

A methodology for assessing changing drought conditions in tropical dry lands

*Dr JMSB Jayasundara
Senior Lecturer in Environmental Management
Rajarata University of Sri Lanka
Mihintale
jmsb1610@yahoo.com*

The problem

- *Drought is been increasing resulting water and food shortage and effecting on livelihoods, health and economy.*
- *Proper management requires appropriate assessment*
- *Climate of the tropical monsoon region is a complex system*
- *Assessing drought needs appropriate indicators.*

Objective

- *To analyze present literature pertaining to drought assessment methods applied recently supporting various aspects of drought management.*

Methodology

- *Literature review*
- *Thematic analysis method (Marchall, 2006).*
 - *organizing available literature,*
 - *concentration on data,*
 - *generating themes,*
 - *coding,*
 - *interpretations,*
 - *alternative understanding and*
 - *writing*

Themes

- *Applications of drought studies,*
- *Drought indices used,*
- *Variables and parameters,*
- *Sources of data,*
- *Spatial scale of the study,*
- *Geographic regions covered,*
- *Analyzed periods, and*
- *Chronology of sources.*
- *Cross theme analysis were important technique for interpretations.*

Applications

- *Indicator performance comparison,*
- *Measurement of types of drought,*
- *Spatial variations,*
- *Temporal variations,*
- *Forecasting and early warning,*
- *Planning and relief distribution,*
- *Impact monitoring, and*
- *Modeling*

Indices

- *The Palmer Drought Severity Index (PDSI).*
- *The Palmer-Z .*
- *Palmer Hydrological Drought Index (PHDI).*
- *Modified Palmer Drought Severity Index (PMDI).*
- *The Crop Moisture Index (CMI).*
- *Bhalme and Mooley Drought Index (BMDI).*
- *The Surface Water Supply Index (SWSI).*
- *The Standardized Precipitation Index (SPI).*
- *Reclamation Drought Index (RDI).*

Categories of indicators

- 1) Palmer Drought Severity Index (PDSI) based indicators,*
- 2) Standard Precipitation Index (SPI) based indicators and*
- 3) Complex indicators for region and sector variations.*

Suggestion

- *Standard Precipitation Index (SPI)*
- *For rainfall based periods identified through weekly data (Standard weeks)*
- *Four weeks total for meteorological drought*
- *Three such periods for agricultural drought*
- *Six and nine such periods for hydrological drought*
- *12 such periods for socio-economic drought*

Further adjustments

- *For minor wewa systems*
- *For large irrigation based agro-ecosystems*
- *For trans-basin irrigation systems*

Climatic seasons in Sri Lanka

Season	Weeks	Dates
<i>1st Inter-monsoon</i>	12 - 19	19th March – 13th May
<i>South West Monsoon</i>	20 - 37	14th May – 16th September
<i>2nd inter-monsoon</i>	38 - 46	17th September – 18th November
<i>North East Monsoon</i>	47 - 11	19th November – 18th March

Agricultural seasons in Sri Lanka

Period	Weeks	Sub-season	Dates	Season
1	39-42	(I) Wet Maha*	Sept.24 – Jan. 14	Maha Season
2	43-46			
3	47-50			
4	51- 02			
5	3-7	(II) Dry Maha**	Jan 15- Apr 1	
6	8-13			
7	14-18	(III) Wet Yala*	Apr 2 – May 6	Yala Season
8	19-22	(IV) Dry Yala**	May 7 – Sept 23	
9	23-26	*Weekly contribution ->2% ** same is <2%		
10	27-30			
11	31-34			
12	35 - 38			

Environmental management approach to drought management

- 1. Holistic approach*
- 2. Systems approach*
- 3. Integrated approach*
- 4. Multidisciplinary approach*
- 5. Participatory approach*

Multidisciplinary approach in drought research

- *NCPDRP*
- *Environmental Management*
 - *CLIMATOLOGY*
 - *HYDROLOGY*
 - *ENVIRONMENTAL ECONOMICS*
- *Economics*
- *Sociology*
- *History*

Research Focus

- *Dry lands – dry zone of Sri Lanka*
- *Exclude Major irrigation and Mahaweli settlement systems for the first stage*
- *Select highlands and minor wewa systems*

Sample

- *Represent all five sub-agro-ecological regions*
- *Represent all river basins*
- *DS divisions with food insecurity & high poverty*
- *500 samples*
- *Small Fund from Faculty Research, Publication & Higher Degree Committee*

Drought management

- *Disaster management approach (Keith Smith)*
- *Integration of all partners*
- *Participatory planning and management*

Thank you!