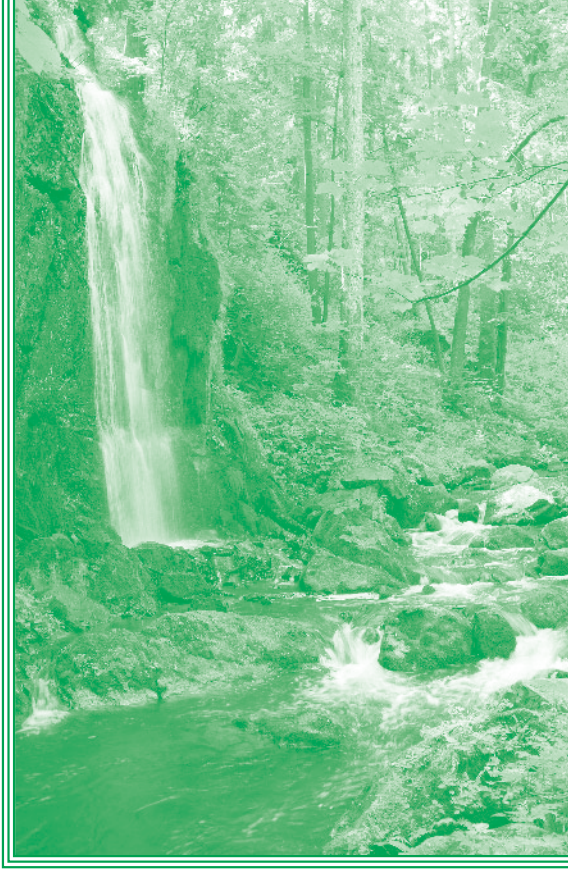
3. NATURAL ASSET BASE

Natural asset stocks, comprising land and ecosystems, water, renewable natural resources, energy carriers, mineral resources and biodiversity, provide an incessant flow of environmental services for the economy. The depletion of the natural asset base leads to the decline in the extent and abundance of these vital services. Therefore, protection and sustainable use of the natural asset base and services derived from the natural environment are a prerequisite of green growth. One of the guiding principles is to keep the natural asset base intact and to maintain or enhance the availability and equality of natural resource stocks and biological diversity at the same time.

Since a declining asset base constitutes a risk to growth, human footprints on the environment, including mining, fishing or forestry, should stay within the capacity of the environment to provide valuable resources and services to the human society. The depletion and degradation of natural assets brings additional economic costs while keeping a sufficient natural asset base provides an ecological insurance for the future. The publication presents several indicators of the natural asset base that were selected to monitor the physical performance of natural assets, including land, ecosystems, freshwater, biodiversity and energy carriers.

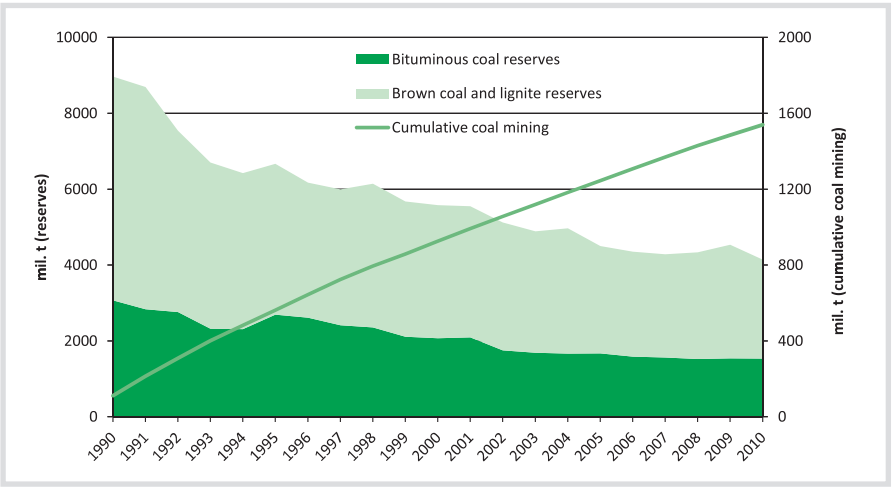


3.1. COAL RESERVES AND MINING

Economic reserves are suitable for mining under current technical and economic conditions. They may either be classified as "explored", which means that their existence is well-proven, or "prospected", which means that their existence is rather assumed by a sampling of the mineral deposit from outcrops and isolated mining works or from geological and geophysical data. Potential economic reserves are not suitable for mining under current technical and economic conditions, but might be usable if these conditions change in future.

The explored economic coal reserves in the Czech Republic decreased by about 54% in 1990-2010 from 8,971 million tons to 4,146 million tons. As the cumulative mining of coal amounted only to 1,540 million tons over the whole period, the decrease in reserves was mostly given by re-classification of reserves from the category of "explored" into the category of "potential" or "prospected" economic reserves.

Figure 15: Explored economic coal reserves and cumulative coal mining (mil. t)



Source: Czech Geological Survey – Geofond

Although only about 0.5% of the world coal reserves are located in the Czech Republic, the reserves of 4,146 million tons might seem quite significant taking into account that the mining amounted to 55 million tons in 2010. It should however, be noted that not all these reserves are currently accessible, as they can be partly situated in protected areas, or due to other cultural or legal restrictions placed on their mining (e.g. so-called "territorial limits for brown coal mining" in Northern Bohemia region). Thus the lifetime of brown coal reserves in 2008 (based on mining in 2008, including losses from mining) was 45 years as such, considering the territorial limits reduces this estimate down to 29 years.

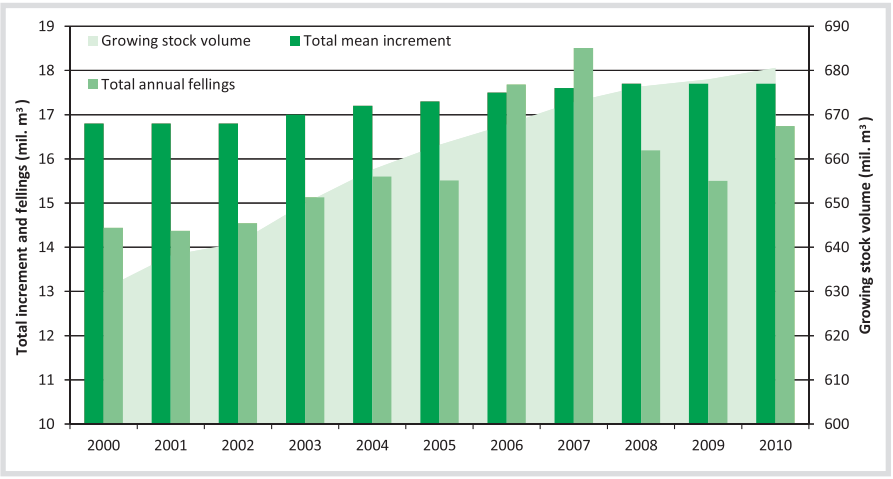
3.2. FOREST GROWING STOCK

The forest growing stock can be defined as the standing volume of trees under bark. The total mean increment reflects the production capacity of forest stands. The balance between the increment and fellings indicates the sustainability of timber production over time.

The forest growing stock is one of the basic indicators of the forest ecosystems state. Growing stocks and increments are related not only to timber production but also to other forest functions and services, such as carbon storage, water retention, biodiversity or recreation.

The forest growing stock has been steadily rising in the Czech Republic, increasing by nearly 8% during the last decade alone. The average growing stock reaches around 260m^3 per hectare of forest land. The growing stock increase is caused mainly by old-growth forests and by increasing annual increments typical for the whole of Europe. However, forest increments have tended to decelerate during the last years.

Figure 16: The forest growing stock, the mean annual increment and the total volume of fellings (mil. m^3)



Source: Czech Statistical Office, Forest Management Institute

Total forest fellings have been increasing but still within the limits of mean annual increments. Only in 2007 and 2008 fellings surpassed mean annual increments (due to the storm Kyrill damage). The total forest growing stock is still increasing however. Forest fellings reached 6.3m^3/ha while mean annual increment was 6.8m^3/ha of forest land in 2010. Therefore, the capacity of forests to provide timber is becoming saturated.

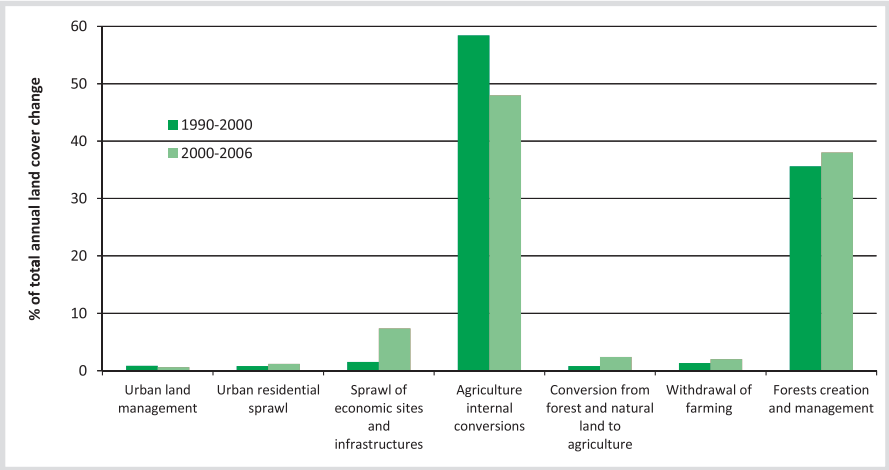
The Czech Republic belongs among the OECD countries with the highest forest growing stocks which reflect natural conditions as well as forest management traditions. In comparison to other European countries, Czech forests are relatively intensively used reaching 0.85-0.9 forest fellings to increments ratio.

3.3. LAND COVER CHANGE

The indicator is based on Land and Ecosystem Accounts, the spatially-explicit database produced by the European Environment Agency. Land and Ecosystem Accounts document balance between land formation and consumption, based on the CORINE Land Cover dataset for the years 1990, 2000 and 2006. Land cover flows are categories of causes of the land cover-change and track transitions between different land cover categories.

Changes in land cover and land use are indicators reflecting the impact of human activities on ecosystems. The land is a spatially limited resource and its competitive use determines the domestic ecological footprint. The transformation of a land cover and the intensity of land use affect the quality of human life through their impacts on ecosystem services such as the quality of drinking water, flood control, climate regulation, the spread of invasive and infectious organisms, as well as the loss of biodiversity.

Figure 17: Land use change intensity as % of annual land-cover change, classified as land cover flows



Source: European Environment Agency

The aggregate intensity of land cover change decreased from 0.81% per year in the period 1990-2000 to 0.33% annually in the period 2000-2006. This slow-down of land use turnover has been caused by the partial stabilization of land use structure, especially in the agricultural sector. The share of agricultural internal conversions on total annual land use turnover dropped by 10 percentage points. On the other hand, urban and infrastructure sprawl increased its share on total land turnover. A considerable share of agricultural land is still taken up by artificial development, especially by the sprawl of economic sites and infrastructure.

Dominant trend over the whole period is a decrease in the extent of arable land, which has been transformed to pastures and meadows, permanent cultures and artificial surfaces. A considerable share of agricultural land is still taken up by artificial development, especially by the sprawl of economic sites and infrastructure. Some agricultural land has been withdrawn with woodland creation. Quite alarming is the steady loss of semi-natural and natural areas, such as semi-natural grassland habitats important for biodiversity.

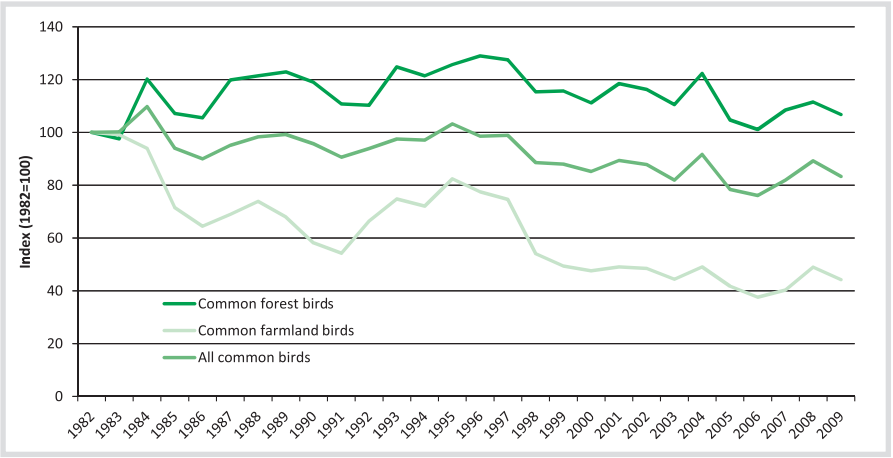
The majority of the OECD countries have experienced similar declines in agricultural lands. At the European level, trends of land take by urbanization and the loss of semi-natural habitats are consistent with the trends in the Czech Republic. In the period between 1990-2000 the Czech Republic was a country with the highest rate of land use change. After 2000, these rates have now become comparable to those in other European countries.

3.4. COMMON BIRD SPECIES

The common bird species indicators are considered to point out wider biodiversity trends where data availability is limited. Common bird indices show trends in abundance of selected common bird species. Data are gathered by volunteers within the Breeding Bird Monitoring Programme. Indicators are reported as a dimensionless change index. Birds as indicators of biodiversity have received wide public and policy resonance.

The common bird index is an indicator of the status and trends of wild natural assets which provide valuable ecosystem services to human society such as pest regulation, pollination or recreation. Birds are selected as a barometer of the state of nature as they are occurring in different habitat types and are sensitive to a wide range of pressures.

Figure 18: Common bird indicators (index, 1982=100)



Source: Czech Society for the Ornithology/Breeding Bird Monitoring Programme

Common farmland birds have declined by more than 50% since 1982. This dramatic decline has been caused predominantly by large-scale agriculture and the loss of semi-natural features on farmland. The partial recovering of farmland bird populations at the beginning of the 1990s has been reversed by agricultural intensification which has caused a further decline of farmland birds.

Forest bird populations have been stable or even slightly increasing. The increasing area of broadleaved forests favours birds occurring in these habitat types. The abundance of all common birds in aggregate has decreased by approximately 15%.

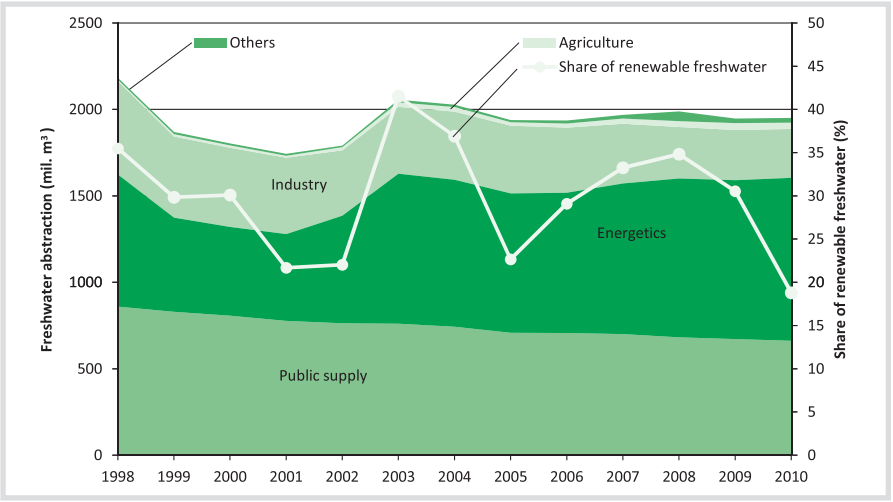
The trend of the decline of farmland and specialist birds is consistent with other OECD and European countries, where bird populations have declined by 30% on average. Common bird indicators have been implemented in a number of countries to monitor the success of halting the loss of biodiversity.

3.5. RENEWABLE FRESHWATER RESOURCES

Renewable freshwater resources are estimated from rainfall, water inflow, runoff, and evapotranspiration. Freshwater abstractions are reported uses of surface water and groundwater. Only water abstraction exceeding 6,000m³ annually or 500m³ per month are included in the statistics.

Freshwater resources are not only required for economic activities but clean water is one of the principal natural resources supporting human health and the quality of life. The Czech Republic has relatively abundant freshwater resources due to sufficient rainfall and relatively low evapotranspiration. However, freshwater quality and quantity is easily depleted by human activities or climate change.

Figure 19: Freshwater abstractions (surface water and groundwater) as a share of renewable freshwater resources (%) and by economic sector (mil. m³)



Source: Czech Hydrometeorological Institute, Ministry of Agriculture, T. G. Masaryk Water Research Institute

Freshwater abstractions are to a large extent determined by the available freshwater resources. The public supply is saturated equally by surface water and groundwater, while industry and energetics are using up surface water especially. The Czech economy directly appropriates between 20-40% of all available freshwater resources annually.

After the initial decrease during the 1990s, freshwater abstractions became stable or even increased during the decade from 2000-2010. The freshwater demand for the public supply and industry has decreased from 1998 by 23% and 48%, respectively. However, these savings have been outweighed by freshwater demand for energetic, agricultural and other uses. Freshwater consumption by agriculture has increased by more than 400%, despite its low absolute demand due to a small fraction of irrigated land in the Czech Republic.

According to international OECD statistics, the Czech Republic is a country with low water stress. However, high water stress has been reached for example during the 2003 heat wave, recording a meteorological as well as an agricultural drought with implications for crop yields.