



Demonstration project : Selbe River basin, Mongolia

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Objectives, Targeted Issues and their Background

To assist development of integrated water resources management (IWRM) in the Selbe and Tuul River Basins with hydrological modelling results from various scenarios and recommendations.

Targeted Issues and Background:

Environmental degradation (vegetation, soil degradation and deforestation impacting on surface and ground water regime and interaction mechanism, ground water contamination, water scarcity)

Surface and ground water monitoring and modelling to assist better management in light of anthropogenic influences and climate change impact.

River Basin Information

The Selbe with 26.2 km length is draining an area of nearly 220 km² in the Tuul River basin of 6300 km².

Land use types are described as Urban, pasture and forest (forest area 54.2 %).

Geographic characteristics of the Selbe river basin

No.	Sites	Cactment area, km ²	River length, km	Basin mean elevation	Channe l slope, ‰	Forested area, %
1	Upper basin-Sanzai	34.2	8.3	1620	21.3	63.7
2	Lower basin-Damba	188	26.2	1510	12.4	54.6

Climate

- Mean annual mean air temperature is -2.0°C , ($+30^{\circ}\text{C}$ - -30°C)
- Annual, basin average precipitation is 264 mm
- Rainfall patterns are highly seasonal /90 per cent of total annual precipitation fall within warm period from May to October/
- Snow cover - 120 days with snow depth of 2-5 cm on average.

Surface runoff formation features and flow regime

Rainfall runoff - 56-76 %

Groundwater recharge - 15-40 %

Snow melting runoff – 4-9 %

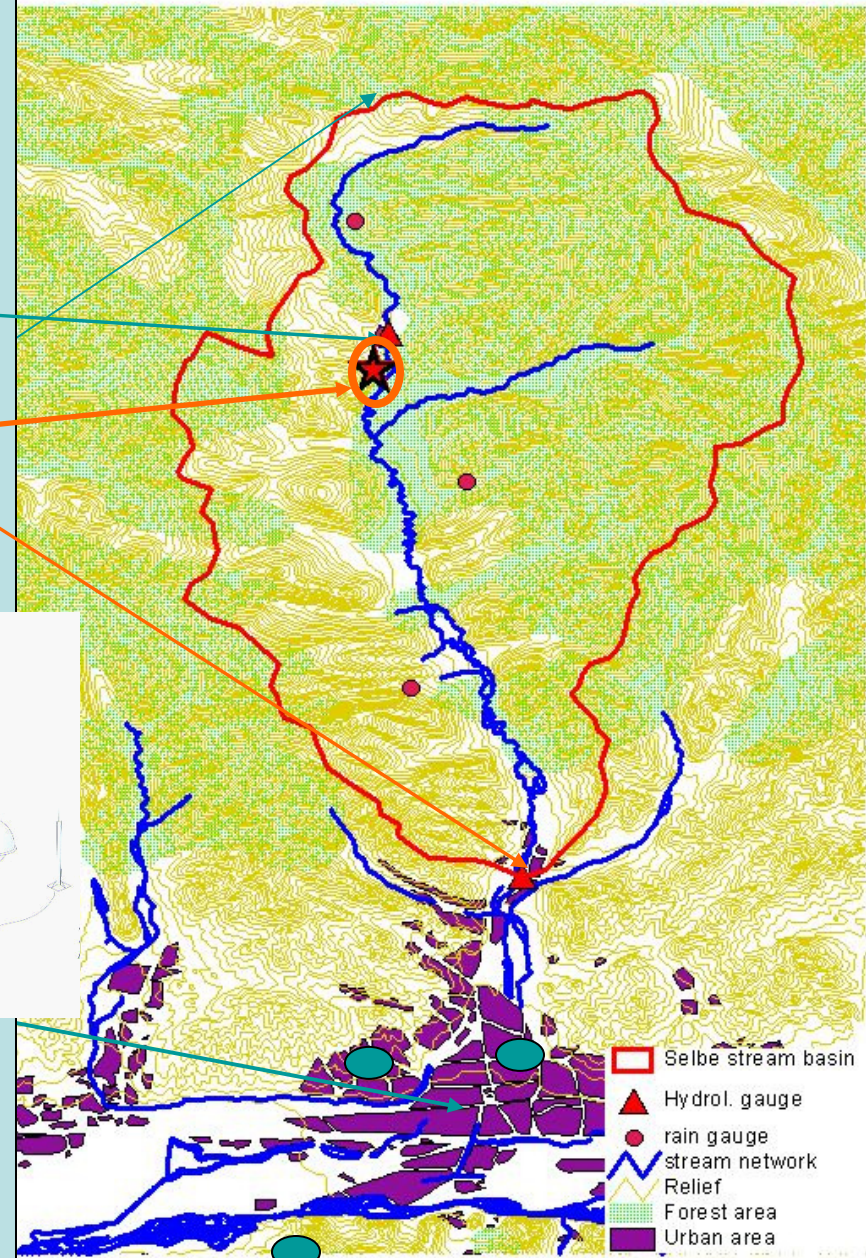
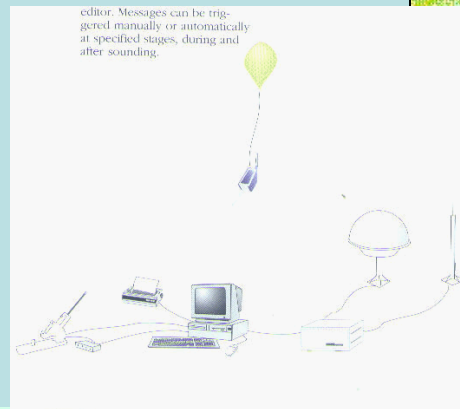
Soils : brown soil, podosol and others

Vegetation: grass and forest

Geomorphology: floodplain, hilly slope, mountain

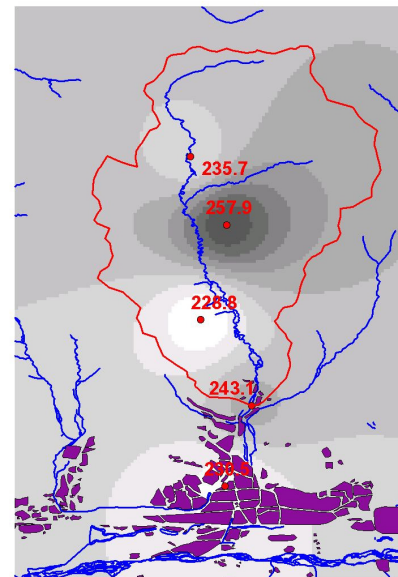
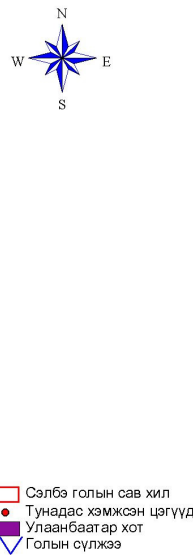
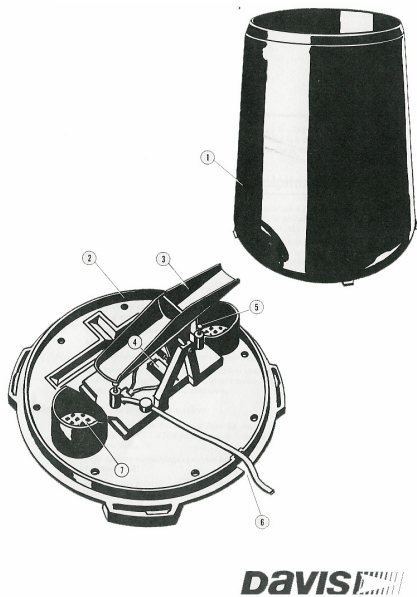
Observation Systems and Data

- 2 stream flow gauges
- AWS in upper basin area
- 3 meteorological stations in lower basin area
- Radio sonde station
- Doppler Radar
- 5 rain gauge sites

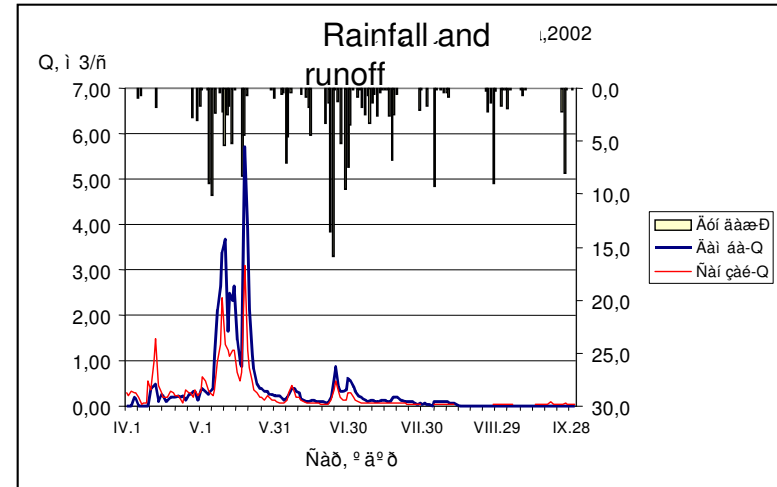
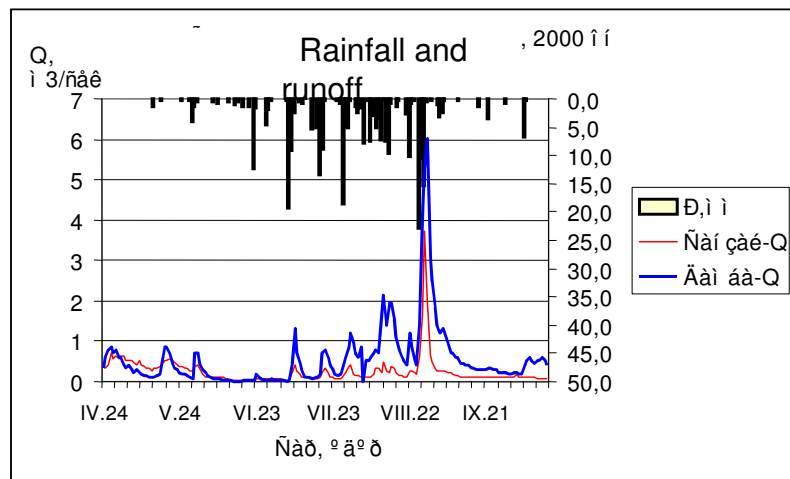
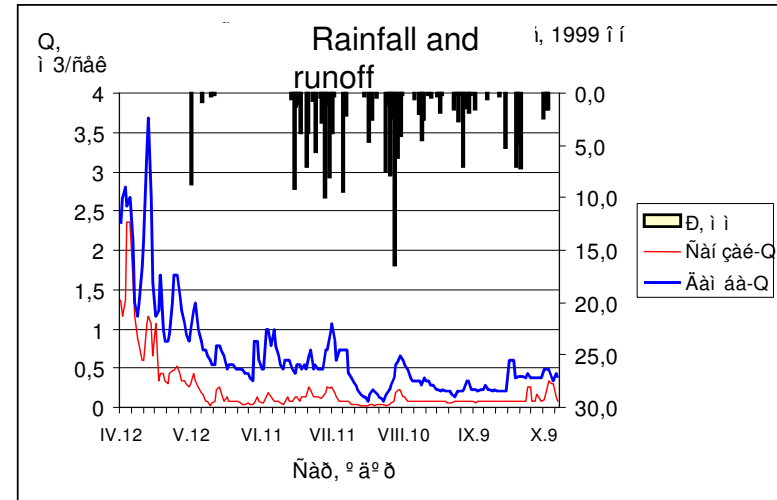
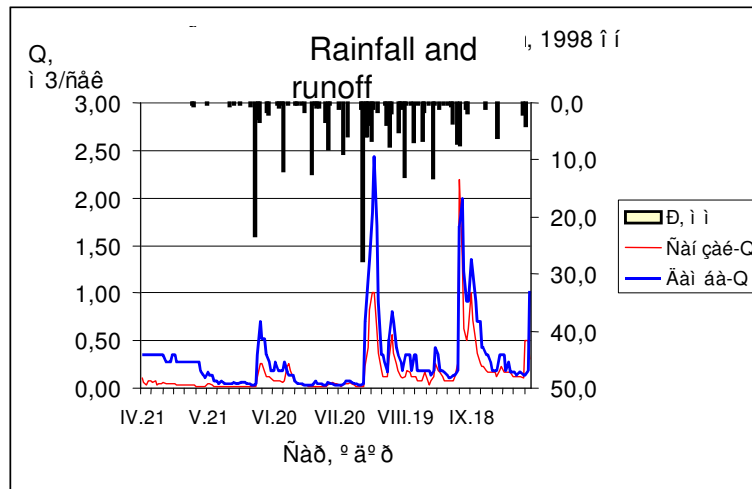


- There is rain gauge network

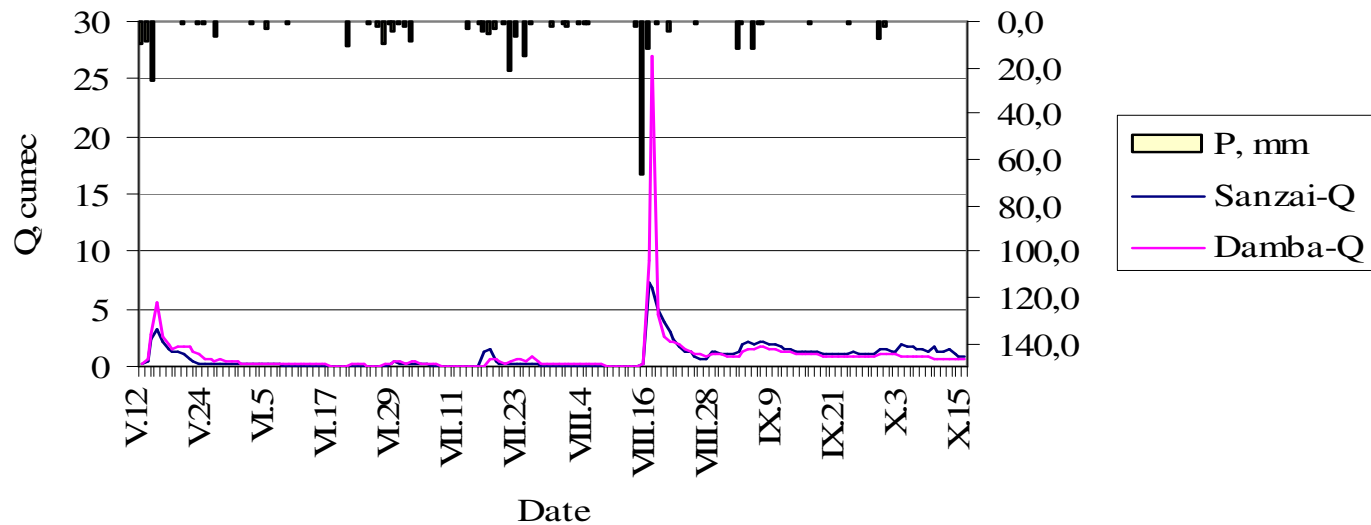
No.	Site	Altitude, m	Coordinates	
			Latitude	Longitude
1	Sanzai	1583	48° 07' 35"	106° 53' 25"
2	Bayanbulag	1510	48° 05' 08"	106° 54' 42"
3	Yargait	1511	48° 01' 45"	106° 53' 47"
4	Damba	1258	47° 58' 41"	106° 55' 36"
5	University*	1299	47° 27'	106° 58'



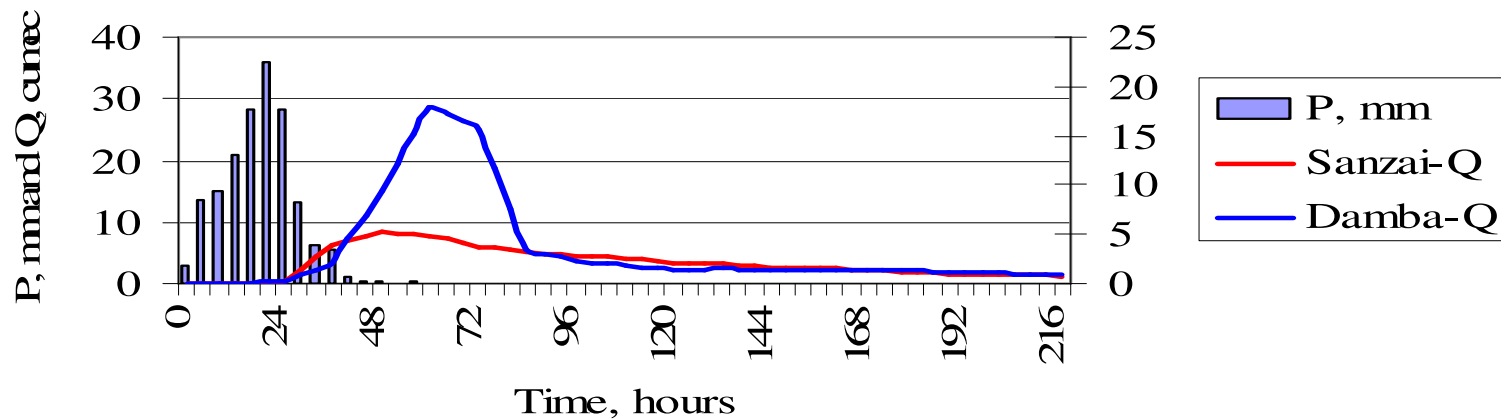
- Since 1985 permanent hydrological observation have been started in the Selbe river basin (1985-1992 and since 1998-present Selbe-Damba and since 1993-Selbe-Sanzai)



Rainfall and runoff distribution in the Selbe river basin , 2003



Rainfall-runoff relationship for selected hydrograph, VIII.14- VIII.23, 4-hours interval

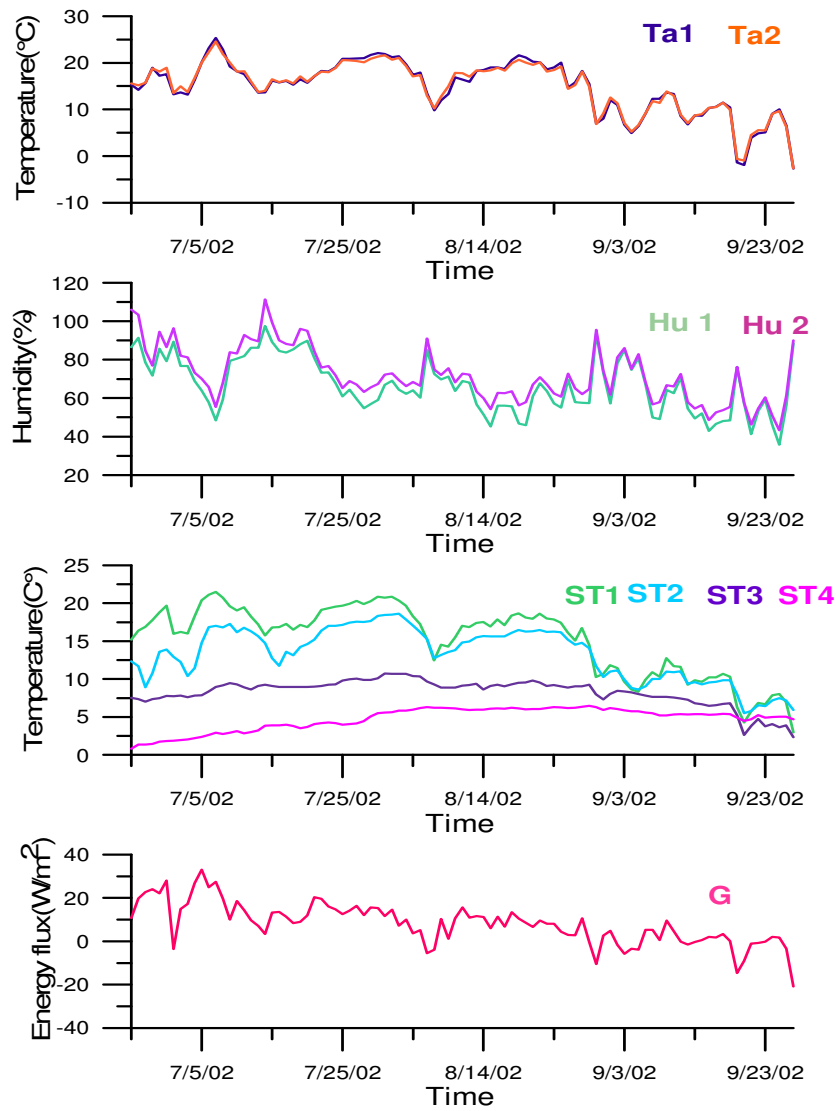




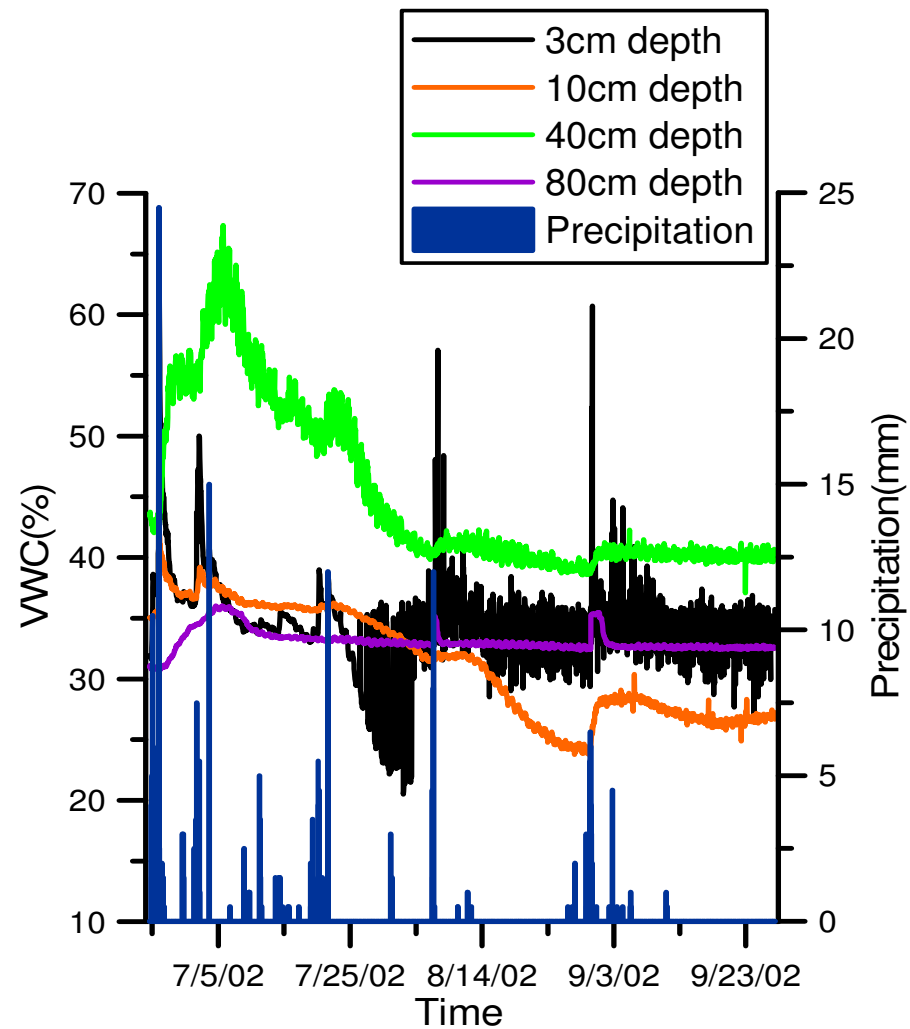
Water cycle station (WaCS) at Sanzai site for IHP Committees and IMH in cooperation with Hiroshima University

Soil physical parameters of the Sanzai site

Depth (cm)	Porosity n (%)	Dry density d (g/cm³)	Saturated hydraulic conductivity (cm/s)
2.5	0.737	0.254	1.58×10^{-2}
12.5	0.677	0.572	1.1×10^{-2}
40	0.827	0.24	1.15×10^{-3}



Monitoring results of air temperature (Ta1: 2.8m h., Ta2: 0.6m h.), humidity (Hu1: 2.8m h., Hu2: 0.6m h.), soil temperature (ST1: 0.03m d., ST2:0.1m d., ST3:0.4m d., ST4:0.8m d.), soil heat flux (G: 0.03m d.) at Sanzai site in 2002



Monitoring results of soil moisture by TDR at Sanzai site in 2002

Reference basin	Selbe river	Lat.	Long.
METADATA (River Basin Description)			
Location (longitude and latitude extent)		48.25-47.9167 N	106.8333-107.000
Catchment outlet longitude and latitude		47.9781 N	106.928
Catchment area, sq, km		220	
Number of MOLTS points in the basin		2	
MOLTS point1 longitude and latitude	Ulannbaator	47.828 N	106.726
MOLTS point1 elevation		1200	
MOLTS point2 longitude and latitude	Mandalgobi	45.743 N	106.264
MOLTS point2 elevation			
...			
MOLTS point X			
Basin Contacts (Name, office address, phone, fax, email)	G. Davaa, Head hydrology section, Institute of Meteorology and		
Basin Maps	available		
Basin Pictures	available		
River Network Maps	available		
Soil Maps and Soil Characteristics	available		
Land Use Maps and Vegetation Characteristics	available		
River Constructions (dams, weirs, etc.) - type, location (longitude, latitude)	No		
OBSERVATION DATA - HYDROLOGICAL			
Streamflow	available		
Reservoir (Water level, Outflow)	available		
Groundwater Table	limited		
Others - please specify (each data type on a single line)			
OBSERVATION DATA - SUB-SURFACE			
Soil Temperature	available		
Soil Moisture	available		
OBSERVATION DATA - SURFACE			
Air Temperature	available		
Humidity	available		
Wind	available		
Pressure	available		
Precipitation	available		
Snow	available		
Skin Temperature	unavailable		
Upward Shortwave Radiation	unavailable		
Downward Shortwave Radiation	unavailable		
Upward Longwave Radiation	unavailable		
Downward Longwave Radiation	unavailable		
Upward Photosynthetically Active Radiation	unavailable		
Downward Photosynthetically Active Radiation	unavailable		
Net Radiation	available		
Sensible Heat Flux	estimation possible		
Latent Heat Flux	estimation possible		
Ground Heat Flux	available		
Momentum Flux	unavailable		
CO2 Flux	unavailable		
Evaporation	unavailable		
Vegetation	limited data available		
OBSERVATION DATA - Atmosphere			
Planetary Boundary Layer Tower	unavailable		
Radiosonde	available		
Radar	available		
Lidar	unavailable		
Profiler	unavailable		
RASS	unavailable		
ADDITIONAL COMMENTS			

Schedule: 2007- 2011 (Data collection and Integration)

- hydro-meteorological monitoring program will be continued.
- Ground water observation and modelling activities will be organized since 2008. (IHP-UNESCO)
- Data collection on land use and its change etc. and analysis

Request to and Plan for Capacity Building Programs

Use of CEOP products: MOLTS, Satellite, water and energy budget (for comparison) and etc.

Instrumentation: Ground and surface water monitoring instruments installation and re-installation will be in 2008.

Capacity building: Use of training and workshops organized within AWCI and others

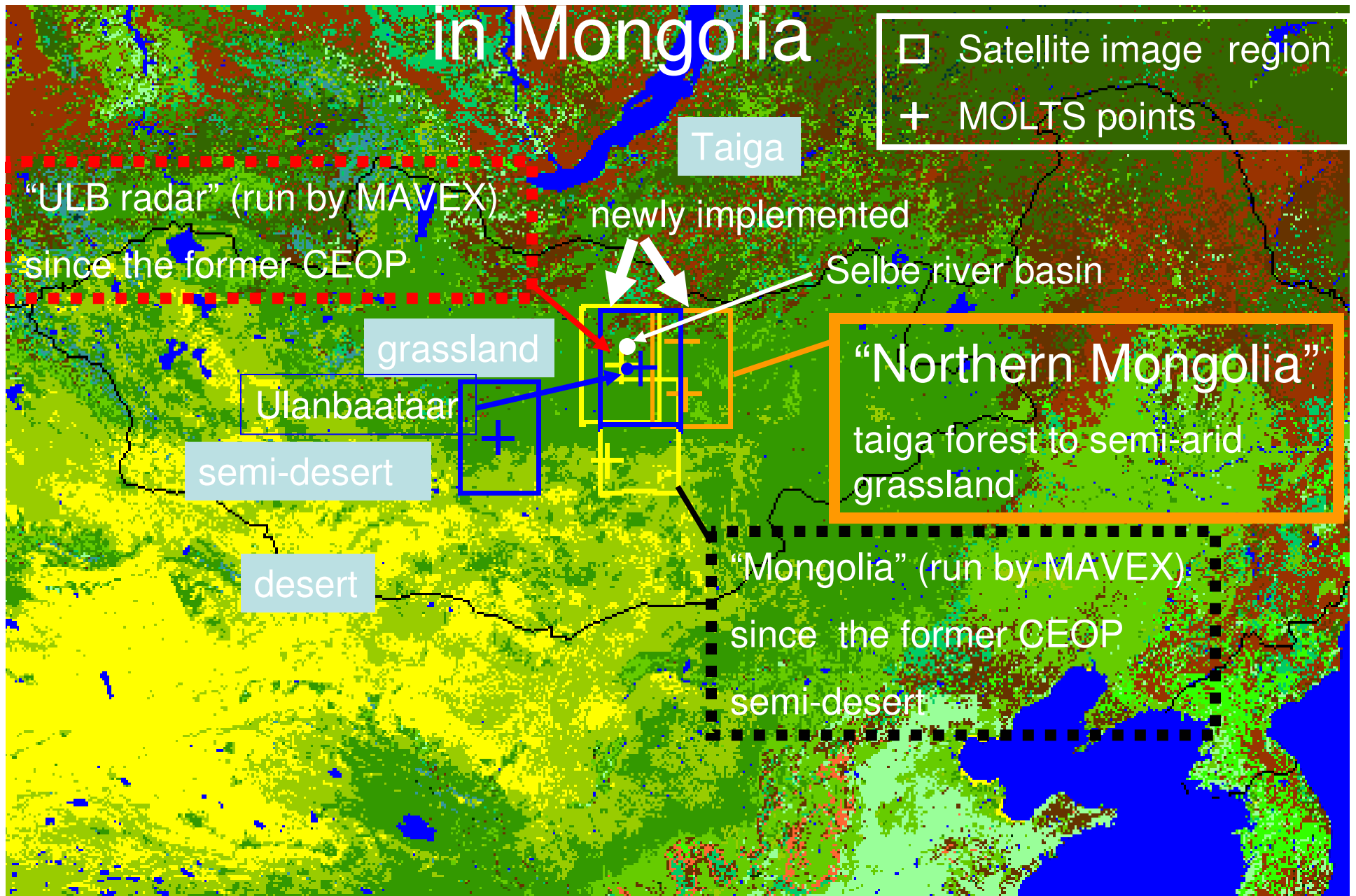
Public awareness: Dissemination of project results for water resources management and application to practices

		Bangladesh				Bhutan	Cambodia	China	Indonesia	Lao PDR	Mongolia	Myanmar	Philippines				Sri Lanka	Thailand			Vietnam					
		RS data	On-site monitoring	Software	Training	Information dissemination sys	Flood forecasting and EWS	Flood forecasting and warning	Flood and drought forecasting	Flood and drought risk map	Flood	Drought	Flash flood forecast	radar and sat data use training	Access to GCM output	in-situ and sat data integration	Flood hazard map	Climate change scenario	Capacity building	Data assimilation	Climate model for long range forecast	Radar interpretation	Meteorological EWS	Flood forecasting	Water quality	Drought forecasting
CEOP	data integration service	2	2	0	0	0	2	2	2	2	2	2	2	2	2	2	2	0	2	0	0	0	2	1	1	
	QC service	2	2	0	0	0	2	2	2	2	2	2	2	2	2	2	2	0	2	0	0	0	2	1	1	
GWSP	Global DB(Digital Atlas, Dam)	1	0	0	0	0	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	1	0	0	
	training &research workshop	0	0	0	1	0	1	1	1	1	1	1	1	0	0	1	1	0	1	0	0	0	1	1	1	
	University curricula	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
	Web-based teaching package	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	0	
UNU	flood inundation modelling	0	0	1	1	0	2	2	2	2	2	1	2	0	0	0	2	0	1	0	0	0	0	2	0	1
	loss estimation	0	0	0	1	0	1	1	1	1	1	1	1	0	0	0	1	0	1	0	0	0	0	1	0	1
	rainfall downscaling and forecast	0	0	0	1	0	2	2	2	2	2	1	2	0	0	0	2	0	1	0	0	0	0	2	0	1
ICHARM	Global Flood Alert System	2	0	0	0	0	2	2	2	2	2	0	2	0	0	0	2	0	0	0	0	0	2	0	0	
	flood hazard map training	0	0	0	2	0	1	1	1	1	1	0	1	0	0	0	1	0	2	0	0	0	0	1	0	0
	river and dam engineering training	0	0	0	2	0	1	1	1	1	1	0	1	0	0	0	1	0	2	0	0	0	0	1	0	0
	Master course on flood mitigation	0	0	0	2	0	1	1	1	1	1	0	1	0	0	0	1	0	2	0	0	0	0	1	0	0
MRC	river basin management training	0	0	0	2	0	1	1	1	1	1	0	1	0	0	0	1	0	2	0	0	0	0	1	1	0
	water quality analysis training	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	2	0
	flood hazard mapping training	0	0	0	2	0	2	2	2	2	2	0	2	0	0	0	2	0	2	0	0	0	0	2	0	0
	flood emergency management training	0	0	0	2	0	2	2	2	2	2	0	2	0	0	0	2	0	2	0	0	0	0	2	0	0
	mathematical modelling training	0	0	0	2	0	1	1	1	1	1	0	1	0	0	0	1	0	2	0	0	0	0	1	0	1
	satellite rain estimation training	0	0	0	2	0	1	1	1	1	1	0	1	0	0	0	1	0	2	0	0	0	0	1	0	1
China	flood and drought management system	0	0	0	0	1	1	1	1	1	1	1	1	0	0	0	1	0	0	0	0	0	0	1	0	1
	training	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
	data&product access	1	1	0	2	2	0	0	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
PUB	WGs and projects	0	0	0	1	0	1	1	1	1	1	1	1	0	0	0	1	0	1	1	1	0	0	1	0	0
JAXA/AIT	Mini-projects	2	2	1	2	0	2	2	2	2	2	1	2	0	0	2	2	0	2	0	0	0	0	2	0	0
	Sentinel Asia	1	0	0	2	2	2	2	2	2	2	0	2	0	0	2	2	0	2	0	0	0	0	2	0	0
MAIRS	Enhanced observation	1	1	0	1	1	1	1	1	1	1	1	1	0	0	1	1	0	1	0	0	0	0	1	0	0
	regional model development	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	1	1	0	0	0	1	

Legend:
3: being applied
2: applicable
1: potentially applicable
0: not applicable

Capacity building on Flood, RS applications are important for Mongolia

Updated CEOP Ref. site configuration



A landscape photograph showing a calm lake in the foreground, reflecting the sky. In the background, there are rolling green hills and a prominent snow-capped mountain peak under a clear blue sky with a few wispy clouds. The text "THANK YOU FOR YOUR ATTENSION" is overlaid in a blue, arched, serif font across the middle of the image.

THANK YOU FOR YOUR ATTENSION