairs to Bund, Weir & Sluices.
- (b) Re-sectioning of Irrigation Channels & Repairs to CM&CD works
- (c) De-siltation and application of silt application in farm lands
- (d) Restoration of Feeder Channel to the tank.
- (e) Raising of FTL, wherever possible
- (f) Demarcation of tank area
- (g) Plantation along the banks and foreshore of tanks under Harita Haram program
- (h) Procedure and action plan to be taken up for the above works has been discussed in detail and the guidelines were issued.

3.4 Action Plan for Implementation

Government formulated certain guidelines for effective and efficient implementation of MK emphasizing the need of prioritizing the tanks to be taken up for restoration, tendering and other working procedures to be followed etc., The tanks with relatively larger command area and that have not been covered under any other programmes such as RRR, a GOI assisted program and CBTMP, a World Bank assisted program, shall initially be taken up for restoration and the rest will be covered in the subsequent phases. The prioritization of the tanks will be done in consultation with local people and the public representatives of the respective areas. Many reforms were introduced for effective implementation of MK in terms Technical Sanction to the estimates, Tender Procedures, Online monitoring and online billing, inter departmental co-ordination, Technological initiatives, community participation, adoption of tanks, Corporate Social Responsibility etc.

3.5 Progress of Mission Kakatiya

Four phases have been implemented so far. As on 30.04.2019 the status MK of works is summarized below.

No of tanks sanctioned	27,653
Total Ayacut	21.39 Lakh Acres (86,600 Million Ha.)
Works Completed Physically	20,192
Expenditure incurred	Rs.3979.53 Crores (39795.30 Million Rupees)
Total Ayacut including Stab. for the completed works	13.80 Lakh Acres) (55,870.45 Million Ha)
Silt excavated	2277.83 Lakh Cubic Meters (227.78 Million Cum)
Storage capacity restored for the works completed	8.04 TMC (227.78 MCM)
Saving to Govt. due to Silt Transportation by farmers	911.13 Cr. (9111.30 Million Rupees)

4. RESULTS AND DISCUSSION

Studies on Impacts of MK were carried out independently by various organizations viz NABCONS, IWMI, Michigan & Chicago Universities, State Ground Water Department.

4.1 Impact Assessment by NABCONS:

NABCONS is a constituent organization of National Bank for Agriculture and Rural Development (NABARD), constituted by Govt. of India. NABCONS have selected 400 tanks of different sizes, taken up under phase I of MK, from the four districts viz. Adilabad, Karimnagar, Medak and Nalgonda. The districts are selected covering all the four agro climatic zones in the state. Groundwater exploitation status has also been considered for stratification. Data of 40 tanks was collected through field surveys and interaction with stake holders and officials of Govt departments for the current year 2016-17 and base year 2013-14 and assessed the water spread area of the tanks, extent of the cropped area, area irrigated and the cropping pattern. The following are the various findings of the study.

- (a) There has been a decrease of 19.2% in the gap ayacut after implementation of the MK I.
- (b) There was an increase in gross area irrigated under tank ayacut by 51.5% over the base year.
- (c) Irrigation intensity has been increased by 45.6% over the base year which is mainly due to the improved water retention capacity in the tanks, post restoration works.
- (d) With more availability of water in the tanks, area under Paddy has substantially been increased from 49.2% in the base year to 62.1% in the assessment year despite the fact that there was a good rainfall in the base year. Its impact is more significant in Rabi 2016-17 with more area under paddy by 7.2% in Rabi over Kharif.
- (e) Increase is witnessed in the yields of Paddy, Cotton and Jowar after MK I over the base year. The increase is more significant in Rabi Paddy (19.6%) and Cotton (11.6%).
- (f) The impact assessment survey shows a decrease in consumption of chemical fertilizers by 35 – 50% which resulted in reduced expenditure on fertilizers by 27.6% over the base year. The decrease in expenditure ranges from Rs.1500 to Rs.3000 per acre per season, depending on the crops. Further, the tank silt application contributed to increase in crop yields, reduction in soil erosion, increase in soil moisture retention, levelling of plot sizes etc. (NABARD. al. 2017).
- (g) Though the rainfall during the baseline year is more than that in the impact year, the rise in groundwater levels is more in the impact year due to larger and longer storage of water in the tanks. In base year, the average rise in groundwater level was 6.91 m where as it is 9.02 m in the year 2016.
- (h) There is an increase of household agricultural income by 78.5% in the tank ayacut area. The reason for increase can be attributed to increase in irrigated area and also the yields. At constant MSP also, the increase in agricultural income is very impressive with 47.4% over the base year.
- (i) Apart from the farmers, the other major beneficiary of MK is the fishermen community. Longer storage period of water in tanks has resulted in increased fish weight and so the yield (NABARD 2017). On average, there is an increase of 36-39% yield, particularly in the Rohu, Katla and Mrigala types of fish.
- (j) During the baseline survey, 63% of the water users have expressed that the physical condition of the tanks in their area are poor, 3% are very poor. After MK-I, peoples' perception is: 46.7% of the tanks are very good, 28.6 % are good, 15.8% satisfactory and only 5.1% of the tanks are reported to be below satisfactory. This is the yardstick to showcase how transparent and committed the Government has been in implementing the programme.

4.2 Findings of Impact Studies by IRMA/IWMI

On behalf of International Water Management Institute (IWMI) Srilanka, & three research scholars from Institute for Rural Management (IRMA) Anand, Gujarat(India) have extensively toured two districts of Telangana viz. Adilabad & Warangal and visited many tanks where MK program was implemented and interacted with Engineers of I&CAD Dept., stake holders in the village. They have presented a report titled "Report on Assessment of MK, 2017" to the Govt. of Telangana ((Singh et al.2017). The findings of IRMA study are briefed below.

- (a) Paddy is the most benefitted crop out of tank irrigation and paddy cultivated area is almost same as tank irrigated area after MK. Apart from this, farmers started cultivating paddy in Rabi season for the first time in some villages.
- (b) Total cultivated area has increased on an average by 196% in Kharif season and 160% in Rabi season.
- (c) By the application of silt on the fields, the improvement in productivity varies with crops. The improvements were 3.32 quintals(15.51%), 3.79 quintals (44.03%), 5 quintals (26.67%), 6.08 quintals (27.4%) and 7.13 quintals (30.15%) for paddy, cotton, turmeric, maize and chilies respectively.
- (d) Fertilizer consumption has reduced by Rs.1915 per acre in case of paddy, Rs.3490 per acre in case of cotton and Rs.595 per acre for Mirchi. In terms of number of bags, Urea has reduced by 1 bag in case of paddy (33.33%) and 2 bags in case of cotton (40%). DAP has reduced by 1 bag (50%) in case of paddy and 1 bag in case of cotton (50%) also. Potash has reduced by 0.5 bags (50%) in case of paddy, 2 bags (66.66%) in case of cotton respectively. But in case of Mirchi only DAP has reduced.
- (e) There is marginal increase of 14% profit per acre in case of paddy and 48% in case of cotton due to both yield improvement and fertilizer reduction even after including silt application costs.
- (f) Post monsoon ground water level has increased by 48% in Nirmal district and 40% in Warangal district.
- (g) There is an increase of 3.3 months in terms of water availability in wells used for irrigation.
- (h) MK has enhanced other livelihood opportunities like fishing, cattle herding etc. which fetched additional income.
- (i) In many villages, other livelihoods have developed into institutional forms like societies, and they act as conservators of tank and tank structure.

4.3 Findings and Observations of University of Michigan

- (a) University of Michigan has sent a team of 7 members to study and analyze the de silting of Minor Irrigation ponds in South India, especially in Telangana State. The team have toured Nalgonda district for three weeks and hosted community symposium which brought out 700 beneficiary farmers from 10 nearby villages. They interacted with beneficiary farmers and collected data through surveys on the local use of pond silt in the district. The team visited two types of villages; those with ponds that had undergone rapid and large scale de-silting and those that had no desilted ponds.
- (b) The overall findings of the study is that desilting is beneficial to both small and large scale systems , promoting both short and long term employment while lowering farming input costs and reducing overall Green House Gas(GHG) emissions from agriculture (Dahagama et. Al 2014). The opportunity is incredible, as there are more than 45,000 ponds across 11,000 plus villages in Telangana. Their analysis, based on the data from CRIDA, shows that the use of silt has significant cut down in fertilizer / pesticide consumption and

thus the use of silt results in a 95% GHG reduction from 2070 kg co₂/Acre (just accounting for the GHG emissions associated with manufacturing) for artificial fertilizers to 92 kg co₂ / acre for silt application. Their survey and interactions with farmers show that on average 50% increase in crop yields the following year when using silt while cutting down on the use of artificial fertilizers by 36%. Their findings strongly suggest that de siltation when integrated into standard agricultural practices has positive impacts on the health and economic status of local farmers as well as the environment.

4.4 Findings of TATA Center for Development in Chicago University

A team of four members (Xavier et. al,2018) have visited Telangana State and evaluated the impacts of MK. The preliminary findings of the team of Chicago are:

- (a) An increase in volume of water available among rehabilitated tanks compared to non-rehabilitated tanks.
- (b) Among a sub-sample of tanks where there was no irrigation in 2015 (pre-period) due to non-availability of water, there is a significant increase in irrigated areas among phase 1 & 2 tanks compared to non-rehabilitated tanks.
- (c) A greater fraction of surveyed farmers used tank water for irrigation in phase 1 & 2 areas compared to non-rehabilitated areas post the program.
- (d) Greater number of days of tank irrigation among farmers in rehabilitated areas.

4.5 Findings of State Ground Water Department :

Telangana State Ground Water Department was one of the departments which involved in the implementation of MK. The dept. geared up itself to study the impacts of MK in Ground Water Scenario (Annual Report 2017). They have collected data of ground water levels and quality of ground water at regular intervals in pre-monsoon months (Oct. to May) and post monsoon months (June to September) and ground water quality two times in a year (May & November) from 230 observation wells from 59 desilted tanks & analysed the effect of MK on Ground water regime and quality of water. After two phases of implementation, State Ground Water Department published a report titled “Annual Report on Impacts of MK De-siltation Programme on Ground Water Regime in 9 Pilot Basins of 9 erstwhile districts (2017-18)”.

4.6 The Findings of their Study are

- (a) During pre-monsoon season predominant water levels are 5-10 Mts bgl falling in 33% of wells whereas during post-monsoon season 0-5 Mts bgl water levels are more predominant (41% of wells). Comparatively water levels in influence zone are at shallower levels than non-influence zone in both seasons.
- (b) Water levels are shallow during May-17 when compared to Nov-17, during May-18 more deep water levels are observed when compared with May-17, and water levels in the range of 10-20 Mts bgl are more predominant representing 41% of the wells.
- (c) The annual replenishable ground water resources available for the water year 2017-18 is 12.37 TMC and ground water extraction during non-monsoon season is 9.86TMC, with over all Stage of ground water extraction of 80%. The stage of ground water extraction decreased by 12% (92% to 80%) and categorization changed from critical to semi-critical category.

- (d) The desiltation program taken under “Mission Kakatiya” has positive impact on ground water regime and ground water quality, therefore it is recommended to extend this program more vigorously in the remaining tanks.

4.7 Impacts on Fish Production:

According to the reports published in “Telangana Today” an English Daily, on 30.04.2018 and 05.05.2019, Telangana State recorded a fish production of 294,209 Tons (Approximate Value: Rs.2942 Crs.) during 2018-19 and 270,209 tons in 2017-18 (Approx. Value : Rs.2565 Crs), an increase of 24,174 tons. Prawn cultivation too recorded good returns with a production of 9998 tons during 2018-19 against 7783 tons in 2017-18. Fisheries department attributed the rise of fish and prawn production to the state Govt measures, mainly reclamation of tanks under MK and construction of new irrigation projects in Godavari and Krishna Basins which assured water retention period atleast 9 months a year. Apart from this, Govt supplied fish seedlings free of cost to the fishermen. During 2018-19 about 70 Crs. (700 million) seedlings were supplied and provided dragnets to the fishermen to improve catching of the fish.

According to a report tabled in the Parliament last year by the Parliamentary Standing Committee on Inland Fisheries and Aquaculture, Inland Fisheries accounts for about 65 % of India’s total fish production. Telangana has nearly 25,000 reservoirs and tanks with a water spread area of 5.73 Lakh sq.km, Telangana State is among the top five inland fish producing states. After formation of Telangana State, new Govt focused on promoting inland aquaculture in various water bodies including reservoirs. Due to this proactive measures and policy shift fetched results and Telangana stood among top five inland fish producing states in India.

5. CONCLUSIONS:

MK started paying dividends from 2016-17 in terms of Increase in water retention period, irrigation in the command area of tanks, Crop yields, Silt application in farm lands, increase in agriculture income, Increase in Ground water table, ground water quality, Development in Fisheries sector, physical condition of tanks, considerable reduction in breaches, improvement in flora fauna, impacts in other livelihoods, rejuvenation of cultural festivities in villages.

The impacts of MK are being analyzed by the Ground Water, Agriculture and Fisheries departments and ICRISAT which signed an MoU with GoT. The research may have to be continued in assessing the impacts of MK and record the benefits of MK in a scientific way in physical terms and in terms of experiences of stake holders as well. As rightly pointed out by IWMI, Govt of Telangana need to bring some Policy Initiatives to sustain long term positive impacts of MK.

6. REFERENCES

- Annual Report (2017) on Impact of MK Desiltation Programme on Ground Water Regime in 9 Pilot Basins of 9 erstwhile Districts. Government of Telangana - Ground Water Department - MK Monitoring Cell.
- Asian Development Bank-Rehabilitation and Management of Tanks in India. (2015) - A study of Selected States.
- Dahagama, A., Espira, L., Monnat, J., Bukhaari, H., Cole, S., Keerthi, S., and Serfling, K., (2014) - Final Report - De- Silting Minor Irrigation Ponds in South India: The Sustainability of Decentralized Resource Distribution.
- Dileep, P. S., (2019) - Push on Cards for fishery sector - News item published in " Telangana Today "on 05.05.2019, Hyderabad Edition, Page No.05.

- Government of Telangana(2015). I&CAD Department-Minor Irrigation- Restoration of Minor Irrigation Tanks - MK - General Gide lines - Orders Issued; G.O.Ms.No.44 Dated:13.03.2015.
- Government of Telangana, (2016) I&CAD Department-Minor Irrigation - Restoration of Minor Irrigation Tanks - MK - General Gide lines - Orders Issued; G.O.Ms.No.48 Dated:12.07.2016
- Manual on Construction Procedure (2015) Irrigation & CAD Department, Government of Telangana State - MK(Rehabilitation of MI Tanks)
- NABARD CONSULTANCY SERVICES PRIVATE LIMITED- (2019). Impact Assessment study on MK - Restoration Minor Irrigation Tanks Implemented by Government of Telangana.
- Osman Mohammed, Wani, S.P., Vineela, C and Murali, R. (2009). Quantification of Nutrients Recycled by Tank Silt and its Impact on Soil and Crop - A Pilot Study in Warangal District of Andhra Pradesh. Global Theme on Agro eco systems Report no. 52. Patancheru- 502324, Andhra Pradesh, India; International Crops Research Institute for Semi-Arid Tropics. 20 pages.
- Padamaja, K.V.,Wani, S.P.,Agarwal, L., & Sahrawat, K.L.,(2003) Economic Assessment of desilted sediment in terms of plant nutrients equivalent: A case study in the Medak District of Andhra Pradesh – Report No. 4, ICRISAT, District Water Management Agency.
- Shah, M.,Bharti & Verma, S.,(2017). IWMI-TATA: Water Policy Program - Publication No.8 - Reviving Minor Irrigation in Telangana, Mid Term Assessment of MK .
- Singh, R., Varthini, S. P., Krishnan, S., and Aryan, P. (2017) Assessment Report of MK in Telangana – submitted to Government of Telangana.
- Xavier Gine, Anup Malani, Aprajit Mahajan and Manaswini Rao(2018) - Research Project at Tata Centre for Development in UCHICAGO-Evaluation of Mission Kakatiya: Minor Irrigation Project in Telangana.