ಕರ್ನಾಟಕ ವಿಧಾನಪರಿಷತ್ತು

ಚುಕ್ಕೆ ಗುರುತಿಲ್ಲದ ಪ್ರಶ್ನೆ ಸಂಖ್ಯೆ	:	42
ಸದಸ್ಯರ ಹೆಸರು	:	ಶ್ರೀ ಕೆ. ಪ್ರತಾಪಚಂದ್ರ ಶೆಟ್ಟಿ (ಸ್ಥಳೀಯ ಸಂಸ್ಥೆಗಳ ಕ್ಷೇತ್ರ)
ಉತ್ತರಿಸಬೇಕಾದ ದಿನಾಂಕ	:	10-07-2018
ಉತ್ತರಿಸಬೇಕಾದ ಸಚಿವರು	:	ಮಾನ್ಯ ಉಪ ಮುಖ್ಯಮಂತ್ರಿಯವರು

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ಕ್ರ ಸಂ	ಪ್ರಶ್ನೆ	ಉತ್ತರ
ಅ	ತ್ಯಾಗರಾಜ್ ಸಮಿತಿ ನೀಡಿರುವ ವರದಿಯಂತೆ ಲಿಂಗನಮಕ್ಕಿ ಜಲಾಶಯದಿಂದ ಬೆಂಗಳೂರು ಮಹಾನಗರಕ್ಕೆ ಕುಡಿಯುವ ನೀರನ್ನು ಕೊಂಡೊಯ್ಯುವಾಗ ಮಾರ್ಗ ಮಧ್ಯದಲ್ಲಿ ಯಾವ ಯಾವ ಜಿಲ್ಲೆಗಳಿಗೆ ಕುಡಿಯುವ ನೀರನ್ನು ಒದಗಿಸಲಾಗುವುದು; (ವರದಿಯ ಪ್ರತಿಯನ್ನು ಒದಗಿಸುವುದು)	ಬೆಂಗಳೂರು ನಗರಕ್ಕೆ ದೀರ್ಘಾವಧಿ ನೀರಿನ ಅವಶ್ಯಕತೆ ಪೂರೈಸಲು ಜಲಸಂಪನ್ಮೂಲಗಳನ್ನು ಗುರುತಿಸುವ ಸಲುವಾಗಿ ಶ್ರೀ. ಬಿ.ಎನ್ ತ್ಯಾಗರಾಜ ಇವರ ಅಧ್ಯಕ್ಷತೆಯಲ್ಲಿ ರಚಿಸಲಾಗಿರುವ ತಜ್ಞರ ಸಮಿತಿಯು ಹಲವು ಶಿಫಾರಸ್ಸುಗಳನ್ನು ಮಾಡಿದ್ದು, ಅದರಲ್ಲಿನ ಒಂದು ಶಿಫಾರಸ್ಸಿನಲ್ಲಿ ಲಿಂಗನಮಕ್ಕಿ ಜಲಾಶಯದಲ್ಲಿ ವಿದ್ಯುಚ್ಛಕ್ತಿ ಉತ್ಪಾದನೆಯನ್ನು ಭಾಗಶ:/ಸಂಪೂರ್ಣವಾಗಿ ಸ್ಥಗಿತಗೊಳಿಸಿದಲ್ಲಿ, ಬೆಂಗಳೂರು ನಗರಕ್ಕೆ 2051 ರವರೆಗೆ ಕುಡಿಯುವ ನೀರನ್ನು ಒದಗಿಸಬಹುದಾಗಿದೆ ಎಂದೂ ಹಾಗೂ ಚಿತ್ರದುರ್ಗ, ತುಮಕೂರು, ರಾಮನಗರ, ಕೋಲಾರ ಮತ್ತು ಚಿಕ್ಕಬಳ್ಳಾಪುರ ಜಿಲ್ಲೆಗಳಿಗೆ ಕುಡಿಯುವ ನೀರು ಸರಬರಾಜು ಮಾಡಬಹುದಾಗಿದೆ ಎಂದು ಶಿಫಾರಸ್ಸು ಮಾಡಲಾಗಿದೆ. ಲಿಂಗನಮಕ್ಕಿ ಜಲಾಶಯದ ಕುಡಿಯುವ ನೀರಿಗೆ ಸಂಬಂಧಿಸಿದ ವರದಿಯ ಪ್ರತಿ ಅನುಬಂಧದಲ್ಲಿ ಒದಗಿಸಲಾಗಿದೆ.
ಆ	ಲಿಂಗನಮಕ್ಕಿ ಜಲಾಶಯದಿಂದ ಕುಡಿಯುವ ನೀರನ್ನು ಕೊಂಡೊಯ್ಯುವ ಯೋಜನೆಯ ವಿಸೃತ ಯೋಜನಾ ವರದಿ (DPR)ಯನ್ನು ಪೂರ್ಣಗೊಳಿಸುವುದು ಯಾವಾಗ ಮತ್ತು ಈ ಯೋಜನೆಗೆ ತಗಲುವ ಅಂದಾಜು ಮೊತ್ತವೆಷ್ಟು; ಯಾವಾಗ ಪೂರೈಸಲಾಗುವುದು;	ತಜ್ಞರ ಸಮಿತಿಯ ವರದಿಯಲ್ಲಿ ಸಲ್ಲಿಸಿರುವ ಶಿಫಾರಸ್ಸುಗಳನ್ನು ಅನುಷ್ಠಾನಗೊಳಿಸಲು ಇರುವ ಸಾಧಕ-ಬಾಧಕಗಳ ಬಗ್ಗೆ ಪರಿಶೀಲಿಸಲಾಗುತ್ತಿದೆ.
ಇ	ಲಿಂಗನಮಕ್ಕಿ ಜಲಾಶಯದಿಂದ ಕುಡಿಯುವ ನೀರನ್ನು ಬೇರೆ, ಬೇರೆ ಜಿಲ್ಲೆಗಳಿಗೆ ಪೂರೈಸುವ ಯೋಜನೆಗೆ ಸಾರ್ವಜನಿಕರಿಂದ ಹಾಗೂ ಸಂಘ ಸಂಸ್ಥೆಗಳಿಂದ ವಿರೋಧ ಅಥವಾ ಆಕ್ಷೇಪಗಳು ಬಂದಿದೆಯೇ; ಬಂದಿದ್ದಲ್ಲಿ ಅವು ಯಾವುವು?	ಈ ಸಂಬಂಧ ಇನ್ನೂ ಯಾವುದೇ ಆಕ್ಷೇಪಣೆಗಳು ಸ್ವೀಕೃತವಾಗಿರುವುದಿಲ್ಲ.

ಸಂಖ್ಯೆ: ನಅಇ 96 ಎಂಎನ್‌ಐ 2018

(ಡಾ॥ ಜಿ. ಪರಮೇಶ್ವರ)
ಉಪ ಮುಖ್ಯಮಂತ್ರಿ

ಚುಕ್ಕೆ ಗುರುತಿಲ್ಲದ ಪ್ರಶ್ನೆ ಸಂಖ್ಯೆ:42ಕ್ಕೆ ಅನುಬಂಧ

APPENDIX-VIII

DIVERSION OF SHARAVATHI RIVER WATER FROM THE LINGANAMAKKI RESERVOIR TO BANGALORE

1) PROPOSAL OF DR.SUDHIR SAJJAN

Dr. Sudhir Sajjan, an engineer from Krishna Bhagya Jala Nigama, Almatti, Karnataka in his presentation before the Expert Committee suggested diversion of Sharavathi river water from the Linganamakki reservoir to meet the drinking water supply needs of Bangalore. Linganamakki reservoir is at present providing hydro power energy to a maximum extent of 5754 MU of electricity and supply to the State Power Grid with a total installed capacity of 1330 MW. Power can be generated from alternate sources using gas, oil, coal, nuclear etc., and also from non conventional sources like wind, solar, etc. But only water is required for potable use. In a drought year, if water is not supplied for irrigation or power generation compensation can be given, but water has to be provided for sustenance of life. Even the latest National Water Policy 2012 gives the highest priority for drinking water over all other demands.

2) PRESENT WATER SUPPLY TO BANGALORE.

Bangalore is getting 1410 MLD of water from the river Cauvery. Due to the nearness of Arkavathi river catchment to the City, a lot of developments have taken place both authorized and unauthorized affecting the flow of water in the Arkavathi river both in quality and quantity. At present only about 50 MLD is drawn from the Arkavathi and that too only for a few months in a year mostly during rainy season.

The river Cauvery has 4 reservoirs in Karnataka which regulate the flow requirement for Bangalore.

S.No.	Reservoir	Capacity in TMC
1	Harangi	8.50
2	Kabini	16.00
3	Hemavathi	37.10
4	KRS	49.45
	Total	111.05

Water is extracted to Bangalore from the Shiva Anekut. Whenever there is a shortfall ,water is drawn from any of these reservoirs. Further drawal of water from the river Cauvery to Bangalore is not possible in view of the conditions imposed in the Cauvery Water Disputes Award.

3) POPULATION AND WATER DEMAND PROJECTION

The Expert Committee have projected the population, water demand, the present supply and the short fall from the year 2011 to 2051. The following is the position.

Year	Population in lakhs	Water demand in TMC	Shortfall in demand in TMC.
2021	142.41	36.40	17.60
2031	210.80	53.90	35.00
2041	283.30	72.40	53.60
2051	345.40	88.25	69.45

Note: The Present Demand in 18.80 TMC

4) POSSIBLE SOURCES FOR FRESH WATER SUPPLY

Karnataka has 7 major river systems. The area drained by each river in the State and the probable inflow in TMC is as follows.

Sl.No	Name of the river	Drainage Area in thousand sq.kms.	Inflow in TMC
1	North Pennar	6.94	0.2
2	South Pennar	3.76	0.2
3	palar	2.97	0.2
4	Cauvery	36.13	388
5	Krishna	113.01	970
6	Godavari	4.43	50
7	West Flowing Rivers	24.53	2000

Palar, North and South Pennar (Pinakini) rivers though very near to Bangalore do not contribute any water as they have small basins in the State. The river Godavari also has a very small drainage area in the State and is too far from Bangalore. Though Krishna River has a large drainage area and is meeting the irrigation and drinking water needs, no surplus water is available. Further water from the river Cauvery is not possible due to restrictions imposed by

the Cauvery Water Disputes Tribunal Award limiting the usage of water in the State and insisting on stipulated monthly discharges to Tamil Nadu. Also these rivers are involved in interstate disputes.

The west-flowing rivers originate in Western Ghats, they flow for a short distance and then join the sea. The intensity of rainfall in the western Ghats in the 4 rainy months ranges from 5000 to 9000 MM with huge inflow. But the water is not utilized due to its geographical terrain and flows into the sea. The total inflow from the west-flowing rivers is nearly 2000 TMC. A portion of water from these rivers if diverted to East can meet the requirement of a number of water starved districts in the State.

5) CRITERIA FOR SELECTING WATER SOURCES FOR BANGALORE.

Any water supply proposal for Bangalore for long-term sustainability should consider the following.

a) Sufficient quantity of water should be available in the river or in the storage reservoir for supply throughout the year for the present and also for future needs of 30 to 40 years.

b) The source should not be vulnerable to pollution.

c) Should not involve interstate problems and preferably free from irrigation and other demands.

d) Availability of a reliable power supply nearby.

e) Construction of a new reservoir should be avoided, if possible, since it involves huge submergence of land, and displacement of villages, environmental issues etc.

f) The project should be achievable with economic viability and long-term reliability.

Bangalore will face a shortfall of 17.60 TMC by 2021 and 69.45 TMC by 2051. The requirement of additional water is very huge and there is a critical need to find a suitable water source for the future generation.

6) MAJOR RESERVOIRS IN WESTERN GHATS.

There are 3 major reservoirs in the Western Ghats controlled by KPCL for power generation. The Supa Reservoir on the river Kali, the Mani Reservoir on the river Varahi and the Linganamakki reservoir on the river Sharavathi. The Supa Reservoir is too far from Bangalore being about 407 KMs. and too interior in the western Ghats. Though Mani reservoir is nearer to Bangalore, its entire water is used for irrigation after power generation. The Linganamakki reservoir is about 300 KMs. from Bangalore. The entire water goes to sea without any irrigation as it passes through a deep gorge. This reservoir is therefore, the best suited for providing drinking water to Bangalore. However, this affects generation of power in the State.

7) THE LINGANAMAKKI RESERVOIR.

Sharavathi river one of the west-flowing rivers, originates at a height of 730 M near Ambuthirtha in Shimoga district and, flows in a north westerly direction for a distance of about 132KMs. before joining the Arabian sea near Honnavar. During its journey it is joined by several tributaries. After flowing for a distance of about 80 kms. along its course, the river drops down a steep fall of 293 M forming the world famous Jog falls. The water after power generation traverses further about 40 kms. in deep valley and joins the sea. There is no irrigation potential for the water below the dam. The reservoir is 6 kms. from Jog falls near Sagar Town. The Linganamakki reservoir has a catchment area of 1991.5 sq km with submersion area of 326 sq km with a water depth of 104 Ft above the min low level. The dam is 2.7 km long with a live capacity of 4294 MCM or 151.6 TMC. The details are furnished in Annexure – I enclosed. The average annual inflow as per the 10 years actual inflow 2003 to 2013 as in Table - I is 180.95 TMC. The reservoir receives water from rains and also from Chakra and Sollahoklu reservoirs which are linked through canals. The water is free from pollution since the catchment is mostly in the forest area. The Annexure – II enclosed indicates the maximum and minimum reservoir level, Rain fall and Surplus from the year 1964 to 2013.

Table – I. Ten years average inflow to Linganamakki reservoir (All figures in MCFT)

Sl. No.	YEAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	TOTAL
1	2003-04	591	555	16185	44855	30212	11418	8536	1385	12277	1135	521	279	127949
2	2004-05	181	1056	31114	32174	64955	8794	4332	2773	1212	794	998	466	148849
3	2005-06	436	152	18389	70625	60610	21614	9731	2755	2160	1356	1779	1523	191130
4	2006-07	633	2738	19251	80622	71806	20447	7561	4388	2249	2294	1592	1583	215164
5	2007-08	948	185	32399	86274	77579	34702	10166	4685	3121	1550	1071	3335	256015
6	2008-09	881	895	20288	40279	69630	22336	5734	1346	681	609	528	645	163852
7	2009-10	216	395	2171	107337	28614	30506	14189	4244	2949	2168	3372	407	196568
8	2010-11	446	75	9555	48385	42297	33296	13047	10570	3413	2283	1620	957	165944
9	2011-12	1174	974	25179	58732	50571	37626	12746	5055	2559	2088	949	1254	198907
10	2012-13	1072	468	6146	30586	67919	26463	6047	3157	905	1189	812	357	145121
AVG (10 YRS)		658	749	18068	59987	56419	24720	9209	4036	3153	1547	1324	1081	180950

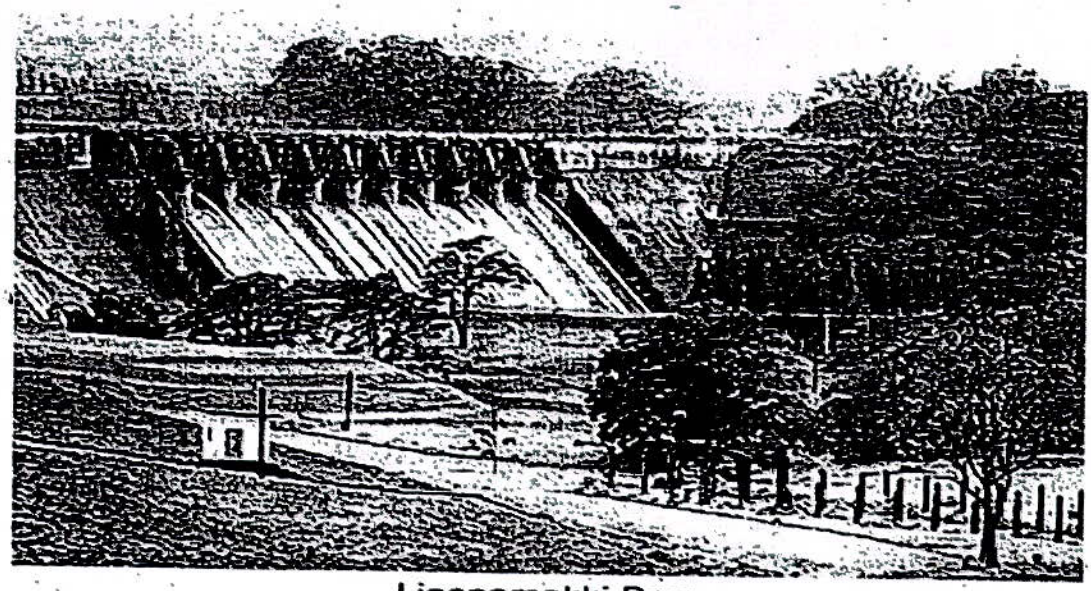
8) POWER GENERATION IN LINGANAMAKKI.

There are 3 hydro power stations below the Linganamakki reservoir.

The water from the reservoir is led into the power house located on the left side of the dam. It has two generating units of 27.5 MW each working on a 29.5 M water head and generating 260 MU of power. The second is the Sharavathi Generating Station which has 10 units of 103.5 MW each working on a head of 443.18M and generating 4972 MU of power. The water is then led into the Gurusoppa Power Station which has 4 units of 6.0MW each working on a head of 47.5M and generating 522 MU of power. All the power houses are in series with a total installed capacity of 1330MW. The total maximum power generated is 5754 MU in a normal year. The Table II below indicates the actual power generated for the past 10years 2003 to 2013.

Sl. No.	YEAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	TOTAL
1	2003-04	18	17	486	1347	907	343	256	42	369	34	16	8	3842
2	2004-05	5	32	934	966	1951	264	130	83	36	24	30	14	4470
3	2005-06	13	5	552	2121	1820	649	292	83	65	41	53	46	5740
4	2006-07	19	82	578	2421	2156	614	227	132	68	69	48	48	6461
5	2007-08	28	6	973	2591	2330	1042	305	141	94	47	32	100	7688
6	2008-09	26	27	609	1210	2091	671	172	40	20	18	16	19	4920
7	2009-10	6	12	65	3223	859	916	426	127	89	65	101	12	5903
8	2010-11	13	2	287	1453	1270	1000	392	317	102	69	49	29	4983
9	2011-12	35	29	756	1764	1519	1130	383	152	77	63	28	38	5973
10	2012-13	32	14	185	918	2040	795	182	95	27	36	24	11	4358
AVG (10 YRS)		20	23	543	1801	1694	742	277	121	95	46	40	32	5434

The low head Linganamakki power house generates only 2.14 MU of power per TMC of water. The high head Sharavathi power generating station produces 30 MU per TMC of water.



Liganamakki Dam

The medium head Gerusoppa station generates 3.33 MU/TMC of water. Since, the power stations are in series 1 TMC of water produces 35.47 MU of power. If 10 TMC of water is withdrawn for Bangalore water supply the loss in power generation will be only 354.70 MU.

POWER SCENARIO IN KARNATAKA.

The present available power installed capacity as on 31.8.2010 (as per the CEA Website) is 11384 MW. This includes contribution from the state sectors of 6530MW, central projects of 1268 MW, and 3586 MW from private sector.

The load forecast for Karnataka as per CAGR figures is about 5% per year. The peak demand and annual energy requirement by 2017 (as per annual power survey of CEA) will be 14071 MW and 81354 MU respectively.

The Government have already initiated action for power generation for future demand which are approved or ongoing at present is as below.

Sl.No	Department	Capacity
1	KPCL	6675
2	NTPC	4000
3	PPP	1900
4	Private Developers	800
	Total	13375 MW

Besides the Government have proposed the following power projects (Source Karnataka Energy Department) for a total capacity of 14500 MW as detailed in Table

Sl no	**Department**	**MW**
1	Koodagi Thermal power project in Bijapur district	4000
2	Kaushik project of 1000 MW in Hassan district	1000
3	Namdu power project in Gulbarga district	500
4	Channlopur in Mysore district	500
5	Ghataprabha plant in Belgaum district	500
6	Raichur plant.	500
7	Gas to energy plant in Bidadi near Bangalore	1400
8	Gas to energy plant in Tadadi in UK district	2100
9	Coal based power project in Chhattisgarh state	4000
Total		**14500**

The gas pipeline from Dabhol in Rathnagiri to Karnataka is giving a fillip for early commissioning of gas-based power plants. It is proposed to utilize this gas for the 1400 MW capacity power plant at Bidadi near Bangalore. The cost of the project is about Rs.7000 crores including land acquisition and civil works. Many other gas-based plants may be commissioned with this gas. A power plant with a capacity of 1400 MW costing about Rs. 7000 crores with gas can meet the power generation capacity of 1330 MW of the Linganamakki reservoir.

The State has taken up a number of initiatives to tone up energy efficiency, improvements in transmission, and distribution of energy to save losses. The State is also encouraging wind-based and solar-based power projects. At present during normal monsoon the demand and supply is manageable. Shortages are felt during summer months resulting in load shedding, scheduled and unscheduled power cuts. With the State Government's proposals for augmenting power generation from various sources it is expected to be self-sufficient in the next decade or two.

The present annual power generation in Karnataka is 11440 MW out of which the contribution from Sharavathi is 1330 MW or 11.62% of the total power produced in the State.

10) EFFECT ON POWER GENERATION IN LINGANAMAKKI IF WATER IS DIVERTED TO BANGALORE

As indicated in sub head-8, every TMC of water generates 35.4 MU of power in the Sharavathi Power Stations. If we draw 10 TMC of water for Bangalore in one Stage the loss of power generation will be 354 MU which will be only 16 % of power generated in Sharavathi and only 2 percent of the total power generated in Karnataka which is very negligible. The Committee have proposed to draw 10 TMC from this reservoir by 2031 and another 20 TMC by 2051. The total power loss will be1062 MU which is about 25% of the power generated at Linganamakki.

The entire Short Fall of water for Bangalore which is 69.45 TMC by 2051 can be met by this reservoir alone without any augmentation from other sources. Even after drawing 60 TMC for Bangalore by the year 2051, the reservoir can still generate power to an extent of 3628 MU as against the present power generation of 5654 MU. For providing drinking water to Bangalore the water has to be pumped from Linganamakki reservoir upto the Yagachi reservoir for which a portion of this power can be utilised.

13. CONCLUSION:-

Linganamakki reservoir is the most suitable, sustainable, and potable water source free from pollution and irrigation demand. There is no need to construct a new reservoir as sufficient storage is available in the present Linganamakki reservoir. Only 30% of the storage is sufficient to meet the full requirement of water for Bangalore upto 2051 without augmentation from any other source. The reduction in power generation will be negligible. No interstate issues are involved.

The water can be drawn in Stages of 10 TMC every decade starting from 2021-31 with gradual decrease in stages in the power generation. With the above, the total withdrawal by 2051 will be 30 TMC which works out to only about 18% of the storage. This will not have much impact on the Power Generation and can easily be made up by the power projects that are already on or those proposed.

Power can be generated from many other sources, but only water is required for drinking purposes. It the storage reservoir at Linganamakki is delinked from Power generation, it alone can meet the drinking water supply needs of Bangalore upto 2051 without any other augmentation and also can meet to need of the districts of Kolar, Chikkaballpur, Tumkur, Bangalore rural, Ramanagar, Chithradurga etc.

Power upto 1440 MW (the capacity of Linganamakki power is 1330 MW) can be generated using gas supplied by GAIL wherever required. It may cost about Rs. 7000 crores.