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**Jacek Cukrowski and Julia Mironova**

# Monitoring Processes of National Development in the Kyrgyz Republic

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## Contents

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## Abstract

The purpose of the paper is to develop a formal method for monitoring and assessment of the process of sustainable national development. In particular, we apply cluster analysis to develop procedures of formal assessment of development gaps, and show how they can be applied for monitoring processes of sustainable development (the method proposed could also be applied for inter-country comparison and assessment of the impact of technical cooperation projects and different internal and external shocks on national development). A formal method is described and implemented for the analysis of national development processes in the Kyrgyz Republic in the period 1992-2000. The study reveals that although in the second part of the nineties many development indicators in the country improved significantly, the development path observed in this period can hardly be classified as sustainable.

# 1. Introduction

Several important strategy documents aimed at sustainable development of the country and national capacity building have been recently approved in the Kyrgyz Republic. The National Strategy for Sustainable Human Development (NSSHD), the Comprehensive Development Framework (CDF) and the National Strategy for Poverty Reduction (NSPR) define the Kyrgyz approach to the sustainable development of national capacity for next several years.

Although intensively discussed, commonly used terms: "national capacity", "national capacity development" or "sustainable development" still remain rather obscure concepts. They lack agreed definitions, a clear analytical framework and related modus operandi (in particular, to talk about development one has to be able to characterize an initial and the final states, but in the case on national capacity it is possible only qualitatively). Comparison and dissection of existing definitions of "national capacity development", "sustainable development", and "national capacity" present a fairly complex picture.

In order to keep things simple, following CIDA (1996), "national capacity development" can be defined as a process by which individuals, groups, institutions, organizations and societies enhance their abilities to identify, and meet development challenges in a sustainable manner.[1] Such a definition implies that, national capacity is a broad concept and should be described and analyzed on three different levels of the hierarchy: (i) the system (or institutional level) as the widest concept, (ii) the entity (or organizational level) and (iii) the individual as the most narrow one. The major dimension of national capacity is at the individual level-people. This level addresses the individual's capacity to function efficiently and effectively within the entity and within the broader system. On the entity level, typical approach focuses on the set of sub-units within the entity: divisions, sections, units, work groups, teams, etc., that need to be analyzed in the following dimensions: mission and strategy; culture, structure and competencies, processes, human, financial, information, resources, and infrastructure. Moreover, also an interaction between organizations within the broader system needs to be taken into account. The system (or institutional) level is the highest level within which national capacity can be described and it covers the entire country or society and all the sub-components (organizations and individuals) that are involved. This includes systems factors: socio-political, government/public sector, economic/technological, physical

[1] For the discussion of different definitions of capacity development, see: Alley, K., and G. Negretto (1999) "Literature review: Definitions of capacity building and implication for monitoring and evaluation". Division of Evaluation, Policy and Planning, UNICEF, New York.

environment, which in general need to be analyzed in the following dimensions[2]: policy dimension, legal/regulatory dimension, management or accountability dimension, resource dimension and process dimension.

Summing up: "a national capacity development" is a complex and multidimensional issue closely related to the concept of sustainable development, and therefore, its assessment cannot be easily done (typical assessments are usually qualitative). In the best case – if the improvement in all the dimensions is observed – researchers are able to make a statement about the progress in national capacity development. However, if the improvements are observed only in some dimensions and some other characteristics deteriorate, then deduction concerning sustainable national capacity development is not that obvious. Although some of national capacity components are formally estimated and monitored by international organizations (see, e.g., UNDP Human Development Report), the overall assessment of development processes is usually based on some subjective, qualitative, and often speculative, considerations. All of these make monitoring and objective assessment of development strategies rather difficult.

As mentioned above the concept of national sustainable development is very complex and cannot be easily handled in the framework of typical methods used in economic studies. A solution to this problem requires a multidisciplinary approach. In particular, since the national capacity is a complex system the problem can be solved (i.e., the development gaps can be estimated and the execution of development strategies can be formally assessed) using methods of systems analysis (see Section 3, for details).

The general purpose of incorporating formal methods to the analysis of sustainable national development in Kyrgyzstan is to provide policy makers with the powerful instrument for monitoring overall national development processes and objective assessment of the execution of development strategies. The paper is organized as follows. In Section 2 the basic documents underlying existing strategies for national capacity development in the Kyrgyz Republic are shortly characterized and the methods used for monitoring and assessment of national development processes are discussed. In Section 3 the basic idea of a formal assessment of sustainable development gaps is presented. In Section 4 the set of key headline performance indicators for monitoring development strategies in the Kyrgyz Republic is proposed. Finally, in Section 5 an implementation of the method proposed for the analysis of national development processes in the Kyrgyz Republic in the period 1992-2000 is presented and the results obtained are shortly discussed. Section 6 concludes.

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[2] See: Capacity Assessment and Development. In Systems and Strategic Management Context. Technical Advisory Paper No.3, UNDP, Management Development and Governance Division, Bureau for Development Policy, 1998.

## 2. Strategies of National Development in the Kyrgyz Republic

To shift to a policy – and programme-based approach in national development, an overall operational governance framework has been established in the Kyrgyz Republic through the following strategy documents: the *National Strategy for Sustainable Human Development, the Comprehensive Development Framework* and the *National Strategy for Poverty Reduction*. These documents have been developed by local authorities with the strong support and assistance of international donors. All the strategies considered aim at poverty reduction and sustainable development of the country.

**National Strategy for Sustainable Human Development (NSSHD)**. The NSSHD was initiated in 1996-97 by UNDP and approved by a National Forum in 1997. The NSSHD is the country's long-term development strategy, going up to the year 2015. It provides a conceptual foundation for the further development of the country in the 21st century and a platform for overall coordination of development activities. The Strategy aims to achieve its development objectives based on domestic resources – that is, on the human, social and environmental capital of the country. The basic idea of NSSHD is to link national priorities and development programmes, and transform them into a nation-wide consolidated policy. The commitment of the country to achieve social progress is reflected in seven components, requiring implementation of a system of objectives which are to be achieved by solving a range of medium- and short-term tasks. The main components of the strategy include: (i) the integration of society, (ii) overcoming internal and external isolation, (iii) overcoming the main threats to human security, (iv) the development of natural capacity, (v) development of human and social potential, (vi) promoting a competitive economy and (vii) building democratic governance. Under the umbrella of the strategy, several thematic programmes have been developed, including poverty alleviation, governance and environment. A big disadvantage of this document, however, is the lack of a built-in mechanism to implement the tasks and monitor their implementation. As a result, many statements of the document have remained mere good intentions and many short-term strategy targets have been missed.

**Comprehensive Development Framework (CDF)**. In March 1999, Kyrgyzstan was selected as a pilot country for the World Bank-supported Comprehensive Development Framework. In this regard, the government began to formulate a national development strategy for 2000-2010. The CDF is based on two important principles. The first focuses on public participation in the discussion, preparation and realisation of the objectives of the CDF. This involves bringing NGOs, people's associations, the

academia, media, business, local and national government and international organisations together to define the objectives of development and the means of attaining it. The second principle is a comprehensive approach to the process of realising the CDF, taking into consideration human and physical factors of development. The final CDF document was prepared in 2001 and approved by the National Forum. It clearly states national priorities and goals, pointing out three main interrelated areas for focused effort by government and society: good governance, social development and sustainable economic growth. The CDF also tries to analyse and quantify all required and available resources for strategy implementation. While the final document is based on some assumptions that seem to be optimistic, the attempt to achieve a balance between goals and means is a new and positive aspect. One sign of a more responsible approach towards the CDF, in comparison to past approaches, is the inclusion in the document of a special chapter on monitoring and evaluation.

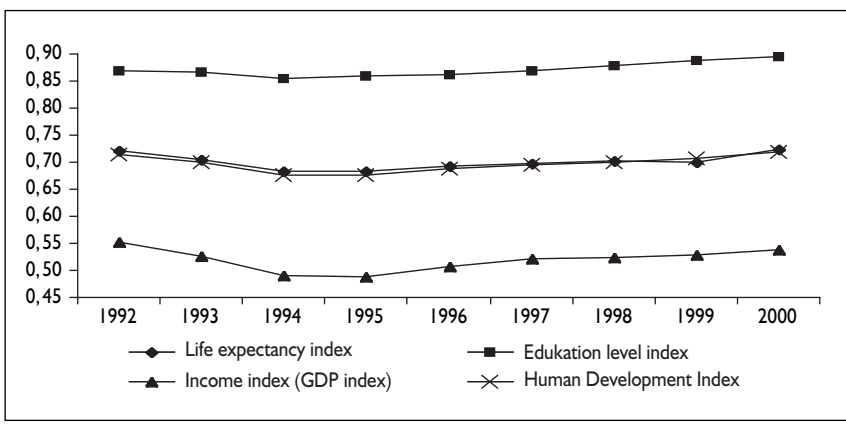
**National Strategy for Poverty Reduction (NSPR)**. The NSPR is a medium-term development program prepared for implementation on the first phase of the CDF (2003-2005). Currently the document exists in the form of a draft only (the final NSPR document is about to be approved). However, the interim NSPR document (I-NSPR) is already being implemented. I-NSPR summarizes the current knowledge and assessment of a country's poverty situation, describes the existing poverty reduction strategy, identifies gaps in poverty data, makes a diagnosis, and lays out the process for addressing these gaps and producing a fully developed Poverty Reduction Strategy Paper in a participatory fashion. According to this document, the basic measures aimed at poverty reduction will be based on the following three principles: (i) orientation of reforms to a human factor, (ii) integrated approach and sequence of reforms, (iii) wide participation of all layers of the population the reform process. It is assumed that economic growth is a final source to generate and transfer income for the poor. In this light good governance and an appropriate legal framework constitute important components of the process promoting economic growth. In particular, the following key issues on poverty reduction will be addressed by the government in the period to 2005 under NSPR: (i) ensure annual GDP growth rate of 4-5 percent, (ii) reduce annual inflation rate to 5 percent, (iii) reduce overall budget deficit to -3,5 percent of GDP (at the same time increase the allocations for social spending in real terms), and (iv) increase tax revenue to 15 percent of GDP.

It must be clear that proper implementation of national strategies requires a development of appropriate monitoring and assessment procedures. It should be acknowledged, however, that many components of national strategies are devoted to the issues for which it is difficult to find any objective indicators. This causes significant problems related to monitoring and evaluation of the progress in their execution.

The easiest approach to monitor an execution of country development strategies is to look on the dynamics of standard indicators estimated periodically by National Statistical Committee of the Kyrgyz Republic. However, the main disadvantage of such indices is that (i) they cover only a part of the problem (typically, economic and social issues), and (ii) usually explain only a single dimension of national development and say nothing about the others. In consequence, observing significant progress/retreat in one particular dimension and the opposite pattern in the other, one can say nothing about the progress/retreat in the execution of a given strategy or about the overall progress in national development. On the other hand, an advantage of such standard indicators is that they allow not only to understand the development of a particular dimension of national capacity but also to make a quick comparison with other countries.

Human Development Index (HDI), estimated yearly by UNDP and widely used as one of basic indicators of a development level, can be considered as an example of such indicators. HDI is an aggregate of three subsidiary indices: index of life expectancy, index of achieved level of education (depending on adult literacy level and share of youth involved in formal educational programs), and GDP index related to GDP per capita based on purchasing power parity.[3] Dynamics of HDI and its components in the Kyrgyz Republic in the period 1992-2000 is presented in Figure 1.

**Figure 1. Dynamics of the Human Development Index and its components (1992-2000)**




[3] For details of HDI calculation see, e.g., National Human Development Report "Democratic Governance: Alternative Approaches to Kyrgyzstan's Future Development", UNDP, Bishkek, 2001.

A simple massage following from Figure 1 is that the development path of the Kyrgyz Republic after the declaration of sovereignty can be divided into two stages: (i) period of transformation decline: 1992-1995 (during this period, production felt rapidly[4] and the living standards of the population went down) and (ii) period of initial stabilization and national development: 1996-2000 (the negative trends in the Kyrgyz economy were stopped in 1996 when economic growth recommenced, and most macroeconomic indicators improved significantly)[5]. Thus, the HDI and its components give some idea about national development but by far it does not cover all important issues affecting sustainable development of the country (see Section 5). For example, it says nothing about social changes in the country or about the cost of economic growth in terms of external debt (this is very important factor since accumulation of huge external debt, which will be necessary to repay in the future, may make the development achievements not sustainable). Therefore, the HDI may not provide correct information about all aspects of sustainable development of a particular country. It should be acknowledged, however, that it definitely shows a general trend of short-run development in selected areas and it is useful for quick inter-country comparison.

Another attempt to monitoring sustainable development in the Kyrgyz Republic has been presented by Mogilevsky[6]. In some reports he described a general idea concerning assessment of the overall progress in the execution of the development strategy and specified more than three hundreds performance indicators needed for monitoring NSSHD. Due to obvious complexity of the selected set of indicators, practical implementation of such a system has been questionable.

In the next section we present a basic idea of a formal method of monitoring and assessment of national strategies of sustainable development. The standard approach, in which distance measures are used for the assessment of the overall development gaps (considered briefly also by Mogilevsky (2000)), is augmented by a system of weights reflecting policy preferences specified in a particular development strategy.

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[4] Such a dramatic output decline was caused, as in the other transition economies, by a number of serious structural distortions and institutional flaws inherited from the command economy and inter-republican division of labor in the former Soviet Union.

[5] See Figure 6 in Section 5 and Table AI.1 in Appendix I.

[6] Mogilevsky, R. (2000) "Performance indicators for monitoring of the National Strategy of Sustainable Development in the Kyrgyz Republic", the paper presented on International Conference: "Statistics, Development and Human Rights", Montreux, September 2000 and Могилевский, Р. (2000) "Показатели для мониторинга Национальной стратегии устойчивого человеческого развития в Кыргызской Республике", *непубликованый отчет.*

## 3. The Method

In order to keep a description of the method as simple as possible, and to give a hint about the way how the development of national capacity (sustainable development of the country) can be formally assessed, a basic idea underlying a formal method of national capacity evaluation is described below in a popular rather than scientific way. A formal approach to the assessment of the strategies of sustainable development is based on the computation of the distances between points in multidimensional space in which a national capacity is characterized. Similar approach is used in the method called *cluster analysis*.

*Cluster analysis* is a procedure used in system science to solve classification problems. Its objective is to group data points into clusters so that the degree of association is strong between members of the same cluster and weak between members of different clusters. As a result, cluster analysis can reveal similarities in data which may have been otherwise impossible to find. Clustering techniques have been applied to a wide variety of research problems (examples of such applications would be a classification scheme for related fauna and flora, medical diseases, as well as models with which to describe populations, societies, political parties[7], or even methods to recognize blood cells or handwriting)[8]. In general, whenever one needs to classify a "mountain" of information into manageable meaningful piles, cluster analysis is of great utility. In the present paper we intend to use this method to *organize* observed huge data sets characterizing national capacity into certain meaningful structures, that is, to develop taxonomy.[9]

To give a basic idea of the method, assume that a current level of national development (national capacity) can be described using three components (dimensions): *human, organizational,* and *institutional*. For the sake of simplicity assume that it is possible to give an assessment of each component in certain numerical scale. Thus, a level of national development of country $C_j$ can be characterized by the triple $(H_j, O_j, I_j)$, where $H_j, O_j, I_j$ are numerical values describing the three basic components of national

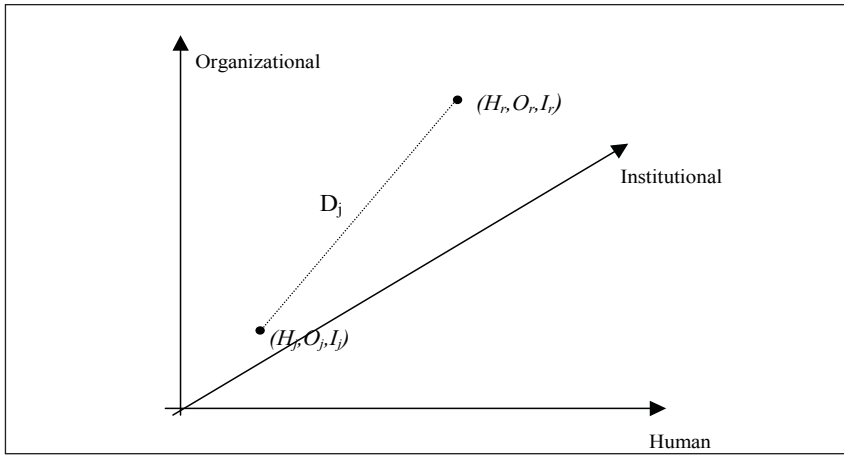
[7] See e.g., Cukrowski, J. (1993) "Cluster Analysis of the Most Significant Parties in the Contemporary Polish Political Scene", Mimeo. Department of Sociology and Politics, Central European University, Prague.

[8] Hartigan, J. A. (1975) Clustering Algorithms. New York: Wiley, provides an excellent summary of the many published studies reporting the results of cluster analyses (see also Everitt, B. (1993) Cluster Analysis. John Wiley & Sons, Inc.).

[9] For the purpose of monitoring and assessment of single country development strategies, only a part of the clustering method is used (computation of distances between data points). The core of clustering technique (grouping procedures) can be implemented in the extension of this concept for the purpose of inter-country comparison, management and monitoring technical cooperation projects (see Appendix II).

capacity (human, organizational, and institutional, respectively). Similarly, one can describe a national capacity of a reference country $C_r$ as $(H_r, O_r, I_r)$. Thus, the triples $(H_j, O_j, I_j)$ and $(H_r, O_r, I_r)$ characterize two different objects (country *j* and country *r*) in three-dimensional space. The dissimilarity between objects, which in our case reflects a development gap between developing country $C_j$ and reference country $C_r$, can be characterized by a distance between them (the most straightforward way is to compute Euclidean distance)[10]. In three-dimensional space (as in the example considered) this measure is the actual geometric distance between objects in the space (i.e., as if measured with a ruler). The two countries case in three basic national capacity dimensions is represented in Figure 2.

**Figure 2. Graphical nterpretation:** $D_j = \sqrt{(H_r - H_j)^2 + (O_r - O_j)^2 + (I_r - I_j)^2}$ **reflects a national development gap between developing country $C_j$ and reference country $C_r$**

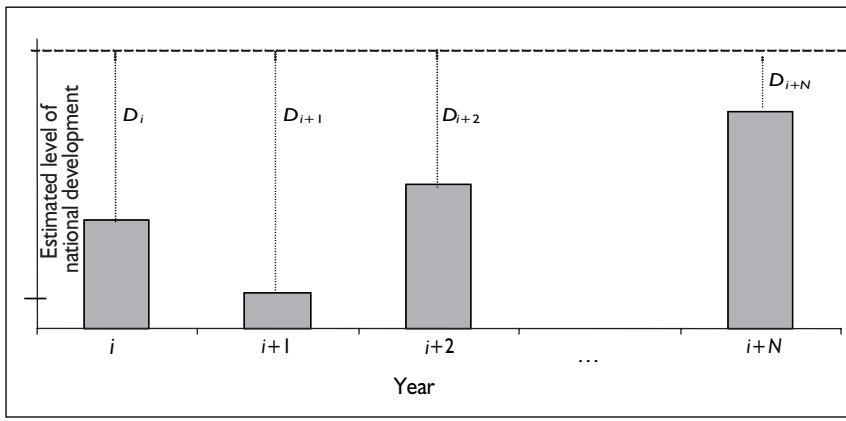



Suppose now that (i) all indicators can be represented in the same units of measurement (e.g., as a share of a corresponding indicator in the reference country), (ii) a level of national development of a given country in subsequent years, say in years: $i$, $i+1$, $i+2$,…$i+N$, can be characterized in a way described above, and (iii) the set of corresponding development gaps $\{D_i, D_{i+1}, D_{i+2}, \ldots, D_{i+N}\}$ can be estimated (i.e., corresponding distances can be measured). Furthermore, assuming that a reference

[10] Use of several other distance measures (such as squared Euclidean distance, city-block (Manhattan) distance, Chebychev distance, power distance, etc.) is also possible.

country is much more developed than the country analyzed in any dimension and any year of the analysis (characteristics of a hypothetical reference country can be determined taking the best values of each indicator (dimension) in the country under study in the whole period of analysis)[11], and that development gaps show the following pattern: $D_{i+1} > D_i, > D_{i+2} >, \ldots, > D_{i+N}$ , a dynamics of the process of national development in the period from the year $i$ to $i+N$ can be shown graphically as in Figure 3.

**Figure. 3. Graphical representation of the dynamics of the process of national development in the period from the year $i$ to $i+N$ ($A_{min}$ – minimum level of national development in the period under study)**




The approach presented above gives a correct picture of the dynamics of the development process only in the case when all dimensions are equally important for national development. Note, however, that although all dimensions of national capacity are important for a sustainable development process, not all of them are equally important. Moreover, preferences of the authorities concerning a development path depend on political situation and definitely affect a development strategy choice (for example, one development strategy can give higher weights to poverty reduction and human development than to economic growth than the other and vice versa).[12] Therefore, for the purpose of monitoring a particular strategy of national development the indicators

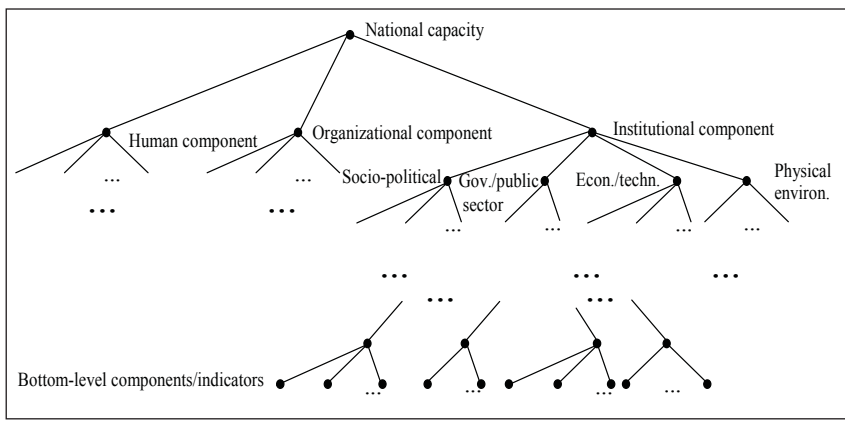
[11] Alternatively, a hypothetical reference county can be constructed using target values of all indicators determined base on the strategy document.

[12] It needs to be acknowledged that there is no single universal strategy for sustainable development and each particular strategy reflects development preferences of the country and, in general, it represents a result of a negotiation process involving different political forces in the country.

(dimensions) selected need to be weighted according to national preferences concerning required development path, described in the strategy document.

Simple considerations presented above aimed to present a general idea of the method. Real life, however, is much more complicated than the example considered, because of at least two reasons: (i) the concept of national capacity and sustainable development is a complex issue and has to be characterized by much more than three basic components, and (ii) not all the components can be easily assessed numerically. Nevertheless, both problems can be solved. In particular, each basic component can be decomposed on a set of sub-components. For example, as mentioned above the institutional level – the highest level within which national capacity can be described – can be decomposed on the set of sub-components including: socio-political, government/public sector, economic/ /technological, physical environment, etc. Each sub-component needs to be analyzed in the following dimensions: policy dimension, legal/regulatory dimension, management or accountability dimension, resource dimension and process dimension. Such an analysis requires further subdivisions. Decomposition process needs to be continued until a set of simple sub-components/indicators is specified. As the result a hierarchical structure, characterizing each basic dimension of national capacity, can be created (Figure 4). At the bottom of this structure there is a set of bottom-level components/indicators characterizing more complex sub-components (placed above them in the hierarchy), that characterize more complex sub-components (placed above them in the hierarchy) and so on, until the top of the structure is reached. Finally, the overall national capacity is characterized by a set of bottom-level components.

**Figure 4. A national capacity disaggregation structure (a general scheme)**



Note that the total number of bottom-level components can be large, but this fact does not change the general concept of the analysis. The only difference is that in this case national capacity is described not by a triple, but by a vector with *K* components (bottom-level components): $(x_1,x_2,...,x_K)$, where $x_k$ $(k=1,2,...K)$ corresponds to numerical evaluation of the bottom-level component/indicator k, and the geometric (Euclidean) distance between two countries $C_r$ and $C_j$ in *K*-dimensional space is computed as: $D_{r,j} = \sqrt{\sum_{k=1}^{K} (x_k^r - x_k^j)^2}$ where $x^r_k$ and $x^j_k$ represent numerical values describing bottom-level component/indicator *k* in the reference country $C_r$ and analyzed country $C_j$.

It needs to be acknowledged that as a result of multidimensional analysis one can assess not only the gaps between the reference country and analyzed country in different years of the development process, but also corresponding gaps between particular components or sub-components of national capacity (placed in the middle of the structure characterizing national capacity), and therefore, can analyze development of each particular dimension/component or sub-component.

It follows from the considerations presented above that proper disaggregation of the concept of national capacity and specification of the set of bottom level-components is the core element of the whole analysis. On one hand side, brief disaggregation can lead to too complex components that would hardly be estimated, on the other hand, however, too detail disaggregation can lead to too complex structure with hundreds of indicators which could be too time-consuming to estimate.[13]

The first best solution would be to determine a compact set of key headline indicators which are estimated and published periodically, e.g., in UNDP Human Development Reports, Word Bank/IMF economic publications, UNESCO reports, etc.[14] (This an approach would make implementation of the system realistic). Such a set of key headline indicators for the monitoring processes of national development in the Kyrgyz Republic is characterized in Section 4.

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[13] More detail methodological considerations related to the selection of indicators can be found in: 'Compendium of Sustainable Development Indicator Initiatives and Publications' (http://iisdl.iisd.ca/measure /compendium.hmt); 'Development Indicators' (http://www.oesd.org/dac/Indicators/index.htm); 'Environmental Economics and Indicators' (http://www-esd/worldbank.org.eei); and 'Recommendations for Core Set of Indicators of Biological Diversity' (http://www.biodiv.org.doc/sbstta-5.html).

[14] Note that even relatively complex issues, such as the level of corruption, are periodically estimated (in numerical form), and results are available for the public.

## 4. Performance Indicators for Monitoring Development Strategies in Kyrgyzstan

Performance indicators can provide crucial guidance for monitoring and evaluation process in a variety of ways. In particular, they can translate physical and social science knowledge into manageable units of information that can facilitate the monitoring process of sustainable development. The problem is that selection of performance indicators is not easy job.

Since the concept of national capacity and the objectives of sustainable development are both complex issues, for the purpose of detail monitoring the execution of development strategies hundreds of indicators need to be specified.[15, 16] Many of them can be hardly estimated quantitatively (see, e.g., Mogilevsky, 2000)[17]. Many other require development and implementation of special evaluation procedures. Therefore, significant amount of resources and time need to be allocated to proper monitoring of the execution of national development strategies.

In order to focus attention on what the process of sustainable development means, and to give a broad overview of how the national development strategies should be monitored, in the present paper we focus on a set of key headline indicators only. The set of key headline indicators intends to cover the main objectives of sustainable development strategies and is specified for the purpose of illustrative analysis of national development in the Kyrgyz Republic in the nineties (see Section 5). It should be acknowledged, that key headline indicators need to reflect specific features of the country under study, what means that the set of performance indicators selected for developed country can be hardly applied for monitoring national development in developing countries.[18] Moreover, no set of indicators can be considered as final and definitive, but must be developed over time to fit country-specific conditions, priorities and capabilities.

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[15] For the monitoring development strategy "A Better Quality of Life: a strategy for Sustainable Development in the United Kingdom" about 150 detail indicators have been specified.

[16] For the monitoring of sustainable development processes over 130 performance indicators have been specified (see "Indicators of Sustainable Development: Guidelines and Methodologies" Division for Sustainable Development, UN Report, 2000, http://www.un.org/esa/sustdev).

[17] Могилевский, Р. (2000) "Показатели для мониторинга Национальной стратегии устойчивого человеческого развития в Кыргызской Республике", *непубликованый отчет.*

[18] For the purpose of comparison, see a set of key headline indicators, constructed for the purpose of monitoring British sustainable development strategy "A better quality of life" available at the web page http://www.sustainable-development.gov.uk

Following UN approach to monitoring processes of sustainable development, in the analysis which follows we focus of the following four dimensions: (i) economic, (ii) human, (iii) environmental, and (iv) institutional.[19] In each dimension we specify the basic objectives and key sub-themes.

A basic objective in *economic dimension* is to ensure sustainable economic growth of the country. In this dimension we specify the following key issues: (i) Production level, (ii) Economic growth, (iii) Capital accumulation, (iv) Indebtness, and (v) Sustainable use of natural resources in the production processes.

A development goal in *human dimension* is to ensure harmonic human development, reduce poverty and social exclusion. In this dimension we specified the following key issues: (i) Poverty, (ii) Human security, (iii) Education, (iv) Health (v) Equity/social exclusion (vi) Welfare and quality of life.

A fundamental objective in *environmental dimension* is to protect natural environment and save natural potential for future generations. In this dimension we focused on the following key issues: (i) Reduction of waste and pollution, and (ii) Conservation of natural environment.

A key objective in *institutional dimension* is to ensure conditions for the development of society. In this dimension we specified the following key issues: (i) Governance, (ii) Democracy, civil society and public participation, (iii) Science and technology and (iv) Cultural development.

It should be noted that the organization of key issues within the four dimensions of sustainable development represents a "best-fit" to guide the selection of indicators. This does not mean that the issues selected should be considered exclusively within one dimension. The social key issue of "Poverty", for example, has obvious and significant economic, environmental, and institutional linkages (it has to be acknowledged that due to the complexity of the concept of national development such an overlapping can be hardly avoided). Similarly, the key economic issue "Sustainable use of natural resources", has strong environmental meaning. Nevertheless, due to greater significance of economic dimension for sustainable development of the Kyrgyz Republic, in our analysis this key issue is included into economic part. A set of key headline indicators selected for the purpose of monitoring development processes in the Kyrgyz Republic is presented in Table 1. Detail description of indices selected is presented below.

*GDP per capita (PPP in US$)* (E1) represents gross domestic product converted to international dollars using purchasing power parity rates[20]. GDP is the sum of gross value

[19] Such division corresponds to lower level sub-components of national capacity disaggregation structure than considered in Section 3.

[20] An international dollar has the same purchasing power over GDP as the US$ has in the United States.

added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current international dollars. The index reflects current economic development and consumption patterns of people.

*GDP growth (annual %)* (E2) similar to the previous index it reflects the current pattern of economic activity. Abandoning economic growth is not sustainable development option (to do so would close off opportunities to improve all other dimensions of development process). Consequently, annual GDP growth is the powerful aggregated indicator of current economic potential.

*Gross fixed capital formation (% of GDP)* (E3) reflects the share of investment in relation to total production. It is obtained by dividing gross fixed capital formation by GDP, both at purchasers' prices. It deals with the processes and patterns of economic activities and reflects important financial component aimed at accelerating the pace of development.

*External debt, total (DOD) (% of GDP)* (E4) is debt owed to nonresidents repayable in foreign currency, goods, or services. Total external debt is the sum of public, publicly guaranteed, and private nonguaranteed long-term debt, use of IMF credit, and short-term debt, represented as a share of GDP. It is a measure of the degree of indebtness, and it helps to access the external debt situation (and debt carrying capacity) of the country. The higher the value, the greater is the output that has to be foregone from sustainable development process to service the debt. It indicates a degree of unsustainability of the development process.

*Share of nonferrous metal industry in gross industrial production (%)* (E5) describes the contribution of colour metal industry to total industrial production. The indicator is meant to represent the potential impact of resource intensive industry on the depletion of non-renewable resources. In Kyrgyzstan, nonferrous metal industry, which includes mainly a gold processing sector, is expected to capture a large portion of this impact. The indicator is linked to sustainable economic development, and the use of non-renewable natural resources, including depletion of mineral resources. The higher the value, the greater is the extraction of gold. The lack of gold in the future can harm a development process. Similar to the previous indicator it indicates a degree of unsustainability of development.

*Percent of population living below poverty line* (S1) represents the proportion of population living below the poverty line. It captures the prevalence of poverty by measuring the proportion of population for whom consumption (or any other suitable measure of living standard) is below poverty line. An increase in this indicator implies a worsening of the poverty situation with a greater proportion of the population falling below the poverty line.

**Table 1(a). A set of key headline indicators selected for monitoring development processes in the Kyrgyz Republic**

| | Objective | Key issue | Indicator | Index \| desired pattern of changes* |
|---|---|---|---|---|
| **Economic dimension** | **Ensure sustainable economic growth of the country** | (i) Production level | GDP per capita | E1: GDP per capita, PPP (current international US$) \| ↑ |
| | | (ii) Economic growth | Annual economic growth | E2: GDP growth (annual %) \| ↑ |
| | | (iii) Capital accumulation | Total investment in the economy | E3: Gross fixed capital formation (% of GDP) \| ↑ |
| | | (iv) Indebtness | Economic dependency | E4: External debt, total (DOD) (% of GDP) \| ↓ |
| | | (v) Sustainable use of natural resources | Withdrawal of natural resources | E5: Share of nonferrous metal industry in gross industrial production (%) \| ↓ |
| **Human dimension** | **Ensure harmonic human development, reduce poverty and social exclusion** | (i) Poverty | Poverty level | S1: Percent of population living below poverty line) \| ↓ |
| | | (ii) Human security | Employment rate | S2: Employment rate, total (% of total labour force) \| ↑ |
| | | | Crime | S3: Number of crimes recorded (per 10000 people) \| ↓ |
| | | (iii) Education | Level of education | S4: Adult literacy rate \| ↑ |
| | | | | S5: Total expenditure on education (% of GDP) \| ↑ |
| | | (iv) Health | General health conditions | S6: Life expectancy at birth (years) \| ↑ |
| | | | | S7: Mortality rate under 5 years old (per 1000 live births) \| ↓ |
| | | | Health service | S8: Expenditures on Health Care (from all sources of financing, as % of GDP) \| ↑ |
| | | | Sanitation level | S9: Access to safe drink water (% of total population) \| ↑ |
| | | (v) Equity/social exclusion | Income distribution | S10: Gini index of income inequality \| ↓ |
| | | | Gender inequality | S11: Female wages as % of male wages \| ↑ |
| | | (vi) Welfare and quality of life | Access to common civilization achievements | S12:Telephone mainlines (per 1000 people) \| ↑ |
| | | | | S13: Number of vehicles (per 1000 people) \| ↑ |
| | | | | S14: Television sets (per 100 people) \| ↑ |

* ↑, ↓ denote increase and decrease of the value of the index (up to desired value), respectively.

**Table 1(b). A set of key headline indicators selected for monitoring development processes in the Kyrgyz Republic**

| | Objective | Key issue | Indicator | Index \| desired pattern of changes* |
|---|---|---|---|---|
| **Environmental dimension** | **Protect natural environment and save natural potential for future generations country** | (i) Reduction of waste and pollution | Current state of natural environment | N1: Toxic emissions from stationary sources \| ↓ |
| | | | | N2: Sewage water pollutant emissions, mln.$m^3$ \| ↓ |
| | | (ii) Conservation of natural environment | Level of environmental protection | N3: Expenditures for environmental protection (per capita, in constant prices) \| ↑ |
| **Institutional dimension** | **Ensure conditions for the development of the society** | (i) Governance | Stabilization of the overall state budget | I1: Budget deficit as % of GDP \| ↓ |
| | | (ii) Democracy, civil society and public participation | Democracy | I2: Number of political parties \| ↑ |
| | | | | I3: Number of published newspapers \| ↑ |
| | | | Civil Society | I4: Number of nongovernmental organizations (excluding political entities) \| ↑ |
| | | (iii) Science and technology | Research potential | I5: Scientists and technicians/1000 people \| ↑ |
| | | (iv) Cultural development | Quality of cultural life | I6: Total number of books published (per 100 000) \| ↑ |

* ↑, ↓ denote increase and decrease of the value of the index (up to desired value), respectively.

*Employment rate* (S2) is a ratio of employed people to the labor force. It is a measure of the utilized labor supply of a country. Indirectly, it characterizes unemployment which is the one of the main reasons for poverty.

*Number of crimes recorded per 10000 people* (S3) shows the total crimes recorded in criminal (police) statistics, regardless of type for each 10000 of inhabitants. It is linked to the problems of illegal behavior, law enforcement and economic and social development. If development is to be sustainable, it should be able to provide living conditions that would enable people to lead peaceful and secure lives. The index indicates a current level of security.

*Adult literacy rate* (S4) indicates the proportion of adult population aged 15 years and over that is literate. It provides a measure of the stock of literate persons within adult population who are capable of using written words in daily life and to continue to learn. It reflects a current level of education and it is critical for further accumulation of human capital.

*Total expenditure on education* (S5) represents education expenditure expressed as a share of GDP. It provides a measure of financial resource input into education. It enables better assessment of the adequacy and allocation of financial resource allocated to education within the national economy. Financial resources for education directly determine school capacity and quality, which in turn influences enrolment, retention and learning of children and youth in school.

*Life expectancy at birth* (S6) indicates the average number of years that a newborn could expect to live, if he/she were to pass through life to the age-specific death rates of a given period. It is an indicator of mortality conditions and, by proxy, of health conditions in the country.

*Mortality rate under 5 years old* (S7) refers to the probability of dying before age 5, per 1000 newborns. It measures the risk of dying in infancy and early childhood. Under-5 mortality levels are influenced by poverty, mothers' education, the availability, accessibility and quality of health services, health risk in the environment, etc.

*Expenditures on Health Care (as % of GDP)* (S8) It covers all expenditures (from all sources) on health care including the provision of health services (preventive and curative), family planning activities, nutrition activities, and emergency aid designated for health but does not include provision of water and sanitation. Financial resources for health care directly determine the quality of health service, which in turn influences health conditions of the population.

*Percent of population with access to safe drink water* (S9) defines a proportion of population with access to an adequate amount of safe drinking water in a dwelling or located within a convenient distance from the user's dwelling. Accessibility to safe drinking water is of fundamental significance to lowering the faecal risk and frequency of associated diseases. It is closely associated with other socioeconomic indicators (e.g., proportion of population with access to a sanitary facility for human excreta) and represents a basic element of primary health care.

*Ginni index of income inequality* (S10) is a summary measure of the extent to which the actual distribution of income, consumption expenditure, or related variable, differs from a hypothetical distribution in which each person receives an identical share. The index varies from a minimum of zero to a maximum of one; zero representing no inequality and one representing the maximum possible degree of inequality.

*Ratio of average female wage to male wage* (S11) is obtained as the quotient of average wage rates paid to female and male employees at regular intervals for time worked or work done for particular occupations. It assesses the remuneration offered to women vis-a-vis their male counterpart and ultimately determines the level of women's participation in the economy.

*Telephone mainlines (per 1000 people)* (S12). The indicator is derived by dividing the number of main telephone lines in operation by the population and multiplying by 1000. It is the broadest and the most common measurement of the degree of telecommunication development in the country. Access to telecommunication provides people in remote areas with easy contact with other people reducing their isolation and providing them with a tool to improve economic, social and cultural awareness. Consequently, access to telephone gives a proxy of quality of people life in the country.

*Number of vehicles (per 1000 people)* (S13). The indicator shows the number of motor vehicles including cars, buses, and freight vehicles (but do not include two-wheelers) per 1000 people. Similar to the previous indicator an access to motor vehicles provides people in remote areas with easy contact with other people (in private life and business) reducing their isolation and providing them with a tool to improve economic, social and cultural awareness.

*Television sets (per 100 people)* (S14). The indicator shows the number of television sets in use, per 100 people. Access to television improves access to education, leisure and culture. Thus, in many countries television set is considered as an indicator of good life conditions.

*Toxic emissions from stationary sources* (N1). The indicator reflects the annual amount of toxic emissions. Amount of emissions is influenced by a country's industrial structure, by the country's standard of pollution abatement and control and the use of clean production technology. It indicates a human impact on the environment through production and consumption.

*Sewage water pollutant emissions* (N2). Emissions of sewage water pollutant reflect the annual amount of sewage pollutions and are measured in $m^3$ (million). Similar to the previous index sewage water pollutant emissions are influenced by the country's standard of pollution abatement and control and the use of clean production technology. They give an indication of human impact on the environment.

*Expenditures for environmental protection (per capita, in constant prices)* (N3). Expenditures for environmental protection comprise the flow of investment and current expenditure that is directly aimed at protection of natural environment, and which is incurred by the public sector, the business sector, and possibly private households. It provides a general indication of a country's financial efforts directed towards environmental protection.

*Deficit as % of GDP* (I1). The deficit corresponds to the overall budget. Macroeconomic stabilization, and, consequently, balanced budget, are the key conditions for sustainable development. They need to be guaranteed by the authorities of the country. Thus, a deviation from fully balanced budget can be considered as an indicator of governance quality.

*Number of political parties* (I2). This index shows a total number of political organizations in the country. Political governance is one of the most important components of democratic governance. It is associated with policy formation, the definition of development goals and the coordination of different interests. Thus, existence of developed/multiparty political system is a precondition for sustainable development.[21]

*Number of published newspapers* (I3). The index refers to the total number of newspapers published in the country. Free access to information and existence of developed and independent media is a condition for building a democratic society, which in tern is a precondition for sustainable development.

*Number of nongovernmental organizations (excluding political entities)* (I4). The genuine involvement and participation of all social groups in decision making is critical to the achievement of sustainable development. The credibility of NGOs lies in the responsible and constructive role they play in society. Governments are encouraged to consult NGOs and establish mechanisms to ensure their participation in decision-making processes at the national level. Thus, existence of system of non-governmental organizations is a precondition for sustainable development.

*Scientists and technicians (per 1000 people)* (I5) indicates the number of scientists and technicians for 1000 people. Scientists and engineers are people trained to work in any field of science or engineering (most such jobs require completion of tertiary education). They are the key performers of research activities aimed at increasing the stock of knowledge and devising new applications in order to ensure sustainable development.

*Total number of books published (per 100000 people)* (I6) refers to the general level of cultural life in the country. In developed countries participation in cultural live should be accessible to everyone, and therefore cultural development needs to be considered as a part of sustainable development process. Although the concept of cultural live covers a broad range of different issues including art, theaters, cinemas, museums, exhibitions, etc., we believe that the number of books published in a given year per 100000 people can be considered as one of possible indicators of cultural potential of the country.

[21] If the indicators I2-I5 are concerned we agree that quantity does not reflect quality, but, nevertheless, we believe that these indices properly indicate observed pattern of changes.

## 5. Implementation of Method Proposed for the Assessment of National Development in the Kyrgyz Republic in the period 1992-2000

Dynamics of each particular index specified in the preceding section in the period 1992-2000 is presented in Table I.1 in Appendix I. Recall from Section 3 that prior to the analysis of national development each particular index has to be represented as a share of its counterpart in the reference country. For the purpose of retrospective analysis presented in this section the set of indices characterizing hypothetical reference country has been constructed taking the most preferred value of each particular index in the period considered.[22] Characteristics of the reference country are presented in Table AI.2 in Appendix I.A complete set of relative indices is presented in Table AI.3 (Appendix I).

Since in the nineties there were no document clearly specifying targets and directions of national development in the analysis which follows we focus on the assessment of the development process in the Kyrgyz Republic from the point of view of two different hypothetical development strategies. The first strategy, called '*liberal*', assumes that economic dimension is a key for the development of the country (social and environmental dimensions are secondary). The second strategy considered, called '*social*', focuses mainly on human and social development giving less weight to the economic dimension. For the sake of simplicity we assume that weights of indicators within particular dimensions are the same in both strategies (weights of development indicators within particular dimensions are presented in Tables AI.4-AI.7 in Appendix I). Weights reflecting development preferences of both strategies under study are presented in Table 2.

**Table 2. Weights reflecting development preferences of both strategies under study**

| | **Development strategy** | |
|---|---|---|
| | ***'Liberal'*** | ***'Social'*** |
| Economic | 0,5 | 0,25 |
| Human | 0,25 | 0,5 |
| Environmental[23] | 0,05 | 0,05 |
| Institutional | 0,2 | 0,2 |

[22] Note that characteristics of the reference country can be also constructed setting each index equal to its target value.

[23] Similar to other studies on sustainable development we included environmental dimension to the analysis, however, in the Kyrgyz Republic its importance in comparison with other problems of the country is in our days rather marginal.

In Figure 5 a dynamics of four basic components (economic, human, environmental and institutional) determining the process of national development of the Kyrgyz Republic is presented.[24] Since weights of development indicators within particular dimensions do not depend on development strategy, a dynamics of basic components is the same in both strategies considered.

In *institutional dimension* a significant progress in the process of sustainable development has been observed. It is not surprising since its two basic sub-components (key issues): 'governance' (except the year 1995 when a significant deterioration of the budget deficit was observed) and 'democracy, civil society and public participation' improved significantly in the period considered and two other ('science and technology' and 'cultural development') did not deteriorate drastically.

In *environmental dimension* after some improvement at the beginning of the nineties, and significant decline in 1996 (due to the jump in sewage water pollutant emissions), a certain progress has been observed at the end of the period considered. Such a pattern can be explained by notable reduction of emissions at the beginning of transformation (to large extend due to significant decline of the production output) and stabilization in the later period. This general pattern has not been reversed by the third sub-component: 'Level of environmental protection' (represented in the analysis by expenditures for environmental protection, per capita), which after initial deterioration was rather stable in subsequent years.

In the other two dimensions: economic and human, which are perhaps much more important for sustainable national development of the Kyrgyz Republic than the previous two, after reaching a top in year 1996, in years 1997-1999 a decline rather than development has been observed (in year 2000 indicators improved a little bit).

In *economic* dimension development processes observed in the nineties are by far not sustainable. This is because the economic development (represented by two basic indicators: production level and annual growth rate) to large extend has been supported by heavy borrowing from abroad and extraction of natural resources. While the basic indicators of short-run economic development ('GDP per capita' and 'Annual economic growth') increased, the other two ('External debt' and 'The share of nonferrous metal industry in GDP' which intends to represent the level of gold extraction) reflecting sustainability of economic development, increased even more (Figure 6). Such a pattern indicates that overall economic development is non sustainable.

[24] Details of corresponding computations (distances from the reference point) are presented in Table AI.8 in Appendix I.

**Figure 5. Dynamics of basic components of the process of national development in the Kyrgyz Republic**

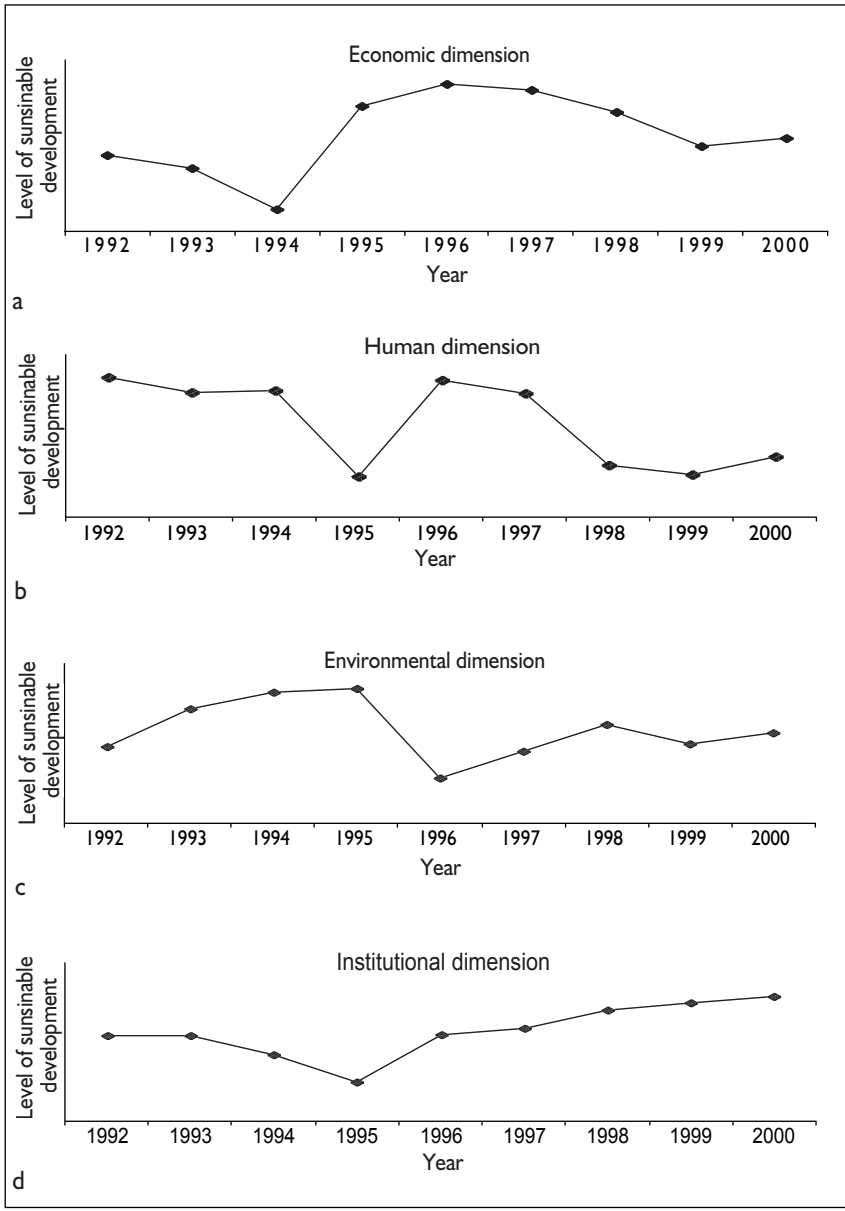
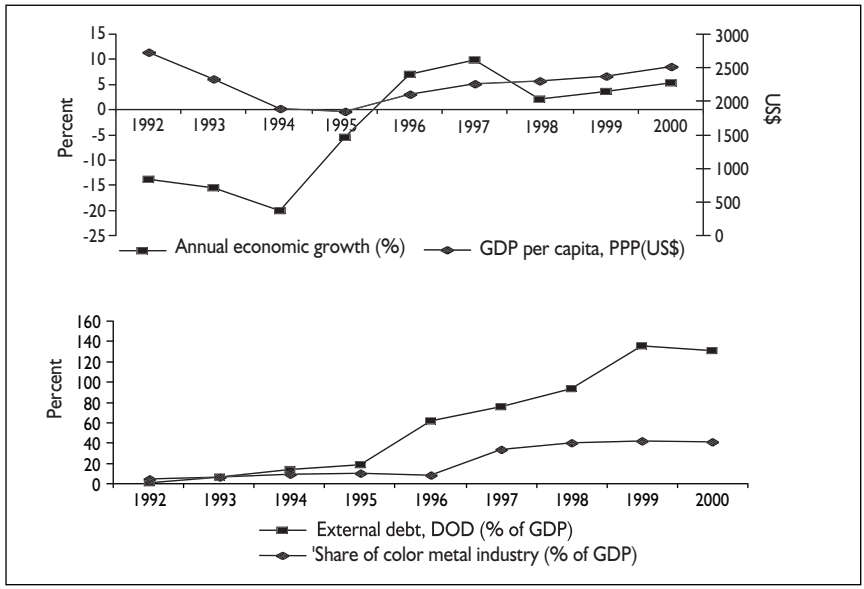


**Figure 6. Dynamics of basic indicators of sustainable development in economic dimension**

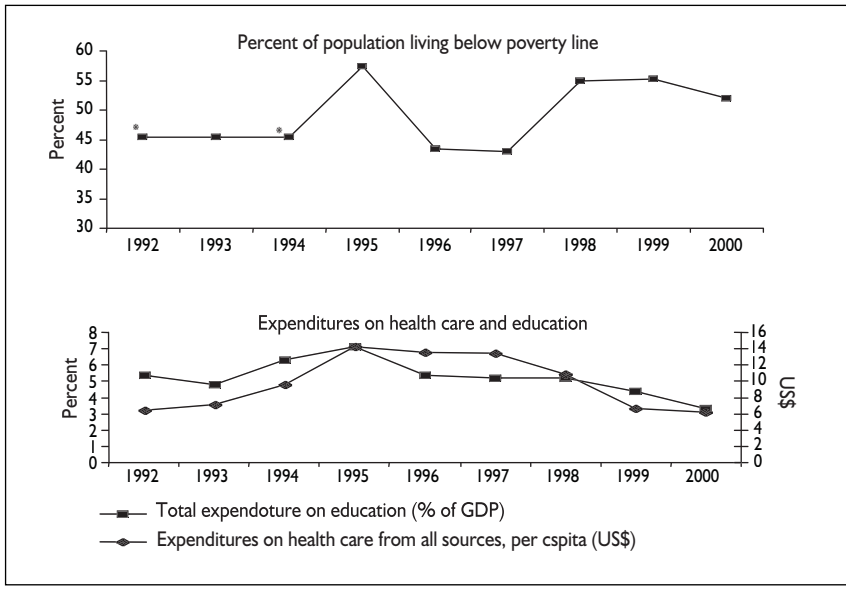



It should be acknowledged that in the present analysis indices of the short run economic development have been considered as the most important (total weight in economic dimension has been assumed equal to 0,98) and only symbolic weight (0,01) has been assigned to each of two indices of nonsustainability of development processes. Such distribution of weights reflects great importance of the present level of economic development of the country. On the other hand, it shows that if one carries only a little bit about the future and sustainability of economic growth, she can conclude that economic development observed in the Kyrgyz Republic accompanied by significant increase of external debt and extraction of natural resources cannot be considered as sustainable.

In *human dimension*, after stabilization period in years 1992-1996 (with the exception of year 1995) in the next three years (1997-1999) a decreasing pattern of sustainable development has been observed. This can be explained by significant increase of poverty - the most important indicator of human development[25], and decrease of total expenditure on education and health care (Figure 7). Decrease of total spending on education and health care indicates deterioration of the quality of services provided in the social sector.

[25] It should be acknowledged that the method of computation of the indicator 'Percent of population living below poverty line' has been changed in the period considered, consequently, it has to be used carefully. Nevertheless, we believe that it is the best available index which reflects changes in the poverty level.

**Figure 7. Dynamics of basic indicators of sustainable development in human dimension**



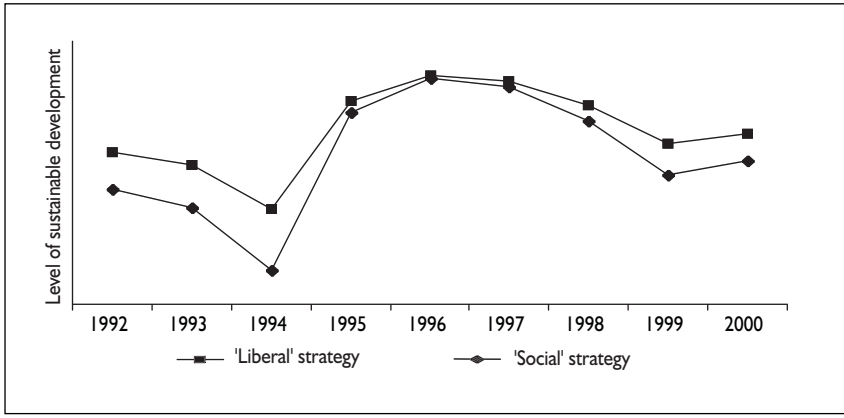

* - data for this year are not available, it has been assumed that in this particular year there was no any change in the value of the indicator).

Comparison of the dynamics of UNDP Human Development Index (Figure 1) with the development of human component (Figure 5.b) in the nineties reveals different patterns of changes, especially in the period 1997-1999. These differences can be explained by non adequate and too simple structure of HDI. As the result the basic components of human development: poverty, quality of education and health service, and social inequality, are not covered by HDI. Consequently, to monitor the process of harmonic/sustainable human development more complex indices need to be used.

Dynamics of the overall process of national development in the Kyrgyz Republic in the period 1992-2000, evaluated from the point of view of two different strategies specified above, is presented in Figure 8. One can notice that the development pattern does not depend much on the strategy. This is because the two basic components of sustainable development processes (economic and human) exhibited similar pattern of changes in the period under study (see Figure 7.a and 7.b). However, more important point which can be gained from this figure is that starting from 1997 an overall national development of the country cannot be considered as sustainable (according to both strategies). In particular, in the period 1997-1999 the level of sustainable development of the country has been declining from year to year (certain progress has been observed only in year 2000). This

pattern has been caused by two main components of national development: unsustainable economic development and deterioration of human component.

**Figure 8. Dynamics of the overall process of national development in the Kyrgyz Republic in the period 1992-2000**




## 6. Conclusion

After gaining independence in 1991, Kyrgyzstan adopted a long-term program of national reforms. In order to overcome the systemic economic crisis of the early 1990's, decisive action was taken in setting up a market economy, together with the necessary infrastructure and institutions that enabled the restoration of economic growth by 1996. Years 1996-1997 have been considered as the beginning of the path of sustainable national development. Very soon, however, during the Russian financial crisis of 1998-1999 it became obvious that the development achievements of the country remained very vulnerable to external shocks. In general, despite some progress, the transition process proved to be more difficult than expected, although it might be noted that - in terms of institutional achievements - Kyrgyzstan has performed relatively well. At the beginning of the new millennium market reforms have not yet been completed. The main problems (poverty, unfinished social reforms, inadequate economic development, etc.) remain and in certain dimensions of national development a regress is observed (e.g., poverty). Recently, in order to intensify processes of national development three basic strategy documents: the

*National Strategy for Sustainable Human Development, the Comprehensive Development Framework* and the *National Strategy for Poverty Reduction*, have been approved. Development and program/framework implementation require the introduction of a system of continued assessment of the country's social-economics situation in order to analyse existing trends and effectiveness of implemented policies. The analysis presented in the present paper explains how such a system can be created.

The method presented in the paper can be applied for monitoring of implementation of national development strategies (moreover, it can also be used for inter-country comparison and the assessment of the impact of technical cooperation projects and different internal and external shocks on national development). For the purpose of monitoring the execution of a particular development strategy, however, the system of weights reflecting development priorities needs to be specified base on the detail analysis of strategy documents. Moreover, the set of development indicators selected in this paper cannot be considered as final and definitive. It has to be developed over time to fit country-specific conditions, priorities and capabilities.

The analysis of development processes in the Kyrgyz Republic in the period 1992-2000 presented in this paper should be considered as an illustration of the method proposed only. Nevertheless, it reveals important and frequently neglected facts concerning sustainability of the process of national development of the Kyrgyz Republic. In particular, it shows that an overall national development of the country accompanied by heavy borrowing from abroad and extraction of natural resources cannot be considered as sustainable, and that starting from 1997 the level of sustainable development of the country declined from year to year (some improvements have been observed in 2000). This is very important message for the authorities and policy makers of the country, because misunderstanding of the development achievements can be easily and painfully verified by the first external shock.

Finally, another important message, following from the analysis presented in the paper, is that monitoring processes of national development in the Kyrgyz Republic should not be restricted to a few standard and selective indicators pretending to reflect different dimensions of the development process. Even significant improvement in some of such indicators does not guarantee that the development process is sustainable. Monitoring procedures should cover development of national capacity as a whole and necessarily include indicators reflecting sustainability of development processes.

# Appendix I

## Implementation of the Method Proposed for the Assessment of National Development in the Kyrgyz Republic in the period 1992-2000 - Computational Details

**Table AI.(a)1. Dynamics of selected indicators in the period 1992-2000**

| Index | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| GDP per capita, PPP (US$) | 2730 | 2330 | 1890 | 1850 | 2101 | 2264 | 2299 | 2377 | 2521 |
| GDP growth (annual %) | -13,89 | -15,46 | -20,09 | -5,42 | 7,08 | 9,92 | 2,12 | 3,66 | 5,40 |
| Gross fixed capital formation (% of GDP) | 14,58 | 13,34 | 12,42 | 20,67 | 22,63 | 12,62 | 13,16 | 15,99 | 16,00 |
| External debt, total (DOD) (% of GDP) | 0,6 | 6,7 | 13,9 | 18,3 | 62,1 | 75,5 | 93,4 | 135,8 | 131,1 |
| Share of nonferrous metal industry in gross industrial production (%) | 4,44 | 6,20 | 9,16 | 10,22 | 8,23 | 33,24 | 40,52 | 41,88 | 41,41 |
| Percent of population living below poverty line | 45,40* | 45,40 | 45,40* | 57,30 | 43,50 | 42,90 | 54,90 | 55,30 | 52,00 |
| Employment rate (% of labour force) | 99,90 | 99,80 | 99,30 | 97,10 | 95,70 | 96,90 | 96,90 | 97,10 | 97,00 |
| Number of crimes recorded /10000 people | 97,81 | 93,55 | 90,64 | 89,34 | 85,08 | 78,86 | 71,48 | 82,13 | 78,69 |
| Adult literacy rate | 97,00 | 97,00 | 97,30 | 97,30 | 97,30 | 97,30 | 97,30 | 98,70 | 98,70 |
| Total expenditure on education (% of GDP) | 5,40 | 4,80 | 6,30 | 7,10 | 5,40 | 5,20 | 5,20 | 4,40 | 3,30 |
| Life expectancy at birth (years) | 68,30 | 67,30 | 66,00 | 66,00 | 66,60 | 66,90 | 67,10 | 67,00 | 68,50 |
| Mortality rate under 5 years old/ 1000 live births | 42,20 | 44,60 | 41,90 | 41,30 | 36,40 | 42,10 | 40,70 | 35,50 | 33,20 |
| Expenditures on Health Care (from all sources, as % of GDP) | 3,70 | 3,00 | 3,90 | 4,30 | 3,40 | 3,50 | 3,20 | 2,60 | 2,20 |
| Access to safe drink water (% of total population) | 18,30* | 18,30* | 18,30* | 18,30* | 18,30* | 18,30* | 18,30 | 14,10 | 14,00 |
| Gini index of income inequality | 0,24 | 0,35 | 0,44 | 0,37 | 0,39 | 0,45 | 0,45 | 0,44 | 0,45 |
| Female wages as % of male wages | 73,00* | 73,00* | 73,00* | 73,00 | 73,00 | 71,00 | 72,00 | 64,00 | 68,00 |

* – data for this year are not available, it has been assumed that in this particular year there was no any change in the value of the indicator.

Sources: National Statistical Committee of the Kyrgyz Republic; World Bank, UNDP Human Development Report 2000; Kyrgyzstan: Common Country Assessment, UNDP, Bishkek 2001.

**Table AI.1(b). Dynamics of selected indicators in the period 1992-2000**

| Index | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| Telephone mainlines/ 1000 people | 18,00 | 17,00 | 16,00 | 14,00 | 12,00 | 11,00 | 12,00 | 10,00 | 8,00 |
| Number of vehicles /1000 people | 75,40 | 82,00 | 75,80 | 79,10 | 74,70 | 75,60 | 76,30 | 76,20 | 80,00 |
| Television sets /100 people | 47,85 | 41,45 | 30,83 | 43,02 | 37,02 | 37,27 | 39,14 | 38,51 | 41,00 |
| Toxic emissions from stationary sources | 128,6 | 94,1 | 64,8 | 55,0 | 47,4 | 37,5 | 44,1 | 30,9 | 34,4 |
| Sewage water pollutant emissions, mln.$m^3$ | 2,57 | 2,05 | 1,63 | 0,85 | 4,50 | 4,00 | 3,20 | 3,80 | 3,60 |
| Expenditures for environ. protection (per capita, in 1995 prices) | 23,00 | 21,90 | 19,60 | 16,20 | 11,71 | 14,07 | 14,17 | 14,17 | 15,71 |
| Deficit of overall budget (%GDP) | -8,20* | -8,20 | -11,60 | -15,30 | -8,60 | -8,30 | -8,70 | -10,90 | -8,40 |
| Number of political parties | 5 | 7 | 12 | 14 | 15 | 17 | 19 | 30 | 22 |
| Number of published newspapers | 140 | 128 | 140 | 142 | 149 | 175 | 164 | 167 | 184 |
| NGOs (excluding political entities) | 438 | 500 | 552 | 661 | 821 | 1131 | 1437 | 2185 | 2936 |
| Scientists and technicians/1000 people | 1,00 | 0,90 | 0,80 | 0,80 | 0,80 | 0,80 | 0,70 | 0,70 | 0,60 |
| Total number of books published/ 100 000 people | 11,00 | 9,00 | 7,00 | 9,00 | 7,00 | 6,00 | 9,00 | 9,00 | 10,00 |

* – data for this year are not available, it has been assumed that in this particular year there was no any change in the value of the indicator.

Sources: National Statistical Committee of the Kyrgyz Republic; World Bank, UNDP Human Development Report 2000; Kyrgyzstan: Common Country Assessment, UNDP, Bishkek 2001.

**Table AI.2. Characteristics of hypothetical reference country**

| Index | Value |
|---|---|
| GDP per capita, PPP (US$) | 2730 |
| GDP growth (annual %) | 9,92 |
| Gross fixed capital formation (% of GDP) | 22,63 |
| External debt, total (DOD) (% of GDP) | 0,62 |
| Share of nonferrous metal industry in gross industrial production (%) | 4,44 |
| Percent of population living below poverty line | 42,90 |
| Employment rate (% of labour force) | 99,90 |
| Number of crimes recorded /10000 people | 71,48 |
| Adult literacy rate | 98,70 |
| Total expenditure on education (% of GDP) | 7,10 |
| Life expectancy at birth (years) | 68,50 |
| Mortality rate under 5 years old/ 1000 live births | 33,20 |
| Expenditures on Health Care (from all sources, % of GDP) | 4,30 |
| Access to safe drink water (% of total population) | 18,30 |
| Gini index of income inequality | 0,24 |
| Female wages as % of male wages | 73,00 |
| Telephone mainlines/ 1000 people | 18,00 |
| Number of vehicles /1000 people | 82,00 |
| Television sets /100 people | 47,85 |
| Toxic emissions from stationary sources | 30,90 |
| Sewage water pollutant emissions, mln.$m^3$ | 0,85 |
| Expenditures for environ. protection (per capita, in 1995 prices) | 23,00 |
| Deficit of overall budget (% GDP) | -8,20 |
| Number of political parties | 30 |
| Number of published newspapers | 184 |
| NGOs (excluding political entities) | 2936 |
| Scientists and technicians/1000 people | 1,00 |
| Total number of books published/ 100 000 people | 11,00 |

**Table AI.3(a). Relative values of indicators selected**

| Index | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| GDP per capita, PPP (US$) | 1,00 | 0,85 | 0,69 | 0,68 | 0,77 | 0,83 | 0,84 | 0,87 | 0,92 |
| GDP growth (annual %) | -1,40 | -1,56 | -2,03 | -0,55 | 0,71 | 1,00 | 0,21 | 0,37 | 0,54 |
| Gross fixed capital formation (% of GDP) | 0,64 | 0,59 | 0,55 | 0,91 | 1,00 | 0,56 | 0,58 | 0,71 | 0,71 |
| External debt, total (DOD) (% of GDP) | 1,00 | 10,85 | 22,44 | 29,48 | 100,2 | 121,7 | 150,7 | 219,1 | 211,4 |
| Share of nonferrous metal industry in gross industrial production (%) | 1,00 | 1,40 | 2,06 | 2,30 | 1,85 | 7,49 | 9,13 | 9,43 | 9,33 |
| Percent of population living below poverty line | 1,06 | 1,06 | 1,06 | 1,34 | 1,01 | 1,00 | 1,28 | 1,29 | 1,21 |
| Employment rate (% of labour force) | 1,00 | 1,00 | 0,99 | 0,97 | 0,96 | 0,97 | 0,97 | 0,97 | 0,97 |
| Number of crimes recorded /10000 people | 1,37 | 1,31 | 1,27 | 1,25 | 1,19 | 1,10 | 1,00 | 1,15 | 1,10 |
| Adult literacy rate | 0,98 | 0,98 | 0,99 | 0,99 | 0,99 | 0,99 | 0,99 | 1,00 | 1,00 |
| Total expenditure on education (% of GDP) | 0,76 | 0,68 | 0,89 | 1,00 | 0,76 | 0,73 | 0,73 | 0,62 | 0,46 |
| Life expectancy at birth (years) | 1,00 | 0,98 | 0,96 | 0,96 | 0,97 | 0,98 | 0,98 | 0,98 | 1,00 |
| Mortality rate under 5 years old/ 1000 live births | 1,27 | 1,34 | 1,26 | 1,24 | 1,10 | 1,27 | 1,23 | 1,07 | 1,00 |
| Expenditures on Health Care (from all sources, % GDP) | 0,86 | 0,70 | 0,91 | 1,00 | 0,79 | 0,81 | 0,74 | 0,60 | 0,51 |
| Access to safe drink water (% of total population) | 1,00 | 1,00 | 1,00 | 1,00 | 1,00 | 1,00 | 1,00 | 0,77 | 0,77 |
| Gini index of income inequality | 1,00 | 1,48 | 1,85 | 1,56 | 1,64 | 1,90 | 1,87 | 1,85 | 1,88 |
| Female wages as % of male wages | 1,00 | 1,00 | 1,00 | 1,00 | 1,00 | 0,97 | 0,99 | 0,88 | 0,93 |
| Telephone mainlines/ 1000 people | 1,00 | 0,94 | 0,89 | 0,78 | 0,67 | 0,61 | 0,67 | 0,56 | 0,44 |
| Number of vehicles /1000 people | 0,92 | 1,00 | 0,92 | 0,96 | 0,91 | 0,92 | 0,93 | 0,93 | 0,98 |
| Television sets /100 people | 1,00 | 0,87 | 0,64 | 0,90 | 0,77 | 0,78 | 0,82 | 0,80 | 0,86 |
| Toxic emissions from stationary sources | 4,16 | 3,05 | 2,10 | 1,78 | 1,53 | 1,21 | 1,43 | 1,00 | 1,11 |
| Sewage water pollutant emissions, mln.$m^3$ | 3,02 | 2,41 | 1,92 | 1,00 | 5,29 | 4,71 | 3,76 | 4,47 | 4,24 |

**Table AI.3(b). Relative values of indicators selected**

| Index | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| Expenditures for environ. protection (per capita, in 1995 prices) | 1,00 | 0,95 | 0,85 | 0,70 | 0,51 | 0,61 | 0,62 | 0,62 | 0,68 |
| Deficit of overall budget (% GDP) | 1,00 | 1,00 | 1,41 | 1,87 | 1,05 | 1,01 | 1,06 | 1,33 | 1,02 |
| Number of political parties | 0,17 | 0,23 | 0,40 | 0,47 | 0,50 | 0,57 | 0,63 | 1,00 | 0,73 |
| Number of published newspapers | 0,76 | 0,70 | 0,76 | 0,77 | 0,81 | 0,95 | 0,89 | 0,91 | 1,00 |
| NGOs (excluding political entities) | 0,15 | 0,17 | 0,19 | 0,23 | 0,28 | 0,39 | 0,49 | 0,74 | 1,00 |
| Scientists and technicians/1000 people | 1,00 | 0,90 | 0,80 | 0,80 | 0,80 | 0,80 | 0,70 | 0,70 | 0,60 |
| Total number of books published/ 100 000 people | 1,00 | 0,82 | 0,64 | 0,82 | 0,64 | 0,55 | 0,82 | 0,82 | 0,91 |

**Table AI.4. Weights of development indicators within economic dimension**

| | Objective | Key issue | Indicator | Weight |
|---|---|---|---|---|
| **Economic dimension** | Ensure sustainable economic growth | Production level | GDP per capita | 0,4 |
| | | Economic growth | Annual economic growth | 0,5 |
| | | Capital accumulation | Total investment in the economy | 0,08 |
| | | Indebtness | Economic dependency | 0,01 |
| | | Sustainable use of natural resources | Withdrawal of natural resources | 0,01 |

**Table AI.5. Weights of development indicators within social dimension**

| | Objective | Key issue | Indicator | Weight |
|---|---|---|---|---|
| **Human dimension** | Ensure harmonic human development, reduce poverty and social exclusion | Poverty | Poverty level | 0,3 |
| | | Human security | Employment rate | 0,1 |
| | | | Crime | 0,05 |
| | | Education | Level of education* | 0,15 |
| | | Health | General health conditions* | 0,15 |
| | | | Health service | 0,075 |
| | | | Sanitation level | 0,025 |
| | | Equity/social exclusion | Income distribution | 0,05 |
| | | | Gender inequality | 0,05 |
| | | Welfare and quality of life | Access to common civilization achievements** | 0,05 |

* It is supposed that each index has the same weight within indicator a given indicator equal to 1/2.

** Weights of indices S13 (Telephone mainlines per 1000 people), S14 (Number of vehicles per 1000 people) and S15 (Television sets per 100 people) within indicator 'Access to common civilization achievements' are assumed to be equal 1/3.

**Table AI.6. Weights of development indicators within environmental dimension**

| | Objective | Key issue | Indicator | Weight |
|---|---|---|---|---|
| **Environmental dimension** | Protect natural environment and save natural potential | Reduction of waste and pollution | Current state of natural environment* | 0,4 |
| | | Conservation of natural environment | Level of environmental protection | 0,6 |

* It is supposed that each index has the same weight within indicator a given indicator equal to 1/2.

**Table AI.7. Weights of development indicators within institutional dimension**

| | Objective | Key issue | Indicator | Weight |
|---|---|---|---|---|
| **Institutional dimension** | Ensure conditions for the development of the society | Governance | Stabilization of the state budget | 0,2 |
| | | Democracy, civil society and public participation | Democracy* | 0,2 |
| | | | Civil Society | 0,2 |
| | | Science and technology | Research potential | 0,2 |
| | | Cultural development | Quality of cultural life | 0,2 |

* It is supposed that each index has the same weight within indicator a given indicator equal to 1/2.

**Table AI.8. Details of the analysis (distances from the reference point, $x10^{-3}$)**

| | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|
| ***Dimension**** | | | | | | | | | |
| Economic | 90081 | 102895 | 144699 | 39557 | 17202 | 23254 | 45029 | 81109 | 72652 |
| Human | 381 | 749 | 708 | 2824 | 456 | 783 | 2544 | 2785 | 2338 |
| Environmental | 1424 | 597 | 218 | 145 | 2099 | 1517 | 944 | 1369 | 1125 |
| Institutional | 1281 | 1290 | 1771 | 2445 | 1250 | 1095 | 650 | 466 | 298 |
| ***Strategy*** | | | | | | | | | |
| 'Liberal' | 363982 | 414013 | 581063 | 162484 | 71966 | 93359 | 182857 | 325921 | 291503 |
| 'Social' | 93167 | 105531 | 147396 | 44991 | 21007 | 26649 | 49167 | 85729 | 76413 |

* Distances have been computed based on 'Social' strategy.

# Appendix II

## Inter-Country Comparison and Monitoring and Managing Technical Cooperation Processes – a Basic Concept

In addition to monitoring the execution of the development strategies there is a strong need for monitoring and assessment of technical cooperation (TC) processes in the Kyrgyz Republic.[26]

Technical cooperation is of special importance for countries such as Kyrgyzstan, which are not rich in natural resources, and where opportunities for economic development are mainly related to the effective use of the available human potential, activity and knowledge of their citizens, as well as the overall effective management of the economy. Consequently, it is scarcely surprising that Kyrgyzstan is vitally interested in all forms of TC.

Since its independence Kyrgyzstan has been the recipient of quite significant amounts of official development assistance (ODA), reaching over 9% of its GDP in 1999. Technical cooperation also started to flow into Kyrgyzstan in 1992 and in some years constituted more than half of the total value of ODA. According to the database created in the UNDP country office, the amount of TC increased steadily until 1998, when it topped out at $35 million, falling back in 1999 and 2000. Total TC during the nine-year period 1992-2000 amounted to $204.6 million or $45 per capita, which is quite a high level by international standards. Detail characteristics of technical assistance to Kyrgyz Republic one can find in Cukrowski and Mogilevsky (2002)[27] and Cukrowski *et al.* (2002)[28]. Not going into details one can easily conclude that although there has been a lot of money spent for technical assistance the results are far from expected. One of the reasons was a lack of proper monitoring and assessment of TC projects form the point of view of overall national capacity development.

In the analysis which follows we extend the concept of monitoring the execution of development strategies presented in the present paper for inter-country comparison and monitoring and managing TC processes.

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[26] See, e.g., Cukrowski J., Dąbrowski, M., Gortat R., Mogilevsky R. (2002) "Reforming Technical Cooperation for Capacity Development. Kyrgyzstan: Country Study", forthcoming in (S. Browne, ed.) "Capacity for Development: Country Experience with Technical Cooperation".

[27] Cukrowski J., Mogilevsky, R., (2002) "Effectiveness of International Aid in the Kyrgyz Republic", Studies and Analyses CASE No. 238, Warsaw (in Russian).

[28] Cukrowski J., Dąbrowski M., Gortat, R., Mogilevsky, R. (2002) "Reforming Technical Cooperation for Capacity Development. Kyrgyzstan: Country Study", forthcoming in (S. Browne, ed.) "Capacity for Development: Country Experience with Technical Cooperation".

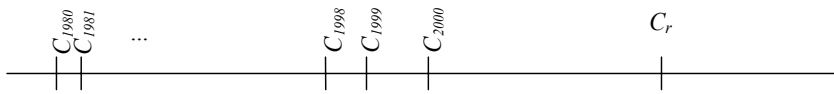
In order to present possible results of the method proposed assume that a set of developing countries (say $\{C_1, C_2, ..., C_N\}$) is included to the analysis and a single developed country $(C_r)$ is selected as a reference point. Assume that national capacity of each of them is characterized by the set of bottom-line components/indicators of the national capacity disaggregation structure (as in Figure 4 in Section 3).

An immediate result of the analysis is a distribution of national capacities of the countries analyzed (as presented in Figure AII.1). Note that this distribution gives not only the ranking of national capacities, placing countries starting from the less developed (on the left hand side) to the most developed, but also groups countries with similar levels of national capacity. Analogous distributions can be created for each particular component specified in the national capacity disaggregation structure or for any particular set of selected components (human, organizational, institutional, educational, health, socio-political, government/public sector, economic/technological, physical environment, etc.), i.e., for any component at any level of disaggregation structure. This can reveal similarities/dissimilarities between countries in respect to each particular set of national capacity components. It can also help to identify the most underdeveloped components. Note, however, that the national capacity distribution represents a static picture only. Much more can be gained from the analysis of the changes in national capacity level.

**Figure AII.1. Distribution of national capacities of the set of countries (a distance between reference country $C_r$ and developing country $C_j$ ($j$=1,2,...,$N$) corresponds to capacity gap)**


To introduce dynamics assume that national capacities of the set of developing countries $\{C_1, C_2, ..., C_N\}$ and a reference country $(C_r)$ are observed and analyzed in several subsequent periods (e.g., years). First of all, for each particular country analyzed an overall national capacity development path can be constructed (as presented in Figure AII.2).

**Figure AII.2. One dimensional development path (the distances may correspond to differences in overall national capacity levels or to differences in selected single national capacity component or a set of components)**



Similar development paths can be determined for each particular component of national capacity disaggregation structure. Furthermore, development paths for a selected set of components showing differences in the development in particular dimensions, can be constructed (see Figure AII.3).

Note that not a particular location of the point corresponding to the specific period is important but its movements in K-dimensional space reflecting changes in national capacity level. These changes are characterized by numerical values and can be further formally analyzed. Note that, in each particular point of time, it is possible (based on formal analysis of the data from the past) to determine a trend of national capacity development (in each particular dimension or the set of dimensions).[29] Knowing a trend one can formally estimate an effect of analyzed policy mix (or other socio-political or economic shocks)[30] on the development of national capacity, comparing the distance between national capacity level of the reference country and the country analyzed after implementation of the project (i.e., after development shock) with the distance between national capacity level of the reference country and the position of the country, following from the extrapolation of the trend line (see Figure AII.4).

Similarly the effects of particular policy mix (development strategy, TC project, or other socio-political or economic shocks) on any particular dimension of national capacity can be determined (i.e., side effects of the policy mix can be analyzed as well). Note that this approach can be applied for the estimation of short term as well as of long term consequences of different external or internal shocks. It would also help to determine possible lags (delays) in the effects of the strategy (TC project) on national capacity development. Moreover, analyzing effects of similar approaches (TC project, development strategies) implemented in different environment (different countries) one can determine conditions concerning national capacity level for successful implementation of the solutions considered and their significant impact for further development.

Finally, data sets describing all countries under consideration in all periods can be pulled out and analyzed together. This will result in a distribution similar to that presented in Figure AII.5 (similar distributions can be derived for any particular component or the set of components of national capacity disaggregation structure).

[29] Methods of time series analysis can be used for trend identification and forecasts (for details see, e.g., Brillinger, D.R. (1994) Trend Analysis: Time Series and Point Process Models, Environmetrics, 5 (1), 1-20).

[30] E.g., wars, rebellions, cataclysms, economic disturbances, etc.

**Figure AII.3. A development path in a selected set of dimensions**

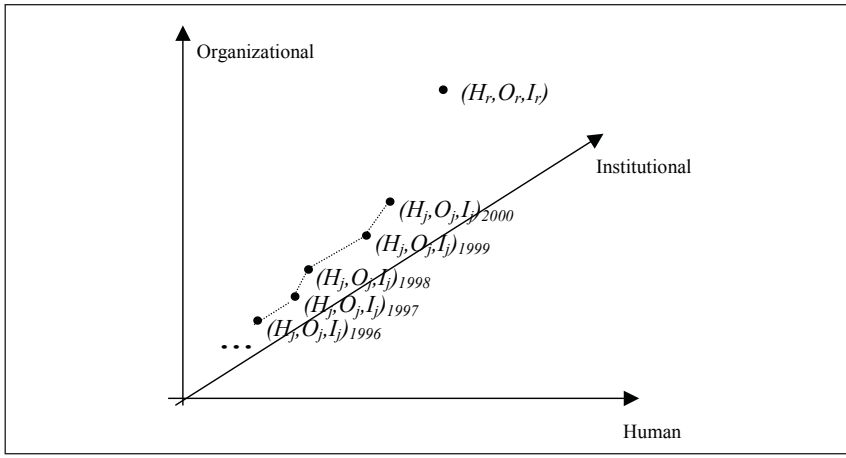



**Figure AII.4. A scheme of the evaluation of the effects of TC policy mix (or other socio-political or economic shocks) on overall national capacity development and the development of its basic components (a triple $(H_j, O_j, I_j)'_{2000}$ describes hypothetical national capacity level resulting from the analysis of the previous trend): an impact of the TC projects (implemented in 1999) on overall national capacity development can be estimated as the difference between the real national capacity gap (after the project implementation) and national capacity gap that would observed be if no projects was implemented, i.e. as the difference between distances $D'_{2000}$ and $D_{2000}$**

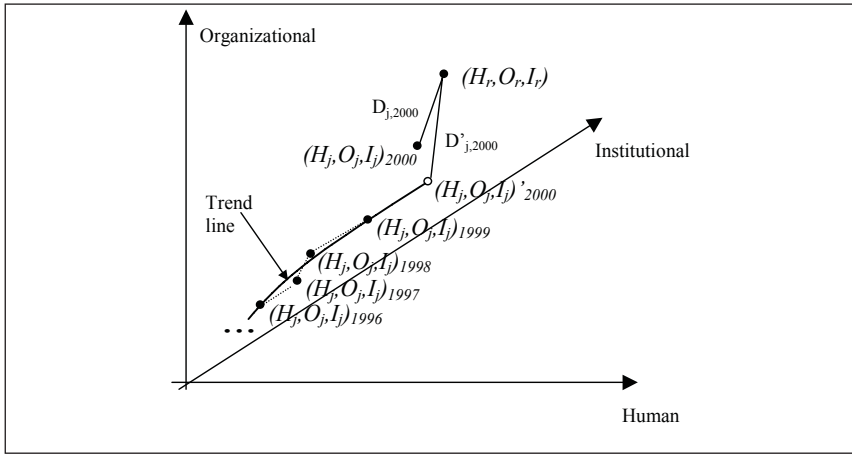
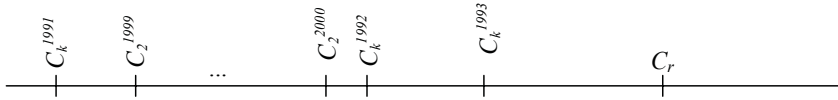


**Figure AII.5. Distribution of national capacities of the set of countries in all periods pulled together**




Note that in this distribution there are groups of countries having similar level of national capacity development in different periods of time. Detail analysis of such distributions can give a hint, which of development strategies (TC projects) proven to be successful in the past in some countries, can be implemented in the other countries with similar level of development, and vice versa (for example, it could follow from the figure like Figure AII.5, that since national capacities of country $C_k$ in 1992 and country $C_2$ in 2000 were very similar, development strategies (TC projects) proven to be successful for the development of national capacity in country $C_k$ in 1992 very likely will be also successful in country $C_2$ in 2000). This could help policy makers not to select similar development strategies (similar TC projects) in the countries with completely different levels of national capacity development.

Above we presented the basic idea of a formal analysis of the impact of TC projects of national capacity development processes. We believe that results which may be obtained from such a study can be used to support different argumentation lines presented in contemporary debates concerning the impact of technical cooperation on the process of sustainable development of Kyrgyz Republic.

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