

Section 11

Key Water  
Developments

## 11.1. America

**The USA and Mexico sign a deal.** "Extension of Cooperative Measures and Adoption of a Binational Water Scarcity Contingency Plan in the Colorado River Basin" is the official name of the international water-sharing deal signed on September 27, 2017. Minute 323, as it's been more informally dubbed, is an extension of the Minute 319 deal put in place in 2012. The new deal suggests spending millions of dollars on conservation and environmental projects and drawing up plans to deal with any shortages amid drought and climate change until 2026. The United States pledged to invest \$31.5 million in water conservation projects in Mexico, such as lining irrigation ditches with concrete to reduce leaks and upgrading irrigation equipment to use less water. The water saved would be divided among the two nations and environmental projects. The agreement allows Mexico to store some of its share of the river water in Lake Mead in the United States if it cannot use it immediately. Mexico can withdraw it later, subject to some conditions.

Source:

<https://www.ibwc.gov/Files/Minutes/Min323.pdf>

**In 2017, the eight Amazon Countries approved the first Strategic Action Program for Integrated Water Resources Management in the Amazon Basin,** through which Bolivia, Brazil, Colombia, Ecuador, Guyana, Peru, Suriname and Venezuela committed to protecting the largest river

basin in the world, discharging 6.6 billion m<sup>3</sup>/year of water into the ocean. Based on a shared Vision and Transboundary Diagnosis Analysis of the basin, achieved through a wide-ranging process of public participation and scientific research, this Program offers collective responses to address the ongoing degradation of water resources, land and biodiversity and strengthens the capacity of the communities to adapt to extreme hydro-climatic events. Three Strategic Lines of Action – Strengthening Integrated Water Resources Management, Institutional Adaptation to Climate Change and Variability, and Knowledge Management – set the agenda for the regional cooperation, which comprises, among others, the implementation of regional monitoring systems (hydro-meteorological, water quality, erosion and sediment transport, climate change vulnerability); institutional capacity building, planning and management; adaptation to climate change (early warning systems, forecasting and risk management); protection and sustainable use of resources (including groundwater); and data sharing, knowledge and awareness raising. The Program will be implemented in the framework of the Amazon Cooperation Treaty Organization (ACTO), with the support from UN Environment and the Global Environment Facility (GEF).

Source: Amazon Cooperation Treaty Organization

## 11.2. Africa

**A dispute between Egypt and Ethiopia regarding the impact of the Grand Ethiopian Renaissance Dam continued throughout the year. The dam is expected to turn Ethiopia into the largest energy exporter in Africa.** Egyptian President Abdel-Fattah el-Sissi, for the second time, delivered a stern warning to Ethiopia over a dam it is building after the two countries along with Sudan failed to approve a study on its potential effects. Ethiopia is finalizing construction of the Grand Ethiopian Renaissance Dam, its first major dam on the Blue Nile, and will eventually start filling the giant reservoir behind it to power the Africa's largest hydroelectric dam. Egypt fears that this will cut into its water supply, destroying parts of its precious farmland and squeezing its population of 94 million people, who already face water shortages. El-

Sissi has sought to foster better ties with sub-Saharan Africa, especially fellow Nile basin countries, insisting that while his country needs its full share of the river's waters, it is ready to help them with their economic development.

Source:

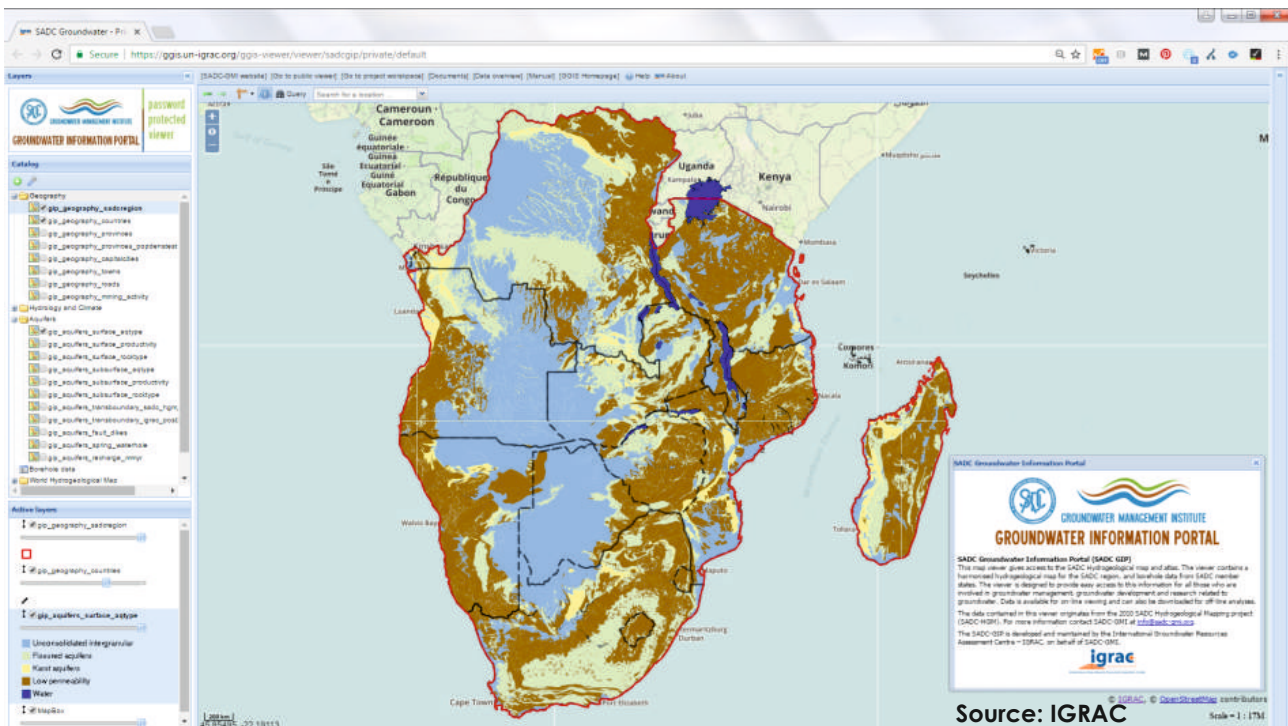
<https://www.usnews.com/news/world/articles/2017-11-18/egypt-warns-ethiopia-nile-dam-dispute-life-or-death>

**Groundwater Information Portal for the Southern African Development Community (SADC-GIP) was developed.** It is a map-based information system providing web-access to the harmonized SADC Hydrogeological Map and Atlas. The portal is commissioned by the SADC Groundwater Management Institute ([www.sadc-gmi.org](http://www.sadc-gmi.org)) and developed and maintained by the

International Groundwater Resources Assessment Centre ([www.un-igrac.org](http://www.un-igrac.org)). Next to SADC hydrogeological info, SADC-GIP portal gives access to other groundwater relevant maps like the WHYMAP Global Groundwater Vulnerability Map to Floods and Droughts and IGRAC's Map of Transboundary Aquifers of the World. In the future, the portal may be expanded with more groundwater relevant maps, data and documents. The portal provides a service to professionals, scientists and other stakeholders in SADC member states who are involved in groundwater management, groundwater development and research on groundwater or

related fields. Users can browse maps and underlying data online and can create overlays of different maps to obtain new insights. Maps and data can also be made available for download for further analyses off-line. The SADC-GIP is one of the groundwater information management portals which IGRAC has developed over the years to facilitate and promote international sharing of information and knowledge required for sustainable groundwater resources development and management worldwide.

See further at: <https://www.un-igrac.org/ggis>



## 11.3. Asia

### Afghanistan

Following the 2015 census, the population of Afghanistan exceeded 32 million people. Its territory covers 652,864 square kilometers. All rivers, excluding the Kabul flowing into the Indus, are continental. The largest rivers are the Amu Darya flowing along the northern border, the Harirod used for irrigation, and the Helmand, which along with the Farakhrud, Khashrud, and Kharutrud Rivers flows into the Sistan depression and forms the Hamun lake system. The rivers are mainly fed by glacial melt water. Lowland rivers have high flow in spring and dry out in summer. Mountain rivers possess significant hydropower

potential. In many areas, groundwater is the only source of water and irrigation.

In July 2017, the Ministry of Energy and Water said it was working hard to implement plans to **build 20 large and medium-sized dams in the country**. According to them, at least 15 dams are currently under construction and 15 other dam projects are being worked on. According to MoEW, they are also preparing to start working on the Kafkan, Tirpol and Pashdan dam projects in Herat, along the Harirod River. Work for building a 10-megawatt solar power plant has started in Afghanistan's southern province of Kandahar<sup>40</sup>.

<sup>40</sup> [http://www.outlookafghanistan.net/national\\_detail.php?post\\_id=18565](http://www.outlookafghanistan.net/national_detail.php?post_id=18565)

The Ministry also informed that the government plans to **build 22 water canals** within the next five years in provinces in the north and northeastern parts of Afghanistan. Costing \$76 million, the project will irrigate more than 70,000 hectares of land in Kunduz, Baghlan, Badakhshan, Takhar and Bamiyan provinces. More than 7.5 million hectares of land is suitable for agriculture; however, 30% is not used due to lack of irrigation water.<sup>41</sup>

**WB will contribute \$233 million to Afghanistan over the next five years in order to improve the living conditions of Afghans.** The aid will go towards improving agriculture, energy, infrastructure and natural resources in Afghanistan, as well development of private sector in order to help boost economic growth.<sup>42</sup>

The Ministry of Agriculture, Irrigation and Livestock (MAIL) plans to establish centers for agriculture services in 250 districts of the country with European Union (EU)'s support over the next two years. They could provide farmers with services in spheres of agriculture and livestock extension and products.<sup>43</sup>

The signing ceremony of a European Union (EU)-funded project, aimed at assisting the Afghan government to **assess agriculture production systems and to strengthen institutional capacity**, was convened by the Afghan Agriculture, Irrigation and Livestock Ministry (MAIL). The 2.5 million Euros project has been developed by the United Nations' Food and Agriculture Organization FAO. Designed for three years, the overall objective of the project is to improve monitoring and analysis of agricultural production systems to support agricultural policies and food security in the country. The National Agro-Ecological Zoning and Land Resources Information Management System will be established in Afghanistan to highly support agriculture policy and investment conditions to achieve sustainable agricultural development for food security, under climate change. The purpose of AEZ, as carried out for complex rural land-use planning, is to identify areas with similar sets of potentials and constraints for optimum land utilization for agriculture development.<sup>44</sup>

**TAPI.** The gas pipeline Turkmenistan-Afghanistan-Pakistan-India (TAPI) will bring to the budget of Afghanistan one billion dollars per year as transit fees and would allow the country to create 12 thousand new jobs, stressed the foreign Minister of Turkmenistan Mr. Rashid Meredov at the 7th conference of regional economic cooperation on Afghanistan (RECCAVII).<sup>45</sup>

**CASA-1000.** Two Indian companies, KEC International Limited and Kalpataru Power Transmission Limited (KPTL), will build Afghanistan's part of the CASA-1000 Project. An agreement on construction of Afghanistan's section of CASA-1000 power transmission line was signed by representatives of Afghan National Power Company Da Afghanistan Breshna Sherkat and two companies.<sup>46</sup>

**One Belt-One Road.** Afghanistan intends to actively participate in the Chinese One Belt-One Road Initiative. For this purpose, a range of infrastructure projects is implemented. Those include energy and transport projects, including the construction of automobile and railway roads, which would connect Northern and Western provinces in Afghanistan. The primary investment for the One Belt One Road project has been estimated at more than \$40 billion. Thanks to its unique geographic location, Afghanistan may become an important chain in the Trans-European Economic Corridor, which will boost economic development of the country.<sup>47</sup>

## Water and Environment Issues in China \*\*

Environmental degradation has become the main threat to social stability in China and coping with the former is a matter of nation's survival. In this context, in recent years China sharply tightened environmental control and took radical steps to change the system of relations between the society and environment known as "building an ecological civilization". The review of water and environmental developments in China provided by Dr. E.A. Simonov is given below.<sup>48</sup>

<sup>41</sup> <http://afghanistan.ru/doc/114126.html>

<sup>42</sup> [http://www.outlookafghanistan.net/national\\_detail.php?post\\_id=19544](http://www.outlookafghanistan.net/national_detail.php?post_id=19544)

<sup>43</sup> <https://www.pajhwok.com/en/2017/08/21/agriculture-services-centers-planned-250-districts-mail>

<sup>44</sup> <http://www.pajhwok.com/en/2017/01/31/eu-project-monitor-afghan-agri-system-signed>

\*\* Material provided by E.A.Simonov, Rivers without Boundaries Coalition

<sup>45</sup> <http://afghanistantoday.ru/hovosti/afganistan-budet-poluchat-tapi-1>

<sup>46</sup> <https://eodaily.com/ru/news/2017/12/22/afganskiy-uchastok-lep-casa-1000-postroyat-indiyskie-kompanii>

<sup>47</sup> <http://afghanistan.ru/doc/108820.html>

<sup>48</sup> Full version of the review in Russian is available on <http://www.cawater-info.net/library/rus/inf/50.pdf>

**13<sup>th</sup> Five-Year Plan and 19<sup>th</sup> Communist Party Congress.** In its 13<sup>th</sup> Five-Year Plan for Economic and Social Development (2016-2020) China proposes a program of future reforms, among the objectives of which is building “a moderately prosperous society” by the end of 2020.<sup>49</sup> The Plan defines environment as one of the 5 measurements of progress of the society in China, while environmental protection and restoration as one of development targets. At the 19<sup>th</sup> Communist Party Congress on 18-24 October 2017, it was confirmed that building the ecological civilization<sup>50</sup> is one of the five basics for socialistic community with Chinese specificity. Xi Jinping announced the demand for “speeding up reform of the system for developing an ecological civilization and building a beautiful China” among 13 principles of the socialism with Chinese characteristics:<sup>51</sup> *“We must establish and practice the philosophy that lucid waters and lush mountains are invaluable assets, uphold the basic national policy for energy conservation and environmental protection, treat the ecological environment as we treat life, coordinate the systematic management of mountains, waters, forests, fields, lakes, and prairies... build a beautiful China, create a good production and living environment for the people, and contribute to global ecological safety.”*

**Legislation and its implementation.** Since 2014, systematic work has been carried out to improve environmental legislation and tighten control. In 2017, several important laws were adopted.

The Environmental Protection Tax Law of China will come into force on January 1, 2018. It stipulates the collection of environmental tax, whereas pollutant discharge fee will be abolished. Environmental pollution will be taxed, including: 1) air pollution; 2) water pollution; 3) solid wastes; and 4) noise production. For water pollutants, tax rate will range from 1.4 to 14 yuan per pollution

equivalent. Regions have the right to fix the tax themselves, depending on the state of environment and development level.<sup>52</sup> Up to 50 billion yuan (about \$7.68 billion) could be collected annually from the new tax, according to estimates from Xinhuanet analysts.

The *“Pilot reform in ecological damage compensation”* came into effect in 2017 to scale up the pilot reform to the whole country.

In 2018, the *Water Pollution Prevention and Control Law* adopted on June 2017, 2017 will come into force.<sup>53</sup> It focuses on agricultural water pollution; fertilizer pollution standards are introduced; protection of drinking water sources is strengthened; discharge of wastewater in those sources is severely punished. By this law, illegal discharge of pollutants is subject to a maximum fine of 1 million yuan and the prosecution of reoccurrence. The government and party leaders will be assigned “river chiefs” and take personal responsibility for their status.<sup>54</sup> 200 thousand “river chiefs” were already assigned; and, assignment is “lake chiefs” is still in process.<sup>55</sup>

Enforcement of tightened environmental legislation is challenging not only for Chinese manufacturers but also for transnational corporations, which transferred production to China.<sup>56</sup> From January to November, China investigated over 35,600 violations of environmental protection laws and regulations, up more than 102 percent year-on-year.<sup>57</sup> In January 2018, the Ministry of Environment Protection (MEP) announced that more than 2,000 large industrial clusters developed centralized treatment systems by the end of 2017, and more than 2,000 automated devices to control water pollution were installed. This means that 90% of the action plan for water pollution prevention has been completed. However, in distant provinces, such as Xinjiang, Qinghai, and Yunnan, this accounts for less than 60% of the required norm.<sup>58</sup>

<sup>49</sup> 13<sup>th</sup> Five-Year Plan for Economic and Social Development of China

<sup>50</sup> I.P.Glazyrina, E.A.Simonov “Ecological civilization” of China: new challenges or new prospects for Russia? -pp. 374-394. Russian Far East: problems of development – connecting territories / edited by V.A.Kryukova and V.V.Kuleshova – Novosibirsk: Institute of Economics and Industrial Engineering within the Siberian Branch of the Russian Academy of Sciences, 2017. – 484 p. ISBN 978-5-89665-321-9 [http://lib.ieie.su/docs/2017/Vostok\\_Rossii/Vostok\\_Rossii\\_problemy\\_osvoenija.pdf](http://lib.ieie.su/docs/2017/Vostok_Rossii/Vostok_Rossii_problemy_osvoenija.pdf)

<sup>51</sup> Opinion: What does 'Xi's Thought' mean for the environment? 24/11/2017 <https://www.chinadialogue.net/article/show/single/en/10235-Opinion-What-does-Xi-s-Thought-mean-for-the-environment->

<sup>52</sup> [https://cnlegal.ru/china\\_taxation/china\\_ecology\\_tax\\_2017/](https://cnlegal.ru/china_taxation/china_ecology_tax_2017/)

<sup>53</sup> <http://shj.mep.gov.cn/zhgl/201606/W02016061256773435682.pdf>

<sup>54</sup> <https://ecologynow.ru/news/s-2018-goda-v-kitae-s-zagrazneniem-vody-budut-borotsya-po-novomu>

<sup>55</sup> <http://www.globaltimes.cn/content/1083456.shtml>

<sup>56</sup> <https://thediplomat.com/2017/12/china-cleans-up-its-act-on-environmental-enforcement/>

<sup>57</sup> <http://russian.people.com.cn/n3/2018/0102/c31516-9310443.html>

<sup>58</sup> [http://china.caixin.com/2018-01-23/101201587.html?mc\\_cid=c28c5ac708&mc\\_eid=d5273b7004](http://china.caixin.com/2018-01-23/101201587.html?mc_cid=c28c5ac708&mc_eid=d5273b7004)

**Reform of the State Council.** Reformation of the whole state governance system was also considered in the “Policy of developing an ecological civilization”. The preparatory process was underway in 2016-2017. In mid-March 2018, during the 13<sup>th</sup> National People’s Congress of the People’s Republic of China, the plan was approved to reorganize ministries and agencies.<sup>59</sup> It changes the structure of government from “sectoral” to “functional” one, with greater focus on environment.

China establishes absolutely new Ministry of Natural Resources (MNR), which, among other things, will be responsible for management, reproduction, and protection of natural resources, establishment and implementation of territorial planning system, and creation of paid basis for natural resource use. MNR, which absorbs the State Forestry and Grassland Administration, will be responsible for all special protection territories and water areas, which previously were under control of 11 agencies.

At the same time, the Ministry of Environment Protection is restructured into the Ministry of Ecological Environment (MEE), receiving the widest range of supervisory and punitive power both over new MNR and other agencies. Climate is also under the control of MEE.<sup>60</sup>

Although the Ministry of Water Resources remains, it loses many research/monitoring functions and registration of water use rights in favor of MNR. It also transfers to MEE the function of river basin water quality management and all matters related to regulation of waste discharge. MEE has also the honorable duty to restore and protect environment in the area of the Three Gorges Dam project and South-North Water Diversion project. Anyway, details and consequences of the reform are still unclear even for the initiators.

The National Development and Reform Commission (NDRC) manages funds for implementation of river-basin management measures of all abovementioned ministries, besides it has obligation to supervise assessment of risks related to overseas investment into projects that may affect transboundary waters and make decisions whether these projects go ahead. Criteria and procedures for evaluation of “restricted” projects are being developed by the NDRC now.

## Hydropower

The 13<sup>th</sup> Five-Year Plan sets that hydropower development will be strictly aligned with more important tasks of environment protection and well-being of population.

The detailed plan of China’s hydropower development shows that development of hydropower capacity on large rivers will be reduced twice as compared to the 12<sup>th</sup> Five-Year Plan. Districts with extensive hydropower development will be reduced to two ones located on the South-Western part of the country. Plans to develop small HPPs are hardly considered (their construction is forbidden or suspended due inefficiency in many provinces). The plan focuses on integrated energy system planning and the need to develop basin hydropower development plans. Now the task of HPPs and PSPs is to balance the development of new RES generating electricity from sun and wind. New installation of conventional hydropower is expected to be “only” 43 GW in the 13<sup>th</sup> Five-Year Plan and 40 GW in the 14<sup>th</sup> Five-Year Plan, whereas pumped-storage hydro new is expected to add 13 GW and 50 GW, respectively. However, manufacturing of giant “gigawatt turbine” is still a priority of power engineering industry, probably, to support overseas projects.

In 2017, energy production by hydropower increased by 0.5%, and its share amounted to 17% in the total energy generation. During 2017, additional 10 GW of hydropower were commissioned (increased by 2.7% during the year) – lowest growth among main types of energy generation. However increase in conventional hydropower documented by IRENA is even smaller - 7,3 GW. The big challenge is the so-called “stranded capacities” in the Yunnan province, particularly in the Mekong river basin. Despite the construction of large power transmission lines to export energy to the Eastern coast of China, energy generated by the Yunnan HPPs is not in demand, as the local authorities in the East support their local energy producers. In this context, in 2017 plans were accelerated to export electricity to neighboring countries, such as Myanmar, Bangladesh and others. This can significantly alter the plans of those countries regarding their own construction of HPPs.

<sup>59</sup> <http://www.straitstimes.com/asia/east-asia/npc-2018-chinas-new-more-powerful-environment-ministry-will-prevent-systemic>

<sup>60</sup> <http://chinawatererrk.org/resources/analysis-reviews/two-sessions-five-highlights-for-water/>

### Energy generation in China, 2017, billion kWh per year

Type	Generation 2017	Annual growth, %
HPP	1,190	0.5
Wind plant	270	21
Solar plant	65	34
Nuclear power station	248	16
Thermal power station	4,633	5.1
Total	6,495	5.9

data by [Energy.net](http://www.energy.net) и [Statistical Bureau of China](http://www.stat.gov.cn)

In a campaign to improve environmental conditions in 11 key river basins (Yangtze, Huanghe, etc) the authorities ordered decommissioning of "illegal" and "harmful" small hydropower plants, which in the first year led to closure of at least several hundred power plants, located in protected areas or sensitive river stretches.<sup>61</sup> One high-profile case in Sichuan province involved demolition of an illegally-constructed hydropower station located inside the buffer zone of the ancient Dujiangyan Irrigation System, a protected UNESCO World Heritage Site and the world's oldest fully operational hydraulic engineering project.<sup>62</sup> While decommissioning so far affected small portion of China's 77 000 small hydropower plants, all remaining have been ordered to follow more stringent environmental regulations than before. Thus Guangdong, Jiangxi, Gansu, Chongqing and other provinces (cities) have issued guidelines for the environmental flow management downstream of the dam, putting forward specific requirements on



*Dujiangyan community members celebrating the demolition of the Shengxing power station in Sichuan Province. The banner reads "We will protect you forever, Dujiangyan World Heritage Site!" Photo by Peng Wei IR*

design and introduction of ecological flow facilities, optimization of dispatch operations and other non-engineering measures. Fujian Province has installed ecological flow monitoring devices in key river basins and introduced ecological flow monitoring to the local government's performance evaluation.

### Transboundary cooperation: Lancang-Mekong Cooperation Mechanism

Chapter 31 of the 13<sup>th</sup> Plan on strengthening water security includes "well-planned steps to develop and harness the water of cross-border river basins, and deepen cross-border water cooperation with neighboring countries" among three tasks.

In 2015-2017, China focused on the Mekong River basin, where the Mekong River Commission (MRC) has been operating for many decades. MRC includes four countries in the lower basin: Vietnam, Thailand, Cambodia, and Laos. MRC was funded through European aid agencies and was not significantly integrated in the decision-making systems of the region's countries. China chose to have only observer status in MRC. Unfortunately, MRC failed not only to prevent substantial negative impacts of gigantic reservoirs developed by China in the upper reaches<sup>63</sup> of Mekong but also could not dissuade other countries to construct new HPPs on the main channel (e.g. Xayaburi dam in Laos,) and tributaries (e.g. [Lower Sesan dam](#) in Cambodia.). Seeing inefficiency of MRC, donors sharply reduced funding.

In 2015, China invited all Mekong basin countries to participate in the **Lancang-Mekong Cooperation Mechanism (LMCM)**, which is a part of the Chinese "One Belt-One Road" initiative and aimed at supporting regional integration. Water resource management, which was initial common theme, took a second place, yielding to issues of development of infrastructure, establishment of development funds, simplification of transboundary cooperation, etc. China pledged \$10 billion to the partner countries for the purposes of joint projects. In November 2015, the first Foreign Ministers meeting was organized; in March 2016, the first LMCM Summit was held on Hainan Island.<sup>64</sup>

<sup>61</sup> <http://www.euronews.com/2018/08/31/dam-nation-big-state-projects-spared-in-chinas-hydro-crackdown>

<sup>62</sup> <https://www.internationalrivers.org/blogs/435/china-shows-its-commitment-to-protecting-domestic-rivers-cultural-heritage>

<sup>63</sup> <https://phys.org/news/2017-01-chinese-hydropower-considerably-season-decreased.html>

<sup>64</sup> [http://www.fmprc.gov.cn/mfa\\_eng/zxxx\\_662805/t1350039.shtml](http://www.fmprc.gov.cn/mfa_eng/zxxx_662805/t1350039.shtml)



Shortly before the Summit, China organized an ostentatious water discharge from its reservoirs in Yunnan province; this step was called as a “measure to mitigate the drought consequences” in Vietnam. This step was taken to demonstrate the readiness of China to use Mekong water resources “for the common good”. However, due to poor scientific planning and lack of warning in advance, this action had many negative consequences and was reasonably criticized by experts and activists. In October 2016, Chinese Ministry of Water Resources in cooperation with MRC launched the report “Joint Observation and Evaluation of the Emergency Water Supplement from China to the Mekong River”<sup>65</sup> justifying this discharge. Thus, within its first year LMCM demonstrated its advantage over old cooperation mechanisms in the region and capacity to pursue regional cooperation policy in favor of China.

In 2017, this policy was extended and strengthened. China in cooperation with other basin countries organized the study of river rapids on the main channel to develop navigation from the Yunnan province to the sea. China proposes to blast all main rapids that hinder the passage of large ships. In Beijing, a [Lancang-Mekong Environmental Cooperation Center](#) was opened. Chinese companies received new concessions and contracts in Cambodia and other basin countries.

In the beginning of January 2018, the 2nd Lancang-Mekong Cooperation (LMC) Leaders' Meeting was held in Cambodia. Co-chair of the meeting Chinese Premier Li Keqiang made five proposals to facilitate cooperation in the basin: 1) develop a Five-Year Plan of Action on Lancang-Mekong Cooperation (2018-2022); 2) strengthen cooperation on (transfer from China) industrial capacity, such as construction of hydropower facilities, etc.; 3) expand cooperation in agriculture; 4) increase cooperation on human resources and staff exchange; and 5) facilitate cooperation on health issues. At the meeting, the Five-Year Action Plan on Lancang-Mekong Cooperation (2018-2022)<sup>66</sup> was adopted and the “Phnom Penh Declaration” was signed. Thus, the LMCM tests new approaches to managing transboundary basins by China, where more equitable multilateral mechanisms cede ground to the Sino-centric model for basin management.



### Developments in other Asian countries and transboundary basins

**The 3<sup>rd</sup> Asia-Pacific Water Summit that was held on 11-12 December in Yangon, Myanmar focused on addressing water security issues.** Since its establishment in 2006 on the occasion of the 4<sup>th</sup> World Water Forum, this network aims at building capacity and strengthening cooperation in the water sector and achieving MDGs and SDGs in the Asia-Pacific region.

**China starts the construction of the World's second largest hydropower station on the Jinsha River, the upper section of the Yangtze.** With a total installed capacity of 16 million kilowatts, the project is expected to generate more than 60 billion kilowatt hours of electricity per year, equal to about two-thirds of Beijing's electricity consumption in 2015. The power will be generated in 2021 and the plant will become fully operational by the end of 2022.

**Dams and Mining Destabilizing the Mekong.** The drastic reduction in sediment flow in the Mekong River is threatening the stability of the delta and the livelihoods of millions of people who depend on its resources, says a new study by UNESCO and the Stockholm Environment Institute (SEI).

The study attributes reduction in sediment flow to infrastructure development, mostly dams, riverbed mining, climate change and land use change in the Mekong region.

If all the dams proposed for the Lower Mekong Basin are developed – including the planned or ongoing 11 mainstream dams – it

<sup>65</sup> <http://www.mrcmekong.org/assets/Publications/Final-Report-of-JOE.pdf>

<sup>66</sup> <http://www.chinadaily.com.cn/a/201801/11/WS5a56cd04a3102e5b17374295.html>

could prevent up to 94 percent of the river's sediment load from being transported downstream, the study warns.

This will lead to loss of nutrients vital for the basin's fisheries and for soil fertility in the floodplains along the entire basin, especially the Tonle Sap in Cambodia and the Mekong delta in Vietnam.<sup>67</sup>

Additionally, scientists reiterated their concerns over water security in the Mekong delta, recognizing the HPP construction in the upper Mekong and plans of Thailand, Laos, and Cambodia as the main threats.

**In 2017, India and Pakistan resumed talks on controversial Kishenganga and Rattle hydro-power projects.** In November 2016, WB set up a Court of Arbitration to look into Pakistan's concerns about the designs of the Kishenganga and Rattle hydroelectric power projects. India claimed that participation of the World Bank was in favor of Pakistan; while the latter believes India's plans to build three other projects (Pakal Dul, Lower Kalnai and Miyar) in the Indus basin violate the Indus Water Treaty.

While the issues remained unresolved, 2017 negotiations seem to be more meaningful than earlier. The World Bank, which is also a signatory of the Indus Water Treaty, will continue to work with both countries to resolve the issues in an amicable manner.

Both countries and the World Bank appreciated the discussions and reconfirmed their commitment to the preservation of the Treaty, which survived three wars between the countries.<sup>68</sup>

<sup>67</sup> <https://www.asianscientist.com/2017/12/in-the-lab/dams-mining-mekong-delta/>

<sup>68</sup> <https://treaties.un.org/doc/Publication/UNTs/Volume%20419/volume-419-I-6032-English.pdf>

## 11.4. Europe

### Russia: Water Resources and Year of Ecology<sup>69</sup>

The year 2017 was proclaimed as the Year of Ecology in Russia. It was intended to achieve aims and objectives laid out in the “Principles of the State Policy in the area of ecological development of the Russian Federation up to 2030”<sup>70</sup> and the State Program “Environmental Protection for 2012-2020.”<sup>71</sup> The Year of Ecology was dedicated to introduction of new waste management system and advanced feasible technologies, protection of the Baikal nature area, conservation of water and forest, development of nature reserve system, and preservation of biodiversity.

#### The following events were organized in the course of the Year of Ecology:

In August 2017, “The Volga River Conservation and Pollution Prevention” program was approved. By 2025, it is planned to reduce discharge of polluted wastewater by at least 80%. It is also planned to modernize and construct treatment facilities at least at 200 enterprises in 17 regions. As part of the project, laboratories are to be organized to control wastewater content and quantity in the first and second category sites that impact the natural environment to a larger extent.

Construction of new biological treatment facilities and reconstruction of existing ones resulted in the reduction of pollutants discharged into water bodies by 42 tons per year. Dozens of water bodies (lakes, ponds, and small rivers) were subjected to environmental rehabilitation; for instance, these are the water bodies of the Volga-Akhtuba floodplain, Tatarstan, Moscow province and many others. As part of the nationwide campaign on cleaning water sites and their banks, more than 10 thousand water bodies were cleaned of 15,200 m<sup>3</sup> of wastes. Volunteer clean-up, outreach campaigns, scientific events, and marathons were organized in Lake Baikal. In August, the President of Russia held a meeting on preservation of Lake Baikal and development of the Baikal nature area, when it was decided to prolong relevant federal target program. The efforts are made to restore the

### Summarizing the Year of Ecology 2017

The results were announced by the Federal Service for Supervision of Natural Resource Management (Rospirodnadzor) at the Ministry of Natural Resources and Environment of Russia (Minprirody) during the ECOTECH International Forum held on 12-14 December 2017. In general, the heads of relevant agencies highlighted successful achievement of the goals set for the Year of Ecology. Another major achievement was the increased environmental consciousness and responsibility of both business entities and citizens. Numerous legislative enactments in the area of environmental protection, which were submitted for consideration or already adopted in the current year, should facilitate those ideas further.

158,000,000,000  
ROUBLES

were contributed by businesses in natural environment in industrial areas

49,000,000  
PEOPLE

were targeted in the zone of negative industrial impact mitigation and should already benefit from

20,000,000  
ROUBLES

across Russia participated in different events in the course of the Year of Ecology

62  
ENVIRONMENTAL AGREEMENTS

were signed between Minprirody, Rospirodnadzor, regional governments, and national enterprises in 2017



Source: [ecoyear.ru](http://ecoyear.ru)  
[ecotech-expo.com](http://ecotech-expo.com)



environment damaged by operation of the Baikal pulp and paper mill. The Lake Baikal Protection Program includes 33 measures. The total budget of the projects is 475.6 billion

<sup>69</sup> Material provided by Prokhorova N.B., Federal State Budgetary Institution 'Russian Research Institute of Integrated Water Management and Protection'

<sup>70</sup> Available at <http://kremlin.ru/events/president/news/15177>

<sup>71</sup> Available at <http://pravo.gov.ru/proxy/ips/?docbody=&nd=102349927&>

roubles, including 112.79 billion roubles in 2017. 99 billion roubles will be allocated for "Protection of water bodies" and 130 billion roubles for "Protection of Baikal and Prebaikal territory".<sup>72</sup>

In the context of severe drought in the Baikal basin, on 27 December 2017 the Government of the Russian Federation adopted a new Decree #1667, which permits raising and lowering water level in the lake in 2018-2020 lower or higher the thresholds established by law in 2001. This decision is again reasoned by a need to ensure water diversion for TPP and energy generation by the Angara hydropower cascade belonging to En+/Evrosibenergo Group.

In November 2017, En+ Group conducted IPO (initial public offering) on the London Stock Exchange. The Rivers without Boundaries Coalition was actively involved in the discussion of risks in the process of IPO. The final IPO prospectus prepared by En+ indicates that the company will strive to reduce its impact on the ecosystem of Lake Baikal. However, in all Russian media, En+ strongly denies any responsibility for the lake's state.<sup>73</sup>

### Control over hazardous industries in 2017



**284,000 tons reduced**  
of pollutant emissions and discharge



**220,000 facilities**  
included in the inventory of the Rosprirodnadzor as the facilities with negative impact



**63 agreements**  
on transition of 47 companies to more ecologically friendly technologies under supervision of Rosprirodnadzor



**139 billion roubles**  
total amount of contracts



**35% of measures**  
by the end of 2017, 64 out of 179 measures planned under the agreements were completed

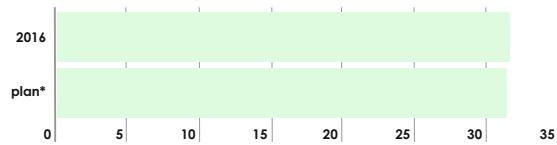


**11 agreements**  
with companies were closed by the end of 2017

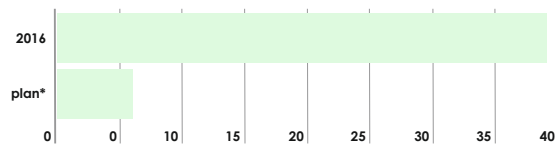
Source: Rosprirodnadzor, Minprirody

### Results anticipated from the implementation of agreements:

Emissions, mln ton/year



Untreated wastewater, mln m<sup>3</sup>/day



Date of completion of contracts between companies and Rosprirodnadzor

Source: Rosprirodnadzor, Minprirody

### Major events on the occasion of the Year of Ecology:

On 18-20 April, **XIV International Scientific and Practical Symposium and Exhibition "Clean Water of Russia-2017"** was organized by Russian Research Institute of Integrated Water Management and Protection in **Yekaterinburg**. More than 350 researchers and executive officers, representatives of scientific and educational institutions, enterprises, and community organizations involved in environmental protection, use and management of water resources, experts from the European Center for River Restoration (Finland, Italy, and Netherlands), representatives of Armenia, Azerbaijan, Uzbekistan, Kyrgyzstan, and Belarus took part in the symposium. The main topic of the Symposium 2017 was the "Implementation of the Water Strategy of the Russian Federation for a period up to 2020".<sup>74</sup>

On 27-30 June, the first All-Russian Water Congress "**Water Resources of Russia for Sustainable Development, Environmental Security and Public Health**" was organized in Moscow. It gathered more than 1000 participants from 67 regions of Russia, as well as from Azerbaijan, Israel, Ukraine, and Belarus. The Congress provided a platform for inter-agency and inter-disciplinary dialogue in developing a comprehensive policy of sound water use in all economic sectors, which will contribute to

<sup>72</sup> <http://ecoyear.ru/>

<sup>73</sup> Report of RWB for 2017

<sup>74</sup> <http://wrm.ru/cwr2017/>

efficient implementation of the Environmental Security Strategy of Russia until 2025 in part of protection, preservation and improvement of water bodies. The Congress was concluded with the adoption of Resolution.<sup>75</sup>

**The day of Lake Baikal** was celebrated in Russia on 10<sup>th</sup> of September.<sup>76</sup>

On 13-16 September, the **All Russian Scientific and Practical Conference “Environment of cooling ponds of power stations”** was held in Chita. The Conference was aimed to address problems of the impact of power stations on aquatic ecosystems, watercourses, and environment and make relevant decision in this field, as well as identify potential for joint research, development, and projects.<sup>77</sup>

On 2-7 October, the **All-Russian Scientific and Practical Conference “Water Resources: New Challenges and Solutions”** was held in Sochi, with participation of more than 120 scientists and experts. The pressing scientific issues related to reliable and environmentally friendly water use, better water quality and ecosystems, efficiency of water management and protection, and water security were discussed during the Conference.<sup>78</sup>

On 12-14 December, the **International Scientific and Practical Forum and Exhibition “ECOTECH” and V All-Russian Congress on environmental protection** were organized in Moscow. The event aimed at summarizing results of the Year of Ecology, including transition to circular economy and other pressing issues.<sup>79</sup>

**In 2017, the Federal Agency for Water Resources accomplished the following work.** Within the framework of the Federal target program “Development of the water sector of the Russian Federation in 2012-2020”, financing of measures was continued to ensure guaranteed water supply in the Krasnodar Territory, Republic of Adygeya, Tambov province, Perm Territory, and Penza province. Two projects were implemented: “Reconstruction and improvement of the technical condition of the Krasnodar reservoir facilities” and “Reconstruction of the Neberdjaev reservoir”. They allowed supplying 302,000

people with water. As to conservation and improvement of ecological status of water bodies and improvement of water quality, the efforts for restoration and environmental rehabilitation were made on 19 water bodies (including on the Gorkov, Krasnodar, Uglich, Ivankovsk, and Pyalov multi-purpose reservoirs) in 17 regions of Russia; two projects on environmental rehabilitation were also developed. Work was completed on 8 water bodies located in 8 regions of Russia and occupying about 170 ha. Additionally, 50 km of river channels were cleaned to improve sanitary state of water bodies. Through budget funds allocated for major construction, work was conducted on 45 sites; construction was completed on 12 sites totaling 25.2 km, including the most significant “Embanking the right bank of the Volga River in Volgograd” along 2.9 km and “Construction and reconstruction of protective hydraulic facilities in the Nikolaevka village, Jewish Autonomous Province” on 8.25 km.<sup>80</sup>

## Developments in Other European Countries and Transboundary Basins

The Italian Ministry for the Environment, Land and Sea organized the **International Summit on “Water and Climate: Meeting of the Great Rivers of the World”**, from 23 to 25 October 2017 in Rome, Italy. This international summit was organized in partnership with UNECE, INBO, the Global Alliances for Water and Climate and Aquamadre. It gathered representatives of the largest river basins (more than 30 basins) from more than hundred countries of the world. It gathered 45 delegations from 5 continents, including 100 contributors and high-level participants from the European Commission, major UN agencies, international financial institutions, and the Union for the Mediterranean. The work of the Summit was organized around four major topics, which were presented in high-level panels and widely discussed among participants: improvement of knowledge on climate change adaptation; management of water resources and aquatic ecosystems in the context of climate change; public participation and involvement of private sector in climate change adaptation at the basin level; and financial mechanisms for

<sup>75</sup> <https://raww.ru>, <https://watercongress.ru/assets/images/resources/66/rezolyucziya-kongress-2017.pdf>

<sup>76</sup> <http://voda.mnr.gov.ru/news/detail.php?ID=424511>

<sup>77</sup> <https://www.vesti.ru/doc.html?id=2932538&cid=17>

<sup>78</sup> <http://www.wrm.ru/news/show.php?id=634>

<sup>79</sup> <http://ecoyear.ru/2017/12/itogi-ekotekh-rossiya-ekologicheskij-lider-mira/>

<sup>80</sup> 2017 Report of the Federal Agency for Water Resources

adaptation to climate change at the basin level. At the end of the discussions, the priority recommendations were formulated for reporting to COP23 and other relevant Forums.<sup>81</sup>

**International Commission for the Protection of the Rhine (ICPR)**, supported by the engineering consultant HKV, developed the instrument **"ICPR FloRiAn (Flood Risk Analysis)"** aimed at evaluating the effect of measures to reduce flood risk and at estimating the future evolution of flood risk. ICPR FloRiAn is GIS based and covers the main stream of the Rhine. Flood maps are the basis for the tool. In addition to the quantification of economic flood risk, modules are developed for quantifying the consequences of risk for human health, to the environment and to culture heritage. In short, the main instrument consists of three interacting calculation modules (Model Builders) resulting in an overall damage or risk assessment.

The ICPR uses this tool to assess risk reduction and evolution along the Rhine from 1995 up to now as well as to carry out regular reviews of the impacts of measures on flood risk reduction for the Flood risk management plan of the international Rhine River Basin. Calculations made with the help of ICPR FloRiAn proved the reduction of flood risks by 25% between 1995 and 2020. The instrument is applicable to other river basins. In 2017, external users (i.e. beyond ICPR) performed first test calculations with the tool.

#### **The issue of low flows in the Rhine River Basin.**

In recent years there has been a shift in the Rhine River basin from looking not only at consequences of floods but also towards low flows. During the last decades, several low flow periods occurred with severe impacts not only

on the river itself but also on different uses of the Rhine. The Rhine states are therefore paying increased attention to this topic and so the ICPR has put in place an international group of low water experts which began its work in early 2017. The Expert group "Low water" analysed the trend of low water since the beginning of the 20<sup>th</sup> century, examined past low flow events and classified them in return periods. In addition, the ICPR investigated the various consequences of low water for different uses of the Rhine and inventoried national low water management measures. This will be the subject of a report to be published in mid-2018. Moreover, the Expert group "Low water" is currently working on setting up a low water monitoring network or system. The International Commissions for the Protection of the Moselle and the Saar (ICPMS) are already testing such a system on the main tributary of the Rhine, the Moselle.

In parallel, the ICPR and two other "Rhine commissions" (the International Commission for the Hydrology of the Rhine basin and the Central Commission for the Navigation of the Rhine) have organised the international symposium "Low flows in the Rhine catchment" on 20-21 September 2017 in Basel (Switzerland). In a nutshell, one of the main outcomes of the workshop is that low flows in the Rhine are not worse than 100 years ago but are nowadays affecting numerous – more or less vulnerable – uses (navigation, industry, agriculture, energy production, etc.). On top of that, scientists expect more frequent summer low flow events in the future, occurring together with higher water temperatures, indicating possible impacts on aquatic ecosystems and the need for further exchanges between water users to improve resilience in the Rhine catchment.

Source: [www.iksr.org](http://www.iksr.org)

## 11.5. Middle East

### India & Israel: Cooperation on water management

Even advanced countries around the world and states like California are noticing Israel's success in the field of water management and recycling.

For example, in the US, the state of California is currently suffering from a severe water crisis,

primarily as a result of inefficient and failed water management in agriculture. Water recycling in agriculture in California is five per cent only, whereas in Israel this rate is 85 per cent.

To resolve the above issues and further deepen the bilateral cooperation, during Prime Minister's Modi visit, the two MoU's were signed between: the Ministry of Drinking Water and

<sup>81</sup> <http://www.minambiente.it/water-and-climate-summit>

Sanitation of India and the Ministry of National Infrastructure, Energy and Water Resources of the State of Israel on National Campaign for Water Conservation in India and Government of Uttar Pradesh and the Ministry of National Infrastructure, Energy and Water Resources of the State of Israel on State Water Utility Reform in India.<sup>82</sup>

**Turkey's plans to construct 22 new dams in the South Anatolia region have already sparked concern of its neighbors.** Officials of the Department of Environmental Protection of Iran criticized Turkey for the reckless construction of giant dams, which leads to the drying up of the rivers. According to environmentalists, one of the dams called Ataturk is the largest dam in the world, which was built on the Euphrates River. Its

volume is 48 billion cubic meters, which is equivalent to the volume of one hundred Iranian dams.

If to sum up all the dams built by Turkey on the Euphrates, it measures to 100 billion cubic meters of water. If Turkey succeeds in constructing the Ilisu dam on the Tigris, with a volume of 10.4 billion cubic meters, then a real water crisis will erupt.

In other words, 100 percent of the water from the Euphrates River and 60 percent of the water from the Tigris River will be blocked; nothing will come to the lands of Syria and Iraq. This will have an adverse impact not only on agriculture, but also on environment, particularly, wetlands and situation in the countries in general.<sup>83</sup>

## 11.6. Australia

**In 2017, Basin plan evaluation was held for one of the river basins of Australia – the Murray–Darling Basin.** It is a complex, diverse and dynamic system. It is constantly changing in response to the influences of people, climate and the way water is used for production, communities and the environment.

The Basin Plan aims to find a balance between the water needs of all Basin users, including communities, industries and the environment. It has been five years since the Basin Plan was established to recover 3,200 GL of water for the environment out of the total water use of 13623 GL or implement projects that would lead to “equivalent” outcomes. It's time to check how implementation is going.

The 2017 Basin Plan Evaluation covers all elements of implementation, from water planning and management, to recovery and use of water for the environment. At this early stage of the Basin Plan's implementation, there are some good signs that the plan is working and on track in many areas. Progress was found to be lagging in a few important areas, including water resource plans and compliance regimes.<sup>84</sup>

At the same time, in November 2017 a group of scientists assessed water reforms in the Murray-

Darling Basin, since the historic National Water Initiative was signed in 2004 and the Murray-Darling Basin Plan was adopted in 2012. Since then, nearly \$8 billion of taxpayers' money has been spent largely to address the chronic over-allocation of water in the river systems of the Murray-Darling Basin.

Overall, the review finds there has been significant progress (the initiative aims to restore the health of river systems in a way that promotes economic prosperity while using less water) since 2004, but this progress has slowed to a trickle since the Basin Plan was adopted in 2012 as a result of strong political pressure.

Only one quarter of the water recovered so far has been acquired since the Basin Plan was adopted, while the cost of water recovery has doubled. Without major changes in implementation, it is almost certain that the Basin Plan will fail.

Particularly, it is proposed to rebuild trust with greater transparency (i.e. improved water accounting), guarantee recovery of the full 3,200 GL, ensure that water recovered achieves measurable improvements to the river system, a regional development package that puts communities at the center of reform, and prepare for the prospect of a future with less water.<sup>85</sup>

<sup>82</sup> <https://economictimes.indiatimes.com/news/economy/agriculture/india-israel-cooperation-on-water-management/articleshow/61767010.cms>

<sup>83</sup> <http://www.waterpolitics.com/2017/07/26/why-turkish-dams-could-push-the-region-toward-new-conflict/>

<sup>84</sup> <https://www.mdba.gov.au/basin-plan-roll-out/2017-basin-plan-evaluation>

<sup>85</sup> <http://wentworthgroup.org/wp-content/uploads/2017/12/Wentworth-Group-Review-of-water-reform-in-MDB-Nov-2017-Review-Report.pdf>

## 11.7. Rivers of the world and nature rights

**This year, the Earth Overshoot Day falls on August 2** – the date when humanity's annual demand on nature exceeds what Earth can regenerate over the entire year. It is calculated using the following formula: planet's biocapacity / humanity's ecological footprint) x 365. This means that for the remaining months of 2017 the humanity will use resources on "credit" – continuing reducing natural resource reserves accumulated over the past years and emitting more carbon dioxide into the atmosphere. The first "ecological debt" was recorded on December 29, 1970 – resource deficit then was only two days. It is coming earlier each year: in 2000 – beginning of October, 2013 – August 20, 2014 – August 19, 2015 – August 13, and 2016 – August 8. But if business continues as usual, the world would be using the resources equivalent to two Earths by 2030, with Earth Overshoot Day moving up on the calendar to the end of June.<sup>86</sup>

**In 2017, four rivers have been given the status of legal persons: the Whanganui River in New Zealand, the Ganges and Yamuna Rivers in India, and the Rio Atrato, in Colombia.** Giving nature legal rights means the law can see "nature" as a legal person, thus creating rights that can then be enforced.<sup>87</sup>

**On July 19, 2017, the UN Secretary-General "Harmony with Nature" report was published.** The report draws on contributions to the seventh interactive dialogue on Harmony with Nature, held on 21 April 2017, that address Earth jurisprudence, the 2030 Agenda for Sustainable Development, trends in the implementation of Earth-centered law and a range of initiatives and achievements in law, policy, education and public engagement relating to Earth jurisprudence during the period 2016-2017.<sup>88</sup>

### **Excerpts from the report concerning national legislation granting rights of Nature:**

**28-31.** On 10 November 2016, the Constitutional Court of Colombia recognized the Atrato River and its basin and tributaries as having rights. The Atrato River, which is in the Chocó region of Colombia, has suffered from illegal mining that has led to both environmental and humanitarian crises and to litigation to defend

the rights of the river and of Tierra Digna-supported local communities. ... In his analysis of the ruling of the Constitutional Court, Mr. Echeverría noted that the Court took an ecocentric and biocultural perspective and that environmental justice required that they must allow Nature to be subject to rights. In applying its decision, the Court took a step forward in the jurisprudence towards the constitutional protection of one of the most important sources of biodiversity in Colombia: the Atrato River. For Judge Jorge Iván Palacio, who ruled in favor of granting rights to the Atrato River, his conclusion was as obvious as it was difficult: they must save the planet from man himself.

**32.** In another example, Mexico City adopted a new constitution in early 2017 that addressed the rights of Nature in paragraphs 2 and 3 of its article 13, which stated that the right to the preservation and protection of Nature would be guaranteed by the authorities of Mexico City. In addition, article 13 indicated that a secondary law would be passed to recognize and regulate the protection of the rights of Nature, as formed by all its ecosystems and species, as a collective entity with collective rights. The result will be that citizens of Mexico City will be able to enforce fundamental rights on behalf of Nature. The Constitution of the State of Guerrero similarly recognizes in its article 2 the rights of Nature.

**33-35.** In March 2017, the parliament of New Zealand granted the Whanganui River legal status as a person, consistent with negotiations between the Government of New Zealand and Whanganui Iwi that formally began in 2009 and moved to the signing of the Whanganui River deed of settlement in 2014. The legislation recognizes the deep spiritual connection between the Whanganui Iwi and its ancestral river and creates a strong platform for the future of the Whanganui River. The river's interests will now be represented jointly by a member appointed by the Maori community and one appointed by the Government.

**36.** On 20 March 2017, the High Court of Uttarakhand, India, granted the Ganga and

<sup>86</sup> <https://www.overshootday.org/>

<sup>87</sup> <http://www.globalwaterforum.org/2017/11/26/new-legal-rights-for-rivers/>

<sup>88</sup> <http://www.harmonywithnatureun.org/chronology/>



Yamuna Rivers legal personhood status. The High Court ordered that two government officials in charge of cleaning and rejuvenating the river as well as the Advocate General of Uttarakhand act as the “legal parents” of the holy rivers and work as the human face to protect, conserve and preserve them and their tributaries. The High Court further stated that those officers would be bound to uphold the status of the two rivers and promote their health and well-being.

**37.** On 30 March 2017, the High Court of Uttarakhand also granted the Himalayan Gangotri and Yamunotri glaciers, including waterfalls, meadows, lakes, dales, forests, wetlands, grasslands and springs, the status of legal persons for their survival, safety, sustenance and resurgence. Judges Rajiv Sharma and Alk Singh observed that past generations had handed over Mother Earth to humans in its pristine glory and humans were morally bound to hand over the same Mother Earth to the next generation. The High Court directed that the rights of those legal entities should be equivalent to the rights of human beings and the injury or harm caused to those bodies should be treated as injury or harm caused to human beings.

**38.** In Ecuador, where the nation's Constitution was amended to include rights of Nature in 2008, judicial decisions in at least five cases have recognized those rights and a number of regulatory actions have enforced that provision. The Plurinational State of Bolivia has enacted two national laws that address the rights of Nature, and Argentina and Brazil also have trends in that regard.



