Chapter 1
Well-being and Sustainability: Measurement System and Institutional Framework

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Contents

Abstract This study aims to analyse the development of human well-being and sustainable development from a long-term perspective. Though often used, these concepts are generally ill-defined. This chapter proposes to clear the decks by proposing unambiguous definitions of well-being and sustainable development. This emphasis on definitions and measurements echoes international efforts to develop standardised measurement protocols that may help society (and policy makers in particular) to assess the extent to which a society is moving in a more sustainable direction. The framework adopted in this chapter (the so-called *CES Recommendations on Measuring Sustainable Development*) charts the well-being of a country at a specific point in time, and also reveals the extent to which the precise way such well-being is generated hampers the well-being of later generations or people elsewhere on the planet. Natural capital is a particular focus, inasmuch as this is a vital resource on which, in the end, all life depends. In this analysis of two centuries of well-being and sustainable development, the institutional evolution of society over time also plays a prominent role.

Keywords Well-being · Sustainable development · Economic growth · Natural capital

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1.1 Toward a Better Understanding of Well-being

> The gross domestic product is an almighty figure in public and political debate: how well is it going with the economy, for that matter with you as a person?... [But] the gdp does not measure how the country is doing, not even how the economy is doing. It only measures the magnitude of market production. In politics there is a need for figures that say more, namely figures that say something about well-being. This is more than only gdp (gross domestic product).[1]

These critical words were spoken by Agnes Mulder, parliamentarian for the Christian Democratic Alliance (CDA) in a parliamentary debate on well-being, in June 2016. Parliament was debating recommendations by the Temporary Parliamentary Commission on Well-Being, a commission charged with investigating how the gross domestic product can eventually be replaced by a system of measurement that does justice to well-being in the broadest sense of the term.[2] Verhoeven of the Democrats 66 party explained the shortcomings of the gdp in yet another way:

> If a contractor builds a house this month, the Dutch economy grows. This everyone understands. If that house is demolished next month, the Dutch economy grows even faster. If the house is subsequently rebuilt, there is even more growth. This is the strange effect you get if the gross domestic product is a synonym for growth. The gdp also increases if more gas is pumped up in Groningen. Is that good for our well-being? No, think the people in Groningen, and rightly so...

Marianne Thieme, leader of the Party for Animals, was explicitly negative: gdp includes economic activities ...

> ... that in and of themselves are anything but a positive contribution to well-being. Think of traffic accidents, air pollution, animal misery, animal disease epidemics and the incineration of whole forests in power plants. ... Why do we trap ourselves in economic indicators that say nothing of the power of our sense of community, care for one another, care for the vulnerable, or the opportunities to develop your talents? Why do we want to measure and express everything in money, except that which makes life really worth living?

However, these critical remarks did not mean that the Second Chamber was about to reject the gdp as indicator. Parliamentarian Veen of the People's Party for Freedom and Democracy (VVD) emphasized that the gdp was still relevant:

> I share the conclusion that the gross domestic product is inadequate as an indicator of well-being, broadly conceived. It only says something quantitatively about the magnitude of our economy. But I also share the conclusion that this is the best available alternative for determining well-being and international comparisons ... tax incomes and employment levels ...

[1] All quotes from this debate are from the official edited minutes. See https://www.tweedekamer.nl/kamerstukken/plenaire_verslagen/detail?vj=2015-2016&nr=99&version=2#idd1e668761

[2] For the report of this temporary parliamentary commission, see: https://www.tweedekamer.nl/sites/default/files/atoms/files/34298-3.pdf

Klever, of the Party for Freedom (PVV) struck a different note. She failed to see the need to develop new measures of well-being. Citizens know full well what the concept well-being means for them, namely if at the end of the month they have enough money left in their pockets:

> Of course health and safety are of importance, but if you want to achieve these you first have to ask yourself how we are going to pay for them. In order to pay for this you need a gross domestic product and you have to look and see what part of the gross domestic product you want to spend on our safety, our care system, our education and so forth. That is ultimately a political decision. For the average nurse or police officer who works 40 hours a week and who sees ever more of their tax money lost, the concept of 'well-being' doesn't change in the least, because someone like that just looks at what is left over in their pockets month by month as spending money.

In the end Dutch Parliament agreed to put well-being and sustainable development high on the political agenda and to devote an annual debate to the topic. This is not an isolated development. Globally there is a growing conviction that society is on the wrong road. This conviction is not limited to activist environmental groups, but is also starting to enter into the discourse of mainstream politics. In 2008 the former French president Nicolas Sarkozy invited two Nobel Prize winners, Joseph Stiglitz and Amartya Sen, to prepare a report aimed at investigating how new benchmarks for well-being and sustainability could be developed.[3]

This Stiglitz Report marked the start of a search for a new 'compass' that would enable politicians and policy makers to determine their course. Up to then the concept of economic growth had been dominant – as measured with the aid of the key indicator gdp. Now for the first time this standard vision was being critically assessed. To what exactly does the concept of well-being refer? And what determines this well-being and its sustainability?

These questions have also moved to the forefront within international organizations like the OESO, in the *Progress of Societies*[4] projects and the *Better Life Initiative*.[5] Both projects aim at finding better indicators for measuring well-being and sustainability. In Europe the European Commission has taken the lead with its *GDP and Beyond*[6] initiative, in which various societal organizations, policy makers and academics are asked to reflect on better ways to measure and shape societal progress.

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[3] J. E. Stiglitz, A. Sen and J.P. Fitoussi, *Report by the commission on the measurement of economic performance and social progress*: http://www.insee.fr/fr/publications-et-services/dossiers_web/stiglitz/doc-commission/RAPPORT_anglais.pdf

[4] http://www.oecd.org/statistics/measuring-well-being-and-progress.htm

[5] http://www.oecdbetterlifeindex.org/

[6] http://ec.europa.eu/environment/beyond_gdp/index_en.html

The crisis of 2008 added fuel to these fires. According to the organizations involved, this crisis demonstrated that the structure of our economic system only creates ever more problems.[7] The sustainability of our well-being over the long term is ever more uncertain. On the economic front there is the chronic instability of the financial sector with its associated 'bubbles' that have produced serious economic disruptions. In addition to this financial and economic crisis there is also talk of an ecological crisis. The realisation is dawning that problems like climate change and global decline in biodiversity are endangering life on earth. Moreover, tensions among different populations, both within and among nations, are also increasing to the extent that one can also speak of a social crisis.

The most prominent example of the striving for a more sustainable world is doubtless the *Post-2015 Agenda* of the United Nations.[8] This ambitious policy initiative, kicked off by world leaders at a UN top level conference in September 2015, contains a list of policy goals aimed at making the world more sustainable by 2030. These *Global Goals for Sustainable Development* will have a major effect on political and policy processes, both on global and national levels. The challenge will be to build a world in which all people have an acceptable quality of life, in which well-being is more equally distributed, and where the interests of future generations are also taken into account.

The debate in the Dutch Second Chamber on gdp reflects this development. Cabinet and parliament have a clear need for robust knowledge on the basis of which decisions regarding well-being and sustainability can be made. At present cost-benefit analyses to support policy decisions are based on a rather limited economic perspective. In addition, social and political debates are generally dominated by short-term visions. Long-term consequences of the behavior of producers and consumers or of government policy are not at present an integral feature of political discourse. The Temporary Second Chamber Commission on Well-Being has suggested a framework for the annual debate on questions of well-being and sustainability. The commission recommends monitoring well-being and sustainability on the basis of the measuring system that also forms the basis of this study.

1.2 Why Study Well-being and Sustainability in a Historical Perspective?

Where political debate in general has eyes only for the most recent developments, this study will examine long-term societal developments throughout a period of more than a century and a half in terms of changes in well-being and sustainability. In contrast with most traditional economic-historical studies we will not focus on economic growth, but rather on the growth of well-being. To what extent does the

[7] This is beautifully expressed in the OECD's NAEC project (New Approaches to Economic Challenges): http://www.oecd.org/naec/

[8] https://sustainabledevelopment.un.org/?menu=1300

growth of well-being depend on depleting vital resources, not only in the Netherlands but also elsewhere in the world?

This is obviously crucial for assessing the extent to which a certain level of well-being can be sustained over longer periods of time. Has well-being been generated on the basis of sustainable development, i.e. are vital resources -whether domestically or abroad- not being depleted over time? Significantly, well-being and sustainable development can have identical meanings, but only on condition that the current generation in a given country also concerns itself with the aspirations to well-being of people in other parts of the world and of future generations. Only when these aspects are incorporated into present-day preferences can well-being and sustainability be seen as identical concepts.

An historical analysis can provide deeper insights if only because sustainability is in essence an intergenerational issue. Choices we make about well-being in the past influence the well-being of later generations due to the possible depletion of vital resources like nature and the environment. Thus, present-day sustainability problems such as climate change and loss of biodiversity have their roots in choices made by prior generations. An historical analysis may reveal which aspects of producer and consumer behavior have wreaked such havoc and what kinds of technologies and institutions have facilitated the present sustainability problem. In this connection it is especially important to describe how societal developments can sometimes lead to outcomes that are both undesired and intolerable. This requires a sensitivity to emergent institutional rigidities that make it difficult to bend developments in a more positive direction.

In addition, the theme of sustainability is not just a present-day phenomenon. Sustainability, as defined by Brundtland et al. in the report *Our Common Future*, is an issue that also cropped up in the past, accompanying attempts to achieve progress through modernisation.[9] Then too, efforts were made to solve the sustainability problems of the moment. This study questions the paths along which and the methods by which, between 1850 and 2010, historical actors succeeded in solving their problems; and the ways in which, more often than not, the solutions chosen also generated new problems. We maintain a focus on how the processes of economic growth and sustainable development were entangled. Which technologies and institutional frameworks made it possible for economic development to be associated – or not – with sustainable development? This volume will provide a deeper insight into the complex relationship between economic growth and sustainability.

1.3 The Dutch Case

There are some long-run features of Dutch society that make it an interesting case for a historical analysis of changes in well-being and its sustainability. Compared to other countries, the agricultural productivity, population density and energy

[9] J.A. Du Pisani, 'Sustainable development - historical roots of the concept', *Environmental Sciences* 3(2006) nr. 2, 83–96.

intensity of the economy are high. Besides, even at an early stage the Dutch economy was quite open and imported large quantities of natural resources. The resulting strong impact on the natural environment has deep historical roots, going back to the Golden Age of the Dutch Republic (the period 1580–1640) or even earlier. The economic success of the Dutch Republic is well documented, especially by Anglo-Saxon scholars.[10] So far, the sustainability aspects of economic development have not been systematically analysed from a long-run perspective (even though the phenomenon was signalled by Anglo-Saxon contemporaries such as William Petty and Matthew Hale).

The roots of the modernisation of the Dutch economy can be traced as far back as the late Middle Ages. In this period the rising levels of the North Sea –the so-called late medieval transgression- had a far-reaching impact on arable production in the coastal provinces. As a result of the rising levels of seawater and of soil subsidence, agricultural land became less suitable for arable production.[11] Hence, farmers reoriented their output toward livestock farming. As livestock farming is much more capital-intensive than arable production, a substantial labour surplus was generated in the coastal provinces. This surplus could be relatively easily absorbed by the urban sector, especially because from the last quarter of the sixteenth century onwards, Amsterdam had become one of the main staple markets in world trade.[12] Not only trade, transport and international financial services flourished in the economy of Holland, but industrial activities also witnessed strong growth, above all the 'trafieken', industries which processed imported raw materials. Most of these 'refined' products were subsequently exported.

This quite specific form of economic specialisation had far-reaching environmental consequences. Even at an early stage the Netherlands was a strongly urbanised area characterised by a high population density. In *European urbanization 1500–1800*, Jan de Vries presents figures which show that in Europe around 1700 9% of the population lived in cities, as against 34% in the Netherlands. This was much higher even than Great Britain and Wales with their 13% urban population.[13] Population pressure continued to increase throughout modern times.. During the twentieth century population growth in the Netherlands was quite high in comparison with other Northwest European countries.[14] The high and increasing population pressure had a substantial effect on the natural environment, in terms of the pollution of soil and water and the subsequent loss of biodiversity.

The high urbanisation was made possible by a highly productive agricultural sector. Jan de Vries has analysed the roots of the high productivity of the rural Dutch

[10] J. de Vries, 'On the modernity of the Dutch Republic', *Journal of Economic* History, 32 (1973) 191–202; J. Israël, *The Dutch Republic: its rise, greatness and fall, 1477–1806* (Oxford 1995).

[11] J.L. van Zanden, 'Op zoek naar de 'missing link' ', *Tijdschrift voor Sociale Geschiedenis* 14 (1988), pp. 359–386.

[12] T.P. van der Kooij, *Hollands stapelmarkt en haar verval* (Amsterdam 1931).

[13] J. de Vries, *European urbanization 1500–1800* (London 1984).

[14] J.L. van Zanden, *Een klein land in de 20e eeuw. Economische geschiedenis van Nederland 1914–1995* (Utrecht 1997), pp.29–31.

economy in the Golden Age in great detail.[15] In the nineteenth and twentieth centuries Dutch agriculture continued to operate at the technological frontier. However, productivity growth in agriculture resulted in quite severe environmental problems, especially due to the quantities of manure that were produced and used.

During the twentieth century the industrial sector also began to burden the natural environment. In the second half of the twentieth century the energy intensity in the Netherlands increased faster than anywhere else in the Western world.[16] Nowadays energy consumption per capita is among the highest in the European Union, whereas the share of sustainable energy is quite low by international standards.[17]

Lastly, compared to the rest of the European Union the Netherlands imports large quantities of natural capital from the least developed countries. Quantitative analysis shows that former colonial powers like the Netherlands still stake huge claims on the natural capital of the poorest countries. Dutch trade data indeed reveal a strong path dependency in terms of trade specialisation.[18]

The specific dynamics of economic development and structural change makes the Netherlands an interesting case with which to study human well-being and sustainable development from a long-run perspective.

1.4 New Perspectives on Growth and Measurement

This study evaluates more than 150 years of societal development from the perspective of human well-being and its sustainability. It tries to identify some of the main determinants of well-being and sustainability and explores how these findings may help in shaping a path toward a low-carbon society which may foster well-being in the broadest sense of the word. It also describes which institutional arrangements governed societal changes in the past and asks what light this sheds on the institutional prerequisites for the present transformation toward a green, sustainable economy.

The historical analysis presented in this book has yielded two important findings. First, a well-being paradox is identified. Nowadays, compared to other countries, the Netherlands ranks high in terms of the life satisfaction of its citizens. Nevertheless, a substantial segment of society does not share this positive outlook on life. This phenomenon is not unique for the Netherlands, as indicated by the substantial rise of populism throughout the western world. This study shows that also in earlier periods, a high ranking on various 'lists' went hand in hand with feelings of strong discontent in society. This study may help to better understand this paradox of well-being.

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[15] J. de Vries, *The Dutch rural economy in the Golden Age, 1500–1700* (London 1974).

[16] A. Maddison, *Dynamic forces in capitalist development. A long-run comparative view* (New York 1991).

[17] CBS, *Monitor Duurzaam Nederland 2014: indicatorenrapport* (Den Haag 2014).

[18] H. Langenberg and J.P. Smits, 'Invoer van grondstoffen uit LDCs: Geworteld in koloniale tijden?', *Internationaliseringsmonitor* 2015 (4), pp. 42–57.

A second finding of this study concerns the significant impact of the Dutch economy on scarce natural resources. Until the 1960s the Netherlands were on a more or less sustainable growth trajectory. Of course, economic development laid a claim on natural resources, but within the limits of sustainability norms as defined by the present generation. In the course of the 1960s, on the one hand the coupling between GDP and improvements in quality of life became much looser (it even inverted on some indicators), while, on the other hand growth became decisively non-sustainable. From this moment on energy consumption and the resulting emissions of CO_2 skyrocketed. The depletion of resources was not restricted to the Netherlands. Natural capital in the least developed countries was also depleted due to the relatively high level of Dutch imports.

This trade pattern has deep historical roots. In order to arrive at a more sustainable way of life, it is important to move toward a more circular economic system in which vital product chains are closed. However, given the open nature of the Dutch economy and in the light of the outsourcing of economic activities by firms and the increasing complexity of global value chains, the closing of many of these chains has become quite difficult. Due to the continuous efforts of countries and firms to specialise on the basis of their revealed comparative advantages, today's economy has become strongly globalised. However, the downside of these economic dynamics is a world with long and complex product chains which put a considerable burden on natural resources.

These two main problems – the increasing distance between state and society as well as the sustainability challenge – cannot be dealt with in isolation from each other. After all, in order to make a fundamental transition to a more sustainable, low-carbon, society, drastic measures need to be taken. In the best case, this will be supported by the active involvement and passive consent of citizens, who recognise it as an opportunity to co-shape well-being. In the worst case, this transition will be experienced by particular groups in society as just another episode in the never-ending story of the neglect of their needs and wants, reinforcing the first problem and undermining the legitimacy of strategies to address the second one.

Such great transformations also occurred at earlier periods in history. In fact, this book deals with the great transformation that took place in the period 1850–1960. The greatest challenge facing Dutch society were the extremely low levels of human well-being. Around the mid-nineteenth century a substantial part of the population was barely able to survive. These problems were alleviated partly thanks to the intervention of physicians and other professionals who got the poverty problem and especially the poor state of local hygiene on to the political agenda. The poor quality of life of the masses was also improved by decreasing income inequality, especially as a result of the tax reforms of the 1860s. Lastly, economic growth ultimately produced higher incomes and an increase in material well-being.

However, this economic growth was in itself the cause of new problems. New technologies proved to be more energy and material intensive. From the 1960s onwards this resulted in increasing claims on natural resources. The 'great transformation' which occurred in the nineteenth and early twentieth centuries was anal-

ysed in depth by Karl Polanyi.[19] He argues that some of the negative effects of economic development – such as the poverty problem – were overcome because the state became more active from the nineteenth century onwards, compensating for some of the social problems created by the functioning of liberal markets.

Following Polanyi, some authors now suggest that a new 'great transformation' is needed, one in which mechanisms will be developed to fight the present sustainability crisis. It is suggested that two types of (re) embedding of economic development are needed.[20] First of all, an embedding in society is necessary. Increasingly, groups of citizens feel that their voices are not heard by politicians. New types of social structures – or the re-discovery or restoration of old organisational forms – are needed, which would enable the state and different segments of society to be in closer contact with each other. This may also yield more, and more widespread, legitimacy for policies promoting the transition to a more sustainable society. But this will require a second re-embedding of the economy, nowin nature. More than ever, ecological limits need to be observed and respected. Economic policy as well as producer and consumer behaviour should be adapted to these limits.

This of course leads to the question whether the coming great transformation, possibly characterised by these two re-embeddings, can be realised within the paradigm in which modernisation is dominated and evaluated by gdp growth. There is a rich body of literature which claims that environmental burdens can be eased within the present-day growth paradigm.[21] Through the introduction of green technologies we could have the best of both worlds: economic growth and the preservation of nature and the environment. Others claim that this is not an option. According to them the only answer to the increasing environmental problems is to abandon the desire for economic growth. In the post-growth paradigm, sustaining the present-day well-being of western society is judged sufficient.[22] Not only would more growth result in unacceptable environmental damage, from a well-being perspective there is also no longer a need for further growth.

Recently, the environmental economist Jeroen van den Bergh has suggested an alternative position.[23] In his proposal he makes a careful distinction between the issue ofwhether economic growth is still possible in the light of ecological constraints, and the critique of gdp as the leading indicator in policy making. Van den Bergh is quite clear about the value of gdp as a leading indicator. It is a wrong com-

[19] K. Polanyi, *The great transformation: The political and economic origins of our time* (Boston 1944).

[20] R. Kemp et al., 'The humanization of the economy through social innovation', Paper for SPRU 50th anniversary conference (version august 2016).

[21] Nowadays especially the green growth paradigm maintains that economic growth and an acceptable pressure on the natural environment can go hand in hand, see for example: http://www.oecd.org/greengrowth/

[22] See for example: F. Schneider, G. Kallis and J. Martinez-Alier, Crisis or opportunity? Economic degrowth for social equity and ecological sustainability. *Journal of Cleaner Production* (2010) 18(6): 511–518.

[23] J. van den Bergh, 'Green agrowth as a third option: Removing the GDP-growth constraint on human progress', *EU Policy paper (WelfareWealthWork),* no 19 (2015).

pass and should therefore be abandoned as soon as possible. He is especially critical of what he calls 'gdp growth fetishism'. In that sense his position reflects the gdp critique as voiced by a majority in the parliamentary debate quoted at the beginning of this chapter.

Van den Bergh coins his perspective as 'a-growth.' Rejecting gdp as a guiding principle, he is 'agnostic' when it comes to the possibility of its growth. He claims that society should first define the environmental damage it deems acceptable in relation to sustaining an acceptable level of well-being. Perhaps, he says, gdp growth is possible, perhaps not. He makes no a priori statements about the possibility of growth in a context that respects environmental limits and that focuses on well-being in the broadest sense. Systematic comparison between gdp series and indicators of well-being and sustainability will answer that question.

The next section will briefly indicate the methodological framework used to analyse these developments. Those not interested in a more detailed description of that framework can make do with reading this paragraph and then move on to Chap. 2.

1.5 Research Methodology in Brief

The following points of departure have guided the selection of themes, the use of concepts, the empirical descriptions and the analysis:

The Measurement Framework for Well-being and Sustainability Researchers at Statistics Netherlands (CBS) have developed a measurement framework that enables them to map well-being, broadly conceived, and its sustainability. This framework measures economic, ecological and societal aspects of existence. The core question is whether the way in which well-being is achieved in the 'here and now' is not achieved at the cost of the depletion of vital resources, whether in the Netherlands or in the rest of the world. But whereas the CBS measurement framework relies on about 100 indicators, this study, in accord with international usage, employs a so-called 'small indicator set.'

Well-being in its original meaning includes whatever contributes to quality of life, insofar as scarce resources are mobilised to constitute this quality of life. But in politics and societal debates the concept of well-being has to a remarkable extent been equated with the gross domestic product (gdp). In response a much broader concept of well-being, broadly conceived, has been proposed and gained wide political support: In April, 2016, a parliamentary committee decided that discussing the state of well-being, broadly conceived should become a yearly routine. This concept of 'well-being, broadly conceived' truly denotes quality of life in the broadest sense. That said, in the remainder of this study, with few exceptions, we will simply ad sense, to denote our quality of life or the extent to which people have been able meet their preferences. This well-being can be measured in objective as well as subjective terms. The latter relates to the ways in which people perceive their quality of life.

Natural Capital Natural capital occupies a special place within the debate on sustainability. That is because it is a critical resource, essential for the continued existence of life on earth. Natural capital forms, as it were, the physical basis on which well-being is built. The development of this natural capital is mapped through time by means of material flows. The analysis includes the entire chain from nature via producers to consumers.

Multilevel Dynamics, Including Institutional Evolution Transitions are coherent changes in a society's (or sector's, city's) set of interrelated and interacted dominant practices and the structures in which these are embedded, informed by a new set of problems and normative orientations.[24] Regarding structure, in the analyses special attention is devoted to the evolution of the material dimension of structure (physical infrastructures) as well as to its institutional dimension: the so-called institutional rectangle, i.e. the specific nature of and alignment between state, market, civil society and knowledge infrastructure.[25] Also, given the nature of our unit of analysis (a country), our focus on the relations between social practices, nature and environment and our interest in capital flows, we will also pay attention to place and connections.

1.6 The Measurement Framework for Well-being and Sustainability

1.6.1 Brundtland Definition

The analyses of well-being and sustainability in this book are based on a measurement framework for sustainable development that was constructed by employees at the Dutch Central Bureau of Statistics (CBS).[26] Statistics Netherlands developed this framework as an alternative for the usual indicators that are derived from the system of national accounts (including the gdp) and that illuminate only the economic aspects of well-being. The measurement framework developed by CBS has been embraced by an important part of the statistical community. Meanwhile 60

[24] J. Grin, J. Rotmans, J. Schot, *Transitions to sustainable development: New directions in the study of long term structural change* (New York 2010), 1–3.

[25] J. Grin, 'Understanding transitions from a governance perspective', in: J. Grin, J. Rotmans, J. Schot, *Transitions to sustainable development: New directions in the study of long term structural change* (New York 2010): 237–248.

[26] Under chairmanschip of Statistics Netherlands an international working group developed the so-called *Conference of European Statisticians Recommendations on Measuring Sustainable Development*, United Nations Economic Commission for Europe prepared in cooperation with the Organisation for Economic Co-operation and Development and the Statistical Office of the European Union (Eurostat) (New York and Geneva 2014). In short, *CES Recommendations on Sustainable Development* (2014): https://www.unece.org/fileadmin/DAM/stats/publications/2013/CES_SD_web.pdf. The CES measurement framework is followed almost seamlessly in the indicator report of the Monitor Sustainable Netherlands: http://www.monitorduurzaamnederland.nl/

countries have indicated that this framework is the best way to map well-being and sustainability. That of course does not make it an internationally accepted standard. Universal acceptance will be a complex and time-consuming process, as indeed that of the gdp once was.

The measurement framework elaborates on the definition of sustainable development given in the Brundtland Report,[27] written by the UN Commission for Environment and Development (WCED):

> Sustainable development is development that meets the needs of the present, without compromising the ability of future generations to meet their own needs, here or in other parts of the world.

In other words, well-being and sustainability are viewed in the light of a just distribution of well-being and of the resources necessary to generate well-being. This pertains not only to a just distribution *between* generations, but also to the justice of the distribution *within* the present generation. The latter stipulation is above all a question of a just distribution *among* prosperous countries and the (poorest) developing countries. The Brundtland Report has canonized a strand of thought about sustainability that conceives sustainability as not solely an ecological problem. Economic and societal phenomena were explicitly included in the analysis. In addition the Brundtland Commission emphatically addressed international differences in well-being, in particular the growing gap in well-being between North and South.

While well-being and sustainability are inherently concerned with the 'here and now', they also speak to the effects of maintaining our present quality of life, both on future generations ('later' dimension) and on people elsewhere in the world ('elsewhere' dimension).

1.6.2 Well-being 'Here and Now'

Well-being is a much broader concept than simply material well-being, a condition that is often measured in terms of consumption of goods and services. Well-being also includes our health, level of education and the quality of the natural and social habitat. The resources or capitals necessary to build up well-being are also broadly defined. These include not only economic capital like machines and tools, but also human capital (health, knowledge and skills), social capital (the quality of social networks and institutions) and of course, above all, natural capital.

Natural capital occupies a special position, because it can be seen as the foundation of well-being. The usual economic view of natural capital is anthropocentric, seeing nature only as 'useful and productive' and as a purveyor of 'ecological services' to humans. This ignores the fact that that certain forms of natural capital, like biodiversity, have an intrinsic value quite apart from the specific 'utility' it might have for humans.

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[27] World Commission on Environment and Development, *Our Common Future* (London 1987).

1.6.3 'Here and Now' Versus 'Later'

From an intergenerational perspective a development is sustainable only if it makes it possible for future generations to achieve at least the same level of well-being as we now enjoy. Of course we have no inkling of the preferences of future generations; we do not know what and to what extent they will want to consume. The only way we can determine whether the present generation is on the road to sustainability, is to check whether we are leaving enough resources for coming generations. A necessary condition for sustainability is therefore also that the per capita quantity of resources (of all the distinct forms of capital) may not decline. Future generations must have access to the same (per capita) quantity of economic, human, natural and social capital in order to meet their needs for well-being.

Tensions may exist between population growth and economy on the one hand, and demands made on natural capital on the other. This is also the reason why in this study population growth is an important contextual variable. Societal developments are often related to population growth, in order to assess whether enough per capita resources are handed over to coming generations. This should not be taken to suggest that economic growth and demands on the environment are necessarily indissolubly linked. Within a more circular economy the demands made on nature and the environment can be significantly reduced even in times of economic expansion.

It should be noted that the above figure only shows the *potential* for sustainable development. On the one hand there are no guarantees that future generations will also mobilize the resources they have inherited in a sustainable way. On the other hand it is entirely possible that in consequence of technological developments, resources may be more efficiently exploited in the future. In that case society could generate the same well-being with *fewer* resources.

1.6.4 'Here and Now' Versus 'Elsewhere'

The capital-based approach sketched above addresses a fundamental aspect of the Brundtland definition, namely the intergenerational aspect of sustainability. This approach is also useful for studying the transborder effects of sustainable development, that is to say the extent to which countries can influence one another with respect to the construction of their well-being.

A country can exploit its own domestic resources for the construction of a certain level of well-being, but it can also choose to import them. In an analysis of well-being and sustainability it is therefore also important to consider international flows of different forms of capital, and in particular to evaluate how the production and consumption activities of one country affect the natural capital of other countries. The other forms of capital are of course also important. In this way, the quality of life in a country can be influenced by the import and export of economic capital

(machines and tools), as well as human capital (namely the flow of knowledge associated with migration). This makes the 'elsewhere' dimension (that indicates the effects on the rest of the world of the striving for well-being in a given country) the final element in the definition of sustainability. In this study we shall look especially at the extent to which natural capital elsewhere in the world was utilized by the Netherlands.

Core Concepts in the CBS Measurement Framework for Well-being and Sustainable Development

Sustainable development: *Development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs, here and elsewhere in the world.*

Well-being (broadly conceived) or quality of life: *A broad concept that is not limited to the 'utility' that people derive from the consumption of goods and services, but that is also related to the freedom and the possibilities people have for satisfying their needs for well-being.*

Resources (capitals): *A supply or resource from which a yield can be derived. Initially capital was regarded strictly as an economic, material concept (like machines, tools, buildings and infrastructure). The concept of capital has gradually been broadened, to the point that it now also includes natural, human and social capital.*

Ecological quality of life: *This concept focuses on the intrinsic value of nature and its ecosystems, quite apart from the question whether these have a direct economic value for humans.*

1.6.5 The Measurement Framework of Well-being and Sustainability (the CES Recommendations)

CBS regularly publishes a Monitor Sustainable Netherlands, in which well-being 'here and now,' 'later' and 'elsewhere' are described. These Monitors map trends since 2000. In this study we shall for the first time attempt to apply this measurement framework to a long term analysis. Of course not all the indicators used in the CBS framework will be available for the period since 1850.[28]

We have therefore opted to work with a 'small set' of indicators. The so-called *CES Recommendations for Sustainable Development*[29] are taken as a point of

[28] In certain cases indicators had to be defined somewhat differently than in the present-day measuring system, due to the lack of availability of sources.

[29] See the report of the *Conference of European Statisticians Recommendations on Measuring Sustainable Development* (New York and Geneva 2014).

Table 1.1 Dashboard well-being 'Here and Now'

Theme		Indicator
Well-being		
	Consumption, Income	Consumer expenditure
		General income inequality
		Gender income inequality
	Subjective well-being	Life satisfaction
Personal characteristics		
	Health	Life expectancy
	Nutrition	Height
	Housing	Housing quality
		Public water supply
	Physical safety	Murder victims
	Work	Unemployment
	Education	Level of education
	Leisure time	Leisure time
Natural environment		
	Biodiversity	MSA
	Air quality	SO_2 in air
		Greenhouse gasses
	Water quality	Public water supply
Institutional environment		
	Trust	Generalised trust
	Political institutions	Democracy

departure. These international guidelines indicate how, for countries with limited databases, the large set of indicators can be reduced to a set of 24 indicators. The strategy was to choose one indicator for each discrete theme, one that could act as a kind of proxy guiding indicator that in essence covers a broader terrain. The theme health, for example, can be charted by means of a large number of indicators, but life expectancy can be seen as an overarching indicator that provides a good summary of general trends in changing health patterns. In certain cases where themes had a rather heterogenous character it was found necessary to adopt multiple indicators in order to cover the theme adequately.

The themes and indicators are presented in the CBS Monitor in three 'dashboards', as indicated in Tables 1.1, 1.2 and 1.3. This measurement system covers the full scope of societal development. But the debate on well-being and sustainability emphasises natural capital. That is why we will delve into natural capital more deeply.

Table 1.2 Dashboard well-being 'Later'

Theme		Indicator
Natural capital		
	Energy	Energy consumption
	Non-energetic resources	Gross domestic consumption
	Biodiversity	MSA
	Air quality	SO_2 emissies
		Greenhouse gas emissions
	Water quality	Public water supply
Economic capital		
	Physical capital	Economic capital stock
	Financial capital	Gross national debt
	Knowledge	Stock knowledge capital
Human capital		
	Health	Life expectancy
	Work	Unemployment
	Level of eduction	Schooling
Social capital		
	Trust	Generalised trust
	Institutions	Democracy

Table 1.3 Dashboard well-being 'Elsewhere'

Theme		Indicator
Well-being		
	Support	Development aid
Natural capital		
	Natural resources	Import of raw materials

1.7 Natural Capital and the Three Material Flows

The Monitor of Well-Being utilises a broad concept of well-being. Concerning the question of the depletion of vital resources, the Monitor distinguishes four capitals: natural, economic, human and social capital. This book, however, devotes particular attention to natural capital, and that for two reasons. First, natural capital can be seen as the foundation on which the entire economic and social system is built. Humans are able to construct (material) well-being by utilising natural resources. In the second place we can view a portion of available natural capital as *critical* capital. Were economic, human or social capital to be seriously threatened, well-being would doubtless be severely compromised. But if nature and the environment are damaged beyond repair, ecosystems can collapse and with them the very foundations of economy and society.

Natural capital is rooted in ecosystems that a society has at its disposal 'by nature' in order to produce useful goods and services. Humans have had little to no

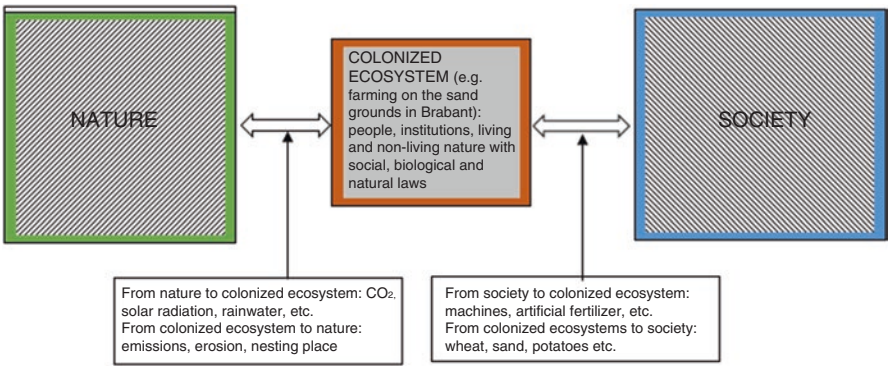

Fig. 1.1 The colonised ecosystem

part in creating these ecosystems, hence the term 'by nature.' Natural capital comprises non-living nature – the ground, the air, water – as well as living nature, the trees, the insects, the birds and other organisms. Living and non-living nature have their own dynamics and exchange matter and energy. Every organisms lives by virtue of metabolic processes or metabolic relationships. A set of close interactions between living and non-living entities is called an ecosystem.[30]

A natural ecosystem in its pure form can hardly be found in the Netherlands because its territory is the product of human intervention. The territory of the Netherlands has been worked to its remotest reaches and in part wrested from the water. In this case we speak of colonised ecosystems, ecosystems influenced by human practices. The Dutch live in such systems also thanks to metabolic relations, but these relations provide even more, namely a stream of products with which the Dutch produce their existence, material culture and society.

This is why we define natural capital as the ability of colonised ecosystems to provide so-called ecosystem services, in other words the ability to generate yields of food, energy, potable water etc.[31] According to this definition, a colonised ecosystem is a separate complex of internal interactions among people, water, air and soil with plants, animals and micro-organisms. In addition to this internal dynamic, a colonised ecosystem has an exchange of matter and energy with nature (for example solar radiation and rainwater) and society (for example, machines, artificial fertiliser, and wheat) (see Fig. 1.1).

[30] R.C. Hoffmann, *An environmental history of medieval Europe* (Cambridge 2014), 5–7 and his inspiring introduction, 1–20.

[31] See for the distinction between natural and colonised ecosystems: Hoffmann, *An environmental history*, 7–11. There is a plethora of literature on ecosystems and ecosystem services. See among others: TEEB, *The economics of ecosystems and biodiversity: An interim report* (Cambridge 2008), 12; and J. Dirkx et al., *Balans van de leefomgeving 2014 deel 7: Natuurlijk kapitaal als nieuw beleidsconcept* (Den Haag 2014), 7.

As point of departure for understanding the yields of colonised ecosystems in this study we will examine three categories of raw materials and sub-soil assets:

- Bio-raw materials: all agricultural yields (crops, cattle, fishing, and forestry)
- Mineral sub-soil assets: all yields from underground extraction of an inorganic nature, including sand, clay, marl, stone, iron ore and other ores.
- Fossil sub-soil assets: all yields from underground extraction of an organic nature, namely turf, coal, oil and gas.

With these categories as point of departure, an all but complete image of material flows in the economy can be constructed. We shall follow the development of raw materials and underground resources through time in great detail, including not only domestic, but also foreign sources. We will also investigate the economic processes in which these raw and underground materials are used. In this way we can reconstruct quite precisely the way in which the Netherlands exploited its natural capital from 1850 on. Special attention will be devoted to the supply chains along which these raw and underground materials find their way to the end user. In this way we can analyse how deeply these material flows reach into the capillaries of the social order, and which role they play in processes of economic growth and social change.

1.8 Institutions and Dynamics

Up to this point the promotion of well-being and sustainability has been sketched as a structural and rather abstract process. In this process, institutional and material structures and their evolution are key factors, as is spatiality (place and connections). But, in the end, structuration theory tells us, in John Law's (1992) famous shorthand, that 'structure is a verb': structure matters to the extent that, and through the ways in which, actors reproduce or transform them in their practices (of production, consumption, policy making, innovation etc.). This study therefore pays due attention to agency and practices. Most specifically, we will discuss the (contesting) ways in which, in a specific period, different groups of actors defined the problem of well-being as well as the normative orientations guiding practices (like 'intensification of production').

An illuminating framework for understanding such long term processes of transformative change is offered by transition studies. A basic theorem from that field is that transitions may occur if fundamental changes in (or the emergence of novel) practices, structural change and long term trends (such as individualisation or Europeanization) coincide and dynamically reinforce each other over time. Absent such interconnected dynamics, the coherence of the system of practices and structures

reproducs itself and resists change. This theorem is rooted in a range of historical studies[32] as well as a review of literature on innovation.[33]

As noted above, in discussing structure and structural change, we will pay special attention to physical infrastructure (above) and to institutional context. More specifically, we will focus on institutions in the domain of (1) politics and government, (2) the economy, (3) a societal 'midfield,' i.e. civil society and (4) science, technology and innovation.

Institutions may be defined as rules maintained by humans that structure their political, economic and social behavior.[34] There is a distinction between formal and informal institutions. Formal institutions are associated with the legal system (in particular the Constitution), rules for decision-making, property rights, agreements and contracts. Next to these there exist informal institutions like rules of behavior, customs and conventions. Such rules generally have deep socio-cultural roots and are implied in e.g. families, schools and neighbourhoods.

The state, the market and the societal mid-field (civil society) can be seen as crucial institutions and principles of social order.[35] It should not be assumed that there is some ideal combination of these various institutions. Every generation will have to provide its own answers to the challenges of its time, answers that consist of repeated restructurings of the institutional system.

The State, or Political and Governmental Institutions These institutions determine the legal framework by means of which personal freedoms, property rights, and the legal security of citizens are specified. They fulfill functions in the anchoring of stability, safety, security and the prevention of corruption and preferential treatment. The state also co-determines the rules of the game in the market, e.g. as a safety net for market failure and as an inhibitor of monopolistic entrepreneurial practices like cartel-forming. The state can also intervene at moments when market forces generate intolerable levels of social inequality.

The Market or the Economic Institutions These institutions determine the economic rules of the game. They specify the scope of action for entrepreneurs, capitalists, workers, consumers and other groups. They set out the playing field for

[32] J. Schot, 'The usefulness of evolutionary models for explaining innovation: The case of the Netherlands in the nineteenth century', *History and Technology* 14 (1998) nr.3, 173–200; F.W. Geels, *Technological transitions and system innovations: A co-evolutionary and socio-technical analysis* (Cheltenham 2005); J. Schot and F. Geels, 'Typology of sociotechnical transition pathways', *Research Policy* 36(2007), nr.3, 399–417; F.W. Geels et al., 'The enactment of sociotechnical transition pathways: A reformulated typology and a comparative multi-level analysis of the German and UK low-carbon electricity transitions (1990–2014)', *Research Policy* 45 (2016), nr.4, 896–913.

[33] A. Rip and R. Kemp, 'Techological change', in: S. Rayner and E.L. Malone (Eds.), *Human choice and climate change. Vol II, Resources and technology* (Columbus1998) 327–399

[34] D.C. North, *Institutions, institutional change and economic performance* (Cambridge-New York 1990).

[35] Zie: Y. Hayami, *Development economics: From the poverty to the wealth of nations (second edition)* (Oxford 2001), chapters 8 en 9.

economic initiatives and competition. They provide the security necessary for market actors to engage in transactions. Countless economic regulatory systems ensure that supply and demand are coordinated as well as possible, so that citizens have access to goods and services to improve their quality of life.

Civil Society, or the Societal Mid-Field The institutions in this quadrant are crucial for the political process. Politics is here considered as the game through which the rules prevailing in economy and society are continually adapted to new situations. Groups coalescing around specific interests attempt to influence that game. In this way it is possible for specific social groups to gain the advantage over others and for vested interests to be protected to the extent that modernisation processes can take off only with the greatest difficulty.[36] In such cases the question is how the societal mid-field is organised and which initiatives from within this institutional quadrant can lead to change. *The science, technology and innovation* system is a fourth crucial institution. While this may possibly not immediately be seen as a principle of social ordering, it is certainly of essential importance for the analysis of well-being and sustainability. After all, technology and innovation are among the important motors of improvement in the quality of life. Not only can technology and science be seen as engines of the economy (and thereby of the increase of material prosperity),[37] but the development of new technologies can make the employment of scarce resources – like natural capital – more efficient. At the same time the role of science and technology in relation to sustainability is suspect because an intensive exploitation of natural capital has also led to negative effects.

In this chapter the methodological framework has been presented by means of which we propose to analyse 150 years of well-being and sustainability.. The CBS measurement framework enables us to trace the main lines along which well-being 'here and now' has developed and the extent to which that has depleted resources in the Netherlands or elsewhere in the world. We pay special attention to natural capital and will chart its historical development with the aid of detailed descriptions of material flows. These data will enable us to assess the extent to which economic developments in the period 1850 to the present have culminated in an increase of well-being and sustainability, or perhaps not. These descriptions will be consistently framed within the 'institutional quadrants,' a strategy that reveals how the structural contextual factors with which actors saw themselves confronted did or did not lead social development in the direction of greater well-being and sustainability.

After this methodological exposition the following chapter wil sketch the historical situation prevailing at the outset of this study. What was the state of Dutch soci-

[36] Jan de Vries remarks how in the course of the eighteenth century the institutions became rigid because the political elite forbade economic innovations that would compromise their position: J. de Vries, 'Barges and Capitalism', *AAG Bijdragen* 21 (1978). Until the 1860s social change was inhibited by institutional ossification, see: J.L. van Zanden and A. van Riel, *Nederland 1780–1814. Staat, instituties en economische ontwikkeling* (Amsterdam 2000), 48–56 and 96–101.

[37] Maddison, *Dynamic forces in capitalist development: A long-run comparative view*.

ety around 1850? How can we compare the Netherlands in 1850 with its present-day condition? How can we characterise the big changes in the domain of well-being and sustainability?

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