



State of Israel  
Ministry of Environmental Protection

# Report on the Measurement of Sustainability

Indicators for Wellbeing, Sustainability and National Resilience



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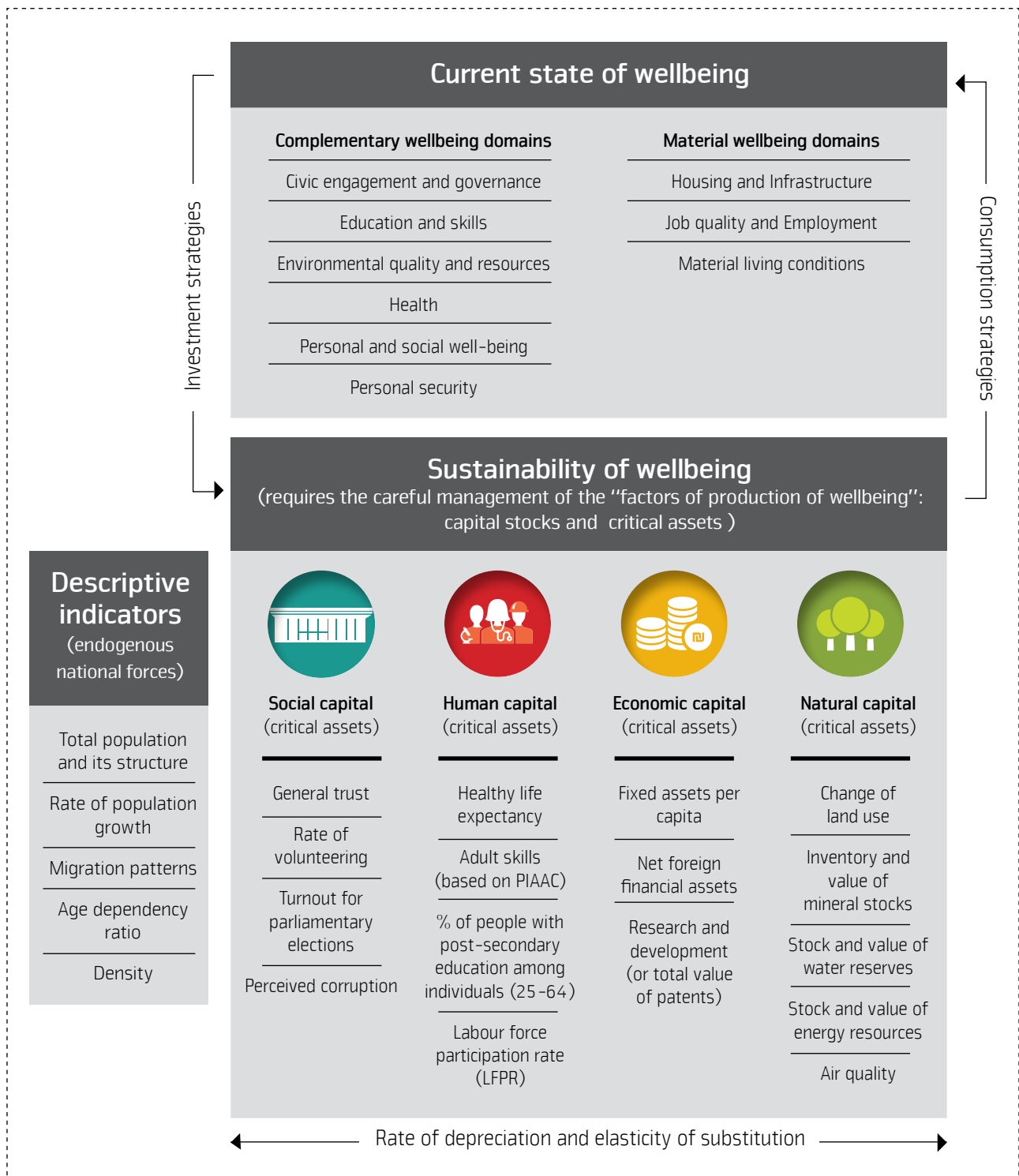
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“It is a commonplace organizational phenomenon that attending to the needs of the moment – putting out fires – takes precedence over attending to the needs for new capital investment or new knowledge. The more crowded the total agenda and the more frequently emergencies arise, the more likely it is that the middle-range and long range decisions will be neglected.”

Herbert A. Simon, *The Sciences of the Artificial*, 1969, 2nd ed., p.185

# Conceptual model linking wellbeing with the sustainability of wellbeing over time



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# Opening remarks by Martine Durand, the OECD Chief Statistician, Director of Statistics

The notion of wellbeing is at the heart of the OECD mission to help governments foster Better Policies for Better Lives. The OECD has been at the forefront of the statistical agenda on measuring wellbeing and progress even before the seminal report of the Commission on Measurement of Economic Performance and Social Progress (the so-called Stiglitz-Sen-Fitoussi Commission), and is today pursuing this work through its Better Life Initiative, a pioneering initiative launched by the OECD Secretary-General, Angel Gurría, during the 50th Anniversary of the Organization in May 2011.

Why is the OECD putting an emphasis on people's wellbeing? The reason is simple. It relates to the sense of a growing gap, already evident in the years before the economic and financial crisis – but which the crisis has further heightened – between what official statistics say about a country's 'economic performance' and people's own assessment and perceptions of their conditions. Addressing this gap is important if we want to retain the confidence of citizens in governments' ability to address what matters to them and to act for the common good. 'Measure what you treasure' should be at the heart of our statistical agenda.

The challenge faced by Israel and other societies around the world is to achieve a consensus on a set of goals for collective action that could allow policies to be guided by a shared and lasting vision on what society we should bequeath to our children and grand-children. Different people and societies are likely to have different views. But what we know is that, in all cases, this will require moving beyond conventional measures of GDP (which only measures the quantity of goods and services produced and exchanged in markets in a given country and period) towards measures that inform about people's own conditions, their feelings and aspirations, and about inequalities in those conditions among the members of the same community. Measuring wellbeing requires to look beyond both the market and the average.

The statistical agenda of wellbeing has travelled a long way since its inception. What was in the past a discussion largely confined to academic circles has since translated into a well-established international agenda. This, by itself, is a major achievement. Countries around the world, from France, to the United Kingdom, to Italy, Austria, Mexico, Korea and others have launched in recent years national initiatives to collect and use sets of indicators to inform citizens and policy makers about wellbeing and quality of life.

This Report on the Measurement of Sustainability by the Israeli Ministry of Environmental Protection represents a first milestone in the initiative launched by the Israeli government in September 2012 to develop Indicators for Wellbeing, Sustainability and Resilience. While much of the ongoing international work has focused on developing better measures of wellbeing 'here and now', the title of this report underscores the importance of taking a long-term perspective, looking at the conditions required for wellbeing to last over time. The OECD is pleased to contribute to this endeavour by the Israeli Government and will work over the coming months to bring its expertise to support its initiative.

But developing better metrics of wellbeing and progress, important as it is to reconnect people and governments, is not the final goal. Better statistics are not ends in themselves but rather means to improve current and future conditions.

This underscores the importance, well recognised by the initiative of the Israeli Government, to use indicators in the policy process.

It is now time to ensure that the new information on the sustainability of wellbeing is put into practice. This requires moving from measuring wellbeing to understanding its determinants, and to assessing how policies can be designed and implemented to improve the lives of citizens. Better metrics of wellbeing today, and of the capital stocks that underpin future well-being, can contribute to that goal. This is at the heart of the OECD's New Approaches to Economic Challenges initiative (NAEC). First, such measures can help to identify policy priorities; second, they make it possible to implement more joined up policies across government departments; and, lastly, good measures of well-being and sustainability support the legitimacy and public acceptance of these policies as directly grounded in people's preferences and priorities.

More than ever, the OECD is today committed to put the notion of wellbeing now and its sustainability into the future at the core of its policy-advice. As recently stressed by the OECD Secretary-General: "Our fundamental assumptions about the functioning of economies, our policies and structural reforms, our systems and institutions, need to be re-oriented towards one supreme objective: improving the wellbeing of people". Such a re-orientation demands a big change in our mind-frames, in how we understand the functioning of markets and the behaviours of people. This is what the OECD and the Israeli Government are trying to achieve.

Martine Durand  
Chief Statistician,  
Director of Statistics  
OECD



# Opening remarks by Avi Gabbay, Minister of Environmental Protection

The dependence of mankind on resources is complete and unconditional. The geographic distribution, availability and distinctive properties of resources have a decisive impact on quality of life everywhere. In the natural sciences, there can be no evolution without some resources. If the discipline of economics could be summed up in just one question, it may very well be: how does society manage its scarce resources?

When we use the term "resources" we take a holistic approach and use it as an "umbrella term" that covers a broad set of "items", or in our case "assets", that comprise the wide resource base of a society: human, economic, social and natural resources.

Similar to our understanding of the term "resources", we also adopt a broad interpretation of the term "capital": natural capital, economic capital, human capital and social capital. Together, these four stocks of capital constitute the resource base of society. Thus, the term "resources" is analogous to the concept of "capital" and this report by the Ministry of Environmental Protection makes free use of these two terms.

Societies do not simply manage their national resource base. They erect institutions to regulate resources and markets and then put people in charge of these institutions. The role of those governors of capital stocks is not a trivial one. Managing the national capital is a complex administrative task, fraught with uncertainty. At any given time, capital may be allocated to different activities, for different population groups and to support different processes. While some capital stocks are finite, the alternatives for their allocation are, in fact, infinite.

In addition, government institutions are also responsible for striking a balance between the consumption and accumulation of any critical asset to ensure its continued consumption over time. Furthermore, since the broad social objective of capital allocation is not "profit maximization" for a specific stakeholder but rather maximization of "wellbeing" for as many individuals in society as possible, the optimization of capital allocation is a normative matter.

If all this is not enough, the government may eventually decide not to allocate capital at all, but rather to invest in it for the benefit of future generations. And this too is a normative issue: what asset to protect, how much of it should be preserved, for what cause and for whom? These questions are shrouded in ambiguity and invite political and public discussion.

Nevertheless, two things are clear. First, without a wide national resource base to draw upon, there can be no social progress, no socioeconomic mobility and no economic prosperity. This is true for societies, for firms and for households.

Second, a national resource base cannot be managed wisely, responsibly and in an equitable manner, while attending to the inheritance we bequeath to future generations, without a reliable, comprehensive and up-to-date indicator system that captures the conditions of assets and stocks at all times.

Therefore, the good governance of Israel's capital stocks must be based on a wide-ranging database. This is why the formulation of sustainability metrics is a principal motivation of the Ministry of Environmental Protection. For this reason, the Ministry has become a leading agency in the national effort to formulate a system of wellbeing indicators, in accordance with government resolution no.5255 of 2012, and resolution no.2494 of 2015,

and also in the attempt to address the elementary questions of whether Israel's socioeconomic development can endure, and for how long? These elementary questions have yet to attain their rightful place in the public discourse.

Accordingly, this report on "the measurement of sustainability" seeks to initiate an endeavor by the government, at whose completion we will be able to present a tight framework of sustainability indicators that will help to assess whether Israel's socioeconomic development can be sustained, and by what means. These measures will serve policy makers and the general public, in decision-making processes, in setting national priorities, in devising government strategies and in policy assessment.

This report is a great achievement and I wish to extend my gratitude to everyone who has taken part in its preparation. I can only hope that the measurement of sustainability will complement the measurement of wellbeing to assure that the quality of life in Israel will be inclusive, just and long-lasting.

Avi Gabbay  
Minister of Environmental Protection

# Opening remarks by Nathan Sussman, Director of the Research Department and Member of the Monetary Committee, The Bank of Israel

The Central Bank of Israel is an independent institution whose main functions are setting monetary policy, advising the government on economic affairs and ensuring the stability and resilience of the national financial system. In its capacity as the economic advisor to the government, the Bank of Israel, through its Research Department, deals with issues related to social and economic progress. Since 2012, the Bank of Israel has been a member of the "Wellbeing, Sustainability and Resilience Indicators" steering committee.

The use of GDP per capita as an indicator of wellbeing is widespread in economic practice. However, GDP per capita does not cover the many different facets of wellbeing and so, additional metrics have been developed, such as the Human Development Index, which combine GDP per capita with health and education measures, among other wellbeing dimensions.

It is probable, and indeed evident, that different people will have different preferences with respect to the different components of wellbeing. One person may prefer an "additional unit" of health over an "additional unit" of education, while another may opt for "a little more" personal security over "a little more" disposable income. Innovative research approaches seek to develop wellbeing indicators that take into account different citizens' preference.

Furthermore, economic growth is not an end in itself, but a means to improve "wellbeing". Whether we measure wellbeing by means of GDP per capita, or whether we measure wellbeing by means of HDI or by means of another complex index that takes into account other elements of wellbeing, it is possible to use the conceptual framework of the "exogenous growth model" developed by Robert Solow. According to this framework, the product (in this instance, wellbeing) is the outcome of a combination of factors which include labor, capital and technology. To this end, GDP growth over time is possible through growth in capital stocks and improvements in technology. Growth of capital stocks is made possible through investment, or the allocation of resources from current consumption for the sake of a better future.

The definition of the term "capital" has expanded over the decades from a narrow definition of produced capital – machinery and equipment – to human capital that includes education, skills and health, to natural capital, and subsequently to social and institutional capital. With the broadening of the concept of capital, it has become necessary to develop a modified theoretical framework linking new capital components, or stocks, that are being used as "production factors" of wellbeing.

Accordingly, it was necessary to find ways to define and to measure these capital stocks, and this lies at the heart of this publication. Ensuring the continued improvement of wellbeing, which is often referred to as "sustainable development" by international organizations, depends on the good governance of the material, human and social-institutional assets.

One of the new components of capital, which has elicited research interest in recent years, is social capital, and in particular its primary assets – trust and solidarity. Without trust among citizens, and between citizens and state institutions, the resources available to society for social and economic activities will be under-utilized: individuals, firms and the government would be compelled to waste resources on monitoring and enforcement to guarantee their rights and safeguard their properties, instead of using these same resources for economic production and for social progress.

Therefore, it is important to understand the relationship between trust, growth and wellbeing and to develop tools to measure social capital. Once social capital indicators are available, it will be necessary to understand how to invest in this type of stock.

After the publication of this work and the adoption of the conceptual framework that links wellbeing with "the factors of production" of wellbeing, the next step will be to carry out a study to identify, define and measure the assets that are the "wellbeing production factors" in Israel.

The aim of this study would be to assist decision makers to monitor and manage the national capital stocks and to attend to various issues in the Israeli economy, such as the labor market and the quality of human capital, the government budget and trust in the Israeli society.

This applied research is of national importance. It also coincides with the thinking about these metrics and indicators on the part of international bodies, including the OECD, which has long supported Israel's efforts to measure wellbeing, sustainability and national resilience.

Prof. Nathan Sussman  
Director of the Research Department  
Member of the Monetary Committee  
Bank of Israel

# Foreword

If the purpose of government is to enhance the quality of people's lives, then the measurement of the efficacy of governance cannot be restricted to the system of national accounts. Managing a nation based on economic measures, such as the Gross Domestic Product (GDP), is likened to driving a car using only the speedometer. The speedometer is a critical indicator. It informs the driver about the speed of the car but it cannot tell the driver how far they can go at the current speed. Or, indeed, at any speed.

We often make use of the metaphor of the instrument panel (the dashboard) to explain the contribution of a comprehensive system of wellbeing indicators to policy making processes. The main idea behind Government Resolution 5255, and of the previous reports of the National Economic Council, the Central Bureau of Statistics and the Ministry of Environmental Protection, is that a system of wellbeing indicators is designated to complement the system of national accounts (SNA). It aims to create a wider representation of social progress and human development than that provided by the GDP. Such a dashboard will include for instance health, education, employment, personal safety, housing and environmental quality indicators. It will be confident that decision making processes in government are based on a wealth of high-quality and reliable data.

But, in fact, a government that aspires to enhance the quality of people's lives cannot base its measurements of performance on wellbeing indicators alone. Although wellbeing indicators reflect the state of progress and development of a country in any given year, an additional set of sustainability indicators is needed.

Sustainability indicators allow us to move beyond conventional measures of wellbeing towards measures of the factors that produce wellbeing. They allow us to take a long-term, future-oriented view. Only sustainability measures may help us evaluate whether or not development policies attend to the needs of present generations without drawing too deeply on the resource base that will provide the needs of future generations. Sustainability measures examine the conditions of these remaining resources, in quantity and in quality. They create a space in which we can discuss the criticality and substitutability of our national assets with other economic, natural, human and social assets.

While the purpose of formulating an indicator system for the measurement of wellbeing is to add interdisciplinary measures to complement GDP – outcome indicators at the individual level and at the market level – the purpose of this paper is to advance our understanding, our measurement capabilities and our stewardship capacity of the determinants and drivers of wellbeing. Returning to the metaphor of the car, speedometer cannot tell the driver of the car how much fuel is left in the tank. This report aims to provide the “driver” with a “fuel gauge”. For there is little sense in designing a system of wellbeing indicators without dealing with the question of the continuing of wellbeing, just as there is no point in talking about the speed of travel if the fuel tank is empty.

# Measuring Sustainability: Setting the Agenda

Sustainable (adjective)

1. Able to be maintained at a certain rate or level;
2. Able to be upheld or defended

- Oxford Dictionary

“Assuming we have been able to assess what is the current level of wellbeing, the question is whether the continuation of present trends does or does not allow it to be maintained. ... (for) the wellbeing of future generations compared to ours will depend on what resources we pass on to them. Future wellbeing will depend upon the magnitude of the stocks of exhaustible resources that we leave to the next generations. It will depend also on how well we maintain the quantity and quality of all the other renewable natural resources that are necessary for life.”

- Report by the Commission on the Measurement of Economic Performance and Social Progress by Joseph Stiglitz, Amartya Sen, Jean-Paul Fitoussi (2009)

“When the rate of return on capital exceeds the rate of growth of output and income, as it did in the nineteenth century and seems quite likely to do again in the twenty-first, capitalism automatically generates arbitrary and unsustainable inequalities that radically undermine the meritocratic values on which democratic societies are based”.

- Thomas Piketty, *Capital in the Twenty-First Century*, 2014, Éditions du Seuil and Harvard University Press, Introduction, p.1

# Background, Scope and Definitions

## Composition of this report

This report on the measurement of sustainability presents the work of the Israeli government consultation forum which was mandated in 2012 to put forward a measurement agenda and metrics for wellbeing, sustainability and national resilience. The forum included representatives from the Prime Minister's Office, the National Economic Council, the Bank of Israel, the Ministry of Environmental Protection and the Central Bureau of Statistics. In September 2014, the forum held an interdisciplinary expert workshop in Jerusalem aimed at developing a clear conceptual framework for measuring sustainability and sustainable socio-economic development. The expert workshop brought together representatives of the consultation forum with representatives of academia in Israel, including scholars from the Hebrew University, Tel Aviv University, the Technion – the Israel Institute of Technology – and the Interdisciplinary Center Herzliya; they were joined by representatives of civil society and delegates of the Organization for Economic Cooperation and Development (OECD) and United Nations Economic Commission for Europe (UNECE) that had taken part in developing the OECD framework for measuring wellbeing (How's Life?, 2013).

The process of devising Israel's conceptual framework and the process of developing the indicators benefited from collaborations with experts from the OECD and members of Statistics Canada, Canada's National Statistical Agency, who were involved, inter alia, in managing the Working Group on Sustainable Development Statistics of the United Nations, the OECD and the Central European Statistical Bureau (Eurostat, UNECE). This working group produced the report entitled Measuring Sustainable Development in 2008. Measuring Sustainable Development has become a milestone in relation to the measurement of wellbeing, welfare, progress and sustainability and helped to inspire the 2009 Stiglitz-Sen-Fitoussi Report on Measuring Economic Performance and Social Progress.

## Objectives

Enriched by the national and international thinking listed above, the specific objectives of this report are:

- To propose a clear and applicable agenda for measuring sustainability based on the capital approach to sustainable development and a four capital stock framework;
- To propose an initial index of critical assets that would serve as the core of the conceptual framework and assist policy makers in decision making processes and political analysts and the general public in Israel in policy assessment processes.

## Some organizing thoughts

Sustainability and Development are celebrated concepts in the contemporary socioeconomic discourse. A marriage of the two socially-constructed concepts – the notion of sustainable development – has also emerged as a prevailing concept in 21<sup>st</sup> century politics. Yet it is typified by ambiguity (Robinson, 2004<sup>1</sup>; Lehtonen, 2004<sup>2</sup>) which, from a policy perspective, may be obstructive. The UNECE notes that “sustainable development can mean all things to all people... (it has) a cloud of ambiguity hanging over (it)” (UNECE, 2015)<sup>3</sup>.

Due to this ambiguity, the ability to measure the sustainability of development has remained limited. Limited measurement capacity of sustainable development makes the task of management for sustainable development a difficult one. It hinders governments from managing socioeconomic development in such a way as to maintain wellbeing over time (Adams, 2006)<sup>4</sup>.

This is why the conceptualization, operationalization and measurement of sustainable development are critical tasks for present-day governments.

The primary objective of this report is to assist policy makers and civil servants in Israel to complete this task: to move beyond ill-defined notions and the current conventional measures of wellbeing, and towards measurement of the factors that produce wellbeing. It seeks to identify those factors of production – the four capital stocks; to describe them and to suggest how to measure them within a clear, concise and practical framework.

Indeed, a clear and concise measurement framework has shortcomings: it may not capture the full breadth of aspects of sustainable development and of a society's overall capital base. However a compact list of sustainability indicators is necessary to support better policy making. As Dasgupta notes (2001, p.178)<sup>5</sup>: "It is necessary to have a tight, analytically sound framework from which to proceed to practical decisions. Along the way, corners will have to be cut and qualitative judgments have to be made. But having the correct framework at the back of one's practical mind is good practice. It enables the evaluator to recognize when a corner has to be cut and it forces him to search for good ways to do it. The danger is to dismiss the framework with the shrug of one's practical shoulders. If one does that, all sort of ad hoc considerations can be expected to creep in, such as the interests of powerful groups in society".

To achieve these goals, this report must begin with a preliminary discussion of scope and concepts before it moves to present the measurement framework.

Fortunately, this report was not conceived and authored in an intellectual void. On the contrary, a great many publications served as the take-off point of this work. Specifically, we envision this report to be a continuation of two seminal works in this field: *Measuring Sustainable Development* by the Working Group on Sustainable Development Statistics of the United Nations Economic Commission for Europe (UNECE), the Organization for Economic Cooperation and Development (OECD) and the Central European Statistical Bureau (Eurostat), and *Report on Measuring Economic Performance and Social Progress* by Joseph Stiglitz, Amartya Sen and Jean-Paul Fitoussi.

By no means did we intend to reinvent the wheel and neither did we plan to rephrase what has been phrased so eloquently before. For these reasons, we built our proposed framework upon the strong foundations of these two aforementioned reports. The modest contribution we hope to offer to the discourse is the discussion we open up into the less-explored areas of the assets that together comprise Israel's natural, economic, human and social capital stock. (In this report, assets will be defined as the "individual elements of a capital stock") (Smith et al., 2001, p.44).

## Scope and concepts

It would be helpful to start this discussion of scope and concepts with etymology. "Sustainability" comes from Latin, where it first appeared in the form of *sustinere*. The meaning was: "to hold, to keep, to support".

While derivations of *sustinere* evolved in other Romance languages, the word was not in frequent use in English for centuries until it was retrieved in 1972 in the seminal book *The Limits to Growth*. Authors Donella Meadows, Dennis Meadows, Jørgen Randers and William Behrens used it to refer to the capacity of an individual, or of a group of individuals, to use or to harvest a stock of resources; so that the stock is not depleted; so that



the resource is not irreversibly exhausted; so it could be used for a long time; so that future generations would be able to continue to consume it to derive utility and satisfaction, welfare and wellbeing.

It is important to note that "sustainable" is an adjective. It is the part of speech used to describe other words, for instance "development".

In 1987, the World Commission on Environment and Development (The United Nations Brundtland Commission) married "sustainable" with "development" to present the new notion of "sustainable development". According to *Our Common Future*, "Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs".<sup>6</sup>

According to the United Nations, the new notion supports economic development, "in particular, for people with a low standard of living" (UNECE, 2015). "At the same time", UNECE stresses, "it underlines the importance of protecting the resource base and the environment. Socioeconomic wellbeing cannot be improved with measures that destroy the environment. Intergenerational solidarity is also crucial: all development has to take into account its impact on the opportunities for future generations" (ibid).

This is a critical point. UNECE asks for the attention of policy makers to be centred on measuring and protecting the resource base that is used on both wellbeing and economic development. As noted by UNECE, the OECD and Eurostat (2008, p.18)<sup>7</sup> "sustainability in itself has no intrinsic value, the challenge of the concept is not so much in the word 'sustainable' but in 'development'" (ibid). To understand, to measure and to govern for sustainable socioeconomic development, the UNECE highlights that it is "important to define what is meant by development. That, in turn, leads quickly to the need to define human wellbeing" (2008, p.18).

However, defining economic development or wellbeing is not the intention of this report. And, at any rate, in the view of UNECE neither economic development nor current wellbeing should be at the very core of government policy. Rather, governments should administer their resource base in a way that enables long-lasting wellbeing and long-lasting improvement of consumption opportunities. Governments should regulate the investments in, and the consumption of, these resources. And they should assure resources for consumption by future generations. In this report, the resource base of a nation is synonymous with wealth, or capital, in their broadest sense, as they are understood in economics. This approach is also taken by the United Nations (United Nations et al., 2003, p. 4): "Sustainable development is development that ensures non-declining per capita national wealth by replacing or conserving the sources of that wealth; that is, stocks of produced, human, social and natural capital".

This brings us nearer to the approach this report adopts to measure sustainable development: the capital theory approach to sustainability.

A lengthy account of the evolution of the term "capital" and its interdisciplinary expansion is included in the Stiglitz, Sen and Fitoussi Report on the Measurement of Economic Performance and Social Progress<sup>8</sup> and in the UNECE, OECD and EUROSTAT's *Measuring Sustainable Development*. Both present the term's evolution from the original uses in macroeconomics in the aggregate production function, also known as the exogenous growth model or the Solow Growth Model<sup>9</sup>, to its current uses, in its broadest sense. According to *Measuring Sustainable Development* (2008, p.44): "All goods and services can be viewed as being produced through the use of capital, normally in conjunction with human labor. Since the concept of sustainable development demands that a very broad view of consumption be taken, then it is necessary to take an equally broad view of capital". This view is embraced by this work as well.

# Capital Approach to Sustainability

The premise that any government has a portfolio of critical assets at its disposal – natural, economic, human, social and institutional assets<sup>10</sup> – lies at the heart of the capital approach. As outlined in the OECD's *How's Life?* (2013), sustaining wellbeing outcomes over time require the careful management, measurement and preservation of four types of capital stock for future generations: (a) economic capital, (b) natural capital, (c) human capital, and (d) social capital.

The OECD's criteria echo the Hartwick–Solow rule for the sustainability of development and wellbeing, that it should represent “a non-declining capital stock over time” (Solow, 1986<sup>11</sup>; Repetto, 1986<sup>12</sup>).

These four capital stocks – economic, natural, human and social – cover an index of tangible and intangible assets that together are affected by the regulations and government decisions taken today and that contribute to the creation of wealth, to the accumulation of capital, to the availability of consumption opportunities and freedoms, and to the production of wellbeing in the future (Dixit, 1980<sup>13</sup>; Hamilton and Hartwick, 2005<sup>14</sup>).

Hartwick (1977<sup>15</sup>, 1978<sup>16</sup>, 1990<sup>17</sup>) largely agrees (see above) although he focuses his analysis on extractive mineral resources, rents from resources, and elasticity of substitution between capital stocks. Similarly, Solow (1986), Pearce and Atkinson (1992<sup>18</sup>, 1993<sup>19</sup>) underscore the affect of natural capital management on sustainable economic development.

According to Smith et al. (2001)<sup>20</sup> and the United Nations (2008), the four capital stocks are defined as follows:

Economic capital consists of both produced capital assets, such as roads or machinery; and of financial capital assets, for instance bonds and reserve funds. Total national economic capital affects the economic sustainability and international positioning of any country (e.g. by means of external debt as a percentage of GDP). Yet, it is as essential to examine the distribution of economic capital within the country as it is to measure total national wealth. Inequitable distribution of national resources between different social groups and sectors may lead to unsustainable conditions in which, for example, household debt may increase while company debt decreases over time. The creation and accumulation of economic capital requires a flow of investments. A methodology for measuring this capital stock is presented in the OECD's *Measuring Capital*.<sup>21</sup>

Natural capital, according to the United Nations European Commission, the International Monetary Fund, the OECD and the World Bank (2003)<sup>22</sup>, and according to Smith et al. (2001)<sup>23</sup> and the United Nations (2008), includes extractive natural resources that are exploited for use in economic production processes, such as hydrocarbons and metals. It also includes non-market assets, such as air and seas. Extractive resources are easier to define and measure than non-market assets. Some of these non-market assets have amenity value, for example landscapes for recreational activities. Other non-market assets may provide vital services for the health of humans and integrity of ecosystems. They are less clear and not easily measurable.

Human capital includes labour, knowledge, skills, health and attributes embodied in individuals that, together, create personal, social and economic development, enable wellbeing, and contribute to the production of economic utilities (by means of labour). It also includes aspects related to human emotional and physical health. The term capital, in this context, emphasizes the fact that the skills, talents, education and health of individuals impact on their wellbeing in the present and can be “accumulated” and impact on their wellbeing in the future (Becker, 1964<sup>24</sup>; Becker, 1993<sup>25</sup>; Smith et al., 2001).

Social capital, the least explored of the four terms, encompasses a variety of factors related to the capacity of people to collaborate in a community, including social norms and trust.

Social capital has been defined by the OECD (2001, p.119)<sup>26</sup> as:

“The network of shared norms, values and understanding that facilitate cooperation within and between groups”.

Trust, in particular, plays a vital role in the creation of social capital. It is a prerequisite for enduring socioeconomic interactions between individuals or groups of individuals (e.g. transactions) and a central element in the establishment of complex social institutions. Putnam (1995<sup>27</sup>; 2000<sup>28</sup>), who brought the term to the political centre stage, describes trust as the necessary “lubricant” for a functioning society. High levels of general trust lead to recurring interactions among individuals. It strengthens common values and norms. It reduces transaction costs<sup>29</sup> and results in a lesser need for regulation and government intervention in markets (Aghion, Algan, Cahuc and Shleifer, 2009)<sup>30</sup>, thus enabling social and economic systems to function in a more efficient manner, and hence it contributes to economic growth (Arrow, 1972<sup>31</sup>; Halpern, 1999<sup>32</sup>; Algan and Cahuc, 2010<sup>33</sup>). Algan and Cahuc (2010) further demonstrate the causal links between trust and growth (ibid).

An especially relevant point with regard to Israel is the impact of social capital on innovation. According to Grootaert (1997)<sup>34</sup> and the World Bank (2001)<sup>35</sup>, social capital constitutes a type of accelerator for innovation. Collaboration between firms and academic institutions accelerates the transfer, distribution and assimilation of knowledge (Freeman and Luc, 2000)<sup>36</sup>. In effect, successful and effective national innovation networks do not exist without “high-quality” social capital (Lundvall, 1992<sup>37</sup>; Lundvall et al., 2001<sup>38</sup>).

## Measuring capital stocks and flows

Classic economic theory maintains that it is important to view capital as having two qualities in respect to time – stocks and flows. These two qualities are illustrated by Fisher (1896, p.514)<sup>39</sup>: “Stock relates to a point of time, flow to a stretch of time... The total capital in a community at any particular instant consists of all commodities of whatever sort and condition in existence in that community at that instant (i.e. capital stocks), and is antithetical to the streams of production, consumption and exchange of these very same commodities (i.e. capital flows)”.

This is an important distinction between stocks and flows with respect to time, but also with respect to the role of governments and to the way of defining, measuring and managing for sustainability, a distinction that was also stressed by the United Nations: according to UNECE (2008, p.9), “though the central focus of the capital approach is asset stocks, the measurement of flows is also integral to the approach. To the extent that an asset changes in value or size over time, there must be identifiable flow that is the cause of the change”. It is through flows that governments administer capital stocks.

The Working Group on Sustainable Development Statistics endorses this approach. It has identified the main flows for each capital stock: for economic capital, the fundamental flow variable is net investment in all types of economic asset. For human capital, the basic flow variable will also be net investment, equivalent to the value of the increase in human capital over time minus depreciation due to ageing, skill obsolescence, failure to keep

up with technological progress and the loss of employees in the workforce due to retirement, unemployment and morbidity. For non-critical natural assets, with high elasticity of substitution with other resources, the main indicator will be the aggregate value of net depletion (Jansson, 1994)<sup>40</sup>. For critical assets, different types of asset would require different measures. For social capital, identifying flow measures is more complex and a set of proxy indicators would have to be developed.

## Asset indicators and valuation

When measuring capital stocks and flows it would be preferable to use comparable measurement units for all assets, regardless of their associated stock. The default would be to use monetary units. However, the use of monetary units raises three major difficulties. Firstly, it is not possible to determine accurately the relative contribution to the different dimensions of wellbeing of every asset in every capital stock. For instance, education and literacy contribute to economic productivity and to good health while also contributing to good parenthood, civil action, and the ability to derive utility (non-economic utility) from art, culture and leisure activities. A contribution which cannot be accurately defined (e.g., good parenting) cannot be valued (United Nations, 2008).

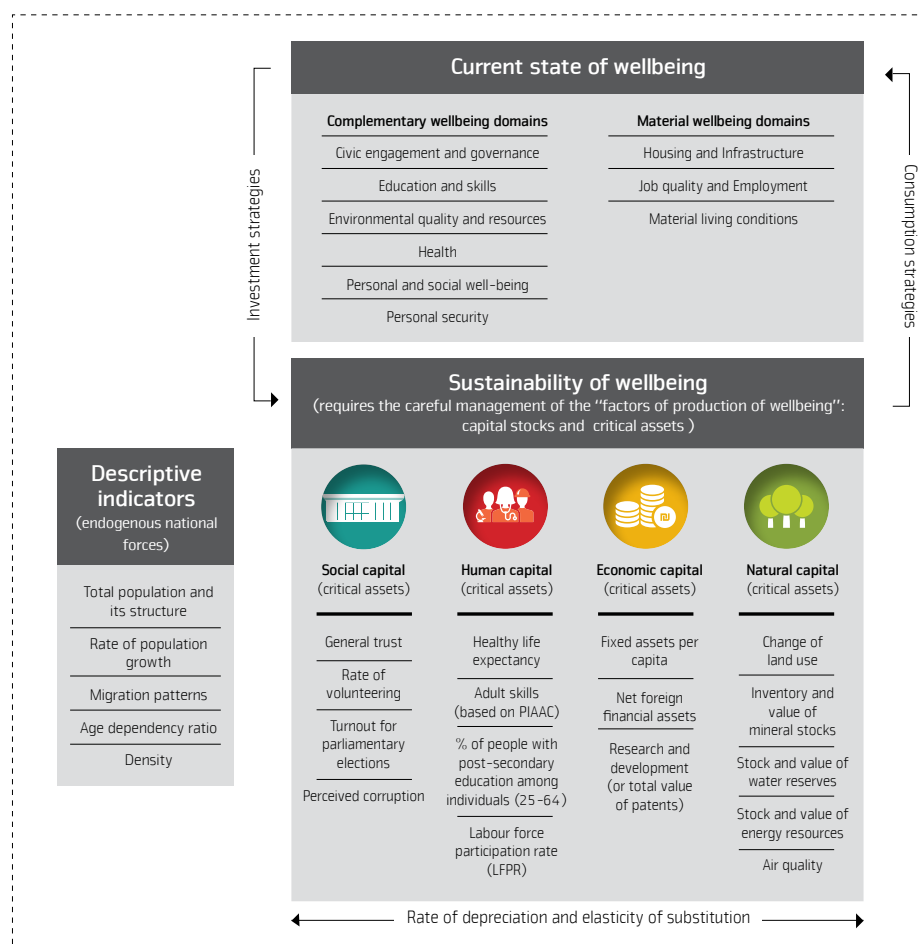
Secondly, even if the contribution of an asset to wellbeing is definable and measurable, it may prove impossible to evaluate this contribution. Markets, as noted, do not always achieve the perfect conditions that enable correct valuation (Smith et al., 2001). Additionally, valuation of some assets may be subjected to normative considerations, biases and inaccuracies: can one value, in monetary terms, the contribution of the Western Wall in Jerusalem, to wellbeing over time, and yet it is a produced economic asset?

The third limitation of valuation of all assets concerns the issue of substitutability of assets. The accepted hypothesis is that some components of the resources base of a nation, or capital assets, have no elasticity of substitution with other assets, resources or goods (Atkinson, Dietz and Neumayer, 2007)<sup>41</sup>. These assets are defined critical capital assets (ibid).

Given that some critical assets are not traded in the market, use cannot be made of a single monetary indicator to represent the overall level of sustainable socioeconomic development of a country (Hartwick, 1978<sup>42</sup>; United Nations, 2008). The Working Group on Sustainable Development Statistics has maintained that it would be unsound to aggregate the monetary value for non-critical assets with those for critical, non-tradable assets, whose valuation is disputed in any case, into a single indicator.

As a result, any practical approach to assessing the sustainability of development, wellbeing or socio-environmental systems requires use of a mixed system of indicators: monetary indicators together with physical and descriptive indicators.

# Framework for Measuring Sustainable Wellbeing



The proposed conceptual framework is based on a modified capital approach to the measurement of sustainability. The framework is based upon the OECD’s conceptual model from 2012.<sup>43</sup>

The proposed framework has four measurement domains. The first measurement domain, at the top of the figure, covers the measurement of wellbeing and material living conditions. The GDP indicator was developed in this “area”, which also covers housing and income, among others. The second measurement domain, adjacent to it, covers the complementary aspects of wellbeing. In this area, aspects of health, education, personal security, environmental quality, personal and social wellbeing, civil action, and others are measured. Non-market benefits and utilities also appear in this area. The third domain of measurement at the base of the framework includes a list of 16 asset indicators, tangible as well as intangible assets, in four capital stocks: natural, economic, human and social.

The framework has been developed to include descriptive indicators regarding population growth, rate of growth, age dependency ratio and migration patterns, as these are critical forces in any discussion on the sustainability of the socioeconomic development of nations. Two types of generic flow connect the “state of current wellbeing” to “sustainability of wellbeing”: (1) investment in critical assets, and (2) consumption of critical assets. Both are in the realm of a nation’s portfolio management strategy.

# Economic Capital Indicators



## Indicator: Fixed assets per capita

**Measurement:** The monetary value of fixed assets owned by the Israeli government, firms and households, and used in production processes, per capita.

**Rationale:** Fixed assets are important inputs into the production processes of goods and services traded in the Israeli economy. The consumption and use of produced goods and services are the principal sources of income for local citizens, and are the means by which citizens derive utility and wellbeing. Therefore, assets are the basis for consumption and material wellbeing over time.

**Further Normative and Methodological Issues:** An outstanding local issue is how this indicator should express the cultural value of produced capital such as heritage and historic sites, buildings and monuments. According to the System of National Accounts, cultural sites are a sub-category of economic capital, along with fixed assets and stocks, and therefore should appear in national balance sheets. Cultural assets contribute to wellbeing and should therefore be expressed within the framework of the indicator. At the same time, valuing cultural assets may prove controversial (what is the economic value of the Western Wall in Jerusalem?). Further discussion on this category is necessary.

**Data Availability/Data Presentation:** The indicator could be prepared on the basis of existing data in the Central Bureau of Statistics and in the Bank of Israel (national balance sheet).

## Indicator: Total value of patents

**Measurement:** The monetary value of patents owned by the Israeli government, public institutions, firms and households, in Israel.

**Rationale:** The aggregate value of patents owned by Israelis provides a measure of the outcome of investment in innovation and in research and development in the Israeli economy. Innovation, in turn, constitutes an important determinant in assuring economic competitiveness and the continuance of Israel's competitive edge in the long term.

**Further Normative and Methodological Issues:** This indicator should be measured per capita. It should be noted that there is a degree of overlap between measurement of the aggregate value of patents and measurement of the investments in research and development. In addition, the value of "research and development" is included, by definition, in the indicator of fixed assets according to the SNA. Thus, there may be additional overlap with the indicator of fixed assets per capita. The research and development indicator is a more accepted indicator in economic statistics. Nevertheless, there is good reason to measure the aggregate value of patents as this would provide an outcome indicator of the state of innovation in Israel. The availability of the data to create the indicator should be taken into account, since data may be dispersed among many firms and may be difficult to obtain.

**Data Availability/Data Presentation:** This needs to be developed by the Central Bureau of Statistics.

## Indicator: Net foreign financial assets

**Measurement:** The monetary value of the difference between Israeli holdings of foreign financial assets and foreigner holdings of Israeli financial assets, per capita.

**Rationale:** The value of Israel's net foreign financial assets is included in the national balance sheet and expresses the debt that the country owes to other countries, or the debt owed by other countries to Israel. Israel's position as a net lender or a net borrower (also called "net debtor") would affect the management of the national budget. If Israel is a net borrower – i.e. if the country borrows more than it saves or lends – then the government must allocate a portion of its annual income for repayment of debts. Conversely, if Israel is a net lender, the indicator would reflect the anticipated increase in national income as a result of the repayment of debt by borrowing countries. National income used to repay foreign debt would not be available for local investment or for the creation of material wellbeing. The income received by Israel from the repayment of debt has the potential to increase local material wellbeing.

**Further Normative and Methodological Issues:** This indicator would also be measured per capita.

**Data Availability/Data Presentation:** The indicator could be prepared on the basis of existing data in the Central Bureau of Statistics and in the Bank of Israel (national balance sheet).

# Human Capital Indicators



## Indicator: Healthy life expectancy

**Measurement:** The average number of years that citizens are expected to live in a health (this figure would be lower than for "life expectancy").

**Rationale:** The healthy life expectancy indicator (for instance, the health-adjusted life expectancy, HALE) broadens the traditional indicator of "average life expectancy at birth" to include aspects of morbidity, by deducting the years of chronic disease and/or injury. The indicator reflects the capacity of Israelis to participate in various social and economic activities (family life, community life, participation in the labour market, leisure activities, etc.). All else being equal, healthy citizens are able to integrate more easily in society than those suffering from deteriorating health. By participating in social activities, an individual can derive satisfaction while at the same time contributing to the overall wellbeing of society.

**Further Normative and Methodological Issues:** This descriptive indicator completes the measurement of human capital in a country as it expresses dimensions that are not captured by other market indicators (monetary indicators), such as rate of participation in the labour force or cost of education. It reflects the capacity of Israeli citizens to engage in the wide array of activities that create wellbeing. No matter what the undertaking is (working, volunteering, parenting, engaging in leisure activities, etc.), healthy people give and gain more utility than unhealthy people.

**Data Availability/Data Presentation:** This needs to be developed. The life expectancy indicator could be prepared on the basis of existing data in the Central Bureau of Statistics and the Ministry of Health.

## Indicator: Labour force participation rate (LFPR)

**Measurement:** The rate of participation in Israel's labour force, defined as the percentage of the population over the age of 15 that is employed or is seeking employment, expresses the population of working age which is employed or interested in employment, including the unemployed. People aged 15 and over who are "employed", or "unemployed" but seeking work, are included in the labour force. People who live on allowances or pensions, students, volunteers and population groups that are not interested in employment, or who are interested in employment but did not seek employment in the month prior to the period of the relevant survey of the Central Bureau of Statistics, are not included in the labour force.

**Rationale:** This indicator measures the share of the working-age population that takes part in the labour market. It reflects the potential size of the labour force available to engage in activities that generate income, which is, in turn, an essential determinant of economic development and material wellbeing. While there is no absolute level of labour force participation that can be considered "best", it is clear that a decline in labour force participation would lead to lower market income and, as a result, might impede the ability to maintain long-lasting economic development. Additionally, comparison of the labour force participation rate in Israel with that of other developed economies, mainly OECD members, is an important comparative indicator for assessing the international competitiveness of the Israeli economy.

**Further Normative and Methodological Issues:** Although this indicator is useful for measuring national human capital, it ought to be complemented with monetary indicators of human capital such as "lifetime income" or "cost of education". The affect of the educational level of the working-age population on the participation



rate in the general labour force should be noted: according to the Bank of Israel, population groups with high educational levels are characterized by relatively high participation in the labour force: the increase in the level of education is the principal explanatory variable of the increase in the rate of participation in the labour force (Bank of Israel, Impact of Education on the Rate of Participation in the Labour Force in Israel, 27 February 2013).

**Data Availability/Data Presentation:** This indicator could be prepared on the basis of existing data in the Central Bureau of Statistics.

### Indicator: Adult skills, a product of the OECD Programme for the International Assessment of Adult Competencies (PIAAC) measuring literacy, numeracy and problem solving in technology-rich environments (age 15 and above)

**Measurement:** The critical life skills including reading literacy, mathematical literacy, and analytical skills that are required for problem solving in a technological environment, among adults (aged 15 and over).

**Rationale:** The indicator expresses the “stock” of people, and the quality of this “stock”, with the aptitude to read, to process mathematical and statistical data and to make use of technology in order to solve problems and complete complex tasks. Literacy, numeracy and problem-solving skills are basic skills that determine the personal capacity to process information, with implications for the ability to acquire education and to take part in the labour force and in civil life. High levels of these skills allow an individual to contribute more to the general social wellbeing and to derive greater personal benefit from integrating in various social circles and in the work force.

**Further Normative and Methodological Issues:** As in the “Healthy Life Expectancy” indicator, this indicator also expresses aspects contributing to the wellbeing of the individual which take place outside the market, and therefore cannot be measured monetarily.

**Data Availability/Data Presentation:** A survey was conducted and data will be made available in 2016 by the Central Bureau of Statistics.

### Indicator: Percentage of people with post-secondary education among individuals aged 25-64

**Measurement:** The share of Israeli citizens aged 25-64 that holds a degree from a post-secondary educational institute (university, college or training institute).

**Rationale:** Assuming all else to be equal, a high level of education enables an individual to take part in different social frameworks, to derive greater utility from diverse social activities and to contribute more significantly to the general social wellbeing. Higher education provides individuals with skills that increase their access to business opportunities as well as tools that assist them in contributing to their own wellbeing (family and community life, among others). This indicator expresses the “stock” and the quality of this stock (quality expressed in the education level) of the available labour force in the Israeli market.

**Data Availability/Data Presentation:** The indicator may be prepared on the basis of existing data in the Central Bureau of Statistics. Additional processing by the CBS is necessary.

# Social Capital Indicators



## Indicator: General trust

**Measurement:** The percentage of the population that believes people can generally be trusted and that there is no special need “to be very careful in dealing with people” in daily life.

**Rationale:** This descriptive indicator expresses the level of generalized trust among members of a society. The level of generalized trust contributes to general wellbeing as many of the determinants of wellbeing require interaction among peers (security, civil involvement, governance, work, education and personal and social wellbeing). Since generalized trust is a feature of a community rather than an individual, it can be passed on from one generation to the next and therefore, it is a useful sustainability indicator for measuring the “stock” of social capital.

**Further Normative and Methodological Issues:** This indicator is also recommended by the OECD. It is proposed that it should be complemented by an indicator of “trust in institutions”, an “institutional capital” measure – a type of capital that some organizations choose to distinguish from other forms of capital. The institutional trust indicator reflects the general functional capacity of a society. This is because the effective functioning of a society is dependent on civil trust in the legal, enforcement, religious and business institutions, among others. Furthermore, there is a correlation between the level of trust in institutions and the inclusive level of trust in political and economic institutions, technological innovation, economic development and progress.<sup>43</sup>

**Data Availability/Data Presentation:** This needs to be developed.

## Indicator: Perceived corruption

**Measurement:** The percentage of the Israeli population that believes that the society is exposed to corruption or that have the impression that corruption has impacted on their own lives.

**Rationale:** This subjective indicator expresses the perception of the presence of corruption in society. The perception of corruption decreases the level of trust in a society and it increases the socioeconomic costs of engaging in different activities. Consequently, the quality of outcomes of these activities declines and so does the wellbeing of citizens. It is sufficient that people perceive that corruption exists to hamper wellbeing as this affects their interaction with their peers, their participation in the labour force and their rate of volunteering, among others.

**Data Availability/Data Presentation:** This needs to be developed.

## Indicator: Turnout for parliamentary elections

**Measurement:** The percentage of the population that votes in Israeli parliamentary (Knesset) elections out of the total number of eligible voters.

**Rationale:** The motivation of people to exercise their democratic right and to vote in parliamentary elections serves as an indicator of their belief that society and their government institutions (Knesset, government) value civic engagement. In other words, this indicator signals the degree to which Israelis believe that the government can sustain their wellbeing and the degree to which they believe that they can make a difference. The percentage of votes and people's belief in the government serve as a measure of the probability that citizens will engage in other forms of civic engagement that yield positive wellbeing outcomes for the society. Civic engagement is viewed as an important component of social capital.

**Data availability/Data Presentation:** The indicator could be prepared on the basis of existing data in the Central Bureau of Statistics.

## Indicator: Rate of volunteering

**Measurement:** The average number of hours per day that Israeli citizens dedicate to volunteering activities, per capita.

**Rationale:** The average number of hours per day, per capita, that Israeli citizens devote to volunteering activities expresses their belief that their peers value the investment of their personal time. In other words, this indicator expresses the degree to which citizens consider that social involvement will increase their level of wellbeing. This indicator can also signal the likelihood that citizens will engage in other frameworks of civic action that may yield positive wellbeing outcomes for society as a whole.

**Further Normative and Methodological Issues:** This specific indicator offers greater clarity than other indicators in this area of volunteering, such as "the share of the population that engages in volunteering activity". There is a significant difference between an individual who volunteers 10 hours a year and an individual who volunteers 1,000 hours a year, although both would be considered and counted as "volunteers".

**Data Availability/Data Presentation:** The indicator could be prepared on the basis of existing data in the Central Bureau of Statistics.

# Natural Capital Indicators



## Indicator: Change of land use

**Measurement:** The annual change in the area of open spaces and the inventory of open spaces.

**Rationale:** An inventory of open spaces equals the sum of the un-built spaces and those for which there is no approved building plan (or a planning permission approval). Open spaces provide a wealth of “goods and services” which contribute, directly and indirectly, to long-lasting wellbeing. “Goods and services”, such as aesthetic inspiration, inspiration to art, heritage and cultural values, recreation and tourism, and satisfaction derived from the observation and exploration of landscapes, cannot be derived from other types of land (cultivated or urban areas). In addition, open spaces provide biodiversity and a habitat for various species, which directly and indirectly contributes to human wellbeing (see the Ecosystem Services approach of the UN). The stock, or supply, of open spaces in Israel is limited and demand for that stock is increasing due to population growth, the splitting of the family into smaller units, urban sprawl, and the demands from the industrial and agricultural sectors. For all these reasons, the administration of open spaces and their commercialization affects the potential stock of space for building in the future.

**Further normative and methodological Issues:** In addition to the physical indicators of the change in area of open space and the rate of the change, the design of monetary indicators for urban land, agricultural land and open space should be considered. Monetary indicators for land of different designations will assist in calculating alternative costs during changes in land uses.

**Data availability/Data Presentation:** This needs to be developed.

## Indicator: Inventory (physical units) and value (market price) of mineral stocks

**Measurement:** Two separate, complementary indicators of the per capita monetary value of Israel's mineral resources and the physical quantity of Israel's mineral reserves.

**Rationale:** Mineral stocks, including construction materials, are a group of materials that contribute to a variety of production processes in the Israeli economy and in particular to the housing and infrastructure sectors. Monetary measurements of minerals are useful as they constitute a factor of production in a range of market activities. A monetary indicator of mineral stocks would enable a comparison of the relative contribution of its natural assets to the Israeli economy (together with the contribution of economic capital and human capital, if monetary indicators are developed for human capital). The physical indicator (inventory) would complement monetary indicators with an assessment of the state of these reserves.

**Further Normative and Methodological Issues:** These two indicators, the physical and the economic, should be measured in terms of stock and value per capita.

**Data Availability/Data Presentation:** This needs to be developed.

## Indicator: Stock (physical units) and value (market price) of water reserves

**Measurement:** Two separate, complementary indicators of the per capita monetary value of water resources in Israel and the physical quantity of Israel's water reserves.

**Rationale:** Water reserves, including surface water, groundwater and desalinated water, represent a critical natural asset for Israel and an essential production input in a variety of industrial and agricultural production processes in the Israeli economy. Water is used by public institutions, companies and households to meet various human needs (drinking, showering, sanitation, economic activities, leisure activities). Since water serves a large number of market activities as well, and since it may therefore be assumed that the market provides reliable price data, it is possible to have a monetary indicator of water stocks. This indicator would enable comparison

of the relative contribution of natural assets to the economy (together with the contribution of economic capital and human capital, if monetary indicators are developed for human capital). The physical indicator (stock) would complement monetary indicators with an assessment of the state of reserves.

**Further Normative and Methodological Issues:** Notwithstanding the importance of monetary indicators for natural capital assets, the valuation of water reserves is not straightforward. In practice, no country has implemented this successfully. Nevertheless, Israel may succeed in creating a monetary indicator, based on its success in dealing with water scarcity and the availability of data.

In the context of water desalination, use can be made of "the capacity to desalinate" as an indicator, for otherwise, the quantity of potential water for desalination would be infinite and hence immeasurable, and would express a potential stock without practical access.

**Data Availability/Data Presentation:** This needs to be developed.

### Indicator: Stock (physical units) and value (market price) of energy resources

**Measurement:** Two separate, complementary indicators of the per capita monetary value of Israel's natural resources and the physical quantity of Israel's energy resources.

**Rationale:** Energy resources, including renewable and non-renewable sources, are an important natural asset for Israel and are an important production factor in a number of production activities in the market. Energy resources are used by households, businesses and public institutions to meet a variety of human needs (heating/cooling, lighting, transportation, industrial production). Since energy resources are used in a wide variety of market activities and since it may therefore be assumed that the market provides reliable price data, it is possible to calculate a monetary indicator of energy resources. This indicator will allow a comparison of the relative contribution of the natural capital (in this case energy) to the Israeli economy (together with the contribution of economic capital and human capital, if monetary indicators are developed for human capital). The physical indicator (stock) will complement monetary indicators with an assessment of the state of reserves.

**Further Normative and Methodological Issues:** It is important to note that the valuation of energy resources can only be completed in the cases where the resource is in active "commercial use" (use in which money is involved). A status of "for profit use" is required for the resource to meet the SNA definition of an asset. Proven reserves that are not extractable, or that are not being exploited, can be measured in physical terms only. This means that offshore natural gas reserves that are not subject to commercial use cannot be valued. Rules for natural resource valuation are explained in the SEEA manual.

**Data Availability/Data Presentation:** This needs to be developed.

### Indicator: Air quality (physical units)

**Measurement:** To be completed by the Chief Scientist in the Ministry of Environmental Protection.

**Rationale:** To be completed by the Chief Scientist of the Ministry of Environmental Protection.

**Further Normative and Methodological Issues:** To be completed by the Chief Scientist in the Ministry of Environmental Protection.

**Data Availability/Data Presentation:** The indicator could be prepared on the basis of existing data in the Ministry of Environmental Protection.

# Descriptive Indicators

Descriptive indicators present some key factors that can affect the circumstances under which decisions are made vis-à-vis capital stock management. They are useful for the interpretation of the model and the results. Descriptive indicators include stock and flow measures in demography as well as proxy indicators of pressure on different socioeconomic systems.

## Indicator: Total population

**Measurement:** Size of the population, including age and gender structure, geographic distribution, percent of Jews out of the total population, percent of Arabs out of the total population, etc.

**Data Availability/Data Presentation:** The indicator could be prepared on the basis of existing data in the Central Bureau of Statistics.

## Indicator: Rate of population growth

**Measurement:** Rate of population growth, including migration patterns into and out of the country, and internal migration trends.

**Data Availability/Data Presentation:** The indicator could be prepared on the basis of existing data in the Central Bureau of Statistics.

## Indicator: Age dependency ratio

**Measurement:** The ratio between the number of people in the working age population to the number of people not in the working age population (dependents) is meant to be a proxy indicator for measuring the economic pressure on the working population which pays taxes (in the form of public expenditure on education, health, welfare, social security and pensions).

**Data Availability/Data Presentation:** The indicator could be prepared on the basis of existing data in the Central Bureau of Statistics and in the Bank of Israel.

## Indicator: Land use and density

**Measurement:** Area, changes in land use and density per square kilometre.

**Data Availability/Data Presentation:** Density indicators could be prepared on the basis of existing data in the Central Bureau of Statistics. An indicator of change in land use needs to be developed.

# Closing Remarks

Development and Sustainability are popular concepts in the political economies of the 21<sup>st</sup> century. However, despite their popularity, they have remained somewhat vague. Consequently, the ability to measure the sustainability of development has remained limited. Limited measurement ability obstructs governments in the stewardship of a society's resource base, capital stocks and national wealth.

This report has attempted to address these intellectual and administrative challenges. It has put forward a tight and intellectually sound framework for the measurement of sustainable development based on the capital theory approach to sustainability. It has provided readers with an initial index of the critical assets that contribute, directly and indirectly, to wellbeing and that should be properly regulated to avoid their depletion and depreciation.

It should be stressed that this report is only the corner stone of the endeavour to develop national sustainability indicators. It has implemented the capital theory approach, which is well rooted in literature and practice; it hopes it has helped to dissipate some of the terminological haze around the terms "sustainability" and "sustainable development", and provided policy makers, trained economists and trained ecologists alike with a common ground on which to assess the sustainability of socioeconomic development. Yet, the catalogue of critical and non-critical assets that are incorporated under the four stocks is so far only a draft catalogue. Additional research effort is called for to develop further indicators and metrics. This sets the statistical agenda for the future.

It should also be emphasized that, perhaps most importantly, by applying the capital theory approach policy makers can focus on the state of the non-market critical assets that contribute to sustainable wellbeing. This would allow them to discuss the bequest their government would hope to leave for future generations.

The "bequest perspective" is a fine point of view with which to bring this report to an end. Bromley (1998, p.238)<sup>45</sup> recommends moving beyond "sustainability" and turning the focus to "social bequests": "this approach liberates us from a zero-sum game in which our gain is an automatic loss for future generations". "Regard for the future through social bequests shifts the analytical problem to a discussion about deciding what, rather than how much, to leave for those who will follow", he concludes.

Ayres, van den Bergh and Gowdy (1998, p.12)<sup>46</sup> sharpen this point: "if we cast the problem as 'how much', this always implies that some amount of a resource should be used and some left. We use 25% of a rainforest and leave the rest, for example. But then the next time we make a decision we start all over again and use 25% of what's left, and so on, until it is all gone. By focusing on bequests of specific rights and opportunities for future generations, we can get away from the straightjacket of substitution and marginal tradeoffs of neoclassical theory". This should set the normative agenda for the future.

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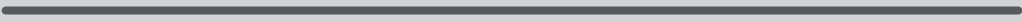
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