ICIMOD

#HKH2Glasgow
ROAD TO UNFCCC COP26

Monitoring the cryosphere in the Hindu Kush Himalaya

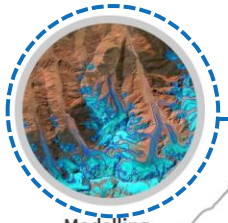
Measurements, analysis and dissemination

- **Over 1,500 professionals and young researchers trained in monitoring cryosphere change using the latest Earth observation tools and techniques**
- **Training on the R software has become an annual training event based on demand**

Field-based monitoring of Yala and Rikha Samba glaciers reveal that they are shrinking and follow the general trend of glaciers in the Himalayas.

In-situ measurements

Remote sensing



Modelling

CRYOSPHERE MONITORING

47 potentially dangerous glacial lakes within the Koshi, Gandaki, and Karnali river basins of Nepal, the Tibet Autonomous Region of China, and India were identified using high-resolution satellite imagery.

Snowmelt is a major contributor to streamflow during the non-monsoon seasons when rain is sparse.

CAPACITY DEVELOPMENT

KNOWLEDGE MANAGEMENT

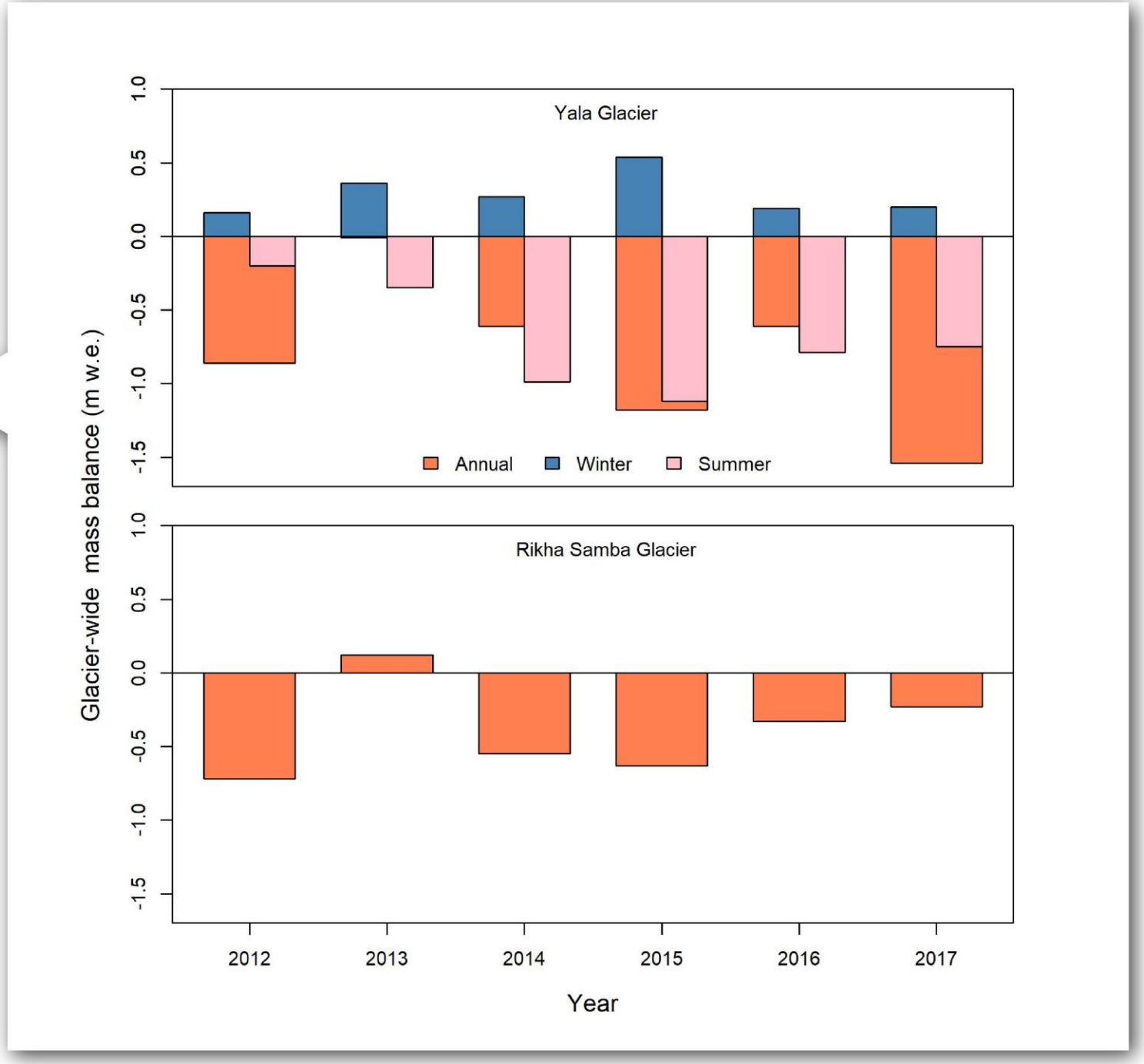
The HKH CryoHub is a dedicated page through which the cryosphere data we have collected over the years is made publicly accessible.

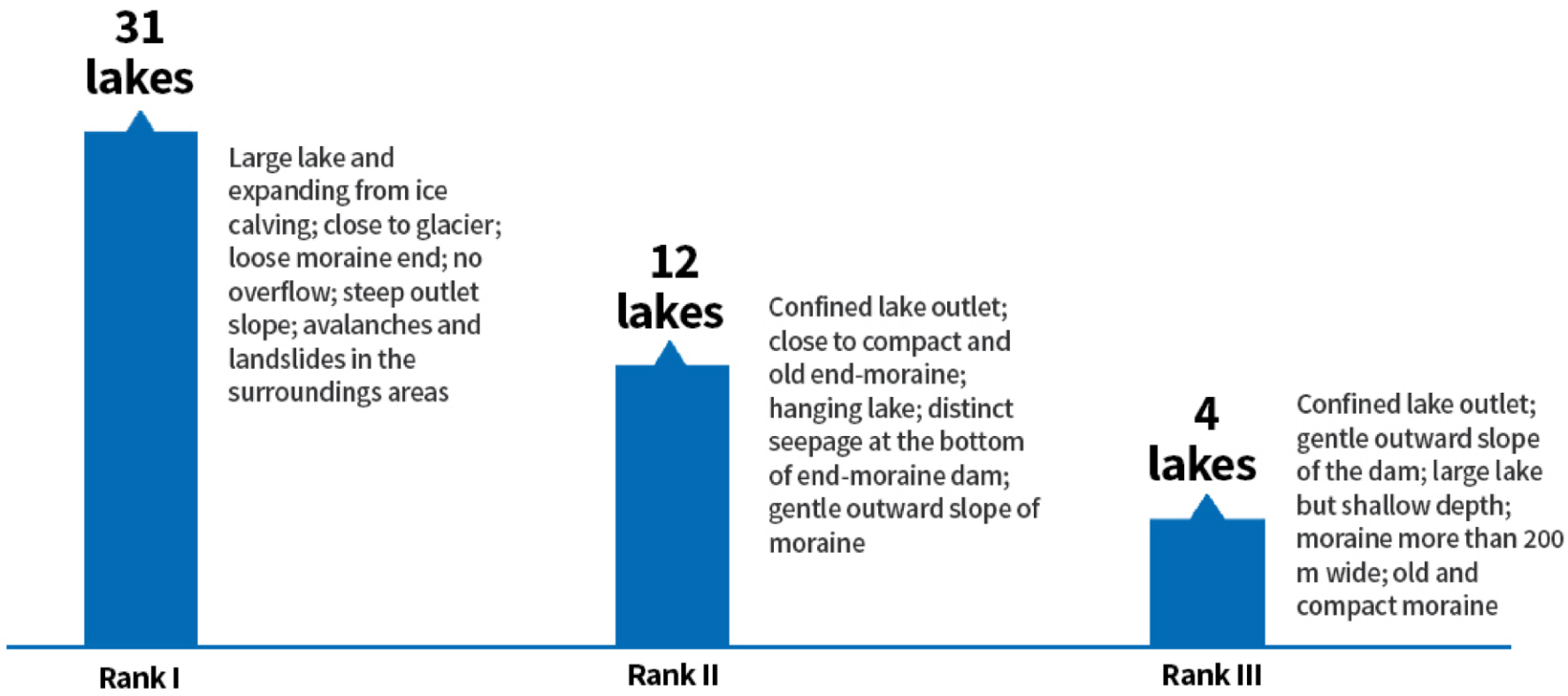
IMPACT

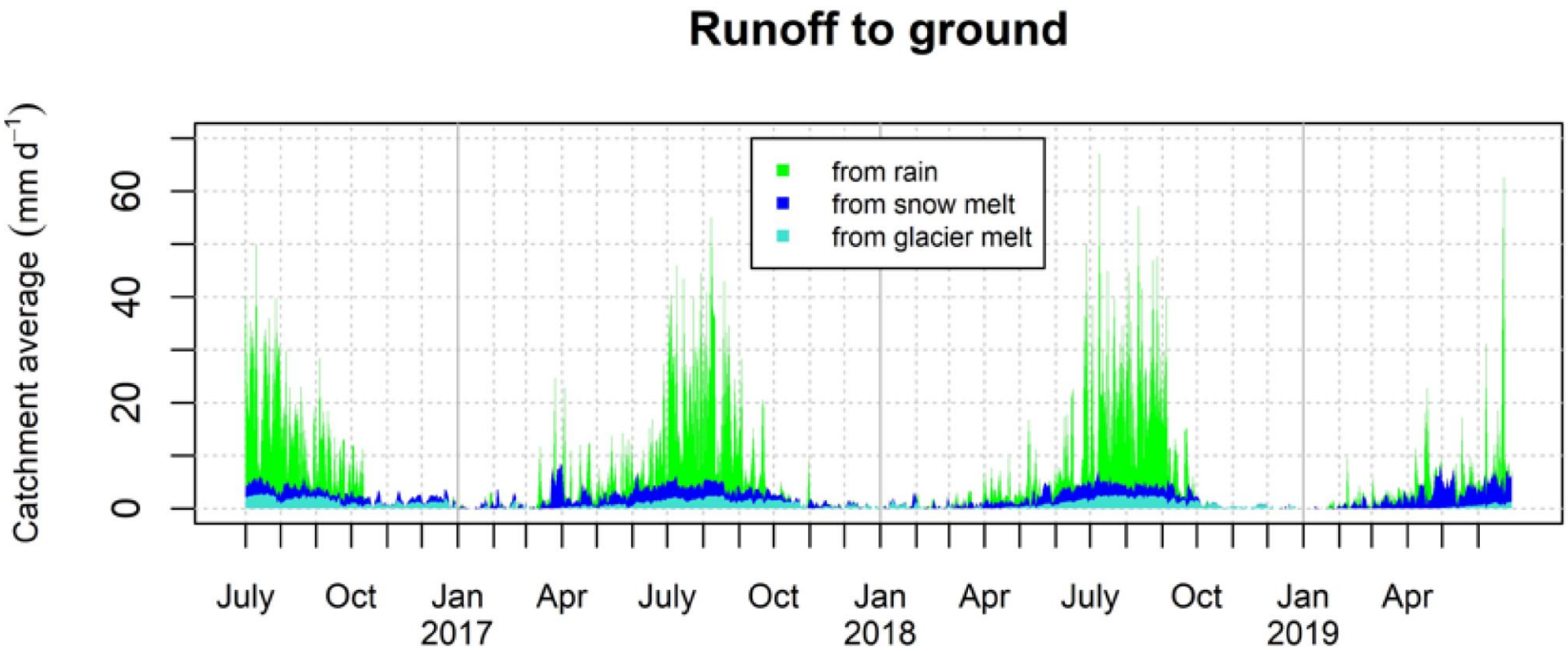
Better scientific understanding and improved public policy

The Hindu Kush Himalaya region

Miriam Jackson, Programme Coordinator, Cryosphere Initiative, River Basins and Cryosphere


Yala Glacier
Rikha Samba Glacier
Annual
Winter
Summer
Glacier-wide mass balance (m w.e.)
1.0
0.5
0.0
-0.5
-1.0
-1.5
2012
2013
2014
2015
2016
2017
Year


31 lakes
Large lake and expanding from ice calving; close to glacier; loose moraine end; no overflow; steep outlet slope; avalanches and landslides in the surroundings areas
12 lakes
Confined lake outlet; close to compact and old end-moraine; hanging lake; distinct seepage at the bottom of end-moraine dam; gentle outward slope of moraine
4 lakes
Confined lake outlet; gentle outward slope of the dam; large lake but shallow depth; moraine more than 200 m wide; old and compact moraine
Rank I
Rank II
Rank III


Runoff to ground
Catchment average (mm d^{-1})
0
20
40
60
from rain
from snow melt
from glacier melt
July
Oct
Jan
2017
Apr
July
Oct
Jan
2018
Apr
July
Oct
Jan
2019
Apr

Reference:

Saloranta T, Thapa A, Kirkham JD, Koch I, Melvold K, Stigter E, Litt M and Møen K (2019) A Model Setup for Mapping Snow Conditions in High-Mountain Himalaya. *Front. Earth Sci.* 7:129. doi: 10.3389/feart.2019.00129

Stumm, D., Joshi, S. P., Gurung, T. R., and Silwal, G.: Mass balances of Yala and Rikha Samba glaciers, Nepal, from 2000 to 2017, *Earth Syst. Sci. Data*, 13, 3791–3818, https://doi.org/10.5194/essd-13-3791-2021, 2021.

Bajracharya, S.R., Maharjan, S.B., Shrestha, F.,Sherpa, T.C., Wagle, N., Shrestha, A.B. (2020). *Inventory of glacial lakes and identification of potentially dangerous glacial lakes in the Koshi, Gandaki, and Karnali River Basins of Nepal, the Tibet Autonomous Region of China, and India.* Research Report. ICIMOD and UNDP