MULTIDIMENSIONAL POVERTY ASSESSMENT FOR THE KYRGYZ REPUBLIC
2020

Multidimensional Poverty Assessment for the Kyrgyz Republic

2020

CONTENTS

LIST OF TABLES

LIST OF FIGURES

1. INTRODUCTION

Recognizing that poverty is inherently multidimensional does not necessary mean that a multidimensional measurement of it is required (Alkire & Foster, 2011). Alongside the minimum rights approach, the other main theoretical underpinning of monetary poverty assessments is that income or consumption can be used as a proxy for the ability to fulfil a set of basic needs. Thus, unidimensional (monetary) poverty approaches can and usually do use a multidimensional conceptualization of poverty and wellbeing (Haughton & Khander, 2009).

However, the idea that a greater command over resources make people better off implicitly calls for a variety of assumptions on market and prices, consumers' behaviour, and utility and preferences. As for market and prices, although theoretically and mathematically possible, non-market and public goods and services are not included in this type of assessments (Ruggeri Laderchi, Saith, & Stewart, 2003). This is particularly relevant for several key dimensions of wellbeing such as education, freedom, and safety which are inherently tied to the provision of public services and for rural, low-income settings where markets operate imperfectly or are do not exist. A second criticism to monetary poverty assessments regards the strong assumption needed in terms of individuals preferences and choices: even if people have the resources to purchase what is considered a minimum level of goods and services, there is no guarantee that they would allocate their resources to purchase it (Thorbecke, 2007). Finally, if the objective of the poverty assessment is to provide a comprehensive picture of how poverty is experienced in a country and what

specific areas of wellbeing are people deprived in, monetary assessments cannot tell much. Differently, a multidimensional approach to the measurement of poverty maintains the focus on several, different domains of wellbeing, thus allowing for a more in-depth mapping of the reality of poverty and its manifestations.

The aim of this report is to develop and propose a methodology for a multidimensional poverty assessment tailored to the Kyrgyz Republic context. Such a measure would then provide a 'tracking tool' to monitor the country's progress on core aspects of wellbeing. Even though a second, child-specific methodology will be presented in a subsequent report, the index here constructed still offers the possibility of analysing relevant patterns of deprivations for children, as well as for other population groups.

The rest of the report is structured as follows. Chapter 2 will briefly present the most relevant core issues of multidimensional indices highlighting their theoretical and practical implications. Then, Chapter 3 will provide an overview of selected international and national multidimensional indices, their similarities, and their differences. Chapter 4 will then present the proposed National Multidimensional Poverty Index for the Kyrgyz Republic providing both the justifications for the chosen wellbeing dimensions and the technical details of the all the indicators constructed. Chapter 5 will finally provide a multidimensional poverty assessment for the Kyrgyz Republic based on the N-MPI constructed while Chapter 6 will offer some concluding remarks.

2. CORE ISSUES OF MULTIDIMENSIONAL POVERTY INDICES

A variety of multidimensional poverty approaches exists (for a comparative review of them see, for example, Alkire et al. (2015)). Multidimensional poverty indices are the main example of counting approaches to multidimensional poverty which are a class of methods based on (i) a list of indicators with (ii) binary thresholds that are (iii) aggregated into a deprivation scores which is then (iv) evaluated based on a poverty cut-off. In this chapter, core issues of multidimensional poverty indices are briefly reviewed in their theoretical underpinnings and their practical relevance in order to inform and guide the development of a multidimensional poverty index for the Kyrgyz Republic. After reviewing the data requirements of this methodology, three theoretical issues are presented: 'Opportunity vs. outcomes', 'Consistency vs. specificity', 'Parsimony vs. accuracy'. Then, in 'Identification and Aggregation' relevant implications of these theoretical issues for the empirical application of the methodology are discussed alongside other interesting ones.

2.1. Data Requirements

Differently, from, for example, dashboard approaches or composite indices at the aggregated level such as the Human Development Index, counting approaches to multidimensional poverty identify the multidimensionally poor by "counting" the simultaneous deprivations occurring at the individual-level. In order to do so, they focus on the individual joint distribution of deprivation and thus require information for each indicator to be available at the individual or household level and to come from the same survey (Alkire & Foster, 2011).[1]

2.2. Opportunity vs. Outcomes

The first theoretical core issue here presented pertains the question of what the index should measure. The most comprehensive and used theoretical framework for multidimensional poverty is Sen's Capability Approach (see for example (Sen, 1993)) which is based on the concept of capabilities.

Since Sen's defines capabilities as the ability and freedom to choose and achieve valuable functionings, his approach is an opportunity-based theory. However, opportunities are incredibly hard to measure: not only are they not always observable, but their inherent potential nature raises doubts concerning their relevance in assessing deprivation and wellbeing. (Robeyns, 2003). Since the conversion of a set capabilities into achieved functionings depends on a variety of factors, should an individual with a large set of capabilities be considered well off even though he might have no way of translating it into higher standards of living?

2.3. Consistency vs. Specificity

The trade-off between consistency and specificity is not a specific feature of multidimensional poverty indices. Poverty lines, and monetary poverty assessments in general, are also subject to the same tension between an approach that is relevant – i.e. that is able to reflect the specificities of a population – and one that is comparable – i.e. that can be used to evaluate both inter- and intra-population differences (Asra & Santos-Francisco, 2003).

At the inter-population level, the trade-off between consistency and specificity translates into the choice between internationally standardized multidimensional poverty indices and nationally tailored ones. At the intra-population level, the trade-off translates instead into the choice between indices for the whole population- that can later be decomposed to highlighted patterns of horizontal inequalities- or, for example, a child-specific index or a women-specific one.

In both cases, the choice is far from being merely theoretical since it has profound practical implications in terms of chosen dimensions, indicators, deprivation thresholds, etc (Thorbecke, 2007).

2.4. Parsimony vs. Accuracy (and Internal Consistency)

The second essential trade-off that characterizes multidimensional poverty indices is that between parsimony and accuracy. Since this type of poverty assessments are theoretically and empirically

---

[1] It should be noted that if data from the same respondent can be linked from different sources, several input datasets can be used.

defined as multidimensional, the question of how many dimensions (and how many indicators within each dimension) to include is not a trivial one.

Two main arguments for constructing an index with the minimum number of indicator (parsimonious) that maximizes the domains or realms of poverty (accurate) exist. Firstly, even though a certain degree of internal consistency amongst indicators- especially within each dimension- is desirable, when two indicators are very strongly correlated dropping one of them minimizes the risk of overidentifying, and thus unfairly penalizing, the poor. Simply put, the second indicator does not add much to the index (low accuracy gain) and it is hence better to exclude it (more parsimonious choice).

The second argument is instead rooted in the reduction of a dashboard of indicators into a single composite index. Ravallion (2012) has highlighted how composite indices are subject to a variety of arbitrary decisions- first and foremost that of a weighting scheme- that shape the aggregation process of the original indicators into one summary measure. Since the theoretical frameworks on which these indices are based often require a large degree of simplification in order to be operationalized, the composite measure, in Ravallion's opinion, become unclear in what it measures and how it should be interpreted. It naturally follows that, the larger the set of indicators and dimensions used, the less clear the meaning of the composite index will be.

2.5. Identification & Aggregation

After having reviewed the three most important theoretical issues of multidimensional poverty indices, it should now be evident that the construction of the index itself is not a simple technical exercise. All three trade-offs presented above have implications in terms of how poverty is operationalized in a multidimensional poverty index.

The first basic question that guides the construction of the index is that of identification,

i.e. who are the poor. This requires a variety of decisions to be taken such as what dimensions

of wellbeing should be included, which indicators should be used to capture the deprivation in one dimension, and what constitute an acceptable level of functioning in one indicator.

The second basic questions that guides the construction of the index is that of aggregation, i.e. how should information on specific deprivations be aggregated first at the individual level and then across individuals to produce a composite index. In terms of aggregation, several key points should be mentioned. First, the issue of weights, and the implicit trade-off among indicators that they introduce. Second, the final poverty cut-off which ultimately identifies the multidimensionally poor once the indicator-level deprivations are aggregated or "counted". Third, whether the depth of poverty should play a role in the computation of the final measure, as the measure A – intensity – does in the case of the OPHI Global MPI). Four, if issues of horizontal inequalities or distribution should be incorporated as they are, respectively, in the World Bank Human Opportunity Index (Molinas, Paes de Barros, & Saavedra, 2010) or in other some distribution-sensitive aggregated measures [for example, (Datt, 2018), (Alkire & Foster, 2016)].

2.6. Decomposability

In addition to the theoretical and practical issues presented above, the importance of decomposability as a key property of multidimensional poverty indices deserve a mention. The property of decomposability is what allows the multidimensional poverty index to be broken down by population subgroup (e.g. age cohorts, sex, and regions) to uncover unequal patterns of poverty. Furthermore, multidimensional poverty indices[2] of the Alkire-Foster variety are also decomposable by dimension which allows the calculation of the contribution of each dimension to poverty and can potentially provide useful insight for policy making (Alkire & Foster, 2011).

---

[2] Note that for Alkire-Foster indices, only the aggregated multidimensional poverty index is decomposable, not the incidence or the intensity of poverty.

3. RELEVANT EXAMPLES

This chapter presents three examples of a multidimensional poverty index that can inform the construction of a National Multidimensional Poverty Index for the Kyrgyz Republic. The first two are international standardized indices that have been used to carry out multidimensional poverty assessments in a large number of countries allowing for transparent and consistent cross-country comparison. The third one is a context-specific index meant to capture the specificity of a country in terms of types, depth, and width of deprivation. The chapter begins with a brief review of each of them to then offer a side-by-side comparison.

3.1. OPHI Global MPI

The Global MPI developed and applied by the Oxford Poverty & Human Development Initiative (OPHI) was introduced in 2010 to replace the United Nations Development Program (UNDP) Human Poverty Index (HPI) which measured multiple deprivations in key areas of human development using aggregated data. Unlike the HPI, the OPHI Global MPI uses microdata which allows for the analysis of multiple deprivation at the individual level.

Table 1: OPHI Global MPI: Dimensions, indicators, weights

Dimension	Indicator	Deprived if…	Weight
EDUCATION	Years of Schooling	No household member aged 10 years or older has completed six years of schooling	1/6
	School Attendance	Any school-aged child is not attending school up to the age at which he/she would complete class 8	1/6
HEALTH	Child Mortality	Any child has died in the family in the five-year period preceding the survey	1/6
	Nutrition	Any person under 70 years of age for whom there is nutritional information is undernourished*	1/6
LIVING STANDARDS	Electricity	The household has no electricity	1/18
	Sanitation	The household's sanitation facility is not improved (according to SDG guidelines), or it is improved but shared with other households	1/18
	Drinking Water	The household does not have access to improved drinking water (according to SDG guidelines) or safe drinking water is at least a 30-minute walls from home, roundtrip	1/18
	Housing	The household has inadequate housing: the floor is of natural materials or the roof or wall are of rudimentary materials	1/18
	Cooking Fuel	The household cooks with dung, wood or charcoal	1/18
	Assets	The household does not own more than one of these assets: radio, TV, telephone, computer, animal cart, bicycle, motorbike or refrigerator, and does not own a car or truck	1/18

Source: Alkire, Kanagaratnam, and Suppa (Alkire, Kanagaratnam, & Suppa, 2018)

The OPHI Global MPI is based on three dimensions of wellbeing: health, education, and living standards with the first two dimensions composed of two indicators, and the third one of six (see Table 1 for a more detailed overview of the Global MPI structure). The OPHI Global MPI uses the Alkire-Foster methodology (Alkire, Kanagaratnam, & Suppa, 2018). This methodology

– presented in detail in the Technical Annex – identifies the multidimensionally poor by counting simultaneous deprivations and setting a final poverty cut-off at a certain percentage of weighted deprivation indicators. As shown in Table 1, the OPHI Global MPI applies equal weighting across dimensions and across indicators within each dimension which results in four indicators weighting 1/6 and six weighting 1/18. The poverty cut-off is then set at one third of the weighted indicators. Three main aggregated measures of multidimensional poverty are then produced (Alkire, Kanagaratnam, & Suppa, 2018):

- H – Incidence of poverty: the proportion of multidimensionally poor people in a population

- A – Intensity of poverty: the average proportion of indicators in which por people are deprived

- M – Multidimensional Poverty Index (MPI): computed multiplying H by A, it reflects

both the proportion of breadth and depth or multidimensional poverty

The Global MPI is the most widely used multidimensional poverty index. It is published annually in the UNDP's Human development Report and the OPHI produces yearly country briefings for more than 105 countries around the world.[3] However, not only does the OPHI Global MPI lack context-specificity, but since its primary focus is on the measurement of acute multidimensional deprivation, its relevance in certain countries can be quite little. In the case of the Kyrgyz Republic, as for all Central Asian countries, the Global MPI reports incredibly low deprivation measures. As shown in Table 2, only 2.3 percent of the Kyrgyz population was considered multidimensionally deprived in 2014. With an average intensity of deprivation of 36.3 percent, it results in a multidimensional poverty index of only 0.008 (Alkire, Kanagaratnam, & Suppa, 2018).

Table 2. Global MPI for selected countries in Eastern Europe and Central Asia

		Total Population		
		MPI (H*A)	H	A
	Survey - Year	0 to 1	Percentage of Population	Percentage of weighted deprivations
Armenia	DHS – 2015/16	0.001	0.2	36.2
Turkmenistan	MICS – 2015/16	0.001	0.4	36.1
Kazakhstan	MICS- 2015	0.002	0.5	35.6
Kyrgyzstan	MICS- 2014	0.008	2.3	36.3
Uzbekistan	MICS – 2006	0.016	4.4	37.3
Azerbaijan	DHS- 2006	0.019	4.9	38.4
Tajikistan	DHS	0.049	12.1	40.4

Source: Alkire, Kanagaratnam, and Suppa (2018).

3.2. World Bank Multidimensional Poverty Index

In 2018, the World Bank launched its first exercise on multidimensional poverty producing two indices. The first one is constructed over three dimensions of wellbeing (monetary poverty, education, and access to infrastructures) while the second adds two more dimensions (health & nutrition, and security). Table 3 below presents all the indicators used in the two indices.

[3] On the OPHI website, a section specifically dedicated to the Global MPI exist (https://ophi.org.uk/multidimensional-poverty-index/). There, a variety of resources can be freely accessed from methodological notes, data tables, and STATA do files to the latest Global MPI report, country briefings, and an interactive databank.

Table 3: Indicators of the World Bank multidimensional poverty indices

	Dimension	Indicator
BASIC VERSION	Monetary poverty	Daily consumption or income is less than US$ 1.90 per person
	Education	At least one school-age child up to the age of grade 8 is not enrolled in school
		No adult in the household (age of grade 9 or above) has completed primary education
	Access to basic infrastructure	The household lacks access to limited-standard drinking water
		The household lacks access to limited-standards sanitation
		The household has no access to electricity
EXTENDED VERSION	Security	The household has been subject to crime in the previous 12 months or lives in a community in which crime is prevalent
		The household has been affected by a natural disaster (including flooding, drought, earthquake) in the previous 12 months
	Health & Nutrition	Any woman age 15-49 with a live birth in the last 36 months did not deliver at a health facility
		Any child age 12-59 months did not receive DPT3 vaccination
		Any child 0-59 months is stunted (HAZ <-2)
		Any woman age 15-49 is undernourished (BMI < 18.5)

Source: World Bank (2018)

Both indices use the Alkire-Foster methodology to produce aggregated measures of multidimensional poverty and apply equal weighting across dimensions and across indicators within each dimension. However, in addition, the World Bank MPI produces also a distribution-sensitive deprivation measure called D based on the number of simultaneous deprivations experienced. Unlike the H, A, and MPI measures, this distribution-sensitive one is not linked to a specific poverty cut-off. Moreover, it penalizes compounding or simultaneous deprivations so that if, for example, two deprivations occur at the same time, their total weight is higher than the sum of the individual weights of the two deprivations. This measure is part of an alternative family of multidimensional poverty measures known as the distribution-sensitive multidimensional poverty measures proposed by Datt (2018) and is also a member of the M-gamma class of indicators presented in Alkire and Foster (2016). The distribution-sensitive measure used by the World Bank is defined as follows:

Where n is the number of individuals in the population; y_{ij} is the achievement of person i on the indicator j; z_j is the deprivation threshold of indicator j; and w_j is the weight assigned to indicator j; and I_j is the indicator-specific function that takes the value of 1 if $y_{ij} < z_j$ and 0 otherwise.

A major difference from the OPHI Global MPI is the inclusion of monetary poverty in the World Bank index. Particularly, the indicator and the deprivation threshold are the same as used for the global monetary poverty measure, which captures progress towards SDG 1. For the World Bank, the theoretical basis for including monetary poverty is the intent to capture how command of monetary resources provides, through the market, access to a range of goods and services that are important for an individual's wellbeing (WB, 2018). Moreover, it should be noted that given the structure of the World Bank MPI (three dimensions with equal weighting and only one indicator for the monetary poverty dimension), individuals that are deprived only in monetary terms are considered multidimensional poor.

$$D = \frac{1}{n}\sum_{i=1}^{n}\left[\sum_{j=1}^{d} w_j I_j(y_{ij} < z_j)\right]^2$$

3.3. Armenian National Multidimensional Poverty Index

Several countries have developed context-specific multidimensional measures to better account for their specificities in terms of deprivation. The Multidimensional Poverty Peer Network (www.mppn.org) reports that 17 countries have implemented national MPIs as official poverty measures: Mexico, Bhutan, Colombia, Vietnam, Chile, El Salvador, Costa Rica, Ecuador, Pakistan, Honduras, Mozambique, Armenia, Panama, Dominican Republic, Nepal, Nigeria, and Philippines. Given the importance of context, only the Armenian N-MPI will be presented in more detail.

Figure 1: Armenian N-MPI structure

BASIC NEEDS	HOUSING	EDUCATION	LABOUR MARKET	HEALTH
☐ Extreme Poverty	☐ Satisfaction with Housing Conditions	☐ No Secondary Schooling	☐ Labour Market Participation	☐ Termination of Usual Activity
☐ Life in Dignity	☐ Adequate Housing	☐ Schooling Enrolment Rate	☐ Long Term Unemployment	☐ Affordability of Health Services
☐ Humanitarian Aid	☐ Overcrowding	☐ Access to Education Services	☐ Decent Jobs	☐ Access to Health Services
☐ Remittance Dependences	☐ Healthy Heating	☐ Quality of Education Services	☐ Underemployment	☐ Quality of Health Services
	☐ Centralized Water System			
	☐ Centralized Sanitation and Garbage Disposal			
	☐ Hot Running Water			
	☐ Quality of Paid Public Services			
	☐ Access to Transportation			

The National MPI for Armenia was developed by the World Bank (WB) and the National Statistical Service of the Republic of Armenia (NSSRA) between 2013 and 2017 through consultations with national stakeholders to identify indicators that could reflect the experience of poverty and deprivation in the country (Martirosova, Inan, Meyer, & Sinha, 2017). Using data from the 2015 Integrated Living Conditions Survey (ILCD) and based on the Alkire-Foster methodology, the national MPI considers five equally weighted dimensions: basic needs, housing, education, labour market, and health. Apart from housing, which includes nine indicators, the other four dimensions have four indicators each. The five dimensions are weighted equally, but the weights of the indicators of each dimension are normatively determined taking into account considerations of subjective evaluation, affordability, access, and quality of goods and services. Figure 1 reports the complete list of dimensions and indicators. The final poverty cut-off is set at one fourth of the weighted indicators.

The adjustment of the dimensions, indicators, cut-offs and weights to the national context and the involvement of local stakeholders in that process strengthens the relevance and appropriateness of the dimensions and indicators and the overall measure. However, being composed of twenty-five indicators, the Armenian MPI falls short in terms of parsimony.

Table 4 presents a side-by-side comparison of the three indices in their most relevant features. Following the core issues presented in the previous chapter, it should first be noted that while the OPHI Global MPI and the World

Bank MPI(s) are standardized, internationally-comparable indices, the Armenian N-MPI is not. As already mentioned, both choices have strengths and weaknesses. Specifically, on the one hand, an international index could have little relevance in certain countries – as it happens to be in the Kyrgyz Republic- but it allows for transparent and consistent cross-country comparison. On the other hand, however, choosing dimensions and indicators based on their relevance in a specific setting (e.g. 'Remittances Dependence' in the case of Armenia) increases the accuracy and pertinence of the index while making it unfit for cross-country comparison.

It is then interesting to note that, in terms of dimensions of wellbeing chosen, the four indices share any similarities. They all include health, education, and some sort of living standards/housing/basic utilities and infrastructure. However, for what pertains the identification of the poor, one important difference exists between the OPHI approach and the World Bank one (and, to a certain extent, also to the approach taken by the Armenian N-MPI): the decision to include or exclude monetary poverty as a dimension of multidimensional

wellbeing. In the case of the World Bank Basic MPI, the difference is even more crucial since, as explained above, the structure of the index makes it so that individuals are considered multidimensionally poor when they are deprived solely in monetary terms.

Methodologically, all four indices use the Alkire-Foster approach to produce aggregated measures of multidimensional wellbeing. However, in addition to H, A, and MPI, the World Bank MPI(s) includes a distribution-sensitive measure (D) which is not based on a particular multidimensional poverty cut-off, but it is simply meant to capture the severity of widespread simultaneous deprivations. The weighting schemes applied are all normatively set: the two international examples apply equal weighting both across and within dimensions, while the N-MPI applies it only across dimensions and then assigning unequal weights to the indicators within each dimension. The final poverty cut-off is set at some percentage of the weighted indicators. The only small difference is that while the cut-offs specified in the OPHI Global MPI and the World Bank indices ideally represent the equivalent of one dimension of wellbeing, the one set in the Armenian N-MPI does not.

Table 4: Overview of selected MPIs

	OPHI Global MPI	World Bank MPI (3-dimension)	World Bank MPI (5-dimension)	Armenia MPI
Data used	DHS, MICS, combined DHS&MICS, national surveys, and PAPFAM*	World Bank 2017 'Global Monitoring Database' of harmonized household surveys	National Household surveys of six countries (Ecuador, Indonesia, Iraq, Mexico, Tanzania, Uganda)	2015ILCS
No. of Countries	105	119	6	1
No. of Dimensions	3	3	5	5
Dimensions	Education, Health, and Living Standards	Monetary Poverty, Education, Access to Basic Infrastructures	Monetary Poverty, Education, Access to Basic Infrastructures, Security, Health & Nutrition	Basic Needs, Housing, Education, Labour Market, Health
No. of Indicators	10	6	12	25
Method	Alkire-Foster (AF) Methodology	Alkire-Foster (AF) Methodology	Alkire-Foster (AF) Methodology	Alkire-Foster methodology
Weighting Scheme	Equal weighting across dimensions and equal weighting across indicators within each dimension	Equal weighting across dimensions and equal weighting across indicators within each dimension	Equal weighting across dimensions and equal weighting across indicators within each dimension	Dimensions are weighted equally while indicators within each dimension are not

Poverty Cut-off	One third of the weighted indicators (k= 33.3%)	One third of the weighted indicators (k= 33.3%)	One fifth of the weighted indicators (k=20%)	One fourth of the weighted indicators (k=25%)
Aggregated Measure Produced	• Incidence (H) • Intensity (A) • Multidimensional Poverty index between 0 and 1 (M)	• Incidence (H) • Intensity (A) • Multidimensional Poverty index between 0 and 1 (M) • Distribution-sensitive measure (D)	• Incidence (H) • Intensity (A) • Multidimensional Poverty index between 0 and 1 (M) • Distribution-sensitive measure (D)	• Incidence (H) • Intensity (A) • Multidimensional Poverty index between 0 and 1 (M)

* Demographic and Health Survey (51 countries), Multiple Cluster Indicator Survey (43 countries), combined DHS-MICS (2 countries), Pan-Arab Project for Family Health (3 countries), national surveys (6 countries)

Source for OPHI Global MPI: Alkire, Kanagaratnam, Suppa (2018)

Source for World Bank indices: World Bank (WB, 2018)

Source for Armenian N-MPI: (Martirosova, Inan, Meyer, & Sinha, 2017)

4. AN MPI FOR THE KYRGYZ REPUBLIC

After having reviewed the most important theoretical and practical issues of multidimensional poverty indices, this chapter introduces the proposed National Multidimensional Poverty Index for the Kyrgyz Republic. Before presenting an overview of the constructed index, available sources of data are presented and discussed below.

4.1. Available Data

As explained in chapter 2, poverty assessments that focus on the joint distribution of deprivations require information for each indicator to be available for each unit of analysis (Alkire S. , et al., 2015). Consequently, multidimensional poverty indices are based on household-level or individual-level microdata. In the case of the Kyrgyz republic, two main datasets that are comprehensive enough for the assessments of multidimensional wellbeing and poverty can be identified. Table 5 offers a side-by-side comparison of the two surveys across a variety of relevant characteristics.

Table 5: DHS and KIHS comparison

	Demographic and Health Survey (DHS)	Kyrgyz Integrated Household Survey (KIHS)
Latest round	2012 (DHS-VI)	2016
Frequency	-	annually
Producer(s)	NSC MoH	NSC
Panel Structure?	No	Rotating panel structure with a maximum of 25 percent of the households replaced at each wave
Sampling Technique	Clustered two-stage sampling process based on the 2009 Population and Housing Census	Stratified two-stage random sampling process based on the 2009 Population and housing Census
Sample size	8,216 households	Ca. 5,000 households
Representativeness	• National • Urban/rural areas • Oblast level (for some indicators)	• National • Urban/rural areas • Oblast level
Units of analysis	• Household • Individual • Children age 0-5 • Woman age 15-49 • Man age 15-59	• Household • Individual
Content	• Household Questionnaire • Woman's Questionnaire • Man's Questionnaire	• Household Questionnaire • Food Expenditure & Consumption • Employment and Unemployment • Non-Food Expenditure • Household Income and Expenditures • Personal property and Housing Conditions

Source for the DHS: "Kyrgyz Republic Demographic and Health Survey 2012" (NSC, MOH, ICF International, 2013)

Source for the KIHS: "The Kyrgyz Integrated Household Survey (KIHS): A Primer" (Esenaliev, Kroeger, & Steiner, 2011)

The Demographic and Health Survey (DHS) uses model survey instruments developed by the MEASURE DHS program (https://dhsprogram.com/) and then adapted for use in the Kyrgyz Republic to provide internationally comparable information on a variety of health-related topics. Following the first DHS conducted in 1997, a second – and so far, last – round was carried out in 2012 by the National Statistical Committee (NSC) and the Ministry and Health (MoH) of the Kyrgyz Republic with the funding of the Government of the Kyrgyz Republic (GovKGZ), the Unites States Agency for International Development (USAID), and the United Nations Population Fund (UNFPA) Kyrgyz Republic office. Through three separate questionnaires, the survey- alongside information on basic socio-demographic characteristics and dwelling unit's conditions – provides individual-level data on: health status and health care utilization; marriage and sexual activity; and knowledge and attitudes toward contraception, HIV/AIDS, and other sexually transmitted diseases. Moreover, the women's questionnaire includes in-depth information on pregnancy history (including antenatal care, delivery, postnatal care, and breastfeeding), childhood mortality, child health (including immunization, diarrhoea, and respiratory illnesses), reproductive health and fertility preferences, and domestic violence.

The Kyrgyz Integrated Household Survey (KIHS) was introduced in 2003 by the National Statistical Committee (NSC) of the Kyrgyz Republic with financial and technical support from the UK Department for International Development (DFID). Differently from the DHS which is modelled over internationally standardized survey questionnaires, the KIHS was designed for the specific purpose of accurately measure monetary poverty and socio-economic living conditions of the Kyrgyz population. The survey is an integrated survey and as such includes a labour force questionnaire conducted quarterly. Moreover, the survey collects information on: socio-demographic characteristics of household members (including migration patterns, education, health care utilization, and anthropometric measures), reproductive

and maternal health (for women between 15 and 49 years of age), personal property and housing conditions, and household income and expenditures. In addition, the KIHS contains a food consumption registry based on a 14-day diary of food consumption and expenditure collected quarterly.

The KIHS will be the main data source for the national multidimensional poverty index. Since the data is collected annually, the multidimensional assessment tool here presented provides the opportunity of having a 'tracking device' to monitor the progress achieved in the Kyrgyz Republic. Furthermore, since the KIHS is a national survey, it contains questions that are relevant in the specific context of the country and can thus help construct a measure that captures the specificity of deprivation in the Kyrgyz Republic.

4.2. Overview of the N-MPI

This section introduces the proposed National Multidimensional Poverty Index for the Kyrgyz Republic based on the 2016 KIHS. As mentioned above, the KIHS contains information at both the individual level – e.g. education, health care utilization, and labour force participation – and the household level – e.g. housing conditions, income, and food consumption. Ideally, information for each deprivation indicator should be available at the individual level. This would truly allow to identify multiply deprived individuals in the country. However, most deprivation information is only available at the household level or for certain population groups such as children or adults. Since the primary is ensuring that all households are included in the multidimensional assessment, the indicators here presented are mostly based on household-level data.

As shown in Figure 2, the proposed National Multidimensional Poverty Index for the Kyrgyz Republic covers five dimensions of wellbeing: monetary poverty, education, health, food security, and living conditions.

Figure 2: National multidimensional poverty index for the Kyrgyz Republic

MONETARY POVERTY

1. Living in Absolute Poverty

EDUCATION

1. Educational Attainment

FOOD SECURITY

1. Caloric Intake
2. Household Dietary Diversity

LIVING CONDITIONS

1. Availability of Hot Water
2. Overcrowding
3. Electric Supply Reliability
4. Drinking Water
5. Sanitation

HEALTH

1. Handwashing Practices
2. Indoor Air Pollution

These dimensions – and the respective deprivation indicators – where chosen following several guiding principles: well-established practice within multidimensional wellbeing indices, relevance for the context of the Kyrgyz Republic, relevance in the context of the Sustainable Development Goals (SDGs), and data availability.

Table 6 presents an overview of all the constructed indicators, including their definition and their respective deprivation headcounts, i.e. the percentage of individuals that are deprived in each individual indicator.

Table 6: Overview of dimensions and indicators of the N-MPI for the Kyrgyz Republic

DIMENSION	INDICATOR	DEFINITION	PERCENTAGE OF DEPRIVED INDIVIDUALS
MONETARY POVERTY	Living in Absolute Poverty	An individual is considered deprived if he/she lives in a household where annual deflated per capita consumption is below the absolute poverty line	25.6%
EDUCATION	Educational Attainment	An individual is considered deprived if he/she lives in a household where at least one individual is educationally deprived	42.7%

HEALTH	Handwashing Practices	An individual is considered if he/she lives in a household where there is no handwashing facility with both water and soap	7.5%
	Indoor Air Pollution	An individual is considered deprived if he/she lives in a household where the main cooking appliance is either primus (kerosene or oil stove), or oven/fireplace	27.8%
FOOD SECURITY	Caloric Intake	An individual is considered deprived if he/she lives in a household that consumed less than 2,100 kcal per capita per day	47.9%
	Household Dietary Diversity	An individual is considered deprived if he/she lives in a household that consumed less than 7 food groups out of 10	40.6%
LIVING CONDITIONS	Availability of Hot Water	An individual is considered deprived if he/she lives in a household where there is no operational hot water supply	90.1%
	Overcrowding	An individual is considered deprived if he/she lives in a household that has less than 18 square meters of living space per person	73.6%
	Electric Supply	An individual is considered deprived if he/she lives in a household that in the past year has been disconnected from the power network at least once a month	23.2%
	Drinking Water	An individual is considered deprived if he/she lives in a household that does not have access to an improved source of water on the premises	39.7%
	Sanitation	An individual is considered deprived if he/she lives in a household that is not connected to an operational sewage system	72.5%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

4.3. Justifications

This section presents the theoretical and practical justifications of the proposed dimensions, highlighting their importance as essential determining factors of people's wellbeing. For each dimension, a brief review of how its fits in the National Development Strategy (NDS) of the Kyrgyz Republic for 2018-2040 will be presented alongside – when relevant – other sources of legislation or public policy. Finally, pertinent empirical evidence on areas of progress and less progress for each wellbeing dimension will complete the picture.

4.3.1. Dimension 1: Monetary Poverty

The conceptualization of poverty or wellbeing as 'command over resources' is probably the longest-standing and most commonly used one. The idea that people are better off when they can afford to buy more goods and services thus providing for better living standards for themselves and their families is quite straightforward. In order to produce transparent and easy to understand poverty statistics, individuals' income or consumption is compared to a poverty line which is set at either an international or national level that ensures the ability to afford minimum standards of living (Haughton & Khander, 2009). Despite differences in how the welfare indicator is defined and calculated and how poverty lines are computed, assessments of monetary poverty rest on two main theoretical bases. First, that a certain level of income is necessary to ensure the enjoyment of minimum rights, and second, that monetary resources can proxy for other aspects of welfare and poverty given the assumptions of rational microeconomic spending behaviours and access and availability to a free market of goods and services (Ruggeri Laderchi, Saith, & Stewart, 2003).

Reducing monetary poverty stands at the heart of any poverty reduction strategy and is included in the 2030 Sustainable Development Agenda as the first goal: "End poverty in

all its forms everywhere" (UN, 2015). The National Development Strategy (NDS) of the Kyrgyz Republic for 2018-2040 mentions the issue of economic security as essential to the achievement of the country's development goals:

"Kyrgyzstan will become a comfortable country for people to live, a country of free and wealthy citizens, who have great opportunities and right to choose their own life [...]" (Draft NDS 2018-2040, August 2018, p. 6)

Throughout the document, several different areas of priority are of significance in terms of ensuring that the Kyrgyz people have access to adequate and decent living standards. For example, the Vision for the Strategic Goal of Human Development states:

"In 2040, every citizen of the Kyrgyz Republic has the potential enabling him to provide a decent standard of living for himself and his family" (Draft NDS 2018-2040, August 2018, p. 9)

Moreover, the importance of guaranteeing minimum standards of living is central to both the country social support system and its labour market. As for the former, the NDS sets forth guiding principles for the state social and economic policy that are aimed at providing

support for vulnerable people, thus ensuring equal opportunities for them to realize their potential. As for the latter, in the Vision for Human Potential and Labour Market, the NDS stresses the centrality of employment as a tool to fight poverty:

"[...] government will legislatively establish minimum social standards and guarantees that will provide citizens with a constitutional right to work, conditions and wages" (Draft NDS 2018-2040, August 2018, p. 24)

Since its independence after the dissolution of the Soviet Union, the Kyrgyz Republic went through two distinct phases of economic development. In the first decade, the transition to a market economy and a democratic governance marked a sharp decline in economic growth: the country GDP dropped of 50 percent between 1990 and 1995 while the number of poor people grew to eight times what it had been in 1987 – 4 million as compared to 0.4 (Babu & Reidhead, 2000). However, at the turn of the century, the situation changed: the Kyrgyz Republic started to see a positive trend. Since then, poverty rates- measured using international poverty lines- have decreased considerably (see Figure 3 for an example).

Figure 3: Poverty trends in the Kyrgyz Republic since 2000 for 1.90$/day (2011 PPP)
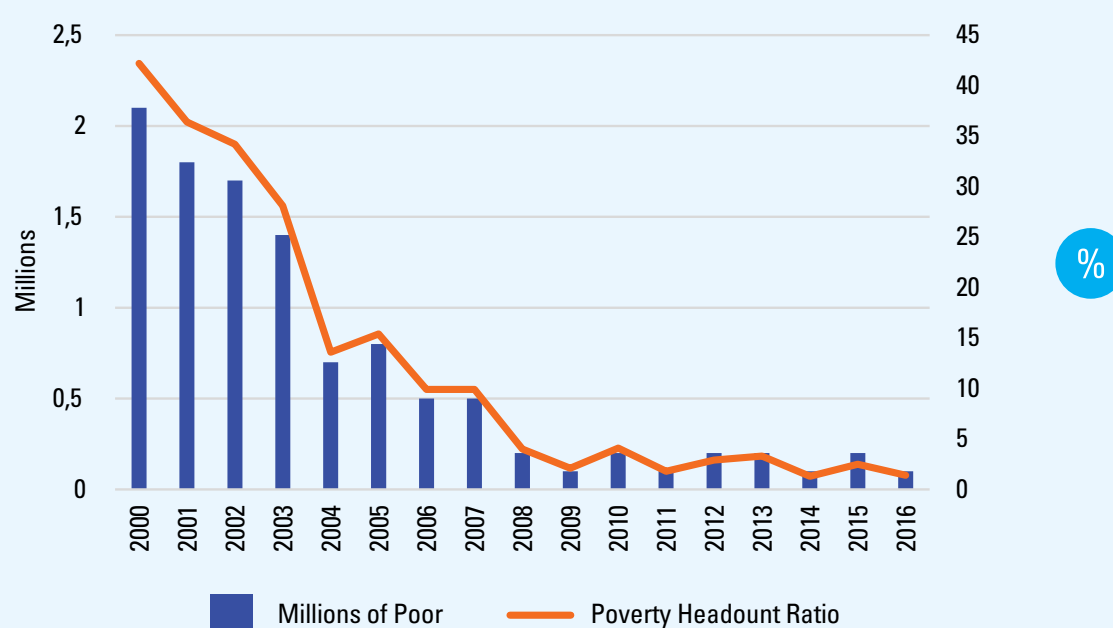
Source: Retrieved from Poverty and Equity Data Portal, World Bank

Nevertheless, when country-specific thresholds are applied, it is evident that poverty is still a reality for many Kyrgyz people. The latest National Statistical Office data reports that roughly one in four Kyrgyz people lives below the national poverty line with considerable patterns of inequality among regions: while roughly 15 percent of the population living in Bishkek city and in Osh oblast is considered poor, the rate surpasses 30 percent in Osh city, Chui oblast, Jalal-Abad oblast, and Batken oblast[4]. The comprehensive poverty profile conducted by the World Bank using KIHS data from 2003 to 2013 (WB, 2015a) identified young people, especially children, and large households as more strongly affected by monetary poverty. Similarly, a latent class analysis conducted by the OECD using the 2015 KIHS data (OECD, 2018) reported that almost half of the poor Kyrgyz people lives in large households with children headed by a young employed man with secondary schooling. Even though, these households are almost as likely to be located in urban areas as in rural ones, almost a quarter of them are in Bishkek city. However, most of the other half of the poor is predominantly located in rural areas and is composed of large households with children often headed by disability or old-age pensioners and widows.

4.3.2. Dimension 2: Education

The importance of education as a dimension of present and future wellbeing of individuals is acknowledged and emphasized under different theoretical frameworks. Following the human capital approach, education is conceptualized as of key instrumental value in augmenting individuals' employability, production possibilities, and economic productivity which in turn positively affect economic and social development at a macro-level. Differently, the human capability approach stresses the intrinsic value of education as an essential element of free and meaningful lives which facilitate and stimulate social and political participation, empowerment, and social cohesion (Unterhalter, 2009).

Given the importance of education as a driver of development both at the micro and macro level, the 2030 Agenda for Sustainable Development includes a specific goal – Goal 4, Quality Education: "Ensure inclusive and equitable education and promote lifelong learning

opportunities for all" (UN, 2015). The 2010 Constitution of the Kyrgyz Republic recognizes the "right to free basic general and secondary education in state educational establishments" as not subject to any limitation whatsoever in article 20.5 (Constitution of the Kyrgyz Republic, 2010). Moreover, education figures prominently in the National Development Strategy (NDS) of the Kyrgyz Republic for 2018-2040. Its multifaceted importance is reflected in the three-folded approach set forth by the NDS. A first mention of education is provided by the Vision for Quality System of Education and Science contained in the Social Development strategic area:

> "Every citizen has access to quality education aimed at fostering harmonious personality, revealing potential of each person, forming practical knowledge and competencies that allow him to change in the world, to be competitive and in demand" (Draft NDS 2018-2040, August 2018, p. 13)

Here, the emphasis is thus put on citizens' right to access an effective, modern, and comprehensive educational system. Secondly, the Vision for Kyrgyzstan as a Country of High Culture focuses on education as an essential element of the cultural development of the Kyrgyz Republic:

> "Education, culture and science […] contribute to the formation of a civic nation, translation of values and social experience based on the rich cultural heritage of the people of Kyrgyzstan" (Draft NDS 2018-2040, August 2018, p. 19)

Thirdly, the crucial instrumental role of education as a source of economic growth and prosperity is highlighted in the Vision for Human Potential and Labour Market which is part of the Economic Wellbeing strategic area:

> "Efforts of the state will be aimed at creating a flexible and modern system of citizens' education and at training qualified personnel who ensure development of the country […]. The development of a national education system, competitive in the international market of services, attractive for obtaining high-quality professional education should be a priority" (Draft NDS 2018-2040, August 2018, p. 23)

---

[4] Source: National Statistical Committee – Statistics on Living Standards, Table 5.04.00.25 "Poverty Rate" retrieved from http://stat.kg/en/statistics/uroven-zhizni-naseleniya/

Before presenting a brief review of the most relevant empirical evidence on education in the Kyrgyz Republic, an overview of the country educational system is presented. The educational system of the Kyrgyz Republic is structured in four stages: pre-school, primary education, secondary education, and tertiary education. There are nine years of compulsory education, from age 6 or 7 to age 14 or 15 which cover primary education (grade 1 to 4) and basic (lower) secondary education (grade 5 to 9). After completing basic secondary education, Kyrgyz pupils can either attend two more years of free education (grade 10 and 11) in order to complete upper secondary education and continue towards tertiary education or enrol in vocational education and training programs[5] (UNESCO, 2012).

Historically, the educational level of the Kyrgyz population has been positive and consistently improving. In terms of literacy, the country fares very well reporting youth, adult, and elderly rates all above 90 percent. Moreover, the differences between sexes are quite small thus proving a high degree of gender parity (see Table 7).

Table 7: Literacy Rates for the Kyrgyz Republic in 2009 – percentage of individuals

	TOTAL	MALE	FEMALE
Youth Literacy Rate (15-24)	99.75%	99.7%	99.8%
Adult Literacy Rate (15+)	99.24%	99.52%	98.98%
Elderly Literacy Rate (65+)	92.47%	95.72%	90.31%

Source: data retrieved from the UNESCO Institute of Statistics (UIS) at data.uis.unesco.org on 30th October 2018

A similar positive outlook emerges when looking at the improvement in mean years of schooling over the years (Figure 4). Not only did the average number of total years of schooling more than doubled in the last six decades, but it also reached and surpassed 10 years almost a decade ago.

Figure 4: Mean years of schooling for selected Central Asian countries
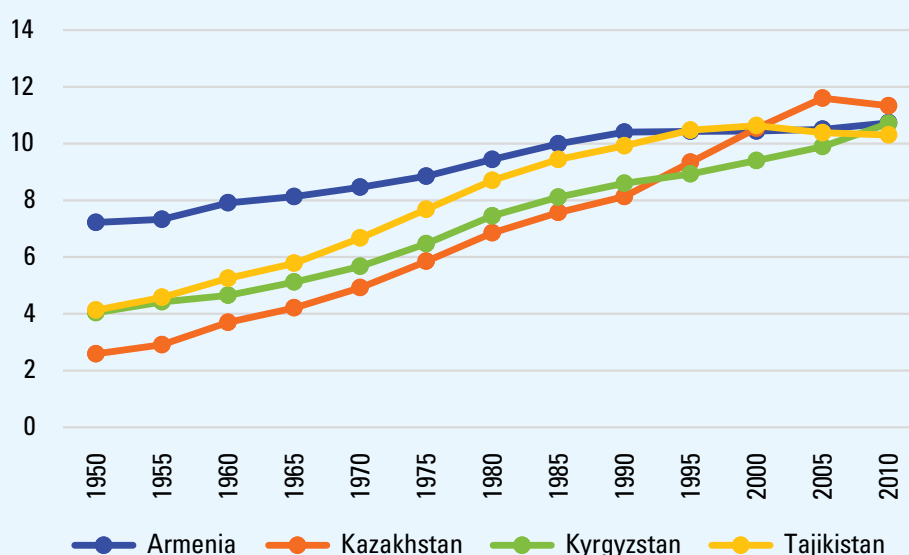
Source: Figure created by the author using the Barro-Lee dataset (v. 2.2 June2018) retrieved from www.barrolee.com on 30th October 2018

[5] Primary Vocational Education and Training (PVET) schools offer three streams: (i) 3-year programs that incorporate general education and vocational training and provides the requirement to continue towards tertiary education, (ii) 2-year vocational training programs that provide some general education alongside vocational education but not enough to access tertiary education, and (iii) 10-month courses that strictly cover vocational skills and are targeted at both youth and adults. Secondary Vocational Education and Training (SVET), instead, are considered post-secondary educational programs below the level of higher education and require an entry qualification of grade 11.

However, both measures can only offer a superficial look on the reality of Kyrgyz people educational status. Even though literacy is crucial in expanding people's choices and the ability to pursue them, it does not necessarily reflect adequate levels of education. Similarly, average years of schooling – as much as enrolment rates – can mask issues of attendance, quality, and disparities.

Firstly, despite nearly universal enrolment rates for compulsory education, problems of attendance still exist. Moreover, low attendance rates disproportionally concern boys from low income families that are often forced to work, children with disabilities and special educational needs, and children without basic registration documents (UNICEF, 2015). Secondly, enrolment rates are considerably lower for both pre-school and upper secondary education. Ajwad et al. (2014) found strong evidence that for the Kyrgyz population preschool attendance is significantly correlated to both cognitive skills later in life and higher probability of being employed. In recent years, early childhood development (ECD) has become a policy priority for the Kyrgyz Republic Government. The establishment of alternative pre-school models such as community-based kindergartens (CBKs) – together with an increased in government expenditure – resulted in an improvement in preschool attendance rates from 19 percent in 2006 to 22.7 percent in 2014 (UNICEF, 2015). Nevertheless, considerable inequalities in access between rural and urban children are still prevalent: in 2014, only 13.5 percent of children living in rural areas had access to preschool compared to 39.2 percent in urban areas (OECD, 2018). In terms of upper secondary enrolment, rates are also substantially lower (below 60 percent). Moreover, in the past five years they have showed a worrying pattern of inequality with boys and children from rural areas lagging behind (OECD, 2018). Lastly, despite high levels of government expenditure on education, learning outcomes are generally poor (Hou, 2011). The Kyrgyz Republic has ranked last in maths, science, and reading in both the 2006 and 2009 Program for International Student Assessment [(OECD, 2007), (OECD, 2010)]. The reasons behind the poor performance of Kyrgyz students are various: disparities in preschool preparation; shortage of teachers, textbooks, and adequate infrastructure; low salaries for teachers; and inadequate structure and content of school curricula (Hou, 2011).

4.3.3. Dimension 3: Health

Health is a domain of wellbeing the intrinsic value of which few would question. According to the Constitution of the World Health Organization: "the enjoyment of health is one of the fundamental rights of every human being" (WHO, 1946). Moreover, health is an important factor for people's opportunities in a variety of other domains of wellbeing, from education and employment to empowerment, security, and dignity. The human capital framework offers a well-established approach to health and its importance both at a micro- and macro-level. Specifically, it focuses on health as a crucial input to employment and, consequently, economic growth. Conversely, health has also been conceptualized as an output of socio-economic conditions, government resource allocation and priority setting, and public services. Differently, the human capability approach emphasises the importance of the process of generating health. As for other domains of wellbeing considered by Sen's approach, a variety of conversion factors occurring at the individual, social, and institutional level influences if and how people can enjoy health achievements: social dynamics, knowledge and information, income and command over resources, environment, work condition, public provision of goods and services, etc. (Proochista & Naveed, 2009).

As a dimension of wellbeing and development, health is enshrined in the 2030 Agenda for Sustainable Development Goal 3: "Ensure healthy lives and promote wellbeing for all at all ages" (UN, 2015). The National Development Strategy (NDS) of the Kyrgyz Republic for 2018-2040 recognizes the importance of health as an essential domain of individual and social development. The Vision for Healthcare that Meets the Needs of the Society states that:

> "In 2040, the healthcare system is accessible, quality, safe, using innovative approaches, oriented to human needs, and the population of the Kyrgyz republic has the most improved health indicators" (Draft NDS 2018-2040, August 2018, p. 11)

Furthermore, the NDS stresses the importance of, on the one hand, preventive medicine and effective & affordable healthcare services at the institutional level, and, on the other hand, the promotion of a healthy lifestyle, information, and responsible attitudes at the individual level. This

is especially clear in the passage that sets forth the long-term objective of health policy:

"Shift from fighting against diseases and their consequences to maintaining a healthy lifestyle" (Draft NDS 2018-2040, August 2018, p. 12)

The Kyrgyz health care system is based on a Mandatory Health Insurance Fund (MHIF) and a state-guaranteed benefits package (SGBP). Since the nineties, the three national health reforms adopted ("Manas" in 2001-2005, "Manas Taalimi" in 2006-2011, and "Den Sooluk" in 2012-2016) expanded and developed the SGBP putting the Kyrgyz health care system on a successful path towards universal health coverage. On top of primary health care and emergency care – which are provided free of charge to all citizens- the SGBP defines a basic package of publicly financed health services available to the entire population. Then, inpatient and specialized outpatient care are provided under referrals following a system of co-payments which vary across insurance levels and exemption statuses[6]. Even though insurance coverage is mandatory, consistent gaps remained in 2013 (Giuffrida, Jakab, Melitta, & Dale, 2013). Despite the considerable progress made in terms of access and utilization, several concerns on the health status of the Kyrgyz population remain. First, although full immunization rates have historically been quite high[7], they have seen a decrease in recent years coupled with raising inequalities between income levels, and urban and rural areas (OECD, 2018).

Secondly, despite the considerable progress made since 2000 in terms of infant and child mortality- which decreased to 17.1 and 20.1 respectively per 1,000 live births in 2017- communicable, maternal, nutritional diseases and common infectious ones (e.g. diarrhoea and lower respiratory diseases) remain the main causes of death among children below one (IMHE, 2018). A different issue that is intrinsically linked to child mortality is maternal mortality:

in the fifteen years from 2000 the number of women dying per 100,000 live births increased from 74 to 76 which placed the Kyrgyz Republic below every other country in Eastern Europe and Central Asia (WHO, UNICEF, UNFPA, WB, UN Population Division, 2015). Such a high mortality rate is the result of issues in both access and quality of healthcare services. Even though the Kyrgyz Republic reports very high rates of antenatal care and women that have access to skilled personnel at birth and/or deliver in a health facility (NSC, UNICEF, 2014), shortages of staff in public hospitals (especially in rural areas), low levels of awareness of health risks during pregnancy, and poor quality services are still prominent problems (OECD, 2018).

Thirdly, the Kyrgyz Republic suffers from a double burden from, on the one hand, infectious diseases such as tuberculosis and HIV/AIDS and, on the other hand, communicable diseases. Even though the leading cause of death for working age individuals are cardiovascular diseases, HIV/AIDS, tuberculosis, and diabetes are a health priority since between 1990 and 2005 they have recorded the largest positive percentage change in lost years of healthy life (DALYs)[8]. Moreover, while tuberculosis and diabetes started to show a positive pattern since 2005, HIV/AIDS did not (IHME, 2016).

4.3.4. Dimension 4: Food Security

The World Food Program (WFP) defines malnutrition as the

"state in which the physical function of an individuals is impaired to the point where he or she can no longer maintain adequate bodily performance process such as growth, pregnancy, lactation, physical work and resisting and recovering from diseases" (WFP, 2000, p. 15)

Malnutrition is usually operationalized into three main spaces: undernutrition, overnutrition, and micronutrient deficiency. The first two refer

---

[6] The exemption categories were expanded over the years. They are based on two types of targeting: targeting based on social categories which aims at reaching the economically vulnerable broadly defined (World War II Veterans, children under 5 years of age, pensioners 75 or above, disabled individuals, etc.) and targeting based on medical condition and diseases aimed at protecting and ensuring health care utilization (pregnant women, terminal stage cancer patients, those with type I and II diabetes, those with TB, AIDS, syphilis, etc.).

[7] Full immunization rates are defined as the percentage of children age 24-35 months who received all vaccinations recommended in the national immunization schedule: BCG (Bacillus Calmette-Guèrin vaccine against tuberculosis), polio, pentavalent – DPT (diphteria-tetanus-pertussis), Hepatitis B, and Hib (haemophilus influenzae type b), and measles.

[8] The data reports Disability-Adjusted Life Years (DALYs) which are computed as the sum of potential years of healthy life lost due to premature mortality and disability.

to, respectively, an insufficient or an excessive intake of macronutrients (i.e. fat, protein, and carbohydrates) which form the bulk of an individual's diet and supply his or her body with energy. The third space of malnutrition- micronutrient deficiency (MND)- occurs when the individual's diet does not provide the adequate intake of vitamins and minerals (WFP, 2012).

All three types of malnutrition have important implications for the physical, psychological, and mental wellbeing of an individual. Firstly, even a short period of undernutrition, especially if experienced during the early development of a child, can have long-lasting detrimental effects if the body adapts to the reduction in macronutrients by using its reserves of energy or by slowing down its physiological processes (CDC, WFP, 2005). Secondly, prolonged overweight and obesity can seriously affect the health of both children and adults by, for example, increasing the likelihood of cardiovascular diseases, diabetes, several common cancers, and metabolic disorders (WHO, 2018). Thirdly, MNDs, which have been called the hidden hunger because they can be prevalent even among those that are not visibly undernourished, pose an enormous challenge to children's physical and cognitive wellbeing with long-lasting effects on brain and immune system development and higher risks of infections and diseases (WFP, 2012).

The 2030 Agenda for Sustainable Development sets as Goal 2: "End hunger, achieve food security an improved nutrition, and promote sustainable agriculture" (UN, 2015). The targets subsequently set forth by the document highlighted different aspects of food security, from access to safe and sufficient food to combating malnutrition. Similarly, nutrition stands at the heart of the Kyrgyz health-related development strategy. In the Priority Directions for until 2023, it is explicitly stated that:

"We must remember about provision of food security and energy value of food for the population of the country as a foundation of national health" (Draft Priority Directions of Activity until 2023, 2018, p. 10)

The 2018-2040 National Development Strategy (NDS) stresses the importance of both physical and economic access to a diet based on minimum standards of food consumption (Draft NDS 2018-2040, August 2018). This comprehensive focus on nutrition is further proved by the provision contained in the Law on Food Security (Law No. 183, 2008) which defines food security as

"the state of the economy of the Kyrgyz Republic which ensures the food independence of the republic and guarantees the physical and economic availability of food for the population in accordance with the established minimum standards for food consumption."

Furthermore, the Food Security and Nutrition Program (FSNP) for 2015-2017 (2015) explicitly states that:

"Food security of the Kyrgyz republic is an integral component of the national and economic security of the country as a whole, since food security issues are closely related to the overall process of social and economic development of the country."

In linking food security to the country political course towards sustainable development, the FSNP sets four main targets for the Kyrgyz Republic: ensuring food availability; ensuring physical and economic access to food; ensuring quality, variety, and caloric intake; and ensuring control and supervision of food safety.[9]

Despite the considerable improvements made in the past decade, nutrition remains a key issue for the Kyrgyz Republic. Alongside problems of food availability, the main issue in that of economic access. Trends in food consumption- both in terms of energy and macro- and micro-nutrients – match closely those of poverty showing high degree of regional disparities (WFP, 2015). The National Statistical Committee of the Kyrgyz republic (NSC) reports that in 2016 an average low-income household spent 69 percent of its monthly budget on food (NSC, 2017a). This prevalence of low economic access results in low dietary diversity which often translates into micro- and macro-nutrient deficiencies among both children and adults (FAO, 2016). Table 8 reports the latest data for the Kyrgyz Republic for the WHO Global 2025 Targets and a selection

---

[9] A Food Security and Nutrition Program for 2018-2022 aligned with the Scaling Up Nutrition (SUN) Movement Strategy and Roadmap for 2016-2020 is currently under works (FAO, 2016).

of the WHO Non-Communicable Diseases (NCDs) Monitoring Framework indicators. As it can be seen, undernourishment among young children remains an issue. However, at the same time overnutrition, especially among adults, suggests that a bigger problem of adequate dietary diversity does indeed exist. The FAO, in its latest Food Security and Nutrition in Europe and Central Asia report noted that 27.1 percent of children and 37.8 percent of adults in Kyrgyzstan suffer from vitamin A deficiency which can cause permanent vision problems and weakened immune system. Moreover, 13.8 percent of Kyrgyz adults were found deficient in zinc which has been associated with increased risks of gastrointestinal infections. Since food insecurity is driven by poverty, and lower income is associated with lower dietary diversity and quality, it should not be a surprise that low income households suffer simultaneously from micronutrient deficiencies and obesity (FAO, 2017).

Table 8: WHO Global 2025 Targets

	Percentage of individuals
Low Birth Weight	6.3%
0-5 Months Exclusive Breastfeeding	41.1%
Under-5 Stunting	12.9%
Under-5 Wasting	2.8%
Under-5 Obesity	7%
Woman Anaemia (15-49 years old)	36.2%
Adult Blood Glucose (Diabetes)	11.1%
Adult Overweight	47.2%
Adult Obesity	14.4%

Source: Data retrieved from Country progress for the Kyrgyz Republic by the Scaling Up Nutrition (SUN) Movement

4.3.5. Dimension 5: Living Conditions

The domain of adequate living conditions is a quite broad one with ramifications on a variety of other dimensions of well-being from health to social inclusion and dignity. International human rights law recognizes the right to an adequate standard of living which alongside food, clothing, and social services, includes adequate housing (see for example Art 25.1 of the 1948 Universal Declaration of Human Rights and Art. 11.1 of the International Covenant of Economic, Social and Cultural Rights). According

to UN-HABITAT (2009), the right to adequate housing includes freedoms, entitlements, and provisions. Firstly, adequate housing means protection against forced evictions ad arbitrary destruction, the right to be free from arbitrary interference with one's home, and the right to choose one's place of residence. Secondly, adequate housing entitles individuals to secure tenure, equal and non-discriminatory access to housing, and participation in housing-related decision-making. Thirdly, adequate housing means more than four walls and a roof. For example, the availability and quality of services, facilities, and infrastructures such as potable water, sanitation, energy for heating and cooking, and lighting is an important factor in determining living conditions adequacy. Equally as important is the concept of habitability, operationalized as physical safety, structural durability adequate space, and protection against damp, cold, heat, and other threats to health. Issues of accessibility and location of the house are also relevant since housing cannot be considered adequate if it is cut-off from public services like transportation, healthcare, education, and other social facilities or if it is located in polluted or dangerous areas. According to UN-HABITAT (2005), the consequences of poor housing are multi-layered and manifest themselves both at the individual and the communal level. At the individual level, poor housing is a major factor in increasing risks in morbidity and mortality especially from infectious and parasitic diseases. Moreover, inadequate standards of living can have long-lasting detrimental effects on the cognitive and educational development of children. Even for adults, living in a shelter that is decrepit, overcrowded, or lacking basic services and utilities can impair employment opportunities, human dignity, self-respect, and mental and emotional health. At the communal level, inadequate housing conditions affect social, political, and economic stability. Not only is poor housing often strongly linked to poverty, but it has far-reaching effects on marginalization and social exclusion.

Given the broadness of living conditions as a domain of wellbeing and development, it is not surprising that a focus on it can be found in different SDGs. For start, Goal 11 ("Make cities and human settlements inclusive, safe, resilient and sustainable") encompasses a variety of important elements in terms of housing conditions. Moreover, Goal 6 ("Ensure availability

and sustainable management of water and sanitation for all") and Goal 7 ("Ensure access to affordable, reliable, sustainable and modern energy for all") touch upon some of the most essential elements of adequate housing such as drinking water, sanitation, power supply, and heating. The National Development Strategy (NDS) of the Kyrgyz Republic for 2018-2040 firstly touches on the right to adequate housing under the strategic area of Social Development where it includes among the objectives to develop and implement minimum social standards the provision to:

> "stimulate the construction of affordable social housing for vulnerable segments of the population" (Draft NDS 2018-2040, August 2018, p. 11)

The other three strategic objectives that concern adequate living standards are framed under the overall strategic area of Economic Wellbeing and Quality Environment for Development: development of regions of the country, quality infrastructure, and environment and adaptation to climate change. Specific areas of priority are identified as energy provision, irrigation networks, road and transport infrastructures, provision of clean water and sanitation systems for all settlements, and sustainable waste management.

Broadly speaking, three main issues can be identified concerning the Kyrgyz Republic housing sector: (i) an increasing number of "marginal housing rings" or novostroiki around major urban centres like Bishkek and Osh, (ii) an insufficient number of affordable housing, (iii) and a deteriorating housing stock with subpar or missing basic utility services and infrastructures (Struyk & Friedmann, 2006). Informal and semi-formal settlements in the Kyrgyz Republic, as well as in other countries of Central Asia, have emerged as a sizable phenomenon as a result of the radical shift following the dissolution of the Soviet Union. Moreover, mass rural-to-urban migration and natural population growth have put increasing pressure on urban centres (UNECE, 2016). The novostroiki around Bishkek and Osh are located on land previously used for agricultural purposes and, although some of the settlements

actually enjoy adequate standards of living, issues of overcrowding, unsafe or non-durable construction materials, and poor connection to basic utilities still exist (UN-HABITAT, 2015).

In the latest comprehensive Country Profile on the Housing Sector in the Kyrgyz Republic, UNECE (2010) highlighted the fact that, even though since 2000 a more strategic approach to housing has been developed, the implementation of the adopted long-term housing programs has not been effective enough which has left a large portion of the population still in need of adequate housing. In terms of affordable housing, the National Report of the Kyrgyz Republic on Housing and Sustainable Development of Cities (UN-HABITAT, 2015) presented at the UN World Conference on Human Settlements (HABITAT III) in 2016 highlighted how the situation has deteriorated as real estate prices have grown faster than average wages: at the end of 2013, in order to purchase an apartment of 54-square meters, it would have taken a Kyrgyz individual 8.3 years if he were to postpone all wages – for comparison the same indicator reported around 4.2 years for Russia and 3.1 for Kazakhstan. Moreover, according to official data from the National Statistical Committee of the Kyrgyz Republic, the adequacy of the housing stock provision, measured in terms of square meters per person, improved only marginally since 1990 when it was estimated around 12 square meters per person: in 2017 the national average was recorded around 13.2 square meters per person with a slight difference between urban settlements (14.2) and rural ones (12.6)[10].

In terms of utilities and basic services provision, the situation has surely improved in the past two decades. Nevertheless, issues of access to quality water, sanitation, and electricity still exist. In terms of water supply and sanitation services, a 2015 World Bank report mentioned how the lack of adequate equipment, funding, and human capital were major reasons for the lack of proper maintenance and the difficulty in improving the quality of these services (WB, 2015b). Moreover, even though official statistics report good national levels of coverage in terms of access to potable water[11], huge disparities

---

[10] Source: National Statistical Committee – Statistics on Housing Found, Table 5.05.01.06 "Total Living Space per 1 Person" retrieved from http://stat.kg/en/statistics/zhilishnyj-fond/
[11] According to the NSC, in 2017 91.1 percent of the Kyrgyz Republic had access to safe sources of drinking water. Source: National Statistical Committee – Statistics on Living Standards, Table 5.04.00.26 "Number of people with access to safe sources of drinking water"

among regions remains. For example, full coverage by a piped system exists only in Chui oblast and in Bishkek city – where, nevertheless, semi-informal settlements often do not enjoy the same standard – while less than 80 percent of the population in Batken and Osh oblasts have access to potable water. Another very important problem connected to the provision of drinking water is that of the hot water supply. According to the 2012 KIHS, only the population in Bishkek and Osh city was covered – at least to a certain extent – by piped hot water (WB, 2015b). In terms of adequate sanitation, the National Statistical Committee of the Kyrgyz Republic reports that in 2017 roughly one third of the Kyrgyz population had access to sewerage with, once again, disparities among oblasts[12]. On the one hand of the spectrum, Bishkek City and Chui oblast are well above the national average with rates, respectively, around 100 and 50 percent of the population covered. On the other hand, however, the population residing in Osh oblast is reported to have no access whatsoever to sustainable sewerage while only 6 percent of that residing in Talas oblast does. The main driver of such poor rates in urban areas is the worsening quality of sanitation systems. Differently, in rural areas, access to central sewage system is extremely low and household rely mainly on toilet with a cesspool (pit latrine) which have a variety of issues from difficulties and discomfort of use at night and during the winter to expensive upkeep and general poor hygienic conditions (Bakashova, Jorritsma, Choitonbaeva, & Wendland, 2013). Finally, in terms of electricity supply, although the Kyrgyz Republic enjoys virtually universal access to electricity at low prices, issues of supply reliability (i.e. frequent power outages) and quality (i.e. fluctuations in voltage, frequency or harmonics) still exist and are mainly cause by the poor and deteriorating conditions of energy sector assets (WB, 2017).

4.4. Proposed Indicators

After having presented the theoretical underpinnings and justifications for the five dimensions of the constructed N-MPI for the Kyrgyz Republic, this section presents a detailed overview of the indicators, including – when necessary- a brief review of their theoretical basis, the technical details of their operationalization for the 2016 KIHS, and some preliminary results in terms of deprivation rates for the total population and selected sub-population decompositions

4.4.1. Dimension 1: Monetary Poverty

As mentioned in the previous section when discussing the theoretical and practical justifications of monetary poverty as a relevant dimension of wellbeing, there are two main choices to be made when constructing an indicator: which welfare measure and which poverty line should be used.

LIVING IN ABSOLUTE POVERTY

Since one of the most important guiding principles and objectives of a N-MPI is the development of a 'tracking device' that can be used to monitor the country progress, the choices made in terms of welfare indicator and poverty line used are based on the standard practice for poverty assessments for the Kyrgyz Republic. Thus, the operationalization of this indicator is:

> *An individual is considered deprived if he/she lives in a household where annual deflated per capita consumption is below the absolute poverty line.*

Table 9 reports the monetary poverty rates for the total population and some selected groups. Roughly, one fourth of the Kyrgyz population lives below the threshold for absolute poverty, which was KGS 2,631 per capita per month in 2016. While the difference between women's poverty rate and men's poverty rate is quite small (only slightly above one percentage point), the risk of living in poverty differs considerably across age groups: while only 20 percent of adults and 20 percent of elderly live in absolute poverty, more than 30 percent of children below 18 does. Furthermore, large differences in headcount ratios can be found not only between rural and urban areas, but also across oblasts.

---

retrieved from http://stat.kg/en/statistics/uroven-zhizni-naseleniya/

[12] Source: National Statistical Committee – Statistics on Living Standards, Table 5.04.00.27 "Share of population with sustainable access to sewerage" retrieved from http://stat.kg/en/statistics/uroven-zhizni-naseleniya/

Table 9: Deprivation headcount for 'Living in Absolute Poverty' indicator

	HEADCOUNT RATIOS Percentage of Deprived Individuals	Population Share
Total Population	25.6%	100%
Urban	18.7%	35.4%
Rural	29.4%	64.6%
Men	26.0%	47.5%
Women	25.2%	52.5%
Children (below 18 years old)	31.7%	38.7%
Adults (18 to 64 years old)	21.9%	55.3%
Elderly (65 years old and above)	20.6%	6.0%
Issykul	25.2%	7.8%
Jalal-Abad	32.2%	19.0%
Naryn	38.1%	4.6%
Batken	37.3%	8.2%
Osh	22.5%	21.0%
Talas	18.0%	4.2%
Chui	30.6%	14.7%
Bishkek	9.8%	16.0%
Osh city	24.6%	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

4.4.2. Dimension 2: Education

There are two main perspectives on education: measuring learning outcomes or measuring access and utilization. Even though focusing on learning outcomes would surely be relevant in the case of the Kyrgyz Republic, when using survey data, the options are restricted to literacy and/or numeracy which are not areas of concern in the Kyrgyz Republic (EPDC, 2009a). Nevertheless, information on access to and utilization of education services can still provide a comprehensive and insightful picture. Household surveys usually provide three types of data on education- educational participation, educational attainment, and schooling efficiency (also called student flow ratios)[13] (EPDC, 2009b). In constructing indicators for a multidimensional poverty index, the first two types of data are of interest: (a) educational participation which is

defined as educational attendance of individuals in school age, and (b) educational attainment which is defined as the highest level of schooling attained by the adult population (UIS, 2004).

EDUCATIONAL ATTAINMENT

The indicator here presented uses an individual and age-specific methodological approach to define adequate levels of education for different age cohorts. Table 10 reports the age-specific definitions of what is considered educational deprivation. Using these definitions, each individual is categorised as either deprived or not in terms of adequate educational level. Once each individual is categorised as either deprived or not, the information is aggregated at the household level in order to construct the 'Educational Attainment' indicator.

Table 10: Age-specific definitions of educational deprivation

Age	
0-2	Never deprived
3-5	Not currently attending pre-school
6-7	Not currently attending pre-school or school
8-16	Not currently attending school at the adequate grade* or above
17 and older	Did not complete lower secondary education (grade 9)

A child in school age is considered attending an adequate grade if: at 8 years old he/she attends at least grade 1, at 9 years old he/she attends at least grade 2, at 10 years old he/she attends grade 3, …, at 16 years old he/she attends at least grade 9

Before looking at how the 'Educational Attainment' indicator is defined and constructed, it is interesting to first look at the results in terms of individual-level educational deprivation (Table 11).

Table 11: Individual-level educational deprivation

	Percentage of Deprived Individuals	Population Share
Toddler (0 to 2)	0%	6.4%
Children (3 to 5)	76.1%	7.6%
Children (6 and 7)	29.4%	4.9%
Youth (8 to 16)	2.5%	17.8%
Adults (17 to 64)	2.2%	57.3%
Elderly (65 and older)	32.8%	6.0%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

First, the results confirm the lack of coverage in terms of pre-school: consistently with the evidence presented in the previous section, roughly three quarters of children age 3 to 5 do not attend pre-school. Moreover, if for youth age 8 to 16, the deprivation ratio is very low (2.5 percent), the same is not true for children 6 and 7 years old: almost 30 percent of these children are currently not attending school or pre-school which suggests that many families decide to not enrol in school their child until he or she turns 8 years old. As for individuals 17 years old and above, a stark difference can be seen between those categorised as adults (64 years old and below) and those categorised as elderly (65 years old and above): while the deprivation ratio for the former is very low, that of the latter is higher than 30 percent.

When the information is aggregated at the household level, the 'Educational Attainment' indicator is then defined as:

Table 12 reports the indicator' headcount ratios for the total population and selected groups. As shown below, slightly more than 40 percent of the Kyrgyz population is deprived, i.e. lives in a household where at least one household member is educationally deprived. Looking at the subpopulation decompositions presented, it is interesting to note that there are more than 10 percentage points of difference between the percentage of deprived individuals living in urban areas and that of individuals living in rural ones. Moreover, differences across oblasts – although not as large in magnitude as they are for monetary poverty – still paint an interesting picture. Less than 30 percent of the individuals residing in Bishkek are educational deprived while in Osh, Batken, and Jalal-Abad oblasts the deprivation ratio is close to 50.

---

[13] They can also sometimes provide information on physical access, usually recorded as distance to school facility or presence of school facility in the neighbourhood, and financial access.

Table 12: Deprivation headcount for 'Educational Attainment' Indicator

	HEADCOUNT RATIOS Percentage of Deprived Individuals	Population Share
Total Population	42.7%	100%
Urban	35.2%	35.4%
Rural	46.9%	64.6%
Men	42.1%	47.5%
Women	43.2%	52.5%
Children (below 18 years old)	51.4%	38.7%
Adults (18 to 64 years old)	35.8%	55.3%
Elderly (65 years old and above)	50.4%	6.0%
Issykul	38.2%	7.8%
Jalal-Abad	46.8%	19.0%
Naryn	38.7%	4.6%
Batken	47.0%	8.2%
Osh	50.8%	21.0%
Talas	45.8%	4.2%
Chui	42.3%	14.7%
Bishkek	27.6%	16.0%
Osh city	44.2%	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

4.4.3. Dimension 3: Health

Measuring health care utilization and barriers to access using household survey data is often problematic given the structure and type of questions asked. The bulk of the health-related information of the KIHS is contained in the third section of the second questionnaire. The form asks about patterns of utilization and costs for those that needed medical assistance during the previous year. Consequently, assessing health care provision for the part of the population that did not need health services is not possible. The same is true for health-related expenditure, recorded in the sixth questionnaire, which makes it difficult to construct an indicator that could capture financial access to health care. Two potential indicators where explored at first. The first one recorded the percentage of individuals not covered by mandatory health insurance. However, according to the data only 1.63 percent of the Kyrgyz population is reported as not covered which makes this indicator not relevant. The second potential indicator explored was meant to proxy for health outcomes using respondents' health self-evaluations on a 5-point scale from 'very good' to 'very poor'. However, as reported in Table 13, the percentage of individuals that reports a health status below satisfactory is too low to make any indicator based on this variable relevant.

Table 13: Individual health status as reported by the household head

Health Status	Percentage of individuals
Very good	28.6%
Good	60.6%
Satisfactory	9.8%
Poor	1.1%
Very Poor	0.1%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

Given the impossibility of constructing indicators that could capture health access, utilization, or outcomes, two indicators that focus on healthy and hygienic practices are presented below.

HANDWASHING PRACTICES

Despite not being included in the MDGs, hygiene is referred to in the SDGs in target 6.2 alongside

sanitation (UN, 2015). The link between hygiene and public and private health is a well-established one. Freeman et al. (2014), in their systematic review of the empirical evidence on the health effects of handwashing, found that handwashing with soap promotion was associated with a 40 percent reduction in risk of diarrhoea. Additional evidence links inadequate hygienic practices to respiratory infections [see for example (Rabie, Tamer, & Curtis, 2006) and (Aiello, Coulborn, Perez, & Larson, 2008)], neonatal mortality (Blencowe, et al., 2011), and a variety of other infectious of parasitic diseases such as parasitic worm infections, skin infections and fungi, HIV-related infections, and pneumonia (Curtis, Schmidt, Luby, Florez, & Touré, 2011).

This indicator measuring poor handwashing hygienic practices is based on the WHO/UNICEF Joint Monitoring Program (JMP) (2017) ladder of measurement which is composed of:

1. 'Basic Hygiene' - availability of a handwashing facility on premises with soap and water;

2. 'Limited Hygiene' - availability of a handwashing facility on premises without soap and water;

3. 'No Facility' - no handwashing facility on premises

In the case of the KIHS, the seventh form contains a question asking the respondent to identify how and where household members usually wash their hands. As shown in Table 14, the question gives respondents six options for identifying household members handwashing practices.[14]

Table 14: Hand-washing facility

Handwashing facility	Percentage of Individuals
Water and cleaner	92.3%
Only water	6.2%
Only cleaner	1.1%
Neither	0.1%
No place for washing hands	0.1%
No permit was given to observe the place	0.1%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

Following the 'Basic Hygiene' step of the JMP ladder above, the deprivation threshold is then set as:

An individual is considered deprived if he/she lives in a household where there is no handwashing facility with both water and soap on the premises

Table 15 reports the headcount ratios for the 'Handwashing Practices' indicator for the total population and some selected groups. As shown, small differences in terms of magnitude exist between individuals living in rural areas and individuals living in urban ones, as well as between men and women, and – to a lesser extent – between age groups. However, considerable differences across oblasts do exist. In Jalal-Abad oblast, Batken oblast, and Osh city, the percentage of deprived individuals is close to 20 percent while in Issykul oblast, Naryn oblast, Talas oblast, and Bishkek it does not even reach 1 percent.

Table 15: Deprivation headcount for 'Handwashing Practices' indicator

	HEADCOUNT RATIOS Percentage of Deprived Individuals	Population Share
Total Population	7.5%	100%
Urban	7.6%	35.4%
Rural	7.5%	64.6%
Men	7.8%	47.5%
Women	7.3%	52.5%
Children (below 18 years old)	8.0%	38.7%
Adults (18 to 64 years old)	7.4%	55.3%
Elderly (65 years old and above)	5.9%	6.0%

14 Since the question contains the option 'no place for washing hands,' the other options are assumed to refer to handwashing facility on the premises

Issykul	0.5%	7.8%
Jalal-Abad	18.0%	19.0%
Naryn	0.6%	4.6%
Batken	13.9%	8.2%
Osh	7.1%	21.0%
Talas	0.4%	4.2%
Chui	3.0%	14.7%
Bishkek	0.4%	16.0%
Osh city	19.0%	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

INDOOR AIR POLLUTION

This indicator is based on a variable that records the main cooking device used. The rationale behind it is that the use of solid fuels such as wood, charcoal, coal, dung, or crop waste and of kerosene[15] on open fires or ovens that can produce high levels of indoor air pollution with a variety of health-adverse effects, from pneumonia, lung cancer and other respiratory diseases to impaired immune response, tuberculosis, and asthma [see for example (Belanger & Triche, 2008) and (Triche, et al., 2002)].

Table 16 reports the main cooing appliances used recorded in the 2016 KIHS. As shown, the percentage of individuals using a gas stove with either central of bottled gas supply, is not very high, around 22 percent. Another 30 percent of the population reports using mainly an oven or fireplace with the remaining half overwhelmingly reporting using an electric fryer.

Table 16: Main cooking appliance used

Main Cooking Appliance Used	Percentage of Individuals
Primus (kerosene or oil stove)	0.0%
Gas stove with central gas supply	19.4%
Gas stove with bottled gas	2.7%
Electric cooking appliance	1.6%
Electric fryer	48.6%
Oven, fireplace	27.7%
Microwave	0.0%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

The 'Indoor Air Pollution' indicator is then defined as:

An individual is considered deprived if he/she lives in household where the main cooking appliance used is either: Primus (kerosene or oil stove), or oven/fireplace

Table 17 reports the deprivation ratios for the total population and selected groups. Once again, in terms of differences in magnitude, it is the rural/urban decomposition that shows the largest difference: roughly 30 percentage points. Differences across oblasts are also considerable:

15 Although some sources suggest that pressurized kerosene stoves such as Primus can be considered a step up on the energy ladder compared to solid fuels, several studies have pointed out that kerosene's combustion can produce particles with adverse health effects and is at risk of fires and explosion [see for example (Lam, Smith, Gauthier, & Bates, 2011) and (Peck, Kruger, van der Merwe, Godakum-bura, & Ahuja, 2008)]. Moreover, the WHO discourages its use although it acknowledges that further research is needed (WHO, 2014).

deprivation ratios surpass 50 percent in both Jalal-Abad and Osh oblast, reaching 76 percent in Batken oblast, while in all other oblasts the ratios are between 0 and 3 percent. As for the two cities, Bishkek and Osh city, the former reports a deprivation ratio of 0.0 percent while the latter reports a deprivation ratio of 6.5 percent.

Table 17: Deprivation headcount for 'Indoor Air Pollution' indicator

	HEADCOUNT RATIOS Percentage of Deprived Individuals	Population Share
Total Population	27.8%	100%
Urban	8.1%	35.4%
Rural	38.4%	64.6%
Men	28.5%	47.5%
Women	27.1%	52.5%
Children (below 18 years old)	30.0%	38.7%
Adults (18 to 64 years old)	26.4%	55.3%
Elderly (65 years old and above)	26.2%	6.0%
Issykul	0.8%	7.8%
Jalal-Abad	51.1%	19.0%
Naryn	1.2%	4.6%
Batken	76.3%	8.2%
Osh	51.6%	21.0%
Talas	2.6%	4.2%
Chui	2.6%	14.7%
Bishkek	0.0%	16.0%
Osh city	6.5%	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

4.4.4. Dimension 4: Food Security

In order to capture both the quantity and the quality of food consumption in the Kyrgyz Republic, two indicators are constructed. The first one focuses on the caloric intake of the food consumed while the second focuses on dietary diversity. In both cases, the data used for calculations comes from the third form of the KIHS which records household food consumption over a period of fourteen days with one to four recordings per household over a year. In order to exclude potential biases caused by seasonality effects, data on food consumption per household was averaged across the four quarters (a more detailed explanation of this process is explained below).

CALORIC INTAKE

Before explaining how this indicator is defined and showing the resulting headcount ratios of deprivation, the technical details of its calculations are presented. Since in the KIHS household food consumption information is available for each quarter of the year, all four quarters are combined.[16] After having excluded tobacco and food for animal, food products recorded in litres are converted in kilogram units using the conversion factors provided by the National Statistical Committee (NSC) of the Kyrgyz Republic:

$$A_{fp_i}(kg) = A_{fp_i}(lt) * CV_{LtK_{fp_i}}$$

where A_{fp_i} is the Amount (A) of food product i consumed by one household; and $CV_{LtK_{fp_i}}$ is the conversion factor for the food product i. Then, food products amounts were converted into caloric intake using macronutrient information provided by the NSC:

$$CI_{fp_i} = A_{fp_i}(kg) * Kcal_{fd_i}$$

where CI_{fp_i} is the Caloric Intake (CI) of food product i consumed by one household; and $Kcal_{fd_i}$

is the kcal contained in 1 kilogram of food product i. Then, the per capita daily caloric intake for each product were calculated:

$$CI_{fp_i}^{dpc} = \frac{CI_{fp_i}}{56 * HHsize}$$

where $CI_{fp_i}^{dpc}$ is the daily per capita Caloric Intake (CI) of food product i consumed. Finally, the food products' daily per capita caloric intakes are summed up to compute the final daily per capita caloric intake:

$$CI = \sum_{i=1}^{N} CI_{fp_i}^{dpc}$$

As shown in Figure 5, the differences across the four quarters do not appear to be especially large.

Figure 5: Quarter-specific daily per capita caloric intake distribution
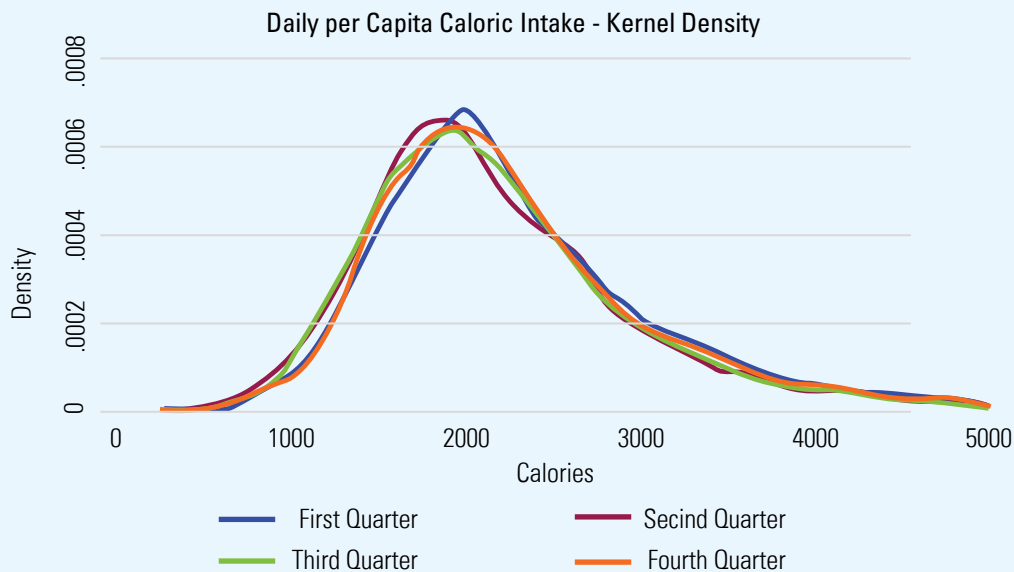
Source: Authors' Calculations using 2016 Kyrgyz Integrated Household Survey

Note: this graph does not show the right tail of the distribution, i.e. daily per capita caloric intake above 5,000

The 'Caloric Intake' indicator is computed by taking the annual daily average, and it is defined as:

Table 18 reports the headcount deprivation ratios for the total population and selected groups. Slightly less than half of the population of the Kyrgyz Republic consumes less than the recommended minimum caloric intake.

Interestingly, urban/rural differences exist. Food security seems to be slightly higher in rural areas. In urban areas, 53 percent of the population has insufficient calorie intake. As for the other decompositions, children are more likely to be living in a food deprived household compared to adults and elderly.

Table 18: Deprivation headcount for 'Caloric Intake' indicator

	HEADCOUNT RATIOS Percentage of Deprived Individuals	Population Share
Total Population	47.9%	100%
Urban	52.6%	35.4%
Rural	45.4%	64.6%
Men	47.8%	47.5%
Women	48.0%	52.5%

[16] In every quarter, households keep a food consumption diary during 14 days.

Children (below 18 years old)	54.5%	38.7%
Adults (18 to 64 years old)	43.9%	55.3%
Elderly (65 years old and above)	43.2%	6.0%
Issykul	50.4%	7.8%
Jalal-Abad	51.4%	19.0%
Naryn	58.8%	4.6%
Batken	57.1%	8.2%
Osh	37.5%	21.0%
Talas	25.2%	4.2%
Chui	45.3%	14.7%
Bishkek	52.4%	16.0%
Osh city	62.6%	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

HOUSEHOLD DIETARY DIVERSITY

In order to capture the issue of low dietary diversity and quality, a Household Dietary Diversity Score (HDDS) was constructed. Even though a simple measure of dietary diversity cannot capture specific deficiencies, a more diversified diet has been linked to a number of improved outcomes such as birth weight, child anthropometric status and caloric and protein adequacy (Ruel, Harris, & Cunningham, 2013). The HDDS is based on the methodology proposed by the Food and Nutrition Technical Assistant (FANTA) Project of the USAID (Swindale & Bilinsky, 2006) as a proxy tool to measure household dietary diversity. The score is based on the count of 12 food groups illustrated in Table 19.

Table 19: 12 Food groups for Household Dietary Diversity Score methodology

FOOD GROUPS
Cereals
White tubers and roots
Vegetables
Fruits
Meat, poultry, offal
Eggs
Fish and seafood
Pulses, legumes, nuts, and seeds
Milk and dairy products
Oils and fats
Sweets
Other (spices, beverages, condiments, etc.)

However, in applying the HDDS methodology to the case of the Kyrgyz Republic, only the first 10 food groups were kept. Food products were categorised into the 10 food groups using the food categorisation provided by the National Statistical Committee (NSC) of the Kyrgyz Republic as a basis adjusted to match the HDDS original methodology.[17]

Explaining how this indicator is defined and showing the resulting headcount ratios of deprivation, the technical details of its calculations are presented. Since in the KIHS household food consumption information is ideally available for each quarter of the year, quarter-specific HDDS were first computed. In order to do so, after having excluded tobacco and food for animal, food products recorded in litres were converted in kilogram units using the conversion factors provided by the National Statistical Committee (NSC) of the Kyrgyz Republic:

$$A_{fp_i}(kg) = A_{fp_i}(lt) * CV_{LtK_{fp_i}}$$

where A_{fp_i} is the Amount (A) of food product i consumed by one household; and $CV_{LtK_{fp_i}}$ is the conversion factor for the food product i. Then, food products amounts were converted into primary products' amounts using the conversion factors provided by the NSC:

$$A_{fpp_i}(kg) = A_{fp_i}(kg) * CV_{to\,PP_{fp_i}}$$

where A_{fpp_i} is the Amount (A) of primary food product i consumed by one household; and $CV_{to\,PP_{fp_i}}$ is the conversion factor for the food product i. Then, per capita daily amounts were calculated for each food product:

$$A_{fpp_i}^{dpc}(kg) = \frac{A_{fpp_i}(kg)}{14 * HHsize}$$

[17] When a food product categorisation was not immediately clear, the FAO guidelines were followed (2012).

where $A^{dpc}_{fpp_i}(kg)$ is the daily per capita Amount (A) of primary food product i consumed. Each household when then assigned a binary food product score: 1 if the food product was consumed in a quantity of at least 15 grams per capita per day, 0 otherwise[18]:

$$\begin{cases} A^{dpc}_{fpp_i}(kg) < 0.015gr \; then \; S_{fpp_i} = 0 \\ A^{dpc}_{fpp_i}(kg) \geq 0.015gr \; then \; S_{fpp_i} = 1 \end{cases}$$

where S_{fpp_i} is the binary Score (S) for primary food product i. Then, each household was assigned a binary food group score: 1 if the sum of the food product scores for that food group is at least 1, 0 otherwise:

$$S_{fg_j} = \sum_{i=1}^{n} S_{fpp_i} \rightarrow \begin{cases} S_{fg_j} = 0 \; then \; S_{fg_j} = 0 \\ S_{fg_j} \geq 1 \; then \; S_{fg_j} = 1 \end{cases}$$

where S_{fg_j} is the binary Score (S) for the food group j. Finally, the Household Dietary Diversity Score (HDDS) was computed as the sum of the binary food group scores.

$$HDDS = \sum_{j=1}^{10} S_{fg_j}$$

Figure 6 shows the difference in number of food groups consumed across the four quarters, i.e. the HDDS. It does seem that in the third quarter – which covers July, August, and September – households reported a more diversified diet.

Figure 6: Quarter-specific HDDS distribution
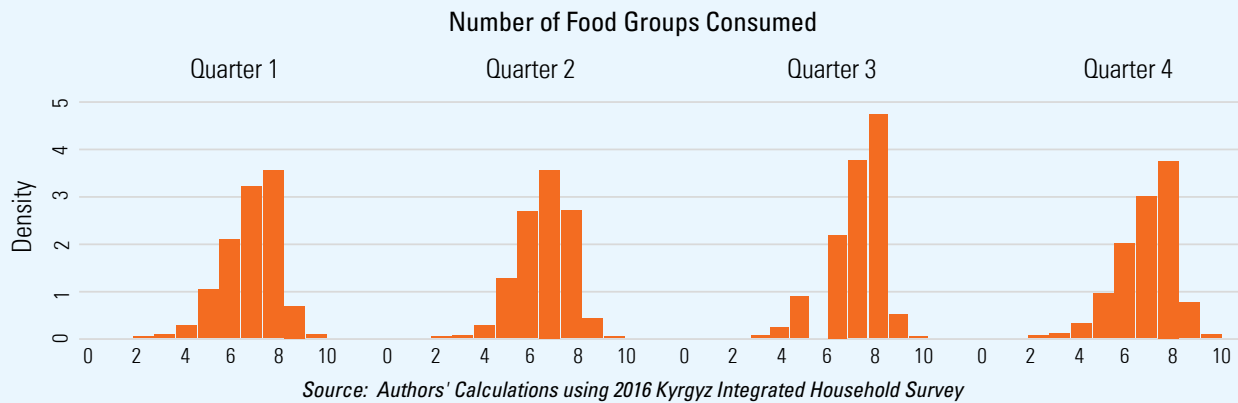
Source: Authors' Calculations using 2016 Kyrgyz Integrated Household Survey

Note: this graph does not show the right tail of the distribution, i.e. daily per capita caloric intake above 5,000

The 'Household Dietary Diversity' indicator is then computed by averaging the four quarter-specific variables. In terms of setting a threshold to identify adequate and inadequate dietary diversity, the FAO (FAO, 2018) acknowledges how no established cut-off point can be found in the literature.[18] FANTA's initial recommendation was to use the HDDS of the highest-scoring or the richest tercile (Swindale & Bilinsky, 2006). Since introducing a purely relative cut-off point would not provide any insight in the context of a multidimensional poverty index, the threshold is set taking into account the average HDDS of the richest tercile which is identified using annual deflated per capita consumption. Figure 7 shows the decomposition by tercile of the HDDS. The bottom tercile distribution – in blue in the graph – is flatter and more on the left, suggesting that poorer households have less diversified diets. As for the middle and the top terciles, the difference between them appears to be smaller, albeit still existing.

---

[18] Moreover, the few thresholds set normatively always refer to HDDS calculated using qualitative 24-hour recall interview. Thus, the number of food items usually consumed is much lower than that computed using 14-day consumption dairy, as it is in the case of the KIHS.

[19] The 15 grams a day per person threshold was modelled following the advice of the FAO (2018).

Figure 7: HDDS distribution decomposed by tercile

Number of Food Groups Consumed Decomposed by Tercile

—— Bottim Tercile   —— Middle Tercile   —— Top Tercile
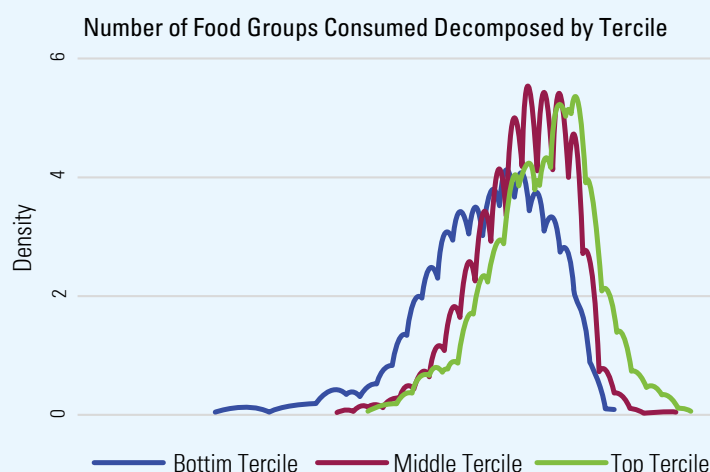
Source: Authors' Calculations using 2016 Kyrgyz Integrated Household Survey

Since it was preferred to set the deprivation threshold at a whole number, and since the average number of food groups consumed by the top tercile is 7.33, the 'Household Dietary Diversity' indicator is defined as:

Table 20 reports the deprivation ratios for the overall population and selected groups. The percentage of deprived individuals is not too different from that of the other Food Security indicator, roughly 40 percent. However, if in terms of caloric intake individuals residing in urban areas were more food insecure, in terms of dietary diversity the opposite is true. As for the other demographic decompositions, differences in terms of magnitude are quite small both between sexes and across age groups. As for the seven oblasts, deprivation ratios range from slightly above 20 percent (Jalal-Abad oblast) to almost 70 percent (Naryn oblast). Interestingly, if only less than 15 percent of Osh city residents is deprived, half of Bishkek residents is.

Table 20: Deprivation headcount for 'Household Dietary Diversity' indicator

	HEADCOUNT RATIOS Percentage of Deprived Individuals	Population Share
Total Population	40.6%	100%
Urban	39.6%	35.4%
Rural	41.1%	64.6%
Men	40.6%	47.5%
Women	40.6%	52.5%
Children (below 18 years old)	41.7%	38.7%
Adults (18 to 64 years old)	39.9%	55.3%
Elderly (65 years old and above)	39.7%	6.0%
Issykul	43.3%	7.8%
Jalal-Abad	23.0%	19.0%
Naryn	67.8%	4.6%
Batken	37.3%	8.2%
Osh	40.4%	21.0%
Talas	45.9%	4.2%
Chui	52.2%	14.7%
Bishkek	50.1%	16.0%
Osh city	13.7%	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

4.4.5. Dimension 5: Living Conditions

In order to capture such a multifaceted dimension of wellbeing as Living Conditions is, five indicators are constructed. Four of them – 'Availability of Hot Water', 'Electric Supply', 'Drinking Water', and 'Sanitation' – refer to basic essential utilities and/or services while the fifth – 'Overcrowding' – is a broader measure of living standards.

AVAILABILITY OF HOT WATER

A very important amenity, especially in the context of a country with long and cold winters as the Kyrgyz Republic, is the availability of hot water. The World Bank report on access to water and sanitation in the Kyrgyz Republic (2015b) highlighted how low availability of piped hot water was a main factor in explaining why low-income and rural families had to rely mainly on public bath or shower room for everyday hygienic practices. The indicator constructed is defined as:

An individual is considered deprived if he/she lives in a household where there is no operational hot water supply

Table 21 reports the deprivation ratios for the overall population and selected groups. The national deprivation ratio is very high, around 90 percent, and although differences across demographic subgroups are not considerable in terms of magnitude, significant patterns of inequality can be found across places of residence. First of all, there are more than 20 percentage points of difference between the deprivation headcount of urban residents and that of rural ones which suggests that living in rural areas in an important factor in determining lack of access to piped hot water. Moreover, all the oblasts, expect for Chui and Bishkek, report deprivation headcounts close to 100. As for Chui and Bishkek, the deprivation ratio for the former is still very high (around 84 percent) while that of the latter is only slightly above 50 percent.

Table 21: Deprivation headcount for 'Availability of Hot Water' indicator

	HEADCOUNT RATIOS Percentage of Deprived Individuals	Population Share
Total Population	90.1%	100%
Urban	76.7%	35.4%
Rural	97.4%	64.6%
Men	91.2%	47.5%
Women	89.1%	52.5%
Children (below 18 years old)	91.8%	38.7%
Adults (18 to 64 years old)	89.4%	55.3%
Elderly (65 years old and above)	85.9%	6.0%
Issykul	99.1%	7.8%
Jalal-Abad	99.6%	19.0%
Naryn	99.1%	4.6%
Batken	98.8%	8.2%
Osh	100%	21.0%
Talas	99.6%	4.2%
Chui	84.0%	14.7%
Bishkek	54.4%	16.0%
Osh city	99.3%	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

OVERCROWDING

One of the main reasons for including this indicator is that overcrowding is often used as a proxy measure for slum dwellings, informal or semi-informal settlements, and other inadequate housing conditions. For example, the first proposed indicator for SDG target 11.1 "Adequate, safe, and affordable housing and basic service" measures the proportion of urban population living in slums, informal settlements, or inadequate housing by checking whether households are deprived in durable housing, sufficient living space, access to safe water and sanitation, and security of tenure (UN-HABITAT, 2016). Moreover, reduced space is also associated with certain types of physical health risks since it facilitates the spread of infectious diseases- such as tuberculosis, hepatitis, and pneumonia- and other respiratory conditions [see for example (ODPM, 2004) and (Gray, 2001)].

Several approaches to the measurement of overcrowding can be found in the literature. The most common one is based on the calculation of an occupancy rate defined as the number of household members per room (or bedroom). However, deprivation thresholds vary considerably. For example, UN-HABITAT has operationalized overcrowding as more than 3 person-per-room (ppr) (2004) or as more than 2 ppr (2003) while several countries have their own ppr or person-per-bedroom (ppb) thresholds[20]. The EUROSTAT uses a different approach which was recently used to construct an overcrowding indicator for the Armenian National MPI (Martirosova, Inan, Meyer, & Sinha, 2017). EUROSTAT uses the concept of 'household adult equivalent' (hae) which computes the number of required rooms per family[21]. A third approach to the measurement of overcrowding is based on the concept of Floor-Area-per-Person which was used as one of the 10 key housing indicators approved by the Commission on Human Settlements (UNCHS) to measure progress towards the objectives of the Global Strategy for Shelter to the year 2000. Evidence on setting a threshold in terms of square metres per person differ across countries and institutions.

After consultations with the National Statistical Office (NSC) of the Kyrgyz Republic, it was agreed to define the 'Overcrowding' indicator as:

An individual is considered deprived if he/she lives in a household that has less than 18 square meters of living space per person

This reflects the aspirations of the Kyrgyz Republic and is in line with goals in the National Development Plan. Table 22 provides the deprivation results for this indicator. As expected, overcrowding is more of an issue in urban areas, but also in rural areas 71 percent of the population are living in an overcrowded situation. Moreover, children are considerably more likely to live in overcrowded houses compared to other age groups. Significant differences in terms of magnitude exist also across oblasts.

Table 22: Deprivation headcount for 'Overcrowding' indicator

	HEADCOUNT RATIOS Percentage of Deprived Individuals	Population Share
Total Population	73.6%	100%
Urban	79.0%	35.4%
Rural	70.6%	64.6%
Men	74.2%	47.5%
Women	73.0%	52.5%
Children (below 18 years old)	82.2%	38.7%
Adults (18 to 64 years old)	69.6%	55.3%
Elderly (65 years old and above)	54.0%	6.0%

[20] The US Department of Housing and Urban Development which uses 1 ppr or 2 ppb (US-DHUD, 2007).
[21] The household adult equivalent is calculated as: one room for the household, one room per couple in the household, one room for each single person aged 18 or more, one room per pair of single people of the same gender between 12 and 17 years of age, one room per each single person between 12 and 17 years of age not included in the previous category, and one room per pair of children under 12 years of age (Retrieved from the EUROSTAT Glossary: Overcrowding Rate at https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Overcrowding_rate)

Issykul	76.9%	7.8%
Jalal-Abad	67.9%	19.0%
Naryn	76.4%	4.6%
Batken	67.6%	8.2%
Osh	63.7%	21.0%
Talas	76.5%	4.2%
Chui	84.3%	14.7%
Bishkek	79.5%	16.0%
Osh city	86.7%	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

ELECTRIC SUPPLY

The 2016 KIHS data confirms that coverage of electricity supply is nearly perfect: 99.62 percent of the individuals live in a household that have access to an operational power network. However, power disruptions are quite common as it is shown in Table 23.

Table 23: Frequency of power disconnections

How often has your household been disconnected from the power network over the last year?	Percentage of Individuals
Never	9.8%
Several times a year	66.9%
Once a month	20.7%
Once a week	1.5%
Several times a week	0.6%
Everyday	0.5%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

Less than 10 percent of the individuals live in a household that did not experience any power disruption in the previous year while most of the population – roughly 70 percent – experienced several disruptions in the previous year. The indicator here presented is constructed based on the frequency of disconnection from electricity and it is defined as:

An individual is considered deprived if he/she lives in a household that in the past year has been disconnected from the power network at least once a month

Table 24 reports the deprivation ratios for the overall population and selected groups. If differences across demographic lines, sex and age, are almost negligible in terms of magnitude, the same is not true for the decomposition based on the location of residence. There are more than 15 percentage points of difference between the deprivation ratio for urban areas (13 percent) and that for rural ones (29 percent). Moreover, both Bishkek and Osh city report considerably lower deprivation headcounts – 8 and 0 percent respectively – while all the other oblasts (excluding Issykul where more than half of population is deprived) report headcounts between 20 and 30 percent.

Table 24: Deprivation headcount for 'Electric Supply' indicator

	HEADCOUNT RATIOS Percentage of Deprived Individuals	Population Share
Total Population	23.3%	100%
Urban	13.1%	35.4%
Rural	28.9%	64.6%
Men	23.9%	47.5%
Women	22.8%	52.5%
Children (below 18 years old)	23.9%	38.7%
Adults (18 to 64 years old)	22.9%	55.3%
Elderly (65 years old and above)	23.9%	6.0%
Issykul	52.7%	7.8%
Jalal-Abad	23.2%	19.0%
Naryn	22.6%	4.6%
Batken	24.2%	8.2%
Osh	25.4%	21.0%
Talas	26.3%	4.2%
Chui	27.7%	14.7%
Bishkek	8.0%	16.0%
Osh city	0.0%	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

DRINKING WATER

The indicator constructed is based on the availability of an improved drinking water source and its location. The deprivation ladder proposed by the WHO/UNICEF Joint Monitoring Program for Water Supply, Sanitation and Hygiene (WHO/UNICEF JMP, 2017) classifies water services into:

- Safely Managed Water Services: drinking water from an improved source that is located on the premises (within the dwelling, plot or yard)

- Basic Water Services: drinking water from an improved source, provided collection time is not more than 30 minutes for a roundtrip including queuing

- Limited Water Services: drinking water from an improved source, where collection time exceeds 30 minutes for a roundtrip including queuing

After consultation with the National Statistical Office (NSC) of the Kyrgyz Republic, it was decided to model the 'Drinking Water' indicator over the Safely Managed Water Service step of the aforementioned deprivation ladder. Table 25 and 26 report, respectively, the main source of water and its location as reported in the 2016 KIHS. As it can be seen, only 27 percent of the individual reports having running piped water at home. Similar shares, however, report using public or private water pump. Following the definition of an 'improved drinking water source' as "[one that] by nature of [its] design and construction [has] the potential to deliver safe water" (WHO/UNICEF JMP, 2017, p. 8) and the mention made in the 2015 World Bank report (WB, 2015b, p. 1), safe drinking water sources are identified as: running water pipeline at home (apartment), well, artesian well, private water tap, and public (communal) water tap. In terms of location of the water source, 27.2 percent of the individuals report having access to water inside the dwelling (i.e. those that have running water pipeline at home), 33.1 percent report having access to water in their yard, and 39.7 percent report having access to water only in the streets.

Table 25: Main source of water

Main Source of Water	Percentage of Individuals	IMPROVED?
Running pipeline at home	27.2%	YES
Well	1.8%	YES
Artesian well	3.7%	YES
Private water pump	27.7%	YES
Public water pump	29.4%	YES
Storage reservoir, river, lake, pond, aryk	7.3%	NO
Imported water (water-cart)	0.1%	NO
Spring	2.8%	NO

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

Table 26: Location of main source of water

Location of the Main Water Source	Percentage of Individuals
Indoors	27.2%
Outdoors (yard, plot)	33.1%
Outdoors (street)	39.7%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

The 'Drinking Water' indicator is then defined as:

> *An individual is considered deprived if he/she lives in a household that does not have access to an improved source of water on the premises (i.e. indoor or in the yard/plot)*

Table27 reports the deprivation ratios for the overall population and selected groups. Similarly to other Living Conditions indicators, the location of residence seems to be quite relevant for the risk of being deprived: while only 9 percent of urban residents do not have access to an improved drinking water source on the premises, more than 55 percent of rural ones do not. Moreover, children report a headcount of deprivation 4 percentage points higher than adults and 8 percentage points higher than elderly.

Table 27: Deprivation headcount for 'Drinking Water' indicator

	HEADCOUNT RATIOS Percentage of Deprived Individuals	Population Share
Total Population	39.7%	100%
Urban	9.3%	35.4%
Rural	56.2%	64.6%
Men	40.4%	47.5%
Women	39.0%	52.5%
Children (below 18 years old)	43.0%	38.7%
Adults (18 to 64 years old)	37.9%	55.3%
Elderly (65 years old and above)	35.2%	6.0%

Issykul	35.2%	7.8%
Jalal-Abad	52.2%	19.0%
Naryn	62.9%	4.6%
Batken	70.2%	8.2%
Osh	65.7%	21.0%
Talas	54.9%	4.2%
Chui	10.5%	14.7%
Bishkek	0.0%	16.0%
Osh city	15.2%	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

SANITATION

The WHO/UNICEF Joint Monitoring Program (JMP) for Water Supply, Sanitation and Hygiene (WHO/UNICEF JMP, 2017) defines the ladder of deprivation for sanitation as:

- Safely Managed Sanitation Facility: improved non-shared sanitation facility where excreta are safely disposed in situ or transported and treated off-situ

- Basic Sanitation Facility: improved non-shared sanitation facility

- Limited Sanitation Facility: improved sanitation facility that is shared between two or more households

According to this ladder the JMP reports that in 2015 roughly 97 percent of the Kyrgyz population had access to at least 'Basic Sanitation Facilities' (WHO/UNICEF JMP, 2017, p. 84)[22]. However, looking at the type of bathroom mainly used by Kyrgyz individuals as reported by the 2016 KIHS (Table 28), it is evident that most of the population has actually access only to toilets with a cesspool.

Table 28: Type of toilet used

Type of Toilet	Percentage of Individuals
Toilet connected to the central sewage system	13.0%
Toilet connected to an individual sewage system	2.8%
Toilet with a cesspool	83.7%
Other	0.4%
Do not have a toilet	0.1%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

This is actually consistent with the WHO/UNICEF JMP data. WHO guidelines for measuring sanitation using household surveys list sanitation technologies that are likely to meet this criterion as: flush toilets and pour flush latrines to piped sewer system, septic tank, or pit, ventilated improved pit (VIP) latrine, composting toilets, and pit latrine with slab (WHO, UNICEF, 2006) and the JMP Methodological note explicitly equates 'toilet with cesspool' to 'toilet connected to a septic tank' (WHO/UNICEF JMP, 2018, p. 16). However, cesspools require appropriate upkeep which, as noted by the World Bank, can be costly and when improperly done can expose household members to contamination from faecal matter (WB, 2015b). Moreover, the National Statistical Committee (NSC) of the Kyrgyz Republic operationalizes 'adequate sanitation' as having access to central or individual sewage systems (NSC, 2017b). Thus, the indicator here proposed is not based on the type of bathroom mainly used by household members, but on the availability of central or individual sewerage:

[22] No estimation for safely managed sanitation services for the Kyrgyz Republic are reported by the JMP for reasons of data unavailability.

An individual is considered deprived if he/she lives in a household that is not connected to an operational sewage system

Table 29 reports the results for this indicator for the overall population and selected decompositions. Similarly to the 'Drinking Water' indicator, individuals living in rural areas are disproportionately affected by lack of appropriate

sanitation: their deprivation headcount is almost 90 percent compared to the 41 percent recorded by individuals living in urban areas. An analogous stark difference can be seen when comparing individuals living in different oblasts: four oblasts report deprivation headcounts between 90 and 100 percent (Jalal-Abad, Batken, Osh, and Talas) with Naryn, and Osh city registering lower headcounts albeit still above the national one. It is only among residents of Chui and Bishkek that the deprivation headcount falls below the national one.

Table 29: Deprivation headcount for 'Sanitation' indicator

	HEADCOUNT RATIOS Percentage of Deprived Individuals	Population Share
Total Population	72.5%	100%
Urban	40.7%	35.4%
Rural	89.9%	64.6%
Men	74.1%	47.5%
Women	71.2%	52.5%
Children (below 18 years old)	76.0%	38.7%
Adults (18 to 64 years old)	70.7%	55.3%
Elderly (65 years old and above)	66.6%	6.0%
Issykul	71.7%	7.8%
Jalal-Abad	92.1%	19.0%
Naryn	83.5%	4.6%
Batken	95.0%	8.2%
Osh	100%	21.0%
Talas	94.3%	4.2%
Chui	50.4%	14.7%
Bishkek	13.2%	16.0%
Osh city	71.3%	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

4.4.6. Tetrachoric Correlation Matrix

Before moving on to the next chapter and discussing the N-MPI results, it is important to look at how correlated the eleven constructed indicators are. Given the importance of both parsimony and internal consistency as guiding principles of multidimensional poverty indices construction, the tetrachoric correlation matrix reported in Table 30 can provide useful insights. Apart from few pairs of indicators from different dimensions (e.g. 'Handwashing Practices' &

'Household Dietary Diversity' or 'Educational Attainment' and 'Electric Supply'), most pairs of indicators are statistically correlated. However, the statistically significant correlations are not always positive. The 'Caloric Intake' indicator is negatively correlated, in a statistically significant way, to 'Availability of Hot Water', 'Electric Supply', and 'Sanitation'; the correlation coefficients are very low, though suggesting only a weak relationship. Of similar low order, is the negative correlation between 'Overcrowding' and, respectively, 'Availability of Hot Water' and

'Electric Supply'. What is perhaps most important correlation that 'Overcrowding' reports with to notice is the negative and significant 'Drinking Water' and 'Sanitation'. The reason might be the fact that the former indicator identifies as deprived mostly individuals living in urban areas like Bishkek and Osh city while the latter two ones report below national average deprivation headcount in these areas. As for the positive correlation coefficients, it is worth mentioning the perfect correlation that exist between 'Availability of Hot Water' and 'Drinking water' is not a surprise since any individual that

lives in a household that has an operational hot water supply has also, by definition, access to an improved source of drinking water on the premises. It is then also not surprising that both indicators report very high correlations with the 'Sanitation' indicator.[23] The correlation coefficients between 'Living in Absolute Poverty' and the other 10 indicators hint at how strong the relationship between monetary poverty and other non-monetary aspects of wellbeing is. For example, deprivation in 'Caloric Intake' is very strongly correlated with poverty while deprivation in 'Indoor Air Pollution' or 'Electric Supply' are not.

[23] The issue of the high positive correlation between sanitation, hot water and drinking water has been raised during discussions with the NSC and other stakeholders. Given the relevance of each of the indicators, the national stakeholders preferred keeping all three indicators included for the time being.

Table 30: Tetrachoric correlation matrix for the indicators of the N-MPI for the Kyrgyz Republic

	Living in Absolute Poverty	Educational Attainment	Handwashing Practices	Indoor Air Pollution	Caloric Intake	Household Dietary Diversity	Availability of Hot Water	Over-crowding	Electric Supply	Drinking Water	Sanitation
Living in Absolute Poverty	1										
Educational Attainment	0.4548*	1									
Handwashing Practices	0.2136*	0.1324*	1								
Indoor Air Pollution	0.1419*	0.1729*	0.3329*	1							
Caloric Intake	0.7649*	0.3015*	0.1132*	-0.0179	1						
Household Dietary Diversity	0.4610*	0.0916*	-0.0243	-0.1581*	0.3791*	1					
Availability of Hot Water	0.3053*	0.1885*	0.3939*	0.5997*	-0.0609*	0.0700*	1				
Overcrowding	0.5379*	0.3948*	0.0520*	-0.1757*	0.5633*	0.1837*	-0.0494*	1			
Electric Supply	0.0959*	0.0122	-0.1380*	0.0155	-0.0375*	0.0752*	0.2549*	-0.0351	1		
Drinking Water	0.1979*	0.1299*	0.0761*	0.4931*	-0.0223	0.0600*	1.0000*	-0.1460*	0.1500*	1	
Sanitation	0.3385*	0.2285*	0.3557*	0.6802*	-0.0527*	-0.004	0.8925*	-0.1014*	0.0968*	0.8925*	1

*Note: * correlation significant at the 1% significance level*

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

5. RESULTS

5.1. Simultaneous Deprivations

Before presenting the N-MPI results, there is one more interesting perspective to take on the constructed deprivation indicators. After having looked at the correlations among them in the previous section, it is relevant to briefly discuss to what extent do deprivations in different indicators occur simultaneously. The idea of simultaneous or overlapping deprivation offers insight in the breadth of multidimensional poverty.

As it can be seen in Figure 8, the distribution of the population across number of simultaneous deprivations is somehow normal. At the left tail of the distribution, 1.3 percent of the individuals is deprived in none of the indicators while, at the right tail, 0.3 percent of the individuals is deprived in ten out of eleven of them. As expected, the around 65 percent of the population is simultaneously deprived in between three to six indicators.

Figure 8: Distribution of the Kyrgyz Population by number of simultaneous deprivations
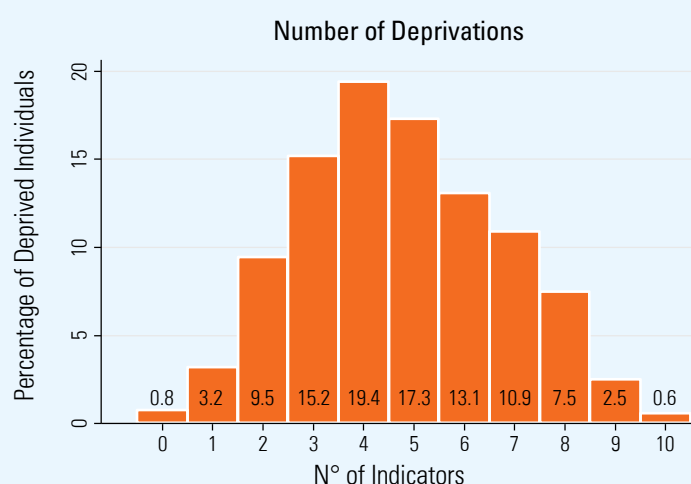
Source: Authors' Calculations using 2016 Kyrgyz Integrated Household Survey

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

Given how relevant did the rural/urban divide proved itself in terms of differences in deprivation ratios for several indicators, it is relevant to investigate whether individuals living in rural areas also suffer from more simultaneous deprivations. As shown in Figure 9, it is evident that they do. If almost 14 percent of the population living in urban areas is deprived in either zero or one indicator, their rural counterpart account for less than 2 percent of the rural population. Similarly, while only 3 percent of individuals living in urban areas are deprived

in eight, nine, or ten indicators, more than 12 percent of individuals living in rural areas are. If instead we look at the decomposition by age group (Figure 10), it is interesting to note that children, as compared to both adults and elderly, are more likely to experience more simultaneous deprivations as their distribution is shifted to the right. Elderly people, instead, have a flatter distribution which means that are more likely to experience either few or many simultaneous deprivations than other age groups.

Figure 9: Distribution of the Kyrgyz Population by number of simultaneous deprivations decomposed by area of residency

Number of Deprivations Decomposed by Type of area (U/R)

Source: Authors' Calculations using 2016 Kyrgyz Integrated Household Survey

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

Figure 10: Distribution of the Kyrgyz Population by number of simultaneous deprivations decomposed by age group

Number of Deprivations Decomposed by Age Groups

Source: Authors' Calculations using 2016 Kyrgyz Integrated Household Survey
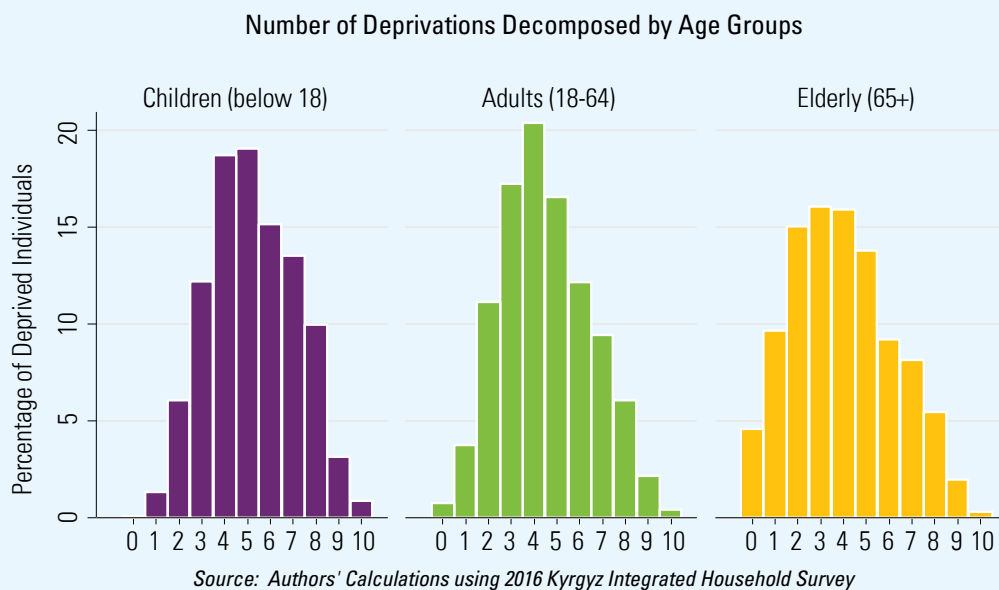
Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

5.2. N-MPI Results

After having constructed the eleven deprivation indicators and having briefly discussed their results in terms of deprivation ratios and simultaneous deprivation, it is now time to turn to the main results of the N-MPI of the Kyrgyz Republic here presented. Table 31 reports the index structure and the assigned weights for each of the indicator[24].

Table 31: Structure of the N-MPI for the Kyrgyz Republic

DIMENSION	INDICATOR	WEIGHT
Monetary Poverty	Living in Absolute Poverty	1/5
Education	Educational Attainment	1/5
Health	Handwashing Practices	1/10
	Indoor Air Pollution	1/10
Food security	Caloric Intake	1/10
	Household Dietary Diversity	1/10
Living conditions	Availability of Hot Water	1/25
	Electricity Supply Reliability	1/25
	Overcrowding	1/25
	Drinking Water	1/25
	Sanitation	1/25

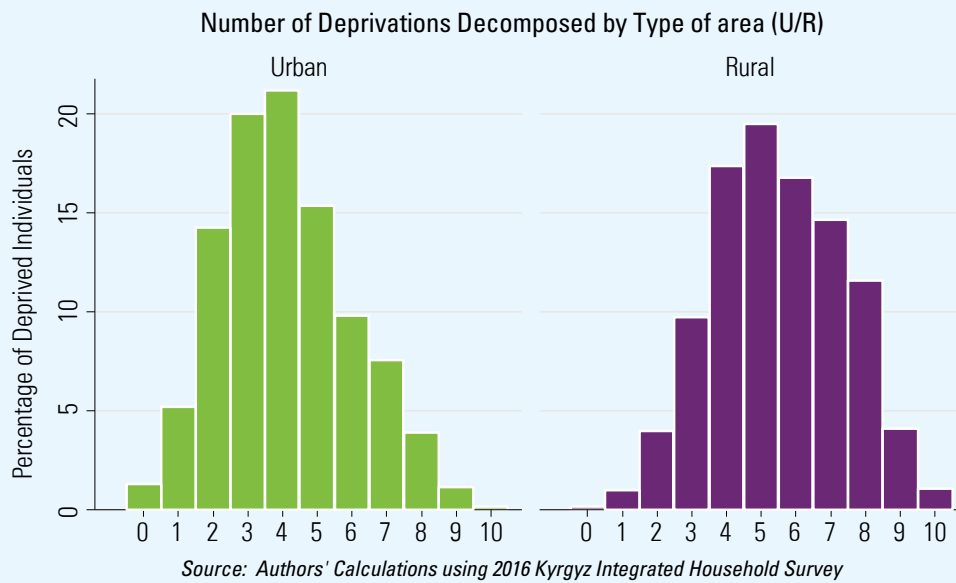*Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey*

A detailed explanation of the Alkire-Foster [24]methodology is included in the Technical Annex. Nevertheless, it is worth it to briefly review its basics. After having defined the indicators, their deprivation thresholds, and their weights, a poverty cut-off must be set. In the case of the N-MPI for the Kyrgyz Republic, a person is identified as multidimensionally poor if he or she is deprived in at least one third of the weighted indicators[25]. Then, the information is aggregated across individuals to produce three main measures of multidimensional poverty:

- Incidence of Multidimensional Poverty (H) – the proportion of the population that is multidimensional poor

- Average Intensity of Deprivation Among the Poor (A) – the average proportion of weighted indicators in which multidimensionally poor people are deprived

- MPI – the final Multidimensional Poverty Index

Table 32 reports the results for the three measures for the overall population and selected groups. Overall, 50.3 percent of the population is multidimensionally deprived and experiencing an average intensity of deprivation of 56.2% of the weighted indicators which results in an MPI of 0.282. As already suggested by the preliminary results presented in the previous chapter and the above section, the decomposition by area of residence is particularly relevant. The share of the rural population that is multidimensionally poor is 20 percentage points higher than that of the urban population. A similar geographical pattern of inequality can be found when looking at the decomposition by oblast. Jalal-Abad, Naryn, Batken, and Osh oblast report higher than average incidence of multidimensional poverty and MPI. As for others, it is Bishkek that really stands out: only 27 percent of its residents are multidimensionally poor which, with a reported intensity of 45.5 percent of the weighted indicators, results in an MPI of 0.122 – less than half of that at the national level. In terms

of demographic breakdown, the comparison of men and women does not provide particularly interesting results. However, when comparing the three age groups – children, adults, elderly –

it is evident that Kyrgyz children are more likely to experience multidimensional poverty reporting a headcount 10 and 15 percentage points higher than that of, respectively, elderly and adults.

Table 32: N-MPI results for the Kyrgyz population and selected decompositions

	H (Incidence)	A (Intensity)	M = H x A	Population Share
Total Population	50.3%	56.2%	0.282	100%
Urban	36.9%	52.6%	0.194	35.4%
Rural	57.5%	57.4%	0.330	64.6%
Men	50.4%	56.3%	0.284	47.5%
Women	50.1%	56.1%	0.281	52.5%
Children (below 18 years old)	59.7%	57.2%	0.342	38.7%
Adults (18 to 64 years old)	43.7%	55.2%	0.241	55.3%
Elderly (65 years old and above)	49.2%	56.1%	0.276	6.0%
Issykul	45.7%	55.3%	0.253	7.8%
Jalal-Abad	59.6%	58.8%	0.351	19.0%
Naryn	58.3%	56.8%	0.331	4.6%
Batken	64.9%	63.6%	0.413	8.2%
Osh	57.5%	56.3%	0.324	21.0%
Talas	49.8%	48.9%	0.244	4.2%
Chui	45.4%	55.8%	0.253	14.7%
Bishkek	26.7%	45.5%	0.122	16.0%
Osh city	47.3%	53.1%	0.251	4.6%

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

Another relevant result to present is the contribution of each dimension to the MPI and the differences in these contributions among subgroups. From what can be seen in Figure 11, when the whole population is considered 'Education' is the dimension that contributes the most (28%) followed by 'Living Conditions', 'Food Security', and 'Monetary Poverty' each accounting for between 19 and 22 percent; lastly, 'Health' contributes to the overall poverty index for just 9 percent. However, when we look at the decomposition shown, it is evident that important differences exist. For example, 'Health' and 'Living Conditions' contribute more to the MPI for those living in rural areas than to the one for those living in urban areas while the opposite is true for 'Food Security', 'Education',

and 'Monetary Poverty'. As for the demographic decompositions, there does not appear to be any relevant difference among sexes, and – to the most part – also among age cohorts. However, education has a higher contribution among elderly people while monetary poverty has a higher contribution among children and adults. Once again, the decomposition by household size reports some very interesting results: monetary poverty does not even contribute in the determination of the index for single-person households, but its contribution progressively increases as the household gets larger – from 13 percent to 23 percent. Comparatively, 'Education' and 'Living Conditions' contribute more to the formation of the MPI for single-person households.

Figure 11: Contribution of each dimension to the MPI for the Kyrgyz population and selected decompositions
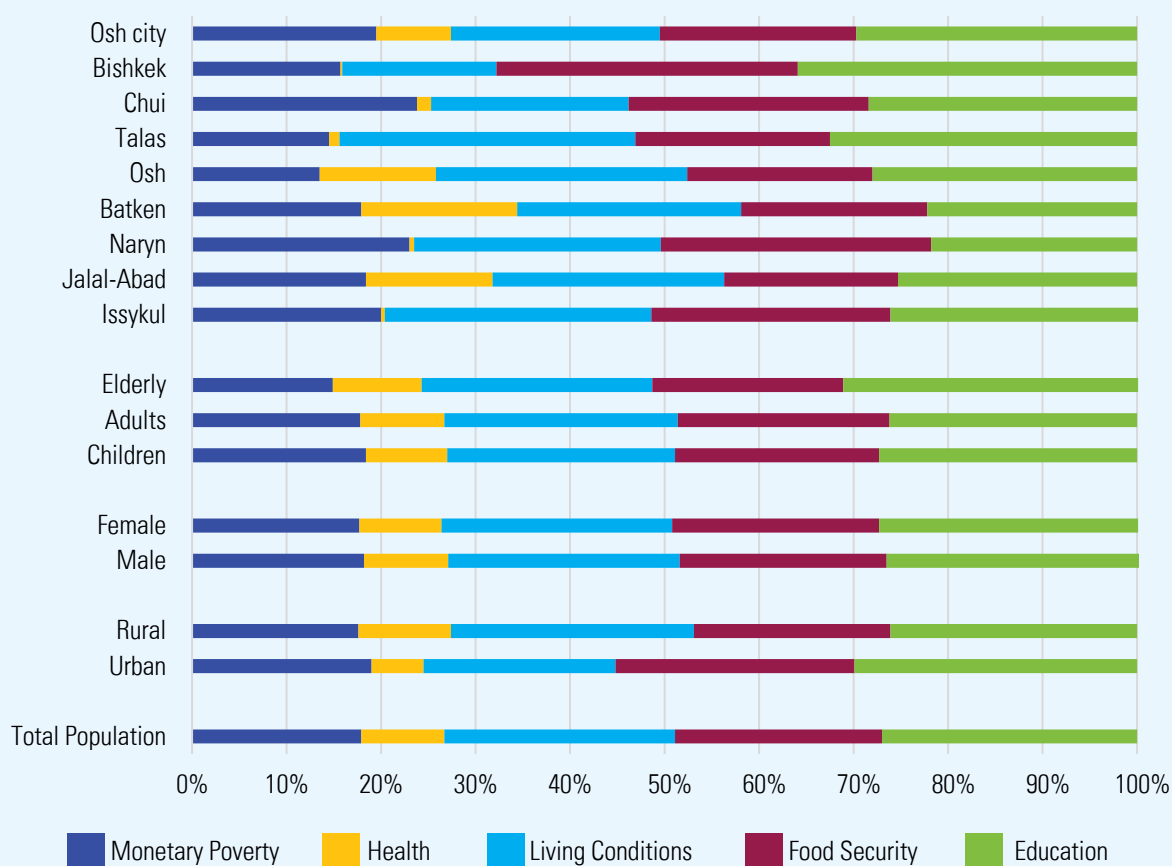
Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

5.3. Sensitivity Analysis

Since the poverty cut-off is set normatively at one third of the weighted indicators, looking at how the incidence of multidimensional poverty and the MPI change across potential poverty cut-offs is important. Naturally, as the poverty cut-off increases, both the H and MPI fall. Nevertheless, it is interesting to note that, as shown in Table 33, both the MPI and the incidence of poverty decrease quite regularly which is consistent with the semi-normal shape of the distribution of simultaneous deprivations shown in Figure 8 at the beginning of this chapter.

Table 33: Sensitivity of H (Incidence) and MPI to different poverty cut-offs

	H (Incidence)	MPI
K=20%	76.3%	0.351
K=40%	42.9%	0.256
K=60%	20.0%	0.146
K=80%	4.69%	0.040

Source: Author's own calculation based on the 2016 Kyrgyz Integrated Household Survey

6. CONCLUDING REMARKS

This report has proposed a methodology to provide the Kyrgyz Republic with reliable and transparent yearly assessments of multidimensional poverty. A variety of theoretical and practical issues has been taken into account in order to develop a tool that could be relevant in capturing the reality of wellbeing deprivation in the country. The index developed in this report is a nationally-specific multidimensional poverty index measuring relevant outcomes of wellbeing based on the annual Kyrgyz Integrated Household Survey hence making it a useful 'tracking device' to monitor areas of progress and areas of less progress for the future. Using eleven indicators capturing five crucial aspects of wellbeing for the Kyrgyz Republic – education, health, monetary poverty, food security, and living conditions,- the N-MPI assesses population- and subpopulation-level multidimensional poverty. Overall, 50.3 percent of the Kyrgyz population is considered multidimensionality deprived and, on average, it experiences poverty in 56.2 percent of the deprivations. This levels of incidence and intensity of multidimensional poverty result in a multidimensional poverty index or 0.282.

Even before computing the aggregated measures of multidimensional poverty, the deprivation ratios provided useful insights on the most important dimensions of poverty in the Kyrgyz Republic. It is clear that the lack- or low standards- of the provision of certain public services or utilities such has sewerage, potable water, reliable electric connections, and gas characterises the country, especially in its rural areas. Furthermore, monetary and food poverty are still worryingly high with a quarter of the population living below the national poverty line and slightly less than half of the population is consuming less than the recommended 2,100 kcal per day. As for education, even though the Kyrgyz adult population enjoys,

for the most part, a good level of educational achievement, children often suffer from deprivation especially in the first few years of life.

Overall, two considerable patterns of unequal deprivation are evident in the country. First, individuals living in rural areas are more often deprived in every deprivation indicators apart from caloric intake and overcrowding. Moreover, they very often experience more simultaneous deprivations than their urban counterparts. Hence, it is not surprising they multidimensional poverty is more frequent and more intense amongst rural individuals. This worrying subpopulation pattern of inequality is then reflect at a region level albeit with differences across the set of indicators. It is undoubtedly, however, they apart from issues of overcrowding and caloric intake, individuals living in Bishkek enjoy a higher standard of living. Secondly, the decomposition of multidimensional poverty by age cohort shows a very clear pattern of deeper and more widespread deprivation among children. This, coupled with the fact that children are more likely than any other age group to experience a larger set of multiple deprivations, makes it evident that child poverty is a crucial issue for the future of the country and its population. Moreover, both multidimensional and monetary poverty are prevalent amongst large households showing a substantial correlation between household size and poverty.

In brief, the structural issues that exist in terms of public provision of essential services and utilities and high levels monetary and food poverty pose a great threat to the present and future of the Kyrgyz Republic. Thus, much must be done provide every Kyrgyz man and woman with adequate standards of living, to ensure that no child is left behind, and to redress the high inequalities that exist across different parts of the country.

TECHNICAL ANNEX

The Alkire-Foster Methodology

The Alkire-Foster (AF) methodology was first proposed in 2009 and later formalized in 2001 to provide a coherent and robust measurement framework for the concept of multidimensional poverty. Differently from earlier attempts, the AF methodology uses a counting approach to identify the poor and then proposes adjusted FGT[26] measures to capture the breadth, depth, and severity of multidimensional poverty. Simply speaking, the methodology is based on two core parts: the identification of the poor and the aggregation across individuals. Below, the AF methodology is explained step-by-step and is followed by a simple real-life example.

IDENTIFICATION

STEP 0: choose Unit of Analysis

The unit of analysis of a multidimensional poverty index is usually the individual. However, the assessment could be carried out taking households, or any other meso-level entity, as the unit of analysis.

STEP 1: Define Dimensions and Indicators

The choice of dimensions and indicators can be guided by a variety of factors: well-established practice, data availability, participatory exercises, implicit or explicit assumptions about what people value or should value, empirical evidence, etc. In defining the structure of the index, some of the core issues discussed in chapter 3 are particularly relevant: consistency vs. specificity, opportunity vs. outcome, and parsimony accuracy.

STEP 2: Assign a Weights to Each Indicator

Each indicator is given a weight, w_j, so that all weights sum up to one

$$\sum_{j=1}^{d} w_j = 1$$

The decision of which weighting scheme to apply is far from a purely technical one. Implicitly, a weighting scheme determines the trade-offs between dimensions of wellbeing. Each weight represents the value of an indicator as compared to the others since weights are understood economically as prices or rates of substitutions. It is quite common to normatively set equal weights across dimensions and equal weights across indicators within each dimension. However, there are a variety of other options, some stemming from a normative judgments, some data-driven, and some mixing the two [for an explanation and example of potential weighting scheme for a multidimensional wellbeing index see (Decancq & Lugo, 2013)].

STEP 3: For Each Indicator Set a Deprivation Threshold and Determine Whether each Individual is Deprived

If deprivation threshold for indicator j =z_j, then:

- When $y_{ij} < z_j$, then $g_{ij}^0 = w_j$
- When $y_{ij} \geq z_j$, then $g_{ij}^0 = 0$

The achievements of each individual are replaced by his or her status with respect to the deprivation threshold.

STEP 4: Compute the Welfare Indicator

The welfare indicator (C_i) is the sum of the weights of all the indicators in which an individual is deprived

$$C_{i=} \sum_{j=1}^{d} g_{ij}^0$$

The idea behind the computation of the welfare indicator is simply counting the number of deprivations for each person. However, instead of defining C_i as a number between 0 and d (i.e. number of indicators), summing indicators weights will result in defining C_i as between 0 and 1.

---

[26] Foster-Greer-Thorbecke (FGT) class of poverty measures which, among other things, allow for the calculation of the incidence, depth, and severity of poverty and are decomposable by population subgroups (Haughton & Khander, 2009).

STEP 5: Define a Poverty Cut-off and Determine Whether Each Individual is Poor

If poverty cutoff=k, then:

- When C_i <k, then individual *i* is not multidimensionally poor

- When C_i <k then individual *i* is multidimensionally poor

AGGREGATION

STEP 6: Censor the Weighted Deprivation Matrix

The deprivation matrix of a population is a matrix of size N by d where N if the number of rows (one for each individual) and d if the number of columns (one for each indicator). Each entry of the matrix represents the individual-specific status in one indicator (0 if not deprived, w_j if deprived). In order to censor the depviation matrix, the welfare indicator of non-poor individuals is replaced with a 0 :

- If C_i < k, then C_i (k)=0

- If C_i ≥ k, then C_i (k)= C_i

STEP 7: Calculate the Incidence and Intensity of Multidimensional Poverty as:

$$Incidence - H = \frac{q}{N}$$

where q is the number of multidimensionally poor individuals and N is the total population

$$Intensity - A = \frac{\sum_{i=1}^{q} c_i(k)}{q}$$

STEP 8: Compute the Multidimensional Poverty Index

$$MPI = H*A$$

EXAMPLE

Imagine a multidimensional poverty index constructed as shown in Table 34.

Table 34: EXAMPLE- MPI Structure

DIMENSION	INDICATORS	WEIGHT
Monetary Poverty	Monetary Poverty indicator	1/3
Education	Education indicator	1/3
Health	Health indicator 1	1/6
	Health indicator 2	1/6

Now imagine a population of five individuals (Irina, Aleksey, Vladimir, Ekaterina, Anna) with the deprivation status described in Table 35.

Table 35: EXAMPLE- Deprivation Statuses of the Imagined Population

INDIVIDUAL	Monetary poverty indicator	Education indicator	Health indicator 1	Health indicator 2
Irina	Deprived	Deprived	Not deprived	Deprived
Aleksey	Not Deprived	Not deprived	Deprived	Not deprived
Vladimir	Not deprived	Deprived	Not deprived	Deprived
Ekaterina	Deprived	Deprived	Deprived	Deprived
Anna	Not deprived	Not deprived	Not deprived	Not deprived

This fictional situation can easily be translated into a simple matrix of deprivation where each 0 stands for non-deprivation and each 1 stands for deprivation. Given the simple weighting scheme presented in Table 34 above, the deprivation matrix can then be converted into a weighted deprivation matrix. Then, the welfare indicator can be computed for each individual in the population.

$$
y = \begin{bmatrix} 1 & 1 & 0 & 1 \\ 0 & 0 & 1 & 0 \\ 0 & 1 & 0 & 1 \\ 1 & 1 & 1 & 1 \\ 0 & 0 & 0 & 0 \end{bmatrix} \longrightarrow y = \begin{bmatrix} 0.33 & 0.33 & 0 & 0.17 \\ 0 & 0 & 0.17 & 0 \\ 0 & 0.33 & 0 & 0.17 \\ 0.33 & 0.33 & 0.17 & 0.17 \\ 0 & 0 & 0 & 0 \end{bmatrix} \longrightarrow C = \begin{bmatrix} 0.83 \\ 0.17 \\ 0.5 \\ 1 \\ 0 \end{bmatrix}
$$

If the poverty cut-off is then set at one third of the weighted indicators, each individual can be defined as either poor or non-poor and the deprivation matrix can be censored.

$$
C = \begin{bmatrix} poor \\ not\ poor \\ poor \\ poor \\ not\ poor \end{bmatrix} \longrightarrow y = \begin{bmatrix} 0.33 & 0.33 & 0 & 0.17 \\ 0 & 0 & 0 & 0 \\ 0 & 0.33 & 0 & 0.17 \\ 0.33 & 0.33 & 0.17 & 0.17 \\ & & & 0 \end{bmatrix}
$$

The three measures of multidimensional poverty can then be computed as:

$$
H = \frac{3}{5} = 0.6 = 60\%
$$

$$
A = \frac{0.83 + 0.5 + 1}{3} = 0.78 = 78\%
$$

$$
MPI = 0.6 * 0.78 = 0.468
$$

REFERENCES

1. Aiello, A. E., Coulborn, R. M., Perez, V., & Larson, E. L. (2008). Effect of Hand Hygiene on Infectious Disease Risk in the Community Settins: A Meta-Analysis. American Journal of Public Health, 98(8), 1372-1381.

2. Ajwad, M. I., de Laat, J., Hut, S., Larrison, J., Abdulloev, I., Audy, R., . . . Torracchi, F. (2014). The Skills Road: Skills for Employability in the Kyrgyz Republic. Washington D.C. (USA): World Bank Group.

3. Alkire, S., & Foster, J. (2011). Counting and Multidimensional Poverty Measurement. Journal of Public Economics, 95(7), 476-487.

4. Alkire, S., & Foster, J. (2016). Dimensional and Distributional Contributions to Multidimensional Poverty. Oxford Poverty and Human Development Initiative. University of Oxford.

5. Alkire, S., & Kanagaratnam, U. (2018). Multidimensional Poverty Index - Winter 2017-18: Brief Methodological Note and Results. Oxford Poverty and Humand Development Initiative. University of Oxford.

6. Alkire, S., Foster, J. E., Seth, S., Santos, M. E., Roche, J. M., & Ballon, P. (2015). Overview of methods for Multidimensional Poverty Assessment. In Multidimensional measurement and Analysis (p. ch. 3). Oxford (UK): Oxford University Press.

7. Alkire, S., Kanagaratnam, U., & Suppa, N. (2018). The Global Multidimensional Poverty Index (MPI): 2018 revision. Oxford Poverty and Human Development Initiative. University of Oxford.

8. Babu, S., & Reidhead, W. (2000). Poverty, Food Security, and Nutrition in Central Asia: A Casa Study of the Kyrgyz Republic. Food Policy, 25(6), 647-660.

9. Bakashova, A., Jorritsma, F., Choitonbaeva, A., & Wendland, C. (2013). Opportunities to Stimulate Local Economies Through Sustainable Innovations for Home Comfort: gender-Sensitive Study for Rural Areas in Issykul and Naryn. Women Engage for a Common Future.

10. Belanger, K., & Triche, E. W. (2008). Indoor Combustion and Ashtma. Immunology and Allergy Clinics of North America, 28(3), 507-519.

11. Blencowe, H., Cousens, S., Mullany, L. C., Lee, A. C., Kerber, K., Wall, S., . . . Lawn, J. E. (2011). Clean Birth and Postnatal Care Practices to Reduce Neonatal Deaths from Sepsis and Tetanus: A Systematic Review and Delphi Estimation of Mortality. BMC Public Health, 11(3).

12. CDC, WFP. (2005). A Manual: Measuring and Interpreting Malnutrition and Mortality.

13. Constitution of the Kyrgyz Republic. (2010, June 27).

14. Curtis, V., Schmidt, W., Luby, S., Florez, R., & Touré, O. B. (2011). Hygiene: New Hope. The Lancet Infectious Diseases, 11(4), 312-321.

15. Datt, G. (2018). Distribution-Sensitive Multidimensional Poverty Measures. Washington D.C. (USA): World Bank Group.

16. Decancq, K., & Lugo, M. A. (2013). Weights in Multidimensional Indices of Well-Being: An Overview. Econometric Reviews, 32(1), 7-34.

17. EPDC. (2009a). Household Survey Guidelines on Education for Use in the Context of the IHSN Question Bank. EPDC Working Paper No. EPDC-09-04, FHI 360, Educationa Policy and Data Center.

18. EPDC. (2009b). How (well) is Education Measured in Household Surveys? A Comparative Analysis of the Education Modules in 30 Household Surveysfrom 1996-2005. IHSN Working Paper No. 002, International Household Survey Network, Education policy and Data Center.

19. Esenaliev, D., Kroeger, A., & Steiner, S. (2011). The Kyrgyz Integrated Household Survey (KIHS): A Primer. Berlin (Germany): German Institute for Economic Research (DIW Berlin).

20. FAO. (2012). Guidelines for Measuring Household and Dietary Diversity. Rome (Italy).

21. FAO. (2016). Food Security and Nutrition Programme for Kyrgyzstan in Action. How to Implement Policy in the Most Efficient Way? Background Document to the Online Consultation held in November 2016, Global Forum on Food Security and Nutrition in Europe and Central Asia.

22. FAO. (2017). The State of Food Security and Nutrition in Europe and Central Asia. Budapest (Hungary).

23. FAO. (2018). Dietary Assessment: A Resource Guide to method Selection and Application in Low Resource Settings. Rome (Italy).

24. Freeman, M. C., Stocks, M. E., Cumming, O., Jeandron, A., Higgins, J. P., Wolf, J., . . . Curtis, V. (2014). Hygiene and Gealth: Systematic review of handwashing Practices Worldwide and Update of Health Effects. Tropical Medicine and International Health, 19(8), 906-916.

25. FSNP for 2015-2017. (2015, September 4). Approved by Decree of the Government of the Kyrgyz Republic No. 618.

26. Giuffrida, A., Jakab, Melitta, & Dale, E. M. (2013). Toward Universal Coverage in Health: The Case of the State Guaranteed Benefit Package of the Kyrgyz Republic. Washington D.C. (USA): World Bank Group.

27. Gray, A. (2001). Definitions of Crowding and the Effects of Crowding on Health: A Literature Review. Gray Matter Research Ltd.

28. Haughton, J., & Khander, S. R. (2009). Handbook on Poverty and Inequality. Washington D.C. (USA): World Bank Group.

29. Hou, D. (2011). Education Reform in the Kyrgyz Republic- Lessons from PISA. Washington D.C. (USA): World Bank Group.

30. IHME. (2016). Global Burden of Diseases database. Institute for Health Metrics and Evaluation.

31. IMHE. (2018). Kyrgyzstan Country Profile. From Institute for Health Metrics and Evaluation: http://www.healthdata.org/kyrgyzstan

32. Lam, N. L., Smith, K. R., Gauthier, A., & Bates, M. N. (2011). Kerosene: A Review of Household Uses and their Hazards in LOw- and Middle-Income Countries. Journal of Toxicology and Environmental Health, 15(6), 396-432.

33. Law No. 183. (2008, August 4).

34. Martirosova, D., Inan, O. K., Meyer, M., & Sinha, N. (2017). The Many Faces of Deprivation: A Multidimensional Approach to Poverty in Armenia. Poverty and Equity Global Practice Group. World Bank Group.

35. NSC. (2017a). Information Bulletin on Food Security and Poverty- 4th Quarter 2016. Bishkek (Kyrgyz Republic).

36. NSC. (2017b). Living Standards of the Population of the Kyrgyz Republic 2012-2016. Bishkek (Kyrgyz Republic).

37. NSC, MOH, ICF International. (2013). Kyrgyz Republic Demographic and Health Survey 2012. Bishkek (Kyrgyz Republic) and Calverton, Maryland (USA).

38. NSC, UNICEF. (2014). Kyrgyzstan Multiple Indicator Cluster Survey 2014- Key Findings. Bishkek (Kyrgyz Republic): National Statistical Committee of the Kyrgyz Republic.

39. ODPM. (2004). The Impact of Overcrowding on Health and Education: A Review of Evidence and Literature. London (UK): Office of the Deputy Prime Minister.

40. OECD. (2007). PISA 2006- Volume 2: data. Program for International Student Assessment. OECD Publishing.

41. OECD. (2010). PISA 2009 results: What Students Know and Can Do. Program for International Student Assessment. OECD Publishing.

42. OECD. (2018). Social Protection System Review of Kyrgyzstan. Paris (France): OECD Publishing.

43. Oxford Poverty and Human Development Initiative. (2017). Kyrgyzstan Country Briefing. Multidimensional Poverty Index Databank. University of Oxford.

44. Peck, M. D., Kruger, G. E., van der Merwe, A. E., Godakumbura, W., & Ahuja, R. B. (2008). Burns and Fires from Non-Electric Domestic Appliances in low and Middle Income Coutries- Part 1: The Scope of the Problem. Burns, 34(3), 303-311.

45. President of the Krygyz Republic. (2018). Priority Directions of Activity for the Period until 2023 Within the Framework of Implementation of the National Development Strategy of the Kyrgyz Republic 2018=2040.

46. President of the Kyrgyz Republic. (August 2018). National Development Strategy of the Kyrgyz Republic for 2018-2040 (Draft). Bishkek (Kyrgyz Republic).

47. Proochista, A., & Naveed, A. (2009). Health. In S. Deneulin, & L. Shahani, An Introduction to the Human Development and Capability Approach: Freedom and Agency (pp. 228-245). International Development Research Center.

48. Rabie, Tamer, & Curtis, V. (2006). Handwashing and the Risk of Respiratory Infections: a Quantitative Systematic Review. Tropical Medicine and International Health, 11(3), 258-267.

49. Ruel, M. T., Harris, J., & Cunningham, K. (2013). Diet Quality in Developing Countries. In V. R. Preedy, L.-A. Hunter, & V. B. Patel, Diet Quality: An Evidence-Based Approach Vol. 2 (pp. 239-261). New York (USA): Springer.

50. Ruggeri Laderchi, c., Saith, R., & Stewart, F. (2003). Does it Matter That We Don't Agree on the Definition of Poverty? A Comparison of Four Approaches. Oxford Development Studies, 31(3), 243-274.

51. Struyk, R., & Friedmann, R. (2006). Pre-Feasibility Study on Housing Finance in the Kyrgyz Republic. Frankfurt (Germany): KfW- Kreditanstalt fuer Wiederaufbau.

52. Swindale, A., & Bilinsky, P. (2006). Household Dietary Diversity Score (HDDS) for Measurement of Household Food Access: Indicator Guide (v. 2). Washington D.C. (USA): FHI 360/FANTA.

53. Triche, E. W., Belanger, K., Beckett, W., Bracken, M. B., Holford, T. R., Gent, J., . . . Leaderer, B. P. (2002). Infant Respiratory Symptoms Associated with Indoor Heatin Sources. American Journal of Respiratory and Critical Care Medicine, 166(8), 1105-1111.

54. UIS. (2004). Guide to the Analysis and Use of Household Survey and Census Education Data. UNESCO, Institute for Statistics, Montreal (Canada).

55. UN. (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. New York (USA): Resolution Adopted by the General Assembly.

56. UNECE. (2010). Country Profiles on the Housing Sector: Kyrgyzstan. New York (USA), Geneva (Switzerland).

57. UNECE. (2016). Informal Settlements in Countries with Economies in Transition in the UNECE Region.

58. UNESCO. (2012). World Data on Education: VII Ed. 2010-2011. International Bureau of Education.

59. UN-HABITAT. (2003). The Challange of Slums: Global Report on Human Settlements.

60. UN-HABITAT. (2004). Urban Indicators Guidelines: Monitoring the Habitat Agenda and the MDGs.

61. UN-HABITAT. (2005). From Budapest to Bishkek: Mapping the Root of Poverty Housing in ECA.

62. UN-HABITAT. (2009). The Right to Adequate Housing. Fact Sheet No. 21/Rev. 1.

63. UN-HABITAT. (2015). National Report of the Kyrgyz Republic- On Housing and Sustainable Development of Cities and Settlements of Kyrgyzstan. Bishkek (Kyrgyz Republic).

64. UN-HABITAT. (2016). SDG Goal 11 Monitoring Framework: A Guide to Assist National and Local Government to Monitor and Report on SDG Goal 11 Indicators.

65. UNICEF. (2015). Situation Analysis of Children in the Kyrgyz Republic. Bishkek (Kyrgyz Republic).

66. Unterhalter, E. (2009). Education. In S. Deneulin, & L. Shahani, An Introduction to the Human Development and Capability Approach: Freedom and Agency (pp. 207-227). International Development Research Center.

67. US-DHUD. (2007). Measuring Overcrowding in Housing. Department of Housing and Human Development.

68. WB. (2015a). Kyrgyz Republic: Poverty Profile for 2013. Washington D.C. (USA): World Bank Group.

69. WB. (2015b). Insights on Household Access to Water Supply and Sanitation. Poverty Global Practice (Europe and Central Asia). World Bank Group.

70. WB. (2017). Analysis of the Kyrgyz Republic's Energy Sector. Washington D.C. (USA): World Bank Group.

71. WB. (2018). Piecing the Poverty Puzzle Together. Washington, D.C. (SA): World Bank Group.

72. WFP. (2000). Food and Nutrition Handbook. Rome (Italy): World Food Program.

73. WFP. (2012). Nutrition at the World Food Programme: Programming for Nutrition-Specific Interventions. World Food Program.

74. WFP. (2015). National Food Security Atlas- Kyrgyz Republic 2015: Summary.

75. WHO. (1946). Constitution of the World Health Organization.

76. WHO. (2014). WHO Guidelines for Indoor Air Quality: Household Fuel Combustion. Geneva (Switzerland).

77. WHO. (2018). Taking Actions on Child Obesity.

78. WHO, UNICEF. (2006). Core Questions on Drinking Water and Sanitation for Housheold Survey. Geneva (Switzerland).

79. WHO, UNICEF, UNFPA, WB, UN Population Division. (2015). Trends in Maternal Mortality: 1990 to 2015. Geneva (Switzerland): World Health Organization.

80. WHO/UNICEF JMP. (2017). Progress on Drinking Water, Sanitation, and Hygiene. Joint Monitoring Programme for Water Supply, Sanitation and Hygiene.

81. WHO/UNICEF JMP. (2018). JMP Methodology: 2017 Update & SDG Baseline. Joint Monitoring Programme for Water Supply, Sanitation and Hygiene.

ANNEX 1.

Multidimensional Child Poverty Index: A Proposal for the Kyrgyz Republic Using the MICS 2018

Contents

List of Tables

List of Figures

List of Boxes

Introduction

The 2030 Agenda for Sustainable Development establishes as Goal #1: "End poverty in all its forms everywhere", including target 1.2: "By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions" (United Nations, 2015). In order to achieve this goal, it is indispensable to acknowledge that "children are more likely to be living in poverty than adults, and everywhere their particular life stage makes them more vulnerable to its devastating effects" (UNICEF, 2017). Child poverty has lifelong consequences. The effects of poverty are more severe for children due to their intrinsic vulnerability. The harmful consequences for the person and the society diminishes long-term developmental capabilities (UNICEF, 2017).

Children, members of large households and rural populations are disproportionately affected by poverty in the Kyrgyz Republic. Latest estimates show that 43.1% of children under the age of 6 live in a household that consumes below the poverty line (OECD, 2018). The corresponding figure for the age bracket 6-15 was 38.2% (OECD, 2018). While monetary poverty indicators are still used widely, there is a strong agreement on the multidimensionality of poverty and the limitation of a unidimensional perspective to define poverty. Moreover, the idea that monetary poverty can be used as a proxy of a more complex concept has been challenged (Roelen, 2017).

Children experience poverty differently than adults (DFID et al., 2009), and there is solid rationale to incorporate child-specific and multidimensional approaches when assessing poverty. Monetary poverty assessments rest on the assumptions that individuals are economic agents whose ability to fulfil their needs depends on their purchasing power (Thorbecke, 2008). Children, however, depend on their immediate environment for the distribution of basic goods (Roelen, Gassmann & Neubourg, 2010), and are limited in claiming their rights and needs. Children's needs are also not the same as those of adults. Furthermore, children's deprivations (for example, nutrition or cognitive stimulation) can cause irreparable damages to their development (Samson, Fajth & Francois, 2016), which may lock them into a vicious circle of poverty (Corak, 2006). Overall, there is a need to understand the specific deprivations that children face in the domains critical to their development.

Statham and Chase (2010) refer to two perspectives of child wellbeing. A developmental perspective associated with deficits and shortfalls, and a children's rights perspective focused on opportunities and aspirations for the future. Hence, a definition of child poverty should also take into account a protection perspective from a rights based approach that includes the Convention on the Rights of the Child (CRC) and the international development agenda (de Neubourg, Chai, de Milliano, Plavgo, & Wei, 2012).

There are at least two main methodologies to measure and assess multidimensional child poverty. The first one is the Multiple Overlapping Deprivation Analysis (MODA) proposed by the UNICEF Office of Research which emphasizes the analysis of multiple simultaneous deprivations, and the second one is the Alkire-Foster methodology for the measurement of multidimensional poverty. In general, constructing a tool to measure child poverty has to start with the selection of domains and indicators, and the construction of thresholds and weights (Sen, 1979; Nussbaum, 2000; Alkire, 2008; Roelen, Gassmann & Neubourg, 2010; Roelen & Gassmann, 2012).

The aim of this report is to develop and propose a Multidimensional Child Poverty Index (C-MPI) for the Kyrgyz Republic, as a complement to the National Multidimensional Poverty Index (N-MPI) (see Gassmann, Perinetti and Timar, 2019). The C-MPI will allow assessing the multidimensional wellbeing of the Kyrgyz children and monitor the country's process. It applies a child-specific approach in terms of dimensions, indicators, and deprivation thresholds.

The methodology follows the Alkire-Foster approach using the 2018 Kyrgyzstan Multiple Indicator Cluster Survey data (MICS 2018).

The dimensions and indicators are selected following the relevant literature, consistency with the Convention on the Rights of Child (United Nations, 1990), coherence with the N-MPI (Gassmann, Perinetti and Timar, 2019), and data availability. Table 1 presents an overview of common dimensions and indicators used in other national and global multidimensional child poverty indices. For each listed indicator, the table also includes the reference to the respective CRC article and whether or not it was used in the N-MPI.

The rest of the report is structured as follows. The next section 2 discusses the specific dimensions and indicators, their rationale and deprivation definition, while in section 3 different options for the Child Multidimensional Poverty Index (C-MPI) are calculated and discussed.

Table 1. An overview of indicators used to assess multidimensional child poverty

Dimension	Indicator	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	TOTAL (out of 16)	KYRGYZ REPUBLIC MPI*	CRC (Article)
Nutrition & Health	Undernourishment	×	×	×			×	×	×	×	×	×	×	×	×		12		Art. 24
	Immunization / vaccination		×	×			×		×	×			×	×	×	×	9		Art. 24
	Breastfeeding			×	×					×					×		4		Art. 24
	Health care / distance to health facility									×	×	×		×			4		Art. 24
	Skilled assistance at birth		×	×						×							3		Art. 24
	Child mortality	×				×											2		Art. 24
	Caloric intake					×											1	Yes	Art. 24
	Dietary diversity																0	Yes	Art. 24
	Handwashing practice									×							1	Yes	Art. 24
	Indoor air pollution								×								1	Yes	Art. 24
Education	School attendance / attainment	×	×	×	×	×	×	×	×	×	×	×	×		×		13	Yes	Art. 28
	Recreation items / toys / books				×				×						×	×	4		Art. 31
	Place to do homework / Stationary for school				×												1		Art. 28
	Friends / Space to play				×												1		Art. 12, 15, 31
Living standard	Drinking water	×	×	×	×	×	×	×	×	×	×	×	×	×	×	×	15	Yes	Art. 24
	Improved sanitation / toilet	×	×	×		×	×		×	×	×	×	×	×	×	×	13	Yes	Art. 24
	Roof, wall & floor material	×		×	×	×	×	×	×	×	×	×		×	×	×	13		Art. 27
	Energy (electricity, fuel, heating)	×	×		×		×	×		×	×	×			×	×	10	Yes	Art. 27
	Overcrowding			×	×		×	×		×	×			×	×		8	Yes	Art. 27
	Assets	×			×	×		×									4		Art. 27
	Poverty		×														1	Yes	Art. 27

	Dimension	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	*	#	Articles
	Information devices	x	x	x		x		x	x	x								7	Arts. 13, 17
Social inclusion & protection	Child labour		x	x	x	x		x	x							x		6	Art. 32
	Child marriage			x		x		x	x			x						4	Art. 19, 37
	Birth registration					x				x			x			x		3	Art. 7, 8
	Living parents					x		x	x									2	Art. 7
	Domestic violence	x		x	x													3	Art. 19, 37
	Crime	x																1	Arts. 3, 6
	Natural disasters	x																1	Arts. 3, 6

Sources: A (OPHI, 2018), B (World Bank, 2018), C (de Neubourg, Chai, de Milliano, Plavgo, & Wei, 2012), D (Ferrone & Chzhen, 2016), E (Alkire, Dorhi, Gyeltshen, & Minten, 2016), F (Qi & Wu, 2015), G (Mohanty, 2011), H (Roelen & Gassmann, 2011), I (de Milano & Handa, 2014), J (Ferrone, Rossi, Salvucci, & Trapp, 2019), K (Mahrt, Rossi, Salvucci, & Trapp, 2018), L (Ogwumike & Ozughalu, 2018), M (Adetola & Olufemi, 2012), N (Roelen, Gassmann, & de Neubourg, 2010), *(Gassmann, Perinetti & Timar, 2019). (Hameed & Haq Padda, 2017), O (Roelen, Gassmann, & de Neubourg, 2010), *(Gassmann, Perinetti & Timar, 2019).

2. A Multidimensional Child Poverty Index for the Kyrgyz Republic

After reviewing the theoretical rationale to define and measure multidimensional child poverty and the international evidence of multidimensional child poverty indices, this section presents the data and the discusses the proposed dimensions and indicators to establish a C-MPI for the Kyrgyz Republic.

Data

Multidimensional poverty assessments rely on microdata at the individual- and household-level. While the N-MPI uses the Kyrgyz Integrated Household Survey (KIHS), the data source for the C-MPI is the 2018 Kyrgyzstan Multiple Indicator Cluster Survey (MICS 2018). This database, collected about once in four years, has information on child-specific indicators and allows for future assessments and international comparison.

Three out of the four MICS 2018 modules are used in the analysis: (1) household questionnaire with basic demographic information on all de jure household members (usual residents),

the household, and the dwelling; (2) under-5 questionnaire, administered to mothers (or caretakers) of all children under 5 living in the household; and (3) questionnaire for children age 5-17 years, administered to the mother (or caretaker) of one randomly selected child age 5-17 years living in the household. Based on module 1, we only kept children between 0 and 17 years old. Variables from modules (2) and (3) were subsequently added using individual and household identification numbers.

The final sample includes 11,022 individual children covering all areas, ethnicities and regions. Out of all children, 68% are living in rural area, 78% are Kyrgyz and 14% are Uzbek. With respect to the regional distribution, 23% are from Osh, 17.5% from Jalal-Abad, 15% from Chui, and 15% from Bishkek city. In addition, 52% are boys and 48% are girls; 19% of the children are between 0 and 2 years old, 13% between 3 and 4 years old, 56.5% between 5 and 14 years old, and 11% between 15-17 years old (Table 2).

Table 2. Sample composition (MICS 2018)

	Age group				Total
	0 - 2 yrs.	**3 - 4 yrs.**	**5 - 14 yrs.**	**15 - 17 yrs.**	
Gender					
Boy	51.6%	49.4%	52.3%	50.8%	51.6%
Girl	48.4%	50.6%	47.7%	49.2%	48.4%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Area					
Urban	31.9%	31.0%	31.8%	33.3%	31.9%
Rural	68.1%	69.0%	68.2%	66.7%	68.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Ethnicity					
Kyrgyz	77.2%	76.5%	79.0%	77.1%	78.1%
Russian	2.4%	3.7%	3.3%	4.5%	3.3%
Uzbek	16.5%	15.6%	12.9%	12.2%	13.9%
Other ethnicity	3.8%	4.2%	4.8%	6.2%	4.7%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Region					
Batken	8.4%	9.1%	7.3%	5.5%	7.5%
Jalal-Abad	19.7%	18.1%	16.6%	17.7%	17.5%
Issykul	6.5%	6.7%	8.5%	9.1%	7.9%

Naryn	4.3%	4.6%	5.6%	5.9%	5.2%
Osh	23.9%	24.3%	23.1%	19.1%	23.0%
Talas	4.6%	4.2%	5.2%	5.0%	4.9%
Chui	13.6%	13.9%	15.2%	17.8%	15.0%
Bishkek city	14.2%	14.7%	14.7%	16.4%	14.8%
Osh city	4.8%	4.6%	3.8%	3.6%	4.1%
Total	100.0%	100.0%	100.0%	100.0%	100.0%
Observations	2,103	1,449	6,222	1,248	11,022
	19.1%	13.1%	56.5%	11.3%	100.0%

Source: Own calculations using MICS 2018.

Dimensions and Indicators

Dimensions and indicators are selected based on four criteria: consistency with the Convention on the Rights of Child, coherence with the national multidimensional index (N-MPI), relevance for the Kyrgyz Republic, use in other studies, and data availability (MICS 2018). During a national stakeholder workshop, all indicators and thresholds were critically discussed. Some initially proposed indicators were removed and others were added. Below, we present the agreed list of indicators.

The development of any national multidimensional poverty index is challenging, yet, a child-specific index even more so. First of all, children's needs differ across their age. A baby has different needs for its wellbeing than a teenager. Due to data limitations, not all desirable indicators can be included, or they are not available for all age-groups. Due to sample limitations (only one child aged 5-17 years is interviewed per household), not all desired indicators can be directly estimated for all children. As a consequence, indicators (and sometimes even dimensions) often differ across age-groups.

The selected indicators represent five dimensions. Wherever possible, indicators are derived from individual-level data. This is the case for nutrition and education. Living standard indicator rely on household-level data, and the dimensions of health and social inclusion and protection use a mix of individual- and household-level data.

Table 3. Dimensions and indicators by age group

Dimension	Indicator	Age group			
		0 - 2 yrs.	**3 - 4 yrs.**	**5 - 14 yrs.**	**15 - 17 yrs.**
Nutrition	Undernutrition- stunting	X	X		
Health	Vaccination	X			
	Handwashing	X	X	X	X
	Indoor air pollution	X	X	X	X
Education	Education	X	X	X	X
Living standard	Drinking water	X	X	X	X
	Improved sanitation – toilet	X	X	X	X
	Heating	X	X	X	X
	Overcrowding	X	X	X	X
Social inclusion & protection	Information – Internet			X	X
	Birth certificate	X	X		
	Living parents	X	X	X	X
	Punishment	X	X	X	

Source: Own calculations using MICS 2018.

As Table 3 shows, the number of dimensions and indicators differs across age-groups: 12 indicators for children between 0 and 2 years old, 11 indicators for children between 3 and 4 years old, 10 indicators for children between 5 and 14 years old, and 9 indicators for the group between 15 and 17 years old. Except for the youngest age-group, indicators cover four dimensions. Unfortunately, information on nutritional status is only available for children under the age of 5.

Dimension 1: Nutrition

Probably the most relevant dimension of child development for lifelong effects is nutrition. Malnourishment in early childhood can affect a child's growth, reduce the mental development and lead to learning difficulties and poor health (UNICEF, 2017). According to WHO, "… malnutrition increases health care costs, reduces productivity and slows economic growth, which can perpetuate a cycle of poverty and ill health" (WHO, 2019). The 2030 Agenda for Sustainable Development established as Goal #2: "End hunger, achieve food security and improved nutrition and promote sustainable agricultures", including target 2.2: "By 2030, end all forms of malnutrition, including achieving, by 2025, the internationally agreed targets on stunting and wasting in children under 5 years of age" (United Nations, 2015).

The WHO has stablished international standards based on length- and weight-for-age growth curves for children between 0 and 5 years old. Three possible indicators are available: underweight (low weight-for-age), stunting (low height-for-age) and wasting (low weight-for-height). In all the cases undernourishment is defined if the individual measure is below two standard deviations of the WHO standard median (WHO, 2006).

In the case of the Kyrgyz Republic 2% of children between 0 and 4 years old are underweight, 2% are wasted and 12% are stunted. Following the protection criterion (i.e. selecting the strongest definition or the hardest evidence), stunting is chosen as the deprivation measure for the C-MPI (see Box 1). While on average 12% of children aged 0-4 suffer from stunting (Table 4), the risk of stunting is higher in rural areas (13%) and among ethnic Uzbek children (16%). Stunting prevalence is higher in Jalal-Abad (15.5%), Issykul (14%) and Osh oblast (14%) (see Table 28).

Box 1. Undernourishment deprivation definition

Children between 0 and 4 years old are defined as deprived (stunted) if their height-for-age score is more than two standard deviations below the WHO Child Growth Standards median.

MICS variable:

HAZ2 – Height for age z-score WHO.

Deprived if: HAZ2 <-2

Table 4. Percentage of children deprived – Undernourishment (stunted)

Age group	Not deprived	Deprived	Total
0- 2 yrs.	88.4%	11.6%	100.0%
3- 4 yrs.	88.1%	11.9%	100.0%
5- 14 yrs.	n.a.	n.a.	n.a.
15- 17 yrs.	n.a.	n.a.	n.a.
Total	88.2%	11.8%	100.0%

Source: Own calculations using MICS 2018.

Dimension 2: Health

Good health is indispensable for a dignified life. It is one of the dimensions recommended by UNICEF to define and measure multidimensional child poverty because bad health affects the quality of life and reduces children's ability to play and learn (UNICEF, 2017). In this context, the 2030 Agenda for Sustainable Development established as Goal #3: "Ensure healthy lives and promote wellbeing for all at all ages" (United Nations, 2015). Moreover, article 24 of the Convention on the Rights of the Child establishes that "state parties recognize the right of the child to the enjoyment of the highest attainable standard of health and to facilities for the treatment of illness and rehabilitation of health" (United Nations, 1990). Given the limitations of the data, only indirect measures of health standards can be included in the C-MPI. The only direct measure included in the MICS

2018 is the status of vaccination of very young children (0-2 years old). For all other age groups, we have to rely on preventive measures, such as handwashing practice, and exposure to health risks in the form of indoor air pollution.

Vaccination

The World Bank and the UNICEF Office of Research prioritize vaccination as a health indicator for younger children due to its relevance to protect from serious and often fatal diseases. MICS 2018 includes immunization information for children between 0 and 2 years, covering four different vaccines and polio drops, which are used to define deprivation (see Box 2). Figure 1 shows that 96% of children between 0 and 2 years old have received the BCG vaccination, while only 63% have received the MMR vaccination for measles, mumps and rubella.

Box 2. Vaccination deprivation definition

Children between 0 and 2 years old are defined as deprived if they have not been given all BCG (Bacille Calmette-Guerin), Pentavalent (Diphtheria, Pertussis, Tetanus, Hepatitis B and Hib), Pneumococcal conjugate and MMR (measles, mumps and rubella) vaccinations, and Polio drops.

MICS variables:

IM14 – Child ever given BCG vaccination.

IM16 – Child ever given Polio drops.

IM20 – Child ever given Pentavalent vaccination.

IM22 – Child ever given Pneumococcal Conjugate vaccination.

IM26 – Child ever given MMR/MR vaccination.

Deprived if: IM14, IM16, IM20, IM22 and/or IM26 = 2 (No) or 8 (DK)

Combined, 48% of the 0-2 year old children are vaccination deprived in the Kyrgyz Republic, meaning that they have not received all the vaccines and drops (see Table 5). Given that all children of that age group are included, it also includes those very young children that simply have not yet completed the full vaccination set. Hence, the indicator is most probably overestimating the actual rate of deprivation once

the children have reached age 2. Differences in deprivation rates are found between children living in urban (54%) and rural (45%) areas, and between ethnic Russian (56%), Kyrgyz (47%) and Uzbek children (51%). Interestingly, the highest share of children deprived of all vaccinations is found in Bishkek city (58%) and the lowest in aryn (37%) (see Table 28).

Figure 1. Percentage of children (0-2) vaccinated

	IM14	IM16	IM20	IM22	IM26
No	04%	12%	10%	13%	35%
Yes	96%	85%	87%	82%	63%

Yes   No   Don't Know
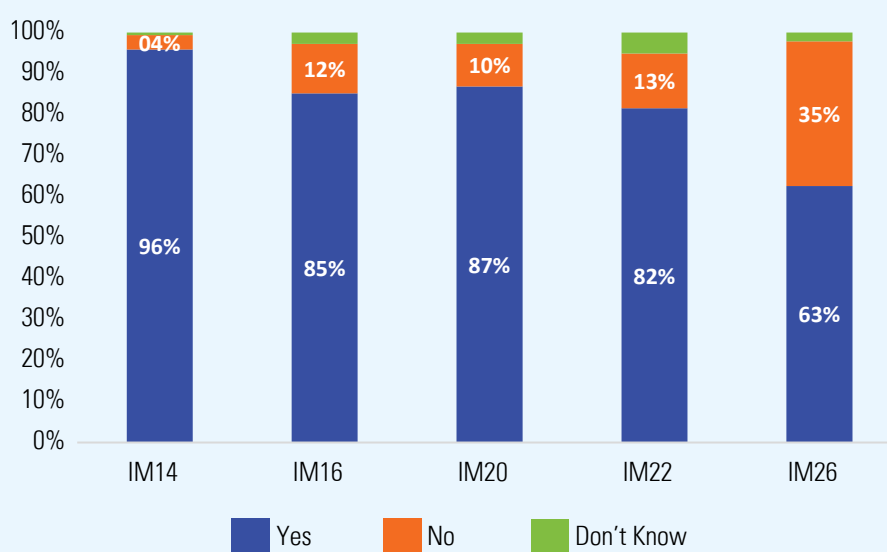
Source: Own calculations using MICS 2018.

Table 5. Percentage of children deprived – Vaccination

Age group	Not deprived	Deprived	Total
0- 2 yrs.	52.4%	47.7%	100.0%
3- 4 yrs.	n.a.	n.a.	n.a.
5- 14 yrs.	n.a.	n.a.	n.a.
15- 17 yrs.	n.a.	n.a.	n.a.
Total	52.4%	47.7%	100.0%

Source: Own calculations using MICS 2018.

Handwashing

Hygiene is included in target 6.2 of the sustainable development goals (SDG), which emphasizes access to adequate and equitable sanitation and hygiene for all (United Nations, 2015). As mentioned in the report for the National Multidimensional Poverty Index (N-MPI), the link between hygiene and health status is strong. Adequate handwashing practices reduce the risk of diarrhea, respiratory infections and other infectious of parasitic diseases (Gassmann, Perinetti & Timar, 2019). In addition, Mahmud et al. (2015) find that handwashing with soap and nail clipping reduce intestinal parasite reinfection rates and the prevalence of anemia in children.

Three variables at the household level from MICS 2018 are used to define deprivation, accordingly with the availability of a handwashing facility with soap and water (see Box 3). Table 6 shows that 37% of children (0-17) live in a household with a fixed handwashing facility inside the dwelling and 25% in yard/plot, of which 99% and 95% with available water and soap.

The indicator of handwashing practice deprivation is calculated at the household level (i.e. being deprived is a household characteristic and not an individual one). Results show that 39% of the children are deprived in the Kyrgyz Republic. Deprivation rates are slightly higher for younger children (see Table 5). Given the definition of the indicator, it is not surprising that deprivation rates are considerably lower in urban (16%) compared to rural (50%) areas. From a regional perspective, the highest level of deprivation is found in Osh (78%) and the lowest in Issykul (5%) (see Table 28).

Box 3. Handwashing deprivation definition

Children are defined as deprived if they live in a household where there is no fixed handwashing facility (sink or tap) with both water and soap.

MICS variables:

HW1 – Place where household members most often wash their hands.

HW2 – Water available at the place for handwashing.

HW3 – Soap or detergent present at place of handwashing.

Deprived if:

HW1 = 3 (mobile object), 4 (no handwashing place) or 5 (no permission to see); or,

HW1 = 1 (sink/tap in dwelling) or 2 (sink/tap in yard/plot), and HW2 = 2 (water is not available), and/or HW1 = 1 or 2, HW2 = 1 (water is available) and HW3 = 2 (soap/detergent/ash/mud/sand is not present) or 9 (DK).

Table 6. Percentage of children living in a household with handwashing facility

Facility		Water and soap	Only water	Only soap	None	Total
1. Fixed (sink, tap) in dwelling	36.6%	99.3%	0.3%	0.3%	0.1%	100.0%
2. Fixed (sink, tap) in yard/plot	25.4%	95.2%	2.7%	2.0%	0.2%	100.0%
3. Mobile object (bucket, jug, kettle)	36.5%	91.6%	6.9%	0.8%	0.8%	100.0%
4. 5. None	1.5%					
Total	100.0%					

Source: Own calculations using MICS 2018.

Table 7. Percentage of children deprived – Handwashing

Age group	Not deprived	Deprived	Total
0- 2 yrs.	59.3%	40.7%	100.0%
3- 4 yrs.	57.8%	42.2%	100.0%
5- 14 yrs.	61.2%	38.8%	100.0%
15- 17 yrs.	63.0%	37.0%	100.0%
Total	60.6%	39.4%	100.0%

Source: Own calculations using MICS 2018.

Indoor air pollution

As in the previous case, indoor air pollution is estimated at the household level. The rationale for inclusion of this indicator follows the N-MPI for the Kyrgyz Republic (Gassmann, Perinetti & Timar, 2019). Households that use open fires or solid fuels without a chimney for cooking are exposed to high levels of pollution with adverse health effects. Two variables at the household level from MICS 2018 are used to define deprivation: the type of cookstove and

the presence of a chimney (see Box 4). Table 8 shows that 72% of children live in a household with adequate cook stove (electric stove, solar cooker, LPG, piped natural gas or biogas stove). In the case of solid fuel stoves, 100% and 96.1% of those having a manufactured or traditional solid fuel stove, respectively, have a chimney.

Following the deprivation definition for indoor air pollution 18% of children are deprived in the Kyrgyz Republic. Looking at deprivation by age group, results shows that deprivation rates are slightly higher among younger children (Table 9). The gap between urban (7%) and rural (24%) areas accounts for 17 percentage points. Relevant differences emerge between ethnic Russian children (0%), Kyrgyz children (19%) and Uzbek children (23.6%). The highest rates of children affected by indoor air pollution are found in Batken (76.5%) and the lowest in Issykul (0%) and Bishek city (0.2%) (see Table 28).

Box 4. Indoor air pollution deprivation definition

Children are defined as deprived if they live in a household where the main cooking appliance is either open fire or fuel stove without a chimney.

MICS variables:

EU1 – Type of cookstove mainly used for cooking.

EU2 – Cookstove has a chimney.

Deprived if:

EU1 = 6 (liquid fuel stove), 9 (three stone stove / open fire), 96 (other) or 97 (no food cooked in household); and/or,

EU1 = 7 (manufactured solid fuel stove) or 8 (traditional solid fuel stove), and EU2 = 2 (No) or 8 (DK).

Table 8. Percentage of children living in a household with indoor air pollution

Cook stove	Chimney				
	Yes	No	Don't know	Total	
1. Electric stove	52.6%				
2. Solar cooker	0.4%				
3. Liquefied petroleum gas (LPG) / cooking	4.7%				
4. Piped natural gas stove	14.0%				
5. Biogas stove	0.3%				
7. Manufactured solid fuel stove	0.3%	100.0%	0.0%	0.0%	100.0%
8. Traditional solid fuel stove	9.8%	96.1%	3.4%	0.5%	100.0%
9. Three stone stove / open fire	18.0%				
97. No food cooked in household	0.0%				
Total	100.0%				

Source: Own calculations using MICS 2018.

Table 9. Percentage of children deprived – Indoor air pollution

Age group	No deprived	Deprived	Total
0- 2 yrs.	80.0%	20.0%	100.0%
3- 4 yrs.	77.3%	22.7%	100.0%
5- 14 yrs.	82.5%	17.5%	100.0%
15- 17 yrs.	85.0%	15.0%	100.0%
Total	81.6%	18.4%	100.0%

Source: Own calculations using MICS 2018.

Dimension 3: Education

There is strong agreement on the relevance of education for development. From a human capital perspective, it is a means to generate endogenous economic growth both at the micro- and macro-level. It is also an end in itself if development is concerned with freedom and capabilities. Moreover, article 28 of the Convention on the Rights of the Child establishes that "state parties recognize the right of the child to education" (United Nations, 1990). The 2030 Agenda for Sustainable Development has as Goal #4: "Ensure inclusive and equitable education and promote lifelong learning opportunities for all" (United Nations, 2015). The 2010 Constitution of the Kyrgyz Republic recognizes the "right to free basic general and secondary education in state educational establishments" without any limitation whatsoever in article 20.5 (Constitution of the Kyrgyz Republic, 2010).

The indicator of educational attainment is calculated following the definition used by Gassmann et al. (2019) for the N-MPI, but it includes additional criteria for early childhood development, which is essential for the development of human capital later on in life. Hence, the possession of books and toys and the interaction with an adult household member at home are included as educational wellbeing indicators for children aged 0-2. The rationale of this addition for younger children is based on studies that found that "the likelihood of being on track in literacy-numeracy almost doubled if at least one book was available at home compared to when there was none" (Manu et al., 2019), and evidence pointing to positive effects of engaging parents in early childhood development (see for example Carter (2017)).

Education deprivation is then defined with the specific attainment expected by age group, using nine variables from MICS 2018 at the individual level (see Box 5). Table 10 shows that only 19.5% of children between 0 and 2 years old have books and toys at home. Most (66%) have only toys, and only 13.5% has neither books nor toys. The percentage of children with books and toys increases with age from 3% at age 0 to 38% at age 2.

Box 5. Education deprivation definition

Children are defined as deprived, if:

At age 0 and 1, they do not have any books and toys at home;

At age 2, they do not have any books and toys at home, and if there is no interaction with a caregiver adult (read books, told stories, sing songs, took outside, play with, count/draw);

From age 3 to 7, they are not currently attending pre-school;

From age 8 to 16, they are not currently attending school at the grade adequate for their age; and,

At age 17, if they have not completed secondary education (grade 9).

A child between 8 and 16 years old is considered attending an adequate grade if: at 8 years old he/she attends at least grade 1, at 9 years old he/she attends at least grade 2, at 10 years old he/she attends grade 3, …, and at 16 years old he/she attends at least grade 9.

MICS variables:

ED4 – Ever attended school or any Early Childhood Education programme.

ED5A – Highest level of education ever attended.

ED5B – Highest grade or year of school at that level ever attended.

ED9 – Attended school during current school year.

ED10A – Level of education attended during current school year.

ED10B – Grade attended at that level during current school year.

EC1 – Number of children's books or picture books.

EC2 – Things used to play with.

EC5 – Caregiver activities with children.

Deprived if:

Age 0 to 1: EC1 = 0 and (EC2A ≠1 and EC2B ≠1);

Age 2: EC1 = 0 and (EC2A ≠1 and EC2B ≠1), and (EC5A = Y (no one read books), or EC5B = Y (no one told stories), or EC5C = Y (no one sang songs), or EC5D = Y (no one took outside), or EC5E = Y (no one played with) or EC5F = Y (no one counted or drew things);

Age 3-7: ED4 = 2 (never attend to school) or ED9 = 2 (no currently attending school);

Age 8-16: ED9 = 2 or, ED9 = 1 and ED10B < 'adequate grade'; and,

Age 17: ED4 = 2 or, ED9 = 2, ED5A <= 3 (complete secondary) and ED5B < 10 or, ED9 =1, ED10A <= 3 (complete secondary) and ED10B < 10.

Table 10. Percentage of children 0-2 years old with toys and book

Age	Books and toys	Only books	Only toys	None	Total
0	3.2%	1.0%	59.7%	36.2%	100.0%
1	17.3%	0.7%	80.1%	2.0%	100.0%
2	38.3%	0.5%	60.3%	1.0%	100.0%
Total	19.5%	0.7%	66.4%	13.5%	100.0%

Source: Own calculations using MICS 2018.

Table 11. Percentage of children 2 years old by type of interaction with an adult

Interaction with adult	Yes	No	Total
Read books	75.9%	24.2%	100.0%
Told stories	84.6%	15.4%	100.0%
Sang songs	100.0%	0.0%	100.0%
Took outside	91.6%	8.4%	100.0%
Played	91.6%	8.4%	100.0%
Named, counted or drew things	76.2%	23.8%	100.0%
Engaged in all 6 interactions	56.4%	43.6%	100.0%

Source: Own calculations using MICS 2018.

Table 12. Percentage of children 3-17 years old attending school

Age	Ever attended school (ED4)		Currently attending school (ED9, if ED4 = Yes)	
	Yes	No	Yes	No
3	42.8%	57.2%	95.4%	4.6%
4	45.8%	54.2%	96.8%	3.2%
5	70.3%	29.7%	95.5%	4.5%
6	93.2%	6.8%	97.4%	2.6%
7	99.9%	0.2%	98.5%	1.5%
8	100.0%	0.1%	99.6%	0.5%
9	99.8%	0.2%	99.8%	0.2%
10	99.6%	0.4%	98.7%	1.3%
11	99.7%	0.3%	99.8%	0.2%
12	100.0%	0.0%	99.4%	0.6%
13	99.6%	0.5%	98.7%	1.4%
14	98.9%	1.1%	97.4%	2.6%
15	99.8%	0.3%	95.0%	5.0%
16	100.0%	0.0%	89.5%	10.5%
17	99.3%	0.7%	82.0%	18.0%
Total	87.5%	12.5%	96.9%	3.1%

Source: Own calculations using MICS 2018.

Information about interaction with adult household members is only available for children aged 2, 3 and 4. In the case of the two year old children, Table 11 shows that 56% of children benefitted from all possible activities included in the data. The most common interaction is singing songs (100%), followed by taking the children outside and play (92%). Slightly less prevalent are more educational activities like telling stories (85%), naming, counting or drawing (76%) and reading books (76%).

Table 12 shows historical (i.e. ever attended school, ED4) and current (i.e. current year, ED9) school attendance rates for children from 3 to 17 years old. On average, 87.5% of children have ever attended school, of which 97% are currently in school. Following the deprivation definition for education, 28.5% of children are deprived in the Kyrgyz Republic. Looking at deprivation by age group, results shows that educational deprivation is considerably higher among children up to the age of 2. It implies that 85.5% of this age-group does not have books and toys at home, and that the interaction with adults is reduced. Less than half of all children aged 3 and 4 attend pre-school, implying that 57.5% of this age-group are deprived. Deprivation rates are considerably lower for children between 5 and 17 years old (6% on average). Most of them attend school at the appropriate age or completed grade 9 (Table 13).

The gap between urban (26.4%) and rural (29.5%) areas is limited. However, more pronounced differences are found between ethnic groups. Russian children are least deprived (20%), while more than one third of Uzbek children are educationally deprived (36%). Educational deprivation rates are highest in Batken (33%) and the lowest in Naryn (19%) (see Table 28).

Table 13. Percentage of children deprived – Education

Age group	Not deprived	Deprived	Total
0- 2 yrs.	14.2%	85.8%	100.0%
3- 4 yrs.	42.5%	57.5%	100.0%
5- 14 yrs.	94.0%	6.0%	100.0%
15- 17 yrs.	93.7%	6.3%	100.0%
Total	71.5%	28.5%	100.0%

Source: Own calculations using MICS 2018.

Dimension 4: Living standard

The Convention on the Rights of the Child states in article 27 that "state parties recognize the right of every child to a standard of living adequate for the child's physical, mental, spiritual, moral and social development." (United Nations, 1990). In addition, the 2030 Agenda for Sustainable Development includes Goal #6: "Ensure availability and sustainable management of water and sanitation for all", Goal #7: "Ensure access to affordable, reliable, sustainable and modern energy for all" and Goal #11: "Make cities and human settlements inclusive, safe, resilient and sustainable".

Following this rationale and for consistency with similar studies (see Table 1), four indicators are selected to measure children's living standards:

drinking water, improved sanitation, heating and overcrowding. Note that all indicators are measured at the household level.

Drinking water

The indicator for drinking water follows the definition used by Gassmann et al. (2019) for the N-MPI. It means that children must live in a household with an improved and permanent source of drinking water on the premises (see Box 6). Table 14 indicates that 91% of children live in a household with an improved source of drinking water on the premises (i.e. piped water into dwelling, yard/plot or public tap, tube well, or protected dug well or spring). However, only 87.5% of children have always sufficient water available.

Box 6. Drinking water deprivation definition

Children are defined as deprived if they live in a household that does not have access to an improved source of water (i.e. always sufficient piped water, tube well, protected dug well or protected spring).

MICS variables:

WS1 – Main source of drinking water.

WS7 – There been any time in the last month without sufficient water.

Deprived if:

WS1 = 13 (piped to neighbour), 32 (unprotected well), 42 (unprotected spring), 51 (rainwater), 61 (tanker-truck), 71 (cart with small tank), 81 (surface water), 91 (bottle water), 92 (sachet water), or 96 (other); and/or,

WS7 = 1 (Yes, at least once), or 8 (DK).

Table 14. Percentage of children living in a household with drinking water

Source		Sufficient			
		Always	**No**	**Don't know**	**Total**
11. Piped water into dwelling	34.3%	87.2%	12.7%	0.1%	100.0%
12. Piped water to yard/plot	32.0%	88.7%	11.2%	0.1%	100.0%
13. Piped water to neighbour	1.4%	79.6%	20.5%	0.0%	100.0%
14. Piped water: public tap / standpipe	16.6%	84.9%	15.0%	0.1%	100.0%
21. Tube well / borehole	2.2%	89.7%	10.3%	0.0%	100.0%
31. Dug well: protected	5.6%	93.7%	6.4%	0.0%	100.0%
32. Dug well: unprotected	0.1%	72.5%	27.5%	0.0%	100.0%
41. Spring: protected	0.6%	87.5%	12.5%	0.0%	100.0%
42. Spring: unprotected	2.4%	87.6%	12.4%	0.0%	100.0%
51. Rainwater	0.0%	100.0%	0.0%	0.0%	100.0%
61. Tanker-truck	0.0%	100.0%	0.0%	0.0%	100.0%
71. Cart with small tank	0.0%	100.0%	0.0%	0.0%	100.0%
81. Surface water	4.8%	86.8%	12.6%	0.6%	100.0%
91. Packaged water: bottled	0.1%	9.7%	90.3%	0.0%	100.0%
92. Packaged water: sachet	0.0%	100.0%	0.0%	0.0%	100.0%
96. Other	0.1%	100.0%	0.0%	0.0%	100.0%
Total	100.0%	87.5%	12.4%	0.1%	100.0%

Source: Own calculations using MICS 2018.

Table 15. Percentage of children deprived – Drinking water

Age group	No deprived	Deprived	Total
0- 2 yrs.	78.8%	21.3%	100.0%
3- 4 yrs.	81.3%	18.7%	100.0%
5- 14 yrs.	79.7%	20.3%	100.0%
15- 17 yrs.	82.0%	18.0%	100.0%
Total	80.0%	20.0%	100.0%

Source: Own calculations using MICS 2018.

At the national level, 20% of children are deprived of safe drinking water (Table 15). The gap between urban (9%) and rural (25%) areas is substantial with 16 percentage points. The highest levels of deprivation by region are found in Batken (46%) and Chui oblast (37.5%), while Issykul (5%) and Bishkek city (5%) have the lowest deprivation rate (see Table 28).

Improved sanitation (toilet facility)

As in the previous case the indicator for improved sanitation follows the definition used for the N-MPI (see Gassmann, Perinetti and Timar, 2019).. A safely managed sanitation facility is defined as an unshared flushed toilet facility on the premises (see Box 7). Table 16 shows that only 24% of children have access to improved sanitation (i.e. toilet flush to piped sewerages system, septic tank or pit latrine). Furthermore, 99.5% of children live in a household with the toilet facility on the premises, and 98.3% do not share the facility with others which are not members of the household.

> **Box 7.** Improved sanitation (toilet facility) deprivation definition
>
> Children are defined as deprived if they live in a household without an unshared flushed toilet facility on the premises.
>
> MICS variables:
>
> WS11 – Type of toilet facility.
>
> WS14 – Location of toilet facility.
>
> WS15 – Toilet facility is shared with others who are not members of the household.
>
> Deprived if:
>
> WS11 = 14 (flush to open dry), 18 (flush to DK where), 21 (improved pit latrine), 22 (pit latrine with slab), 23 (open pit), 31 (composting toilet), 41 (bucket), 51 (hanging toilet/latrine), 95 (no facility/bush/field), 96 (other);
>
> WS14 = 3 (elsewhere – no in own dwelling/yard/plot); and/or,
>
> WS15 = 1 (Yes).

Table 16: Percentage of children by type of toilet facility

Toilet facility		Own dwelling/ yard	Not shared
Flush to piped sewerage system	14.2%	99.9%	97.1%
Flush to septic tank	1.0%	100.0%	99.4%
Flush to pit latrine	9.0%	99.9%	99.7%
Flush to open drain	0.0%	100.0%	100.0%
Flush to don't know where	0.0%	100.0%	100.0%
Ventilated improved pit latrine	2.4%	99.8%	98.9%
Pit latrine with slab	73.3%	99.3%	98.4%
Pit latrine without slab / open pit	0.1%	100.0%	100.0%
Total	100.0%	99.5%	98.3%

Source: Own calculations using MICS 2018.

Based on the sanitation deprivation definition, 76% of children are deprived of improved sanitation (Table 17). There is a substantial gap between urban (50%) and rural (89%) areas accounting for 39 percentage points. In addition, sanitation deprivation rates differ by ethnic group with 32% of Russian children, 77% of Kyrgyz children and 88.1% of ethnic Uzbek children deprived. By region, the highest deprivation rates are found in Osh (99%), while Bishkek city (38%) and Batken (44%) have the lowest deprivation rates (see Table 28).

Table 17. Percentage of children deprived – Improved sanitation (toilet facility)

Age group	No deprived	Deprived	Total
0- 2 yrs.	23.4%	76.7%	100.0%
3- 4 yrs.	25.6%	74.4%	100.0%
5- 14 yrs.	23.2%	76.8%	100.0%
15- 17 yrs.	24.5%	75.5%	100.0%
Total	23.7%	76.3%	100.0%

Source: Own calculations using MICS 2018.

Heating

An important living standard indicator in countries such as the Kyrgyz Republic with long and cold winters is the availability of space heating with an adequate and sustainable fuel source (see Box 8). Two alternative options are proposed for heating deprivation, with the first allowing for a larger variety of heating system. The second option follows the N-MPI and considers only access to a central heating system as an appropriate heating source. Table 18 shows that only 9% of children live in a household with central heating, while the majority (72%) lives in a household which utilizes a traditional cookstove with a chimney for heating. Yet, few of those use fuel which is considered adequate or sustainable.

Hence, heating deprivation rates are quite high with 88% of children being deprived (Table 19). The difference with the stricter definition is marginal. Overall, there is a large gap between urban (67%) and rural (98%). In addition, results show signifcant differences between Russian children (41.7%), and Kyrgyz and Uzbek children (89% and 95% respectively). By region, the highest deprivation rates are found in Osh (99.7%), while Bishkek city (55%) has the lowest deprivation rate (see Table 28). Yet, even in the city, more than half of the children are deprived of an adequate heating system.

Box 8. Heating deprivation definition

Children are defined as deprived if they live in a household without an adequate system for space heating (i.e. central heating; or, space heater or cookstove with a chimney and fuelled by solar air heater, electricity, piped natural gas, liquefied petroleum gas (LPG) / cooking gas, biogas or alcohol / ethanol.

MICS variables:

EU6 – Type of space heating in household.

EU7 – Space heater have a chimney

EU8 – Type of energy source for heater.

Deprived if:

EU6 = 6 (three stone stove / open fire), 96 (other) or 97 (no space heating); or,

EU6 = 2 (manufactured space heater), 3(traditional space heater), 4 (manufactured cookstove) or 5 (traditional cookstove); and, EU7 = 2 (No) or 8 (DK), or EU8 > 6 (gasoline/diesel, kerosene/paraffin, coal/lignite, charcoal, wood, crop residue, animal dung/waste, processed biomass, garbage/plastic, sawdust or other).

Table 18. Percentage of children by space heating

Space heating		Chimney	Adequate fuel
Central heating	8.7%		
Manufactured space heater	6.1%	36.2%	80.2%
Traditional space heater	3.4%	92.0%	8.6%
Manufactured cookstove	10.0%	96.8%	15.5%
Traditional cookstove	71.7%	100.0%	1.1%
Three stone stove / open fire	0.2%	n.a.	14.2%
Total	100.0%		

Source: Own calculations using MICS 2018.

Table 19. Percentage of children deprived – Heating

Age group	Not deprived	Deprived	Total	Alternative option		
				Not deprived	Deprived	Total
0- 2 yrs.	10.5%	89.5%	100.0%	7.7%	92.3%	100.0%
3- 4 yrs.	12.3%	87.7%	100.0%	9.9%	90.1%	100.0%
5- 14 yrs.	11.6%	88.4%	100.0%	8.4%	91.6%	100.0%
15- 17 yrs.	12.9%	87.1%	100.0%	10.0%	90.0%	100.0%
Total	11.6%	88.4%	100.0%	8.7%	91.4%	100.0%

Source: Own calculations using MICS 2018.

Overcrowding

Following the N-MPI for the Kyrgyz Republic (see Gassmann, Perinetti and Timar, 2019), overcrowding is included as a proxy for inadequate housing conditions, which is also related with SGD target 11.1: "Ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums". Overcrowding is defined based on the number of persons per bedroom (see Box 9).

Box 9. Overcrowding deprivation definition

Children are defined as deprived if they live in a household with more than three persons per bedroom.

MICS variables:

HC3 – Number of rooms used for sleeping.

HH48 – Number of household members.

Deprived if:

(HH48 / HC3) > 3.

Table 20. Percentage of children deprived – Overcrowding

Age group	No deprived	Deprived	Total
0- 2 yrs.	77.0%	23.0%	100.0%
3- 4 yrs.	76.5%	23.5%	100.0%
5- 14 yrs.	80.8%	19.2%	100.0%
15- 17 yrs.	89.1%	11.0%	100.0%
Total	80.4%	19.6%	100.0%

Source: Own calculations using MICS 2018.

Overall, 58% of children live in a household with 4 to 6 household members, and 57% of children live in a household with only 1 or 2 bedrooms. Based on the proposed deprivation definition, 20% of children are living in overcrowded circumstances. The percentage of children deprived is slightly higher for children between 0-2 and 3-4 years old (23% and 23.5% respectively) than for older children between 5-14 and 15-17 years old (19% and 11% respectively) (Table 20). Overcrowding is particularly an issue among Kyrgyz and Uzbek children with 21% and 19% deprivation rates, respectively). From a regional perspective, the highest deprivation rate is found in Naryn (33%), while Issykul (13.5%), Bishkek city (14%) and Batken (15%) have the lowest deprivation rates (see Table 28).

Dimension 5: Social inclusion and protection

Social inclusion and protection from violence is a relevant dimension for children because of the vulnerabilities relatively to their age (UNICEF, 2017). Moreover, the Convention on the Rights of the Child in article 3 establishes that "state parties undertake to ensure the child such protection and care as is necessary for his or her well-being, taking into account the rights and duties of his or her parents, legal guardians, or other individuals legally responsible for him or her, and, to this end, shall take all appropriate legislative and administrative measures." (United Nations, 1990). Following this, the 2030 Agenda for Sustainable Development established as target 16.2: "End abuse, exploitation, trafficking and all forms of violence against and torture of children".

Four indicators are chosen to measure social inclusion and protection: access to information, having a birth certificate, living with parents, and exposure to violence.

Information

Article 13 of the Convention on the Rights of the Child states that "The child shall have the right to freedom of expression; this right shall include freedom to seek, receive and impart information and ideas of all kinds, regardless of frontiers, either orally, in writing or in print, in the form of art, or through any other media of the child's choice." (United Nations, 1990). Lack of access to internet at home is chosen to measure information deprivation in the Kyrgyz Republic for children between 5 and 17 years old (see Box 10). The indicator will only be included for children 5 years and older. Access to information becomes important once children start attending school and during adolescence in order form their own opinions and to interact with others through social media. As such, this indicator also has a component of social inclusion. Note, that MICS 2018 only contains general information on the availability of internet at the household. We do not know to what extent children individually have access. Hence, we assume that children have access if internet is available in the household.

Box 10. Information deprivation definition

Children between 5 and 17 years old are defined as deprived if they live in a household without access to Internet.

MICS variables:

HC13 – Access to Internet at home.

Deprived if:

HC13 = 2 (No)

Overall, 26.5% of children aged 5 to 17 are deprived of access to internet at home (Table 21). The percentage of children without internet access is in rural areas (31%) is almost double the rate in urban areas (17%). Similarly, deprivation rates are considerably lower for children of ethnic Russian origin (8%) versus Kyrgyz and Uzbek children (26% and 36.5% respectively). Looking at regions, the highest deprivation rate is found in Batken (48%) while the lowest rates are found in Bishkek and Osh cities (12% and 16% respectively) (see Table 28).

Table 21. Percentage of children deprived – Information

Age group	Not deprived	Deprived	Total
0- 2 yrs.	n.a.	n.a.	n.a.
3- 4 yrs.	n.a.	n.a.	n.a.
5- 14 yrs.	73.0%	27.0%	100.0%
15- 17 yrs.	76.0%	24.0%	100.0%
Total	73.5%	26.5%	100.0%

Source: Own calculations using MICS 2018.

Birth registration

Article 7 of the Convention on the Rights of the Child states that "The child shall be registered immediately after birth and shall have the right from birth to a name, the right to acquire a nationality […]" (United Nations, 1990). Having a birth certificate is often a requirement for the access of public services, such as education and health. Hence, it is important for children to be registered. However, the information on birth registration is only available for children between 0 and 4 years old (see Box 11).

Box 11. Birth registration deprivation definition

Children between 0 and 4 years old are defined as deprived if they do not have a birth certificate.

MICS variables:

BR1 – Birth certificate.

Deprived if:

BR1 = 3 (No)

Almost all children up to the age of 4 have been registered at birth. Only 2.9% of children between 0 and 4 years old are deprived. The rate for children 0-2 years old (4.5%) is higher than for 3-4 years old children (0.6%) which may indicate late rather than lack of registration (Table 22). The lack of birth registration is slightly higher among girls (3.5%) than boys (2%). A similar gap is noticed between rural (3%) and urban (2%) areas. There are also ethnic differences as the deprivation rate for ethnic Russian children (0.8%) is lower than for Uzbek (2%), Kyrgyz (3%) and children of other ethnic groups (7%). At the subnational level, the highest deprivation rate is found in Chui (6%) (see Table 27).

Table 22. Percentage of children deprived – Birth registration

Age group	Not deprived	Deprived	Total
0- 2 yrs.	95.5%	4.5%	100.0%
3- 4 yrs.	99.4%	0.6%	100.0%
5- 14 yrs.	n.a.	n.a.	n.a.
15- 17 yrs.	n.a.	n.a.	n.a.
Total	97.1%	2.9%	100.0%

Source: Own calculations using MICS 2018.

Living together with the parents

Article 7 of the Convention on the Rights of the Child establishes that "The child shall be registered immediately after birth and […] as far as possible, the right to know and be cared for by his or her parents." (United Nations, 1990). An estimated 740,000 Kyrgyz live and work abroad, which is about 13% of the total population (World Bank, 2019a). According to UNICEF, 11% of children had at least one biological parent living abroad in 2014 (UNICEF, 2019). Even though the annual remittance inflow was a staggering 2.5 billion USD in 2017 (World Bank, 2019b), supporting many households to make ends meet, children left behind are more vulnerable to economic and social risks than children in non-migrant households. Accounting for the high migration prevalence, but also considering empirical evidence that children left behind are not necessarily worse off than their peers (see, e.g., Waidler et al., 2017; Gassmann, et al., 2017; Gassmann, et al., 2016), deprivation in this context is when both the biological father and mother are not living in the same household as the child. This definition also covers other social situations, such as divorce or parents that passed away (see Box 12).

Box 12. Living with parents deprivation definition

Children between 0 and 17 years old are defined as deprived neither the natural mother nor the natural father live in the child's household.

MICS variables:

HL12 – Is natural mother alive.

HL13 – Does natural mother live in household.

HL16 – Is natural father alive.

HL17 – Does natural father live in household.

Deprived if:

HL12 = 2 (No), HL13 = 2 (No), HL16 = 2 (No) and HL17 = 2 (No).

Based on the definition of parental deprivation 9% of all children are deprived, which means that neither of their biological parent is living in the same household. The deprivation rate increases with age (Table 23) indicating that defer the decision to migrate until the children are of a certain age. The percentage of deprived children in rural areas (11%) is higher than in urban areas (7%). Parental deprivation rates are highest among ethnic Kyrgyz children (10.7%). At the subnational level, the highest deprivation rates are found in Jalal-Abad (14%) and Naryn (12%) (see Table 28).

Table 23. Percentage of children deprived – Living parents

Age group	Not deprived	Deprived	Total
0- 2 yrs.	96.0%	4.0%	100.0%
3- 4 yrs.	90.3%	9.7%	100.0%
5- 14 yrs.	89.2%	10.8%	100.0%
15- 17 yrs.	88.3%	11.7%	100.0%
Total	90.6%	9.4%	100.0%

Source: Own calculations using MICS 2018.

Punishment

Article 19 of the Convention on the Rights of the Child establishes that "state parties shall take all appropriate legislative, administrative, social and educational measures to protect the child from all forms of physical or mental violence, injury or abuse, neglect or negligent treatment, maltreatment or exploitation, including sexual abuse, while in the care of parent(s), legal guardian(s) or any other person who has the care of the child.", and article 37 mentions that "no child shall be subjected to torture or other cruel, inhuman or degrading treatment or punishment." (United Nations, 1990).

MICS 2018 contains information about how parents or other caregivers are disciplining children. This information is available for all children aged 1-4, and for one randomly selected child aged 5-14 per household. The way children are disciplined is used as a proxy for violence against children. Two different variables are used for different age groups according to the MICS 2018 data. Using these data, we then extrapolate to other children in the household assuming that the type of punishment used by adults within the household towards any child applies to all children between 0 and 14 years old (see Box 13).

Box 13. Punishment deprivation definition

Children between 0 and 14 years old are defined as deprived if any adult in the household has punished any child (1-14) by: shaking; shouting, yelling or screaming; spanking, hitting or slapping with bare hand, belt, brush, stick, etc; calling dumb, lazy, etc; hitting or slapping on the face, head, ears, hand, arm or leg; and/or, beating up.

MICS variables:

UCD2 – Child (1-4 years old) discipline methods used by any adult in the household.

FCD2 – Child (5-14 years old) discipline methods used by any adult in the household.

Deprived if:

Children 0-14 years old are deprived if:

- For any child (1-4 years old), UCD2 = C (shook), D (shouted), F (spanked, hit or slapped on the bottom with bare hand), G (hit with a belt, stick, etc), H (called dumb, lazy, etc.), I (hit or slapped on the face, head or ears), J (hit or slapped on the hand, arm or leg), K (bet up); or,

- For any child (5-14 years old), FCD2 = C (shook), D (shouted), F (spanked, hit or slapped on the bottom with bare hand), G (hit with a belt, stick, etc), H (called dumb, lazy, etc.), I (hit or slapped on the face, head or ears), J (hit or slapped on the hand, arm or leg), K (bet up).

Table 24 shows the different type of punishment methods used by adults with children between 1 and 4 years old (UCD2) and between 5 and 14 years old (FCD2). The most common method is "explained wrong behavior" followed by "took away privileges". These two methods are considered appropriate for disciplining a child. All other methods are considered inappropriate punishment.

Table 24. Methods of child discipline used by any adult in the household

Child discipline method	Age 1-4 (UCD2)	Age 5-14 (FCD2)
Took away privileges	61.7%	81.0%
Explained wrong behavior	79.3%	97.4%
Shook him/her	20.2%	24.9%
Shouted, yelled, screamed	54.6%	71.7%
Gave something else to do	31.7%	66.9%
Spanked, hit, slapped on bottom with bare hand	32.6%	33.4%
Hit with belt, hairbrush, stick or other hand object	1.6%	3.8%
Called dumb, lazy or another name	15.5%	37.5%
Hit / slapped on the face, head or ears	2.9%	5.2%
Hit / slapped on hand, arm or leg	9.9%	12.4%
Beat up, hit over and over as hard as one could	0.9%	1.3%

Source: Own calculations using MICS 2018.

Using the deprivation definition outlined above, 76% of children aged 0-14 are deprived, meaning that they live in a household where adults use inappropriate punishment mechanisms. The deprivation rate increases with age (Table 25). There are no relevant differences by gender, ethnicity or area. At the subnational level, the highest deprivation rates are found in Osh city (87%) and Chui oblast (86%) (see Table 28).

Table 25. Percentage of children deprived – Punishment

Age group	Not deprived	Deprived	Total
0- 2 yrs.	27.8%	72.2%	100.0%
3- 4 yrs.	18.2%	81.8%	100.0%
5- 14 yrs.	23.9%	76.1%	100.0%
15- 17 yrs.	n.a.	n.a.	n.a.
Total	23.9%	76.1%	100.0%

Source: Own calculations using MICS 2018.

Indicator deprivation incidence

Table 27 provides an overview of all indicators by age-group as discussed above. In total, 13 indicators were defined covering 5 deprivation dimensions. Given that not all indicators are available for all age groups, the number of indicators varies from 9 indicators for the oldest age group to 12 indicators for the youngest age group.

Table 26. Indicator definitions

Dimension	Indicator	Definition
Nutrition	Stunting (children from 0 to 4)	Children between 0 and 4 years old are defined as deprived (stunted) if their height-for-age is more than two standard deviations below the WHO Child Growth Standards median.
Health	Immunization / vaccination (children from 0 to 2)	Children between 0 and 2 years old are defined as deprived if they have not been given all BCG (Bacille Calmette-Guerin), Pentavalent (Diphtheria, Pertussis, Tetanus, Hepatitis B and Hib), Pneumococcal conjugate and MMR (measles, mumps and rubella) vaccinations, and Polio drops.
	Handwashing (fixed facility)	Children are defined as deprived if they live in a household where there is no fixed handwashing facility (sink or tap) with both water and soap.
	Indoor air pollution	Children are defined as deprived if they live in a household where the main cooking appliance is either open fire or fuel stove without a chimney, or if they do not have food cooked in household.
Education	School attendance (children from 3 to 17)	Children between 3 and 7 years old are defined as deprived if they are not currently attending pre-school; children from 8 to 16 are deprived if they are not currently attending school at the grade adequate for their age; children aged 17 are deprived if they have not completed grade 9.
	Early childhood development (children from 0 to 2)	Children between 0 and 1 years old are defined as deprived if they do not have any book or toy at home; children at age 2 are defined as deprived if they are not have any book or toy at home and if there is no interaction with a caregiver adult (read books, told stories, sing songs, took outside, play with, count/draw).
Living standard	Drinking water	Children are defined as deprived if they live in a household that does not have access to an improved source of water (i.e. always sufficient piped water, tube well, protected dug well or protected spring).
	Improved sanitation / toilet	Children are defined as deprived if they live in a household without an unshared flushed toilet facility on the premises
	Heating	Children are defined as deprived if they live in a household without an adequate system for space heating, (i.e. central heating; or, space heater or cookstove with a chimney and fuelled by solar air heater, electricity, piped natural gas, liquefied petroleum gas (LPG) / cooking gas, biogas or alcohol / ethanol).
	Overcrowding	Children are defined as deprived if they live in a household with more than three persons per bedroom.

Social inclusion & protection	Information (children from 5 and 17)	Children between 5 and 17 years old are defined as deprived if they live in a household without access to Internet
	Birth registration (children from 0 to 4)	Children between 0 and 4 years old are defined as deprived if they do not have a birth certificate.
	Parents present	Children between 0 and 17 years old are defined as deprived neither the natural mother nor the natural father live in the child's household.
	Punishment (children from 0 to 14)	Children between 0 and 14 years old are defined as deprived if any adult in the household has punished any child (1-14) by: shaking; shouting, yelling or screaming; spanking, hitting or slapping with bare hand, belt, brush, stick, etc; calling dumb, lazy, etc; hitting or slapping on the face, head, ears, hand, arm or leg; and/or, beating up.

Table 27. Summary of deprivation indicators by dimension and age group

		Total	Age group			
			0 – 2	3 - 4	5 - 14	15 – 17
Nutrition	Stunting	11.8%	11.6%	11.9%	n.a.	n.a.
Health	Vaccination	47.7%	47.7%	n.a.	n.a.	n.a.
	Handwashing	39.4%	40.7%	42.2%	38.8%	37.0%
	Indoor air pollution	18.4%	20.0%	22.7%	17.5%	15.0%
Education	Education	28.5%	85.8%	57.5%	6.0%	6.3%
Living standard	Drinking wáter	20.0%	21.3%	18.7%	20.3%	18.0%
	Improved sanitation	76.3%	76.7%	74.4%	76.8%	75.5%
	Heating	88.4%	89.5%	87.7%	88.4%	87.1%
	Overcrowding	19.6%	23.0%	23.5%	19.2%	11.0%
Social inclusion & protection	Information- Internet	26.5%	n.a.	n.a.	27.0%	24.0%
	Birth certificate	2.9%	4.5%	0.6%	n.a.	n.a.
	Living with parents	9.4%	4.0%	9.7%	10.8%	11.7%
	Punishment	76.1%	72.2%	81.8%	76.1%	n.a.

Source: Own calculations using MICS 2018.

The indicators with the highest deprivation rates are heating (88%) and improved sanitation (76%), both from the living standard dimension. They are in the top-4 for all age groups. Nevertheless, there are some differences by age group. In the case of 0-2 year old children, the second highest deprivation rate is found for education (85.5%) and the third for punishment (72%). For 3-4 year old children the second highest deprivation rate is for punishment (82%) and the third is for education (58%). In the case of 5-14 year old children the third

place is for punishment (76%) and the fourth is for handwashing practices (39%), while for 15-17 year old children the third place is for handwashing practices (37%) and the fourth place for information (24%) (see Table 27).

The number of simultaneous deprivations is shown in Figure 2. Almost one in four children (23.5%) is deprived in four indicators. Less than 2% are not deprived at all. On the other hand, 6.5% of all children are simultaneously deprived in 7 or more indicators.

Figure 2. Distribution of children by number of simultaneous deprivations, %
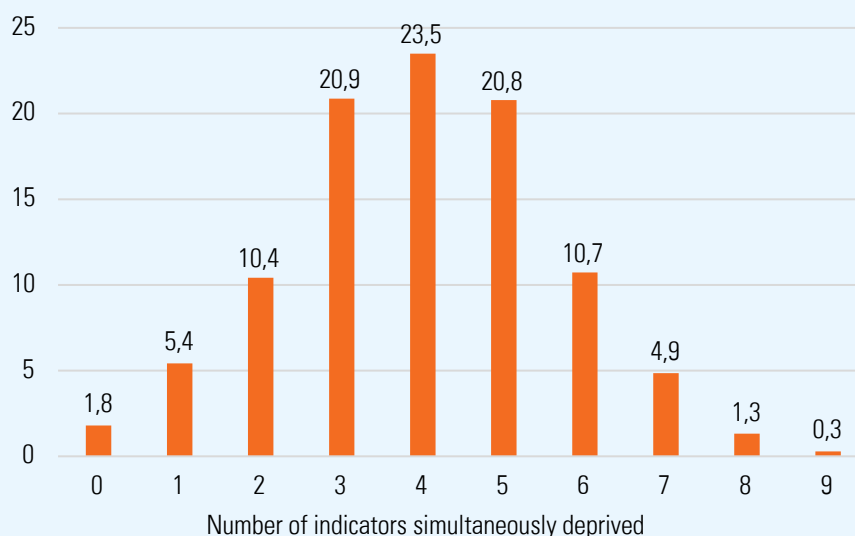
Source: Own calculations using MICS 2018.

On average, children are deprived in four indicators simultaneously. Simultaneous deprivations are highest among the youngest children and lowest among the oldest age-group. A part of it can be explained by the larger number of indicators used for very young children. There also relevant difference between area, ethnicity and region. On average the number of simultaneous deprivations in rural areas (4.5) is higher than in urban areas (2.9).

Children of Uzbek (4.4) and Kyrgyz (4.0) ethnicity have higher average numbers of simultaneous deprivations than ethnic Russian children (1.9). With respect to the regions, the lowest average number of simultaneous deprivations is found in Bishkek city (2.4), Osh city (3.4) and Issykul oblast (3.4), while Osh (4.8), Jalal-Abad (4.5) and Batken oblast (4.6) have the highest averages for simultaneous deprivations.

Table 28. Child deprivation rates by indicator

		Nutrition		Health		Education	Living standard				Social inclusion & protection			
		Stunting	Vaccination	Hand-washing	Air pollution	Education	Water	Sanitation	Heating	Over-crowding	Information	Birth certificate	Living with parents	Punishment
Total		11.8%	47.7%	39.4%	18.4%	28.5%	20.0%	76.3%	88.4%	19.6%	26.5%	2.9%	9.4%	76.1%
Age group	0- 2 yrs.	11.6%	47.7%	40.7%	20.0%	85.8%	21.3%	76.7%	89.5%	23.0%	n.a.	4.5%	4.0%	72.2%
	3- 4 yrs.	11.9%	n.a.	42.2%	22.7%	57.5%	18.7%	74.4%	87.7%	23.5%	n.a.	0.6%	9.7%	81.8%
	5- 14 yrs.	n.a.	n.a.	38.8%	17.5%	6.0%	20.3%	76.8%	88.4%	19.2%	27.0%	n.a.	10.8%	76.1%
	15- 17 yrs.	n.a.	n.a.	37.0%	15.0%	6.3%	18.0%	75.5%	87.1%	11.0%	24.0%	n.a.	11.7%	n.a.
Sex	Male	12.5%	47.4%	38.0%	17.7%	28.4%	20.4%	76.4%	87.9%	19.2%	25.9%	2.3%	9.3%	76.4%
	Female	11.0%	47.9%	41.0%	19.2%	28.7%	19.7%	76.2%	88.9%	20.1%	27.1%	3.5%	9.5%	75.8%
Area	Urban	8.8%	53.6%	16.2%	6.9%	26.4%	9.0%	49.9%	66.9%	17.4%	16.7%	2.2%	6.8%	77.7%
	Rural	13.1%	44.9%	50.3%	23.8%	29.5%	25.2%	88.7%	98.4%	20.7%	31.1%	3.2%	10.6%	75.4%
Ethnicity	Kyrgyz	11.0%	46.9%	39.6%	18.9%	27.4%	20.8%	76.6%	89.0%	20.6%	26.1%	3.0%	10.7%	76.1%
	Russian	5.4%	56.2%	4.2%	0.0%	20.2%	12.5%	32.2%	41.7%	2.9%	8.0%	0.8%	1.8%	75.0%
	Uzbek	15.9%	51.0%	53.1%	23.6%	35.6%	11.4%	88.1%	94.7%	19.4%	36.5%	1.8%	5.6%	75.9%
	Other	13.4%	46.1%	21.3%	8.0%	32.0%	37.9%	67.2%	91.7%	16.4%	20.0%	7.4%	4.6%	78.9%
Region	Batken	11.9%	46.9%	52.0%	76.5%	33.2%	46.3%	43.8%	97.3%	15.1%	47.8%	1.2%	7.4%	51.8%
	Jalal-Abad	15.5%	47.1%	51.8%	36.4%	31.3%	27.0%	91.1%	89.4%	23.0%	22.0%	2.5%	13.6%	69.8%
	Issykul	14.2%	51.7%	5.3%	0.0%	25.3%	4.8%	86.8%	94.4%	13.5%	20.5%	0.4%	9.8%	80.0%
	Naryn	6.5%	36.6%	19.3%	8.1%	19.3%	23.3%	95.5%	95.9%	33.2%	37.2%	3.1%	11.7%	77.7%
	Osh	13.7%	41.9%	78.3%	20.8%	29.2%	12.7%	99.3%	99.7%	21.4%	38.1%	2.7%	9.7%	74.8%
	Talas	10.0%	45.4%	35.4%	7.2%	28.9%	9.1%	76.3%	96.5%	18.7%	45.4%	2.2%	7.5%	84.7%
	Chui	10.1%	49.6%	19.9%	3.2%	29.4%	37.5%	69.9%	93.7%	18.4%	15.0%	6.0%	10.1%	86.3%
	Bishkek city	5.9%	58.3%	11.1%	0.2%	24.6%	5.0%	38.3%	54.6%	14.1%	11.6%	3.0%	4.0%	80.0%
	Osh city	10.9%	52.9%	15.9%	4.6%	32.4%	11.9%	59.9%	74.9%	23.7%	16.3%	3.1%	9.1%	86.9%

Source: Own calculations using MICS 2018.

3. Multidimensional Child Poverty Assessment for the Kyrgyz Republic

In the previous section thirteen indicators organized in five dimensions were identified differentiating between four age groups. The number of dimensions and indicators vary across age group because not all indicators are available for all children. In the context of aggregating and estimating the C-MPI, this imbalance has implications for dimension and indicator weights. As a result, the same indicator can have a different weight in a different age group. The organization of indicators into dimensions and the number of dimensions and indicators matters for the final measure of the C-MPI. Hence, different combinations may lead to different multidimensional child poverty rates. For the aggregation and estimation of the C-MPI, three options are used (see Table 27):

- Option A: 5 dimensions with 11 indicators for 0-2 and 3-4 years old children; 4 dimensions with 10 indicators for 5-14 years old children, and 9 indicators for 15-17 years old children;

- Option B: 4 dimensions for all (merging nutrition and health) with 11 indicators for 0-2 and 3-4 years old children, 10 indicators for 5-14 years old children, and 9 indicators for 15-17 years old children;

- Option C: 5 dimensions with 12 indicators for 0-2 years old children (including vaccination), 11 indicators for 3-4 years old children; 4 dimensions with 10 indicators for 5-14 years old children, and 9 indicators for 15-17 years old children.

Deprivations and weights

The Alkire-Foster methodology is used to construct the C-MPI as in the case of the N-MPI. Information is aggregated across individuals to produce three measures of multidimensional child poverty:

- (H) Incidence of Multidimensional Child Poverty, measuring the proportion of children that is multidimensional poor;

- (A) Average Intensity of Deprivation Among Poor Children, indicating the average proportion of weighted indicators in which multidimensionally poor children are deprived; and,

- (M) Multidimensional Child Poverty Index, being the product between (H) and (A).

To define a child as multidimensionally poor a threshold of one third (1/3 or 33.33%) of the weighted indicators is defined as in the case of the N-MPI. Equal weights for each dimension are defined (i.e. 1/5 in options A and C, and 1/4 in option B). Within dimensions, indicators have equal weights (see Table 28).

Table 29. Selected dimensions, indicators and weights to measure multidimensional child poverty

Dimension	Indicator	Option A				Option B				Option C			
		0-2	3-4	5-14	15-17	0-2	3-4	5-14	15-17	0-2	3-4	5-14	15-17
Nutrition	Undernourishment- stunting	1/5	1/5			1/12	1/12			1/5	1/5		
Health	Vaccination									1/15			
	Handwashing	1/10	1/10	1/8	1/8	1/12	1/12	1/8	1/8	1/15	1/10	1/8	1/8
	Indoor air pollution	1/10	1/10	1/8	1/8	1/12	1/12	1/8	1/8	1/15	1/10	1/8	1/8
Education	Education	1/5	1/5	1/4	1/4	1/4	1/4	1/4	1/4	1/5	1/5	1/4	1/4
Living standard	Drinking water	1/20	1/20	1/16	1/16	1/16	1/16	1/16	1/16	1/20	1/20	1/16	1/16
	Improved sanitation- toilet	1/20	1/20	1/16	1/16	1/16	1/16	1/16	1/16	1/20	1/20	1/16	1/16
	Heating	1/20	1/20	1/16	1/16	1/16	1/16	1/16	1/16	1/20	1/20	1/16	1/16
	Overcrowding	1/20	1/20	1/16	1/16	1/16	1/16	1/16	1/16	1/20	1/20	1/16	1/16
	Information- Internet			1/12	1/8			1/12	1/8			1/12	1/8
Social inclusion & protection	Birth certificate	1/15	1/15			1/12	1/12			1/15	1/15		
	Living with parents	1/15	1/15	1/12	1/8	1/12	1/12	1/12	1/8	1/15	1/15	1/12	1/8
	Punishment	1/15	1/15	1/12		1/12	1/12	1/12		1/15	1/15	1/12	

Source: Own calculations using MICS 2018.

Multidimensional Child Poverty

Table 30 presents the results for the three different options of the C-MPI. Overall, between 51% and 54% of children are multidimensionally deprived with an average intensity of deprivation between 46% and 47.5% of the weighted indicators which results in an C-MPI between 0.232 and 0.256.

Comparing the three options, option B (i.e. merging nutrition and health into one dimension) results in higher multidimensional child poverty rate and index. The different C-MPI options only affect children under 5 (Table 30). In option B a lower weight is assigned to stunting, which is no longer a separate dimension for children under 5 (see Table 29). Stunting is an indicator with a relatively low deprivation rate. The reduction from five to four dimensions increases the weight of the living standard dimension for children under 5, which includes indicators with high deprivation rates. Correspondingly, option A leads to a lower multidimensional poverty rate as it gives a higher weight to nutrition and lower weight to living standard indicators for children under 5. Option C differs from A by including vaccination as an additional health indicator for children aged 0-2. While the overall C-MPI only increases marginally, it increases the multidimensional child poverty measures for the youngest age-group, but still not to the same extent as option B. The different options of the C-MPI have no effect on the ranking of the different age groups. The youngest children are always the most vulnerable and the risk of multidimensional poverty decreases with increasing age with all three options.

Table 30. C-MPI options, by age-group

		Total	Age-group			
			0 - 2 yrs.	3 - 4 yrs.	5 - 14 yrs.	15 - 17 yrs.
Option A	H- Prevalence	50.9%	74.6%	58.5%	46.0%	27.2%
	A- Intensity	45.6%	47.7%	48.1%	43.8%	44.8%
	M- Child MPI	0.232	0.356	0.281	0.201	0.122
Option B	H- Prevalence	53.9%	85.2%	65.7%	46.0%	27.2%
	A- Intensity	47.5%	51.8%	51.7%	43.8%	44.8%
	M- Child MPI	0.256	0.442	0.339	0.201	0.122
Option C	H- Prevalence	51.5%	80.8%	58.5%	46.0%	27.2%
	A- Intensity	45.6%	47.7%	48.1%	43.8%	44.8%
	M- Child MPI	0.235	0.386	0.281	0.201	0.122

Source: Own calculations using MICS 2018.

All poverty measures are just estimates of the 'true' situation. The reliability of these estimates depends on the quality of the underlying data, the choice of the dimensions and indicators and the assumptions made while calculating the measures. While the poverty level provides an indication of the severity of the problem, what matters in the end is the ranking of different groups of children and whether the ranking changes under different assumptions, i.e. in our case, the three C-MPI options. Figure 3 compares the multidimensional child poverty rates for different population groups. Irrespective of the option chosen, multidimensional child poverty is always substantially higher in rural areas than in urban areas. Regarding the ethnic background of the children, Uzbek children have the highest poverty rates, followed by Kyrgyz children and children of other ethnic groups. Ethnic Russian children have the lowest multidimensional poverty rates. It is interesting to note that the change from option A to B has the largest effect in urban areas and for ethnic Russian children.

The situation is less clear-cut when comparing poverty rates by region. Irrespective of the selected option, child poverty rates are highest in Batken and Osh oblast, followed by Jalal-Abad and Talas. Naryn, Chui and Osh city have similar poverty rates, but the ranking changes depending on the selected option. Undoubtedly the lowest multidimensional child poverty rates are measured for Issykul and Bishkek.

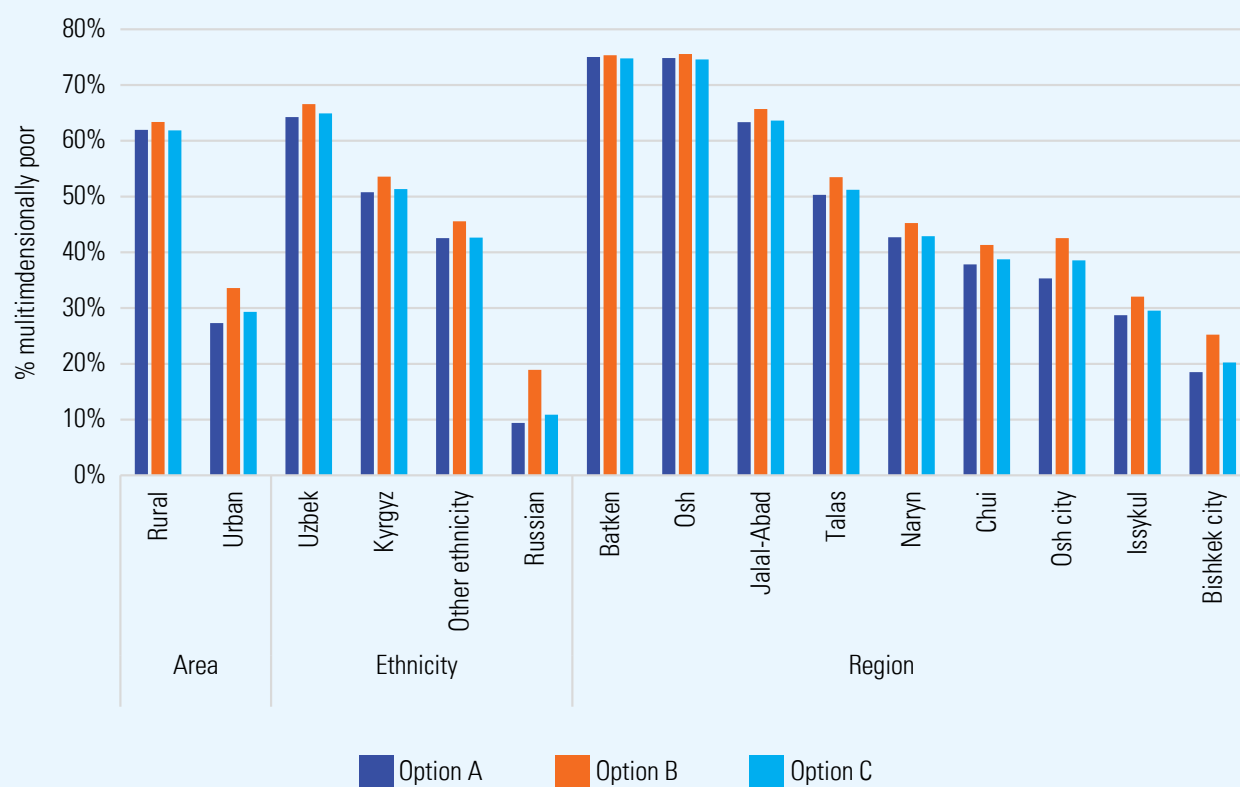**Figure 3.** Multidimensional child poverty rates (H-prevalence), different options

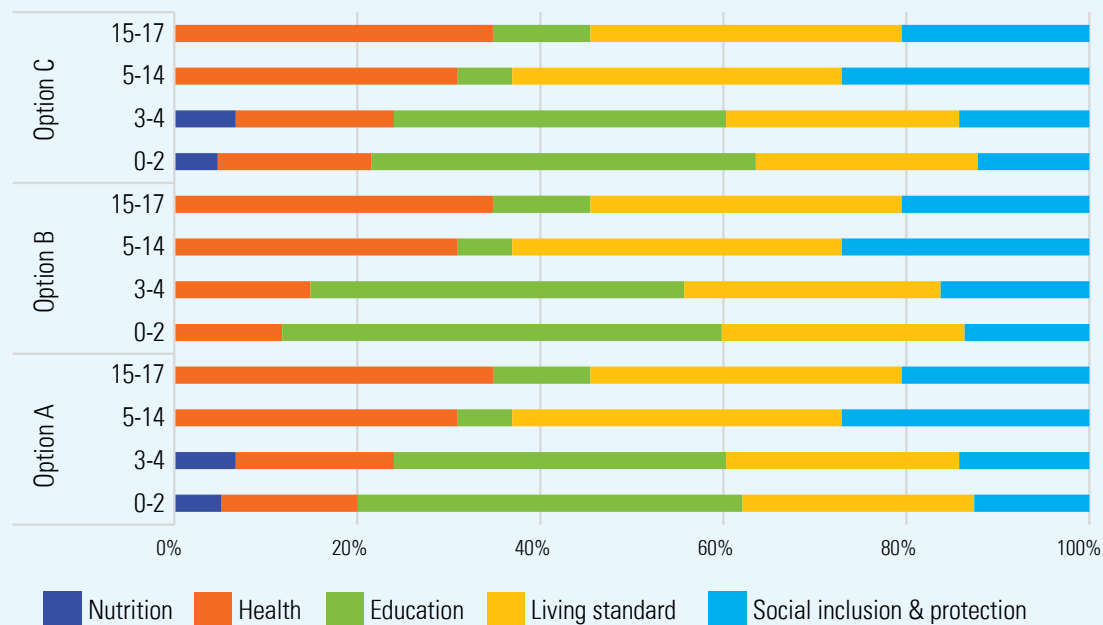**Table 31.** Multidimensional child poverty index, different options

		Option A			Option B			Option C		
		H-Prevalence	A-Intensity	M-Child MPI	H-Prevalence	A-Intensity	M-Child MPI	H-Prevalence	A-Intensity	M-Child MPI
Total		50.9%	45.6%	0.232	53.9%	47.5%	0.256	51.5%	45.6%	0.235
Age group	0- 2 yrs.	74.6%	47.7%	0.356	85.2%	51.8%	0.442	80.8%	47.7%	0.386
	3- 4 yrs.	58.5%	48.1%	0.281	65.7%	51.7%	0.339	58.5%	48.1%	0.281
	5- 14 yrs.	46.0%	43.8%	0.201	46.0%	43.8%	0.201	46.0%	43.8%	0.201
	15- 17 yrs.	27.2%	44.8%	0.122	27.2%	44.8%	0.122	27.2%	44.8%	0.122
Sex	Male	50.1%	45.5%	0.228	53.0%	47.4%	0.251	50.9%	45.5%	0.231
	Female	51.9%	45.7%	0.237	54.8%	47.7%	0.261	52.2%	45.7%	0.239
Area	Urban	27.3%	43.0%	0.117	33.6%	44.6%	0.150	29.3%	43.2%	0.127
	Rural	62.0%	46.1%	0.286	63.4%	48.3%	0.306	61.9%	46.1%	0.285
Ethnicity	Kyrgyz	50.8%	45.6%	0.231	53.6%	47.6%	0.255	51.4%	45.6%	0.234
	Russian	9.4%	39.8%	0.037	18.9%	39.0%	0.074	10.9%	40.0%	0.043
	Uzbek	64.3%	46.1%	0.296	66.6%	48.0%	0.320	64.9%	46.1%	0.299
	Other ethnicity	42.5%	44.4%	0.189	45.6%	46.5%	0.212	42.6%	44.7%	0.191
Region	Batken	75.0%	47.2%	0.354	75.3%	48.6%	0.366	74.8%	46.9%	0.351
	Jalal-Abad	63.3%	47.8%	0.303	65.7%	49.6%	0.326	63.6%	47.7%	0.303
	Issyk-kul	28.7%	42.2%	0.121	32.1%	45.7%	0.146	29.5%	43.0%	0.127
	Naryn	42.7%	42.9%	0.183	45.3%	45.6%	0.206	42.9%	43.3%	0.186
	Osh	74.8%	46.0%	0.344	75.6%	47.9%	0.362	74.6%	45.9%	0.343
	Talas	50.3%	43.2%	0.217	53.5%	45.7%	0.245	51.2%	43.5%	0.223
	Chui	37.8%	44.1%	0.167	41.3%	46.9%	0.194	38.7%	44.5%	0.172
	Bishkek city	18.5%	41.7%	0.077	25.2%	43.2%	0.109	20.2%	42.2%	0.085
	Osh city	35.3%	43.9%	0.155	42.6%	46.4%	0.197	38.6%	44.0%	0.170

Source: Own calculations using MICS 2018.

Finally, Figure 4 reveals the contribution of each dimension to the C-MPI. For the older age groups (5-14 and 15-17 years), deprivation in health and living standards account for the largest share of multidimensional poverty. For the younger children, education-related deprivations are most important.

Figure 4. Contribution of each dimension to the Child MPI

Source: Own calculations using MICS 2018.

Further disaggregating the composition of multidimensional child poverty, Table 32 provides the contribution at indicator-level. Education deprivation, lack of appropriate handwashing facilities, lack of appropriate sanitation, suboptimal heating systems, exposure to corporal punishment and lack of access to internet are important contributor to the C-MPI. Indicators with higher contribution to multidimensional poverty of 0-2 and 3-4 year old children are education, punishment, heating and handwashing practices, while for 5-14 year old children, important indicators are handwashing practice, punishment, heating and improved sanitation. For 15-17 year old children, handwashing practice, heating, information and lack of improved sanitation contribute most to the C-MPI.

Table 32. Contribution of each indicator to the Child MPI

Dimension	Indicator	Option A				Option B				Option C			
		0-2	3-4	5-14	15-17	0-2	3-4	5-14	15-17	0-2	3-4	5-14	15-17
Nutrition	Stunting	5.2%	6.7%	-	-	1.8%	2.2%	-	-	4.8%	6.7%	-	-
Health	Vaccination	-	-	-	-	-	-	-	-	7.3%	-	-	-
	Handwashing	10.2%	11.0%	21.5%	22.6%	6.8%	8.1%	21.5%	22.6%	6.4%	11.0%	21.5%	22.6%
	Indoor air pollution	4.7%	6.3%	9.5%	12.2%	3.2%	4.6%	9.5%	12.2%	3.0%	6.3%	9.5%	12.2%
Education	Education	42.0%	36.3%	6.0%	10.6%	48.0%	40.8%	6.0%	10.6%	42.0%	36.3%	6.0%	10.6%
Living standard	Drinking water	2.4%	2.5%	4.1%	3.9%	2.5%	2.7%	4.1%	3.9%	2.3%	2.5%	4.1%	3.9%
	Improved sanitation	9.6%	9.5%	13.3%	13.1%	9.9%	10.1%	13.3%	13.1%	9.2%	9.5%	13.3%	13.1%
	Heating	10.6%	10.7%	14.6%	14.3%	11.4%	11.8%	14.6%	14.3%	10.3%	10.7%	14.6%	14.3%
	Overcrowding	2.7%	2.8%	4.1%	2.7%	2.8%	3.4%	4.1%	2.7%	2.5%	2.8%	4.1%	2.7%
Social inclusion & protection	Information (Internet)	-	-	7.8%	14.3%	-	-	7.8%	14.3%	-	-	7.8%	14.3%
	Birth certificate	0.7%	0.1%	-	-	0.7%	0.1%	-	-	0.6%	0.1%	-	-
	Living with parents	0.6%	1.9%	3.0%	6.2%	0.7%	2.0%	3.0%	6.2%	0.5%	1.9%	3.0%	6.2%
	Punishment	11.2%	12.2%	16.3%	-	12.3%	14.1%	16.3%	-	11.1%	12.2%	16.3%	-
Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Own calculations using MICS 2018.

Concluding Remarks

This report contained the development and analysis of a multidimensional child poverty index (C-MPI). The C-MPI is meant to supplement the N-MPI and allow for a more child-sensitive poverty analysis. The index relies on the MICS which is regularly implemented by the NSC in collaboration with UNICEF. The MICS collects a lot of child-specific data which are not available in the KIHS, such as anthropometrics, early childhood development, or how children are disciplined. These data are collected about once in four years and as such provide an important addition to the annual N-MPI, which is based on the KIHS. According to the N-MPI (Gassmann, Perinetti & Timar, 2019), multidimensional deprivation among children is deeper and more widespread among children. Given that children are more likely than any other age group to experience a larger set of multiple deprivations, child poverty is a crucial issue for the future of the country and its population.

The methodology proposed in this report takes into account global standards and practices for the measurement of multidimensional child poverty, but applies national definitions and thresholds relevant in the context of the Kyrgyz Republic. It can serve as a monitoring device of child poverty and identify dimensions that require more attention and point at groups of children that are lagging behind.

In the report three different options were presented for the C-MPI. A challenge of every C-MPI is the heterogeneity of the child population as such. Babies and toddlers have rather different needs than school-aged children or adolescents. Nevertheless, a C-MPI tries to represent all children. This implies that indicators differ across age-groups, and sometimes even dimensions. The latter is also driven by data issues. Even though the MICS is a rich source of data on children, not all information is available for all children. For example, nutritional indicators can only be calculated for children under 5. Hence, the focus is generally on malnutrition. Yet, older children may also be nutritionally deprived, for example in the case of overweight and

obesity. Vaccination rates, by experts considered a key indicator of preventive health, also have limitations. In the current case, this information is only available for children up to 2 years old. Almost half of these children have not had all vaccinations. Yet, they may still receive them as we include both children of a few months old with those that are close to 24 months old and where the likelihood of having received all vaccinations is much higher.

Given the imbalance of dimensions across age-groups in option A, option B combines nutrition with the health dimension for children under 5. This reduces the weight of nutrition in the overall measure and increases the weight of other dimensions and indicators. Given the importance of nutrition for the development of children and given the issues with vaccination as applied in option C, we recommend to use option A as the final C-MPI for the country.

Based on the analysis in this report, 51% of all children are multidimensionally deprived and, on average, they experience deprivation in 46% of the indicators. The incidence level and intensity of multidimensional child poverty results in in C-MPI of 0.232. Similar to the N-MPI (see Gassmann, Perinetti & Timar, 2019), the lack of adequate living standards, such as safe water, improved sanitation facilities and adequate heating systems contribute substantially to multidimensional child poverty.

Multidimensional child poverty is more prevalent and more intense in rural areas, where also the largest share of children live. Inequalities also appear at the regional level, although the ranking differs depending on the indicator. Overall, children living in Bishkek and in Issykul oblast enjoy a better life compared to children living in other regions. The regular analysis of child-specific multidimensional poverty will support the country in its endeavour to achieve the SDGs and improve the life of the children. Children are the future of society, hence, improving their wellbeing is a long-term investment for the government.

References

1. Adetola, A., & Olufemi, P. (2012). Determinants of Child Poverty in Rural Nigeria: A Multidimensional Approach. Global Journal of Human Social Science, 12(12).

2. Alkire, S., Dorhi, L., Gyeltshen, S., & Minten, T. (2016). Child Poverty in Buthan: Insights from Multidimensional Child Poverty Index (C-MPI) ans Qualitatie Interviews with Poor Children. National Statistics Bureau: Monograph Series No.9.

3. Alkire, S., Ul Haq, R., & Alim, A. (2019). The State of Multidimensional Child Poverty in South Asia: A Contextual and Gendered View. OPHI Working Paper No. 127.

4. Carter, B. (2017). Engaging parents in their children's education. UK Government's Department for International Development (DFID).

5. Constitution of the Kyrgyz Republic. (2010, June 27).

6. de Milano, M., & Handa, S. (2014). Child poverty and deprivation in Mali. Florence: Unicef Office of Research: Working Paper WP-2014-20.

7. de Neubourg, C., Chai, J., de Milliano, M., Plavgo, I., & Wei, Z. (2012). Cross-Country MODA Study- Multiple Overlapping Deprivation Analysis (MODA). Technical Note. Florence: Unicef Office of Research: Working Paper WP-2012-05.

8. Ferrone, L., & Chzhen, Y. (2016). Child Porverty in Armenia: National Multiple Overlapping Deprivation Analysis. Florence: Unicef Office of Reasearch.

9. Ferrone, L., Rossi, A., Salvucci, V., & Trapp, F. (2019). Child Poverty in Mozambique: National Multiple Overlaping Deprivation Analysis. Florence: Unicef Office of Research.

10. Gassmann, F., Perinetti, V., & Timar, E. (2019). Multidimensional Poverty Assessment for the Kyrguz Republic. Maastricht/Bishkek: Maastricht Graduate School of Governance/UNICEF.

11. Hameed, A., & Haq Padda, I. (2017). Multidimensional Child Poverty Measurement and its Mappig: Case of Balochistan, Pakistan. MPRA Paper No. 85021.

12. Mahmud, M., Spigt, M., Bezabih, A., Pavon, I., Dinant, G.-J., & Blanco Velasco, R. (2015). Efficacy of Handwashing with Soap and Nail Clipping on Intestinal Parasitic Infections in School-Aged Children: A Factorial Cluster Randomized Controlled Trial. PloS Med, 12(6).

13. Mahrt, K., Rossi, A., Salvucci, V., & Trapp, F. (2018). Multidimensional poverty of children in Mozambique. Helsinki: UNU-WIDER: Working Paper 2018/108.

14. Manu, A., Ewerling, F., Barros, A., & Victora, C. (2019). Association between availability of children's book and the literacy-numeracy skills of children aged 36 to 59 months: secondary analysis of the UNICEF Multiple-Indicator Cluster Surveys covering 35 countries. Journal of Global Health, 9(1).

15. Minujin, A., & Nandy, S. (2012). Global child poverty and well-being. Measurements, concepts, policy and action.

16. Mohanty, S. (2011). Multidimensional Poverty and Child Survival in India. PLoS ONE, 6(10).

17. Ogwumike, F., & Ozughalu, U. (2018). Empirical Evidence of Child Poverty and Deprivation in Nigeria. Child Abuse & Neglect, 77, 13-22.

18. OPHI. (2018). Global Multidimensional Poverty Index 2018: The Most Detailed Picture To Date of the World's Poorest People. University of Oxford.

19. Qi, D., & Wu, Y. (2015). A Multidimensional Child Poverty Index in China. Children and Youth Services Review, 57, 159-170.

20. Roelen, K. (2017). Monetary and Multidimensional Child Poverty: A Contradiction in Terms? Development and Change, 48(3), 503-533.

21. Roelen, K., & Gassmann, F. (2014). Beyond averages: Child well-being in Kazakhstan. Journal of Children and Poverty, 20(2), 91-110.

22. Roelen, K., Gassmann, F., & de Neubourg, C. (2010). Child Poverty in Vietnam: Providing Insights Using a Country-Specific and Multidimensional Model. Social Indicators Reasearch, 98(1), 129-145.

23. Statham, J., & Chase, E. (2010). Childhood wellbeing: A brief overview. Childhood wellbeing research centre.

24. UNICEF. (2017). A world free from child poverty. A guide to the tasks to achieve the vision. New York: UNICEF and the Global Coallition to End Child Poverty.

25. UNICEF. (2019). Children of Migrants. available at: https://www.unicef.org/kyrgyzstan/children-migrants

26. United Nations. (1990, September 2). Convention on the Rights of the Child. United Nations General Assembly.

27. United Nations. (2015). Transforming Our World: The 2030 Agenda for Sustainable Development. New York: United Nations General Assembly.

28. WHO. (2006). WHO Child Growth Standards. Geneva: World Health Organization.

29. WHO. (2009). WHO child growth standards and the identification of severe acute malnutrition in infants and children. World Health Organization and UNICEF.

30. WHO. (2019, 11 10). Malnutrition. Retrieved from World Health Organization: https://www.who.int/news-room/fact-sheets/detail/malnutrition

31. World Bank. (2018). Piecing Together. The Poverty Puzzle. Washington: The World Bank.

32. World Bank. (2019a). Migration Data. available at: https://www.knomad.org/data/migration/emigration

33. World Bank. (2019b). Remittances Data. available at: https://www.knomad.org/data/remittances

For every child
Whoever she is.
Wherever he lives.
Every child deserves a childhood.
A future.
A fair chance.
That's why UNICEF is there.
For each and every child.
Working day in and day out.
In more than 190 countries and territories.
Reaching the hardest to reach.
The furthest from help.
The most excluded.
It's why we stay to the end.
And never give up.

unicef ✿

for every child