SOME NEGATIVE EFFECTS OF LARGE DAMS

Large dams have enjoyed a very positive reputation as industrial powerhouses in comparison to fossil fuel equivalents. The dam lobby claims that they produce negligable greenhouse gases, little disturbance to river systems, and labels them ‘renewable and green technology’. In reality, studies have shown that dams can be more polluting, emit more greenhouse gases and be less sustainable than even fossil fuel alternatives.

Effects of dam reservoir.

Flooding of the area above the dam can cause a number of environmental and economic problems including:

Submergence of valleys and low lying sites which are often of exceptional geological, ecological, cultural and therefore touristic (economic) value. Thórhallsdóttir (2007) points out that most of the biodiversity of the highlands occurs in the river valleys and low lying wetlands, making these areas particularly valuable in an Icelandic context.

Methane gas and CO2 production from rotting vegetation and soil, and processes at the dam head (known as the fizzy drinks effect), can be up to 54 times that of equivalent gas powered plants in tropical reservoirs. (Methane has 28-34 times more atmospheric warming potential than CO2). As reserviors rise and fall, vegetation continues to grow and rot on fertile silty soil and on the reservoir surface, leading to continued emissions throughout the dams lifetime. (Fearnside, 1995).

Earthquakes and volcanic activity can be induced by the weight of the reservoir on nearby fault lines, and lubrication of faults by excess water. There are many recorded cases of this effect, including 5 strong earthquakes on the Indian peninsula in the 1980´s and 4 earthquakes over 6 Richter since the 1960´s. (Gupta, 1992). Even small earthquakes (common under dams) can lead to dam cracking and reservoir overtopping, as in the Vaiont dam disater in Italy which killed 2,600 people when landslides caused the dam to overflow. (McCully, 2001).

Sedimentation due to build up of river carried material behind the dam (especially in glacial rivers) can quickly reduce the dams lifetime, and significantly effect the amount of power produced. Sedimentation in the Sanmexia dam in China reduced energy generation from 1,200MW to only 250MW after only 3 years. Annual average hydro plants in the USA produce only 46% of expected generation according to industry. (McCully, 2001).

Soil erosion of silt deposited at the edges of reservoirs can seriously damage surrounding vegetation and farmland by ‘sand blow’. The Karahnjukar project is predicted to affect 2,900km² of land (or 3%) of Icelands land mass (govt figures), partly due to this effect. (Thórhallsdóttir, 2007).

Mercury poisoning of fish populations caused by decomposition of de-oxygenated soils by bacteria (noted in Finland and USA- see Rosenberg et al, 1995).

Landscape and wilderness fragmentation of often rare and undisturbed landscapes, affecting movement of animal populations and drastically altering the ecosystems in the watershed. (Thórhallsdóttir, 2007).

Effects downstream of the dam

Dams create an impassable block in the river system which seriously reduce the amount, and alter the nature, of downstream flow. Effects of this aspect include:

Sediment deprivation of nutrient rich organic silt to farmland, freshwater fish populations, and eventually to the sea (as silt and sediment are trapped behind the dam). This leads to less fertile farmland along floodplains of the river, erosion of the riverbed and bank, and a decrease in riverine fish. When the river meets the sea sediment deprivation causes serious erosion of coasts and deltas (which depend on riverine sediment to protect and renew them), and enormous damage to fish and algal populations which require calcium from the sediment for nutrition. The subsequent decrease in algae reduces drawdown of atmospheric carbon (which algae normally consume), and has a considerable effect on climate change on a global scale (60% of the worlds large rivers are dammed). (McCully, 2001, Gislason, 2006, and Neu,1982).

Fish populations and other biodiversity are seriously affected by dams. Salmon and other migrating fish cannot pass the dam to reach their spawning grounds. Andromous fish such as this return to the same breeding grounds each year, and cannot reproduce if their path is blocked. In the Columbia river lamprey and salmon were devastated to 1% of their previous population after a dam was built, ruining the fishing economy and biodiversity. Other fish may not be able to lay their eggs in the eroded beds of sediment deprived rivers, or tolerate the change in water quality. (Nehlsen et al, 1991 and McCully, 2001)

Dams as 'renewable energy'?

Proponents of hydroelectric power describe it as green and renewable (or sustainable) technology. In reality these projects often have short lifetimes and a huge economic and environmental cost:

Siltation of the reservoir (especially in glacial rivers) considerably reduces the lifetime of the dam by damaging turbine blades and lowering power generating capacity (see previous section on 'sedimentation'). Most dams do not last their predicted lifetime and many considerably less. (Besant Jones, 1993).

Decommissioning of dams can cost almost as much as building them, (involving complex dredging, drainage and reconditioning of the reservoir), and is never included in cost benefit analysis. Many American dams are now being decommissioned after only 50-70 years of energy production. (1800 dams were earmarked for destruction in 1994, one 30m high dam at Glines Canyon costing over $203 million). Studies show that costs (to taxpayer) significantly increase 25-35 years after building due to need for repairs. (Skalar, 1993).

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