



Transboundary River Basins & Assessment

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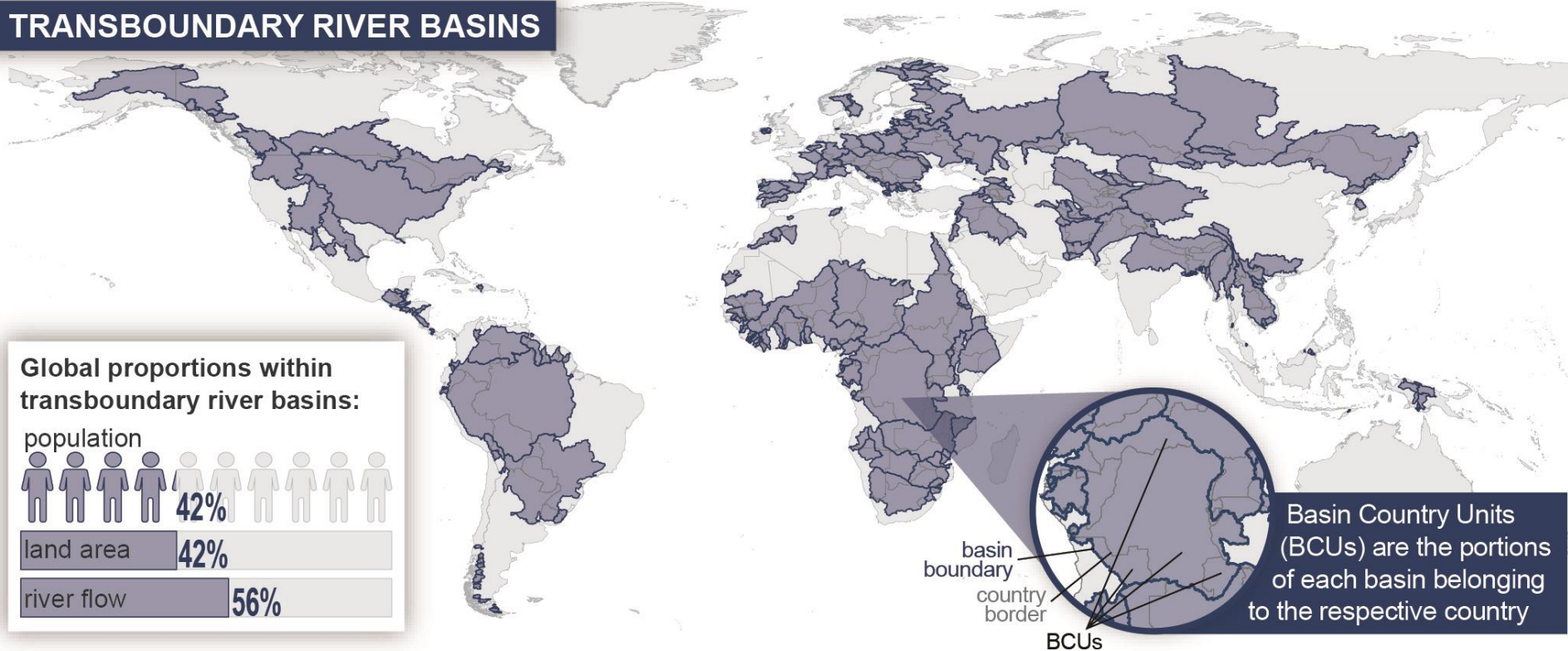




Assessment Scope

286 Transboundary River Basins – 796 Basin Country Units (BCUs)
/+26 selected deltas/

TRANSBOUNDARY RIVER BASINS



Develop a simple, scalable methodology

Use existing information and modelling

Use of composite indicators

Transboundary River Basin Indicators



THEMATIC GROUP		INDICATOR
Baseline Transboundary Status (2010)		Projected Transboundary Stress (2030/2050)
Water Quantity	<ol style="list-style-type: none"> 1. Environmental water stress 2. Human water stress 3. Agricultural water stress 	<ol style="list-style-type: none"> 1. Environmental water stress 2. Human water stress
Water Quality	<ol style="list-style-type: none"> 4. Nutrient pollution 5. Wastewater pollution 	<ol style="list-style-type: none"> 3. Nutrient pollution
Ecosystems	<ol style="list-style-type: none"> 6. Wetland disconnectivity 7. Ecosystem impacts from dams 8. Threat to fish 9. Extinction risk 	[Environmental water stress]
Governance	<ol style="list-style-type: none"> 10. Legal framework 11. Hydropolitical tension 12. Enabling environment 	<ol style="list-style-type: none"> 4. Exacerbating factors to hydropolitical tension
Socioeconomics	<ol style="list-style-type: none"> 13. Economic dependence on water resources 14. Societal wellbeing 15. Exposure to floods and droughts 	<ol style="list-style-type: none"> 5. Change in population density
Water Systems Links		
Lakes	<ol style="list-style-type: none"> 1. Lake influence 	
Coastal areas	<ol style="list-style-type: none"> 2. Delta vulnerability (sea level rise, wetlands, population and governance) 	



Relative Risk Categories

Raw indicator values -> Relative risk categories

- Global comparative assessment
- Comparability across indicators
- Scorecards for individual basins (Factsheets)

Relative Risk Category



1 Very low

2 Low

3 Moderate

4 High

5 Very high

ESQB_GUY	85.45	25.25	2.05	47.09	2	8.78	2,082.23	
ESQB_VEN	35.09	8.06	3.28	0.00	0	22.48	213.52	
Total in Basin	120.54	34.31	5.33	47.09	2.56	31.25	586.76	0.08

Socioeconomic Geography

BCU	Area (1000 km ²)	BCU area in basin (%)	Population (1000 people)	Population density (people/km ²)	Annual pop. growth (%)	Rural population ratio (% pop. rural)	Urban population ratio (% pop. urban)	Large Cities (>500,000)	GDP per capita (USD)	No. of dams	Dam Density (No./1000 km ²)
ESQB_BRA	0	0.00	0	0.79	0.04			0	11,208.08	0	0.00
ESQB_GUY	115	0.75	41	0.36	0.22	3.59	96.41	0	3,846.53	0	0.00
ESQB_VEN	39	0.25	154	4.22	0.99			0	14,414.75	0	0.00
Total in Basin	154	1.00	205	1.33	1.30	0.72	19.26	0	12,302.78	0	0.00

TWAP RB Assessment Results: BCU and Basin Relative Risk Category per Indicator*

Thematic group	Water Quantity			Water Quality			Ecosystems			Governance			Socioeconomics		
BCU	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
ESQB_BR															
ESQB_GUY	1	1	2				1	1	2	2	3	3	4	1	4
ESQB_VEN	1	1	2	1	1	2	2	2	2	3	4	4	1	2	2
River Basin	1	1	2	2	2	2	1	2	1	4	4	4	3	4	3











Indicators

1 - Environmental water stress 2 - Human water stress 3 - Agricultural water stress 4 - Nutrient pollution 5 - Wastewater pollution
 6 - Wetland disconnection 7 - Ecosystem impacts from dams 8 - Threat to fish 9 - Extinction risk 10 - Legal framework 11 - Institutional resilience 12 - Enabling environment 13 - Economic dependence on water resources 14 - Societal well-being 15 - Exposure to floods and droughts

TWAP RB Assessment Results: BCU and Basin Relative Risk Category per Projected Indicator

Projected indicator	1. Environmental water stress		2. Human water stress		4. Nutrient pollution		14. Change in population density		11. Hydrological resilience
Basin BCU	P-2030	P-2050	P-2030	P-2050	P-2030	P-2050	P-2030	P-2050	Projected
ESQB_BRA									
ESQB_GUY	2	3	1	1					3
ESQB_VEN	2	3	1	1			2	3	3
River Basin	2	3	1	1	2	2	1	1	4

* Used (or dotted) cells indicate a lower degree of certainty in results due to global modelling limitations and other gap-filling methods.

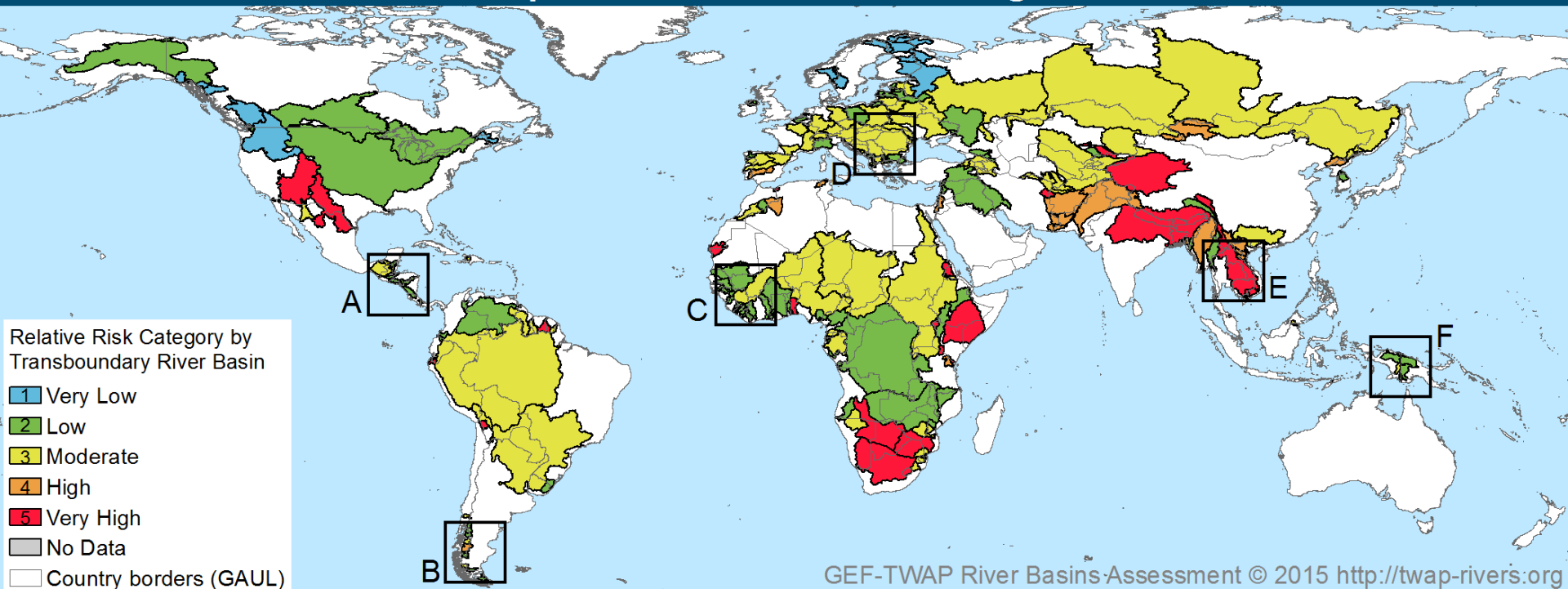











Population	Runoff (km ³)	1	2	3	4	5	7	8	10	11	12	13	14	Av
Population	Runoff [km ³]	Environmental Water Stress	Human Water Stress	Agricultural Water Stress	Nutrient Pollution	Urban Water Pollution	Ecosystem impacts of dams	Threat to Fish	Institutional Resilience	Enabling Environment	Economic Dependency on Water Resources	Societal Well-being	vulnerability to Climate-related Natural Disasters	Unweighted normalised Score
0,498,008	270,498,008	1.00	1.00	0.96	0.50	0.69	0.80	0.66	0.41	0.64	0.44	0.08	1.00	0.68
89,570	6,289,570	0.63	0.80	0.86	0.75	0.63	0.64	0.69	0.64		0.47	0.56	0.57	0.66
505,570	10,505,570	0.38	0.79	0.72	0.50	0.61	1.00	0.82	0.25	0.26	0.81	0.89	0.49	0.63
148,620	17,148,620	0.50	0.86	0.94	0.50	0.63	0.77	0.66	0.59	0.73	0.23	0.34	0.64	0.62
26,820	4,126,820	0.38	0.76	0.71	0.50	0.66	0.84	0.59	0.50	0.90	0.49	0.57	0.46	0.61
54,230	2,954,230	0.50	0.76	0.85	0.50	0.63	0.83	0.70	0.75	0.36	0.25	0.63	0.58	0.61
87,560	3,987,560	0.38	0.80	0.74	0.50	0.63	0.96	0.56	0.53		0.48	0.66	0.50	0.61
		0.50	0.82	0.87	0.25	0.61	0.87	0.60	0.22		0.84	0.22	0.52	0.64

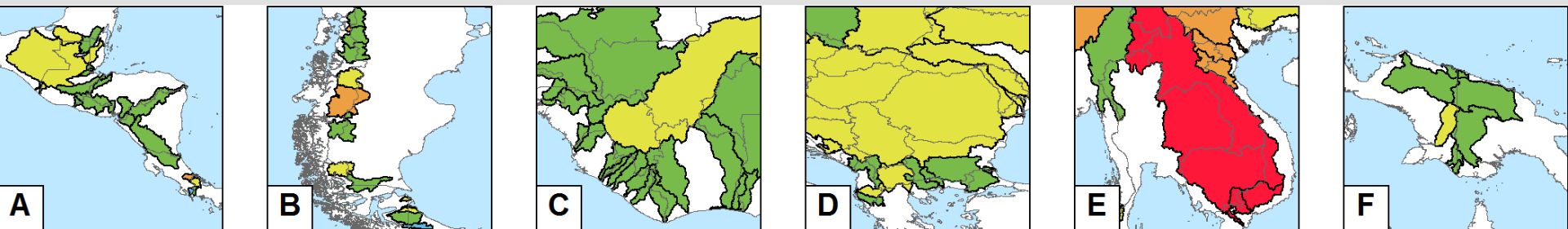
Example: Basin level

Exposure to Floods and Droughts

Basin Level



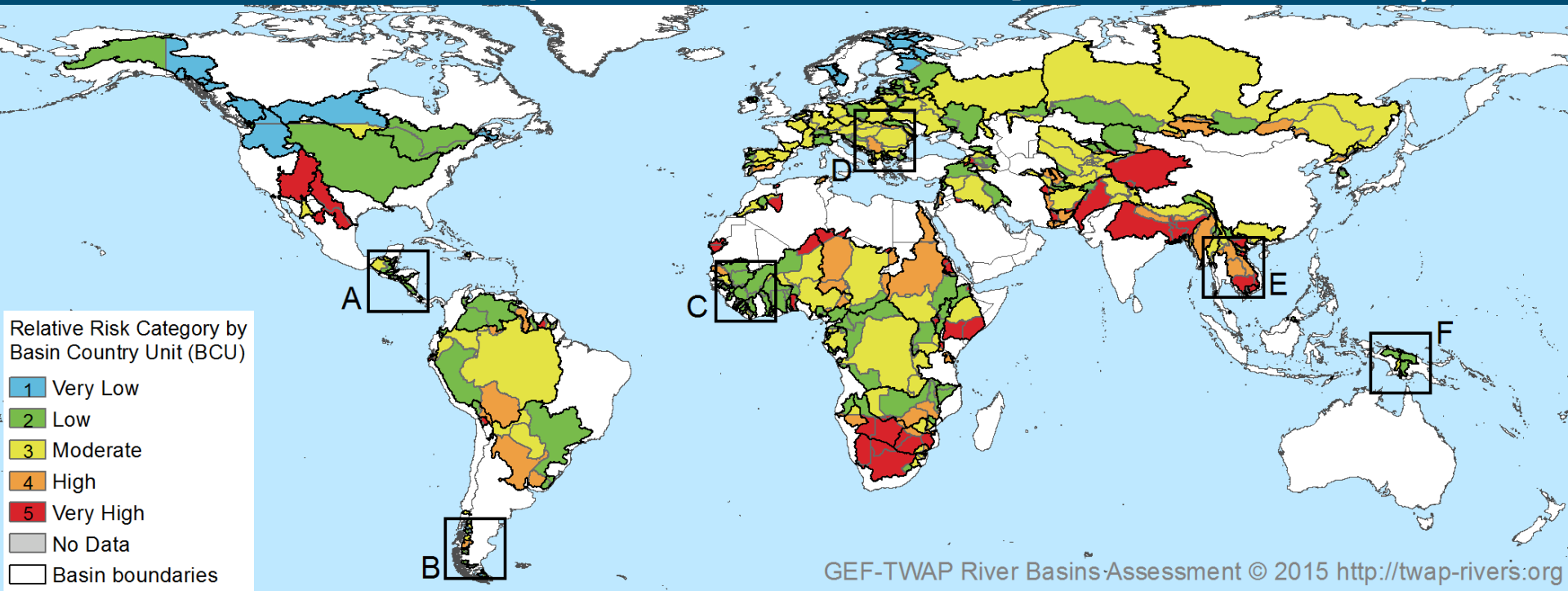
Small Basin Clusters



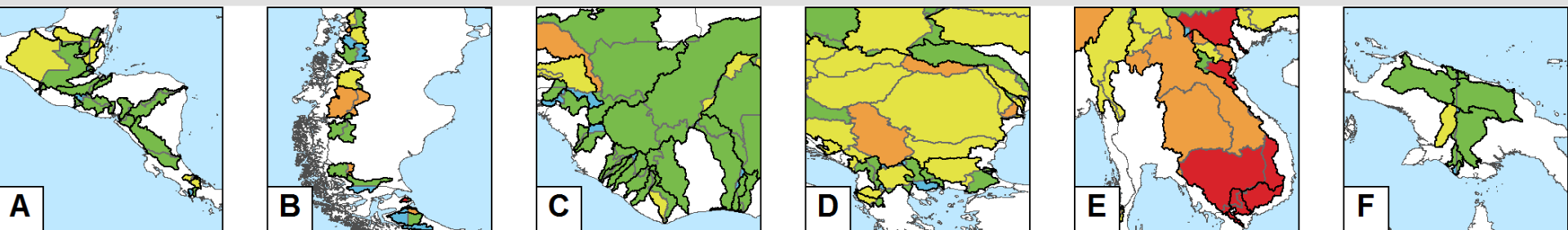
Example: BCU level

Exposure to Floods and Droughts

Basin Country Unit Level



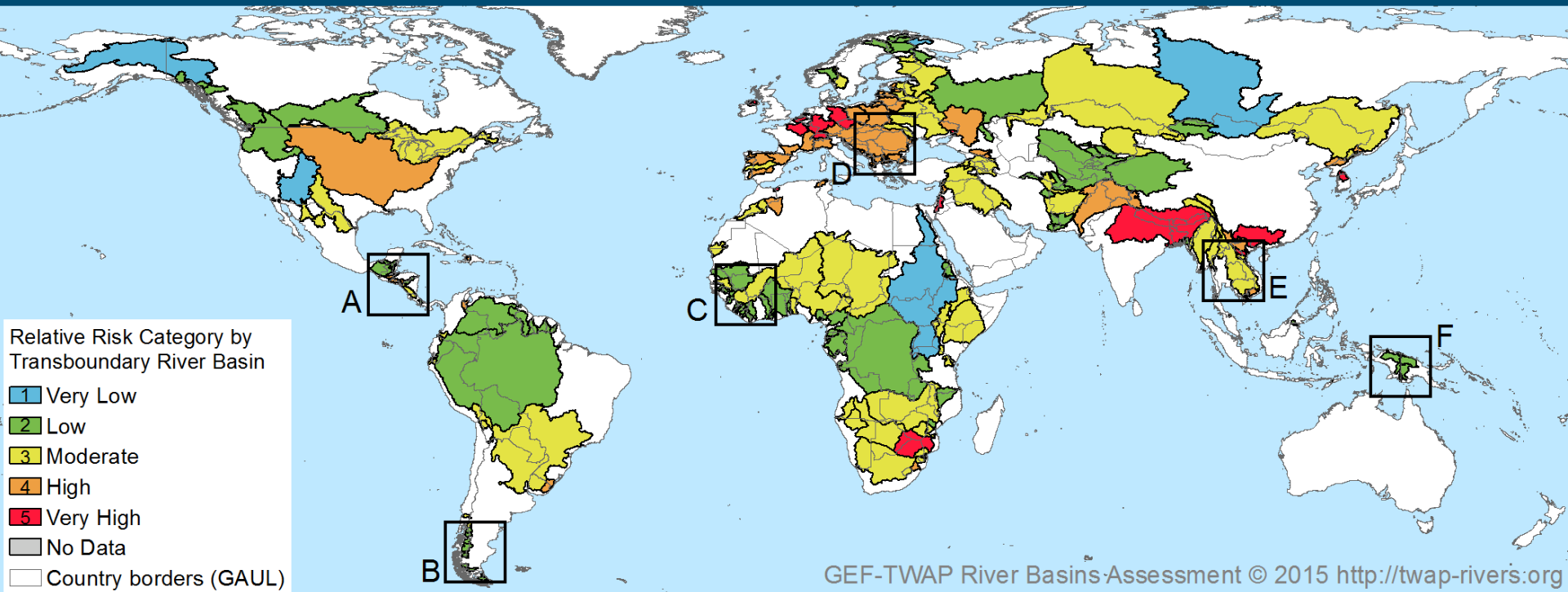
Small Basin Clusters



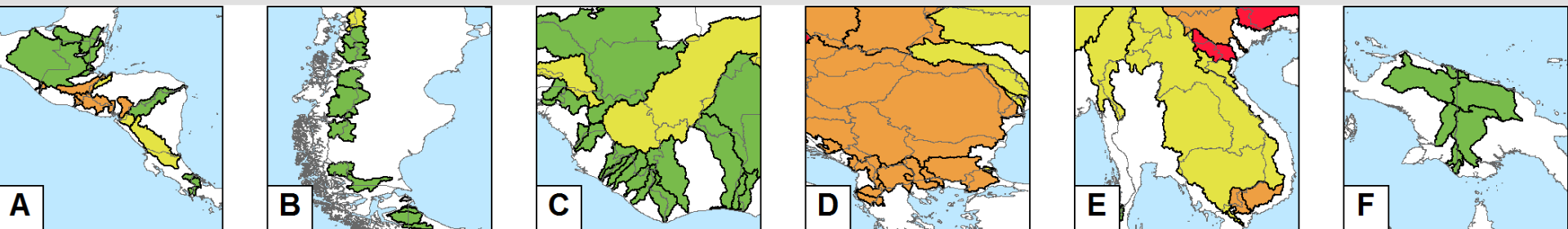
Example: Baseline

Nutrient Pollution

Basin Level



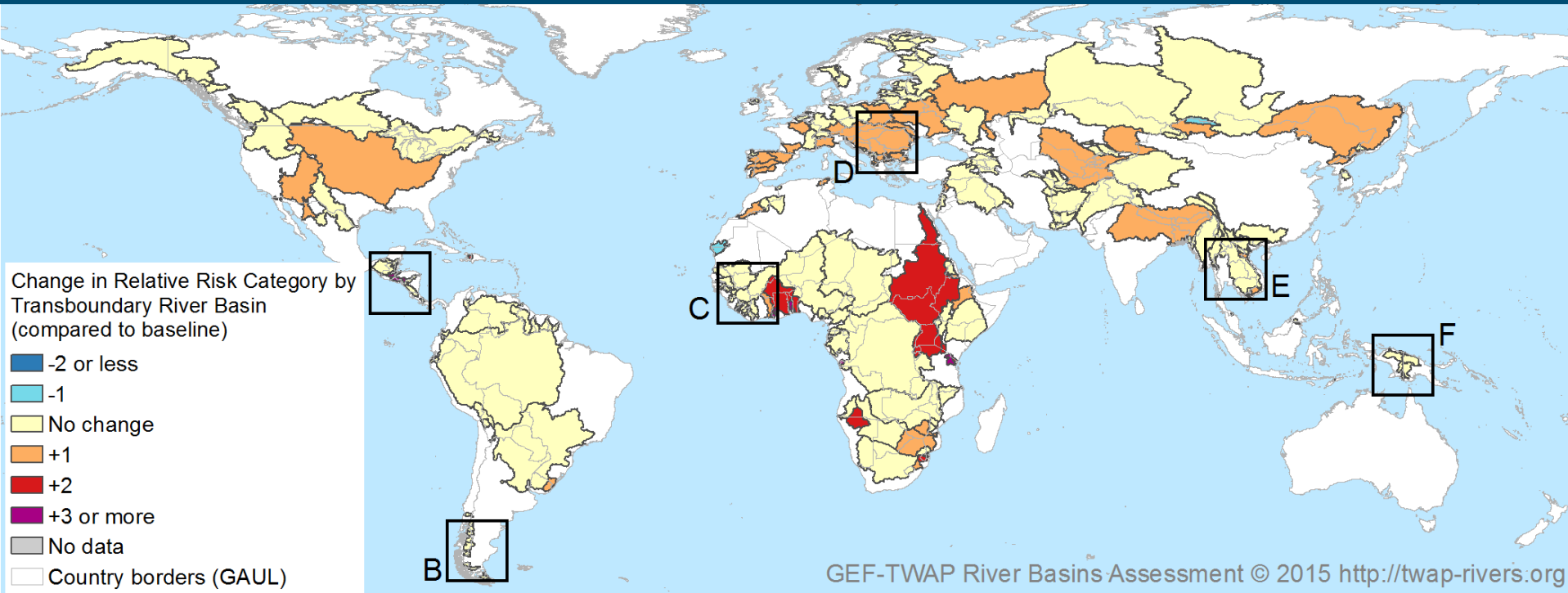
Small Basin Clusters



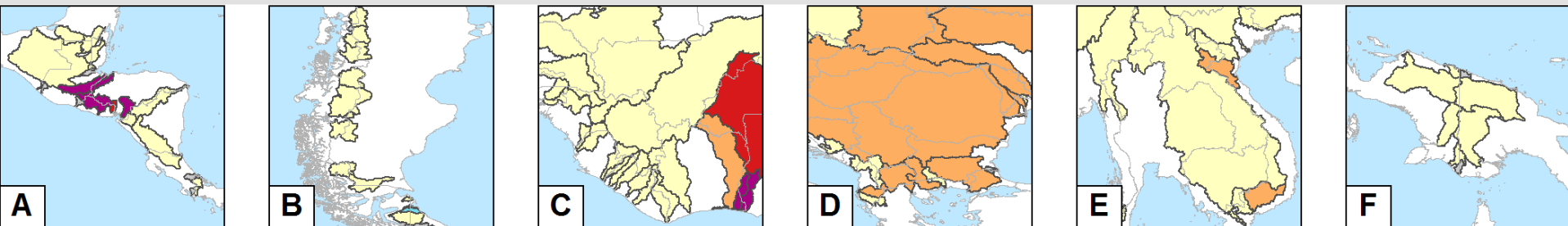
Example: Projected change

Nutrient Pollution - Projected Risk Change (2050)

Basin Level



Small Basin Clusters

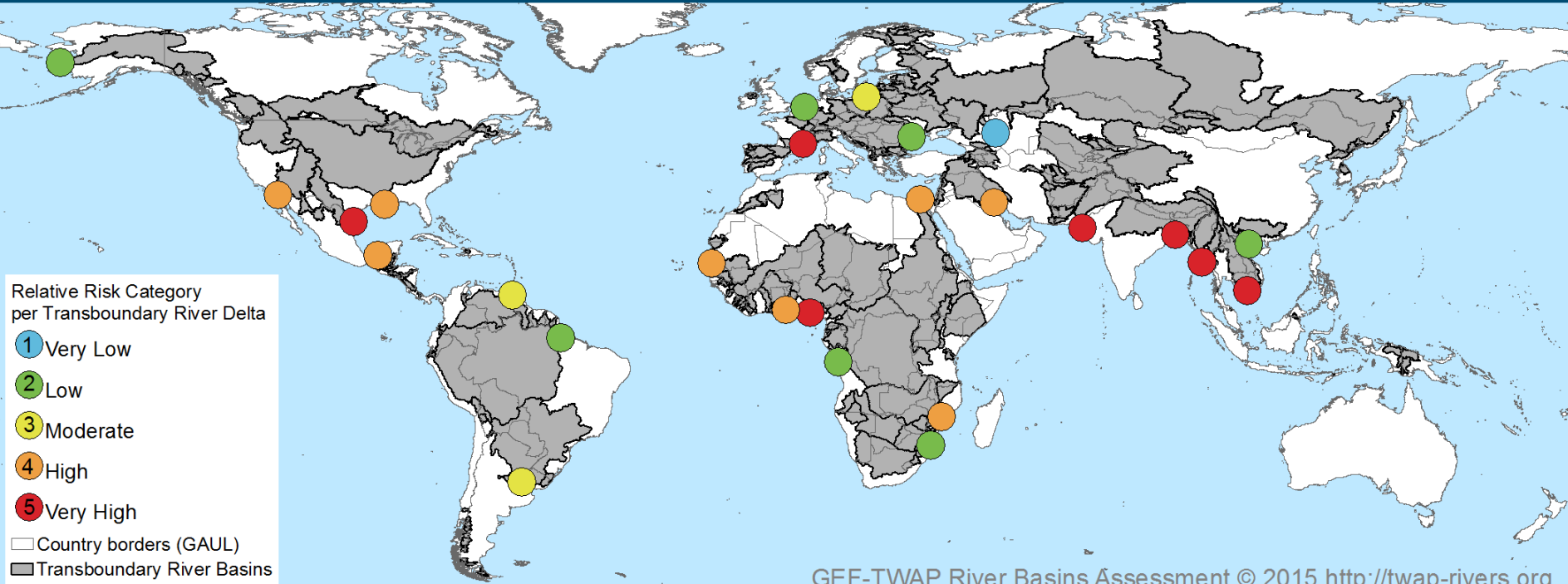


Example: Deltas



Relative Sea Level Rise (RSLR)

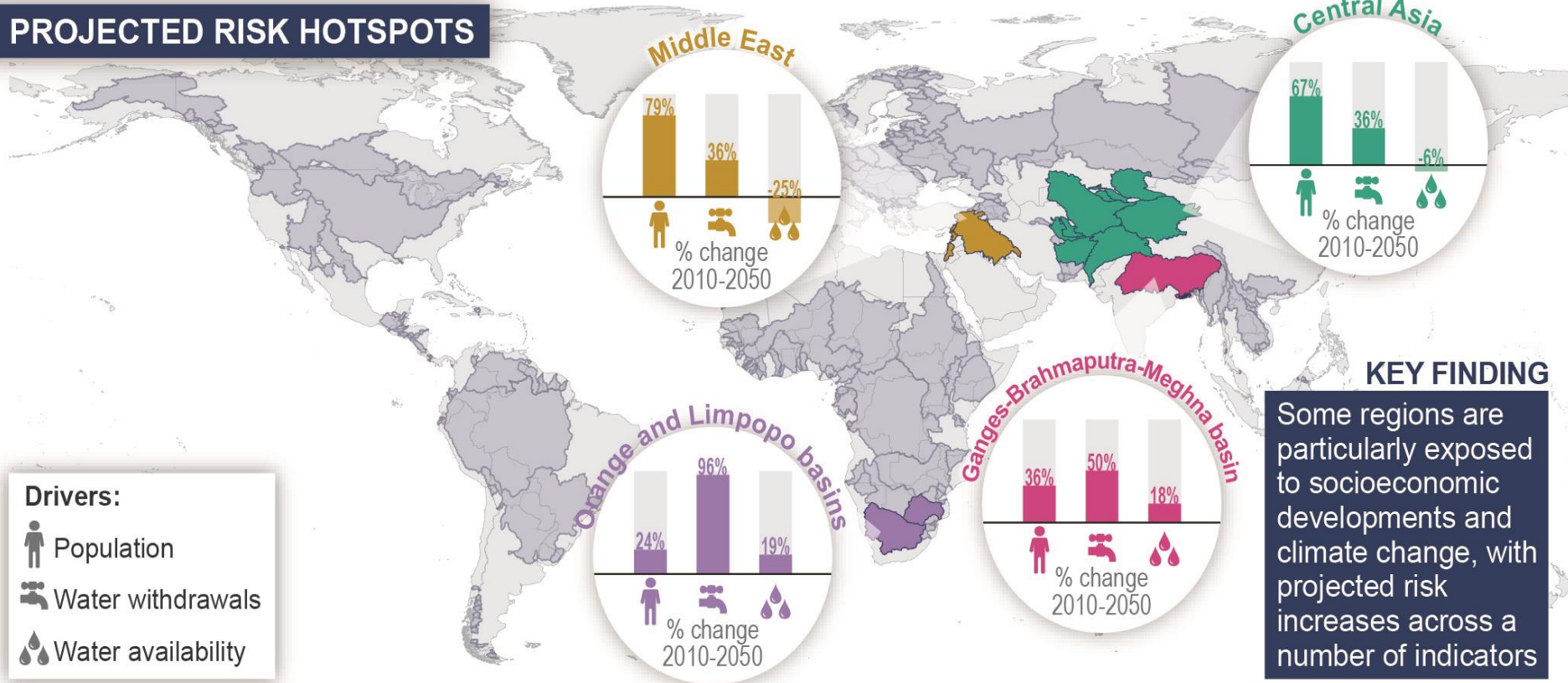
Deltas



4 projected 'hot-spots'



PROJECTED RISK HOTSPOTS



KEY FINDING

Some regions are particularly exposed to socioeconomic developments and climate change, with projected risk increases across a number of indicators



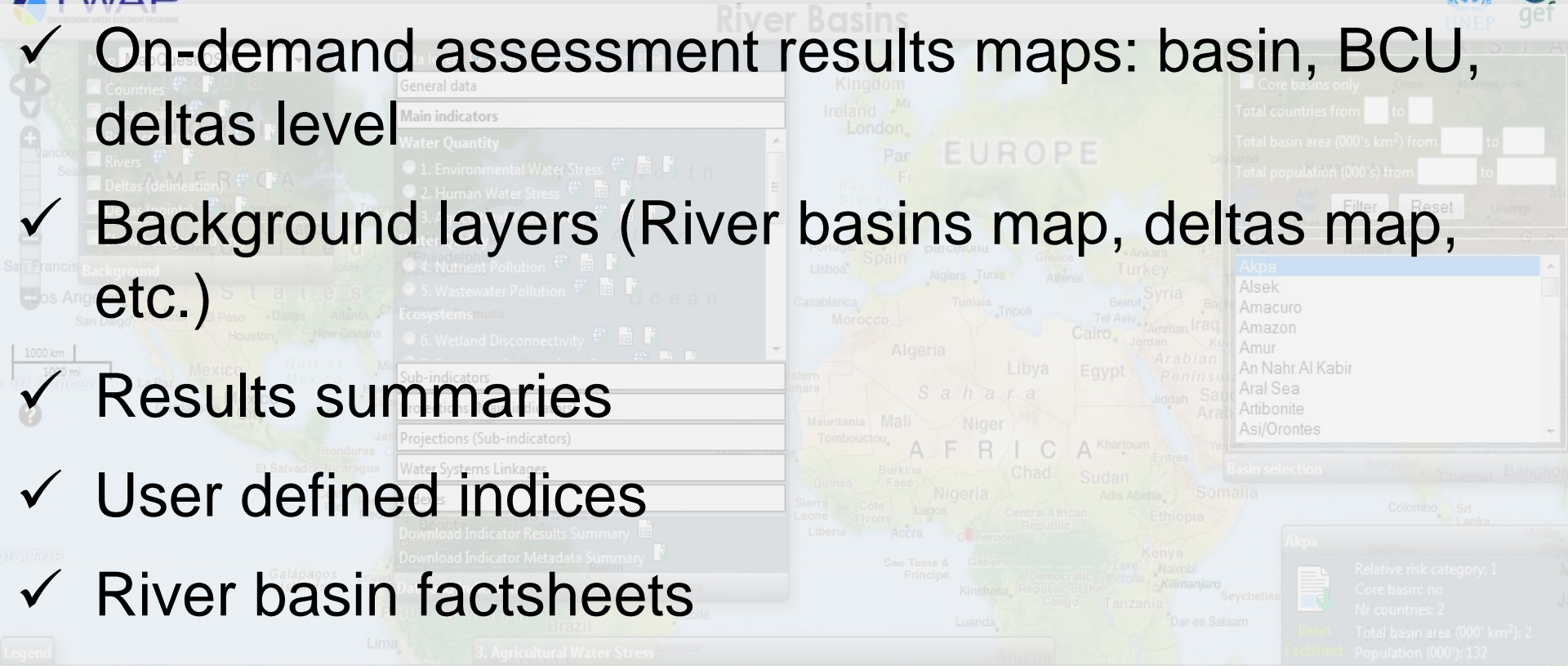
Interactive results & data portal



Transboundary Waters Assessment Programme



- ✓ On-demand assessment results maps: basin, BCU, deltas level
- ✓ Background layers (River basins map, deltas map, etc.)
- ✓ Results summaries
- ✓ User defined indices
- ✓ River basin factsheets
- ✓ Results files and metadata sheets





Key findings – Lessons learned

- **Process:** considerable time and effort in harmonizing the existing global datasets, creating an updated/better resolution delineation of the global transboundary river basins (286), features efforts needed to harmonize and utilize global datasets.
- **Indicators:** valuable in making global comparison, given the vast difference in data available on local scales;
- challenging not only the lack of data in many basins, but also the lack of agreed thresholds for many indicators (see SDGs).
- **Uptake in decision-making:** too early to evaluate that, but current work is aiming to apply TWAP data in a new WB study in relation to infrastructure development.
- TWAP RB data portal has close to 800 downloads (about half of that basin factsheets),
- **Integration with other water systems:** indeed a challenge, but a lot of the groundwork enables better integration in future. Particularly updating the delineations of the water bodies to avoid overlap of relevant water bodies.

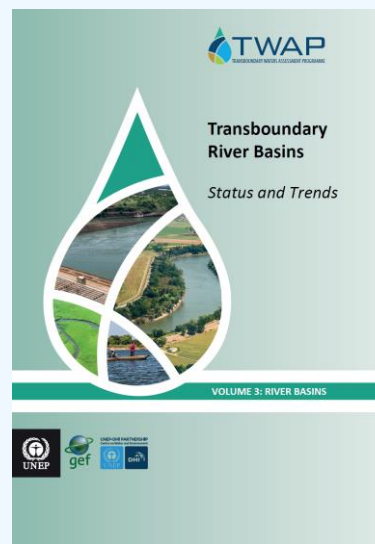




Key findings – outlook

- river basin component - top-down approach - globally available data - the only way to cover all 288 TB river basins.
- bottom-up approach with stakeholder inclusion would have favoured basins with existing structures and data and left those basins behind most in need of basic data.
- the river basin component links to the lakes component and the coastal component (incl. deltas). groundwater component would be next to connect more closely (see also GEMS and WWQA).
- TWAP could contribute to the UNECE 3rd assessment - update the different indicators - the baseline year was typically 2010 (older for some indicators) and it may be relevant to update to 2015





Thank you

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<http://twap-rivers.org/>