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***DATA BOOK III***

***Photographs***

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**THE STUDY ON FLOOD AND DEBRIS FLOW  
IN THE CASPIAN COASTAL AREA  
FOCUSING ON THE FLOOD-HIT REGION  
IN GOLESTAN PROVINCE**

**FINAL REPORT  
VOLUME IV  
DATA BOOK III  
PHOTOGRAPHS**

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## **CHAPTER 1 SITE CONDITIONS**

### Golestan Dam



Golestan Dam and Reservoir



Water Level Gauge

### Golestan II Dam



Golestan II Dam (under construction, December 2004)



Upstream of Golestan II Dam



Downstream of Golestan II Dam

### Madarsoo Floodplain



Downstream View of Lower Madarsoo from Left Bank (downstream of Kalaleh Bridge)



Upstream View of Lower Madarsoo from the same point above



Upstream View of Lower Madarsoo from Right Bank, Khojehlar village (downstream of Kalaleh Bridge)



Upstream View of Middle Madarsoo from Left Bank, Ghanjagh Shahrak vaillage (upstream of Kalaleh Bridge)



Opposite Bank of Lower Madarsoo from Left Bank and Lower Terrace (downstream of Kalaleh Bridge). Two-staged terraces can be clearly distinguished from this photo.



Beshoily village

Beshoily village was located in the center part of the Madarsoo Floodplain before the 2001 Flood. Village was completely destroyed by the flood, but all of the villagers could save their lives due to early evacuation. Now they relocated to the hillside as new Beshoily village.



Old Beshoily Village



New Beshoily Village



Golestan Forest National Park



Entrance of Golestan Forest



Visitors in the Summer Season



Visitors in the Summer Season



Waterfall



Camping Site of Waterfall



Car Parking (washed out by the 2005 Flood)



Camping Site of Waterfall





Wild Boar Family in the Winter Season



Fish came back to or grew up in the Madarsoo after the 2005 Flood.

### Cheshme Khan River Basin



Upstream part of the confluence with Madarsoo River. Agricultural land extends over the plain.

### Gelman Dareh River



Entrance to the Dasht basin along the Gelman Dareh. Agricultural land extends over the plain.





Trace of the 2001 Flood, Drift Weeds



New Excavated Canal after the 2001 Flood

Dasht Village



Agricultural Land in the Dasht Basin viewing from the Top of Polder Dike



Village in the Left Side and Agricultural Land in the East viewing from the Top of Hill



Upper Part of Dasht Basin along the Gelman Dareh (Sunflower Field)



Ghyz Ghaleh River and Polder Dike. The sediment runoff deposited along the dike and in some part of agricultural land.



Polder Dike and Dasht Village viewing from the Top of Hill



Upstream View of Dasht Bridge



Downstream View of Dasht Bridge



Ghyz Ghaleh River Basin



Middle Reaches of Ghyz Ghaleh. This area is most seriously devastated in the Madarsoo River basin.



A house for princes built on the top of the rock long ago is passed down by oral tradition, which is the origin of the name of Ghyz Ghaleh.



Troop of Serow on the Ridge

Dasht Shad Village



Upper Part of Ghyz Ghaleh River Basin. The topography becomes mild compared with the middle reaches.





Uppermost of the Ghyz Ghaleh: Dasht Shad Village viewing from the Mountain Ridge



Bird View of the Headwaters of the Ghyz Ghaleh from the uppermost Mountain Ridge

Bidac Village



Bidac Village located in the Dasht-e-Sheikh River Basin

## CHAPTER 2 HYDRO-METEOROLOGICAL STATION

### 2.1 Water Level Gauging Station

#### Tangrah in the Madarsoo River Basin



#### Dasht Bridge in the Madarsoo River Basin



Galikesh in the Oghan River Basin



Hojighousan in the Gorgan River Basin





## 2.2 Rainfall Gauging Station

Golestan Forest



Dasht-MET



Dasht-MOE



Dasht Shad



Farsian Farang



### CHAPTER 3 2001 FLOOD DISASTER

#### Loveh Village



Loveh Bridge was washed out, and serious bank erosion occurred along the downstream bend.

#### Beshoily Village



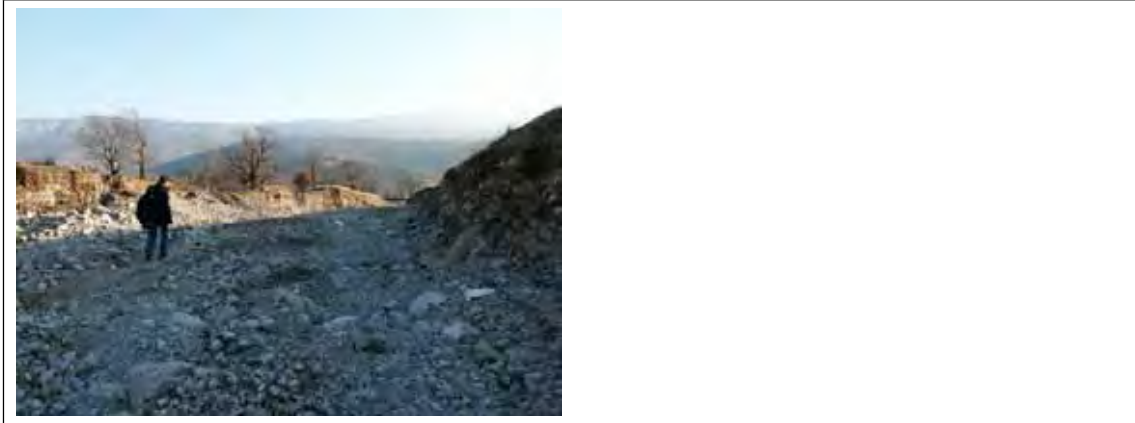
Houses made of soil and clay were washed out by the 2001 Flood.

#### New Beshoily Village

Near the new Beshoily village, debris flow occurred with channel scouring.







Beshoily - Terjenly

In between Beshoily and Terjenly villages, debris flow also occurred in a mountain stream.



Terjenly Village

Debris flow attacked Terjenly village, which occurred in the two mountain streams.







Upper Stretch of the Mountain Streams

Tangrah Village

Debris flow occurred along a mountain stream in Tangrah village. Numerous boulders deposited in a upper part of village.



Golestan Forest



Debris Deposits near Tangra Entrance



Debris Deposits near Tangra Entrance



Debris Scar at 3 m above the Ground



Destruction of Road connected to Mashhad



Serious Erosion along Riverbank and Fan End



Dasht Village

Wide valley-head erosion occurred just upstream of confluence with Cheshme Khan along the Madarsoo.



Ghyz Ghaleh River



Breached Earth Dam viewing from Lower Point



Breached Earth Dam viewing from Upper Point



Downstream Stretch of Breached Earth Dam





Stored and Eroded Sediment in the Basin of the Earth Dam



Stored Sediment in Upper Stretch of the Earth Dam



Longitudinal View of Stored Sediment in Upper Stretch of the Earth Dam



Broken Intake Structure



Breached Upper Sabo Dam



Sediment Accumulated in the Upper Basin of the Upper Sabo Dam viewing from the Dam Embankment



**Chapter 4 2005 Flood Disaster**

Kalaleh Bridge



Upstream of Kalaleh Bridge



Downstream Bend of Kalaleh Bridge



After the 2005 Flood, Washing out Spur Dike



Before the 2005 Flood, Placement of Riprap Spur Dike



14 Metry Bridge



Flooding upstream of 14 Metry Bridge



Overtopping the Gorgan-Mashhad Road



Overtopping the Gorgan-Mashhad Road



Floodwater through the 14 Metry Bridge



Damage on the road Embankment



Damage on the 14 Metry Bridge



Korang Kaftar Bridge



Both sides of approach were washed away.

Loveh Bridge



Before the 2005 Flood



Washed-away Approach



Bank Scouring



Washed-away Approach



Beshoily

Old Beshoily village was flooded due to constriction of river channel by a connection bridge.



Terjenly

The retaining wall was destroyed by local scouring along the concave bank of the Terjenly bend due to improper foundation of the wall.



Tangrah

Along the Tangrah bend, the wall was also destroyed under the similar mechanism to the Terjenly bend.





Above: Flood Trace of Drift Weeds on the Fence

Left: Flood Trace at Tangrah Station

### Golestan Forest

In the Golestan Forest, the 2005 Flood destroyed the infrastructures of temporary bridges, road and flood retaining walls, which were restored after the 2001 Flood.







Dasht Bridge and Valley-Head Erosion







Before the 2005 Flood



After the 2005 Flood. Erosion was progressed upwards in 30 to 50 m by the 2005 Flood.

## **CHAPTER 5 PARTICIPATORY ACTIVITIES IN VILLAGES**

### Training Workshop with Red Crescent on 25 September 2005



### Village Training in Dasht on 1 February 2005



Preliminary Stakeholder Meeting in Dasht on 7 September 2005



Disaster Map prepared by their Experiences



Emergency Equipment installed by the JICA Study Team



Preliminary Stakeholder Meeting in Terjenly on 8 September 2005



Stakeholder Meeting in Dasht on 30 January 2006



## CHAPTER 6 WORKSHOPS AND MEETINGS

### Inception Meeting in October/November 2004



Steering Committee Meeting on 31 October 2004, Tehran



Technical Committee Meeting on 2 November 2004, Gorgan



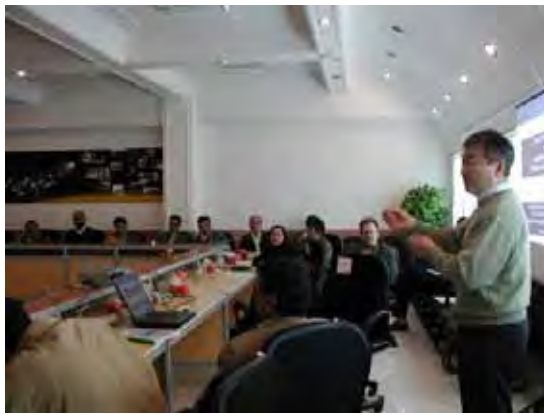
Minutes of Meeting was signed on 7 November 2004, Tehran.



Model Test on 12 February 2005, Gorgan



Progress Report Meeting in February 2005



Technical Committee Meeting on 16  
February 2005, Gorgan



Steering Committee Meeting on 22 February  
2005, Tehran





Sabo Training Workshop in May 2005, Karaj



Hydrology Workshop on 28 June 2005, Gorgan





Interim Report Meeting in September 2005



Study Tour to the Project Sites on 18 September 2005, Madarsoo River Basin



Technical Committee Meeting on 19  
September 2005, Gorgan



Steering Committee Meeting on 21 September 2005, Tehran



Minutes of Meeting was signed on 24 September 2005, Tehran.





Feasibility Study Meeting in March 2006



Technical Committee Meeting on 1 March 2006, Gorgan