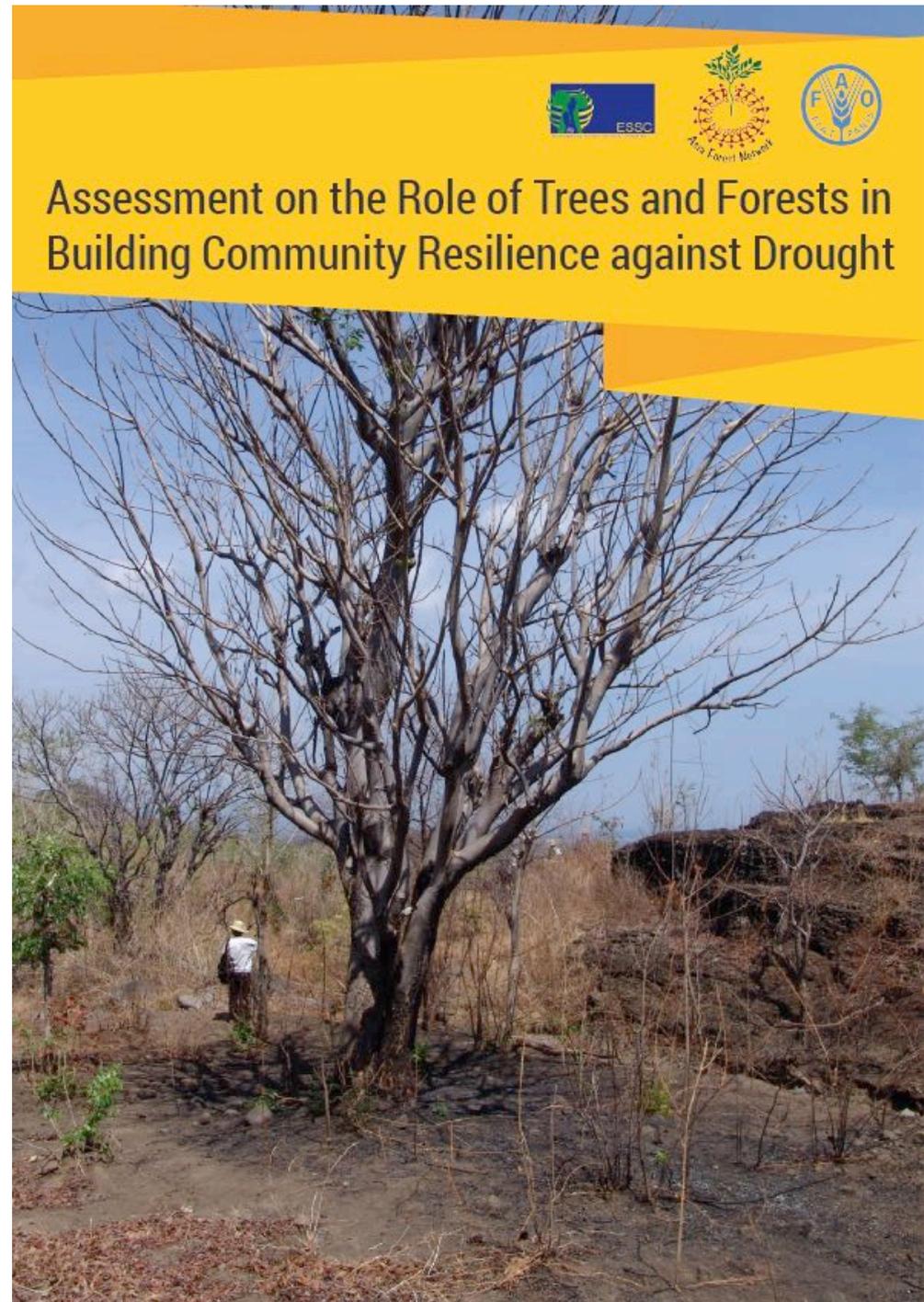


SETTING THE CONTEXT

Regional Workshop on
Forests and Droughts

10-11 August 2015, Bangkok



Report Structure

1. Abstract
2. Country Profile

3. Drought in the Country
4. Rationale for Case Study
5. Drought Impacts on Forests and People

6. Likely implications of climate change on droughts and forests

7. Lessons learned
8. How to promote a better future

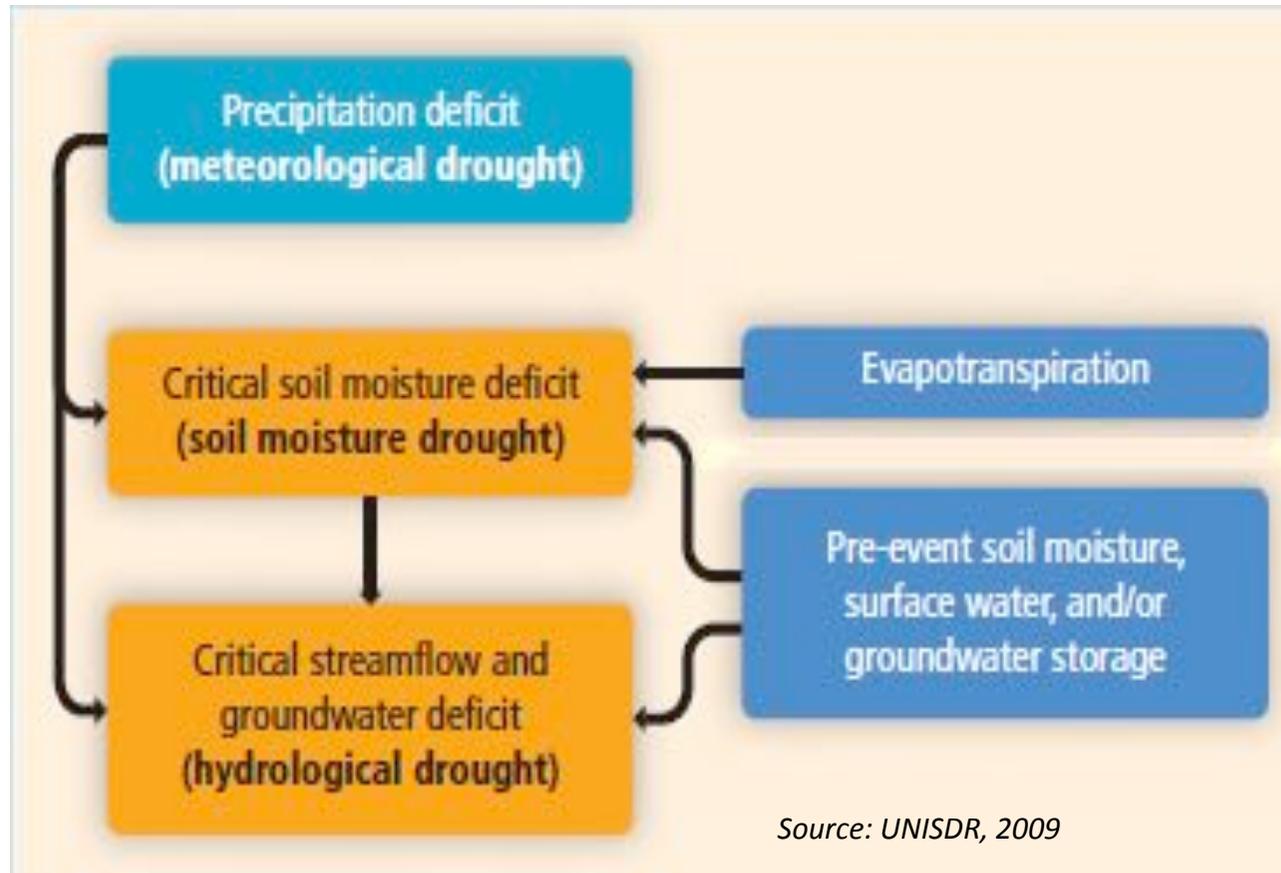
1. Context (regional)

2. Observed Impacts (Q1)

3. Future Implications (Q2)

4. Ways to resilience (Q3)

1.1 Defining Drought Conceptually



Can we expand this chart to depict impacts?

Socio-economic drought

1.2 Defining Drought Operationally

Country	Thresholds		Who Officially Defines?	Some Local Terms for Drought
	Dry Spell	Drought		
Australia				
Bangladesh				
Bhutan			Dept. of Hydrometeorology, Ministry of Economic Affairs	
China			National Meteorological Center, China Meteorological Administration	
India				
Indonesia	Dry: if rainfall between 70% - 85% of normal condition	Very dry: rainfall 50-70% of normal condition Extremely dry: rainfall < 50% of normal condition	Indonesian Agency for Meteorology, Climatology and Geophysics (BMKG)	Kekeringan
Philippines	3 consecutive months below normal rainfall conditions; 21%-60% ↓ from average rainfall	3 consecutive months of reduced rainfall with the average rainfall ↓ from 60% and over.	Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA)	tagtuyot (Fil) hulaw (Binukid) huwaw (Bisaya) El Nino
Samoa			Samoa Meteorology Division	

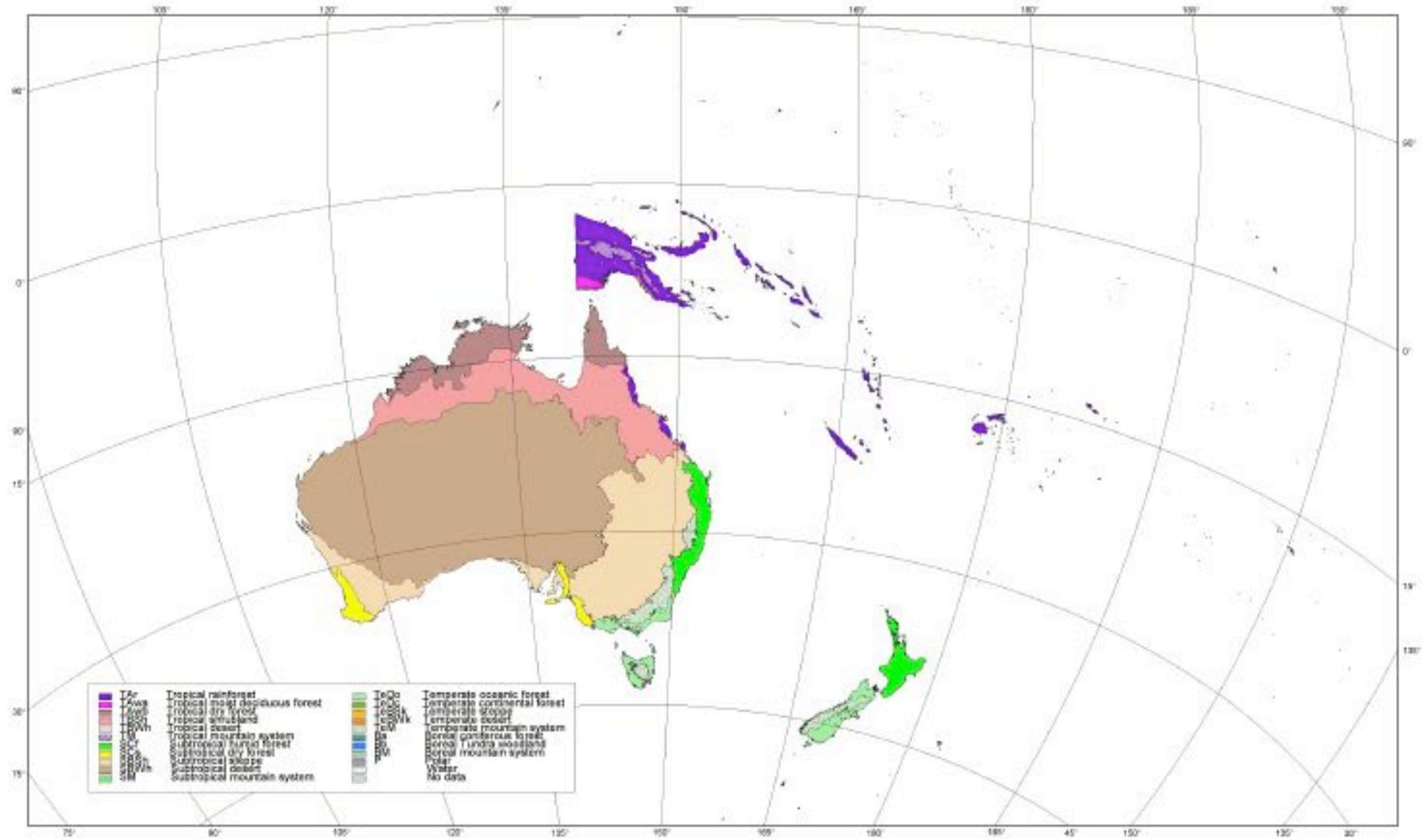
1.3 Drivers of Drought

- Precipitation
- Evapotranspiration
- Wind speed
- ENSO
- Other natural modes of climate variability
- Feedbacks



GLOBAL ECOLOGICAL ZONES

Oceania



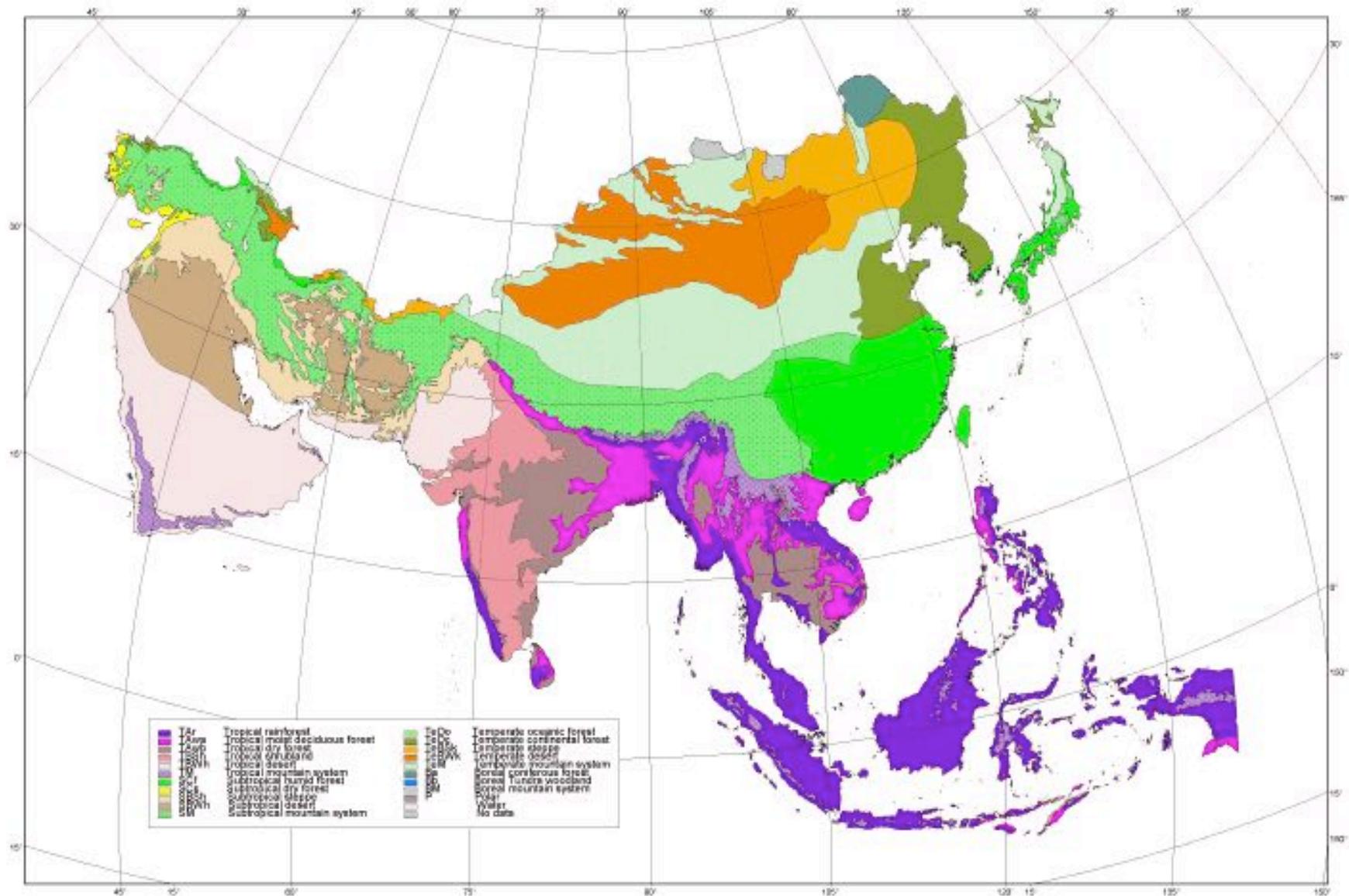
0 500 1000 1500 km

Lambert Azimuthal Equal Area Projection
Center 25°S 140°E



GLOBAL ECOLOGICAL ZONES

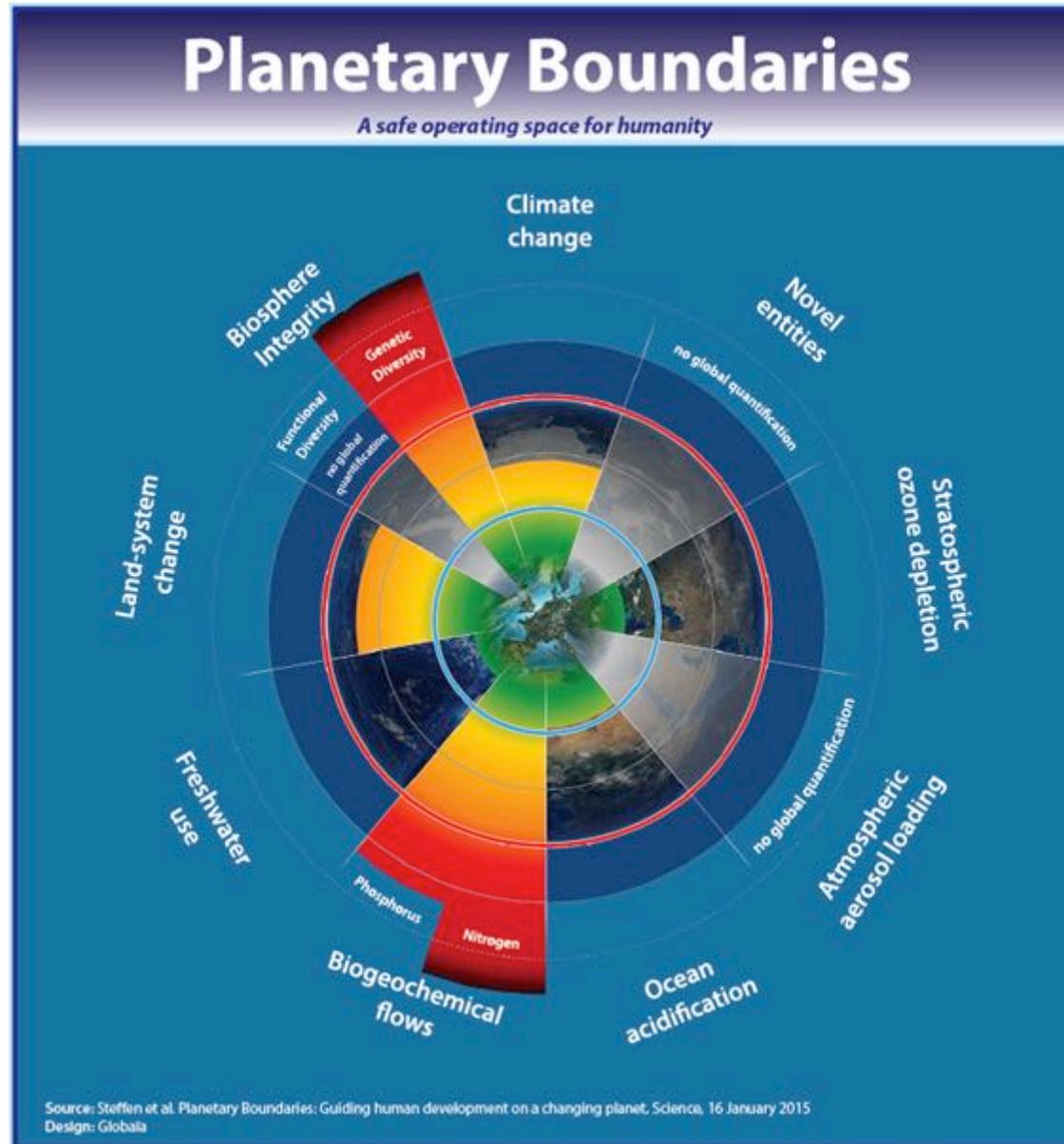
Asia



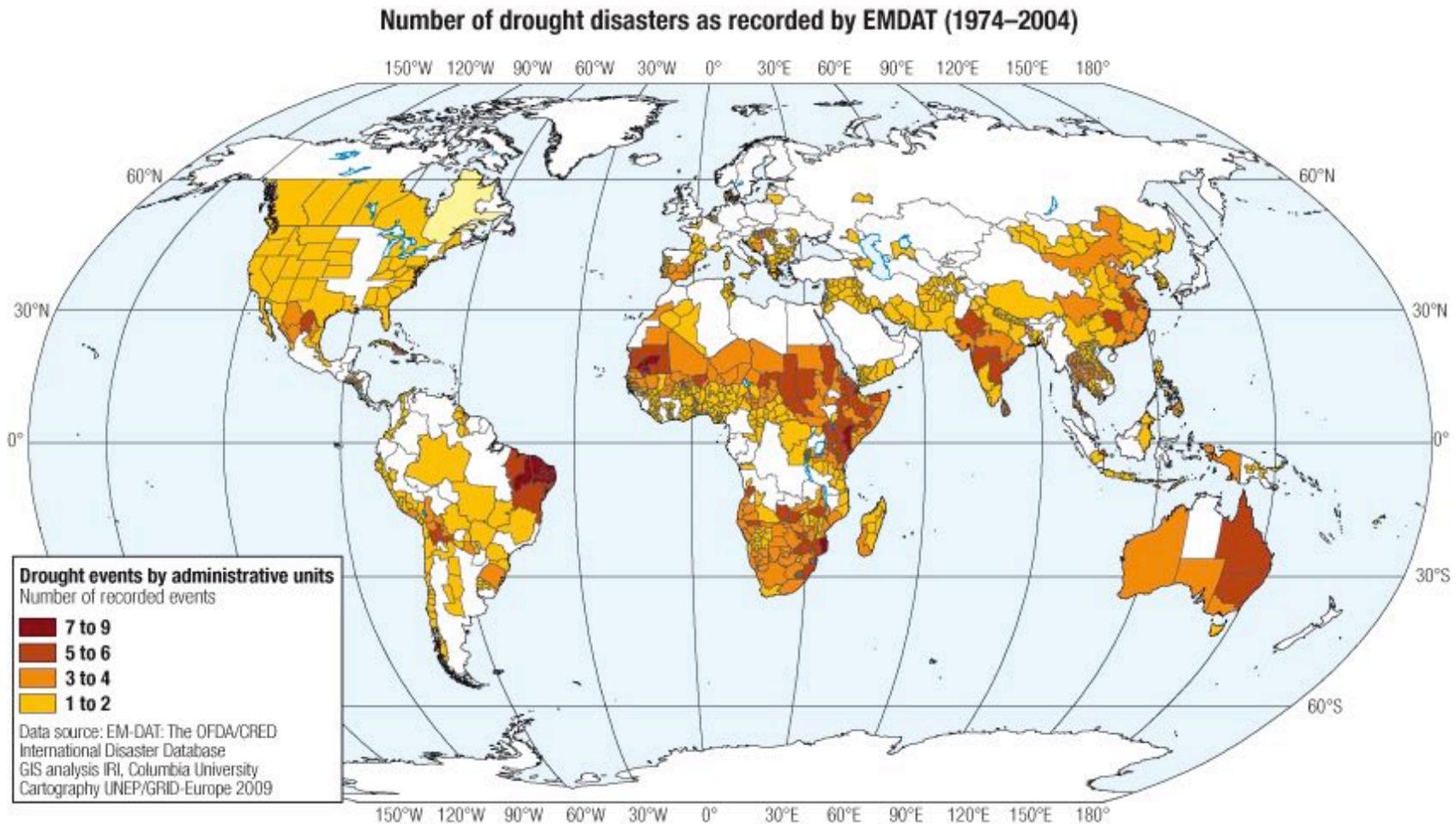
0 500 1000 1500 km

Lambert Azimuthal Equal Area Projection
Center 207N 86°E

1.4 Anthropocene



2.1 Drought Locations & Frequency



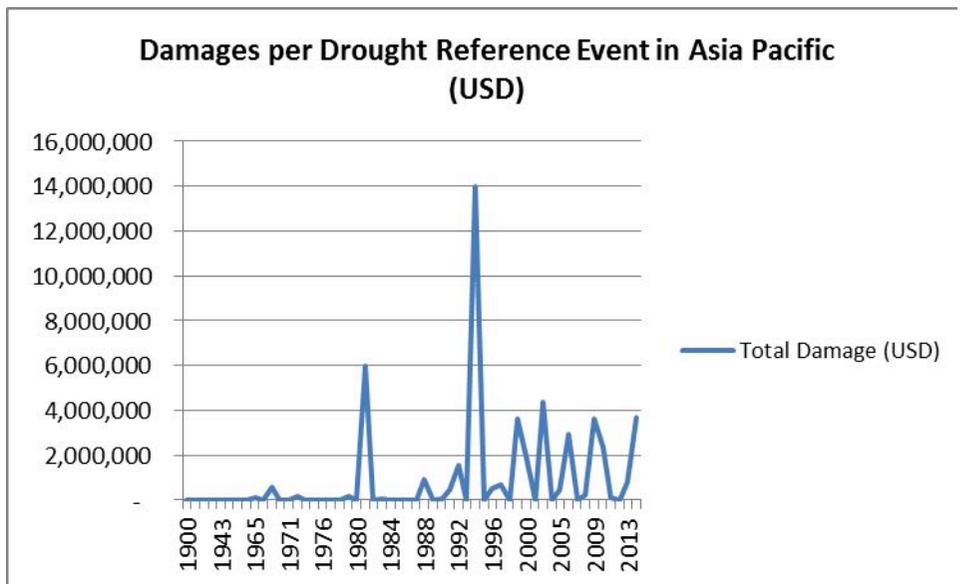
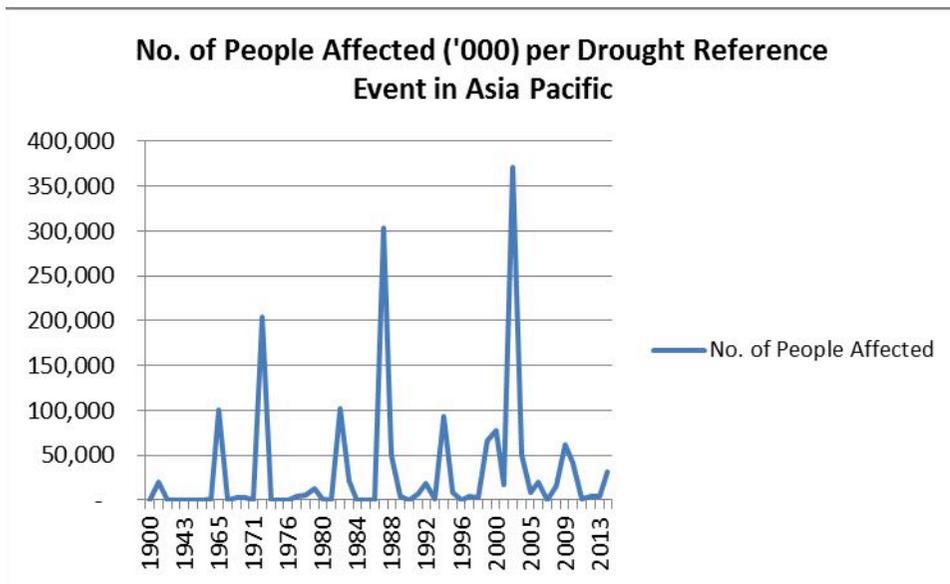
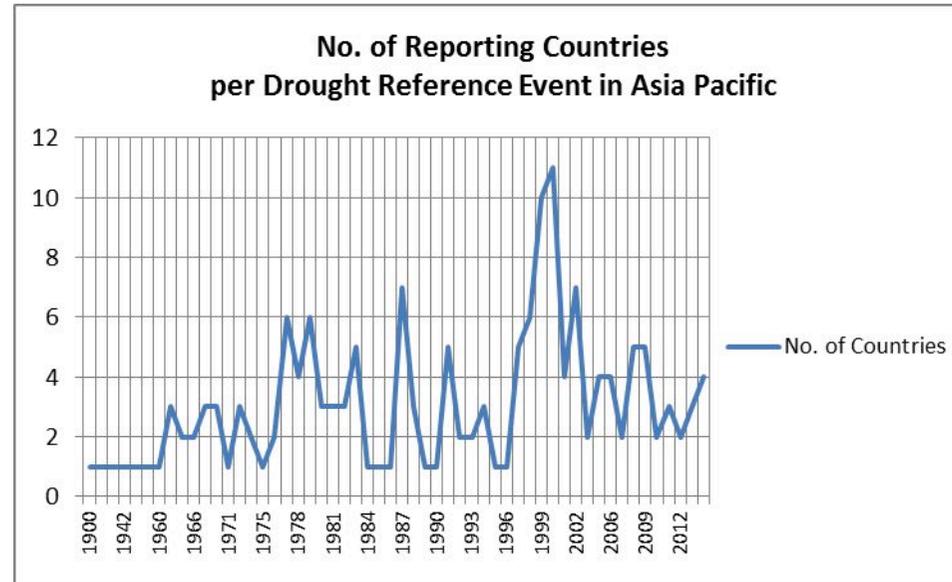
Source: UNISDR, 2009

Frequency of Drought in selected Asian and Pacific countries, 1900-2014

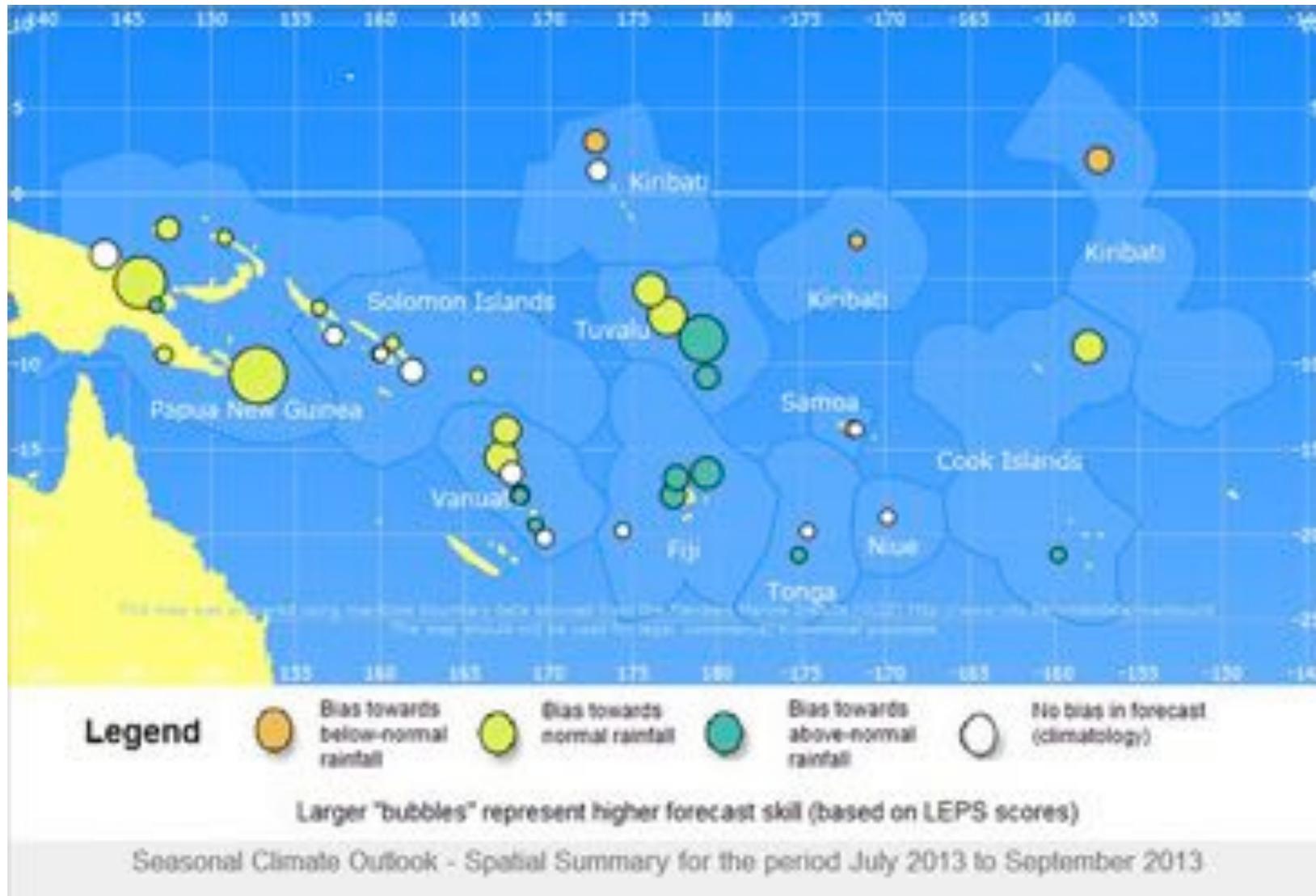
Country	Reference Events	No. of Events	No. of Occurrences
Australia	<u>1967</u> , <u>1974</u> , 1976, 1978, 1981, 1991, <u>1992</u> , <u>2002</u> , <u>2006</u>	9	10
Bangladesh	1943, 1947, 1974, 1979, 1983, 1989, 2009	7	7
Bhutan	No report	No report	No report
China (excl. HK)	1920, 1928, 1965, 1978, 1979, 1983, 1985, 1988, 1991, 1992, 1994, 1995, 1997, 1999, 2000, 2001, 2002, 2003, 2005, 2006, 2008, <u>2009</u> , <u>2010</u> , 2013, 2014	25	36
India	1900, 1942, 1964, <u>1965</u> , <u>1972</u> , <u>1979</u> , 1982, <u>1987</u> , 1993, 1996, 2000, 2002, 2009	13	14
Indonesia	1966, 1972, 1978, 1982, 1984, 1986, 1987, 1997, 2003	9	9
Philippines	1978, 1980, 1983, 1987, 1990, 1998, 2002, 2007	8	8
Samoa	No report	No report	No report

Source: EM-DAT accessed as of 28 May 2015 ; Note: underlined years coincide with years mentioned in the country chapters

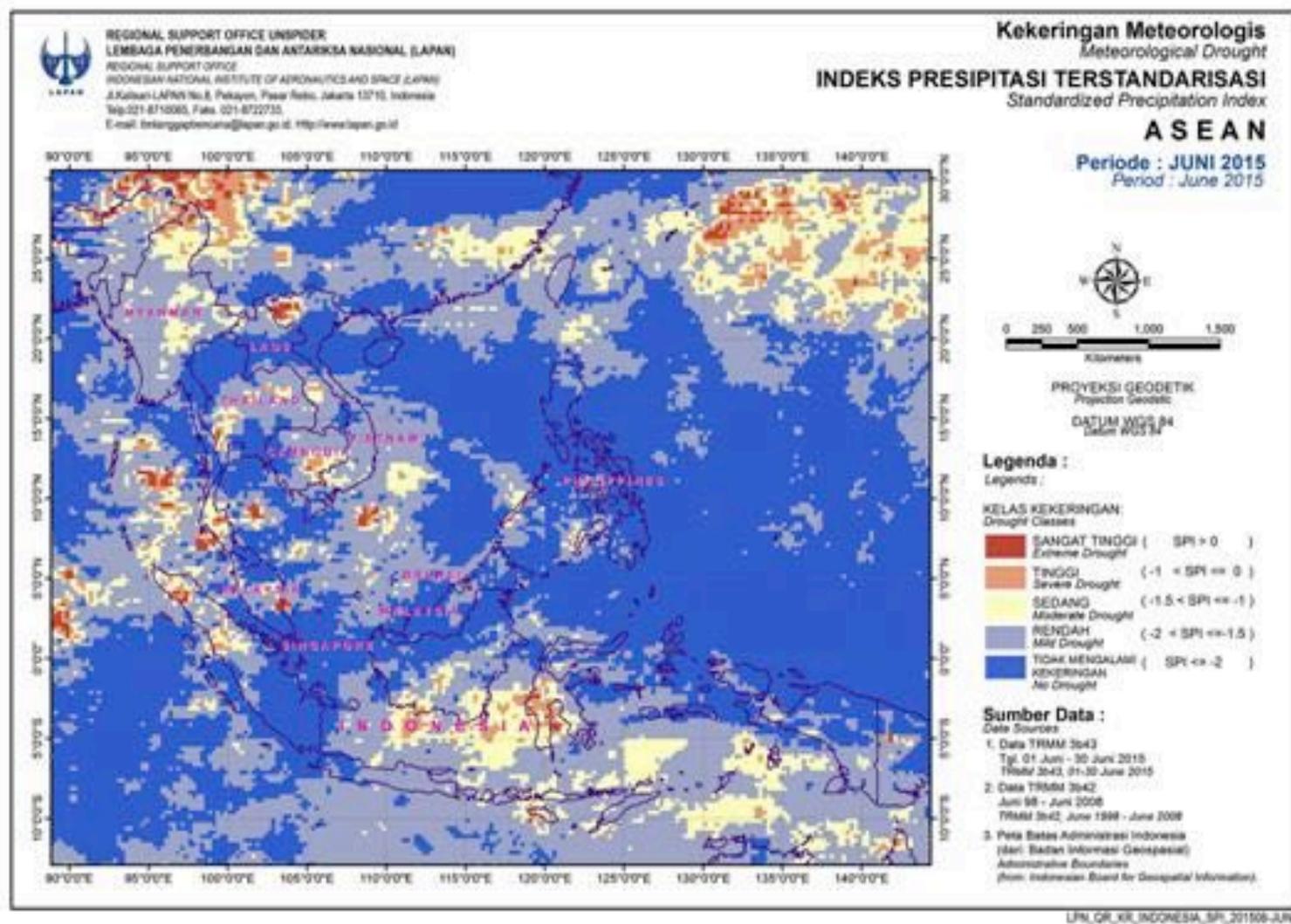
2.2 Regional Impact (EM-DAT)



Pacific monitoring, 2013



Southeast Asia monitoring, June 2015



Source: UN Spider, June 2015

2.3 Observed Impacts: Global and Regional Perspectives

- UNISDR Global Assessment Reports [2009](#), [2011](#)
- International Disaster Database ([EM-DAT](#))
- IPCC ([Special Report](#) 2012, [AR5](#))

- [ASEAN Drought Monitoring](#) June 2015
- [SAARC Disaster Management Center](#);
[South Asian Disaster Knowledge Network](#)
- [SPC Drought Forecasting Tool](#) 2013

2.4 Case studies

#	CASE STUDY AREA	COUNTRY
1	Kimberley, northwest Australia	Australia
2	southwest of western Australia	Australia
3	inland New South Wales and Queensland	Australia
4	Nachole Upazila, Bangladesh	Bangladesh
5	Tanore Upazila, Bangladesh	Bangladesh
6	Niamatpur Upazila, Bangladesh	Bangladesh
7	Wangdue District, western Bhutan	Bhutan
8	Sarpang District, southern Bhutan	Bhutan
9	southwest China provinces	China
10	North China	China
11	Northeast China	China
12	Purkhawas Village, Jodphur District, ...	India
13	Pastoral Raika community, western Rajasthan	India
14	Gunungkidul District, Jogjakarta, Indonesia	Indonesia
15	Situbondo District, East Java Province, Indonesia	Indonesia
16	Kapuas Hulu District, West Kalimantan Province, Indonesia	Indonesia
17	Kupang District, East Nusa Tenggara Province, Indonesia	Indonesia
18	Mountain Province, Philippines	Philippines
19	Northcentral Mindanao, Philippines	Philippines
20	Asau to Aopo Forest Protected Area, northwest Savaii Island, Samoa	Samoa
21	Gatavai and Taga Forest Protected Area, south Savaii Island, Samoa	Samoa

Study Methods

- Literature Review
- Field Visits
- Risk perception surveys
- Focused group discussions
- Semi-structured interviews

3. IPCC Observations and Predictions

- Observed: insufficient evidence and spatially varying trends
- Projected (high confidence):
 - ↑ frequency and/or duration of heat waves and warm spells in North Asia and South Asia (2012)
 - ↑ frequency, duration, and/or severity of heat waves and warm spells in East Asia, Tibetan Plateau and Australia/New Zealand (2012)
- *If droughts intensify in lowland Southeast Asia, the synergies between warmth, drought, logging, fragmentation, fire and tree mortality, possibly exacerbated by feedbacks between deforestation, smoke aerosols, and reduced rainfall, could greatly increase the vulnerability of fragmented forest landscapes (IPCC, 2014). **What will happen to the people?***

REGION/Sub-region	OBSERVED CHANGES (since 1950)		PREDICTED CHANGES (2100)	
	Heatwaves/Warm Spells	Dryness	Heatwaves/Warm Spells	Dryness
ASIA				
All Asia	Insufficient evidence in several regions * _**	spatially varying trends in most regions *-**	continental - ↑ frequency &/or duration *** INO, PHI, MYS, PNG - inconsistent signal *	inconsistent change in CDD and SMA between models in large part of domain *
North Asia - China - Bhutan	spatially varying trends ** - overall WSDI ↑ - few areas ↓	spatially varying trends ** central & NE N. Asia - ↑ dryness - ↓ in other areas	↑ frequency and/or duration ***	inconsistent signal of change in CDD and SMA in large part of domain *
East Asia - China	China - ↑ HW ** N. China – ↑ WSDI ** S. China – ↓ WSDI **	overall tendency for ↑ dryness; ↓ in few areas**	↑ frequency, duration, and/or severity ***	inconsistent signal in CDD and SMA *
Southeast Asia - Indonesia - Philippines	Insufficient evidence *	spatially varying trends, inconsistent trends between studies *	continental - ↑ frequency and/or duration INO, PHI, MYS, PNG - ↑ WS index but inconsistent HW *	inconsistent signal in CDD and/or SMA *
South Asia - Bangladesh - India	Insufficient evidence *	Insufficient evidence * c. India - ↑ dryness India - ↓ CDD	↑ frequency and/or duration *** signal magnitude depends on index choice **	inconsistent signal in CDD and SMA *
Tibetan Plateau	spatially varying trends *	↑ dryness Lack studies *	↑ frequency, duration, and/or severity ***	inconsistent signal of change in CDD *

REGION/Sub-region	OBSERVED CHANGES (since 1950)		PREDICTED CHANGES (2100)	
	Heatwaves/ Warm Spells	Dryness	Heatwaves/Warm Spells	Dryness
AUSTRALIA / NEW ZEALAND / SMALL ISLAND STATES				
All Australia / NZ	depends on region * - **	NW Aus - ↓** South Aus - ↑ **	↑ frequency and/or duration *** NW - strongest ↑** inland - most consistent ↑ **	depends on region *_**
North Australia	Insufficient evidence *	NW - decrease in dryness per SMA, PDSI since mid 20th c **	↑ frequency and/or duration *** NW - strongest ↑ ** inland - most consistent ↑**	inconsistent signal of change in CDD and SMA *
South Australia/NZ	south Aus ↑ **	per SMA, PDSI, CDD ** SE Aus - ↑ since mid-20th c southwestern tip of Aus - ↑ central Aus - ↓	↑ frequency and/or duration *** NW - strongest ↑ in HW duration ** inland - most consistent ↑ **	southern and SW Aus - ↑ in CDD **
Small Island States	Pacific Ocean - ↑ in warm days and nights *	South Pacific - negative trend in ave total wet-day precipitation *	South Pacific - limited records *	

Source: IPCC, 2012

4. Ways to resilience

Ways to promote better future	AUS	BAN	BHU	CHN	IND	INO	PHI	SAM
Assist forest communities (how?)								
Establish early warning systems								
Communicate role of trees and forests								
Adjust policies								
...								
...								
...								

Let's do this together!

Do you agree? What do you think?

- The approach to drought in the past has been generally reactive and response-oriented, i.e. through crisis management. [SAARC](#)
- 6 priority gaps in drought management include: (i) data availability and access; (ii) monitoring capacities; (iii) budget for research; (iv) budget for operations; (v) knowledge sharing; (vi) coordinated strategy. [ASEAN](#)

We'd like to hear more details on...

- Q1: Observed impacts?
- Q2: Future implications of climate change?
- Q3: How to promote a better future?