

DECISION SUPPORT SYSTEM FOR MALAYSIA FLOOD MANAGEMENT: Intelligent vs Effectiveness

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- **❖ WORLD AND MALAYSIA'S RECENT DOUGHT S AND FLOODS.**
- **❖ FLOOD MANAGEMENT AND MITIGATION.**
- **❖ WHAT IS DECISION SUPPORT SYSTEM (DSS)**
- **❖ DSS FOR FLOOD MANAGEMENT: MOVING FORWARD**

***** CONCLUSION



Update on Global Drought Patterns

Technical Summary of the recent IPCC assessment:

"More intense and longer droughts have been observed over wider areas, particularly in the tropics and subtropics since the 1970s."

"droughts are becoming more frequent, more intense, more spatially extensive, and of longer duration".

U.S. Department of Energy the National Oceanic and Atmospheric Administration:

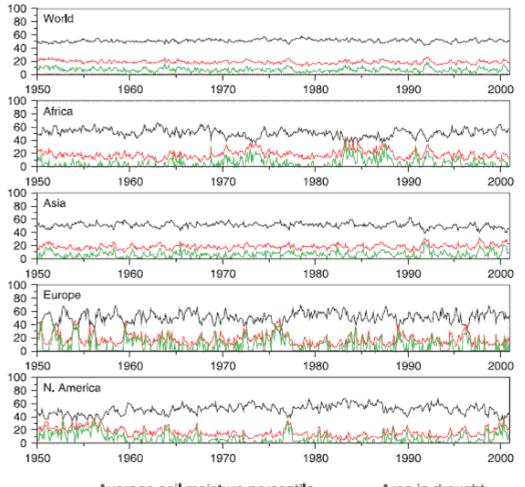
"Drought patterns at the global scale found no evidence to support claims of increasing drought activity."

That does not seem consistent with the story coming from the IPCC!!! – Why???

- a. Different measures of drought
- b. Parameters used- precipitation, temperature, flow
- c. Crop stress indices







Monthly time series of areaaveraged soil moisture percentile, percentage area in drought, and percentage contiguous area in drought (U.S. of Department Energy the **National** Oceanic and Administration, **Atmospheric** 2009)

Average soil moisture percentile —— Area in drought —— Contiguous area in drought





	Number of droughts	Number of droughts ≤ 6 months	Number of droughts ≥ 12 months
Africa	44	28	4
Asia	86	37	22
Europe	40	24	4
North America	57	34	8
Oceania	24	17	1
South America	45	37	4





MALAYSIA'S RECENT FLOODS

JPS bina kolam takungan banjir

SELAYANG - Sebuah projek kolam takungan banjir dengan peruntuk an bernilai RM227,000 dilaksanakan Jabatan Pengairan Saliran (JPS) Gombak awal minggu lalu sebagai persediaan musim tengkujuh.

Jurutera Daerah Gombak, Ir Mohd Fuad Buang berkata, usaha itu dijangka dapat menyelesaikan masalah banjir di kawasan hilir iaitu Selayang Indah dan sekitarnya.

Katanya, projek tersebut berada

dalam fasa kedua sambungan daripada fasa pertama melibatkan naik taraf parit tanah kepada konkrit yang selesai 2011 dengan kos RM2.5 juta. "Fasa kedua dijangka dapat me

ngurangkan isipadu air dari arah Selayang Mutiara dan sekitarnya se belum sampai ke penghujung longkang di pasar tani di sini.

Kelewatan projek berlaku disebabkan masalah teknikal dan dijangka siap hujung bulan ini," katanya kepada Sinar Harian, semalam.

Sementara itu, Pengerusi |KKK Selayang Baru, Jumari Talip berkata, dia menerima baik usaha yang dilakukan oleh IPS dalam mengatasi masalah banjir di sini namun berharap dalam masa sama pembersihan long kang dapat dilakukan.

"Difahamkan projek tersebut tidak mampu menyelesaikan sepenuhnya masalah banjir di sini tetapi dapat mengurangkannya.

"Dalam masa sama MPS diminta mengambil perhatian longkang di lalan 29 dengan melakukan ker-

Berbanding negara lain termasuk Amerika Syarikat

Malaysia terbaik urus banjir

KUALA LUMPUR 25 Nov. -

Peromirusan banitr di negara ini merupakan antara yang terbaik jika dibandingkan dengan negara-negara lain termasak negara maju se perti Amerika Syarikat

Menteri di Jabatan Perdana Menteri, Datuk Seri Shahidan

Kastim berkata, ter 🗡 pat negara maju y pihak berkuasanya ya tiba di kawa banjir seminggu s pas berlakunya ber na itu, berbeza di gara ini yang mai sentiasa bersiap s

Menurut beliau, selain jabatan kerajaan, terdapat sukarelawan vang turut membantu kerja-kerja memindahkan manesa dan menyediakan makanan di

pusat-pusat peminda-"Di negara kita juga, ketika berlakunya ban-iir, manesa belam di-

Beliau menjawah soalan tambahan Datek Hasbullah Osman (BN-Gerik) mengenal kesiapriagaan kerajaan terutama dari sudut menyediakan bekalan makanan ketika menghadapi bencana banjir. Sebelum ita, menjawah soalan

Siti Zailah Mohd, Yusoff (Pas-Rantan Panjang) mengenal cadangan pembinaan pusat pemindahan banir. Shakidan memberitaku, peng-

banjir baharu yang khusus untuk digunakan semasa bencana tidak wajar kerana langkah ini melihatkan implikasi kewangan yang besar sedangkan fungsinya hanya ketika bangar. Ini boleh menyebabkan fasiliti itu terbiar semasa tidak berlakunya bencana," katanya,

Mengulas laneur, Shahidan berkata, Jabotan Kerja Rayu (JKR) juga telah menetapkan standard pem-

班修更新: January 31, 2011 17:34



(新山、昔加末、馬六甲、關 、芙蓉31日綜合訊)南馬再次 發生大水災,造成柔甲兩州多個 地區淹沒,疏散人數達逾4萬人, 已有4人因水患而斃命。上国為位 于柔州和森州邊界的金馬十發生

Tingkat amaran awal banjir

■ Guna Tambahan masalah ba teknologi terkini pastikan banjir negara lebih efisien

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of Asia Street, as no house,

"The only thing we can do is to make careful preparations to reduce the impact of the floods. We have also asked JPS to prepare flood mitigation plans. However, the cost is very high and the Government has to consider the affordability first before making any decisions," (The Star, 19 January 2014).

The two keywords can be highlighted from the statements;

a) Reducing the impact of the floods, b) Preparing flood mitigation plan

"Sustainable Flood Management"

- -adjustment to the environment.
- integrated consideration of economic, ecological and social consequences.
- -The new paradigm must go beyond simply reducing losses to building sustainable flood management strategy.
- -requires more multiple actions.
- Limitation: complex, involving many decision makers, limited technical information, etc.



Flood situation required fast and accurate decision...

DECISION SUPPORT SYSTEM (DSS)

Decision Support System (DSS) for flood management is a process that can provide a reasonable and best results to decision makers in managing flooding

"computer-based tools having interactive, graphical and modeling characteristic to address specific problems and assist individual in their study and search for a solution to their management problems" Loucks and daCosta (1991)







STRUCTURAL

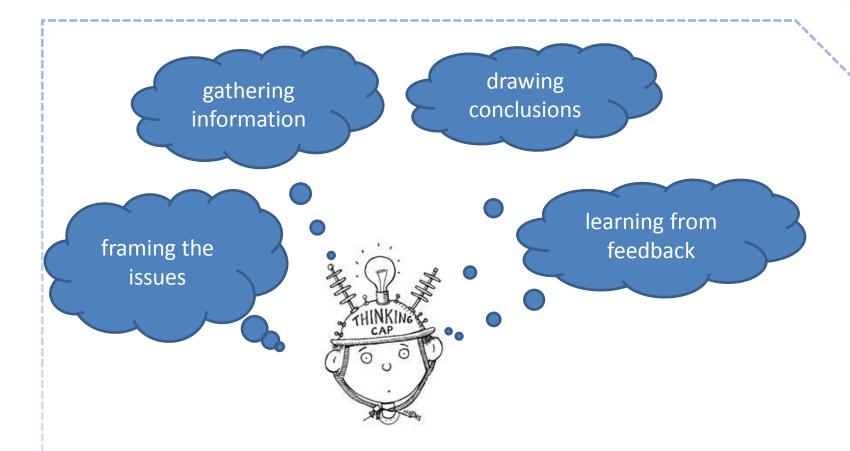
NON STRUCTURAL





DSS

Good decision making needs data & information !!

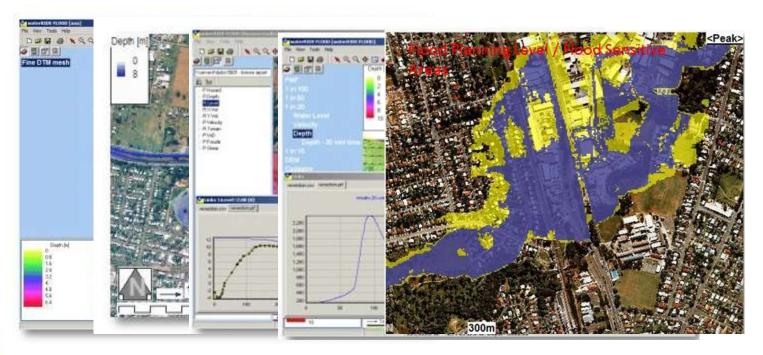




Integrating human knowledge with modeling tool is the best concept of DSS which could assist decision makers during different phases of flood management...

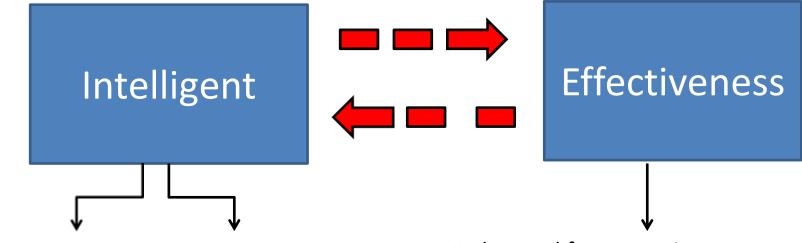
4 primary characteristics of DSS for flood management system.

- (a) helps decision-makers at the upper level;
- (b)flexible and quick responds to questions;
- (c) provides 'what if' scenarios; and
- (d)considers the specific requirements of the decisionmakers.





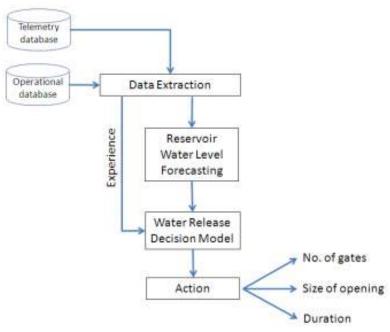
DECISION SUPPORT SYSTEM (DSS): Intelligent vs Effectiveness



- Knowledgebased system (KBS)
- Artificial intelligence
- Understand from experience
- Conclude in situation where exist fuzziness and uncertainty
- Use knowledge and experience to manipulate the environment
- Respond quickly to new situations.



Examples of IDDS for drought and flood



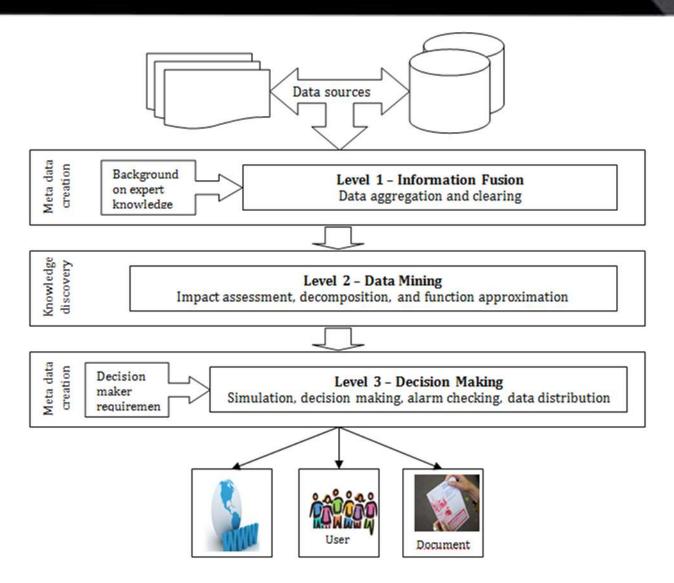
Conceptual Model of IDSS for Reservoir Operation (Wan Hussain, et.all. 2010)



IDSS for flood management- UniSZA (Ku Fazly, et.al 2014)



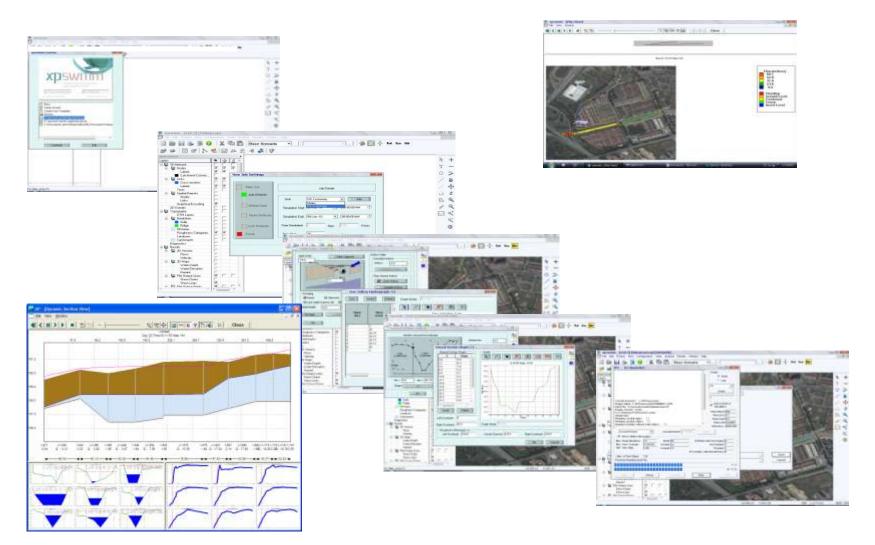
IDSS USING MULTI-CRITERIA ANALYSIS- LRB

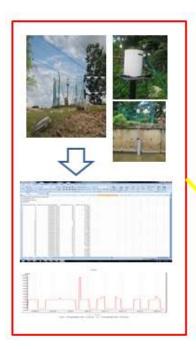




IDSS – GIS SWMM for LRB







DSS-LRB











MOVING FORWARD

Get back our why DSS....

...to assist planners, stakeholders and decision makers for best flood management approach-no matter at pre, during or post floods....

...DSS provides support to the user and does not replace the

individual.

Conventional/ manually

IDSS



- Local / Regional Level Needs to Improve Data Sharing
- GIS data models (e.g., like NHD, NASIS)
- Structure for sharing metadata (e.g., SHEFs, Open, Cloud, repository)
- Example applications to demonstrate decision making value
- Understanding data quality (metadata / QC)
- Set priorities for data types of greatest (national) value
- Money for cost sharing data creation (based on national priority?)
- Money for maintenance
- Manpower for maintenance



THANK YOU



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