

# **Statistics Netherlands**

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# MEASURING WELL-BEING WITH AN INTEGRATED SYSTEM OF ECONOMIC AND SOCIAL ACCOUNTS

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Summary: The national accounts provide a systematic overview of the performance of a nation's economy. An important indicator which can derived from this system is Gross Domestic Product (GDP). Often, (volume growth of) GDP is put on a par with (the increase of) welfare or well-being of the society concerned. The latter, however, contains many other aspects; it is a multi-dimensional phenomenon. In this paper, (economic) well-being is defined, and different methods to take into account the various aspects of well-being are discussed. Subsequently, the System of Economic and Social Accounting Matrices including Extensions (SESAME), the Dutch alternative to measuring well-being, is introduced.

*Keywords*: economic accounting, economic growth, environmental accounting, GDP, genuine economic progress, integration, NAMEA, national accounts, SAM, SESAME, SNA1993, social accounting, welfare, well-being.

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#### 1. Introduction

1. The primary goal of national accounts can be summarised as providing "a comprehensive accounting framework within which economic data can be compiled and presented in a format that is designed for purposes of economic analysis, decision-taking and policy-making" (United Nations et al., 1993: paragraph 1.1). As such, the primary focus of national accounting clearly concerns the description of the status and development of the economy at a meso- and macro-level. Important indicators which can derived from this system are economic indicators like Gross Domestic Product (GDP), government deficit, etc.

2. In the past – and even nowadays – (volume growth of) GDP has often been put on a par with (increasing) welfare or well-being of the society. And indeed, maximalisation of economic growth and employment has been and often still are the primary goals of government policy. For that reason, national accounts have been criticised as not taking account of other aspects of welfare or well-being. The new international guidelines for national accounts, the System of National Accounts (SNA) 1993, in fact also recognise this deficiency: "Thus, movements of GDP cannot be expected to be good indicators of changes in total welfare unless all the other factors influencing welfare happen to remain constant, which history shows is never the case" (United Nations et al., 1993: paragraph 1.69).

3. A line of defence to this criticism is that GDP "merely" is a measure of production which, although "it is important because it largely determines how much a country can afford to consume and it also affects the level of employment" (United Nations et al., 1993: paragraph 1.69), does and can not properly reflect welfare. This being true, one should recognise that policy makers and other users of national accounts put great emphasis on the development of GDP, and that national accountants do have a responsibility to develop new methodologies to measure welfare.

4. In this paper, first, it is discussed in section 2 how to define welfare or wellbeing. Subsequently, in section 3 different methods for the measurement of wellbeing are reviewed. Here, attention is also paid to the main arguments pro and contra the distinct methods. In section 4, emphasis is put on the System of Economic and Social Accounting Matrices including Extensions (SESAME), the Dutch alternative to measuring well-being. In addition to a discussion of the main reasons to develop such a system, the present status and the future research programme of SESAME are discussed. Section 5 winds up with a number of conclusions.

# 2. <u>How to Define Well-Being?</u><sup>1</sup>

5. As in the case of e.g. health, well-being is often defined in negative terms: e.g. the absence of hunger, illness, unemployment, criminality, etc. By nature, a positive definition is more abstract, as it refers to a "dimension" instead of a problem. In a positive definition, one has to capture the contents of a dimension such as security, instead of referring to problems such as the number of thefts, murders, etc. Defining well-being in positive terms may also be hampered by conflicts between different dimensions of well-being. For example, realisation of security may become contrary to freedom of choice by people. Another example in a more familiar field of interest for economists is the possible disparity between income growth and environmental degradation.

6. In general terms, one could define well-being as an individual being well, happy or prosperous. Very important in this definition is the fact that it puts people in the centre of interest. As stated in United Nations Development Programme (1995) when discussing "human development": "The real point of departure of human development strategies is to approach every issue in the traditional growth models from the vantage point of people". The same is true for well-being. In this particular case: economic growth is not a goal in itself, it is "only" a means for enhancing the state of well-being of individuals.

7. Being well, happy or prosperous clearly can be associated with the *satisfaction of human needs*. Insofar a person or a society has available the possibilities to fulfil his or her needs, one can say that he or she is well off. In this respect, it may be superfluous to state that human needs are not constant. They may increase or decrease and/or their character may change depending on changes in personal circumstances. Confining it to the economy: if e.g. personal income increases, the degree of satisfaction about the present level of consumption may also change. Higher income, certainly if it surpasses a certain threshold, does not necessarily result in a higher degree of satisfaction. Furthermore, human needs are varied and manifold, and as such well-being is to be considered a multi-dimensional phenomenon.

8. In defining well-being as the satisfaction of human needs, a major issue is the kind of human needs that contribute to or decrease the well-being of an individual or the society at large. Often, these needs or different aspects of wellbeing are presupposed, based on an implicit or explicit ideology. From a materialistic point of view for example, one will put much emphasis on the importance of material welfare, i.e. the availability of income to obtain the goods and services needed. On the other hand, egalitarism may consider equal chances of

<sup>&</sup>lt;sup>1</sup> The contents of this paragraph draw heavily on two articles: Veenhoven (1996) and Ankersmit and Gringhuis (1997) respectively. The authors owe them considerable thanks for their excellent overviews of the theoretic fundamentals of well-being.

all individuals as the major contributor to well-being, whereas individualism will draw attention to freedom of choice.

9. Instead of making assumptions about the needs which are essential for the well-being of human beings, it is also possible to consider well-being as a "state of mind", the condition of which can be asked for directly. In essence, this comes down to asking people whether or not they are happy. In line with Veenhoven (1996), one could call this approach "recognisable" well-being. A basic objection to such an approach is that it does not provide information on the reasons for the (un)happiness of the respondents. As a consequence, it does not provide any tools for policy makers to improve the well-being of individuals and the society at large.

10. To be able to give insight in the reasons of (un)happiness, well-being has to be addressed as a multi-dimensional phenomenon and assumptions have to be made about the aspects that contribute to well-being. In line with Veenhoven (1996), this approach is called "assumed" well-being. Implicitly or explicitly, it is assumed that certain aspects either have a positive or a negative relationship with well-being. Having defined these aspects of well-being, one still has the possibility either to describe the objective quality of the aspect as such, or to describe the degree of satisfaction for each aspect. The latter approach has the advantage that it also gives insight whether or not people actually are satisfied about the status of a certain aspect of well-being. In that case, it is still needed, however, to establish a clear relationship with the objective quality as a measure of the actual status. Otherwise, the description of well-being contains the same deficiency as in the case of asking people directly their "state of mind" in relation to happiness, albeit to a lesser extent: if there is no (clear) relationship with the objective quality of the various aspects of well-being, the necessary tools for policy are missing.

11. In many studies of well-being, the objective quality is described for a number of aspects contributing to or detracting from well-being. Such a description of "means" <sup>2</sup> may not state anything about the degree of satisfaction, on the other hand it can easily be extended with such an indicator. At the level of the society as a whole, one can also argue that in a democracy the appropriate choice of means will be established in the political process, and in the end such a process will reflect people's choices. Furthermore, in their pursuit of happiness individuals may make choices that give rise to externalities for other (future) people or the (future) society at large. As a consequence, the sum of the well-being of individuals may be suboptimal. In a description of means, these drawbacks can also be taken into account.

12. When looking at the choice of variables, the point of departure in economic studies is usually the deficiency of national accounts in general, and economic growth in particular, to reflect (the development of) well-being or genuine economic progress. For that reason, other aspects that are assumed to contribute to or to detract from well-being are added to the mainstream economic indicators. The approach is

<sup>&</sup>lt;sup>2</sup> Please note that the term "means" does not only relate to economic means such as income, housing conditions, etc. Here, it refers to the objective quality of aspects contributing to well-being in general.

predominantly a materialistic one, and Osberg and Sharpe justifiably speak of *economic* well-being (Osberg and Sharpe, 1998). In their approach, they distinguish four main aspects of well-being: (1) effective per capita consumption flows (including household production, leisure and unmarketed goods and services), (2) net societal accumulation of stocks of productive resources to reflect the sustainability of well-being for future generations, (3) poverty and inequality, and (4) insecurity (personal security from crime and ill health as well as future income).

13. In other research programmes like the development of a "Genuine Progress Indicator" or its predecessor the "Indicator of Sustainable Economic Welfare" (GPI and ISEW, respectively; cf. e.g. Cobb, Halstead and Rowe, 1995) and the development of a "Green National Income" (cf. e.g. Van Dieren, 1995), much emphasis is put on sustainability. A major goal is to develop indicators which measure the success of a society in achieving (economic) progress in the short term without damaging prospects for continued progress in the long term. (Economic) progress is defined more broadly than traditional economic indicators; it should be "much closer to the common-sense accounting that a household would do" (Cobb, Halstead and Rowe, 1995), i.e. it should reflect the perception of the general public. The approach essentially is a negative one. In the GPI for example, apart from adding e.g. benefits that can be derived from unpaid (household) activities, all kinds of defensive expenditures and estimated costs of environmental and social problems are subtracted from final consumption expenditure.

14. The Human Development Report also questions the predominant position of economic growth and income. The purpose of its indicator, the Human Development Index (HDI), however, is not to measure welfare or happiness, but to measure empowerment. "Human development is a process of enlarging people's choices. In principle, these choices can be infinite and can change over time. But at all levels of development, the three essential ones are for people to lead a long and healthy life, to acquire knowledge and to have access to the resources needed for a decent standard of living. If these choices are not available, many other opportunities remain inaccessible" (United Nations Development Programme, 1995). Although it is stated that the HDI is not a measure of welfare, implicitly it is assumed that enlarging people's choices will enhance people's (future) well-being. An important addition, however, is that human beings should not merely be looked upon as beneficiaries, but also as agents of chance in the development process.

15. The starting point of the System of Economic and Social Accounting Matrices including Extensions (SESAME), elaborated in this paper, is the traditional national accounts. In addition to that, in principle all other social and environmental aspects which (may) affect well-being of individuals and the society at large are included. Basically, the approach is a materialistic one. An important feature of SESAME is that it is "merely" an information system, which among other things provides integrated indicators for different aspects of well-being. As such, its goal is to provide government and other users with the information needed to develop policies in which different aspects of well-being can be taken into account and weighed against each other. Neither implicitly nor explicitly, it wants to value the

contributions of the different aspects to well-being. The latter is considered to be the task of the users in general and the politicians in particular.

16. In the SESAME, well-being is considered to consist of three parts. Firstly, benefits derived from presently available means for different dimensions of wellbeing: income, health, security, housing, education, environment, meaningful participation in society, leisure, etc., etc. Secondly, security about future provisions of these benefits for present as well as future generations. This introduces the issue of sustainability, or the issue of investing in future capital stock and preventing degradation of present resources. Thirdly, the SESAME contains the distribution of all welfare attributes among various layers of the society concerned. Before discussing the SESAME in more detail, in the next section attention is paid to different methods of tracking a multi-dimensional phenomenon such as well-being.

#### 3. <u>How to measure Well-Being?</u>

17. As stated in section 2, well-being is a multi-dimensional phenomenon, and most studies try to tackle this phenomenon by making assumptions about the aspects that are considered to be the main determinants of well-being, i.e. an "assumed" well-being. In statistical practice, however, each of the many aspects of well-being can only be measured in different terms: production of market goods and services in money terms, unpaid activities in hours worked, pollution in tons of CO2-emissions, etc., etc. Nevertheless, there is a repeated, naive demand for a single indicator that properly reflects well-being. From this dilemma, a strong debate is going on between protagonists and antagonists of two principally different methods to measure "assumed" well-being. In the following, these two methods are referred to as the "single indicator approach" and the "multiple indicator approach".

18. In the single indicator approach, the ultimate goal is to reflect well-being into one indicator, i.e. to "translate" all aspects of well-being into one denominator. The protagonists of the multiple indicator approach state that, from an objective point of view, such an aggregation of different aspects of welfare is not possible, and that statisticians should refrain to the compilation of one or a small number of indicators for each aspect of welfare.

19. In the single indicator method, two alternative methods of aggregation have been pursued. In the first one, all aspects of well-being that – as a consequence of not being marketed – only can be measured in one or another physical unit, are hypothetically denominated in money terms. Subsequently, these imputed values are added to or subtracted from a macro-economic aggregate. A well-known example is "Green National Income", in which the negative externalities of environmental pollution are valued and subtracted from National Income. Another example is the development of the "Genuine Progress Indicator" (GPI), in which numerous additions and subtractions are made to final consumption expenditure of households as normally defined in the system of national accounts; see e.g. Cobb, Halstead and Rowe (1995).

20. The second alternative is the development of a composite index like the Human Development Index (HDI) of the United Nations. The goal of the HDI is "... identifying basic capabilities that people must have in and contribute to society" (United Nations Development Programme, 1995). As stated in section 2, these capabilities are approximated by life expentancy at birth, educational attainment, and income. For each of these, the actual level has been indexed to a certain defined goal. Subsequently, the overall index is constructed by taking a simple average of the three indicators.

21. Another more complex example of a composite index is the index of economic well-being developed by Osberg and Sharpe (1998) for Canada. Here, numerous indicators for components of economic well-being, defined as indices

with 1971 as the base-year, have been weighed together. The development of this composite index is compared with the volume growth of GDP per capita.

22. The above-mentioned indicators of well-being can be criticised on the number of points (cf. e.g. Keuning, 1993). In the following, we will discuss our three main points of criticism. The first one relates to the valuation of aspects of well-being for which in reality no prices are paid, such as environmental pollution and unpaid household activities and volunteer jobs. Take for example the calculation of "Green National Income". In our opinion, such a calculation can only be the result of an explicit modelling exercise <sup>3</sup>. The essence of this argument is the following. All agree that market prices do not correctly reflect relative scarcities, mainly because of lacking ownership rights for nature. However, if prices had been introduced for an (unsustainable) use of the environment, virtually all prices and volumes in the economy would have changed. Therefore, the composition and size of National Income itself would have changed drastically if the environment had been priced. Just subtracting (hypothetical) environmental costs from actual National Income yields an incoherent and essentially meaningless figure <sup>4</sup>.

23. This can be further illustrated as follows. Every commodity is produced in an unsustainable way or uses inputs (e.g. paper products in services production) that were produced in an unsustainable way. Taking the environment into account thus means that in the reference year all commodities might have become more expensive. Clearly, not all prices would have been affected to the same degree, and in fact the actual price changes would have depended on many factors (e.g. whether or not the rest of the world had introduced these "true scarcity" prices as well). In turn, these diverging price changes would have set in motion all kinds of substitution processes, so that "in the end" the economy would have looked completely differently from the one we actually lived in. Probably, the original effect on National Income would have been mitigated.

24. Moreover, somebody would have *received* all this money charged on behalf of the environment, and even if it had all been saved and only used for the acquisition of financial assets, this might have lowered interest rates with a concomitant positive influence on investment (in environment-extensive industries). This again would have had an upward effect on Green National Income.

25. Of course, it is fully legitimate to assign some sort of shadow prices to an unsustainable use of the environment. However, a correct estimation of Green National Income thus requires much more than just a reduction of National Income

<sup>&</sup>lt;sup>3</sup> This is also the concensus view of the worldwide group of national accountants and environmental statisticians who meet annually to discuss the progress in this field (the so-called London group). In a recent meeting, this has been formulated as follows: "However the group took the view that a proper adjusted "eco-GDP" estimating what GDP would have been *if* the economy had been on a sustainable path - in which all prices and quantities would have been different - could only be the result of an economic model, not a simple accounting deduction as has been often suggested." (Newson, 1996).

<sup>&</sup>lt;sup>4</sup> The 1993 SNA also concludes: "Use of other than market valuation leads to a number of valuation inconsistencies ..." (United Nations et al., 1993: 21.184).

by hypothetical environmental outlays. It implies a *re-calculation* of National Income, simulating what would have been its size if the economy had been sustainable. Such a model requires realistic assumptions on the (major) economic impacts of introducing shadow prices for (over)exploiting the environment. Hypothetical environmental costs on the one hand and actual National Income at market prices on the other hand are equally incomparable as kilos of apples and kilos of oranges.

26. The second point of criticism relates to the purpose of these single indicators for well-being. The main problem in this regard is that such a single indicator has no relation whatsoever with policy options. Pointing out adverse developments in well-being and changing these developments by government policy are important goals of describing the well-being of a society. For that purpose, one needs indicators which relate to the various fields of government policy: economic policy, social policy, environmental policy, etc. In addition to that, one needs an underlying analytical framework from which the various interrelationships between the relevant aspects of well-being can be derived. Only in that case, politicians can sensibly act upon eventual adverse developments.

27. The final point of criticism is that the compilation of a single indicator places statisticians in the seat of politicians. Both in the case of valuation and in the case of a composite index, statisticians put weights to the various aspects of wellbeing. In addition to assumptions about the main determinants of well-being, statisticians then pretend to be able to make statements about the importance society attaches to the various aspects of well-being. Such a weighing can only be subjective and should be left to the politicians as representatives of the society at large. In fact, in our opinion, an objective aggregation of various societal objectives is not possible. It may even be dangerous, considering the fact that, by including subjective elements into the calculations, the objectivity and independence of statistics is at stake.

28. Concluding, we think that a single indicator approach should be abandoned. Instead, one should try to develop an information system from which separate indicators per subject matter can be derived. Furthermore, an important requirement of this information system would be the integration of the data on the various aspects of well-being, so that, among others, the interrelationships between the components of well-being can be detected and analysed. In the following section, the contents and development of such a system in the Netherlands, i.e. the System of Economic and Social Accounting Matrices including Extensions (SESAME), is discussed.

## 4. The SESAME-approach

#### 4.1 Introduction

29. Unless one directly asks people about their state of mind, it is impossible to capture well-being in a single indicator. Such a measure of well-being, however, does not give any guidance to government and other users wishing to monitor, or even promote, the well-being of the population. On the other hand, it is clear that a prime task of national statistical offices is to comprise the countless numbers they collect on the various aspects of well-being to a manageable, "executive" summary. For this purpose, the System of Economic and Social Accounting Matrices including Extensions (SESAME) has been developed by Keuning (1996), and implemented in the Netherlands (cf. e.g. Kazemier, Keuning and Van de Ven, 1998).

30. The SESAME can be defined as a detailed and integrated statistical information system in matrix format, from which a set of core (macro-)indicators for different aspects of well-being can be derived (Keuning, 1997). Such a summary typically describes trends in main indicators: e.g. Gross Domestic Product (GDP), population size, (un)employment, inflation, income inequality, environmental indicator(s), unpaid household and volunteer activities, average income in the poorest subgroup, average number of years of schooling, average expenses on health, average number of victims from crime. Consistent indices covering distributive aspects can also be derived for all variables included in the SESAME, because the system registers both the national total value and its distribution among socio-economic household groups, categories of (employed) persons, etc.

31. Whatever set of aggregates is preferred, they would all share two crucial features: first, every indicator is computed from a single, consistent, statistical information system, and secondly, each indicator uses the most suitable measurement unit for the phenomenon it describes. In essence, SESAME meets the concern already expressed in a 1977 United Nations' report: "It is recognised by all that it is not practicable to make a direct measure of the welfare of a community in monetary or in any other terms. The best that can be done is to measure a number of factors that are generally supposed to contribute to or detract from welfare, not forgetting that the distribution of the aggregate among individuals may be as important from the welfare point of view as the aggregate itself."

32. The starting-point for the design of a SESAME is the more familiar Social Accounting Matrix (SAM), cf. e.g. United Nations et al. (1993: Chapter XX). A SAM is very similar to the present core system of national accounts in matrix format. Besides, some distinguishing features of a SAM are: (a) its incorporation of both the supply and demand side of actual labour markets (on which persons and not households operate), and (b) its emphasis on the interrelations between economic processes (so that both ends of all transactions are shown), which makes it quite expedient for economy-wide modelling and analyses. Although a SAM provides a useful insight into the functioning of an economy, it is still incomplete as a

framework for a comprehensive analysis of well-being. For, a SAM is fully in monetary units, whereas (changes in) attributes of well-being are typically measured as (changes in) non-monetary units.

## 4.2 The basic idea underlying SESAME

33. The basic idea underlying a SESAME is a chain for the "production" of well-being, as depicted in figure 1 (for a closed economy); cf. Keuning (1998) for a more extensive description. In the centre of the figure, and at the beginning of the chain, people, time and assets are placed. For, all activity starts with the availability of people, time and assets. People refers to the number of persons by household group, cross-classified by characteristics that play a role in consumption behaviour and abilities to generate income and well-being (age group, gender, location of residence, within/outside the labour force, educational attainment, etc.). Time is obviously the 24 hours in a day and the 365 days in a year that people have available for consumption (the arrow from the middle to the left), income generation (the arrow from the middle to the right), non-income generating production (the arrow from the middle to the top), and leisure time that is not spent on consumption (mainly sleeping). Assets mainly consist of the assets as defined by the 1993 SNA; cf. United Nations et al. (1993): Annex V.D. They may also include other less welldefined assets such as knowledge (R&D, organisational and product concepts, schooling of the population), uncultivated natural resources and social cohesion which also affect the present and future capabilities of a society to "produce" wellbeing.

34. People, time and assets are combined in production processes and thereby income is generated. So the second shell in the chain is the conventional economic cycle. Production includes non-income generating production by e.g. volunteers and activities within the household. The income generating production is subsequently (re-)distributed and then used for consumption expenditure and saving. However, well-being goes beyond the money flows in this cycle.

35. The end of the chain consists of all kinds of attributes for well-being that predominantly are expressed in non-monetary units. The conversion of consumption expenditure into non-monetary attributes of well-being is shown at the left-hand side of figure 1. Among others, they consist of the provision of basic needs, health, education, security, housing and entertainment. In addition, the welfare attributes derived from non-income generating production should be taken into account. This is done at the top right-side of the figure. Ideally, for services like child care and housekeeping output volumes should be estimated. If these are not available, the time spent on these activities may serve as a proxy measure.

# Figure 1. Flow chart of the single period welfare chain as represented in a SESAME



36. Well-being is also influenced by external effects of production and consumption. The most obvious example concerns environmental pollution, which are explicitly taken into account in the SESAME-concept, by means of the so-called NAMEA-module (NAMEA stands for National Accounting Matrix including Environmental Accounts); see Keuning (1993) and De Haan and Keuning (1996). In addition, various other external effects, such as the positive social effects from (basic) education can be presented in the SESAME.

37. Important indicators for well-being may also be derived from the generation and (re)distribution of income. Here, poverty, social exclusion as a result of not being able to participate in the society due to e.g. low income, and income distribution in general are the most obvious examples. These are shown at the bottom right-side of figure 1.

38. It is important to note that present outcomes of the economic cycle and wellbeing affect future possibilities to "produce" well-being. The assets of tomorrow are created today, and assets may be consumed, depleted and/or destroyed as a result of present activities. In the first place, this relates to the production and consumption of fixed assets as defined in the 1993 SNA, such as infra-structure, buildings, software and machinery. In addition, knowledge is created by research and development, and education. Social exclusion may directly affect the future abilities and "willingness" of people to participate in the labour market. It may also adversely affect the social cohesion of a society. As a consequence, the potential future production may decrease.

39. Another point of interest in the basic idea underlying SESAME is that people are not only considered as beneficiaries of well-being. Alongside the assets available in society, they are also in the centre of the "production" of well-being. As such, people are the single most important agents of change in the development of well-being. In this respect, the welfare approach and the human development approach, as defined in United Nations Development Programme (1995), are integrated here.

## 4.3 Advantages of an integrated, systematic approach

40. An important feature of a systematic approach, like SESAME, is the presentation of data in a framework which enables to show the interrelationships between the relevant aspects of well-being. Existing links can be detected e.g. between production and environmental pollution, between employment, income (distribution) and non-income generating activities, between production of educational services, schooling of the population and entry chances on the labour market, between social insurance and social exclusion, and between all of these and GDP or the government budget.

41. Furthermore, the data are statistically "integrated". Among others this means that (a) differences in statistical concepts and groupings between sources have been eliminated, (b) source data have been made consistent between sources and over time, (c) alternative estimation procedures have been applied to solve lacunae in data in order to reach full coverage, and (d) administrative and respondent-friendly concepts have been transformed into statistical concepts which are comparable over time and between countries.

42. An integrated statistical information system has many advantages. For example, it yields more stable and more precise summary indicators for performance monitoring, policy analysis and (if desired) administrative uses. Only if such indicators are embedded into a statistical information system, their definition and estimation are intertwined with (many) other parts of the system, which enhances their impartiality and thus their public acceptance.

43. Furthermore, higher reliability of the data is a major advantage of an integrated system. An accounting system contains many logical identities which all serve to check and to correct the underlying survey results. In this respect, the implicit or explicit coverage of data for units below the survey threshold, hidden units and undeclared activities should be mentioned. Finally, although initially the integration of data in an accounting system may be very time-consuming, eventually more reliable timely indicators can be estimated by extrapolating such an accounting system with the necessarily very fragmented information that is available for a much more recent period. As a consequence, the timeliness of reliable data can be enhanced.

44. As a consequence of presenting data on the various aspects of well-being in an systematic and integrated framework, the scope for monitoring, analysis, forecasting and policy simulation is significantly enlarged. As the interrelations between the various aspects of well-being are described in a consistent way, the whole "production" cycle of well-being can be modelled. For example, the way in which e.g. government policy to enhance environmental conditions affects other aspects of well-being can be quantified. In our opinion, presenting alternative scenarios with such a model will provide users in general and the government in particular with the best information available to make the appropriate choices.

#### 4.4 Present status and future research

45. The SESAME is a modular system which can be compiled in accordance with user priorities and data availability. In the Netherlands, the first priority has been the compilation of a Social Accounting Matrix (SAM; see Timmerman and Van de Ven, 1994) and an environmental module labelled National Accounting Matrix including Environmental Accounts (NAMEA; see De Haan and Keuning, 1996; Keuning and De Haan, 1997). By now, both the SAM and the NAMEA are compiled annually and are an intrinsic part of the regular national accounts publication in the Netherlands; see e.g. CBS (1998).

46. In the SAM, labour input and compensation of employees have been subdivided by gender and seven levels of education. Furthermore, income generated by production of goods and services, other payments and receipts of income, consumption expenditure and saving are described for fifteen household groups. In the Dutch case, the grouping of households has been based on main source of income (wages and salaries, entrepreneurial income, or transfer income), and composition of the household (single-person households, and multi-person households with/without children). As a consequence, the labour market and aspects of income distribution can be directly related to the economic process.

47. One of the most important issues that challenged the predominant position of economic growth was the issue of environmental degradation and the sustainability of the present economic growth. For this reason, the NAMEA has been developed. In the Dutch NAMEA, among others environmental degradation has been linked to production of goods and services (by industry) and consumption expenditure (by purpose) for eight environmental themes: the greenhouse effect, ozone layer depletion, acidification, eutrophication, waste, water depletion, emission of toxic substances, and use of space. In addition, the depletion of three types of natural resources (crude oil, natural gas and wood) has been incorporated; cf. Keuning, De Haan and Van Dalen (1999). Each of these problems is monitored with the help of a single summary indicator, expressed in the appropriate physical units. Finally, various environmentally relevant flows, e.g. on waste water, on local air pollution and on marl extraction, are described. A few years ago, the SAM and NAMEA have also been combined in a so-called SAMEA (Keuning and Timmerman, 1995).

48. At an early stage, a time use module has also been developed (Kazemier and Exel, 1992). In this module, hours spent on unpaid activities have been integrated with the paid activities in the traditional national accounts. Up to now, a regular compilation of this module has not been pursued, however, mainly due to lack of adequate source data. In turn, the lack of source data on time use on the one hand and the gradually improving source data on environmental issues on the other hand, may also reflect relative priorities which have been assigned to these fields of statistics.

49. Recently, the SAM has been expanded with a pilot socio-demographic module; see Kazemier, Keuning and Van de Ven (1998) for a more elaborated description. In an era of continued concern about labour force participation rates, particularly in Europe, and about the possible impact of an ageing population on the (financial) basis for the welfare state, there is a growing awareness of the importance of the interactions between social-demographic trends and economic performance. The primary goal of the extension with the socio-demographic module was to describe the labour force position of the population between 15 and 65 years of age (the potential labour force): (a) participating in "formal" labour (shown by economic activity), (b) receiving social benefits for unemployment, disability, etc., and (c) receiving no income at all. Doing so, the potential labour force has been subdivided by age-group, gender, educational attainment, and household group to which they belong. In addition, the social insurance system has been described more extensively, and the grouping of households according to the SAM has been extended with a special focus on single-parent households with children. Here too, the integration of all these data with the traditional national accounts was an important goal.

50. More and more, it is recognised that knowledge in general and human capital in particular may be the main driving force of economic growth. Moreover, well-being may be significantly enhanced by an increase of knowledge in the society. Apart from its income generating capacity, education itself empowers people, as stated in United Nations Development Programme (1995). It enlarges their possibilities to make choices. Furthermore, knowledge may increase the health of people, directly by discovering new means to cure people from diseases, and indirectly by having more resources available through economic growth. At the moment, the development of a module for knowledge is underway at Statistics Netherlands. At present, the focus is on an improved description of the expenses made to increase knowledge through Research and Development, education (formal schooling as well as in-company training), and the purchase of specific goods and services embodying knowledge. In future, among others the estimation of available knowledge and the integration of volume data on schooling are important goals. The result of the latter may be the link between formal schooling and the labour market.

51. Another future development will be the incorporation of detailed (volume) data on health into the national accounts. Furthermore, new time use data have become available for 1997, and the integration of these data into a module for unpaid activities will be taken up again in the near future. In this respect, it is

noteworthy that the interest of government in the contribution of unpaid activities to well-being is growing again. This may be affected by the sharp increase in female labour participation in the Netherlands and a concomitant decrease of unpaid activities during the last decade. In the meantime, the presently available modules will be improved, expanded, and/or included in the regular programme.

#### 5. Summary and Conclusions

52. The predominant position of the core economic indicators is challenged more and more. The main reasons for this challenge are the neglect of other aspects of well-being, and the neglect of the sustainability of economic growth. As a response, several attempts have been made to develop a single indicator which does include these aspects as well. Positive and negative attributes of well-being have been added to and subtracted from well-known macro-economic aggregates such as National Income and Final Consumption Expenditure. Another method was the development of composite indices in which the assumed attributes of well-being were weighed together.

53. Although the above-mentioned approaches may have a function in as far as they show that the search for economic growth is something different from the search for the Holy Grail, the development of a single indicator does have serious shortcomings both from a methodological point of view and from a users' point of view. Many aspects of well-being do not have prices, and putting prices on them, while assuming "ceteris paribus" for GDP itself, boils down to comparing apples and pears. Another point of criticism is that single indicators do not have any relationship whatsoever with policy options. In this respect, it is important to note that many aspects of well-being are interrelated, and to make the proper choices in (government) policy these interrelationships can not and should not be neglected. Finally, putting weights to the various aspects which contribute to or worsen well-being puts statisticians in the seat of politicians. This overambitious role will eventually damage the trustworthiness of statistics itself.

54. To conclude, in our opinion well-being is a multi-dimensional phenomenon which can not be squeezed into a single indicator. Instead, a statistical information system should be developed from which a summary indicator for each of the various aspects of well-being can be derived. The System of Economic and Social Accounting Matrices including Extensions (SESAME) provides such an alternative. In this system, the summary indicators share two basic features: (1) every indicator is computed from a single, consistent and integrated framework which also contains more detailed information at the meso-level, and (2) each indicator uses the most suitable measurement unit for the aspect it describes.

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