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EMERGENCY PLAN FOR RAPID DEVELOPMENT OF WATER RESOURCES AND OVERCOMING POWER LOAD SHEDDING

BY

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SYNOPSIS

Since the completion of Tarbela Dam in 1974 no major dam or hydroelectric project has been taken up in Pakistan. The rate of population growth in Pakistan is 3.1 percent per annum and we are forced to import large quantities of food items such as wheat, sugar, pulses and edible oil. Pakistan is the largest importer of edible oil in the world so far as the per capita consumption is concerned. We depend heavily on import of P.O.L. for our energy requirements. We have reached this deplorable state inspite of the fact that we have the largest contiguous irrigation system in the world and 20 MAF of Indus water is presently going waste to Sea. There is immense hydroelectric potential on the Indus. To overcome this long neglect we need an emergency plan for development of water and power resources. This paper suggests the first step towards achieving self-sufficiency in food and energy.

In the Revised Action Programme (RAP) for irrigated agriculture prepared by WAPDA in 1979, Kalabagh Dam was the key project for water and power development of Pakistan. As per this plan it was to be completed by 1994 and Thal Reservoir of 1.6 MAF capacity was to be completed by 1984-85. Thal reservoir has immense multipurpose benefits as it is not only a storage but can firm up power from Tarbela Dam in the canal closure period of December-January and thus prevent load shedding. This would also generate power at tail of Chashma-Jhelum Link.

Another project suggested by World Bank as far back as 1967 is Chiniot Dam of 1.4 MAF. This should also be taken up now as it not only makes available extra storage water and improves the operation of Lower Chenab Canal System but would also firm up Mangla Dam power in the same way as Thal Reservoir firms up Tarbela Dam power.

A recent suggestion made in connection with Chashma Hydro Project to raise Chashma Barrage by 3 ft would not only restore the storage to its 1970 position of 0.87 MAF but would also improve the power potential at Chashma Barrage.

Ghazi Barotha Hydro Project recently approved has a power channel capacity more than 50 percent higher than the largest project in the world, i.e. Narbada. It passes through high water table area in seismic zone and is risky. The project is expensive and single purpose only. There are better projects like Thahkot, Bunji and kohala which could be more useful and economical. The other projects suggested in paper No.317 of 1990 in Upper Indus should follow kalabagh Dam.

Until major hydroelectric projects are completed an economical method of power generation in the private sector is to use rice husk at husking mills for power generation. This has a power potential of 1200 MW. This method has been followed in Malaysia and Indonesia with great success. Another great advantage of this project is that cheap cement can be made as a by-product from the ash of rice husk. As the cost of cement is rising fast in Pakistan this would control the price and also allow us to become self-sufficient in cement.

There is need to refine our decision making process in selection of important projects. The present haphazard method has to be replaced by modern method of thorough study of all pros and cons by think tanks otherwise we would make blunders as in the past and waste the limited financial resources available to us. For developing countries think tanks are as important as the battle tanks. Even the world's most advanced country U.S.A. maintains scores of think tanks.

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1. INTRODUCTION

Since the completion of Tarbela Dam in 1974 no major dam or hydroelectric power project has been taken up. The position of availability of water and power are in a deplorable state. Pakistan has one of the World's highest population growth of 3.11 percent per annum. It is significant to note that with the largest contiguous system of irrigation in the world, Pakistan imported in the year 1992 -201, 700 million metric tons of wheat, 105,500 million tons of edible oil, 11,660 million tons of sugar and 13,900 million tons of pulses. Pakistan has become the largest importer of edible oil in the world so far as the per capita consumption of imported edible oil is concerned. We are also leading in the volume of edible oil import trade. Self sufficiency in food is self respect for the country. The policy of self reliance is incomplete without self-reliance in food and electric power. It is as important as self reliance in defence. We can overcome these shortages with proper planning of our water resources. At present 20 MAF to 30 MAF of water is wasted to the sea for want of storages and irrigation systems. An emergency plan is required to undertake this. This paper attempts to formulate this plan.

In 1990 the author presented paper No. 537 in which a number of long-term and short-term projects were suggested. This paper was discussed in the annual convention of March, 1992. The session was chaired by Member (Power) WAPDA. A consensus was evolved after the discussion that the suggestions made in the paper should be seriously considered. It is necessary to recapitulate those proposals and the developments in the last 3 years since the paper was originally published.

2. KALABAGH DAM

The most important project recommended in the Revised Action Programme for irrigated agriculture prepared by WAPDA in 1979 was Kalabagh Dam. It was recommend in this programme that Kalabagh Dam should be completed by 1994 to meet the serious water and power shortages. Unfortunately the Project was delayed due to various objections raised by N.W.F.P. and Sindh Governments. These objections have been examined in depth and a number of discussions were held by WAPDA with these two provinces. The present position is summarized below:-

a) The level of the full reservoir has been reduced from RL 925 to 915. This will have no flood risk for Nowshera which is at an elevation 938. It does not effect the operation of Mardan SCARP, the outfall elevation of which is 958.7. It is estimated that the Project will submerge 35,000 acres out of which 27,500 acres will remain submerged permanently and have to be acquired. This area includes 24,500 acres in Punjab and 3,000 acres in NWFP. As NWFP has serious objection to submergence, the project should not be made a hostage to this small area of 3,000 acres. Kalabagh Dam is the most vital project for water and power development to benefit all the provinces. Water

& Power of this dam is to be shared by all the provinces. Another redeeming feature of Kalabagh Dam is that it is one of the few dams in the world which has excellent topographic features for sediment sluicing and an infinite life. If NWFP still has objections, the reservoir level can be lowered further to exclude the submergence of the 3,000 acres in NWFP. Another important recent, development is that Munda dam on Swat has been approved and by this dam the levels in Kabul river would also be controlled. There are proposals to also control flow of Nallahs falling into the Kabul River from the right bank.

b) Unfortunately Sindh had politicized the Kalabagh Dam issue to such an extent that Sindh legislators and senators used to make wild statements that Sindh would be converted into a desert because there was not enough water in the Indus to even fill the dam.This may be due to the bitterness created in Sindh during the period when the MRD movement was suppressed. It goes to the credit of the previous Federal Government which was headed by a Prime Minister from Sindh that they supported the Kalabagh Dam just a few days before they were sacked in August 1990 though when they assumed power in 1988 they had strongly opposed it.

There are some technical objections to Kalabagh Dam which need to be examined. These have been studied in depth by WAPDA and number of meetings were held with Sindh Government. One objection is that due to upstream storages the salinity from the sea would encroach upstream. To keep down this Sindh demanded a minimum of 10 MAF of water to flow down to sea. This is waste of precious water just to keep down salinity as there are structural methods such as construction of gated weirs in the estuary which can block the flow of saline water. This is an international practice all over the world. How does Sindh expect to get 10 MAF water when it claims that there is not enough water to fill up Kalbagh Dam, having a capacity of 6 MAF? However IRSA (Indus River System Authority) is also studying this question in depth.

The other objection is that the kacha areas on either side of Indus would lose the annual flooding by construction of Kalabagh Dam. This also has been examined by WAPDA and it is not such a serious problem. A very important problem that has to be considered is that between Sukker and Kotri millions of acre-feet of water is wasted in the kacha areas. The reason is that water which floods the depressions never comes back to the river when the river levels fall. These water ponds not only cause obstruction to communications but create unhygienic conditions along villages in the kacha area. The losses are indicated in Appendix-II.

The Government has started a plan to develop the kacha areas by allotting land to local Harris and construction of roads, police stations, schools, hospitals and power lines. Irrigation facilities such as tubewells and pumps will be made available. There is a scheme for supply of yellow tractors to the farmers. In fact this area will become one of the most productive in Sindh and would no longer be a hideout for decoits. This is one of the most fertile areas in Sind and forms a considerable chunk of good land in the province.

c) In the light of the above facts there is no reason why we cannot develop a consensus in CCI (Council of Common Interests) in favour of Kalabagh. What is required is a determined effort on the part of the Federal Government as was done to achieve agreed accords on the different issues of River Water allocations and distribution of financial resources between the provinces. As soon as a consensus evolves in the CCI, go ahead signal for Kalabagh Dam may be given. A very important point about this dam is that even the first phase of the project with 8 units and 2400 MW would take 6 years to complete. The sooner a decision is taken to start the project the better.

3. MEDIUM STORAGES

THAL RESERVOIR

A number of canals are being constructed on three months supply basis which cannot work without storage supplies. As Kalabagh may take 6 years, medium storage of 1.6 MAF is Thal Reservoir which can be ready in 4 years and could fill up the gap before Kalabagh. This project was prepared as far back as 1983 and has not been sanctioned. One of the greatest advantage of this storage is that it firms up power from Tarbela Dam to the extent of 935 and 1021 GWH with 14 and 17 Tarbela power units inclusive of 188 GWH from tail of CJ Link. The redeeming feature of this reservoir is that it firms up power at Tarbela in critical months from December to June. This will thus contribute to reduction of load shedding during canal closures in December-January and early Kharif up to June.

CHINIOT BARRAGE STORAGE

In the world bank master plan for water resources of 1967 a storage of 1.4 MAF at Chiniot on Chenab river was recommended. This is an excellent storage site as a barrage of 30 ft above the river could make available 1.4 MAF of water. The irrigation department Punjab has now recommended taking up this project. By conjunctive operation with Mangla dam this storage would improve the power potential of Mangal dam in the same way as Thal Reservoir improves the power capability of Tarbela dam. This project also could be completed in 4 to 5 years.

CHASHMA STORAGE

By raising Chashma barrage by only 3 ft the original storage of Chashma of 0.87 MAF could be restored as it has silted up and has a capacity of 0.497 MAF now. This would also improve the power capability at Chashma barrage and make the 8 units more attractive.

4. GHAZI BAROTHA HYDROELECTRIC PROJECT

The detailed feasibility of this project has been completed and construction is to start when arrangements for its execution are made. The project has been controversial. The following are some of the unfavourable points of the project.

a) The power channel of 1600 cumecs is over 50% the size of the largest channel under construction in the world on Narbada river. Maintenance of such a large concrete lined channel in a highly seismic area with a number of cross drainage works and high water table is risky.

b) when the sluicing of Tarbela dam starts the head pond and channel would silt up fast.

c) The project is single purpose without any storage and generates power as a run of the river project with low firm power and does not help load shedding in December-January.

d) The life of the peaking ponds is small.

e) The cost per kw is one of the highest. Please refer to Appendix-I.

f) To study the other benefits, its comparison with Narbada project is detailed below:-

PROJECT	CHANNEL CAPACITY (cumecs)	POWER (M.W)	AREA IRRIGATED (M.acres)	DRINKING WATER SUPPLY	COST IN DOLLARS
Ghazi Barotha	1600	1450	NIL	NIL	2 billion
Narbada	1100	1000	4.4	30 M. People	3 billion

There is no justification to take up this project as even run of the river projects like Kohala, Thakot and Bunji are far better. Another great advantage of these projects is that they are not subjected to reduction of supplies due to canal closures as in the

case of Ghazi Barotha which is downstream of Tarbela Dam. The Ghazi Barotha Project was examined by Punjab Irrigation Department in 1951-52 and given up being uneconomical.

It is surprising that the feasibility of Ghazi Barotha does not consider alternative projects though it is international practice to study and compare such alternative projects.

5. EXTRA POWER GENERATION AT RICE HUSKING MILLS BY USING RICE HUSK AS FUEL

This proposal was discussed in the author's Engineering Congress Paper No.537 of 1990 at pages 500-501. It may be worth repeating as this is the quickest way for rural electrification. A potential of 1200 MW is available from this source. Malaysia and Indonesia are using this for a long time. Another great advantage of this method is the manufacture of cheap cement from the rice husk ash which is available as a byproduct. It may be mentioned here that the prices of cement have been rising steadily in Pakistan. Cement which was available at Rs. 100 per bag a year ago is now selling at Rs. 150/- to 156/- per bag. This is all the more the reason to go in for using the husking mills for power generation and manufacture of cement.

6. NEED TO REFINE DECISION MAKING PROCESS

How is it that an excellent project like Thal Reservoir does not get approval for the last ten years whereas a less attractive project like Ghazi Barotha gets quick approval. As indicated by Ghani Eirabie in his article of February 25th 1993, (copy enclosed as Appendix) decision making in Pakistan has tended to be haphazard frequently erratic or arbitrary. He further states that we have replaced the well researched and well thought out five year development plans of the planning commission by the adhoc politically motivated projects of doubtful financial validity.

To overcome this deficiency he suggests that think-tanks could examine the pros and cons by expert assessment of documented back up. He feels"that in third world countries still engaged in evolving basic state structures, think tanks are more important than battle tanks. If the world's most advanced country, the United States, feels compelled to maintain scores of think tanks, perhaps Pakistan's need for a few cannot be gainsaid".

It is necessary that large organizations like WAPDA which formulate giant development projects for water and power have their think tanks. A suggestion was made for a small research cell which can serve as a nucleus for a think tank in paper No. 537 page 505 of Engineering Congress 1990 but so far no action has been taken by WAPDA.

REFERENCES

1) Thal Reservoir Project PC-I WAPDA June 1983.

2) Engineering Congress Paper No.537. A Plan for self sufficiency in power for Pakistan, 1990 by Mohiuddin Khan.

3) Need to refine decision making process-Article by Ghani Eirable in Nation February 25th 1993.

4) News item from AFP new Delhi in Nation dated April 1, 1993 on Narbada Project.

5) News item from "Nation" dated June 28, 1993 regarding import of food items.

APPENDIX-I

COMPARATIVE STATEMENT OF COST OF HYDRO-ELECTRIC PROJECTS IN PAKISTAN - DOLLARS PER KW INSTALLED

NAME OF PROJECT	GENERATION (MW)	CONSTRUCTION COST INSTALLED/KM (US $)
1. Chashma Hydro	270	1029
2. Kalabagh Dam	2400	744
3. Tarbela Dam 14-17	1296	512
4. Bhasha Dam	3416	739
5. Ghazi Barotha	1450	1370

APPENDIX-II

LOSS OF WATER BETWEEN SUKKER AND KOTRI IN THE KACHA AREA DUE TO SEEPAGE AND EVAPORATION

YEAR	LOSS IN MAF IN TEN DAYS PERIODS					
	JULY IST PERIOD	2ND PERIOD	3RD PERIOD	AUGUST IST PERIOD	2ND PERIOD	3RD PERIOD
76-77	0.38	0.86	2.62	5.84	10.14	2.29
77-78	0.85	0.35	1.15	0.88	0.29	0.80
78-79	1.04	4.46	5.96	3.33	4.89	1.22
79-80	0.13	0.51	0.58	0.37	0.09	1.36
80-81	0.29	0.84	1.15	1.43	2.95	1.10
81-82	0.56	0.31	1.76	3.29	1.82	0.08
82-83	0.50	0.59	0.48	0.63	1.87	1.26
83-84	0.54	0.07	0.84	1.10	5.72	4.05
84-85	0.71	0.42	0.59	0.61	1.19	3.01
85-86	0.51	0.67	0.33	1.56	1.44	1.73
86-87	0.81	1.82	3.68	5.49	10.80	3.23
87-88	1.10	0.60	0.66	0.27	0.26	0.28

Note: It would be seen from the figures underlined in the statement above that the losses in this reach of the river are miner as much as half to full capacity of Kalabagh Dam even in one ten day period of July and August.