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The Tragedy of Khait: A Natural Disaster in Tajikistan

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sustainable mountain development and to many initiatives in a variety of sectors that are already underway. The traditional good spirit within the Mountain Agenda is alive and has received further impetus from the scope of the forthcoming IYM.

- There was clear consensus on 6 overall thematic clusters within which activities in the framework of the IYM should preferably take place: sustainable livelihoods; culture; education and public awareness; biophysical environment; sustainable use; and governance, policy, and peace.
- A huge number of meetings have been announced from all over the world. There is no doubt that all these meetings will make a significant contribution to raising awareness about mountains. However, there is an urgent need to map out these events, put them in a coherent framework, identify overlaps, and facilitate synergies.
- During a very fruitful session on resource mobilization, important thoughts on issues related to funding were shared and discussed among the participants, indicating how progress can be made.
- It is being increasingly recognized that national committees or similar structures are very important in the implementation of the IYM. Presentations by Madagascar, Peru, Italy, and Kyrgyzstan on the structure of their committees and their agenda for the IYM were a highlight of the Geneva meeting. This session provided many ideas about how the establishment of national committees can be further promoted and facilitated.
- Links with the International Year of Ecotourism 2002 were established through the presence of a member of the World Tourism Organization, who also made a presentation.
- Last but not least, participants clearly agreed that FAO should continue to play a strong leading role in coordinating and facilitating preparations and observance of the IYM.

The meeting very clearly revealed that, despite the progress made so far, there is still a long way to go in making preparations for the IYM in terms of establishment of national committees, coordination and facilitation, exchange of information, preparation of concrete actions, etc. It has been proposed that task forces related to specific issues and thematic clusters be established. Many participants, on behalf of their institutions, expressed an interest in participating in activities resulting from this. There was overwhelming agreement that the IYM should not be considered merely a period of isolated events but rather as an important step in the long-term process of raising public awareness begun at the Earth Summit in Rio de Janeiro in 1992 (UNCED). This process will also ensure adequate political, institutional, and financial commitment for concrete action designed to implement sustainable mountain development. It should thus extend well beyond 2002. Let's get all our acts together to make the IYM a successful exercise with a long-term positive impact on mountain communities and their fragile environments!

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The Tragedy of Khait: A Natural Disaster in Tajikistan

A remote and hazardous mountain region

Eastern Tajikistan comprises the mountains of the Gissar-Alai, the Pamir Mountains ("Roof of the World"), and the high Pamir Plateau. The region has a long history and fascinating folklore and legends, first brought to the attention of the Western World by Marco Polo and his entrepreneurial uncles. During the 19th century, it was all but inaccessible to travelers from the outside world, save for the military, often secret, probes of Czarist Russia and Imperial British India, as the "Great Game" led to high adventure and intrigue. With the establishment of the Soviet Union and the incorporation of the Tajik SSR, access from the outside world improved, especially through scientific visits (Sven Hedin, Russian and German scholars). However, as eastern Tajikistan is far from Moscow, bounded by the heavily guarded frontiers of China and Afghanistan, and proximally, initially by British India and subsequently by Pakistan's Northern Areas, access was carefully controlled, particularly after 1940.

One major exception, however, was the international mountaineering fraternity. Foreign climbing parties were occasionally invited to join Soviet expeditions to attempt the highest summits, politically named Peak Communism, Peak Lenin, and Peak Revolution. In the post-World War II period, an even rarer exception was the invitation of an occa-

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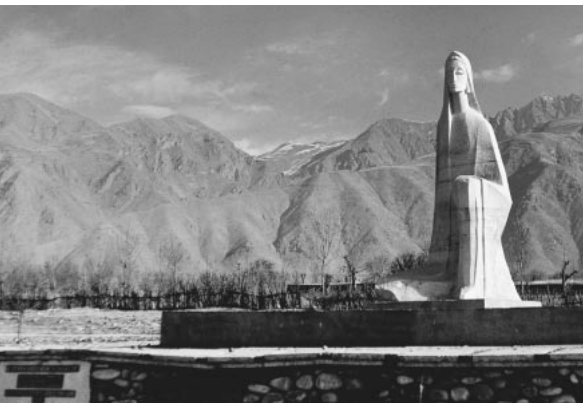

FIGURE 1 The monument to the victims of the Khait disaster of 1949. (Photo by A. Yablokov)

sional Western biologist to work with Soviet scientists. Nevertheless, systematic visits by US seismologists led to a remarkable Soviet/US collaboration. A network of seismic stations was established throughout the region, with the research center at Garm on the Surkhob River, a tributary of the Vakhsh River. The Pamir, after all, is one of the most active seismic regions in the world. Earthquake activity was one of the main elements of the tragedy related here.

For centuries, valleys of the Pamir Mountains had supported farming communities; trade caravans had passed through many of them along the Silk Road between Samarkand and China. Nevertheless, the Pamiri people must have had to contend with an array of mountain hazards, including earthquakes, rockfalls, landslides, floods, and avalanches. There is abundant geomorphic evidence of the former occurrence of large landslides, for instance, that blocked valleys and dammed up ephemeral lakes. Subsequently, some of these lakes must have drained catastrophically. One of the more recent of the landslide lakes is Lake Sarez. It originated following an earthquake that occurred during the winter of 1911 and today is more than 60 km in length and over 500 m deep (Alford et al 2000).

FIGURE 2 Aerial view of the lower Surkhob Valley in the Tajikistan Pamir. The valley floor, from the bottom left almost as far as the main river, is buried under the rock debris that resulted from a massive rockfall and landslide triggered by the major earthquake of 1949. The rock debris covers the former site of Khait, the regional administrative center. (Photo by J. D. Ives)

Nevertheless, the mountain people continued to thrive and preserve their way of life until the beginning of World War II, when the Soviet Union itself began a life-and-death struggle. The urgent demand for gun cotton, as well as cotton for clothing, prompted the Red Army to forcibly evacuate many of the Mountain Tajiks to labor in the cotton fields of Tajikistan's southwestern lowlands, where level land and irrigation water were abundant. This forced evacuation continued after the war, even into the 1970s when helicopters were used: the Tajik SSR served to clothe the Soviet Union for decades. Since *peristroika,* the break-up of the Soviet Union, and the creation of an independent Republic of Tajikistan, things have changed dramatically—not always for the best, but at least the flow of information has begun and accelerated. Nevertheless, 1999 marked the 50th anniversary of the tragedy of Khait, yet the details of what happened in 1949 have not been told until now.

A giant landslide destroys entire communities

At a point about midway between Garm and Jirgital, not far from the road, a high monument of white marble has been erected (Figure 1). The figure of a woman, representing the Motherland, has lowered her head, dropped her hands, and is frozen in eternal grief. Behind her marble frame, in the depth of the Yarhich River valley, lie the drab hills of Tajikistan's largest grave.

On the old maps, the valley of the Yarhich, a right-bank tributary of the Surkhob River, is depicted as a densely populated region. It contained the district center, Khait, situated further into the broad valley and near the mouth of the Obidara-Khauz brook. There were many villages along both slopes as far as the source of the Yarhich River: Badimlog, Turatal, Deplan, Karakol, Mazar, Aitalob, and many others. Each consisted of dozens of cottages. There were also villages along the many tributaries of the Yarhich. Gardens, fields, and meadows extended from the lower slopes almost to the summits of the mountains. The life cycles of generations of farmers had modified the mountain landscape into a productive and attractive habitation.

The beginning of July 1949 was a time of anxiety. Cloudbursts occurred throughout the mountains; the soil reached saturation point and became potentially unstable over wide areas. At the same time, a cycle of seismic activity began. Earthquakes shook the area, intensifying day by day. Between 7 and 9 July, they were especially intense, and scattered rockfalls and small landslides broke out across the region. In some places, entire mountainsides, complete with their vegetation cover, slid down onto the valley floors, and several villages were destroyed. The inhabitants lived in the open, anxious for what might follow. But no one could have imagined what happened next because it was so terrible. The trigger was one of the most powerful earthquakes of the century, with a force of 10.0. This caused a huge mass movement; a block of 250 million cubic meters literally fell off the top of Borgulchak Rock! This monstrous mass of earth and rock split into 2 parts as it fell, turning into a virtual river of stones. It swept down the Obidara-Khauz Valley, destroying everything in its path. At great speed, it soon reached Khait, at a distance of 12 km. The width of the slide was about 500 meters. It was accompanied by a great cloud of dust resembling a thunderstorm. An

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FIGURE 3 Aerial view of the point of initiation of the July 1949 landslide. This view clearly shows that a large part of the upper mountain slope was discharged, with debris tumbling down the valley for more than 12 km, destroying not only Khait but many small villages as well. (Photo by J. D. Ives)

air wave, such as would be generated by a powerful explosion, preceded the stone jumble and smashed fleeing people. All other sounds were drowned in the booming rumble of the unimaginable rock storm. In a matter of minutes, Khait had ceased to exist. A tangle of stone hills, 40–60 m in height, was all that remained. The rock stream had choked the riverbed of the Yarhich for hundreds of meters and, like a stone wave, had rolled up the opposite valley side.

This disaster struck in the space of a few minutes on 10 July 1949. The same earthquake had touched off countless landslides throughout the length of the Yarhich Valley. All the above-mentioned villages were destroyed almost instantly; many were crushed with all their inhabitants. Heaps of stones and wet earth remained in place of gardens, cottages, barns, and fences. As a symbol of the scale of the disaster, a tree was forced into the air on the crest of one of the earth mounds, its roots upward to the sky.

Altogether, 150 settlements in the region of Khait were affected by the earthquake. Police stations, banks, and administration buildings were buried beneath meters of stone. It was determined to attempt to dig out some of the buildings to prevent possible scavengers reaching documents, money, or weapons. Sappers dug deep holes under great difficulties. However, when the first bank safes were opened, it was found that the enormous pressures generated had pulverized bank notes into a solid mass of pulp, demonstrating that the blind power of nature is boundless. Photographs taken from a helicopter in September 1990 show the source area of the mass movement (Figure 3) and the lower section of the valley where the site of Khait is now covered with landslide debris (Figure 2).

Such an event turns thoughts to another time and place. The eruption of Vesuvius and the annihilation of the Roman cities of Pompeii and Herculaneum, for instance, almost 20 centuries ago are known throughout the world. Books, paintings, and movies have been dedicated to that great tragedy. Yet the terrible catastrophe that struck a small Tajik town was shrouded in secrecy. During the formidable rule of Joseph Stalin, information about accidents and natural catastrophes was suppressed unless special permission was granted. The decision was made in 1949 to conceal the tragedy of Khait. Thus, the actual number of victims has remained unpublished until now. Local survivors estimate that 28,000 people lost their lives. The accuracy of this estimate is not known. Certainly, the small country of Tajikistan lost a large number of its citizens on that fatal day. So should you ever pass by the monument, pause for a moment, contemplate the grandeur of the mountains, remember the people who lived in Khait and in the surrounding villages and farms more than half a century ago.

Postscript

Catastrophic events, such as the one that struck Khait, are rare in terms of human history but are by no means unknown. The destruction of Pompeii and Herculaneum has been mentioned already. In 1970, an ice avalanche from the summit of Huascaran (6768 m), Peru, itself triggered by an earthquake, generated a rockslide/landslide that moved on an air cushion at speeds of more than 400 km/h and devastated the town of Yungay 12 km distant, killing more than 18,000 people (Hofmann et al 1983). Detailed studies have been made of gigantic prehistoric events in the Austrian Tyrol (Koefels, 9000 years ago) and in Nepal (Langtang National Park, more than 25,000 years ago), where 3 km^3 and 10 km^3 of material, respectively, fell vertically through several thousand meters (Heuberger et al 1984). There are other examples. While they are infrequent and usually occur in high mountain areas that have low population densities, as singular events, they are among the most devastating in the world in terms of impact on the surrounding land.

Mountain regions are characterized by a variety of natural hazards, many augmented by human modification of the landscape. The smaller disasters, defined as those that occur frequently but that involve smaller impacts, can be managed or guarded against by wise land-use planning or construction of technical defenses. The large catastrophes, those with a very long recurrence interval and great impact magnitudes, such as the examples given here, are beyond human forecast or effective defense. Nevertheless, there is an urgent need to collect and archive all relevant data. Mapping of natural (mountain) hazard potential in areas of high relief should be undertaken whenever possible.

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