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An overview of the irrigation projects in India with special reference to Karnataka

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Abstract
The irrigation projects are the lifeline of the agriculture in India. For many areas, it is not only providing water for irrigation but also drinking water, industrial use and other multi purposes. There have been tangible and intangible benefits accruing from the irrigation projects. The present paper highlights the irrigation projects across India with the special focus on the Karnataka State.

Keywords: Capacity generation, irrigation project, flood control

Introduction
Irrigation is the artificial application of water to land for the motive of agricultural manufacturing. Effective irrigation will have an impact on the whole increase process from seedbed instruction, germination, root growth, nutrient utilization, plant growth and re-growth, yield and quality.

The key maximizing irrigation efforts is uniformity. The producer has a number of manipulate over how much water to provide and when to use it however the irrigation machine determine uniformity. Deciding which irrigation structure is the best for the agricultural operation requires knowledge of equipment, system design, plant species, increase stage, root structure, soil composition and land formation. Irrigation structure must encourage plant to develop while minimizing salt imbalance, leaf burns, soil erosion, and water loss. Losses of water will occur due to evaporation, wind go with the flow, run-off and water (and vitamins) sinking deep below the foundation area. Right irrigation control takes careful consideration and vigilant observation.

Types of Irrigation Systems
Based on the way water is distributed throughout the field, the irrigation systems are classified into many types. Given below are some of the common types of irrigation systems

Surface irrigation
This type of irrigation system works independently of any mechanical pump. Water distribution takes place along the gravity all over and across the land

Localized irrigation
A piped network is used to distribute water under low pressure to each plant

Drip irrigation
This type of irrigation is effective at minimizing evaporation and runoff as it is a localized form of irrigation wherein drops of water are delivered near the root region

Sprinkler irrigation
Overhead high-pressure sprinklers are used in this type of irrigation to distribute water from a central point in the field. Alternatively, sprinklers on moving platforms can also be used for watering

Center pivot irrigation
This is mostly used in flat areas especially in the United States. Water distribution is done using sprinklers that move on wheeled towers in a circular pattern

Lateral move irrigation
In this type, a series of pipes each with a wheel and sprinklers are used for irrigation. The pipes are operated either manually or mechanically. This system is considered economical but more laborious

Sub-irrigation
This is used more often in areas with high water tables. A system of pumping stations, canals, gates and ditches are used for distributing water

Manual irrigation
The irrigation of this type is through manual labour and watering cans.

Major Irrigation Projects in India
The irrigation projects consist of huge surface water, storage and diversion structures. The area envisaged to be covered under irrigation is of the order over 10,000 hectors.

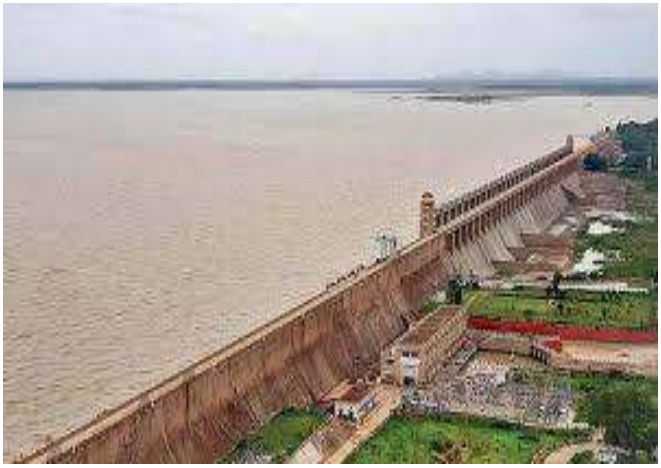

Fig 1: Tungabhadra Irrigation Project

The Tungabhadra Dam is constructed across the Tungabhadra River, a tributary of the Krishna River. The dam is near the town of Hospet in Karnataka. It is a multipurpose dam serving irrigation, electricity generation, flood control, etc. This is a joint project of erstwhile Hyderabad state and erstwhile Madras Presidency when the construction was started; later it became a joint project of Karnataka and Andhra Pradesh after its completion in 1953.
The dam creates the biggest reservoir on the Tungabhadra River with 101 thousand million cubic feet (tmc) of gross storage capacity at full reservoir level (FRL) 498 m MSL, and a water spread area of 378 square kilometres. The dam is 49.5 meters high above its deepest foundation. As of August 2013, the project has an estimated capacity of 93.46 TMC.

Sarda Sahayak Irrigation Project
Sarda canal system is one of the biggest and oldest irrigation system of Uttar Pradesh. It is located in Banbasa district, Champawat in Uttarkhand. It was constructed across Sharda River in the year 1928 to provide irrigation in 25.5 Lakh Hectares and to protect the area lying in Ganga-Ghaghra doab. The project provides benefit to 15 districts namely pilibhit, Lakhimpur khere, Shahajahanpur, Hardoi, Lucknow, Barabanki, Pratapgarh, Sultanpur, Allahabad, Varanasi and etc,. The project was implemented to increase and extend irrigation in the lower reaches of Sarda Canal System and to increase the irrigation supplies to command of Sarda Feeder Channel. Length of the dam was 258.80 Km, approved cost of this project ₹199 crore, actual cost is ₹1333.66 crore.

Kangsabati Irrigation Project
The Kangsabati also often referred to as the Kangsabati Irrigation Project and the Kangsabati Reservoir Project, is a project started in the Indian state of West Bengal in 1956 as part the Indian Second Five Year Plan to provide water to 3,484.77 km^2 of land in the districts of Paschim Medinipur, Purba Medinipur, Bankura and Hooghly. It involves irrigation land using water from Kangsabati River, as well as the Shilabati and the Bhoirobbanki rivers. The dam was located in Mukutmanipur, District Bankura, the height of the dam was 41.15m, length 11.27 Km, approved cost of the project was ₹ 25.26 Crore, actual cost ₹ 288.08 Crore.

Sabarmathi Irrigation Project
The Sabarmati Reservoir Project is located across river Sabarmati near village Dharoi in Satalasana taluka of Mehsana district, Gujarat state. From geodetic Coordinates point of view it is located on latitude N 240 00’00’’ and longitude E 720 52’00’’. The project comprises a masonry gated spillway structure flanked on either side by non over flow dams and earthen dams and 4 numbers of saddle dams in dykes of 5420 m long. Command area of project is on both sides of Sabarmati River, through two main canals namely, L.B.M.C. (Left Bank Main Canal) 29.50 km long and R.B.M.C. (Right Bank Main Canal) 43.50 km. long. The project was planned for irrigation facilities to 127 villages of Kheralu, Visnagar, Mehsana, Sidhpur and Vijapur talukas of Mehsana district through R.B.M.C. and 49 villages of Idar and Himmatnagar talukas of Sabarkantha district through L.B.M.C. The annual area under irrigation was estimated as 36842 ha (91000 Acres).

Medium Irrigation Projects In India
These are also surface water projects but with medium size storage and diversion structure, with the area under irrigation between 10,000 and 2,000 hectares.

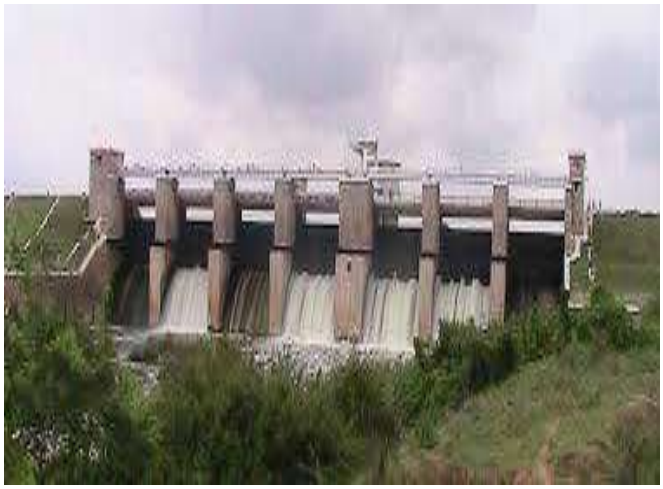

Fig 2: Kelavarapalli Irrigation Project

Kelavarapalli Reservoir Project or Kelavarapalli Dam located in Hosur Taluk, Krishnagiri District, Tamil Nadu India. In distance of 10 km away from Hosur and 8 km from Karnataka, across the River Ponniar, Kelavarapalli Reservoir project built in 1995 has become a popular picnic spot at Hosur. The Dam sustains agricultural projects in the surrounding area and provides drinking water for Hosur. The dam provides irrigation facilities for 22 villages in Hosur Taluk. The dam length 547 m and maximum height of the dam was 13.5m. The Kelavarapalli project cost is ₹ 372 crore, and Storage Capacity 44.28 feet.

Denkada Irrigation Project

Denkada anicut was constructed across Champavathi River in 1965-1968. The project is located near saripalli village, Nellimarla mandal, Vizianagaram District Andhra Pradesh to irrigate a total ayacut of 5,153 acres (20.85km^2), Tarakarama Thirtha Sagaram barrage was constructed to supply irrigation water to 6,690 hectares. The dam width is 200 m and length of the dam was 183m. The Districts benefited is Vizianagaram and cost of the construction was ₹ 24 Crore.

Aruna Irrigation Project

It is ongoing medium irrigation project, located in Vaibhavwadi Taluk, Sindhudurg District, Maharastra. Construction of the Dam is across the Aruna River in 2005. This Dam provides the irrigation facilities to 9,027 hectares and benefited 12 villages. Its estimated cost was ₹ 53.944 Crores. Benefited Districts are Ratnagiri, Sindhudurga. The Maximum height of the dam is 80.41m, length 1,207m. The Purpose of Aruna project is Hydroelectric and irrigation facilities.

Krishpuram Reservior Project

The Krishpuram Project is a Medium Irrigation Project was constructed in 1981, across Kushathali River, krishnapuram village, Karvetinagar Mandal, Chittur District, 30 km from Nagari to irrigate 6,125 acres in Karveti Nagaram (5000 acres) and S R Puram (1,125 acres) Mandals in Chittor Districts. The Reservoir length is 488m and height is 21m. The Approved cost of this project was 2.46 crore, Actual cost is 4.37 crore total cultural command area 2.48 hectares.

Major Irrigation Projects in Karnataka

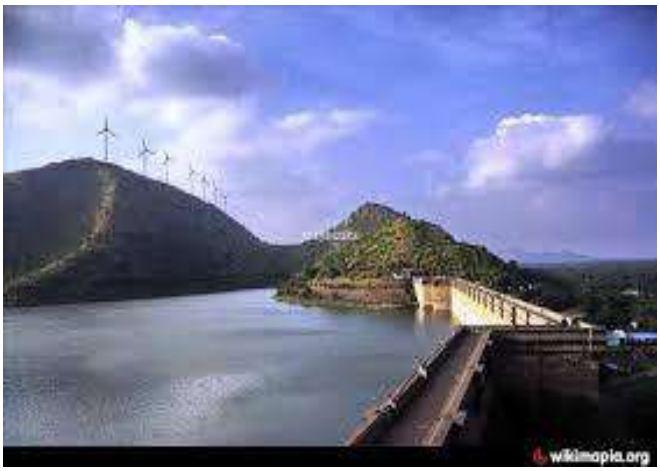

Fig 3: Vanivilas Sagar Irrigation Project

The vanivilas Sagar Dam is constructed across Vedavathy River near Marikanive Village in Hiriyur Taluk of Chitradurga District during the year 1897-1907. The Vedavathy River is a tributary to Krishna River. The Main object of Vanivilas Sagar Project is to provide irrigation facility in the drought prone areas of Chitradurga District. The project provides irrigation to 25,000 acres of land. The Irrigation is proposed under high level canal taking off from the main dam on the left bank and, left bank and right bank canals taking off from Kathrikeyanahalli Anicut constructed 8 Kms below the Dam, water spread area 8,763 hectares.
The height is 43.28 m and the length 405.50m with the gross storage capacity of water 850.30 mcum (30tmc).

Yagachi Irrigation Project

It is an ongoing project built across the River Yagachi, a tributary of river Kaveri. The Dam situated at a distance of 3 Km from the town of Beluru in Hassan District in the state of Karnataka. The Dam was constructed with the objective to harness water resource for the purpose of irrigation and to meet the demands for drinking water in Beluru, Chikamagaluru and Hassan District. The Dam was constructed in the year 2001. The Reservoir is situated at an altitude of 965 feet above the sea level. The length of the Yagachi Dam is 1,280 m, the Maximum height above the foundation of Reservoir is 26.237m.

Hemavathy Irrigation Project

Hemavathy Dam is constructed across the River Hemavathy, an important tributary of the River Kaveri. The Dam is located in Gorur, near the city of Hassan in Karnataka. Built in 1979 the Reservoir has been serving multiple purposes of providing water supply for drinking, other purposes and for irrigation of the agricultural land of the nearby villages. Hemavathy dam is a large Reservoir covering a catchment area of 2,810 Sq, Km, with a length of 4,692 m and a height of 58.5 m, the Reservoir has gross storage capacity of 1,053.63 mcm. The beneficiary districts are Hassan, Tumkur, Mandya and Mysore.

Ghataprabha Irrigation Project

The Ghataprabha Left Bank Canal Irrigation Project is located in the North West of Karnataka, bordered by the two rivers Krishna and Ghataprabha. The gross command area is over 180,000 ha with an irrigated area of approximately 160,000 ha. The entire project which comprises also a right bank canal bounded by the Krishna river in the North, Maharastra state to the West, the confluence of Krishna river & Malaprabha river in the East & the water divide are the basin boundary between Ghataprabha & Malaprabha rivers in the South. The area is bounded by North Latitudes 15”45’ & 16” 40’, East longitudes 74” 15’ & 76” 00‘. The area is well connected by road & rail to other parts of the state. The Pune– Bangalore National Highway & the Banagalore Miraj line passes through the area. The interior part of the command area is well connected to both district headquarters at Belgaum & Bagalkot by weather roads.

Medium Irrigation Projects in Karnataka

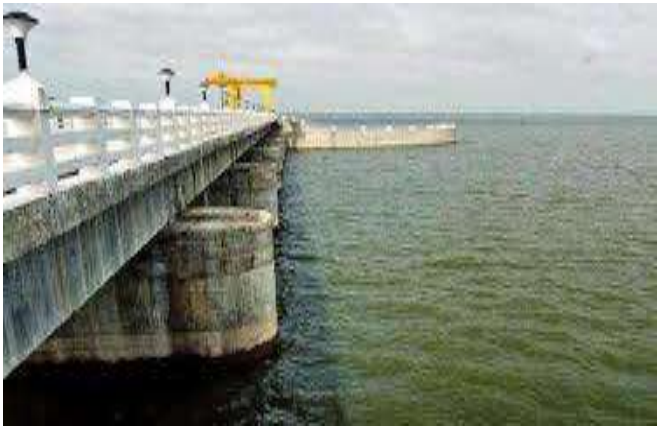

Fig 4: Chandramapalli Irrigation Project

The Chandrampalli dam is constructed across river Bhima. The dam is located in Chandrampalli Village of Chincholi Taluk under the Gulbarga District of Karnataka. It is responsible for the irrigation of several villages in Chincholi Taluk. The dam was constructed in the year 1973. The dam has capacity to store water upto 493.16ft. The maximum water level of the dam is 496.21m and height of the dam was 28.65m and length 926m.

Kanakanala Irrigation Project

Kanakanala Dam is a small Reservoir built across the river Kanakanala. The river Kanakanala flows through the Krishna basin in Karnataka. The dam is situated in Killarhatti under Kustagi Taluk of Raichur District. The construction of the Reservoir was completed in the year 1975. Since then it has been meeting the water demands for irrigation of nearby areas. The Reservoir length of 975.65m and height 20.12m, construction cost of this reservoir is ₹ 1 Crore.

Gayathri Irrigation Project

The Gayathri Reservior is constructed across Suvarnamukhi River near Kariyalla Village in Hiruyur Taluk of Chitradurga District. It was constructed in the year 1963. The total length of the reservoir is 1,021.53m and height 17.07m, Storage capacity of 18.08mcum. The total water spread area of the Reservoir is 1831.00sqkm provided for irrigation and construction cost of this reservoir is 0.4.

Arkavathi Irrigation Project

Arkavathi dam is built across the river Arkavathi, a tributary of the river Kaveri. It is located near the Kanakapura town in the Ramnagar District of Karnataka. The dam helps in the irrigation of the nearby areas. The Dam is a structure, built in the year 2004. The reservoir has a length of 720 m, height of the dam 29.685 m above the foundation.

Irrigation Projects under Krishna Bhagya Jala Nigam Limited

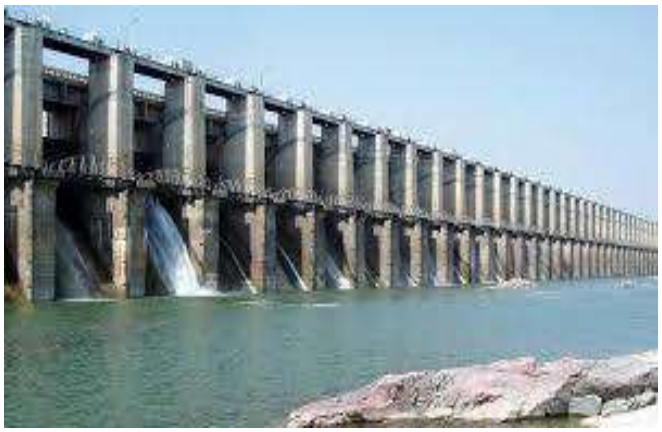

Fig 5: Narayanpur Irrigation Project

Basava Sagara Dam previously known as Narayanpura dam, constructed across the Krishna River. It is located in Narayanpur Village, Shoraur Taluk and Yadgir District. The construction was completed in the year 1982. The reservoir total storage capacity of 37.965 tmcft (1,075km^3). It was a single purpose project meant only for irrigation but downstream electrical generation and drinking water consideration enter into its management. The dam is 29 m height and over 10.637 m length. It provides water to irrigate 4.21lakh hectares in Gulbarga, Yadgir, Raichur and Bijapur Districts.

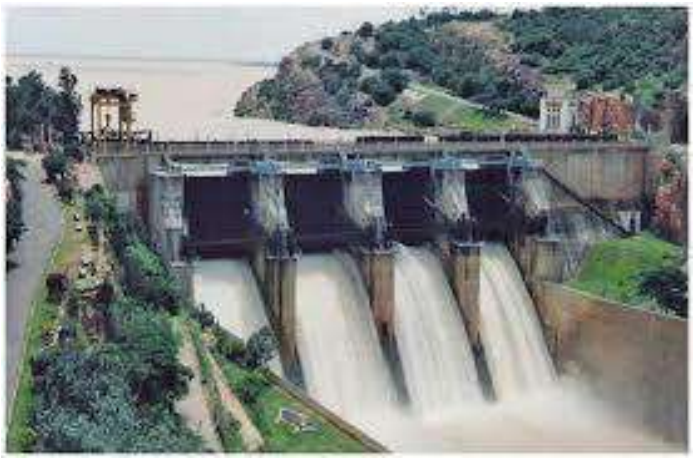

Fig 6: Ramthal Irrigation Project

It is the largest drip irrigation project in Asia. It is located in Hungud Taluk, Bagalkot District in Karnataka and work started in 2005 and completed in the year 2017. It involves 2,150 Km of pipeline covering around 60,000 acres. The main goal of the project is to utilise the backwaters of Almatti project. The project was envisioned by the Krishna Bhagya Nigam Limited (KBJNL). It irrigates 12,300 acres, 6000 farmers are benefitted. The project uses just 2.77 tmc of water needed to irrigate 60,000 acres.

Fig 6: Almatti Dam

Almatti irrigation project is located in Basavana Bagewadi, Bijapur District, Karnataka India, was completed in July 2005. The target annual electric output of the dam is 560 mw. The Almatti Dam is the main reservoir of the upper Krishna irrigation project, the 290 mw Power Station is located on the right side of the Almatti Dam. The cost of the construction is 547.50 crore and height of the dam is 49.29 m.

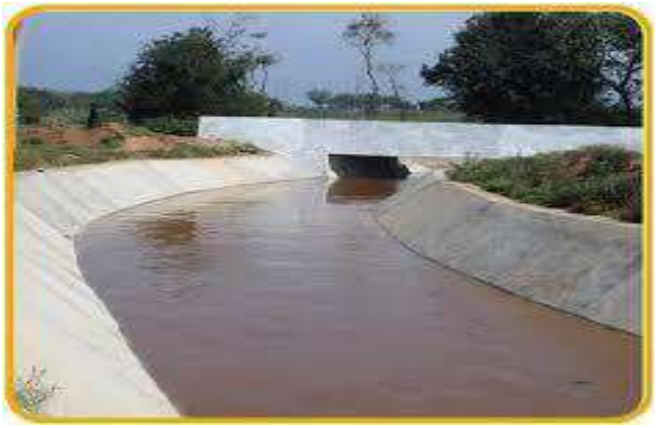

Fig 7: Mudbal Branch Canal

Mudbal Branch Canal construction started in the year of 1988 and completed in the year 2002. The Branch Canal Construction cost is 300 Crore. It benefited the Districts / Taluks of Kalburgi District, Jewergi Taluk, Yadgir District and Shahapur Taluk. Irrigation potential was created 44,321 Hectares and also this project capacity 1, 26,023.

Multi- Purpose Irrigation Projects in India

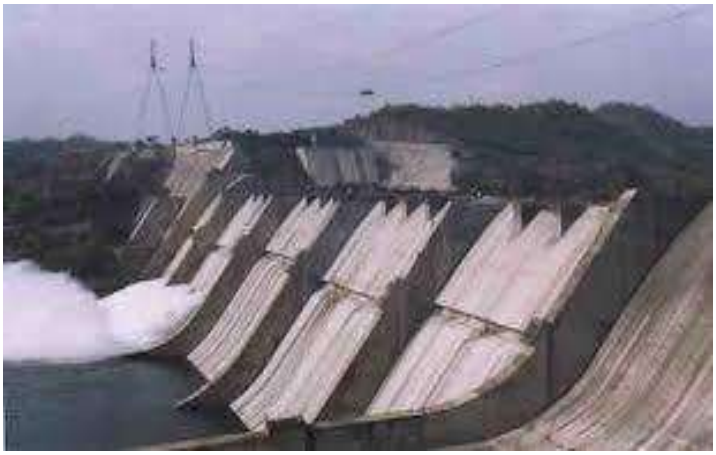

Fig 8: Ramganga Irrigation Project

The Ramganga Dam is also known the Kalagarh Dam. The construction across Ramganga River, the dam is located in Pauri Garhwal District, Uttarkhand, India. It supplies a 198 mw power station and provides water for the irrigation of 57,500 hectares of farmland. In addition, it provides for flood control and recreation. Construction on the dam began in 1961 and it was completed in 1974. The benefited districts are Unnao, Mainpuri, Kanpur and Saharanpur, and length of the dam 27.5m and height 630m.

Bhadra Irrigation Project

The Bhadra Dam is located on the Bhadra River a tributary of Tungabhadra River. Bhadra Dam is located in the boarder of Badravathi and Tarikere, in the western part of Karnataka India. The Dam was constructed in the year 1947-1965. The benefits derived from the reservoir storage are irrigation with gross irrigation potential of 162,818 hectares, Hydro power generation 39.2mw, drinking water supply and industrial use. The height and length of the dam is 194ft and 1,708m respectively. The districts benefited out of the Irrigation Projects are Shimoga, Davanagere and Chikmagalur.

Sriram Sagar Irrigation Project

The Sriram Sagar Project also known as the Panchapandu project an India flood-flow project on the Godavari. The

project is located in Nizambad District Telangana state. The dam was constructed in the year 1963. Sriram Sagar is an irrigation project across river Godavari in Telangana to serve irrigational needs 4,00,000 hectares in Karimnagar, Warangal, Adilabad and Khammam Districts, is also provides drinking water to Warangal city. There is Hydroelectric plant working at the dam site 36mw capacity generating. The height and length of the dam is 43 m and 15,600 m respectively.

Ukai Irrigation Project

The Ukai Dam, constructed across the Tapti River, is the second largest reservoir in Gujarath after the Sardar Sarovar. It is also known as Vallabh Sagar. It is located in Ukai town, Tapi District Gujarath State, the dam constructed in the year 1972. The dam is meant for irrigation and power generation and also flood control. Water spread of about 52,000hectares, its capacity is almost same as Bhakra Nangal Dam. The dam height 80.77m and lenth 4.927m, construction cost of this project 1389million, and benefited of the districts are Valsad, Navsari, Surat and tapi.

Approved and Actual Cost of Irrigation Projects (In India)

Sarda Sahayak Irrigation Project

It was constructed in the year 1928. This dam is located in Banbasa District, Champawat in Uttarkhand. The approved cost of the construction of this dam was ₹ 199 Crore and actual cost of construction ₹ 1,333.66 Crore.

Kangsabati Irrigation Project

The dam is located in Mukatmanipur, District Bankura in West Bengal. The dam was constructed across Kangsabati River in the year 1956. The approved cost of construction of this dam is ₹ 25.26 Crore and actual cost is ₹ 288.08 Crore.

Krishnapuram Resevoir Project

It is a medium irrigation projected constructed across Kushathali River in the year 1981. The dam located in Krishnapuram village, chittor District. The approved cost of construction in this dam was ₹ 2.46 crore and actual cost is ₹ 4.37 crore.

Annamayya Irrigation Project

It is medium irrigation project constructed across cheyyeru river in the year 1981-2001. The dam located in Badanagadda Village, Rajampet Mandal, Kadapa District. The approved cost of this project was ₹ 9.15 Crore and actual cost is ₹ 65.26 Crore.

Conclusion

The irrigation, power production, flood control are necessary for the development of a state. But the irrigation facilities, not benefits of power production hardly reach to those people who need to be developed. The benefits go to the industrialists, urban areas, big farmers which cater the interest of political parties, technocrats, bureaucrats, construction firms, thus the interests of the powerful group are projected as national interest and the weaker group has to pay the primary cost of such projects in the form of displacement. The irrigation projects are always in the best interest of the larger groups. The tangible and intangible benefits and the end user results become pertinent.

The management of irrigation systems has gained importance over the last five decades due to a tremendous increase in irrigated area in India, primarily as a result of massive investments in new and existing surface irrigation projects. There has been a growing realization of possible improvement in water management for a more efficient use of available water resources. The potential of information technology applications for improved irrigation system management was realized long ago, but concerted efforts on this front have only been made in the last ten years. The use of computers, communication and information to control irrigation systems will yield many benefits, resulting in obvious economic savings and in intangible benefits whose value cannot be measured in monetary terms.

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