

NOREF Report

Water and energy dynamics in the Greater Himalayan region: opportunities for environmental peacebuilding

Michael Renner

Executive summary

The water crisis in the Greater Himalayas constitutes an enormous challenge for the region and a growing, if still under-reported, concern in the West. Elements of the crisis include floods and droughts, unpredictable changes in the timing of water flows, hydropower rivalries and persistently unsafe drinking water.

Population growth, urbanisation, and consumption and dietary changes are key drivers of the growing demand for irrigation, hydropower and industrial water use. But blame for scarcity and pollution problems often lies in extremely poor water and ecosystem management practices across the region. For domestic change to take place, greater transparency and public awareness are essential, yet difficult to achieve. Climate change will increasingly exacerbate these already observable problems and add new ones in the form of sea-level rise, changing monsoon patterns and the shrinking of glaciers. Pakistan's massive 2010 floods provided an unwelcome preview of a global warming-dominated future.

This report looks at a variety of approaches to this critical problem. Specific actions that can be taken vary across the region and include the following: land reform, a reconsideration of subsidy policies, better maintenance and repair of water infrastructure, investments in wastewater treatment, rainwater harvesting and general water conservation technologies, and crop diversification, substituting less water-intensive crops.

Transboundary dialogues need to reinforce commonalities of needs across the region. Opportunities for cooperation are found in environmental monitoring and data-sharing, water conservation, ecosystem stewardship, "peace parks", and disaster diplomacy. A key question is whether existing initiatives can be sustained,

scaled up and broadened. For instance, monitoring activities eventually need to transition toward international watershed management agreements.

The efforts discussed in this report can generate fresh perspectives, but a string of disparate, short-lived efforts are unlikely to build momentum. Furthermore, contrary to the responses championed by the region's powerful water bureaucracies, the solution lies not in grandiose engineering works such as dams or river diversion schemes.

Meaningful local capacity-building is essential and requires sustained commitment. While civil society initiatives are welcome, governments eventually need to be brought on board. Developing the necessary political will and reforming established mindsets are essential prerequisites and fundamental hurdles to surmount, and there is no blueprint for how to do this successfully. Ultimately, given the staying power of orthodox views and vested interests, it is incumbent upon us to continue to ask inconvenient questions and challenge established mindsets.

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Note: The text makes reference to a number of organisations marked with a triangular symbol [▶]. Brief profiles for these and other organisations can be found in a companion database file.

The Greater Himalayan region, sometimes also called the Hindu Kush-Himalaya region, includes Afghanistan, Pakistan, India, Nepal, Bhutan, Bangladesh, Myanmar and China (Tibetan Plateau). This region is the source of several major Asian river systems that provide water for more than a billion

people: the Amu Darya, Syr Darya, Tarim, Indus and its tributaries, Ganges, Brahmaputra (Yarlung Tsangpo in China), Irrawaddy, Salween, Mekong, Yangtze and Yellow. The principal focus in this report is on the South and Central Asian river basins among them.

Overview: selected major Himalayan rivers

| | Syr Darya | Amu Darya | Indus | Ganges | Brahmaputra |
|---|--|---|--|---------------------------------|---|
| Selected tributaries | Naryn, Kara Darya | Panj, Vakhsh, Kyzyl Suu | Beas, Chenab, Jhelum, Kabul, Kunar, Ravi, Sutlej | Ghaghara, Gandak, Kosi, Yamuna | Raidak, Amochu, Bhareli, Dibang, Lohit, Sankosh |
| Countries in basin (in upstream to downstream order) | Kyrgyzstan, Uzbekistan, Tajikistan, Kazakhstan | Afghanistan, Tajikistan, Turkmenistan, Uzbekistan | China, India, Pakistan | India, Nepal, China, Bangladesh | China, India, Bhutan, Bangladesh |
| Basin area (km²) | 782,617 | 534,739 | 1,081,718 | 1,016,124 | 651,335 |
| Glacial melt in river flow (%) | Significant | Significant | 44.8 | 9.1 | 12.3 |
| Cropland (%) | 22.2 | 22.4 | 30.0 | 72.4 | 29.4 |
| Irrigated land (%) | 5.4 | 7.5 | 24.1 | 22.7 | 3.7 |
| Loss of original forest cover (%) | 45.4 | 98.6 | 90.1 | 84.5 | 73.3 |
| Population (million) | 20 | 21 | 179 | 408 | 119 |
| Pop. density (people per km²) | 27 | 39 | 165 | 401 | 182 |
| Water supply per capita (m³/year) | 1,171 | 3,211 | 830 | 1,700-4,000 | 1,700-4,000 |

Data sources: World Resources Institute, *Watersheds of the World 2005*, http://earthtrends.wri.org/pdf_library/data_tables/wat3_2005.pdf, and individual watershed maps (http://earthtrends.wri.org/pdf_library/maps/watersheds/); Waterwiki, <http://waterwiki.net/index.php/Welcome>; USAID (US Agency for International Development), *Changing Glaciers and Hydrology in Asia: Addressing Vulnerabilities to Glacier Melt Impacts*, Washington, DC, November 2010.

Note: Not included are the South-east Asian rivers (Irrawaddy, Mekong and Salween), the Yangtze and Yellow (which are not transboundary), and the Tarim (which runs almost exclusively in China).

Water represents one of the most pressing challenges for the region. These manifest themselves in a variety of ways: rising scarcity, flood events, changes in the timing of water flows that will become more pronounced with climate change, and continued problems with unsafe drinking water. Demand for water is rapidly increasing. Among the

major factors are population growth, urbanisation, and consumption and dietary changes, which lead to expanded irrigation, growing demand for hydropower, and increased industrial water use.

In South Asia, water availability per capita has decreased by almost 70% since 1950.¹ In India, per capita availability in 2005 was just slightly above the threshold of 1,700 m³ that indicates water stress, and could decline to 1,140 m³ by 2050. At 1,100 m³ in 2006, Pakistan is already water stressed and close to dipping below the 1,000 m³ that indicates outright water scarcity.² By 2050, “without water-productivity gains, South Asia would need 57 percent more water for irrigated agriculture and East Asia 70 percent more”.³

Yet it would be a mistake to fixate on water scarcity as if it were an inevitable fact of life about which nothing can be done. Substantial blame lies in extremely poor water and ecosystem management practices across the region. Symptoms of mismanagement include unlined irrigation canals, dilapidated urban water infrastructure, water theft, highly inefficient agricultural practices, waterlogging and salinisation, and irrational pricing that encourages water waste.

Water loss: Some 40% of the water supplied to India’s capital, Delhi, is lost and another 25% cent is unbilled water.⁴ In Afghanistan, poorly constructed or maintained irrigation canals translate into water losses as high as 70%.⁵ In Central Asia, a 2004 World Bank report found that 79% of water is wasted, largely because of leaky and damaged irrigation infrastructure.⁶

Inefficient irrigation: Farmers in Uzbekistan and Turkmenistan – heavily focused on cotton – use 12,000–14,000 m³ of water per hectare for irrigation. This compares with 9,000–10,000 m³ in Pakistan and Egypt – countries that hardly have efficient systems in place. Modern cotton-growing techniques require only about 7,000 m³.⁷

Groundwater depletion: In northern and north-western India, eastern Pakistan, and in the northern plain of China, water is being extracted from aquifers at rates that greatly exceed long-term replenishment.⁸ Due to massive government electricity subsidies for well pumps, India alone accounts for more than a quarter of the world’s groundwater withdrawals.⁹

Meanwhile, industrial and household wastes across the Himalayan region are often discharged into rivers without treatment, and runoff of agricultural chemicals adds more problems. Sanitation systems remain highly inadequate and waterborne diseases run rampant. In China, an estimated 70% of rivers are polluted. In India, high levels of salinity are caused by the excessive exploitation of ground and surface water. In Pakistan, unsafe water kills 250,000 children each year.¹⁰

Water bureaucracies – “hydrocracies”, in the words of one seasoned regional observer – remain powerful and entrenched. Yet the solution lies not in gigantic engineering works such as building more dams and embankments, or carrying out grandiose river diversion schemes. Instead, what is needed

1 Ashok Jaitly, “South Asian perspectives on climate change and water policy”, David Michel and Amit Pandya, eds, *Troubled Waters: Climate Change, Hydropolitics, and Transboundary Resources*, Washington, DC, Stimson Center, 2009, p 17.
2 Wilson John, “Water security in South Asia: issues and policy recommendations”, *ORF Issue Brief*, no. 26, New Delhi, Observer Research Foundation, February 2011, p 3; India 2050 forecast from *Science Daily*, “IPCC report: millions at risk of hunger and water stress in Asia unless global greenhouse emissions cut”, 11 April 2007, <http://www.sciencedaily.com/releases/2007/04/070410134724.htm>.
3 Aon Benfield UCL Hazard Research Centre (University College London), China Dialogue and Humanitarian Futures Programme (King’s College London), *The Waters of the Third Pole: Sources of Threat, Sources of Survival*, London, 2010, p 18.
4 *Asian Age*, “Water: will it run out?”, 29 July 2010, <http://www.asianage.com/life-and-style/water-will-it-run-out-881>.
5 IRIN, “Afghanistan: water crisis a growing human tragedy”, October 2006, <http://www.irinnews.org/InDepthMain.aspx?InDepthId=13&ReportId=60533&Country=Yes>.
6 Erika Weinthal, “Water conflict and cooperation in Central Asia”, Occasional Paper for *Human Development Report 2006*, UNDP, p 26, <http://hdr.undp.org/en/reports/global/hdr2006/papers/>.

7 Information on Turkmenistan and comparison with modern techniques from Renat Perelet, “Climate change and water security: implications for Central Asia”, *China and Eurasia Forum Quarterly*, vol 8, no. 2, 2010, p 178; and on Uzbekistan and Pakistan from Weinthal, “Water conflict and cooperation in Central Asia”, pp 19-20.
8 Aon Benfield UCL Hazard Research Centre et al., *The Waters of the Third Pole*, pp 18-19.
9 Columbia Water Center, “India water stress index”, http://water.columbia.edu/?id=India&navid=india_water_stress, accessed 4 March 2011; Committee on Foreign Relations, *Avoiding Water Wars: Water Scarcity and Central Asia’s Growing Importance for Stability in Afghanistan and Pakistan*, Majority Staff Report prepared for the Committee on Foreign Relations, US Senate, Washington, DC, 22 February 2011, p 17.
10 Information on China from Aon Benfield UCL Hazard Research Centre et al., *The Waters of the Third Pole*, p 20; on India from John, “Water security in South Asia”, p 5; and on Pakistan from IRIN, “Unsafe water kills 250,000 children a year – government”, 19 April 2011, <http://www.irinnews.org/report.aspx?ReportID=92518>.

is a more people-centered approach. Demand-side management is critical across the region. Water-conserving technologies, crop diversification, proper maintenance and repair of existing infrastructure, adequate investments in wastewater treatment, and a stronger embrace of rainwater harvesting are all critical tasks in their own right.

Environmental degradation

Across the region, environmental degradation has altered the flow and availability of water in important ways. Deforestation has led to soil erosion and reduced water-retention capacity. Wetlands and rangelands serve as important buffers for glacial melt water and precipitation runoff. But wetlands are being degraded by dams and the overpumping of groundwater. Soil erosion and loss of vegetative cover are reducing the ability of rangelands to retain water. In river deltas, reduced river flows and increased seawater intrusion have contributed to the loss of mangroves, which are important spawning grounds for fish. Inefficient irrigation methods have led to the widespread waterlogging and salinisation of croplands, depressing yields.

Climate change will increasingly exacerbate already observable problems, although impacts will vary considerably across the region. Sea-level rise will cause additional saltwater intrusion into coastal freshwater systems and croplands. Monsoon patterns may be subject to dramatic change, with significant impacts on the amount and timing of rainfall.¹¹ A declining trend in annual precipitation in the last few decades has been observed in the arid plains of Pakistan and north-east India, even as intense rainfall events have become more frequent in many parts of Asia.¹²

Forest fires and fossil fuel burning contribute to so-called “brown clouds” that block and reflect solar radiation, and lessen the summer monsoon rainfall. Already, brown clouds decrease India’s rice harvest by at least 10%. And by depositing dark particles and aerosols on the surfaces of glaciers, brown clouds cause them to melt faster.¹³

11 See, for example, Jaitly, “South Asian perspectives on climate change and water policy”.

12 John, “Water security in South Asia”, p 6; Aon Benfield UCL Hazard Research Centre et al., *The Waters of the Third Pole*, p 12.

13 Aon Benfield UCL Hazard Research Centre et al., *The Waters of the Third Pole*, p 27.

Food security could be seriously threatened by the shrinking of glaciers. During the dry season a large portion of the western Himalayan region’s agriculture is heavily dependent on melt water from Himalayan glaciers. This is especially the case for the Indus, which carries the largest proportion of melt water of any river worldwide.¹⁴ Although there is reason to believe that the Himalayan glaciers are receding faster than elsewhere in the world, conditions among them vary considerably. A serious shortfall of detailed data and lack of monitoring suggest caution in making predictions.¹⁵

In the short run, glacier melt will lead to an increase in water flows and river sedimentation, and augment the risk of glacier lake outburst floods and landslides. But over several decades, runoff would shrink and seriously diminish water availability.¹⁶ There could also be serious seasonal imbalances. With warmer temperatures, winter precipitation may not be in the form of snow, but rain. Thus, the timing of water flows feeding the rivers may shift to the winter, reducing the amount of snow melt in the early spring.¹⁷

Pakistan’s massive 2010 floods provided an unwelcome preview of a global warming-dominated future. Extremely heavy monsoon rains were driven by high ocean temperatures that pumped more water vapour into the atmosphere, as well as La Niña conditions that prevented dispersal over a wider area. In mid-August 2010 the Indus River reached its highest water level in 110 years of record keeping. Conditions on the ground worsened the situation: deforestation driven by illegal logging and expanding croplands, the heavy siltation of the Indus (partially natural, partially human-caused), extensive drainage of wetlands and clearing of shrublands, and densely populated flood plains.¹⁸

14 USAID (US Agency for International Development), *Changing Glaciers and Hydrology in Asia: Addressing Vulnerabilities to Glacier Melt Impacts*, Washington, DC, November 2010, p 51.

15 Aon Benfield UCL Hazard Research Centre et al., *The Waters of the Third Pole*, p 11; Jaitly, “South Asian perspectives on climate change and water policy”, p 21.

16 Jaitly, “South Asian perspectives on climate change and water policy”, p 21.

17 Upmanu Lall, “Himalayan glacier melt: the real problem”, *Water Matters @ Columbia*, 14 June 2010, blogs.ei.columbia.edu/water/2010/06/14/himalayan-glacier-melt-the-real-problem/.

18 *Middle East Report Online*, “Disaster strikes the Indus River valley”, editorial, 17 August 2010, <http://www.merip.org/mero/>

Hydropolitics

Political, military and economic power is highly asymmetric among the region's states, as is their capacity to manage water resources. There are few bilateral or regional institutional mechanisms to govern the region's transboundary water resources and only a very limited exchange of water-related data. Treaties concerning the Indus, Ganges and Mahakali rivers fail to offer an integrated approach.

The ►South Asian Association for Regional Cooperation has set up centres on meteorological research, forestry, coastal zone management and disaster management, and in 2010 decided to launch additional climate-related commission initiatives. But the organisation remains relatively weak, with little autonomous capacity to act.¹⁹

Pakistan-India: The 1960 Indus Waters Treaty is about separating, rather than sharing, water resources. Pakistan feels vulnerable to India's dam-building plans, while India feels hamstrung by Pakistani objections to its projects. Indian hardliners argue that Delhi should resort to strong-arm tactics and possibly walk away from the treaty. Still, the overall relationship has moved into more positive territory in recent months.²⁰

India-Bangladesh: Bangladesh has been uneasy about the potential for reduced Ganges flows ever

since India completed its Farakka Barrage. The country is also alarmed by India's planned Inter-Linking Rivers Project, which would move water from the upper parts of the Ganges, Yamuna and Brahmaputra rivers westward, running counter to promises India made in 1996.²¹

India-Nepal: The Mahakali Treaty of 1996 was an effort to overcome mistrust, but implementation has proven problematic. The ►Strategic Foresight Group notes that India and China are both investing in Nepal's hydropower sector – which could lead either to a degree of cooperation or growing rivalries.²²

India-China: China is claiming part of India's Arunachal Pradesh. Its planned South-North Water Transfer Project would draw water from several rivers that originate in Tibet and re-route water from the Brahmaputra toward the Yellow River. Some Indian experts regard this as a declaration of "water war" amid an increasingly alarmist view of China's intentions. In 2010 the ►Institute for Defence Studies and Analyses in Delhi openly called into question whether China will be a responsible upper riparian and exclaimed that "Tibet's water is for humanity, not for China alone".²³

Afghanistan and its neighbours: The country has no agreements governing the river basins it shares with its neighbours. Afghanistan diverts about two billion cubic metres for irrigation from the flow of the Amu Darya. It is conceivable that the country could eventually use five times as much water – a prospect that worries downstream riparians Turkmenistan and Uzbekistan.²⁴ To the south-

mero081710; Nathaniel Gronewald, "Pakistan – a sad new benchmark in climate-related disasters", *New York Times*, 18 August 2010; Kamila Shamsie, "Not just a natural disaster", *China Dialogue*, 18 August 2010, <http://www.chinadialogue.net/article/show/single/en/3780-Not-just-a-natural-disaster>; Marcus Oxley, "Pakistan floods: preventing future catastrophic flood disasters", Teddington, Global Network of Civil Society Organisations for Disaster Reduction, 29 September 2010.

19 David Michel, "A river runs through it: climate change, security challenges, and shared water resources", David Michel and Amit Pandya, eds, *Troubled Waters: Climate Change, Hydropolitics, and Transboundary Resources*, Washington, DC, Stimson Center, 2009, p 84; SAARC summit statement at http://www.saarc-sec.org/uploads/news-updates/file/Thimphu%20Statement%20on%20Climate%20Change-29%20April%202010_20100501012213.pdf; Jaitly, "South Asian perspectives on climate change and water policy", p 26.

20 Michael Kugelman, "Safeguarding South Asia's water security: the twin imperatives of effective trans-national water arrangements and internal water management", paper presented at the conference on Natural Resource Management in South Asia, Observer Research Foundation, New Delhi, 8 March 2011, <http://www.observerindia.com/cms/export/orfonline/documents/ENM-Events/ppt/0311-Michael.Kugelman.pdf>; IDSA (Institute for Defence Studies and Analyses), *Water Security for India: The External Dynamics*, IDSA Task Force Report, New Delhi, September 2010, p 10.

21 Jaitly, "South Asian perspectives on climate change and water policy", p 28; Aon Benfield UCL Hazard Research Centre et al., *The Waters of the Third Pole*, p 29.

22 Author interviews with Nepalese water experts, Kathmandu, 24-25 March 2011; Jaitly, "South Asian perspectives on climate change and water policy", p 28; Strategic Foresight Group, "The Himalayan challenge: water security in emerging Asia", executive summary, Mumbai, 2010, <http://www.strategicforesight.com/Himalayan%20Challenge%20ES.pdf>.

23 On overall developments in the India-China relationship, see Michael Kugelman, "India's China fears", *Dawn*, 7 April 2011, <http://www.dawn.com/2011/04/07/indias-china-fears.html>; and "A Himalayan rivalry", *The Economist*, 19 August 2010, <http://www.economist.com/node/16843717/>; IDSA, *Water Security for India*, pp 9-10, 48; and Aon Benfield UCL Hazard Research Centre et al., *The Waters of the Third Pole*, p 22.

24 UNDP Regional Bureau for Europe and CIS, *Central Asia Human Development Report*, Bratislava, 2005, p 91.

east, Afghanistan and Pakistan would both benefit from joint management of the Kabul River basin. However, no such arrangements exist, hindered by unresolved political disagreements and limited Afghan technical capacity.

Key messages

1. Across the Himalayan region, water is typically seen as a resource whose exploitation for irrigation and energy purposes is to be maximised on the national level. Hundreds of dams that are on the drawing boards will not only have far-reaching economic and environmental impacts, but could also become major political irritants.²⁵

2. Water is seen as a national security issue in a region that suffers from a fundamental lack of political trust among countries and weak regional institutions. Instead of pursuing policies that create positive economic interdependencies – such as shared hydropower facilities across borders – each state pursues exclusive national policies. Unresolved territorial issues with a bearing on water issues include Kashmir, Tibet and Arunachal Pradesh. In Afghanistan, endless war has not only destroyed physical water infrastructure, but also sharply limited water management capacity.

3. Water flow data are classified (with limited exceptions on flood information sharing). Governments withhold data not just from neighbouring states, but also from their own populations. Yet keeping water data secret is counterproductive in that it nurtures suspicions: if you don't know what your neighbour is doing, you tend to assume the worst. In Pakistan, for instance, this has facilitated poisonous rhetoric claiming water theft by India. And domestically, this secrecy makes it difficult for civil society to evaluate government policy.

4. As dominant powers, India and China prefer bilateral dealings to multilateral, region-wide approaches to water policy. Their smaller neighbours resent such domineering attitudes. Since India is both an upstream riparian – vis-à-vis Pakistan and Bangladesh – and a downstream riparian – vis-à-vis China and Nepal – it might be expected to

appreciate the value of nuanced, mutually beneficial arrangements. Yet it takes conveniently contradictory positions relative to its different neighbours.

5. Regional institutions are fragmented in terms of membership – especially if viewed from a Greater Himalayas perspective – and mandate. South and Central Asian concerns are rarely bridged. Afghanistan, as the country that connects both regions, finds itself in a peculiar situation: it is grouped with Central Asia in organisations with an economic mandate, but with South Asia in organisations that focus on water and environmental issues. To some extent, this is also true of Pakistan.

6. There is an urgent need to move beyond “separating-the-waters” approaches that are steeped in national zero-sum thinking and toward more inclusive, cooperative institutions for shared governance and resource stewardship. This might take the form of a broad Himalayan rivers commission, regional working groups of water ministers, a cross-border forum of water user associations, or the like.

7. Conventional water policies fail not only on account of their inability to provide safe drinking water for the majority of people, but also because they ignore environmental aspects and especially climate impacts. Environmental policies may offer a more fruitful arena for cooperation because they build on shared interests. Farmers across the region face similar challenges, including waterlogging, rising salinity, more frequent episodes of floods and droughts, and rising uncertainty about the impacts of climate change on water availability and the timing of flows. The region as a whole desperately needs to embrace integrated water resource management (IWRM) principles. IWRM is important for domestic water policy, but by reducing demand pressures across the region, it also helps to generate greater latitude for policymakers.

8. There is a critical link between transboundary and domestic policy: poor domestic water management drives governments toward more confrontational stances vis-à-vis their neighbours. Only by taking action at home will the states of the region be able to generate the manoeuvring space needed for calmer and more productive water relations

²⁵ Aon Benfield UCL Hazard Research Centre et al., *The Waters of the Third Pole*, pp 20, 22.

with one another.²⁶ The precise nature of needed domestic change varies from country to country, but includes:

- land reform (especially in Pakistan, where water rights are closely linked to land rights, and land ownership is highly inequitable²⁷);
- subsidy reform (subsidised farm inputs such as free water and cheap fertilisers and fuel give farmers few incentives to conserve, and have led to the massive overpumping of groundwater in India, for instance);
- repairs of leaky irrigation infrastructure (especially in Afghanistan and Central Asia);
- water conservation (including measures to boost irrigation efficiency and greater reliance on rainwater harvesting); and
- substituting water-intense crops (often, this is not simply an agronomic consideration, given that vested interests influence the choice of crops: in Pakistan, sugar mills are often owned by influential politicians; in Turkmenistan and Uzbekistan, cotton cultivation gives rulers access to foreign exchange earnings and political control via patronage systems²⁸).

9. Environmental and forestry ministries might be expected to play key roles with regard to these reforms and new approaches. But the domestic power structure often is such that they are relatively weak vis-à-vis entrenched water “hydrocracies”, and foreign and military bureaucracies.

10. For domestic change to take place, greater transparency is indispensable. Information in the public domain needs to be well researched and grounded in socio-economic and governance issues. Regional NGOs argue that an outside party could play a role in nudging governments toward greater openness, placing more well-researched information into the public domain. In part, this also requires greater support for academics and

civil society groups that are trying to effect change at home.²⁹

11. Another critical element for changed domestic policies is building greater public awareness of environmental and resource limits, and of climate change impacts on water (scarcity, floods, etc.). Schools could be an entry point for changed priorities and new thinking via improved environmental education. Climate youth movements are very active in South Asia. But just as global climate models need to be translated into regional models for the Himalayan region, much of the information about climate change impacts is only available in English and needs to be translated to reach a broad public.

12. Comparing domestic best practices (experiences in promoting water efficiency, rainwater harvesting, providing clean drinking water in cities, etc.) among riparians could build a degree of engagement and goodwill, and may offer an entry point to politically more-challenging cross-border collaboration (such as joint climate impact studies, data sharing, etc.).

13. Regional politics renders government-to-government collaboration extremely difficult to achieve. To gain momentum, engagement is also needed at various levels of society:

- **State-/provincial-level** authorities need to be paired across national borders (such as a new collaborative effort involving India’s Maharashtra state and China’s Guangdong province).
- **Civil society** and people-to-people contacts need to be established, especially those that give voice to landless farmers and other marginalised groups.
- **Gender** dimensions deserve more attention, since women play an exceedingly important role in water provision for many households and confront the reality of polluted water on a daily basis.

²⁶ Kugelman, “Safeguarding South Asia’s water security”.

²⁷ Michael Kugelman, “International responses to Pakistan’s water crisis: opportunities and challenges”, *NOREF Policy Brief*, no. 11, November 2010, pp 4-5.

²⁸ Weinthal, “Water conflict and cooperation in Central Asia”, pp 21-22.

²⁹ Author communication with Himanshu Thakkar, South Asia Network on Dams, Rivers and People, New Delhi, 21 March 2011. German organisations have provided some useful advocacy support (author communication with Simi Kamal, Hisaar Foundation, Karachi, 17 March 2011).

- Another important dimension is to train the **media** via journalist workshops and more broadly to assist in spreading relevant knowledge and environmental awareness in society.
- **Military-to-military** exchanges – perhaps at first at a Track II level involving retired military leaders – may produce new perspectives and dynamics, and dampen any rhetoric about impending “water wars”.
- Another angle that may be worth exploring is bringing **leaders from different faiths** together. The Himalayan rivers hold great cultural and spiritual significance, and religious leaders can help raise the value and visibility of conservation and environmental protection.

Transboundary dialogues

A number of transboundary dialogue efforts have been and are being undertaken in the Greater Himalayas. On the bilateral India-Pakistan level, there were many Track II dialogues prior to the Mumbai terrorist attack of 2008. The pace now seems to have picked up again, to some extent paralleling the improvement of official relations between the two states.

The objectives of the multi-donor backed ► **South Asia Water Initiative (SAWI)**, for instance, include the mitigation of carbon emissions and adaptation to climate change and water security through improved water resources management, and an attempt to overcome divides among different disciplines, sectors, and jurisdictions. SAWI encompasses a promising Abu Dhabi Dialogue process, an informal consultative process to foster cooperation on the rivers of the Greater Himalayas, with participation not only from South Asian countries, but also from China and Afghanistan. Analysts from the region feel that it is still too early to evaluate how successful SAWI may eventually be.

Several other efforts are worth mentioning:

- The ► **Global Water Partnership** – founded in 1996 by the World Bank, the ► UN Development Programme (UNDP) and the Swedish International Development Cooperation Agency – is working in both South and Central Asia to

promote transboundary dialogues, climate adaptation, integrated water resource management and sharing of best practices.

- The ► **International Water Management Institute (IWMI)** focuses on collaborative research efforts dealing with challenges faced by poor communities. IWMI has offices in Pakistan, India, Nepal and Central Asia, and has carried out a comprehensive water assessment study in South Asia.
- The ► **MacArthur Foundation’s Asian Security Initiative** supported a dialogue process run by the ► **Strategic Foresight Group** in Mumbai. In collaboration with the World Bank, the ► International Union for Conservation of Nature (IUCN) Nepal, and the ► Bangladesh Institute of Peace and Security Studies, some two dozen experts from Bangladesh, China, India and Nepal came together in 2009 and 2010 to discuss water stress and climate change in the Himalayan river basins and possible building blocks of regional cooperation.³⁰
- The ► **Centre for Dialogue and Reconciliation** in New Delhi and ► **Aman Ki Asha** (a joint initiative of Pakistan’s and India’s leading media groups) brought together leading experts from both countries for a July 2010 Water Is Life seminar that discussed ways to use water as a tool to build trust, transparency and cooperation. Ideas discussed included the exchange of up-to-date data; sharing success stories; making water resources and supply information available to the public; joint monitoring of flows at strategic points; a joint study of factors responsible for reduced flows in the western rivers; and a holistic approach that includes better watershed management, protecting forests, local water regulation and alternative methods of power generation.³¹

³⁰ Asia Security Initiative, “ASI research update: water security in South Asia”, 11 August 2009, http://www.asiasecurity.macfound.org/news/entry/asi_research_update_water_security_in_south_asia/.

³¹ Centre for Dialogue and Reconciliation, “Dialogue initiative for peace and conflict resolution in Kashmir, March 2010–28 February 2013”, http://www.cdr-india.org/eu_funded_projects.php#. Pakistani experts present included Khalid Mohtadullah, Zaigham Habib, Rafay Alam, Sulaiman Najib Khan and Ayub Qutub. Indian delegates were Ramaswamy Iyer, R. Rangachari, Ravi Chopra, Virendra Kumar, Prem Shankar Jha and B. G. Verghese. Javid Shahmiri and Zubair Ahmad Dar provided perspectives from Jammu and Kashmir. Participant profiles are at http://www.amankiasha.com/participant_profiles.asp.

- The **Climate Summit for a Living Himalayas**, initiated in 2010 by the government of Bhutan with support from the ►International Centre for Integrated Mountain Development (ICIMOD), the ►World Wildlife Fund for Nature (WWF) and the MacArthur Foundation, focuses on water, food security, biodiversity and energy, with the aim of generating an eastern Himalayan climate adaptation plan among leaders from Bangladesh, India, Nepal and Bhutan.³²
- The ►**South Asia Consortium for Interdisciplinary Water Resources Studies** is promoting pro-poor, human development perspectives and is active in education, research and advocacy in order to change the basic water resources management paradigm. This is especially critical with regard to drinking water quality and sanitation. Other networks like ICLEI - Local Government for Sustainability can play an important role in propagating best urban practices.
- The ►**Environment and Security Initiative (ENVSEC)** established by the ►UN Environment Programme (UNEP), UNDP, and the Organisation for Economic Cooperation and Development in 2003 has undertaken assessments of the linkages between the environment and security in south-eastern Europe, the southern Caucasus and Central Asia. Through extensive, yet careful regional consultations involving governments, national experts and NGOs, ENVSEC undertakes the mapping of hotspots, raises awareness and seeks to catalyse specific solutions. Lessons learned from the ENVSEC experience may be useful for South Asia and the Greater Himalayan region.

Promising initiatives and ideas

UNEP argues in a 2009 report that: “Integrating environmental management and natural resources into peacebuilding ... is no longer an option – it is a security imperative.”³³ In a similar vein,

32 ICIMOD (International Centre for Integrated Mountain Development), *Climate Summit for a Living Himalayas Bhutan 2011: Report on the High Level Consultative Meeting on Sacred Himalayas for Water, Livelihoods, and Bio-cultural Heritage, August 18-20, 2010*, Kathmandu, 2010, <http://www.bhutanclimatesummit.org.bt/resources/files/dwn3ay1093nr.pdf>.

33 UNEP (UN Environment Programme), *From Conflict to Peacebuilding: The Role of Natural Resources and the Environment*, Nairobi, 2009.

UNDP’s *Central Asia Human Development Report* found that: “There is probably more political will for regional cooperation on environmental issues than in other areas. This is because environmental cooperation is rarely perceived as a threat to security or sovereignty.”³⁴

Indeed, the idea of “environmental peacemaking/peacebuilding” is to see shared environmental needs and interests as a unique opportunity, and to translate them into cooperative efforts among countries with difficult political relationships. Environmental cooperation can help to enhance mutual trust by establishing pragmatic, working-level contacts. Such action may allow parties in dispute to develop cooperative habits that, over time, may help transform core conflict dynamics. It is important, however, to open such processes to a wide range of stakeholders and to facilitate a vibrant dialogue among civil society groups across borders.

Dialogues and consultations need to reinforce commonalities of needs, experiences, and perspectives across the region. The following areas present opportunities for cooperation and are discussed below: environmental monitoring and data sharing, water conservation, ecosystem stewardship, “peace parks”, and disaster diplomacy.

Environmental monitoring and data sharing

Joint monitoring and information sharing can contribute to building trust. The sharing of quantitative data (water flow) is often controversial, suggesting that qualitative aspects may offer a more tenable entry point. Cooperation on the scientific and technical aspects of ecosystems and climate change could be a promising beginning toward broader bilateral or regional cooperation.

The Himalayan region is characterised by highly uneven national monitoring capabilities. In the most extreme case – Afghanistan – the country’s reluctance to engage in water dialogues stems in large measure from the fear that extremely limited technical capacities and a knowledge gap (resulting from three decades of warfare) give it a weak hand

34 UNDP Regional Bureau for Europe and CIS, *Central Asia Human Development Report*, p 107.

in any water negotiations.³⁵ Afghanistan's capacities need to be rebuilt before there is any hope of striking agreements governing the river basins it shares with its neighbours. Beyond the Afghan case, a region-wide centre for hydro-meteorological expertise could help produce a more even playing field and address problems stemming from uneven knowledge and capacity among individual countries.

Aside from uneven national capacities, however, tremendous gaps in hydrological and meteorological knowledge remain across the region. Limited or incorrect information about the state of natural systems in the Himalayas can easily lead to misguided decision making and mutual suspicions.³⁶ While a particular government may not want its rivals to have access to water flow data, it is hard to see what it gains by having its neighbours make poorly informed decisions that could backfire on everyone.

In South Asia, the seasonal flow of the Indus, Chenab and Jhelum rivers has declined over time. A joint Pakistani-Indian study of the reasons – among which environmental degradation and climate change figure large – and impacts would make sense. Shaheen Akhtar of the ►Institute for Regional Studies in Islamabad notes that in July 2010 India and Pakistan discussed and agreed in principle to install a telemetry system to record real-time water flow at various locations. India had for many years been cold to the idea.³⁷

India and China signed an agreement to share hydrological data on the Yarlung Tsangpo/Brahmaputra River in 2008. China had initially held back relevant information, but agreed to provide flood-related data during the monsoon seasons in 2010-2012. This follows on an earlier bilateral agreement to share flood data for the Sutlej River. The shift in Beijing's approach is seen as a major trust-building measure, especially since the country does not share its river project plans with other

neighbouring countries.³⁸ India and China have also discussed the possibility of conducting some joint glacier research, and signed a memorandum of understanding in 2010.³⁹

Global climate change models need to be translated into regionally appropriate models and accurate regional forecasting tools need to be developed. Ashok Jaitly of the ►Energy and Resources Institute in New Delhi has urged “a much bigger research program with a substantial input of human and financial resources”.⁴⁰

The impact of climate change on glaciers is a dimension of particular concern, given their importance for water security for hundreds of millions of people. Yet, as a ►US Agency for International Development (USAID) assessment concludes, “long-term, comprehensive data for the remote glacierized areas of the Himalayas do not exist”. To the extent that historical data are available, they mostly focus on terminus location measurements rather than on total glacier mass.⁴¹ The collection of *real-time* data via satellite and remote-sensing technology, cross-checked by ground measurements, is especially important.

A better understanding of likely climate change impacts on the monsoon cycle is as important as improved glacier measurements. In November 2010 America and India signed the Monsoon Agreement to improve long-range predictive capabilities. The agreement teams up scientists from the US National Oceanic and Atmospheric Administration and India's Ministry of Earth Sciences.⁴² Because the monsoon is of critical importance for many countries in South Asia, a wider regional accord including Pakistan and Bangladesh should be sought.

35 Matthew King and Benjamin Sturtewagen, *Making the Most of Afghanistan's River Basins: Opportunities for Regional Cooperation*, New York, East-West Institute, February 2010, p 12.

36 USAID, *Changing Glaciers and Hydrology in Asia*, pp 53, 56.

37 Shaheen Akhtar, “Emerging challenges to Indus Waters Treaty: issues of compliance and transboundary impacts of Indian hydro projects on the western rivers”, *Regional Studies* (Islamabad), vol XXVIII, no. 4, Autumn 2010, pp 3-66.

38 *Economic Times* (India), “China agrees to share data on Brahmaputra”, 1 May 2010, http://articles.economictimes.indiatimes.com/2010-05-01/news/27586551_1_dam-project-brahmaputra-share-hydrological-data.

39 *Tibet News*, “China, India to jointly research Himalayan glaciers”, 25 March 2010, http://english.chinatibetnews.com/news/2010-03/25/content_430154.htm; author communication with Himanshu Thakkar, South Asia Network on Dams, Rivers and People, New Delhi, 21 March 2011.

40 Jaitly, “South Asian perspectives on climate change and water policy”, p 31.

41 USAID, *Changing Glaciers and Hydrology in Asia*, p 1.

42 NOAA (US National Oceanic and Atmospheric Administration), “New U.S.-India ‘Monsoon Agreement’ to improve global seasonal climate forecasts”, 10 November 2010, http://www.noaa.gov/stories2010/20101110_monsoon.html.

ICIMOD monitoring and data-sharing projects

- Indus Basin Initiative: The aim is to support detailed monitoring of snow, ice and water resources; build capacity; and develop water availability scenarios. Initially focused on Pakistan and Afghanistan, China and India are to be brought into the project later on.
- Flooding: ICIMOD has launched a project to establish a regional flood information system in the Indus, Ganges-Brahmaputra-Meghna and Kosi river basins.
- Glaciers and glacial lake outburst floods: The first ever Hindu Kush-Himalaya baseline inventory of glaciers was conducted in 1999-2004 and a more ambitious second inventory in 2010. A glacial lake survey of Nepal and Bhutan was completed in 2001 and later extended to selected areas of Tibet, India and Pakistan.
- Land cover mapping: Case studies were carried out in three protected areas in Nepal, Tibet and Pakistan for the Hindu Kush-Karakoram-Himalaya Partnership.
- Remote sensing of snow cover: Only China and India have the capacity to map snow cover. In 2009 ICIMOD was chosen to house a regional cryosphere hub for regional data and information.
- Satellite Rainfall Estimation Project: This project was carried out in 2006-2010 with member countries and technical assistance from the US National Oceanic and Atmospheric Administration, US Geographical Survey and USAID. Sharing real-time data and information about rainfall and river flows across national borders remains a challenge.
- Black carbon: ICIMOD is participating in the ABC Asia Project (ABC = Atmospheric Brown Cloud) and manages two climate observatories in Nepal. It may expand its efforts in gathering and disseminating black carbon research and knowledge.

Reliable sets of hydrological and meteorological data accessible to and accepted by all parties are a must for a shared, undisputed understanding of the environmental realities that govern water flows.⁴³ Nationally collected data are all too easily regarded as national secrets and viewed with suspicion by neighbours. Jointly collected data and collaborative studies can help to build transparency and trust across borders, particularly if facilitated by one or more trusted intermediaries.

ICIMOD aspires to be the premier regional repository of data and knowledge on mountains. It was set up by the governments of Afghanistan, Bangladesh, Bhutan, China, India, Myanmar, Nepal and Pakistan. It is undertaking a broad range of monitoring and data-sharing projects to improve knowledge of natural systems and environmental changes.⁴⁴

ICIMOD is well placed to become a key data repository and scientific clearinghouse on water and climate issues. Still, some NGOs in the region, such as the ► South Asia Network on Dams, Rivers and People, feel that ICIMOD is too cautious in pushing its member governments for greater data access and transparency. NGOs also argue that building up civil society capacity is critical. A broad transboundary framework among scientific institutions, governmental agencies and civil society groups is needed. At a 2009 Strategic Foresight Group workshop, for example, one speaker proposed the creation of a regional climate change information network that could facilitate greater cooperation.⁴⁵

[index.php/search/generalpub/25](http://www.irannews.org/Report.aspx?Reportid=90070); Aon Benfield UCL Hazard Research Centre et al., *The Waters of the Third Pole*, p 23; and IRIN, "Water is a good servant but a bad master", 4 August 2010, <http://www.irannews.org/Report.aspx?Reportid=90070>.

45 Strategic Foresight Group, *International Workshop on Challenges of Water Stress and Climate Change in the Himalayan River Basins*, Collaborative Dialogue Process, Kathmandu, 6-7 August 2009, Mumbai, Strategic Foresight Group, 2009, p 6, <http://www.strategicforesight.com/Kathmandu%20Report.pdf>.

43 GTZ (Deutsche Gesellschaft für Technische Zusammenarbeit), *The Water Security Nexus: Challenges and Opportunities for Development Cooperation*, Bonn, 2010, p 18.

44 Based on ICIMOD fact sheets, <http://www.books.icimod.org/>

Involving local communities is critical to the success of hydrological and meteorological monitoring. Jaitly highlights the fact that “many communities have long traditions of coping with extreme events such as droughts, floods, and cyclones. That local knowledge is invaluable for a fuller understanding of climatic risks and for evolving pragmatic responses.”⁴⁶

Similarly, a 2010 USAID report argues that “community-based observations offer a way to both involve communities and to build, at low cost, both capacity on the ground and observational data sets”.⁴⁷ For an approach that may be worth emulating, the report points to a 2010-2014 community-based climate monitoring effort under the RIMES programme (Regional Integrated Multi-hazard Early Warning System) run by the Asian Institute of Technology. A pilot programme involving community-based observations was initiated in Mongolia, where on-the-ground observational data were evaluated against instrumented or satellite data. This approach is to be extended to the six RIMES member countries: Pakistan, India, Nepal, Bhutan, Myanmar and China (Tibet).⁴⁸

Water conservation

Even as many of the countries of South and Central Asia confront increasing water scarcity, their water management suffers from a major defect – highly inefficient water use, especially in agriculture. Prioritising greater water-use efficiency and promoting an overall culture of water conservation is an overdue task. Such measures would provide tremendous manoeuvring space to all countries in the region and dampen what is often seen as a zero-sum game over water allocation among riparians. In the first place, water conservation is a matter of domestic policies. But sharing best practices and technologies could also be a fruitful avenue for regional collaboration.

There are multiple opportunities for water-saving measures, but adequate investment is required. In the first place, leaky irrigation canals and other infrastructure need to be repaired so that water

intended for crop-growing purposes actually reaches the fields. In the fields themselves there are additional opportunities for squeezing more benefit out of each drop of water applied. Drip irrigation provides much greater efficiency than the widely used flood irrigation. Drip technologies, however, are expensive for small land holdings and may require subsidies.⁴⁹

The so-called “system of rice intensification” offers great water savings. It requires 25–50% less water than is needed for conventional rice paddies (because fields are not flooded throughout the entire production cycle); can increase yields by at least 50%; and by substantially reducing or eliminating the need for chemical fertilisers, renders rice cultivation more profitable for farmers. First developed in Madagascar in the early 1980s, the technology has evolved since then, can be tailored to local circumstances, and has spread to more than 20 countries, including parts of China, India, Pakistan and Bangladesh. Interestingly, it has been adopted in the Pakistani Punjab, but not the Indian Punjab.⁵⁰

Greater water efficiency is also a question of economics. In India, energy is so heavily subsidised by the government that farmers have massively expanded the number of tube wells, with no incentive to use water efficiently. But any significant rise in prices would likely drive millions of marginal farmers over the edge. The ►Columbia Water Center (CWC) has proposed an incentive structure that would reward farmers for conserving energy and enable them to invest in more efficient techniques. The CWC is currently implementing a pilot incentive programme in India’s Gujarat state.⁵¹

Better practices are not just about more-efficient technologies. Soil conservation measures, including zero till or minimum tillage, also have their place,

46 Jaitly, “South Asian perspectives on climate change and water policy”, p 31.

47 USAID, *Changing Glaciers and Hydrology in Asia*, p 53.

48 Ibid., p 55.

49 Author discussion with Himanshu Thakkar, South Asia Network on Dams, Rivers and People, New Delhi, 21 March 2011.

50 Himanshu Thakkar, “More rice for less water”, *InfoChange News & Features*, June 2005, <http://www.infochangeindia.org/20050602206/Agriculture/Features/More-rice-for-less-water.html>; author discussion with Himanshu Thakkar, South Asia Network on Dams, Rivers and People, New Delhi, 21 March 2011; Committee on Foreign Relations, *Avoiding Water Wars*, p 16.

51 Columbia Water Center, <http://www.water.columbia.edu/?id=India&navid=Gujarat>.

as does planting less water-thirsty and more drought-resistant crop varieties. In some locations, agroforestry may offer additional options.⁵²

Finally, rainwater harvesting is receiving growing attention in both rural and urban contexts. There are a number of urban success stories, such as in Chennai and Bangalore, that are worth emulating elsewhere in the region.⁵³ Rainwater harvesting can ease the immense pressure on river systems and underground water reservoirs from irrigated agriculture and can help make rain-fed agriculture more sustainable.⁵⁴

India's National Action Plan on Climate Change, launched in June 2008, includes a National Water Mission among whose objectives are water conservation and waste minimisation, rainwater harvesting, and ensuring the more equitable distribution of water both across and within states through integrated water resource development and management.⁵⁵

Ecosystem stewardship

Too much attention has been directed toward the maximum exploitation of water resources and the associated question of how water is to be divided among countries. Too little attention has been given to securing the underlying conditions that make a reliable flow of water possible in the first place. Water security requires that urgent attention be given to the quality and integrity of ecosystems. This translates into tasks like forest protection and reforestation, wetlands protection, flood plain restoration, biodiversity conservation, and so on. It also means addressing the serious problems of waterlogging and salinity that affect many agricultural systems. Ecosystem stewardship requires that the countries of the Greater Himalayan region attend to shared needs and learn from each other in terms of best practices.

Pakistan has proposed to India joint watershed management and joint environmental studies in the Indus basin. While the 1960 Indus Waters Treaty

has held up well despite three wars between the two countries, there is a growing recognition of its shortfalls. It has never been about joint management, but about water partition, and it was not designed to meet the – then not apparent – challenges of climate change. Views are divided on whether the treaty can be made to be more responsive to today's needs or whether additional agreements for greater data sharing and joint water management should be sought – something that would depend heavily on improved political relations.⁵⁶

Found all the way from the headwaters of Himalayan rivers to the coastal deltas, wetlands are important for water storage, capture excess water in the rainy season and release it in the dry season, and perform critical ecosystem services like cleansing water. Forests also fulfill important functions, from offering habitat for flora and fauna and storing carbon to protecting watersheds and moderating water runoff. Large portions of major Himalayan river basins have suffered deforestation and forest degradation over the last few decades, with negative consequences for the environment and local communities.

WWF launched the High Altitude Wetlands Initiative in 2002 and has been working with Pakistan, Nepal, Bhutan, India and China. This is an area in which ICIMOD – in cooperation not only with WWF, but also the IUCN, Wetlands International and the Ramsar Convention – has become very active, promoting dialogue, networking, and exchange of information.⁵⁷

In principle, such initiatives should not be too politically controversial. However, the experience of WWF India in trying to have Pangong Tso, a wetland on the India-China border, designated as a protected area under the Ramsar Convention offers a cautionary tale. India's Ministry of Environment and Forests signed off on the proposal in 2002. The hope was that an Indian Ramsar site would lead to a similar designation of adjacent Chinese territory and eventual joint management. But India's Ministry of External Affairs never gave the needed approval.⁵⁸

52 USAID, *Changing Glaciers and Hydrology in Asia*, p 60.

53 Author communication with Simi Kamal, Hisaar Foundation, Karachi, 17 March 2011, and Suresh Rohilla, Centre for Science and Environment, New Delhi, 21 March 2011.

54 John, "Water security in South Asia", p 4.

55 *Asian Age*, "Water: will it run out?"

56 See, for example, Kugelman, "Safeguarding South Asia's water security" and IDSA, *Water Security for India*, pp 40-41.

57 *Climate Himalaya Initiative News*, "Safeguarding Himalayan wetlands", 2 February 2011, <http://www.chimalaya.org/2011/02/02/safeguarding-himalayan-wetlands-2/>.

58 Author communication with Archana Chatterjee, WWF India, 22 March and 13 April 2011.

ICIMOD has been involved in several landscape conservation initiatives over the past decade. In 2002 work began on developing a sustainable approach to transboundary biodiversity management of the landscape surrounding Mt. Kangchenjunga in the eastern Himalayas – an area shared by Bhutan, China, India and Nepal. More than a dozen protected biodiversity conservation areas exist in these countries, but they remain isolated from one another. The project was intended to find ways to link and extend them, and led to the identification of six potential corridors.⁵⁹

Another promising transboundary project is known as the Mt. Kailash Sacred Landscape Conservation Initiative (KSLCI). This collaborative effort involving UNEP and government agencies in India, China and Nepal started in July 2009. The KSLCI seeks to facilitate transboundary biodiversity conservation and sustainable development through scientific and technical cooperation, information exchange, and local community participation. The area in question stretches over a remote south-western portion of Tibet and adjacent parts of north-western Nepal and northern India – an ecologically diverse and fragile area where the Indus, Brahmaputra, Karnali and Sutlej rivers originate. Local communities are to participate in conservation measures and via community-based institutions.⁶⁰

Wildlife conservation is another way to protect critical ecosystems. WWF and the International Crane Foundation are among the groups that have pursued national and transboundary conservation efforts targeted at a range of endangered animals, including marine turtles, river dolphins, migratory cranes and flamingoes, tigers, and rhinos.⁶¹

Peace parks

Ecosystem and wildlife conservation efforts are typically pursued for very specific environmental and habitat purposes. But conservation zones can

also serve a broader agenda. The notion of “peace parks” – transboundary protected areas that can facilitate cooperation between hostile or uneasy neighbours and thus be seen as an instrument of peacemaking – has been proposed in a range of locations around the world. The IUCN has argued that “protected areas along national frontiers can not only conserve biodiversity but can also be powerful symbols and agents of cooperation especially in areas of territorial conflict”.⁶²

One area that has attracted a variety of proposals is the Siachen Glacier – disputed and heavily militarised by India and Pakistan. In 1989 and 1993 military disengagement plans for the area almost succeeded, and in 2004 Siachen was designated as one of eight topical areas in the “composite dialogue” between the two neighbours. A proposal for a formal peace park was actually discussed by the two nations, but was derailed by a disastrous summit meeting in 2001 amid growing tensions. Another proposal was to replace the military presence by a joint science centre for glaciology and hydrology, with third-party participants and sponsors. In a similar vein, some studies are already being carried out by American, Indian and Pakistani scientists under the International Karakoram Science Project.⁶³

A number of transboundary wildlife and wetlands protection areas linking Afghanistan with its neighbours Pakistan, Uzbekistan, Tajikistan, Turkmenistan and Iran have been proposed. In the Karakoram, the Swiss Agency for Development Cooperation and IUCN Pakistan are developing a peace park concept for the Wakhan Corridor (north of the Pakistani portion of Kashmir), linked in part to IUCN Pakistan’s Mountain Areas Conservancy Project, an ongoing initiative that involves four conservation areas. The concept also envisions a larger set of transboundary protected areas in Afghanistan, Tajikistan and China. Another promising proposal is for a Pamirs international conservancy, which could be connected to the Tajik National Park. The success of such ventures depends

59 Andreas Schild, “Foreword”, Nakul Chettri, Bandana Shakya and Eklabya Sharma, *Biodiversity Conservation in the Kangchenjunga Landscape*, Kathmandu, ICIMOD, June 2008 http://www.books.icimod.org/uploads/tmp/icimod-biodiversity_conservation_in_the_kangchenjunga_landscape.pdf.

60 From <http://www.icimod.org/ksl> and <http://www.icimod.org/publications/index.php/search/publication/688>.

61 TV Padma, “A greener peace in the Himalayan peaks”, 22 September 2003, <http://www.siachenglacier.com/greener-peace.html>.

62 IUCN (International Union for Conservation of Nature), “Protected areas, benefits beyond boundaries”, *WCPA in Action*, Gland, World Commission on Protected Areas, 2000, p 17.

63 Kent Biringer and K. C. (Nanda) Cariappa, “The Siachen Peace Park proposal: reconfiguring the Kashmir conflict?”, Saleem H. Ali, ed., *Peace Parks: Conservation and Conflict Resolution*, Cambridge, MA, MIT Press, 2007, pp 280, 284-287.

in part on rebuilding Afghanistan's pre-1979 system of conservation programmes, which has been under way since 2005.⁶⁴

Disaster diplomacy

Floods and droughts are challenges that will intensify as climate change takes hold. Because no country is immune to these problems, in principle there is an opportunity for what might be thought of as "disaster diplomacy" based on a realisation of shared vulnerabilities and mutual goodwill.

To date, such notions have played out to a limited extent in the wake of disasters. Following Pakistan's catastrophic flooding in 2010, the Indian government offered \$5 million in aid (later increased to \$25 million). But the aid was offered only belatedly and Islamabad in turn delayed acceptance for weeks.⁶⁵ Bottom-up efforts were not hampered by the recalcitrance and cold calculation that both governments displayed. A large number of South Asian NGOs tried to create channels through flood relief donations that could be delivered across the border.⁶⁶

The aftermath of a disaster provides only a temporary window of opportunity. A preferable approach would be to join hands across borders with regard to disaster preparedness and risk reduction. This concerns a range of measures, including flood warning, glacial lake stabilisation, and so on. But neighbours could also cooperate on climate adaptation and resilience-building measures, such as developing drought-resistant crops.

The joint monitoring activities discussed earlier in this report can also be seen in this context. Cooperation on qualitative issues does not need to be limited to natural disasters as such. All of the nations in the region confront a truly man-made disaster: water pollution that presents a pervasive threat to human health for hundreds of millions of people and kills many each year.

Conclusion

Multi-track diplomacy efforts are important in that they can generate fresh perspectives. Although seen by some as little more than "talk shops", it is unclear what the alternative would be. But such dialogue processes need to be sustained. A string of disparate, short-lived efforts driven by different donors and other actors may cause confusion rather than build momentum. A regional platform that bundles and coordinates these efforts may be required. Meaningful local capacity-building is essential and requires sustained commitment. And eventually, governments need to be brought on board, although there is no blueprint for how to do this successfully. Efforts that take place outside official channels (so-called Track II efforts) cannot entirely escape the strictures of the overall political climate between countries in the region, especially the Pakistani-Indian and Sino-Indian relationships.

There are no silver-bullet solutions. Scientific and environmental collaboration may offer a relatively easy entry point. But translating this into political change is a huge challenge. A key question is whether existing initiatives can be sustained, scaled up and broadened. For instance, monitoring activities eventually need to transition toward joint watershed management agreements. Given the staying power of orthodox views and vested interests, it is important to ask inconvenient questions and challenge established mindsets.



64 Stephan Fuller, "Linking Afghanistan with its neighbors through peace parks: challenges and prospects", Saleem H. Ali, ed., *Peace Parks: Conservation and Conflict Resolution*, Cambridge, MA, MIT Press, 2007, pp 294-303.

65 Nita Bhalla, "Flood-hit Pakistan accepts India aid, but no real disaster diplomacy", Reuters AlertNet, 31 August 2010.

66 Swarna Rajagopalan, "The Indus floods and 'disaster diplomacy'", Asia Security Initiative blog, 29 August 2010, asiasecurity.macfound.org/blog/.