

INHERIT

Exploring triple-win solutions for living, moving and consuming that encourage behavioural change, protect the environment, promote health and health equity

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EXECUTIVE SUMMARY

INHERIT Baseline Review

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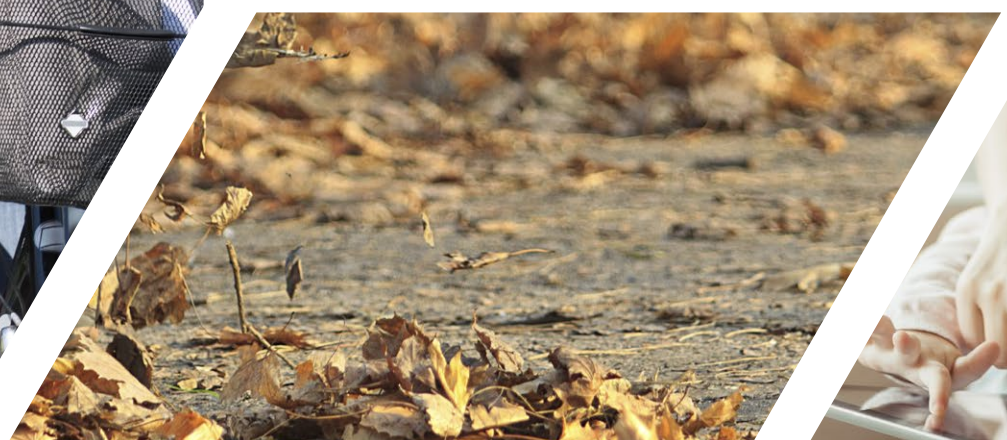


This summary report is based on a more extensive 'baseline' literature review produced by INHERIT: Staatsen, B., van der Vliet, N., Kruize, H., et al. (2017) INHERIT: Exploring triple-win solutions for living, moving, and consuming that encourage behavioural change, protect the environment, promote health and health equity. EuroHealthNet, Brussels.

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INHERIT (Inter-sectoral Health and Environment Research for Innovation) aims to change lifestyles and behaviours, with strong consideration for the socio-economic contexts that people live in, to support the transition to more sustainable societies. It explores what kinds of policies, practices, and innovations in the areas of **living** (green space and energy efficient housing), **moving** (active transport), and **consuming** (food and beverages) contribute to lifestyle and behaviour change to achieve a 'triple-win': protecting the environment, improving health and contributing to greater health equity.

The INHERIT project (www.inherit.eu), coordinated by EuroHealthNet, has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No 667364.

OUR CURRENT LIFESTYLES AND BEHAVIOURS ARE ENVIRONMENTALLY UNSUSTAINABLE

Human consumption and activity is damaging the global ecosystems and the resources and systems that we rely on as a species for health, wellbeing and survival. Our economies are largely based on 'take-make-consume-dispose' models that are depleting our resources at an unprecedented rate, destroying biodiversity, generating pollution, and leading to climate change. Western models of economic development cannot be replicated by other parts of the world, or sustained - there are simply insufficient resources for everyone on the planet earth to have a European lifestyle. For a population of 10 billion (the estimated world population in 2050) this would require at least two planet Earths.

TREAD LIGHTLY, WE HAVE ONLY ONE EARTH

Material footprint is a measure that is used to assess the resource use of specific populations in relation to factors including housing, mobility, food, energy, and water supply. North America currently has the highest material footprint at 25 tonnes per capita per year, followed by Europe with 20 tonnes. Asia and the Pacific and Latin America and Africa have material footprints of 9-10 tonnes and 3 tonnes per capita, respectively. (UNEP, 2016)

In addition, many aspects of our lifestyles and behaviours are threatening our health. Our transport, energy, and food production systems generate high levels of pollution that damage health. Characteristics of our way of life, like sedentary occupations, a lack of physical activity, and overconsumption of processed foods and meat, as well as the stresses of daily life, including social isolation for some, have been linked to growing levels of non-communicable diseases, including heart disease, cancer, mental health problems, and diabetes. In addition, while most Europeans may not (yet) feel the direct consequences of global warming, we are not isolated from this in a world connected economically, socially, and environmentally. Extreme weather events may for example, destroy crops in Africa and lead to water shortages and more migration flows.

Changes in life circumstances, including environmental, medical, and nutritional improvements have led to improved life expectancy across Europe. Yet many of the life-years gained are not spent in good health, particularly amongst lower socio-economic groups. While the nature of the links between non-communicable diseases and environmental factors is not sufficiently understood, it is clear that exposure to environmental factors plays an important role in their provenance. The global burden of disease due to the environment is 22%, based on recent estimates of the WHO.

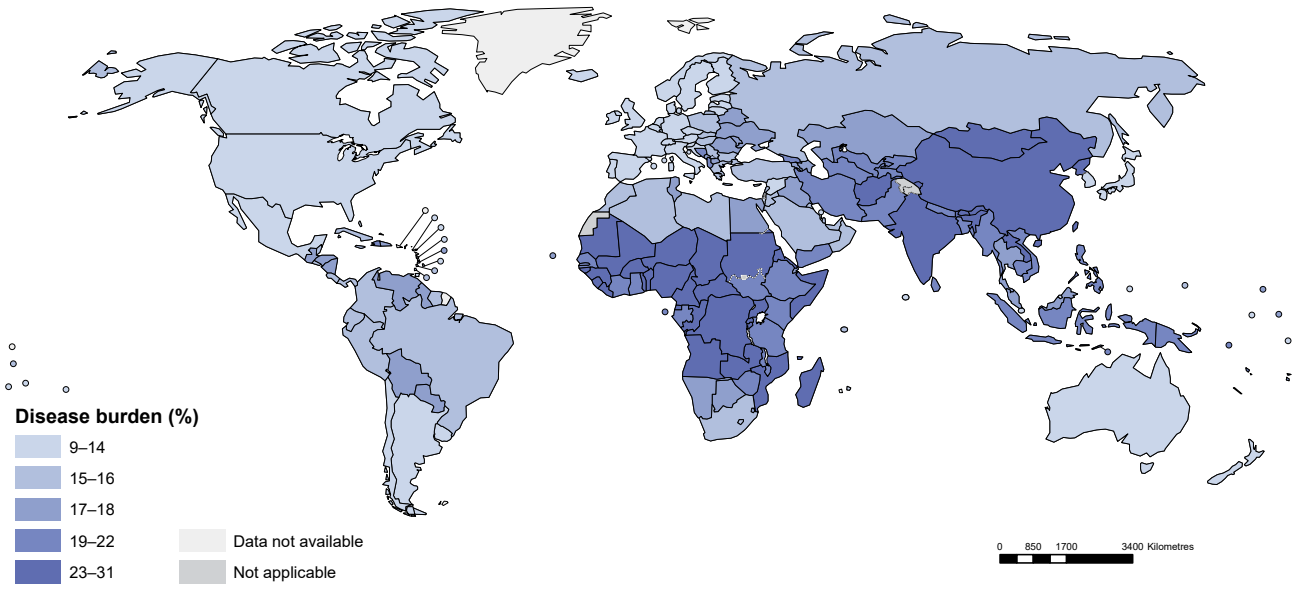
Our societies are also becoming more unequal. Wealth is being concentrated in a smaller percentage of the population, who can afford to escape environments with poor living quality. Those in lower socio-economic groups are, in contrast, much more likely to be exposed to environmental threats and unhealthy living conditions compared to other socio-economic groups, compounding their disadvantages and exacerbating social, health, and environmental inequalities. High levels of social inequalities can have severe social and political repercussions, and undermine the wellbeing of everyone in society by generating a perception of injustice and reducing trust and social cohesion, which can lead to intolerance and discrimination.

INCOME AND WEALTH INEQUALITY IN EUROPE

- While globalisation has reduced income and wealth gaps between countries, inequalities have often risen within countries.
- In Europe in the 1980s, the average income of the richest 10% was seven times higher than that of the poorest 10%; today it is around nine and a half times higher. The economic recovery has not reversed the long-term trend towards increasing income inequality.
- In Europe, the top 10% of households hold 50% of total wealth; the 40% least wealthy own little over 3%.[1]

1. OECD. Understanding the Socio-economic divide in Europe. 26 January 2017

THE OVERALL IMPACT OF THE ENVIRONMENT ON HEALTH

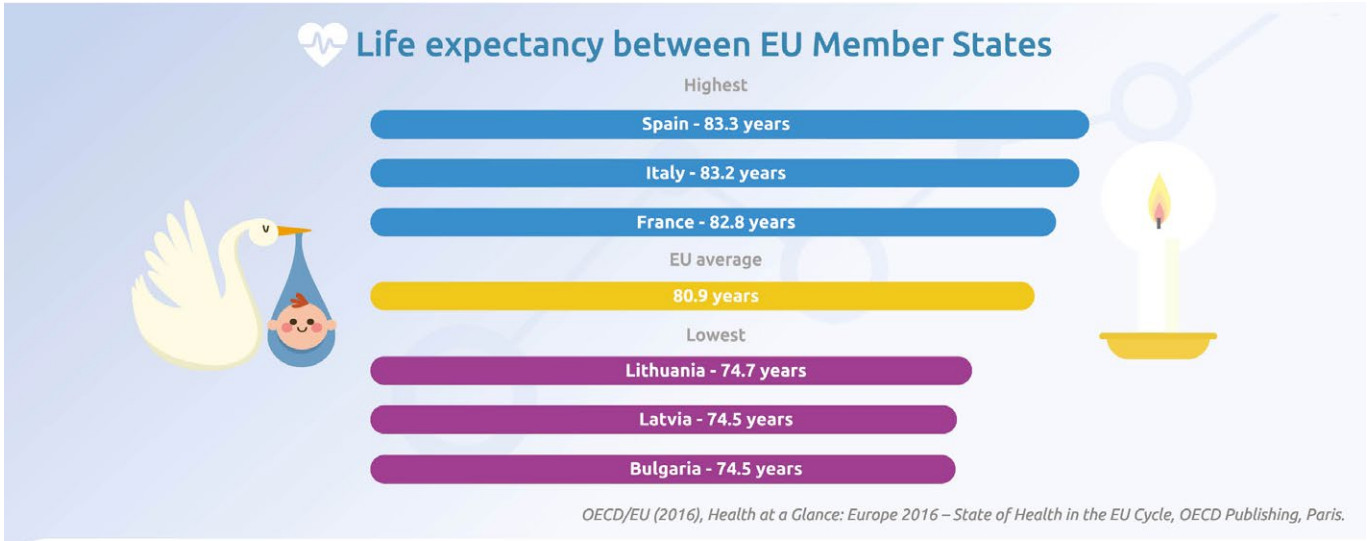


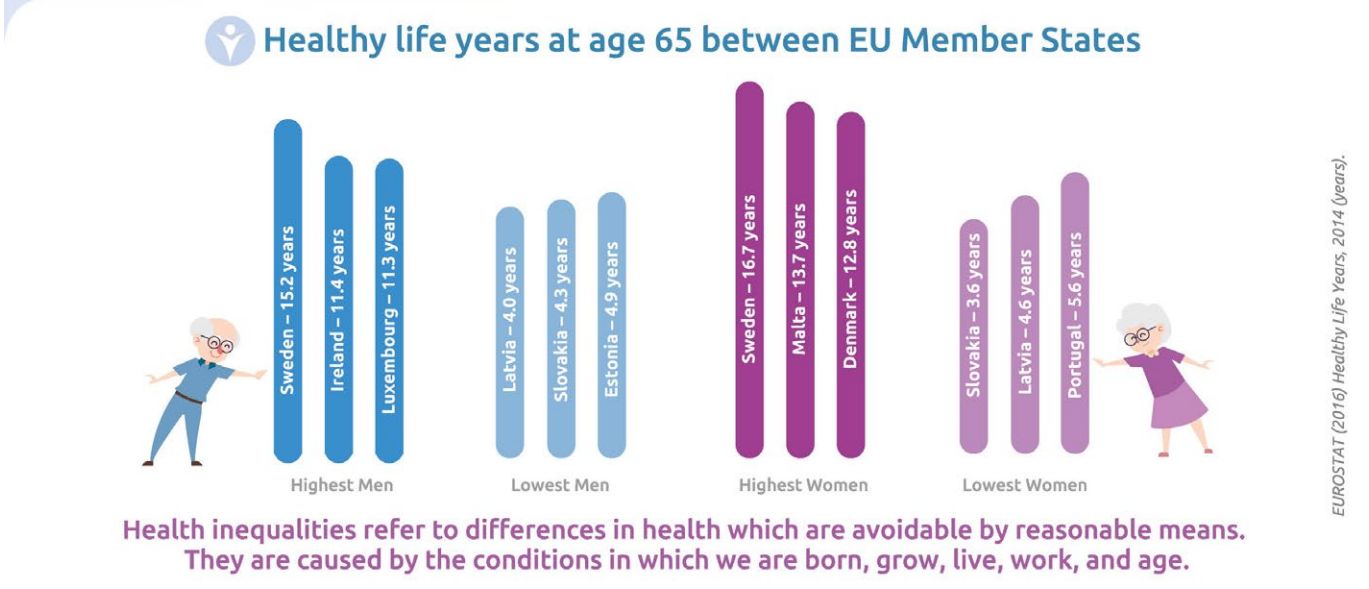
A systematic and comprehensive review of the WHO on overall impacts of the environment on health showed that, in 2012, 23% of global deaths were attributable to the environment, amounting to 12.6 million deaths. When accounting for both death and disability, the fraction of the global burden of disease due to the environment is 22%. In children under five years up to 26% of all deaths could be prevented, if environmental risks were removed. This estimate focuses on the reasonably modifiable environment and data from intervention studies, and the results therefore indicate the potential burden of disease that could reasonably be prevented by environmental interventions. Factors included in the calculation were air pollution (including second-hand tobacco smoke), water or soil pollution, ultraviolet (UV), noise, electromagnetic fields, occupational risks, built environments, agricultural methods, climate change and behaviour related to environmental factors (e.g. physical activity related to urban design).

Arguably, the most direct impact of income and wealth inequalities is their role in undermining health and sustaining health inequalities. A correlation between socio-economic status and health is evident in all countries. The higher a person's socio-economic status, usually measured by their income or educational level, the healthier he/she is likely to be. While monitoring of socio-economic inequalities in health at EU level is still at an early stage, the evidence available from published studies reveals an increase in health inequalities between social groups in many countries.

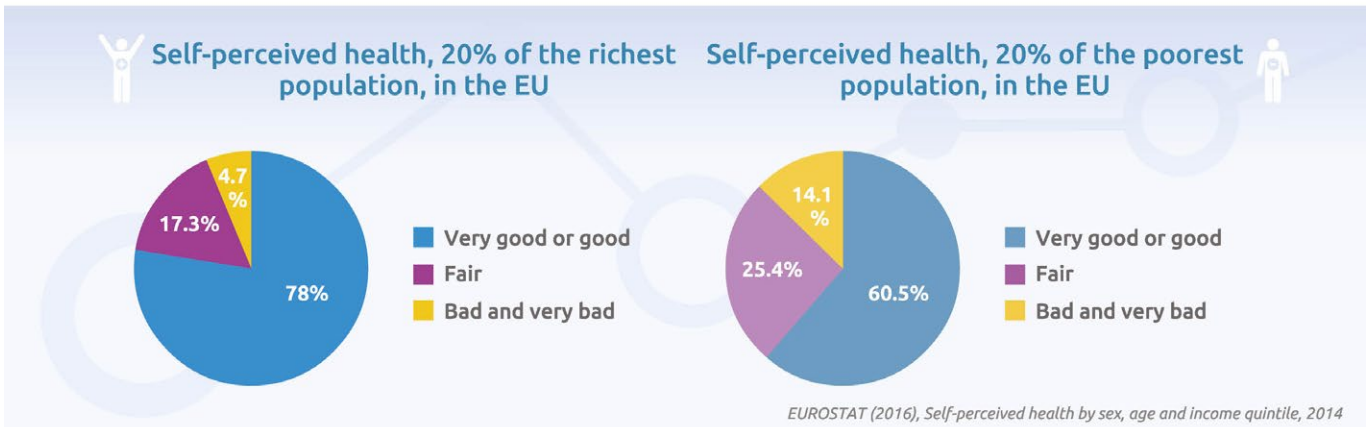
While the situation presented can seem disheartening, there is room for optimism. Awareness about the way we are impacting the planet and the consequences of this is growing and many initiatives are taking place that signal a strong momentum for change. This is reflected for example, in the widespread support for the United Nations 2030 Agenda for Sustainable Development and the commitment from governments across the world to align their policies to its goals and targets. The need to confront climate change also provides a window of opportunity for actions that lead to both climate resilience and social resilience. Many European city councils are working to make their cities more climate-resilient in a way that is also improving quality of housing and neighbourhoods.

While the key challenges set out may require major and contentious shifts of policy, much can also be achieved through a stronger focus on lifestyles and behaviours. Change can take place quickly if more people adopt lifestyles and behaviours that support environmental sustainability and health and support the drive to make sustainability the rejuvenated brand of Europe: *"living well and sharing fairly within the limits of our blue planet."*





Health inequalities refer to differences in health which are avoidable by reasonable means. They are caused by the conditions in which we are born, grow, live, work, and age.



ADAPTING LIFESTYLES AND BEHAVIOUR

Lifestyle choices and behaviours result from a complex interaction of factors acting at the level of society with individual characteristics, which create opportunities and constraints. The choices that we make can critically affect the local and physical environment we experience on a daily basis, as well as having effects on environments far beyond the boundaries of the neighborhood or country in which we live. This makes lifestyle/behaviour a powerful entry point for change, to transition to more environmentally sustainable, healthier, and more equitable societies. Carefully chosen policies, interventions, and innovations can provide an initial impetus by providing people with the opportunity, motivation, and capability to change their lifestyles and behaviours in ways that protect the environment, health, and promote more equitable societies. As people gain awareness and implement changes themselves, they can use their power as consumers and voters to press public and private actors to adopt further policies, interventions, and innovations which, in turn, pave the way to further change. Achieving healthier and more sustainable lifestyles therefore involves action from individuals and civil society,as well as public and private sector agents.

THE INHERIT MODEL

The INHERIT model (Figure 1) provides a tool to think about the complicated issues addressed by INHERIT in ways that point to solutions. As with all models, the INHERIT model is a focused and simple representation of a complex reality. It is a tool that can be used to help think about and navitage a complex set of issues in an effort to answer the challenging question "How can behaviour and lifestyle change support the transition to healthier, more environmentally sustainable and equitable societies?"

The INHERIT model builds on the DPSEEA Model.[2] It reflects how the unique, complex, and dynamic interaction of many macro-level **Driving Forces** affecting any location create their own particular **Pressures on the Physical Environment** in that location. **Physical Environments** are likely to differ considerably between places in ways that can be very relevant to the health of those living there. Moreover, even if individuals or groups reside in the same area, this does not mean that their **Exposure** to and **Experience** of the environment is inevitably the same. Many factors, including behaviour, influence **Exposure/Experience** in health-relevant ways. Individuals differ greatly in how an exposure to the environment may affect their **health and wellbeing**, contributing to inequalities in **health and wellbeing**. People differ greatly in their ability to mitigate the effects of negative exposures/experiences and their socio-economic status plays a significant role in their ability to do so. Inequalities between groups and individuals occur at all stages, as depicted in figure 1 by podiums with different levels.

THE COM-B COMPONENTS

Capability entails being psychologically or physically able to perform a certain behaviour. Psychological capability refers to having the necessary health skills to know what a healthy diet constitutes. Physical capability can be achieved through physical skills development such as training, whereas psychological capability can be realised by increasing knowledge.

Opportunity can be social or physical. Our social or cultural milieu may dictate what we define as normal travel or appropriate energy use behaviour, and the presence of a public park nearby offers the opportunity to be in green space. Opportunities can be both positive and negative (lack of money, access to green space) as well as improved through environmental change.

Motivation can stem from the reflective or automatic system, defined as all brain processes that energise direct behaviour including habitual processes and analytical decision making. Increasing knowledge or changing attitudes towards certain behaviour can realise a change in motivation.

2. Corvalan, C., Briggs, D. & Kjellstrom, T. (1996) Development of environmental health indicators, In Briggs, D., Corvalan, C. & Nurminen, M, (Ed.), Linkage Methods for Environment and Health Analysis: General Guidelines, United Nations Environment Programme, United Nations Environmental Protection Agency, and World Health Organisation, Geneva, pp. 19-53.

The model presents two pathways from macro level Driving Forces to health and wellbeing Effects. In the proximal pathway ('here and now'), health and wellbeing of a population is affected by changes to the environment near to them in space and time. The distal pathway ('there and then'), reflects the recognition that our activities can result in health-relevant environmental changes in other parts of the world, but also that environment and health impacts may only become apparent years later.

Behaviour is represented in the model by elements of the Behavioural Change Wheel (BCW[3]). The Behavioural Change Wheel incorporates the COM-B ('capability', 'opportunity', 'motivation', and 'behaviour') model that recognises that behaviour is part of an interacting system involving all these components. Surrounding layers of the BCW reflect different kinds of interventions that can affect one or all of the COM components, while the outer layer reflect seven policy categories that can support the delivery of these interventions. According to the BCW, interventions can change one, two, or all three components of the behavioural system.

The INHERIT model places an emphasis on those parts of the causal process that can be influenced by human behaviour. This is what most distinguishes it from existing public health or environmental models. These "behavioural hotspots" are denoted within the model by a magnifying glass symbol implying the need for careful analysis not just of the nature and impact of the behaviours, but also of the forces that create and sustain them. Only by such an approach can effective policies be developed. Anyone seeking to apply the model to a particular issue is also challenged to consider the contextual factors that contribute to inequalities in health and wellbeing, and whether any policies or actions exist or may be developed to address these.

3. Michie S.,van Stralen MM, West R. The behaviour change wheel: a new method for characterising and designing behaviour change interventions. Implement Sci.2011;6:42.

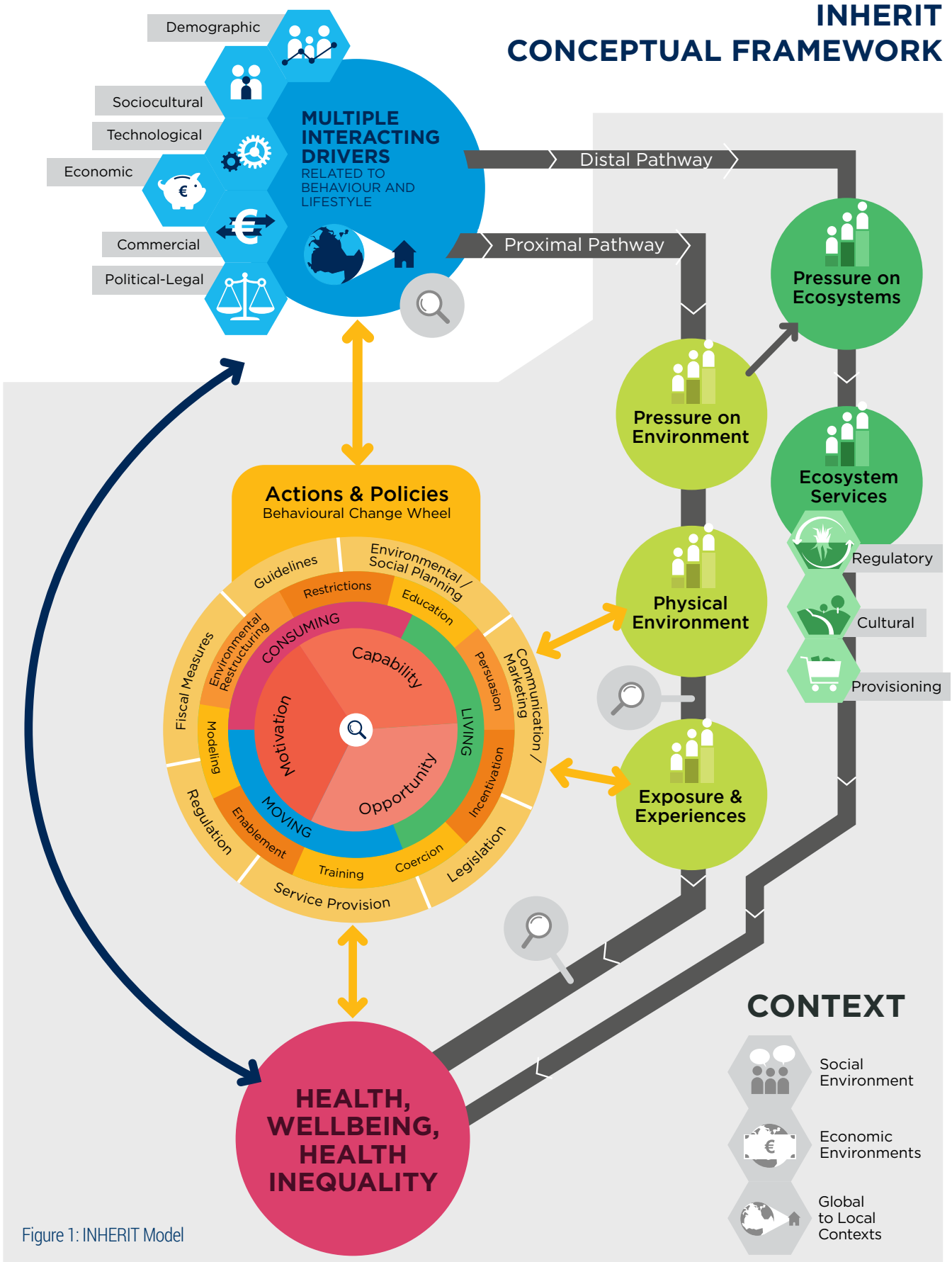


Figure 1: INHERIT Model

KEY DRIVING FORCES

Several key interelated driving forces put pressure upon and affect our physical environment in direct or indirect ways, with differential impacts on the health and wellbeing of people.

Economic and financial systems are closely related to the **political-legal** forces and determine how goods and services are produced, as well as how resources are distributed within societies. Today, the dominant form of economic organization in the world combines aspects of market and planned economies. An acceleration of trade, which has expanded three-fold since the 1970s, has led to a significant improvement in living standards across the world. Processes of globalisation have also accelerated consumption patterns and the depletion of natural resources, and intensified the use of vehicles, planes, and ships for transport, increasing pollution. **Commercial forces**, or strategies and approaches used by the private sector to produce and promote their products, also have strong positive and negative impacts on the environment, health, and equity.

Technological developments like the rise of Internet and smartphones have and are drastically changing how we live, work, move, and consume. Increasing levels of automatisation and the rise of artificial intelligence is also changing the way in which we live and affecting the nature and availability of work. Technological developments can indirectly put pressure on the physical environment, but also lead to solutions for environmental sustainability, health, and equity.
Economic and technological developments have underpinned the transition of developed countries (including the EU) from industrial to **knowledge-based economies**, oriented towards high-tech investments and industries as well as high skilled labour and productivity gains. In 2006, manufacturing accounted for less than a fifth of employment in the EU27 Member States while knowledge based sectors accounted for more than two thirds of jobs created as manufacturing moved to other parts of the world.

Social and cultural factors:
The driving forces mentioned above generate socio-cultural forces that put pressure on the environment and affect health, wellbeing, and health inequalities. Technological developments have enabled societies that value convenience, speed, and efficiency. An abundance of consumer goods led to 'consumer societies' where people define themselves by what they own, and consumption is a leisure activity. Many people in employment have little time to spend in restorative, recreational pursuits, while others, like older and socially vulnerable people including the long-term unemployed, are unable to participate in fast-paced societies and risk social exclusion and loneliness.

Demographic developments:
European societies are ageing. In the EU the percentage of EU citizens older than 65 years is, on average, projected to rise from 18% now to 30% in 2060. The increase in the share of older people in the population will coincide with a decline in the share of the working population. Europe's ageing population is a concern since elderly people are more vulnerable to air pollution and increasing temperatures. It is a health pressure that should be addressed in the formulation of solutions to environmental pressures.

Urbanisation:
over the last decades the rate of urbanization has continuously increased. In Europe, from 1950 to 2011, the proportion of people living in cities rose from 51% to 73%. It is expected that two-thirds of the world's population (6.3 billion people) will be living in cities by 2050. Urbanisation and individualisation means that more homes in Europe are being occupied by fewer people.

Food production and consumption:
Around 40% of the world's land surface is being used to produce food, and in the EU around half the land is farmed with the majority of this being used to raise animals for meat. Throughout the EU there has been a reduction in the number of farms, with larger, specialised production units, leading to monocultures with considerable impacts on the environment, biodiversity and the quality of food. In the current globalised economy, cost considerations rather than concern for environmental impact determines how and where food is produced. Much of the food being produced is also going to waste in EU countries (180kg per capita per year) due to consumer behaviour and a lack of coordination between actors in the supply chain.

LIVING GREEN SPACE

DRIVING FORCES AND TRENDS

While the share of green areas in the total city surface varies greatly between European countries, in general, the quantity and quality of urban green space across Europe is under great pressure. The forces of urbanisation and densification as well as high prices of land in cities are resulting in removal or degradation of existing green space in ways that are hard to reverse. Sociocultural drivers such as a general disconnectedness with nature may have resulted in a lower valuation of green space, affecting both availability and use of urban green space.

WHAT IS BEING DONE?

A number of high-level policies and initiatives encourage national, regional, and local actors to invest in the provision of green space, particularly in disadvantaged areas:

- The EU Biodiversity Strategy (Target II) aims to strengthen the protection of ecosystems and the use of green infrastructure.

- 'Nature-Based Solutions and Re-Naturing Cities' is part of the EU Research and Innovation policy agenda.

- European Green Capital Award aims to encourage European cities to become more sustainable.

- The WHO Ministerial Environment and Health Declaration (2010) is committed to "providing each child, by 2020, with access to healthy and safe environments and settings [...]"

- The EC's Natura 2000 initiative aims to ensure the long-term survival of Europe's most valuable and threatened species and habitats.

- The Economics of Ecosystems and Biodiversity (TEEB) is a global initiative assessing the costs of the loss of biodiversity and the associated decline in ecosystem services.

- Several initiatives at country level, such as the Norwegian Ministry of Environment's National Strategy for an active outdoor life, aim to increase the number of active outdoor activities in and by cities and towns, particularly for children and young people from immigrant backgrounds, persons with disabilities, and sedentary people.

WHAT IS NEEDED?

Whether people actually use green space is determined by a wide range of factors, like the characteristics of the physical and social environment as well as individual factors like life stage, lifestyle, and individual values. While providing more green space can increase people's opportunity and motivation to use it, other features like size, (perceived) walking distance and ease of access, quality, attractiveness, and safety are also very important. To ensure that green space links up with the activities people want to undertake there, it is important to involve people in the design of green space. Providing accessible maps and information about green space and the activities taking place there, educating people about the value of green space, and involving them in its maintenance can increase its use and enable more people to experience the enjoyment that it can provide.

Although there are many examples of promising policies and interventions with a potential to achieve the 'triple-win', only a few of them have been evaluated. Therefore, the effects of these policies and interventions and (economic) benefits are largely unknown. This is unfortunate, since evidence-based arguments are powerful tools to bring in new stakeholder groups, particularly politicians and authorities.

Current green space interventions often focused on one dimension of a broad set of potential benefits (e.g. physical activity, biodiversity, playgrounds for children), and do not mention broader social and health benefits or potential economic dividends. Gaining more insight into the costs and co-benefits of interventions is therefore important.

Ensuring adequate provision of green space that is used by people requires a wide range of stakeholders to work together. These include nature conservation authorities and green NGOs, city or regional authorities, a range of health sector players and social agencies and participants, policy makers, and funders at all levels.

THE 'TRIPLE-WIN' OF INVESTING IN MORE QUALITY GREEN SPACE IN URBAN AREAS

ENVIRONMENT

If well-designed:

• Reduced climate change due to CO2 sequestration (and local food production, active transport and pro-environmental behaviour)

• Lower noise levels

• Improved air quality

• Mitigation of effects of climate change (high temperatures –protection heat stress, and extreme rainfall)

• Encouraging people to spend time in green space can reconnect them to the natural environment, strengthen their appreciation of, and resolve to protect it

HEALTH

• The provision of attractive environments to exercise, play, relax, and meet people has a positive effect on mental and physical health:
- perceived general health
- reduction of stress levels
- reduced obesity
- better cognitive function
- reduced cardiovascular morbidity
- reduced prevalence of type 2 diabetes
- reduced adverse pregnancy outcomes
- reduced all cause and cardiovascular disease mortality
- promotes social inclusion

• Negative/adverse effects:
- elevated exposure to pesticides and herbicides
- increased risk on vector-borne diseases, allergies

HEALTH EQUITY

• Health effects are particularly evident for people with a lower socio-economic status, as well as children, pregnant women, the elderly or people with a chronic illness

• Populations that live in the greenest areas have lower levels of health inequalities than those living in areas where they have less exposure to green space

LIVING ENERGY EFFICIENT HOUSING

DRIVING FORCES AND TRENDS

Today, with 85-90% of time spent indoors, the indoor environment of houses profoundly affects health and wellbeing, healthy and sustainable living. Too much ventilation wastes heat or cool air, but air exchange rates must always be maintained at levels sufficient to remove or dilute indoor air pollutants and water vapour produced by human activities. The business of delivering a healthy indoor environment must therefore be viewed as one of achieving a balance between insulation, ventilation, and heating/cooling whilst remaining alert to the wider sustainability of the energy source itself.
Whether or not energy can be used efficiently in houses to decrease un-necessary consumption and optimize indoor air quality and thermal comfort depends on the quality of housing. There are differences (in degrees) in the quality and availability of housing across the EU, with lower socio-economic groups at more risk of living in poor quality housing.

The energy efficiency of Europe's housing stock and the energy consumption of households is not only an economic and a health issue for occupants, it is also a key driver of climate change and a global health threat. In the EU, households account for 25% of final energy consumption (total energy consumed by end users, including households, industry, and agriculture). On a positive note, this percentage has, since 2000, fallen at an average rate of 1.5% per year. This is due to energy efficiency measures driven by various types of policies, improvements in the energy efficiency of large appliances, as well as higher energy prices. The share of energy from renewable sources (mainly biomass) is also increasing, and EU households now derive 14% of energy consumption from renewable sources. At the same time, the electricity consumed by small appliances and the increase in the size of dwellings has offset progress in energy efficiency.

WHAT IS BEING DONE?

A number of policies and programmes exist at many different levels (regional, national, EU) that aim to improve energy efficiency through renovation by raising awareness and by engaging with consumers in innovative ways:

- The 2012 Energy Efficiency Directive contains a set of binding measures for the EU Member States

to make sure the EU reaches a 20% energy efficiency target by 2020.

• The 2030 climate and energy framework, adopted by the EU in 2014 sets the following targets: 40% cuts in greenhouse gas emissions (binding); 27% share for renewable energy (binding); 27% improvement in energy efficiency (non-binding).

• There are numerous Action Plans and Guidelines that educate and raise awareness, such as the WHO guidelines for the protection of public health from health risks due to dampness, associated with microbial growth, and contamination of indoor spaces.

• Many tools and innovations also exist to inform, persuade, incentivize, or enable people to change their behaviours in relation to domestic energy consumption, such as smart meters.

WHAT IS NEEDED?

Behaviour plays an important role when it comes to energy efficiency in homes. Even the most carefully designed ventilation systems, for example, can be rendered suboptimal by a lack of maintenance or adequate use. Efforts to change people's behaviours in relation to energy use at home must therefore be accurately informed by knowledge and insight from many fields, not least behavioural sciences. Low income households may for example be more willing to change energy behaviour in response to pricing incentives. Furthermore, the use of innovative in-home technology offers promise to reduce energy consumption, provided it is easy and convenient to use. More knowledge is needed on the effectiveness of such measures in relation to the maintenance of indoor air quality and household energy consumption.

When implementing home improvements to make houses healthier and more energy efficient, it is also important to consider the health impacts of associated factors, such as increased housing costs, possible relocation of residents, and changes to the neighbourhood. Few energy saving policies and programmes integrate health aspects. Likewise, public health programmes are unlikely to incorporate household energy efficiency amongst the measures adopted. As the interaction between health, fuel poverty, and energy efficiency is complex, it is important that the different sectors developing these policies and programmes work more closely together to ensure a more integrated approach. It is only through this that the INHERIT triple-win of improvements to health, health inequalities, and sustainability can be achieved.

THE 'TRIPLE-WIN' OF INVESTING IN HEALTHY ENERGY EFFICIENT HOUSING

ENVIRONMENT

- Reduced GHG emissions
- Decrease in ambient air pollution
- Indoor environment: decrease dampness, mould and, allergens

HEALTH

- Improved self-rated health, less wheezing, and fewer hospital admissions for respiratory conditions
- Decreased number of people with asthma
- Decrease in number of days absent from school due to respiratory complaints
- Improved respiratory health
- Improved mental health
- Improved relationships and social interactions
- Increased opportunities for leisure and study (due to more rooms adequately heated)
- Fewer excess winter deaths
- Fewer deaths from cardiovascular and respiratory diseases

HEALTH EQUITY

- Those in lower socio-economic groups are most likely to live and suffer the consequences of poor quality and badly insulated housing and therefore to benefit most from measures to improve energy efficient housing, indoor air quality, and thermal comfort
- Reduced fuel costs lead to greater disposable income. More budget is therefore available for other necessities like food
- Decreased fuel poverty

CONSUMING FOOD & BEVERAGES

DRIVING FORCES AND TRENDS

Agriculture intensification, globalisation of our food systems, population growth, urbanisation, and the average increase in wealth with accompanying lifestyle changes have altered food production and consumption in ways that negatively affect our health and our planet. The global food system currently accounts for 30% of all anthropogenic greenhouse gas emissions. Our overconsumption in general, excessive levels of red meat consumption and low levels of fruit and vegetable consumption contribute to risks for obesity, diabetes and cardiovascular diseases. In addition, meat and dairy consumption have the largest environmental impacts of all food groups. Common food behaviours such as the consumption of foods that are out of season and high rates of food waste also put excessive pressure on the environment. EU-27 countries contribute 17% of global food waste despite representing only 7% of the global population.

The production and consumption of more sustainably produced plant-based foods would help to sustain the environment and promote health and health equity.
It must be noted that not all food groups that are good for health are beneficial to the environment: fish, meat, and dairy have a relatively high environmental impact, while sugar-based sweets may have a relatively low environmental impact, presenting a challenge that must be carefully addressed.

WHAT IS BEING DONE?

A broad range of policies exist to encourage food to be produced more sustainably, to encourage people to consume healthier food and to reduce levels of food-waste.

- The EU Action Plan on Childhood Obesity (2014-2020) aims to contribute to halting the rise of overweight and obesity in young people.

- The Seventh Environmental Action Programme and the EC Communication 'Roadmap to a Resource Efficient Europe' include food waste and sustainable consumption amongst their central themes

- The EU's scheme for school milk, fruit, and vegetables aims to increase intake of these foods by children.

- Several EU countries have started to integrate health and sustainability into national dietary guidelines.

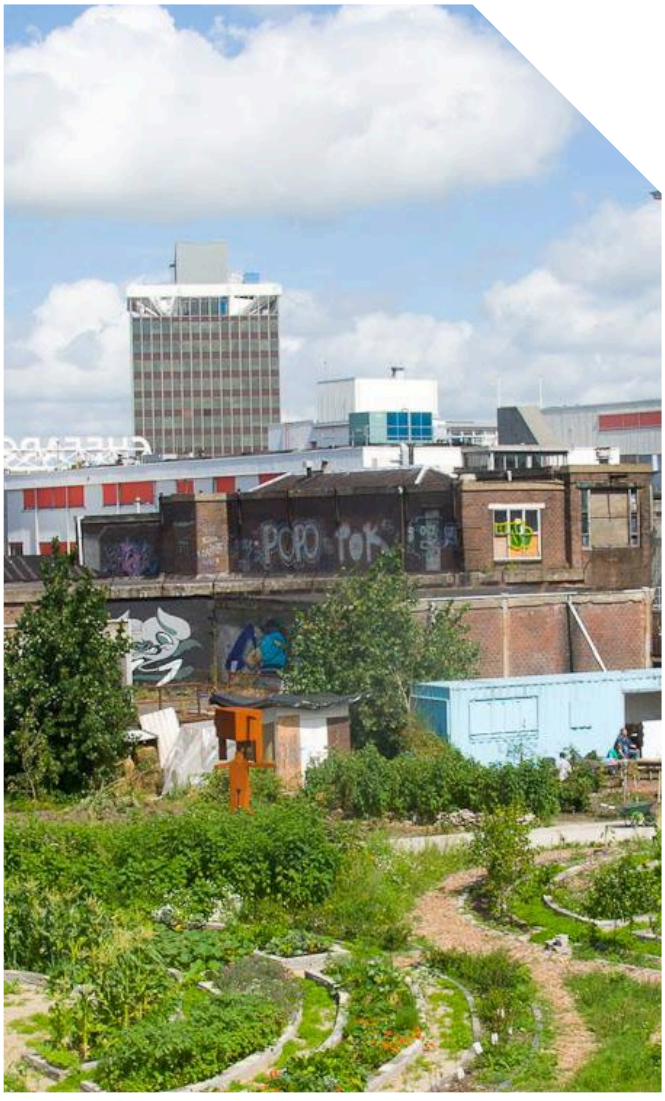
WHAT IS NEEDED?

Greater insight into consumers' food and food waste behaviours is of great importance if these are to be understood and modified. Literature shows that it is not enough to merely increase knowledge or awareness about the importance of health and sustainability: people choose certain foods based on taste preferences, price, attractiveness, convenience, and because they conform to conventional social norms. In the trade-off with all the other characteristics of a certain product, sustainability and health are often, currently, weak competitors. Therefore, changing the choice architecture and making healthy, sustainably produced products the easier and more attractive options is crucial to encouraging healthy, sustainable diets. Moreover, since food behaviours (including food waste) are largely habitual, encouraging people to adopt healthier and sustainable food habits calls for changes to social, physical, and information environments. Children and their parents are an important target group, since healthy, sustainable habits are best developed early in life. Food choices take place in a context of factors, and some of these are more upstream (e.g. availability and affordability of healthy foods) while others are more downstream in relation to an individual's sphere of influence (knowledge, food preferences, food storage skills, sociocultural food practices).

Changing individual and societal food behaviours therefore necessitates changes to the entire food supply chain, from producer to consumer, and a combination of upstream to downstream strategies. It is important to identify the leverage points where changes can be made in the food supply chain to create a healthier environment for consumers (e.g. food availability, pricing, marketing), and to identify barriers by applying e.g. supply chain analysis. Industries and retail must take responsibility and government should more actively stimulate them to change, as they play a key role in the availability and affordability of healthy and sustainable food for all. For example, the common addition of sugar, salt and fats to processed products should be addressed, as well as practices that promote overconsumption like providing discounts on large packages.
When developing food and food waste policies and interventions, it is of great importance to take both health and sustainability into account. For example, more EU countries could provide food guidelines in an integrated way, which would give more powerful messages than the separate and sometimes conflicting ones that now come from the health and sustainability fields.

More implementation research is needed to understand which interventions and policies are the most effective to change the food-related behaviours of people in lower socio-economic groups. There is evidence that food environments and pricing strategies significantly influence the consumption patterns of people in these groups. More insight is needed on the role industry and retail sectors can play in encouraging the consumption of healthy and sustainably produced foods (e.g. fruits and vegetables in supermarkets) amongst these groups.

Overall, when it comes to changing practices by the food industry that are detrimental to health and/or the environment, governments tend to prefer using non-interventionist measures and the European industry has great power and dominance. Cooperation with the food industry in combination with stronger measures to stimulate them to change is therefore needed.



THE 'TRIPLE-WIN' OF INVESTING IN MORE SUSTAINABLE PRODUCTION AND CONSUMPTION OF FOOD

ENVIRONMENT

- Reduced GHG emissions
- Reduction in the amount of land required to produce food
- Preserved fish stock and marine ecosystem balance
- Reduced levels of food waste
- Preservation of biodiversity
- Reduction in the amount of water required to produce food
- Improved resource efficiency
- Reduced energy consumption

HEALTH

- Decreased blood pressure
- Decreased blood sugar levels
- Decreased prevalence/incidences of non-communicable diseases
- Decreased cardiovascular diseases risk
- Decreased obesity levels
- Decreased mortality (all-cause, cardiovascular, cancer)
- Decrease in the risk of diabetes
- Decrease in the burden of disease

HEALTH EQUITY

- Improved nutrition among low socio-economic groups
- Improved availability and accessibility foods for low socio-economic groups
- Reduced levels of obesity amongst low socio-economic goups

MOVING ACTIVE TRANSPORT

DRIVING FORCES AND TRENDS

Transport is responsible for a quarter of the EU's present-day green-house gas (GHG) emissions, and it is also the only major economic sector in Europe where GHG emissions are higher than their 1990 levels. An important driver for the on-going growth in motorised transport in Europe is economic (work patterns, increase in distribution of goods by road). Urbanisation, spatial planning, and social-cultural forces also play a big role (urban sprawl and distances to work, school, shops and other services, time pressures, travel by car for leisure and family purposes) People's 'need' for convenient and fast transport is the main reason for the enormous increase in car use in recent decades.
Active transport is defined as walking or biking to and from work, school, shops/services, leisure activities, or to public transport stops. As car use has grown, walking has declined. Rates of active transport to school have declined dramatically over the past 30 years mainly due to an increase in distances and perceived safety risk (by parents). In the EU, the mean proportion of the population using a bicycle is 8%, with 36% for the Netherlands.
Available EU data shows an average journey length for motorised transport between 9 and 22 km per day. These distances provide many opportunities to substitute motorised transport with more environmentally friendly modes of transport, such as cycling or walking, especially in urban areas.
There is some indication of a cultural shift towards the decline of car usage taking place in economically developed regions, largely due to the decline in car use amongst people under 35.

A review of recent health impact assessments shows that health benefits outweigh the health risks associated with active transport, including accidents and exposure to air pollution. The greatest benefits are obtained when people switch from being non-active to doing some physical activity. Cost-benefit analyses indicate considerable health and economic benefits (including business and job opportunities) from active transport, suggesting that these benefits outweigh the costs of measures promoting active transport.

WHAT IS BEING DONE?

Policies to stimulate the shift towards more active modes of transport include:

• The EU transport White Paper, which calls for more measures to facilitate walking and cycling in urban areas, followed by the EC Communication a sustainable future for transport: towards an integrated, technology-led and user friendly system', which calls for, amongst other things, the elimination of conventionally fuelled cars in cities.

• The EC's Urban Mobility Package that makes Sustainable Mobility Urban Plans almost mandatory for EU cities.

• The Roadmap to Resource Efficient Europe that includes mobility.

• Several initiatives at country level, such as the UK Cycling and Walking Investment strategy (aim: double cycle activity) and the Dutch Agenda Bike (aim: 20% increase bicycle kilometres). A growing number of European cities have plans to become partly private car fee cities.

WHAT IS NEEDED?

If no additional measures are taken beyond those currently planned to curb GHG emissions resulting from transport in the EU, it will be difficult for the EU to reach its targets for CO2 reductions. A transition to sustainable mobility is urgently needed.

In order to be effective and achieve the 'triple-win' of improving health, environment, and equity, measures to promote active transport should be accompanied by measures to reduce car use and improve access to public transport. Authorities at the national, regional, and local levels must pay attention to making the built environment more conducive to integrating physical activity into daily life (e.g. developing or improving infrastructure for cycling, facilitating walking to school, reducing speed limits, ensuring traffic calming measures in the proximity of schools). Sustainable transportation strategies should also maximise accessibility for all citizens, thus ensuring equity.

Several reviews of the effectiveness of measures to promote active transport indicate that complementary application of infrastructural and psychological approaches may optimise effectiveness. The most successful interventions use integrated approaches that combine upstream measures with downstream strategies. Examples of upstream measures include changing cycling infrastructure or providing subsidies for public transport. Downstream measures could involve for example teaching self-regulation skills to encourage individuals to generalise beneficial behaviours, like using active transport when going shopping or visiting relatives as well as commuting to work, and providing information on the consequences of behaviour. In addition, policies designed to promote active transport

will be more effective where they target important antecedents of behaviour by changing perceptions, motivations, and norms as well as the consequences of behaviour (by e.g. financial incentives). This calls for a thorough understanding of travel behaviours when designing interventions.
The need to consider a broad range of factors also means that the transport, urban planning, environmental, and health sectors should work together more effectively at early stages of planning to improve health and the environment in a way that benefits all population groups.
A change in travel behaviours can also be achieved through innovations that fundamentally change current means of transport and our way of engaging with them. These innovations consist not only of technological breakthrough, such as electric and self-driving vehicles, but also of new business models fueled by information technology (IT) developments (web applications, new mobility services, lifestyle coaching).
The existing evidence base for effective interventions that stimulate people to shift from car use to active transport is based mostly on cross sectional studies. There are only a few studies of actual interventions showing the impact of changing transportation infrastructure or other aspects of the built environment on walking or cycling or a modal shift away from car use, let alone changes in overall physical activity or carbon emissions. This lack of evidence reflects several challenges that are still unresolved in this area of research, including problems of measurement and evaluation.

THE 'TRIPLE-WIN' OF INVESTING IN ACTIVE TRANSPORT

ENVIRONMENT	• Decrease in air pollution and consequently improve air quality • Decrease in noise pollution • Decrease in GHG emissions • Less congestion (if also decrease in motorized transport)
HEALTH	• Positive effect on mental and physical health due to more physical activity: lower body mass index and decreased rate of obesity - reduced prevalence of type 2 diabetes - reduced cardiovascular morbidity - reduced all cause and cardiovascular disease mortality - improved mental health • Increased self sufficiency and social activity • Positive effect related to less noise/air pollution (only if more active transport is accompanied by a decrease in motorised transport) - decreased risks of respiratory diseases - decrease adverse birth outcomes - decrease neurodevelopmental disorders - improved sleeping patterns by reducing traffic noise - decreased annoyance by reducing road traffic noise
HEALTH EQUITY	• Reduced exposure of social disadvantaged groups to traffic, air pollution, and related adverse effects • Increased physical activity among low income and ethnic minority adults

CONCLUSIONS

Our lifestyles and behaviours support and are shaped by a range of drivers that are destroying natural ecosystems in ways that are frequently detrimental to our health and that maintain or increase health inequalities. There are many actions that people, policy makers and the private sector can take to address these drivers and to promote environmental sustainability, while also improving health and health equity. In this way it is possible to deliver a 'triple-win' for society. This summary has highlighted how measures relating to the provision of green space, energy-efficient housing and to the production and consumption of food and active transport can lead to such 'triple-wins'. The challenge is to strengthen and scale-up the most promising 'triple-win' initiatives, to encourage lifestyles and behaviours that enhance well-being and quality of life for all.

Since economic systems are shaped by and rely on people's behaviours, this can be a powerful entry point for change towards more sustainable societies. People change behaviours when they have the motivation, capability and opportunity to do so. Influencing motivation, capability and/or opportunity can be achieved through 'upstream' measures that change the contexts and environments in which people live (for conscious or unconscious change), or through 'downstream', targeted measures. Behaviour change is most likely to occur in response to a combination of these measures. Awareness raising, education and training are essential to influence motivation, capability and/or opportunity (e.g. Bikeability programmes UK and Netherlands), but only if accompanied with changes to the environment (e.g. safe cycling and walking routes) that facilitate new behaviours. In addition, targeted measures to achieve behaviour change must take into consideration the characteristics of the specific populations or persons that they wish to target, understand what is important to them and adapt measures to their frame of reference. For most people, but especially low-income groups, economic measures, such as financial incentives (highlighting savings) and fiscal policies (making environmentally-detrimental or unhealthy products more expensive) are effective.

Another reason why it is important to take a combination of structural and behavioural measures is that context and environment are powerful factors in influencing habit development and maintenance. Daily behaviours are habitual parts of an automatic process and resistant to change. Context and environment are powerful influencers of habit

development and maintenance. This means that simply informing people is not enough, as people do not consciously reflect on the daily behaviours they perform. It is also why the best opportunity to change people's habits is at moments in their lives in which contexts and cues change (e.g. moving house, changing school or retiring). It is at such times people are more amenable to change.

Taking actions that achieve 'triple-wins' in pursuit of more sustainable societies, that involve a good mix of structural and targeted approaches to behaviour change calls for collaboration by many different actors across sectors. Governments must create an enabling environment, the private sector must develop new products and business models, and citizens must acquire and apply capabilities as voters and consumers to pave the path to change.

There are signs of progress and change. At the policy level this is reflected for example by the adoption of the UN Sustainable Development Goals for 2030, and the many initiatives at national and local level calling for more attention to health and sustainability in all policies. The private sector is also investing in products, innovations and initiatives that promote environmental sustainability and health, recognising that there is a strong market in this area and that doing so is key to sustaining the economy and business. These developments consist not only of technological breakthroughs (e.g. electric vehicles, lifestyle coaching applications, mobility services), but also new business and ownership models (e.g. health insurance companies that invest in green space), fuelled by information technology (IT) developments. Such products and initiatives play an important role in catalysing change in established systems.

Encouragingly, some drivers relating to the urban environment and social, cultural and demographic factors are already producing positive change. There is for example a cultural shift towards less car use in economically developed regions, especially among younger generations. This can be attributed to greater awareness of environmental and health needs and attention to economic considerations linked to contextual factors. There is also an increasing focus on strategic urban planning, to stimulate modal shifts towards walking, cycling and public transport, decreasing mobility needs and making sustainable modes of transport safer and more accessible.

While there are positive developments, much more can be done to ensure the wellbeing and quality of life of current and future generations in Europe and beyond. Many initiatives are being taken that could have a positive effect in several areas, offering co-benefits which are often not yet discernible. While recently there is evidence of more integrated policy making processes, most policies and practices are still sector specific and fragmented, focusing on one topic at the time, with the risk of unintended negative consequences in another domain.

A more coherent, integrated and systematic approach, with a healthy environment and behaviour as a central consideration, and common ambitions and goals is needed to transition to healthier, more sustainable and equitable lifestyles. INHERIT will contribute to this through a further analysis of a range of policies, innovations and practices in the domains of living, moving and consuming, that its partners identified as potentially leading to a 'triple-win'. It will investigate the success factors and barriers to inter-sectoral action and the costs and benefits to the environment, health and health inequalities. INHERIT will also aim to identify opportunities to scale-up promising practices and thus contribute to a more sustainable and healthier world, in particular for the more and most vulnerable members of society.

INHERIT is about stimulating effective policies, practices and innovations that address key environmental factors and promote health and wellbeing.

This summary report is drawn from the first product of INHERIT. It sets out the situation and explores what is being done and what is needed to stimulate sustainable lifestyles and behaviours in the areas of living, moving and consuming which protect the environment, health and promote health equity.

INHERIT

The full report and more information on INHERIT is available at **www.inherit.eu**

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