

To,

The Central Public Information Officer

Ministry of Environment, Forests and Climate Change

Indira Paryavaran Bhawan, Jorebagh Road

New Delhi 110003

Subject: Request for obtaining information under Section 6(1) of the Right to Information Act, 2005.

I, Mukut Biswas, son of Amalendu Biswas, resident of 5 A.P.C Avenue Dumdum East Sinthee Kolkata-700030, Contact Number: 9874019450, being the Managing Trustee of Prameya Foundation-an organization aiming to foster environmental sustainability through community empowerment, wish to seek information as under:

1. Total number of Glaciers in the Indian Himalayas and Karakoram mountains and the current rate at which they are retreating.
2. Total number of potentially dangerous Glacial lakes formed in the recent years due to such retreat and their current status.
3. Policies taken for the prevention of Glacial Lake Outburst Floods and who will be liable for any Glacial Lake Outburst Flood in the future?
4. Whether there is any particular legislation regarding the protection of the Himalayan Glacier from anthropogenic activities/climate change or not? If the answer is affirmative then kindly provide the details of such legislation.

I state that the information sought does not fall within restrictions contained in section 6 of the Right to Information Act, 2005 and to the best of my knowledge it pertains to your office.

A fee of Rs. 10/- in the form of IPO is being affixed herein. I further declare that I am willing to pay the requisite cost for obtaining copies of the documents sought.

Dated 30.6.18

Hubert Priewas

Signature of the Applicant.

Place: Kolkata

F.No. 30/02/2016-CS-I
Government of India
Ministry of Environment, Forest & Climate Change
(Mountain Division, CS-I)

Indira Paryavaran Bhawan,
2nd Floor, Vayu Wing,
Jorbagh Aliganj,
New Delhi-110003.

Dated: 11th October, 2018

To,

✓ Sh. Mukut Biswas
5. APC Avenue
East Sinithee Dumdum
Kolkata-700030

**Sub: First Appeal under Section 19 (1) of RTI Act, 2005 regarding
Glaciers in Indian Himalayas**

Dear Sir,

This has reference to your RTI Appeal Registration No. MoENF/A/2018/00092 received by the First Appellate Authority on 10.09.2018 against the reply furnished by the CPIO in response to your RTI application dated 04.07.2018 (RTI Application Registration No. R/2018/589).

2. As directed by Appellate Authority, the undersigned is forwarding your RTI Application to other concerned organizations/agencies with the request to provide you information directly.

Yours sincerely

S. Bose

(Subrata Bose)

Scientist-F and CPIO

Telefax: 24695422

Email: subrata.bose@nic.in

Encl: As above.

Copy to:

1. Sh. Pankaj Kumar, Asstt. Advisor, (P&P and Guidelines) NDMA Bhawan, A-1, Safdarjung Enclave, New Delhi - 110029.
2. Dr. Dinesh Gupta, Director General, Geological Survey of India, Ministry of Mines, Shastri Bhawan, New Delhi.
3. Prof. Ashutosh Sharma, Secretary, Department of Science and Technology, Technology Bhawan New Mehrauli Road, New Delhi-110016.
4. Director, Wadia Institute of Himalayan Geology, 33 GMS Road, Dehradun - 248001, Uttarakhand
5. Director, Snow & Avalanche Study Estt (SASE), Defence Research Development Organisation (DRDO), Him Parisar, Near Bhaskar Chowk, Sector 37A, Chandigarh-160036.

Dr. Pankaj Kumar
Checked by

F.No. 30/02/2016-CS-I
Government of India
Ministry of Environment, Forest & Climate Change
(Mountain Division, CS-I)

Indira Paryavaran Bhawan
3rd Floor, Jal Wing
Jorbagh Aliganj
New Delhi-110003

Dated: 11th October, 2018

To,

Shri Mukut Biswas
5. APC Avenue
East Sinthee Dumdum
Kolkata-700030

**Sub: First Appeal under Section 19 (1) of RTI Act, 2005 regarding
Glaciers in Indian Himalayas**

Dear Shri Mukut Biswas,

This has reference to your RTI Appeal Registration No. MoENF/A/2018/00092 received on 10.09.2018 w.r.t. the reply furnished by the CPIO in response to your RTI application dated 04.07.2018.

2. I have gone through your appeal and the pertinent records in the file. The CPIO of this Ministry has already responded to your RTI application on 06.07.2018 i.e. well within the stipulated time.

3. Please note that this Ministry is not directly dealing with glacier related subject matters. Department of Science & Technology (DST), Ministry of Earth Sciences (MoES), Ministry of Mines (Geological Survey of India: Glaciology division) are the other Ministries/ Departments responsible for various facets of glacier science. I am directing CPIO to forward your RTI application to the above Ministries/ Departments working on glaciers with the request to provide you the relevant information. In order to support you in your research work, I am also herewith sharing the following documents with you, free of cost.

- i. Technical report on Snow and Glacier Studies
- ii. Photo copies of replies of MoEF&CC to some Lok Sabha questions on shrinking of lakes/glaciers & melting of himalayan glaciers

4. In view of the above, I conclude from the facts presented before me and as stated in your appeal that the same is not tenable and is disposed off hereby. We appreciate your interest in the activities of this Ministry

Yours sincerely,

Jaiwardhan R. Bhatt

Dr. J R Bhatt

Advisor and First Appellate Authority

Telefax: 24695293

Email: jrbhatt@nic.in

Copy to:

1. CPIO, Dr. Subrata Bose, MoEF&CC
2. Section Officer, RTI Cell, MoEF&CC

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

LOK SABHA
STARRED QUESTION NO. 22
TO BE ANSWERED ON 18.07.2017

Shrinking of Lakes/Glaciers

*22. SHRI JAGDAMBIKA PAL:

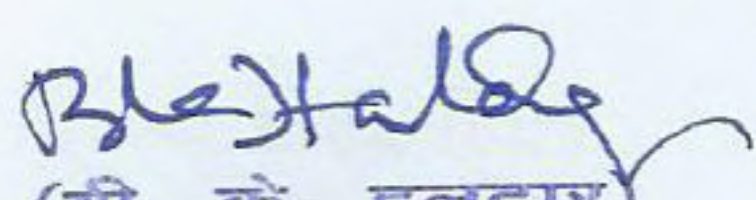
Will the Minister of ENVIRONMENT, FOREST AND CLIMATE CHANGE be pleased to state:

- (a) whether the lakes, waterfalls and glaciers particularly in the Himalayan region are shrinking/receding/melting rapidly due to climate change and global warming;
- (b) if so, the details thereof;
- (c) whether the destruction/tragedy caused in Kedarnath also occurred/happened due to the melting of glaciers; and
- (d) if so, the details thereof and the precautionary measures taken by the Government in this regard?

ANSWER

MINISTER FOR ENVIRONMENT, FOREST AND CLIMATE CHANGE
(DR. HARSH VARDHAN)

(a) to (d): A statement is laid on the Table of the House.


(बी. के. हलदार)
(B. K. HALDAR)
अनुभाग अधिकारी / Section Officer
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
M/o Environment, Forest and Climate Change
भारत सरकार, नई दिल्ली
Govt. of India, New Delhi

**Statement referred to in reply to Part (a) to (d) of Lok Sabha Starred Question No. 22
by SHRI JAGDAMBIKA PAL regarding 'Shrinking of Lakes/Glaciers'**

(a) and (b) As per information received from Department of Science and Technology, the processes of glacial recession are rather irregular in rate and in amount and time of occurrence. However, evidence for global warming being the causative factor for retreat of glaciers is inconclusive. According to information supplied by Department of Space, monitoring of glacier moraine-dammed lakes and glaciers has been carried out at Space Application Centre, Ahmedabad. The data of monitoring of glacial moraine-dammed lakes shows that surface area of these lakes has increased during period of monitoring. The data of monitoring of glaciers in Himalaya shows that pace of glacier retreat has slowed down after the year 2000. However, monitoring of waterfalls or lakes other than moraine-dammed type has not been carried out.

The glacial lakes and water bodies greater than 50 hectares in size in Himalayan region were monitored on monthly basis by National Remote Sensing Centre, Hyderabad during June to October of 2011 to 2016 years. This 6-year period is not sufficient to study the influence of climate change effects in shrinking of lakes in Himalayan region.

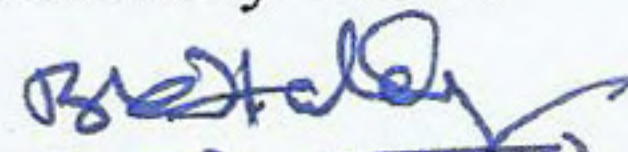
Changes in glaciers during 1962 - 2001 time frame are based on monitoring long term changes (~ 40 years) in 2630 glaciers. Glacier extents in 1962 were taken from Survey of India (SOI) topographical maps on 1:50,000 scales as reference and that of 2001 timeframe were taken from satellite data. This study showed a total loss of 13.4 % in area of 2630 glaciers of the Indian Himalaya.

During 2000/01/02 and 2010/2011-time frame, changes in 2018 glaciers were observed using Indian Remote Sensing Satellite data. The study has shown that 87% glaciers are stable (no change), 12% glaciers retreated and 1% glaciers have advanced. This gives a net loss of 20.94 sq. km in the total area of 10,250.68 sq. km for all the monitored glaciers mapped in the year 2000/01. Net change in glaciated area varies from one region to another.

The common glaciers in the above two studies are 1460.

(c) The combined effect of very heavy rainfall, heavy snowmelt and breaching of the Chaurabari lake in the upstream which could have resulted in a gushing outflow with large amount of debris caused destruction. The very heavy rainfall in the entire catchment further increased the magnitude of floods downstream.

(d) Government is implementing the National Action Plan on Climate Change (NAPCC) with a view to enhance the ecological sustainability of India's development path and address climate change in all regions of the country. NAPCC comprises, inter alia, of eight National Missions including National Mission for Sustaining the Himalayan Eco-system (NMSHE) which aims to strengthen the system for observing and monitoring the Himalayan glaciers. Major initiatives taken under NMSHE include creation of four Thematic Task Forces on Himalayan Agriculture, Traditional Knowledge systems, Forest Resources and Plant Diversity, and Fauna and Wildlife Habitats. It also includes networking of related institutions for focused research in different themes of Himalayan ecosystem. Programmes have been initiated for training in the field of glaciology, awareness programmes for community based

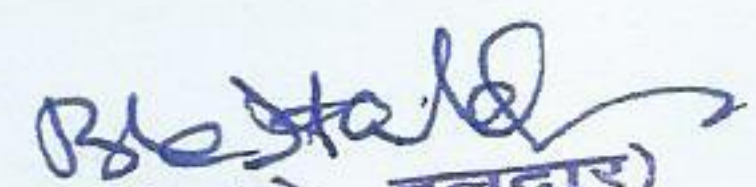

(बी. के. हलदार)
(B. K. HALDAR)

अनुसंधान अधिकारी, अंतरिक्ष अनुसंधान संगठन
प्रमुख, अंतरिक्ष अनुसंधान संगठन
अंतरिक्ष अनुसंधान संगठन
अंतरिक्ष अनुसंधान संगठन

organizations and officials related to the Indian Himalayan Region. Also, State Climate Change Centres have been set up in the seven Himalayan states, namely, Jammu and Kashmir, Himachal Pradesh, Manipur, Mizoram, Tripura, Sikkim and Meghalaya.

Further, under the National Plan for Conservation of Aquatic Ecosystems (NPCA) scheme, assistance is provided for conserving lakes and wetlands, on cost sharing basis between the central and the state governments. The various activities covered under the scheme include interception, diversion and treatment of waste water, shoreline protection, lakefront development, de-silting, bioremediation, catchment area treatment, lake beautification, survey and demarcation, bio-fencing, fisheries development, weed control, biodiversity conservation, education and awareness, community participation, etc.

During the last three years from 2014-15 to 2016-17, an amount of Rs 20.24 crore under National Wetland Conservation Plan/NPCA and Rs 115.88 crore under National Lake Conservation Plan has been released to concerned state governments for conservation of wetlands and lakes respectively. During current financial year, an amount of Rs 60 crore has been allocated for NPCA schemes.


(बी. के. हलदार)
(B. K. HALDAR)
अनुभाग अधिकारी/Section Officer
पर्यावरण, वन एवं जलवायु परिवर्तन विभाग
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भारत सरकार, नई दिल्ली
Govt. of India, New Delhi

GOVERNMENT OF INDIA
MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE

LOK SABHA
UNSTARRED QUESTION NO. 6546
TO BE ANSWERED ON 06.04.2018

Melting of Himalayan Glaciers

6546. DR. BHARATIBEN D. SHYAL:
SHRI KIRTI AZAD

Will the Minister of ENVIRONMENT, FOREST AND CLIMATE CHANGE be pleased to state:

- (a) whether Himalayan glaciers are melting rapidly;
- (b) if so, the details thereof;
- (c) whether the Kedarnath disaster happened due to melting of glaciers and if so, the details thereof;
- (d) whether the Government has conducted any study in this regard; and
- (e) if so, the details and the outcome thereof and the steps taken by the Government in this regard?

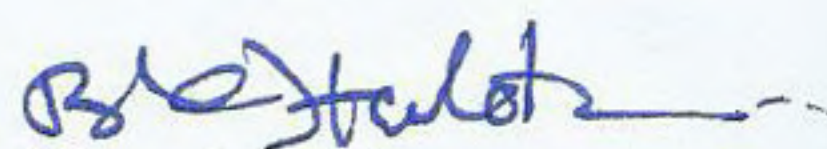
ANSWER

**MINISTER OF STATE IN THE MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE
(DR. MAHESH SHARMA)**

(a) and (b) Indian Space Research Organization (ISRO) has monitored the glacier advance and retreat of 2018 glaciers, across the Indian Himalayan region using satellite data of 2000-01 to 2010-11. The study shows that 87% of glaciers showed no change, 12% glaciers retreated, and 1% glaciers have advanced.

(c) Kedarnath disaster in June 2013 cannot be directly attributed to the melting of glaciers. The combined effect of very heavy rainfall on two consecutive days and subsequent bursting of the 'Chorabari' lake which was located between the valley wall and lateral moraine of the glacier may have contributed to the disaster.

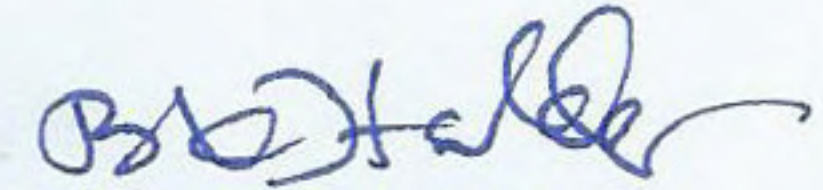
(d) and (e) A team from Geological Survey of India (GSI) visited Kedarnath area during September 2013 for geotechnical and glaciological evaluation. They also undertook Ground Penetrating Radar (GPR) survey for the assessment of bedrock/ overburden profile in October 2013. The survey indicated undulatory topography below the man-made platform of the temple. Further, a number of institutions such as Department of Space, Wadia Institute of Himalayan Geology (WIHG), University of Kashmir, University of Jammu, Sikkim University, Jawaharlal Nehru University and many other institutes are engaged in monitoring and conducting research in the area of glaciology. The Government has also setup a Center for Glaciology at WIHG, funded by the Department of Science and Technology, to carry out detailed investigations of glacier masses in the Himalayan Region.


(बी. के. हलदार)
(B. K. HALDAR)

अनुभाग अधिकारी/Section Officer
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
Ministry of Environment, Forest and Climate Change
भारत सरकार, नई दिल्ली
Govt. of India, New Delhi

Further, the government is implementing the National Action Plan on Climate Change (NAPCC) with a view to enhance the ecological sustainability of India's development path and address climate change in all regions of the country. NAPCC comprises, inter alia, of eight National Missions including National Mission for Sustaining the Himalayan Eco-system (NMSHE).

NMSHE is aimed at evolving management measures for sustaining and safeguarding the Himalayan glaciers and mountain ecosystem. The mission includes enhanced monitoring of Himalayan ecosystem through establishment of monitoring network, promoting community-based management, human resource development and strengthening regional cooperation. Government has prepared guidelines entitled "Governance for Sustaining Himalayan Ecosystem", (G-SHE), which have been shared with all state governments in the Himalayan region. All Himalayan states have also prepared their respective State Action Plans to address the state specific issues.



(बी. के. हलदार)
(B. K. HALDAR)

अनुभाग अधिकारी/Section Officer
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय
M/o Environment, Forest and Climate Change
भारत सरकार, नई दिल्ली
Govt. of India, New Delhi



WADIA INSTITUTE OF HIMALAYAN GEOLOGY

(An Autonomous Institution under Department of Science & Technology, Govt. of India)

33, GENERAL MAHADEO SINGH ROAD

DEHRA DUN – 248001

Speed post

Confidential

Dated: 28.11.2018

No.: 06/2018 /646

To,

Mr. Mukut Biswas
5 A.P.C. Avenue
Dumdum, East Sinthee, Kolkatta-700030.

Sub.: Information sought under the Right to Information Act, 2005.

Sir,

Kindly refer your application dated 30.06.2018 addressed to Ministry of Environment and Forest, New Delhi and received at this end on 30.10.18. The information are being supplied as under:-

1. Wadia Institute of Himalayan geology (WIHG) has not been prepared glacier inventory of Indian Himalaya-Karakoram region. However, according to glacier inventory by the Geological Survey of India (GSI) Indian part of Himalaya and Karakoram region comprises 9,575 glaciers. These glaciers are retreating at varied rate. The study carried out by several worker during the last few decades by using satellite data as well as ground measureents suggest that most of glaciers are retreating with variable rates in different part of the Himalaya. Study carried out by wadia institute for Gangotri, Dokriani and Chorabari glaciers in Uttrakhand Himalaya during the last few decades show that the Gangotri Glacier receded ~1042 m (~20m/year) from 1965 to 2017, Dokrian glacier retreating rate is fluctuate between 16m and 18m/yr (1991-2015), whereas the Chorabari has 9-11m/yr (2003-2017). A study of Bahuguna et al. (2014, Current Science, V.106,(7),1008-1013) have been carried out for 2018 glaciers from Karakoram, Himachal, Zaskar, Uttarakhand, and Sikkim regions using high resolution satellite data of year 2000 /01/02 and 2010/11. The study suggest that among 2018 glaciers, 1752 (86.8%) have been observed to be stable (no change in the snout position), 248 glaciers (12.3%) have exhibited retreat and 18 of them (0.9%) have experienced advancement.

2. Wadia Institute has prepared glacier lake inventory of Uttarakhand and Himachal Pradesh. In total, 1266 glacier lakes (size >500 m²) identified in Uttarakhand from high-resolution satellite images (2011-2013), covering an area of 7.6 km². Out of the 1266 glacier lakes, 329 have been classified as moraine-dammed lakes (i.e., end moraine, lateral moraine, recessional moraine and other moraine lakes) which cover 3.9 km² area. A total of 958 glacier lakes (size >500 m²) of Himachal Pradesh (covering an area of 9.6 km²) have been mapped using high-resolution satellite images. Out of these, 345 have been classified as moraine-dammed lakes having a total area of 5.1 km². However, the information about formation of potentially dangerous glacier lakes is not available.

3. This information is not available.

4. This information is not available.

If not satisfied with the information provided, an appeal may be made to the Director & First Appellate Authority of this Institute within a period of thirty days of the receipt of this letter.

Yours faithfully,


Dr. (P.S. Negi)

Scientist 'E' & C.P.I.O

W.I.H.G.



भारत सरकार/Govt. of India
भारतीय भूवैज्ञानिक सर्वेक्षण/Geological Survey of India
केन्द्रीय मुख्यालय/Central Headquarters
27, जे एल एन मार्ग/27, J. L. Nehru Road
कोलकाता-16/Kolkata-16



To
✓ Sh. Mukut Biswas
5, APC Avenue
East Sinthee Dumdum
Kolkata-700030

3520/SP-3 Ref:/255/P&M-4/RTI/2018

Date: 26/11/2018

Ref: letter of CPIO, MoEF&CC to you with a copy to DG, GSI, F. No. 30/02/2016-CS-I; dated: 11/10/2018.

Sub: Information on Glaciers in Indian Himalaya in connection with the RTI application of Shri Mukut Biswas dated 11.10.2018, received on 14.11.2018

Sir,

The para wise reply of the queries on the above subject matter is furnished below for your perusal and reference.

Q. No.-1: Total number of glaciers in Indian Himalayas and Karakoram mountains and the current rate at which they are retreating.

Reply-1: As per 'Inventory of the Himalayan Glaciers' Special Publication No. 34, GSI, 2009 there are **9575 glaciers** in the Indian part of Himalayas distributed at its entire stretch from Kashmir in West to Arunachal Pradesh in East. The Karakoram Mountain Range covers the part of India, Pakistan, China, Afghanistan and Tajikistan, hence compilation of data on glaciers is restricted to Indian Territory only.

A total of 59 numbers of glaciers have been studied for their retreat. Details of retreat of studied glaciers is appended as **Annexure-I**.

Q. No. 2: Total number of potentially dangerous Glacier lakes formed in the recent years due to such retreat and their current status.

Reply-2: In Uttarakhand Himalaya 49 lakes have been identified as GLOF potential lakes.

Another item on "compilation of an inventory of glacial lakes of north western Himalaya and identification of potentially vulnerable areas for high GLOF-risk has been also taken up since April 2016 and work is under process.

GSI is not carrying out real time monitoring of the glacial lakes to know the current status.

Q. No. 3: Policies taken for the prevention of Glacial Lake Outburst floods and who will be liable for any Glacial Lake Outburst Flood in the future.

Reply-3: There is no specific policies taken by GSI for the prevention of Glacial Lake Outburst floods as such. However, GSI State Unit Sikkim and Government of Sikkim had jointly carried out multi-institutional expedition to study the Glacial Lake Outburst Floods in July-August 2018. The report has been submitted to the Secretary, LR & SSDMA, Government of Sikkim. GSI may carry out such kind of studies in future as and when requested by the stakeholders.

Glacial Lake Outburst floods is an unpredictable natural phenomenon like earthquake/tsunami/landslide etc. In case of any Glacial Lake Outburst Flood occurs in future, the liability rests equally with the People and State Administration for taking up quick post disaster rehabilitation measures.

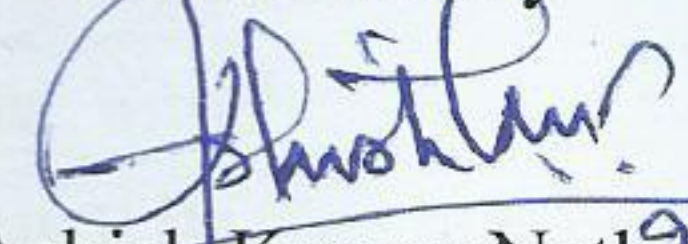
Q.No.4: Whether there is any particular legislation regarding the protection of the Himalayan Glacier from anthropogenic activities/climate change or not? If the answer is affirmative, then kindly provide the details of such legislation.

Reply-4: The issue does not come under the purview of GSI.

This issues with the approval of the competent authority.

Encl.: as above.

Yours sincerely


Ashish Kumar Nath
Director, PSS, P&M-4

Ref:255/P&M-4/RTI/2018

Date: 26/11/2018

Copy to- Sh. Subrata Bose, Scientist-F & CPIO, Ministry of Environment and Forest and Climate Change
(Mountain divn.), Indira Paryavaran Bhawan, 2nd Floor, Vayu Wing, Jorbagh, Aliganj, New Delhi.


Ashish Kumar Nath
Director, PSS, P&M-4

Details of Retreat of monitored glaciers

Name of glacier	Basin	Identification No.	Period	Average annual retreat (m/year)
Durung Drung	Indus	IN5Q13205 582	1971-2013	13.1
Hagshu	Indus	IN5Q13205 559	1975-2015	11.4
Pensilungpa	Indus	IN5Q13202 263	1962-2015	7.4
Shafat	Indus	IN5Q13202 080	1975-2015	22.0
Parkhachik	Indus	IN5Q13202 094	1962-2015	3.2
ChhotaShigri	Chenab	IN5Q21212 159	1962-1995	6.8
Bara Shigri	Chenab	IN5Q21212 152	1962-2015	32.4
Hamtah	Chenab	IN5Q21212 180	2000-2010	12.5
Triloknath	Chenab	IN5Q21209 019	1968-1996	17.9
YocheLungpa	Chenab	IN5Q21211 179	1963-2006	19.5
Mulkila	Chenab	IN5Q21211 170	1963-2006	14.8
Panchinala – I	Chenab	IN5Q21211 146	1963-2007	10.6
Panchinala – II	Chenab	IN5Q21211 148	1963-2007	11.9
Tingal Goh	Chenab	IN5Q21211 188	1963-2008	16.0
Miyar	Chenab	IN5Q21210 045	1961-1996	16.4
Sonapani	Chenab	IN5Q21212 028	1906-2014	17.6
Gangstang	Chenab	IN5Q21211 007	1963-2008	29.7
Gepang Gath	Chenab	IN 5Q21212 014	2003-2012	45.0
SamundarTapu	Chenab	IN5Q21212 074	1962-2013	24.8
Batal	Chenab	IN5Q21212 054	1962-2014	7.2
Man Talai (Gl. No. 115)	Beas	IN5Q22109 115	1989-2004	23.3
Beas Kund	Beas	IN5Q22108 015	1963-2003	18.8
Gl. No. 30	Beas	IN5Q22108 030	1963-2003	13.8
Jobri	Beas	IN5Q22108 036	1963-2003	2.5
Sara Umga	Beas	IN5Q22109 025	1963-2004	41.5
Tal	Ravi	IN5Q21106 047	1963-2005	39.9
Manimahesh	Ravi	IN5Q21106 059	1968-2005	29.1
Gara-I	Satluj	IN5Q22214 050	1979-2010	25.6
ShauneGarang	Satluj	IN5Q22213 084	1963-1984	31.1
BilareBange	Satluj	IN 5Q22213 082	1963-2011	65.2
NaraduGarang	Satluj	IN 5Q22213 078	1963-2011	34.1
Pin	Satluj	IN5Q22219 095	1965-2014	12.7
Nisti	Satluj	IN5Q22219 089	1965-2014	14.5
Parang	Satluj	IN5Q22219 485	1962-2013	11.0
Padma	Satluj	IN5Q22219 478	1962-2013	7.0

Name of glacier	Basin	Identification No.	Period	Average annual retreat (m/year)
NagpoTokpo	Satluj	IN 5Q22219 259	1962-1998	6.4
Bandarpunch	Yamuna	IN 5O12301 045	1960-1999	25.5
JhajjuBamak	Yamuna	IN 5O12301 029	1960-1999	27.6
JaundarBamak	Yamuna	IN 5O12301 033	1960-1999	37.3
Tilku	Yamuna	IN 5O12301 025	1960-1999	21.9
Bhrigupanth	Bhagirathi	IN 5O13106 041	1962-1995	16.7
Gangotri	Bhagirathi	IN 5O13106 029	1935-1996	18.8
Glacier No. 3	Alaknanda	IN 5O13206 069	1932-1956	8.3
Chorabari	Alaknanda	IN5O13202 003	1992-1997	11.0
Bhagirathi Kharak	Alaknanda	IN 5O13206 028	1962-2001	14.7
Dunagiri	Alaknanda	IN 5O13209 044	1992-1997	3.0
Pindari	Alaknanda	IN 5O13203 048	1958-2001	9.4
Milam	Ghaghra	IN 5O10303 034	1906-2011	20.6
Burphu	Ghaghra	IN 5O10303 063	1963-2011	69.7
Jhulang	Ghaghra	IN 5O10304 024	1962-2012	9.4
Nikarchu	Ghaghra	IN 5O10305 024	1962-2002	9.1
Poting	Ghaghra	IN 5O10303 008	1963-2011	29.0
Adikailash	Ghaghra	IN 5O10305 028	1962-2002	13.1
Sankalpa	Ghaghra	IN 5O10303 074	1881-1957	6.8
Meola	Ghaghra	IN 5O10304 010	1912-2012	18.6
Chipa	Ghaghra	IN 5O10304 007	1961-2012	24.9
Zemu	Tista	IN5O20105 032	1907-2012	9.0
Changme Khangpu	Tista	IN5O20104 022	1983-2012	13.4
East Rathong	Tista	IN 5O20101006	1966-2015	20.0

राष्ट्रीय अंटार्कटिक एवं समुद्री अनुसंधान केन्द्र

पृथ्वी प्रणाली विज्ञान संगठन
पृथ्वी विज्ञान मंत्रालय
(भारत सरकार)

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गोवा - ४०३ ८०४, भारत



NATIONAL CENTRE FOR ANTARCTIC & OCEAN RESEARCH

Earth System Science Organisation
Ministry of Earth Sciences
(Government of India)
Headland Sada, Vasco-da-Gama
Goa - 403 804, INDIA

No: NCAOR/I/RTI(1)/18

Date: 11.07.2018

To
Sh. Mukut Biswas
5 APL Avenue East
Sinthee Dumdum
Kolkatta-700030

Sub:- Information under RTI Act-2005

Sir,

With reference to your RTI application No. NCAOR/R/2018/80004 dated 09.07.2018 information as requested is provided below:

1	Total number of Glaciers in the Indian Himalayas and Karakoram mountains and the current rate at which they are retreating	GSI: Total number of glaciers in Indian Himalaya - 9,575 (Sangewar C.V. and Shukla S.P., 2009)
2	Total number of potentially dangerous Glacial lakes formed in the recent years due to such melting and their current status.	SAC: This inventory has shown presence of a total number of 32,392 glaciers (https://link.springer.com/chapter/10.1007/978-3-319-57765-4_8 : The 2400 km long Himalayan mountain chain and the glaciers therein, contribute to most of the perennial rivers that constitute the life line for northern plains of India and adjoining areas because of their potential for irrigation, hydropower generation and being critical indicators of climate change. A large number of these glaciers, especially those in the Indus, the Ganga and the Brahmaputra basins, have been monitored for more than last two decades, using different satellite data. Space Application Centre of ISRO has prepared an updated inventory of Himalayan glaciers on 1:50,000 scale using Resourcesat-1 satellite data (2004-07), which serves an important document for monitoring the health of these glaciers. This inventory has shown presence of a total number of 32,392 glaciers, of different sizes, in the three above mentioned basins. The monitoring of snout of these glaciers in the two periods of 1989-90 to 2001-04 and 2001-02 to 2010-11 has presented a contrasting data. During the period of 1989-90 to 2001-2004, 76% of the glaciers have shown retreat, 7% have advanced and 17% have shown no change. As compared to this during the next decade i.e. 2001-02 to 2010-11, only 12.3% glaciers have shown retreat, 86.6% of glaciers have shown stable front and 0.9% have shown advancement. Though the space borne satellite data has been used for covering large tracks of inaccessible terrain of Himalaya for snout monitoring, there is need to include and develop models to estimate the thickness of glaciers using this space data. The data from space borne Lidar