and Serbia and Montenegro (67 percent), whereas Bulgaria and the Slovak Republic have mostly invested in nuclear power (over 50 percent).

Conclusion

The main problem in the DRB is the water quality rather than quantity. Nine countries (six EU members and three concession countries) are at different stages of implementation of the WFD. The other contracting parties of the ICPDR are also working towards the common goal of improving the quality of water resources. However, marked differences in economy, sociology and topography complicate the tasks of the states. For this reason, neither WFD nor ICPDR goals are yet to be implemented uniformly throughout the region, and there is still a substantial amount of work to be done at the national level. However, members of ICPDR consider the sustainable utilization of water resources as the overriding priority and work together to this end.

3. Ethiopia

Ethiopia is located in East Africa and constitutes a major portion of the Horn of Africa. Its terrain consists mostly of a huge central plateau and surrounding lowland plains, producing three climatic zones: tropical in the south and southwest, cold to temperate in the highlands and arid to semi-arid in the northeastern and southeastern lowlands. As a result, the amount of rainfall and surface run off is highly variable and depends on location and altitude. In fact, four basins located on the western part of the country contribute 83 percent of the national surface water potential, while other areas produce very low surface runoff.

Ethiopia has 71 million inhabitants, half of which live at around 2,200 metres above mean sea level (m.a.s.l), in the areas with cooler temperatures, higher rainfall and fewer instances of malaria. Another 40 percent lives between 1,400 and 2,200 m.a.s.l. The remaining population lives at altitudes below 1,400 m.a.s.l. Thus, Ethiopia's population is also unevenly distributed, with nearly 80 percent of the 71 million inhabitants living in only 37 percent of the total area of the country.

Ethiopia has seven transboundary basins that carry over 95 percent of annual runoff. However, there is no comprehensive agreement binding riparian states. The riparian countries of one of these basins, the Nile Basin, taking into consideration the challenges of meeting their growing water needs in a sustainable manner, have launched the Nile Basin Initiative (NBI) in 1999. While basin countries are currently engaged in negotiations, it is hoped that the NBI will provide the basis for a permanent legal and institutional framework.

With a per capita gross national product (GNP) of US $100 in 1994, Ethiopia ranks as one of the poorest countries in the world. In 1994, the per capita GNP income in Ethiopia was less than half of those in sub-Saharan Africa as a whole, where per capita GNP was approximately US $259. Overall, it is estimated that nearly 52 percent of the population is below the national poverty line,[5] with poverty in urban and rural areas estimated at 58 percent and 48 percent respectively.

Water resources

Ethiopia has nine major rivers and twelve big lakes. Lake Tana, for example, in the north is the source of the Blue Nile. However, apart from the big rivers and major tributaries, there is hardly any perennial flow in areas below 1,500 m. While the country's annual renewable freshwater potential is 122 billion m^3, only 3 percent of this amount remains in the country. It is estimated that 54.4 billion m^3 of surface runoff and 2.6 billion m^3 of groundwater can be developed for utilization. Currently less than 5 percent of surface water potential is used for consumptive purposes.

Challenges to life and well-being

Ethiopia is largely dependent on the agricultural sector, which provides 86 percent of the country's employment and 57 percent of its GDP. Rainfed crop cultivation is the principal activity and is practised over an area of 27.9 million hectares (ha), or approximately 23 percent of

Map 14.4: Overview of the river basins in Ethiopia

Source: Prepared for the World Water Assessment Programme by AFDEC, 2006.

potentially arable land. Frequent and severe droughts cause serious decreases in the incomes of rural inhabitants who tend to rely heavily on agriculture. While estimates have shown that up to 3.7 million ha can be irrigated, a mere 300,000 ha of irrigation has been developed. To make matters worse, projected large- and medium-scale irrigation schemes will likely do little to secure the food supply for the rapidly growing population.

Wetlands in Ehiopia are very valuable areas for rural communities. They contribute directly to food security by providing vegetables in the early rainy season when the supply of food from the upland fields is running out for many families. Moreover, many rural inhabitants obtain drinking water from the springs around the wetlands. However, wetlands are being degraded due to human-related activities, such as draining for agriculture, cattle grazing, industrial pollution and unsustainable utilization of resources. Although there are some policies that specifically address wetlands, there is, at the national level, an overall lack of wetland policy.

Ethiopia's urban population is close to 10 million people, 25 percent of whom are located in Addis Ababa. Half of the urban population lives in towns smaller than 30,000 inhabitants. Although Ethiopia is rural-centred (85 percent of the population lives in rural areas), the rate of urban growth is increasing at a yearly average rate of 5 percent, which is much higher than the average national growth rate of 2.9 percent per year.

The status of water and sanitation infrastructure is very poor in Ethiopia: only 10 percent of Ethiopians have access to proper sanitation facilities and 31 percent to safe water. Service coverage is considerably higher in urban areas than in rural areas (74.4 percent and 23.1 percent respectively). Furthermore, almost 25 percent of water installations in rural areas are not functional at any given time. Central Statistic Authority (CSA) results from 1998 showed that 63.8 percent of people living in rural areas had to fetch water from a source within a distance of 1 km. The situation gets worse during dry periods, as water carriers have to walk longer distances for even smaller quantities of lower quality water. Accordingly, the incidences of diseases related to unsafe water supply and inadequate sanitation are very high. High population growth rates, low education levels and high rates of illiteracy have also contributed to the burden of ill health.

The major causes of morbidity among patients seeking treatment in health facilities include respiratory infections, malaria, skin infections, diarrhoeal diseases and intestinal parasitic infections. About three-quarters of Ethiopia is known to be a breeding ground for mosquitoes, the vector of malaria. Malaria is especially endemic in hot lowlands, which prompts many Ethiopians to live in the highlands. Diarrhoea, the most prevalent water-related disease, accounts for 46 percent of the under-five child mortality rate. The five illnesses mentioned above account for over 63 percent of all reported cases of child morbidity. Women and girls are particularly vulnerable to water-borne and water-related diseases as they more frequently come into contact with contaminated water (they are usually responsible for fetching water for the family).

The main source of energy production in Ethiopia (about 93 percent) is biomass (fuel wood, coal, agricultural residues, animal wastes, etc.), which leads to rapid forest depletion. The contribution of hydropower to annual energy production is approximately 1 percent. It is estimated that 30,000 MW of hydropower can be generated using available water resources. However, merely 670 MW of hydropower potential is currently developed. Household consumption accounts for 87.5 percent of total energy consumption, while industry accounts for 5 percent. As Ethiopia's economy depends almost entirely on subsistence agriculture, the need for electricity has been quite low. However, this situation is changing, as urbanization and industrialization increase energy demands. The Ethiopian Electric Power Corporation aims to set up a variety of hydroelectric, oil and gas resource development schemes in order to improve access to electricity from 15 percent to 20 percent by 2010.

The effects of water-related natural disasters

As most of the rivers in Ethiopia flow in deep gorges, floods have not traditionally been a common phenomenon. However, due to massive deforestation and loss in surface vegetation, flooding now annually occurs in some areas, such as in the banks of the Blue Nile River and in the vast plains of the Baro Akobo Basin in the country's southwestern region. Although sometimes associated with economic and social damages, floods provide much needed water to ensure the fertility of grazelands, making them anticipated events, especially for nomads, whose incomes are dependant on animal husbandry.

Drought is a frequent natural disaster in Ethiopia. Recent observations have shown that the frequency of droughts have increased over the last few decades. There have been about thirty major drought episodes over the past nine centuries. Of these drought episodes, thirteen were very severe at the national level. **Table 14.1** shows the number of people affected by droughts and the population which required basic food assistance between 1990 and 2004.

The contingency plans for water-related natural disasters are prepared by the Disaster Prevention and Preparedness Commission (DPPC), which brings together all concerned stakeholders to draft a plan of action to be implemented by all relevant organizations.

Water policy implementation

The Federal Water Resources Management Policy, issued in 1999, elaborates on the water supply and sanitation, irrigation and hydropower sectors. It promotes the sustainable development of water resources for equitable social and economic benefits through public participation and IWRM. In order to implement the requirements set forth in the policy, various legal and

5. National poverty line is deemed appropriate for a country by its authorities. For this reason, the national poverty line should not be used for comparison between other countries as it varies significantly (Human Development Report, 2005).

Table 14.1: Number of people affected by recent droughts

Year	Population affected	Food assistance requirements (number of people)
1990	3,429,900	374,400
1991	1,850,000	838,974
1992	5,228,530	1,288,737
1993	1,644,040	739,280
1994	889,000	577,586
1995	3,994,000	492,460
1996	3,153,000	253,118
1997	1,932,000	199,846
1998	5,820,415	572,834
1999	2,157,080	1,138,994
2000	7,732,335	836,800
2001	6,242,300	639,246
2002	5,181,700	557,204
2003	14,490,318	1,461,679
2004	9,369,702	964,690

institutional capacity-building efforts are currently underway. For example, the fifteen-year Water Sector Development Programme (WSDP) was put into effect in 2002, and the Water Resources Management Proclamation was issued the same year to provide legal ground for the implementation of the Water Policy. The Water Sector Development Programme is composed of five programmes and sets the targets on water supply and sewerage, irrigation and drainage, hydropower development, general water resources programme and institutions/capacity-building. Furthermore, vocational and technical training centres, operational since 2003, have been established to train technicians on irrigation development schemes and water supply and sanitation services. In addition, the government has taken the initiative to establish basin institutions. For this purpose, with the financial and technical aid of international donors, an institutional study has been initiated for the Blue Nile (Abbay) Basin as a pilot project. Upon the successful completion of this project, the establishment of similar institutions in other basins are foreseen. However, awareness-raising activities to disseminate existing plans and policies at various levels (public and national institutions) are lacking. Furthermore, due to the absence of a functioning monitoring and evaluation system, the rate of implementation and the effectiveness of policies have not yet been assessed.

Conclusion

most of the Ehiopians do not have access to safe water and sanitation. The Water Sector Development Programme (WSDP) prepared for 2002-2016 aims to improve the existing situation; however, the investment required for the implementation of this programme cannot be financed by national funds alone. Attracting international donors will therefore likely remain a priority in order to alleviate the heavy burden of disease, poverty and hunger that the country currently faces.

4. France

Excluding its overseas territories, over 60 million people live in France, within a surface area of 551,695 km^2.

There are six major river basins in France: the Adour-Garonne, the Artois-Picardy, the Loire-Britanny, the Rhine-Meuse, the Rhone-Mediterranean and the Seine-Normandy. These basins are managed by separate basin agencies that were established by the 1964 Water Law and further reinforced by the 1992 Water Act.

The WFD is similar to the French institutional system in that it requires the implementation of IWRM at the basin level. The most recent French water law (passed in 2003) takes the WFD into account, calling on all EU Member States to achieve 'good status' for all of their water bodies by 2015 (see **Box 14.1** on the WFD and the case studies for the Danube River Basin and the Lake Peipsi/Chudskoe-Pskovskoe Basin for further information on the implementation of the WFD).

France's six major river basins have different climatic, hydrological and socio-economic characteristics. Consequently, six basin agencies have been set up to address the differing challenges of each basin. The specific basin challenges are briefly summarized below.

Map 14.5: Overview of the river basins in France

Source: Prepared for the World Water Assessment Programme by AFDEC, 2006.