Importance of Real-Time Data for Effective Decision Making

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29th November 2013
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REAL-TIME DATA

Definition: “Real-Time Data: data that is delivered immediately after collection, so that there is no loss of currency”

With real-time data it is possible to watch a situation as it is unfolding.
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In practice, the term is usually extended to cover data that is made available *after a short delay* also.

The permissible delay depends on the type of application.

*(Near-real-time data is an IT term. Not defined for water resources or hydrology.)*
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In Sri Lanka – No real-time data* yet!.
(... in the accepted sense)

*This presentation is confined to water-related data only.
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Main collections of Sri Lanka water data:

- Hydrological Data
- Reservoir Data
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Hydrological Data (principally):

• Manually collected hourly, but delivered the first week of following month.

• This delay was not a problem for main types of use.

• A few stations used to send data at three hourly intervals for Flood Forecasting. (by UHF Radios, now telephone)
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Reservoir Data:

• Collected by reservoir owners – largest owners ID, MASL: smaller owners CEB, NWSDB

• Used to be posted to head office. Received on ???

• Now using telephone to convey daily data for major reservoirs
The situation will change with the Hydro Meteorological Information System (HMIS)

HMIS will provide a reliable, automated data network with central and backup databases and modern data analysis tools.
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HMIS in brief-

• 122 monitoring stations, which are functionally,
  • 73 discharge sites
  • 109 rainfall sites
  • 35 water level sites
  • 19 climate data sites
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Typical HMIS Station with Sensors.
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HMIS in brief, continued ...

• Automated measurements and logging at site
• Automated data transmission to main Data Centre via METEOSAT satellite
• Two Data Centers with modern DBMS and analytical tools
• Dissemination of data via Internet
HMIS is implemented under Component 2 of the Dam Safety and Water Resources Planning Project (DSWRPP), a World Bank funded project. It is currently underway.

HMIS will provide Automated Real-Time Data for the first time in Sri Lanka.
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Decision Making and Real-Time Data:

Types of Decisions:

– Long term
– Short term
– Urgent
Long-term decisions such as Planning, Investment, Infrastructure development etc.

- Dependent on reliable water data, such as mean annual flow, average precipitation, 100-year return period flood, inundation areas etc.

- However these decisions do not need real-time data.
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**Short-term decisions** such as making or updating Seasonal Operating Plans (SOP) etc

- Rely on the historical patterns of catchment rainfall and stream flow, command area rainfall and user patterns.
- Real-time data will be useful for the initialization of the plan and for the adjusting of the plan during the season.
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**Short-term decisions** such as Reservoir Operation

- Without real-time data, the Engineer has to make decisions based on his experience.
- Real-time data on the catchment rain fall, stream flow etc allows him to make a better decision balancing user demand against the storage and inflow.
Immediate decisions such as Spill gate Operation for safety

Flood time challenge for reservoir managers: how much water to be released to accommodate impending flood wave?

• Too little and the dam will be imperiled.
• Too much and the next season may suffer.
Immediate decisions such as Spill gate Operation for safety (contd...)

If he has real-time data of the catchment rainfall, upstream inflows etc, he can run a mathematical model.

With this, his decisions will be informed decisions, not a gamble depending on luck.
Immediate decisions such as Flood Forecasting

Flood forecasts are one type of decision making, which cannot be done without real-time data.

To have an accurate and timely forecast, it is essential to have real-time data from the catchment – rainfall, discharge values of influent streams and spill data of any catchment tanks.
Immediate decisions such as Flood Forecasting (contd …)

Using these values in an appropriate model, it is possible to calculate the inflow hydrograph.

Note: Forecast must be accurate and allow sufficient lead-time. The two are often incompatible. Only with more data, can both be improved.
In conclusion, it was seen that the availability of real-time data will have different effects.

- **Long term decisions** will not be improved.
- **Short term decisions** will be somewhat improved.
- **Urgent decisions** that affect immediately will be highly improved or become possible with real-time data.
Thank you!