

The Benefits of Cycling



Benefits and co-benefits

Cycling has a wide range of benefits¹. First of all, to facilitate cycling asks less investments than to facilitate motorized vehicles. Cycling demands less space and is very effective in reduction of congestion. Also bicycle parking demands up to 10 times less space than parking a car.

The prime benefit of any transport system, including cycling, is providing accessibility, i.e. to move an individual and/or goods safely and efficiently to the desired activity at the destination location. But there can be additional benefits not directly related to providing accessibility. Co-benefits can be grouped into benefits of improving the performance of the transport system at large and its contribution to economic development, as well as in benefits that decrease the adverse effects of transport.

Cycling improves accessibility

As a single mode, cycling can improve accessibility. Compared to walking, cycling can enlarge an individual's radius of action within a given travel time budget with a factor 3 to 4 thus covering an area which is 9 to 16 times larger. Compared to public transport, cycling (as a single mode) is individual, is much more flexible, and has a high 'penetration ability'. Cycling can be used by all social classes, and thus contributes to accessibility in a very equitable manner. Accommodating cycling through the provision of more cycling friendly road conditions doesn't harm or exclude anyone. Public spending on cycling facilities is (in principle) beneficiary for all parts of the population.

Cycling further enables mobility for many more people. In particular for all people not driving a car, cycling is a way to go. Cycling can contribute significantly to poverty alleviation. It makes locations for income generation, schools, health care centers more within reach and it supports all kinds of participation to society. More cycling will also contribute to increased employment and income, directly in the retail and maintenance and indirectly by enabling workers to operate more efficiently. Captive pedestrians who can shift to the bicycle, increase their radius of action substantially. Health care workers in Cape Town could double the number of patients by cycling instead of walking, house cleaning women in India could also double their work and income².

Cycling improves the performance of public transport

Cycling can contribute to a better performance of public transport. Since cycling as a feeder mode can be 3 to 4 times faster than walking, the catchment area of public transport stops thus can become 9 to 16 times larger. If used intelligently

¹ See e.g. Co-benefits of cycling inclusive planning and promotion; I-CE report for the Global Road Safety Facility at the World Bank, 2010; www.cycling.nl

² Projects supported in the Bicycle Partnership Program by I-CE, www.cycling.nl

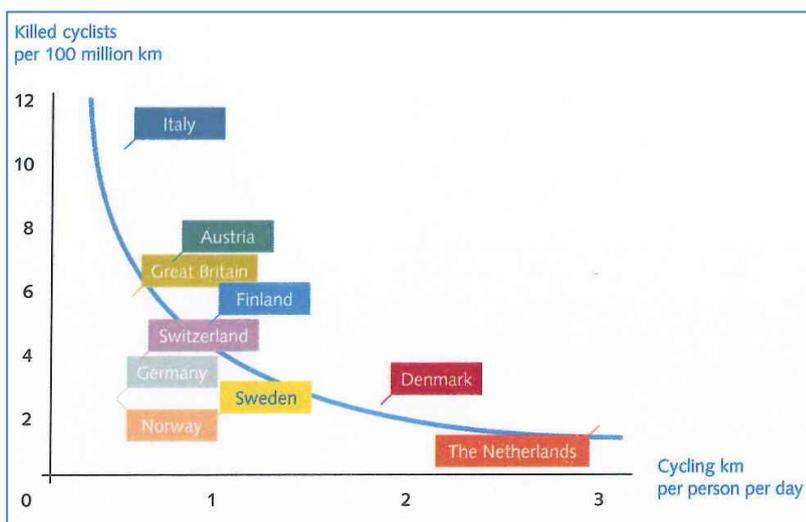
one can build an integrated 'cycling and public transport' system. Such an integrated transport system would optimise both the public transport route network and the (more local) cycling route networks. The latter should be optimally connected to the important public transport stations (or 'stops'), and these stations should offer the proper services (bicycle parking facilities).

Cycling can counter congestion

Attractive cycling conditions will help to moderate (or at least delay) people's aspirations to own and use a private car and current car owners may be tempted to substitute a part of their trips by cycling trips. But to utilise this potential co-benefit of bicycle use, the competitive position of cycling (in combination with public transport) should be improved substantially.

Cycling can improve road safety

It is almost inconceivable that cycling promotion can be successful without improving cyclists' safety, as for many people lack of road safety is the main impediment for cycling more often. Thus 'cycling promotion' and 'improving road safety' can result in a self-reinforcing interaction of these two policies. Another reinforcing mechanism is the so-called 'safety by numbers' effect. Experiences in developed countries show that an increase of cycling is going together with a decrease of risks for the individual cyclist. Apart from the obvious combination of cycling promotion and improving road safety this is explained by the presumption that fellow road users will better adapt their road behaviour to the presence of cyclists when there are more of them on the road. The implication of this mechanism is that the gains of increased cycling with regards to road safety are only to be received when the increase is beyond a certain critical mass.³ See chart 3.



³ See e.g. Co-benefits of cycling inclusive planning and promotion; I-CE report for the Global Road Safety Facility at the World Bank, 2010; www.cycling.nl

Figure 4. More cyclists, lower risks, the relation between accidents and bicycle usage. (From 'Cycling in the Netherlands, Ministry of Transport, Public Works and Water management, 2009)

Cycling makes cities more attractive

The introduction of motorized transport has created urban structures that accommodate vehicular traffic rather than people. Children are amongst the groups that have suffered most of this at the cost of their scope to develop themselves as independent citizens. The promotion of cycling can help in a paradigm shift from vehicle oriented to people oriented transport planning. It can reintroduce the human scale in road design. And as a coherent network of cycling routes is one of the conditions for successful cycling promotion, it can help to overcome the severance effect of urban highways by a change in priorities. As a consequence of increased cycling the dominance of motorized traffic in the 'townscape' will be moderated.

Cycling avoids air pollution and GHG emissions

Cycling contributes to improving air quality and mitigating climate change if it substitutes short (often urban) motorized trips. Those trips contribute substantially to air quality problems (like SO₂, NO_x, PM) and the climate problem (CO₂). This substitution of private car trips by cycling is very relevant for developed countries. For developing countries the relevance of cycling is also that promotion of cycling can help to prevent a shift to private motorized modes. Transport related CO₂ emissions are expected to increase 57% worldwide in the period 2005 – 2030, and it is estimated that transport (passenger and freight) in developing countries will contribute about 80 percent of this increase. The gains of cycling promotion should be measured against the expected trends in transport in a business as usual scenario. If this potential of cycling to contribute to a decrease of existing emissions and the prevention of (the growth of) future emissions is to be utilised, it is essential that cycling is perceived as an attractive, efficient, safe and convenient mode of transport. This co-benefit can only be harvested if the primary benefit (improved accessibility) is guaranteed. Individuals will not cycle primarily for the sake of the environment, but because of its efficiency as a mode of transport for reaching their desired activity locations.

Cycling reduces noise

Motorized transport is also the cause of the noisy environment in large parts of our cities produced by a combination of engine noise and the interaction between tyre and road surface. Both are correlating with driving speed. Given the restrictions of whatever mitigating measures it remains worthwhile to try and prevent this problem by promoting the use of non motorized modes of transport like cycling, and measures to discourage and restrict car use in sensitive urban areas.

Cycling improves physical health

Cycling is not only non motorized but also active transport. Cycling commuters appear to have (on average) a substantial better physical health than commuters using other modes. Daily half an hour on the move walking or cycling already

has a dramatic impact on prevention of diseases, saves and extends lives. The required (minimum) level of daily exercise (20 to 30 minutes moderate exercise) equals an average cycling commuter trip. A shift from motorized transport to cycling and walking adds to the health benefits as it saves emissions and improves road safety. In the UK substantial research on the health benefits of cycling has been performed.⁴ Some conclusions are:

- Cycling has the potential to be one of the most healthy and accessible forms of physical activity as it can so often be integrated into daily life. Coronary Heart Disease is the single most common cause of death in both men and women and lack of physical activity is one of the most important risk factors for CHD. It is estimated that 36% of all CHD can be attributed to lack of physical activity such as cycling.
- Type 2 diabetes is the most common metabolic disorder worldwide. Physical inactivity can increase the risk of developing this condition by up to 50%.
- Physical activity has a protective effect on colon cancer with an average risk reduction of 40-50%.
- Physical activity appears to be associated with a reduced risk of breast cancer.
- Physical activity is associated with improved subjective well-being, mood and emotions, and enhanced levels of self esteem.
- More than 50% of adults in the UK are overweight, putting them at increased risk of hypertension, coronary heart disease, Type 2 Diabetes, and osteoarthritis.
- Cyclists of a certain age are as fit as non cyclists who are 5 year younger.

⁴ Nick Cavill e.a.; Review of economic analyses of transport infrastructure and policies including health effects related to physical activity, 2007

Cycling in the Netherlands

After the big increase in numbers of cars in the 1950s and 1960s a significant shift in urban and transport policies took place in the Netherlands in response to high accident rates and rising environmental concerns. Since then, walking, cycling, and public transport are the predominant modes of travel within urban areas. Bicycle facilities and public transport lines are used as 'backbone' for new urban plans, and car parking fees were differentiated for residents and visitors.

The effect of this policy has been impressive. It stopped and reversed the decline of cycling, and nowadays 27% of all trips in the Netherlands is made by bicycle. In urban areas this percentage can be as high as over 50% of urban trips. 40 % of rail passengers use the bicycle to go to the station, and this percentage is still rising. Urban centres offer an agreeable atmosphere for people walking and cycling. Residential areas are turned into large 'habitat areas' with a speed limit of 30 km/h or less. Road casualty numbers are now back to about 25% of the 1970's figures. In the same period both the number of cycling trips and car trips increased.

The Netherlands 'only' had to preserve the existing cycling, whereas many other European countries adopting these policies, had to start from almost scratch. But nowadays in Europe and in North America there is a growing and almost general recognition of the relevance of cycling for urban transport.

In 2000 Interface for Cycling Expertise produced the report *The Economic Significance of Cycling*, which included some cost/benefit calculations of investments in cycling. In all cases the cost/benefit ratio was profitable. Understandably the ratio appeared to be more profitable in situations where cycling investments were a rather new phenomenon.

Cost-benefit ratios

In Norway substantial research has been performed on the cost benefit ratios of cycling policies. The results are based on data from Norway and might be more context dependent than data regarding health benefits, but the health benefits were responsible for more than 50% of the total benefits.⁵

I-CE calculated the cost-benefit ratios for cycling interventions in four cities. Amsterdam, with already a share of 28% by cycling in 2000, planned to invest in bicycle parking and infrastructure with a budget of 150 million euro. The benefits on less pollution, less use of space, improved health, road safety, time savings and theft prevention were 50% higher than the costs. In Bogota, the bicycle master plan resulted in high traffic safety benefits. In addition the savings on parking space, congestion, user costs and road maintenance resulted in a cost benefit ratio of 1:7 (see ref. xi).

⁵ Saelensminde,K, cost- benefit analyses of walking and cycling track networks taking into account insecurity, health effects and external costs of motorized traffic, Transportation research Part A: Policy and Practice, volume 38, 2004