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Sujlam Suflam Spreading Canal – a revolutionary form of water management to change the water problem in water scarcity area

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ABSTRACT

Gujarat's water supply varies widely from year to year and area to area. Sometimes floods and water shortage occur in the same year. While the wettest areas in the south, most of Gujarat's people and farmlands are in the drier Northern and Western portions of the state. State's challenge is how best to conserve, control and deliver enough water to meet needs where and when they occur.

There are very few perennial rivers in the state out of a total of 185 rivers and limited facility of surface irrigation. Perennial rivers are located in 20% area of the state, which accounts for 80% of surface water of the state.

The annual rainfall in western & Northern Gujarat and hilly eastern tribal belt is about 300 to 600 mm. rainfall is not only scanty, but erratic and unevenly distributed.

As such majority of the area of the state is rain-fed and there is achute shortage of irrigation water in this area. This leads to drought every third year. The drought is such a menace that not only it eats away billions of rupees but along with it because of lakh of surface and ground water resources, millions of cattle and shepherds have to migrate from saurashtra, kachchh and north Gujarat to the area of south Gujarat in search of water, food and fodder. Further, in order to mitigate scarcity, the state government has to undertake scarcity relief works at a huge cost.

The ground water table is very deep and polluted, quality of which is not suitable for irrigation and drinking purpose. There is depletion of ground water by about 3 to 5 meters every year. Deterioration of quality of ground water leads to diseases like fluorosis.

The state adopted an integrated approach for efficient and sustainable water resources development and management, which is inclusive in scope. This includes "Inter Basin Transfer of Water".

Key words: *Rainfall, Water shortage, Water Table, Irrigation*

AIM

Sujalam Sufalam scheme and comprehensive management of water management have been prepared only after the state-wide study of both the areas covered by the water bodies and the victims of the shortage of the state government.

Below are the findings of the study that has been studied for the last few years on the situation of water resources and water resources in scarcity areas.

- Rain, uncertain, irregular, insufficient
- Ground water harvesting has steadily increased - In northern Gujarat, the average annual level of water ranges from three to five meters below the level
- Electricity demand for water has increased steadily
- Low and poor quality water sources

- Fluoride, Nitrate, Salt, Polluted, Healthy Harmful Groundwater
- Accelerated growth of water resources in south Gujarat
- Total ten districts of the state are directed as dry and dry suburban areas.
- Total ten districts of the state are directed as dry and dry suburban areas. In which six districts of North Gujarat, Ahmedabad, Gandhinagar, Mehsana, Banaskantha, Sabarkantha and Patan, Surendranagar district of Saurashtra, Panchmahal and Dahod districts of Kutch and Kachchh districts of Central Gujarat

1. INTRODUCTORY PLANNING

Gujarat has developed a lot in the industry and agriculture sector. Due to the abundance of water in the north part of Gujarat, Saurashtra and Kutch, there is a lack of development. The area does not contain perennial rivers. The farmers have to rely on ground water as well as due to irregular rainfall. Since they are continuously pulling the ground water, the ground water level has dropped below 250 to 300 meters. The only way to draw this water is to use 2286 MW of electricity in 1.93 lakh wells in North Gujarat. The government has to indulge in crores rupees subsidy and cessation of indebtedness. While south and central Gujarat, hundreds of thousands of solid feet of water in the perennial rivers flow into the sea. This is the goal of taking excessive water from the scarcity area. Sujalam Suflam Spadding Canal has planned to take extra water from the Mahi River to the Rail river of Northern.

In addition to the quantity of water received from Kadana dam, a total of 1200 cusecs of water has been planned to run in Sujalam Sufalam canal, through 6 pipelines carrying 200 cusecs carrying capacity of Narmada main canal. For water supply in Sapu reservoir, Mukteshwar reservoir and Dantivada reservoir of Banaskantha district respectively, 2, 1 and 1 pipelines are planned from Narmada main canal.

This canal planned to be 373 km in length from the Kadana dam to the rail river of Banaskantha district

1	Total Length of Canal	337 km
2	Canal FSL	120.40 meter
3	The planned amount to drive by canal.	700 million cubic meter
4	Canal capacity	2000 cusecs
5	Canal Bottom Width	12 meter
6	Canal Foliage	1:10,000
7	Canal curve	1:1.5 meter
8	Water Height In the Canal	4.25 meter
9	Re-board of canal	0.75 meter
10	Type of canal lining	Without lining
11	Canal flow	0.72 meter / second

Figure 1. Typical Details Of Canal

CANAL PATH AREA OUTLINE

SR. NO	Name of district	Canal chainage in km	Canal length in km	Passing near through city of concern district
1	Panchmahal	0 to 27.15	27.15	Lunavada
2	Kheda	27.15 to 69.87	42.72	Kapadvanj
3	Sabarkantha	6.87 to 158.97	89.10	Bayad, dhansura, prantij, talod
4	Gandhinagar	158.97 to 185.94	26.97	Mansa
5	Mahesana	185.94 to 228.42	42.48	Vijapur, mahesana, unjha
6	Patan	228.42 to 274.34	45.92	Patan
7	Banaskantha	274.34 to 337.52	63.18	Diyodar

Figure 1. Canal Pateh Area Outline

CROSSLINE OF CANAL AND RIVERS

SR NO	Name of river	chainage in km	Types of Improved Structure
1	Bhadar	14.70	aqueduct
2	Laavri	44.25	aqueduct
3	Shedhi	53.25	aqueduct
4	Mahor	73.95	aqueduct
5	Dhamani	87.70	aqueduct
6	Varanashi	102.75	Level crossing
7	Vatrak	105.15	aqueduct
8	Khari	109.65	Level crossing
9	Mazam	118.95	aqueduct
10	Meshvo	130.80	aqueduct
11	Luni	135.60	aqueduct
12	Khari	143.55	aqueduct
13	Bokh	151.65	aqueduct
14	Sabarmati	158.97	canal syphon
15	Khari (mahesana)	210.23	canal syphon
16	Rupen	214.72	canal syphon
17	Pushpavati	223.72	canal syphon
18	Saraswati	247.845	canal syphon
19	Khari (banas)	260.61	canal syphon
20	Chikariya	266.61	canal syphon
21	Banas	274.295	canal syphon

DETAILS OF LARGE CHECK DAMS ON RIVER CROSSING CANAL

SR NO	Name of river	Nos of check dam
1	Laavri	4
2	Mahor	3
3	Varanashi	1
4	Vatrak	5
5	Mazam	1
6	Meshvo	2
7	Khari (sabarkantha)	5
8	Sabarmati	5
9	Khari (mahesana)	5
10	Rupen	4
11	Pushpavati	5
12	Saraswati	3
13	Khari (patan)	2
14	Khari (banaskantha)	4
15	Chikariya	3
16	Banas	3

CANAL BENEFIT AREA

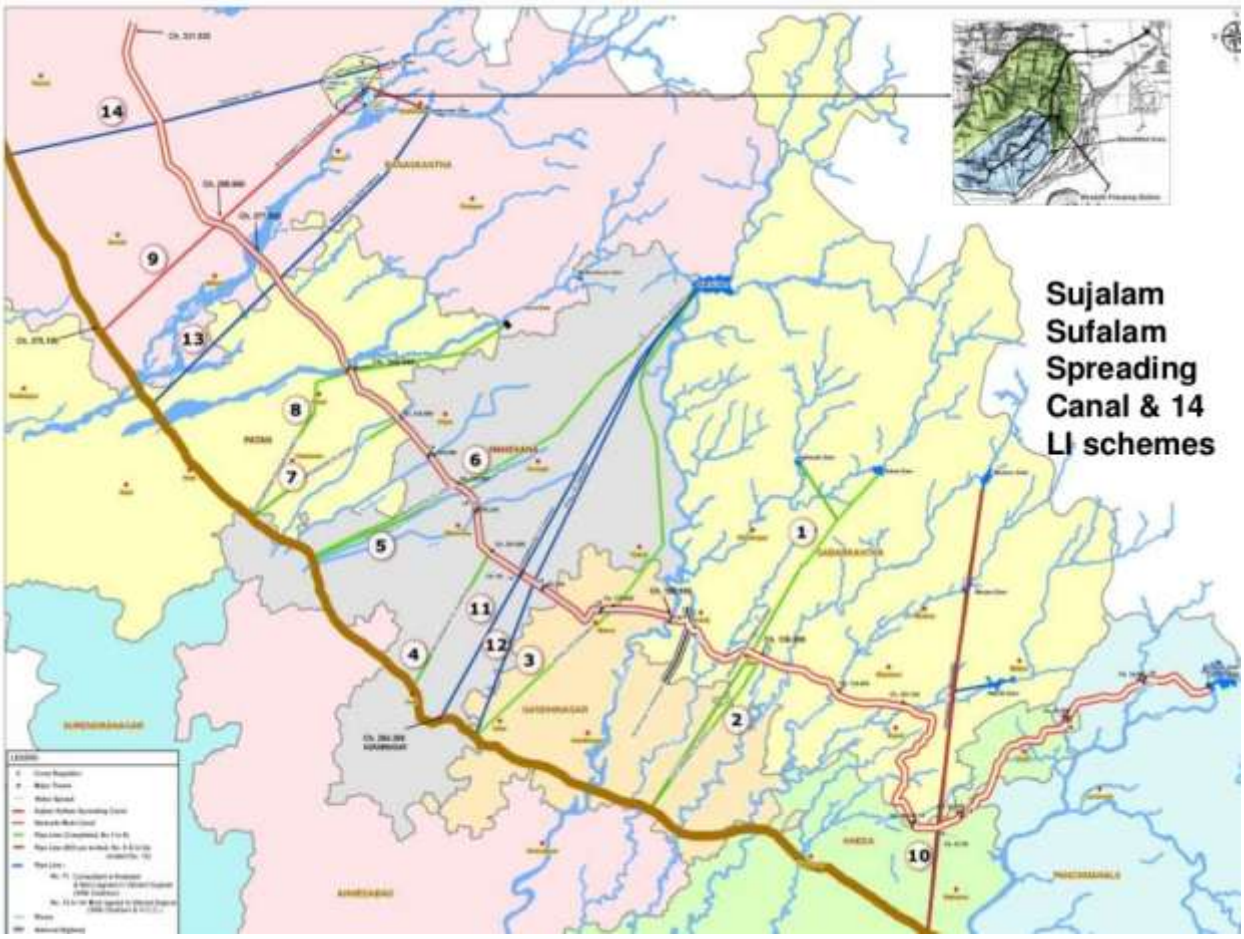
Under the plan to recharge the areas between of Sujalam Suffam Spreading canal and Narmada main canal like Panchmahal, Kheda, Sabarkantha, Mehsana, Patan and Banaskantha districts and to providing irrigation facilities, branch canals have been planned to make 337 km long Sujalam Sufalam Spradinga Canal, apart from every two

kilometers. This is a plan to provide surface water for irrigation to the area between the Narmada Main Canal and Sujalam Sufalam Spreading canal.

2. IMPLEMENTATION IN GUJARAT STATE, INDIA

It is an integrated approach to augment water resources in water deficit and overexploited area of the state. It includes minor & macro level measures like inter basin transfer from surplus to deficit basin and extensive ground water recharge through Spreading canal, Lift Irrigation through pipe lines, high level canals, salinity ingress prevention measures and check dam.
Sujlam Suflam Spreading Canal is an unlined canal of 332 km length traversing through 7 districts. The canal is having a capacity of carrying 2000 cubic feet per second (cusecs) of water. The canal all along its course has major structures for crossing 21 Rivers, 2 National Highways, 27 State Highway, 7 Railway Lines. Besides, there are 600 other structures.

NARMADA BASE LIFT IRRIGATION SCHEME TO UTILISE EXCESS FLOOD WATER – 14 lift irrigation pipelines are planned to fill up 9 reservoirs and enroute ponds of North Gujarat region to augment irrigation facilities and drinking water supply to villages.



BENEFITS ACHIEVED

- Recharging of ground water between 3 to 5 meter
- Envisages irrigation benefits to 70,000 hectare area
- Drinking water supply to 679 village & 8 towns
- 261 enroute ponds connected

BIRD VIEW BENEFITS (NORTH GUJARAT REGION)

- During the monsoon and during the rains no water and rivers and drainage were transported to the farmers of 9 Gandhinagar, Mehsana, Patan, Banaskantha district, 9 large check dams, 50 small check dams and 36 pond filled with irrigation irrigation and underground recharge.
- Sujalam Sufalam Spray On both sides of the canal, there are surviving bore wells which were dried by going downstream. Now Sujalam Sufalam spray In the canal, irrigation of the water coming after the water level is rising and the remaining bore / wells are irrigated by irrigating the water. In addition, the remaining bore / wells in this area are constantly available for water due to water recharge.
- Sujalam Sufalam Spray Direct / indirect irrigation benefits are received in 56131 hectares of Mehsana, Patan, Gandhinagar and Banaskantha districts by carrying water to the canal.
- In additional Bhasariya pipeline is planning to fill 41 ponds of 41 villages of Patan and Chasmas taluka and fill 33 ponds of 30 villages through Degadi pipeline.

CONCLUSIONS

"1,200 cusec surplus water from SSP & Kadana dams diverted to North Guaratj under Sujalam Sufalam Yojna"
For the purpose of recharge the excess water of the Kadana reservoir to the dry area of North Gujarat, the state government has constructed Sujlam Suflam Spreading Canal from Kadana to Raah. The water of Kadana reservoir and Narmada main canal based pipelines have been transported from the Chain age 158 to 332 km under the Sujlam Suflam Circle- 2, Mahesana. Respective Water is transported in 13 drains which crossing rivers like Khari, Rupen, Saraswati, Pushpati, Banas and respective Canal.
During the monsoon and during the rains no water and rivers and drainage were transported to the farmers of 9 Gandhinagar, Mehsana, Patan, Banaskantha district, 9 large check dams, 50 small check dams and 36 pond filled with irrigation irrigation and underground recharge.

Sujalam Sufalam Spray On both sides of the canal, there are surviving bore wells which were dried by going downstream. Now Sujalam Sufalam spray In the canal, irrigation of the water coming after the water level is rising and the remaining bore / wells are irrigated by irrigating the water. Moreover, continuous water is available due to water recharge in the existing bore / wells of this area. And Sujalam Sufalam Spray Direct / indirect irrigation benefits are received in 56131 hectare area of Mehsana, Patan, Gandhinagar and Banaskantha districts by carrying water to the canal.
Bhasariya pipeline is planning to fill 41 ponds of 41 villages of Patan and Chasmas taluka and fill 33 ponds of 30 villages through Degadi pipeline.

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