

A framework for application of operations research techniques to prevent flood and consequent public health challenges: Lessons from floods in Surat, India

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Introduction

Surat is a fast growing city in Gujarat State of western India. It lies along the Arabian sea on the bank of river Tapi



Flood history in Surat

Flood year	Peak inflow (lakh cusec)	Max Outflow (lakh cusec)	Level reached at Hope Bridge (meter)	Outcome
1968 (no dam)	-	15	12.01	Major flood
1978	<8	4.4	-	No flood
1979	<8	3.3	-	No flood
1994	8.9	6	10.2	Flood
1998	10.5	7	11.5	Flood
2006	10.6	9	12.01	Major flood

Source: People committee on Gujarat flood 2006: A report

Ukai Dam

1. Ukai dam was constructed in 1972 to prevent floods in Surat, located about 100 Km upstream
2. Catchment area of the dam is about 62,000 Kms
3. Most of it is in states of Maharashtra and Madhya Pradesh

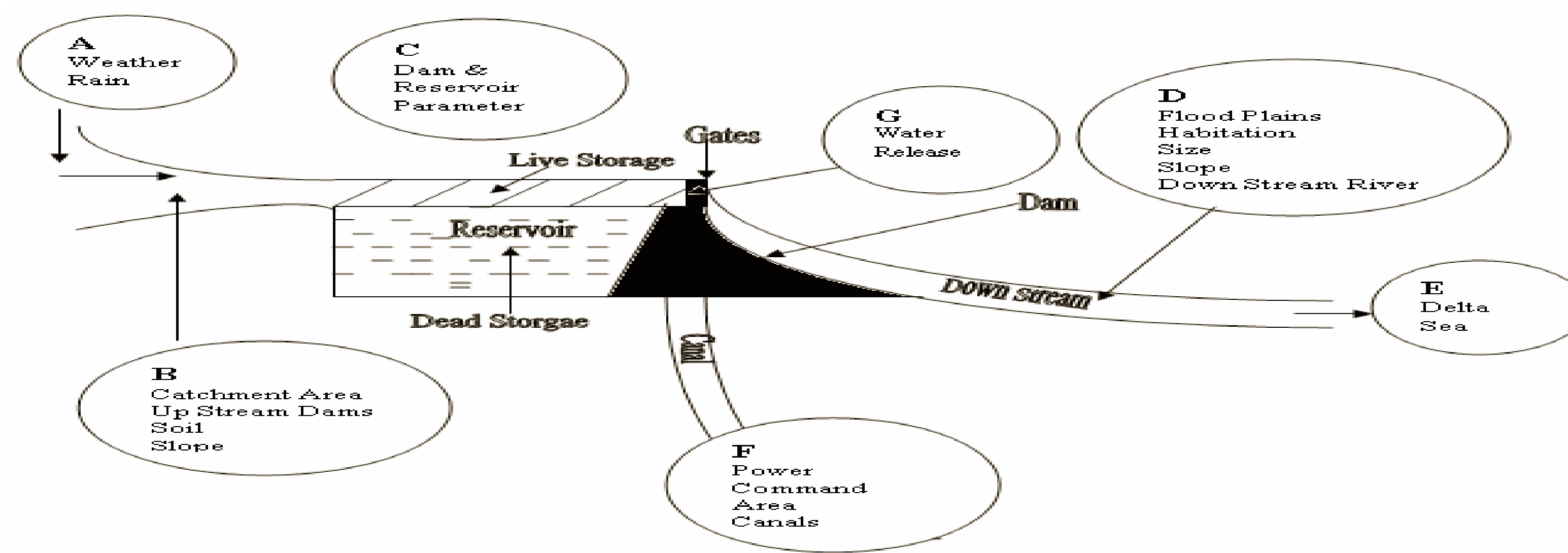
Dam Management at UKAI

1. Water management in the dam by using a old rule book and guidelines prepared in 2000
2. Only few parameters are used for water release from the dam - date, water level and rain fall at catchment area, inflow from Maharashtra state

Events leading to 2006 floods

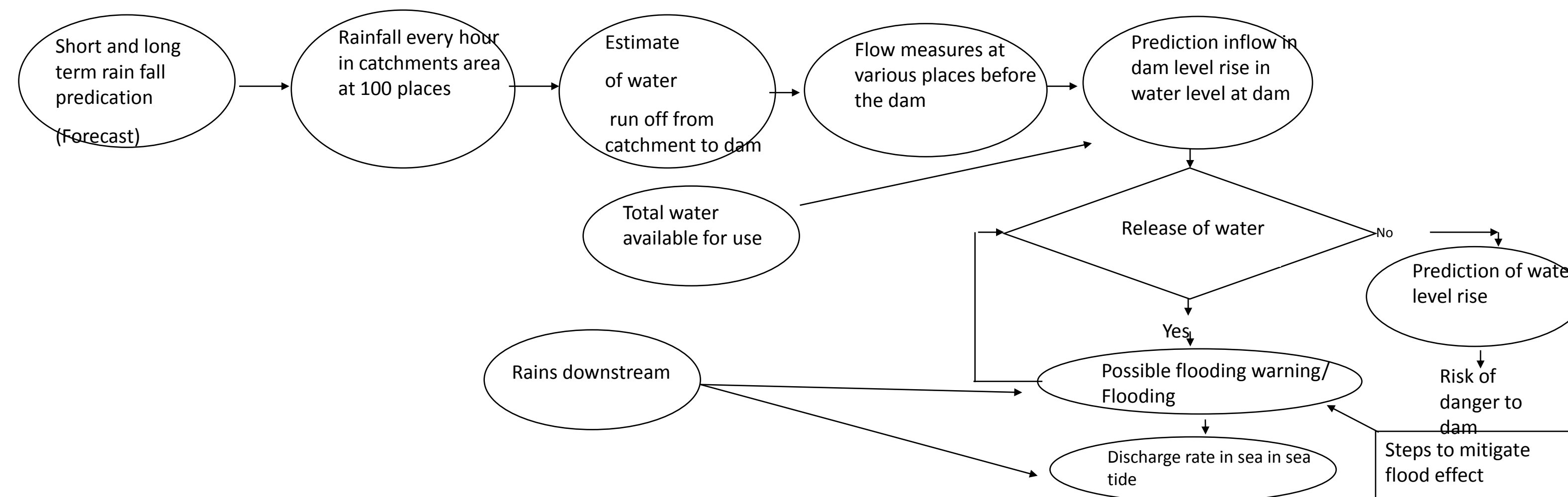
- 2nd August- Heavy rains predicted in the catchment area in 72 hrs
- Heavy rain fall in catchments area on 4th and 5th August recorded
- Not much water released from dam on 4th and 5th August
- Rapid release of water on 7th August leading to major floods
- Total estimated damage \$5 billions

Parameter to be considered for dam water release



Flooded street in Surat

Proposed Decision Support System diagram



Conclusions

1. DSS using OR techniques and information technology can substantially reduce risk of floods and resulting public health problems
2. Public health community should actively advocate development and use of such OR and DSS systems