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# Design and indicator system of the statistical survey on functional and foundational learning skills of children living in Georgian households

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**Abstract:** This paper aims to design and implement a statistical survey to assess the functional and foundational learning skills of children aged 7–14 living in Georgian households. It also focuses on developing a methodology for calculating the wealth index and internationally comparable indicators such as the overcrowding rate. The study employed a three-stage stratified cluster random sampling design, involving 3,597 households across 193 clusters. Survey instruments were adapted from reputable sources including UNICEF, Eurostat, and the Washington Group on Disability Statistics. To ensure representativeness and comparability, five types of statistical weights were calculated. The construction of the wealth index utilized factor and regression analysis, while indicators related to Sustainable Development Goals, such as SDG 4.1.1a and 4.5.1, were derived from the data. The overall household response rate was 56.9%, with the target group response rate reaching 99.9%. The study revealed that 6.6% of children experienced functional difficulties, and 62.1% of the household population live in overcrowded housing, a rate that exceeds Eurostat averages. The wealth index distribution demonstrated significant disparities between urban and rural households. The survey methodology proved to be statistically reliable, producing robust indicators on children's education, functional skills, and living conditions. The findings provide valuable evidence for shaping education policy, teacher training, and social inclusion strategies. Additionally, the study enables Georgia to align with international statistical standards and SDG monitoring requirements, supporting sustainable development efforts across the country.

***Keywords:*** *Functional and foundational learning skills, Living conditions statistics, Sampling and weighing design, Wealth index.*

## 1. Introduction

Eurostat calculates living conditions indicators based on the EU-SILC (European Union Statistics on Income and Living Conditions) survey. Developed countries that are not members of Eurostat typically conduct similar surveys independently, while in developing countries, the Multiple Indicator Cluster Survey (MICS) is carried out with the financial and methodological support of the United Nations Children's Fund (UNICEF). In Georgia, the National Statistics Office conducts the *Georgian Household Income and Expenditure Survey*, which serves as an analogue to Eurostat's *Household Budget Survey*. However, due to limited financial resources, a statistical survey equivalent to EU-SILC is not implemented in the country. To partially address this gap, certain high-priority living standards indicators for Georgia have been incorporated into the Household Income and Expenditure Survey through the addition of relevant question blocks/modules. Nevertheless, this approach still does not allow for the collection of information on many important statistical indicators. In the field of education statistics, the PISA [1] was conducted in Georgia in 2018 by the Ministry of Education, Science and Youth. That same year, the MICS 2018 Georgia survey was implemented, although it did not include the module on foundational learning skills [2]. In 2024, with the financial support of the LEPL – Shota


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Rustaveli National Science Foundation of Georgia, a comprehensive Statistical Survey on the Functioning and Foundational Learning Skills of Children Living in Georgian Households was conducted under the scientific auspices of Ivane Javakhishvili Tbilisi State University. The primary objectives were to identify functional difficulties among children living in Georgia, assess their learning skills, and examine the impact of functional difficulties on educational outcomes. The relevance of the study is grounded in several key considerations: 1) To evaluate the education level and learning skills of children in Georgia across different components (e.g., literacy, numeracy) and demographic characteristics (e.g., settlement type, age group, gender). 2) To determine the extent to which functional difficulties affect the acquisition of education and foundational skills, providing a basis for developing targeted school policies aimed at eliminating negative effects. 3) To assess the specific challenges faced by children with functional difficulties, inform teacher training, and ensure faster social and educational integration for these children. Such measures are expected to positively influence not only affected children but also their peers, fostering mutual understanding, self-awareness, and motivation from an early age. 4) To measure the learning skills of Georgian children and compare them with similar data from other countries, providing evidence for potential education reforms and adjustments to school curricula and teaching strategies.

One of the main scientific innovations of the project is the calculation of the Sustainable Development Goal indicators (SDG 4.5.1: Parity indices (female/male, rural/urban, bottom/top wealth quintile and others such as disability status, indigenous peoples and conflict-affected, as data become available) for all education indicators on this list that can be disaggregated), SDG 4.1.1a: proportion of children achieving minimum proficiency in reading and mathematics, the Eurostat indicator (overcrowding rate), and the assessment of the level of education of children living in Georgian households in various socio-economic contexts (living conditions, functional difficulties, gender, age, etc.).

The 2014 Georgian Population Census database served as the basis for both sample selection and the calculation of statistical weights. The target population of the survey comprised children aged 7–14 years residing in Georgia. To meet the statistical objectives of the study, a stratified three-stage cluster random sampling design was employed: Primary Sampling Unit (PSU): Enumeration area of the Census, Secondary Sampling Unit (SSU): Household address, Tertiary Sampling Unit (TSU): All children aged 7–14 living in the household.

## 2. Literature Overview

The measurement of children's development, functioning, and foundational learning skills has become a central focus of international statistical monitoring over the past two decades. The Sustainable Development Goals (SDGs) established by the United Nations in 2015 emphasize inclusive and equitable quality education for all, with SDG target 4.1 aiming to ensure that all girls and boys complete free, equitable, and quality primary and secondary education, and SDG target 4.5 focusing on eliminating disparities in education. Indicators such as SDG 4.1.1a (proportion of children achieving minimum proficiency in reading and mathematics) and SDG 4.5.1 (parity indices) provide a standardized basis for assessing progress and identifying inequalities in educational outcomes [3].

UNICEF's Multiple Indicator Cluster Surveys (MICS), particularly the sixth round (MICS6), have been instrumental in generating internationally comparable data on the situation of children and women. The MICS6 methodology incorporates modules on household composition, education, household characteristics, income, child care, assistance received, maternal functioning, child functioning, child discipline, parental involvement, and foundational learning skills [4]. These modules allow for the assessment of both environmental factors and individual capacities, thereby supporting evidence-based policy formulation.

The child functioning module, developed in collaboration with the Washington Group on Disability Statistics, offers a standardized framework for identifying functional difficulties in domains such as vision, hearing, mobility, communication, cognition, and behavior [5]. This framework aligns with the


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Convention on the Rights of Persons with Disabilities (CRPD) and ensures cross-country comparability.

Foundational learning skills—often considered the building blocks of lifelong learning—are essential for educational success and broader social inclusion. Research has shown that literacy and numeracy skills acquired in early and primary education are strongly correlated with later educational attainment, employability, and civic participation [6]. The use of direct assessments within MICS6 enables robust measurement of these skills among children of primary school age, providing critical insights into learning outcomes beyond mere school attendance.

Eurostat's methodology for measuring overcrowding rate offers an additional perspective on the socio-economic context in which children grow up, reflecting housing conditions that may impact both well-being and learning capacity [7]. Similarly, the International Telecommunication Union (ITU) guidelines on information and communication technology (ICT) access and use facilitate the integration of digital inclusion indicators, recognizing the increasing role of digital skills in educational development.

Existing studies highlight the strong interlinkages between socio-economic conditions, functional abilities, and educational outcomes. For example, UNICEF [8] reports that children with functional difficulties often face significant barriers in achieving minimum proficiency levels in reading and mathematics, even when attending school. Likewise, the OE CD [9] stresses that early identification and targeted interventions are crucial to closing achievement gaps and meeting SDG education targets.

New evidence since 2024 emphasizes both urgency and policy traction on foundational learning. UNICEF's *Foundational Learning Action Tracker 2024* documents how countries are codifying commitments across curriculum, assessment, materials, instruction, and remediation, yet implementation gaps persist and learning poverty remains high [10]. The 2024/2025 UNESCO Global Education Monitoring (GEM) Report highlights leadership as a lever for improving foundational outcomes and notes that progress on learning quality is lagging despite near-universal primary enrollment in many systems [11]. Complementary briefs by the World Bank [12] synthesize post-pandemic setbacks in early literacy and numeracy and call for structured pedagogy, targeted instruction, and regular learning assessment to accelerate recovery—aligning with approaches used in this study [13].

Recent EU statistics show overcrowding remains salient for child well-being and equity analysis: in 2023, 16.8% of the EU population and 26.0% of young people (15–29) lived in overcrowded dwellings, with sharp cross-country variation—useful comparators for Georgia [14, 15]. Measurement tools have also advanced: UNICEF/Washington Group released a Humanitarian Version of the Child Functioning Module (CFM) in 2025 and a Teacher Version Guidance Note expanding disability-disaggregation options for education surveys [8]; new validation work in 2025 further supports reliability across contexts [16]. Finally, methods for socioeconomic stratification continue to evolve beyond classical DHS wealth-index PCA; a 2024 study proposes updated approaches integrating primary and secondary data, relevant for robustness checks alongside standard DHS documentation [17].

In the Georgian context, the application of internationally recognized methodologies such as MICS6, Eurostat's housing indicators, and ITU's ICT indicators allows for alignment with global standards while addressing national policy priorities. By calculating key indicators like SDG 4.1.1a, SDG 4.5.1, and overcrowding rate (overcrowding rate in case of Georgia has never been calculated before), the present study contributes to the growing body of evidence necessary for effective policy design, ensuring that no child is left behind in terms of development, functioning, and foundational learning.

### *2.1. Problem Statement*

The aim of the paper is to solve the following problems:

- Assess the statistical suitability of the sampling design of the statistical survey of the functioning and fundamental learning skills of children living in Georgian households and determine its compliance with the survey objectives;
- Take into account the sampling frame and other sources (the number of the population of Georgia by regions, the distribution of the population of Georgia by sex and age groups, the size of households, etc.) in the process of calculating statistical weights;
- Calculate the wealth index and obtain statistically reliable results, which implies the implementation of correct factorial and statistically reliable regression analysis;
- Calculate internationally comparable indicators, of which the Eurostat overcrowding rate, which was calculated for Georgia for the first time, is noteworthy.

## 3. Methodology

In the initial phase of the Statistical Survey on Functioning and Foundational Learning Skills of Children Living in Georgian Households, a comprehensive system of statistical indicators was developed, a tabulation plan was established, and a fieldwork instruments was designed.

The survey incorporated: The short version of the Washington Group on Disability Statistics questionnaire on functional difficulties [13] the UNICEF methodology for assessing foundational learning skills [4] and the Eurostat methodology for measuring living conditions indicators [7].

### *3.1. Survey Instruments*

The statistical survey instruments comprised four questionnaires: a demographic questionnaire, a household questionnaire, a main questionnaire, and a refusal form. These instruments were fully based on the methodologies of the Washington Group, Eurostat, and the United Nations Children's Fund (UNICEF). The questionnaires covered the following modules: 1) Demographic data 2) Education 3) Childcare 4) Household income 5) Receiving help 6) Household characteristics 7) Mother/caregivers functioning 8) Child's background 9) Child discipline 10) Child functioning 11) Parental involvement 12) Foundational learning skills 13) Reasons for non-response. The methodological foundation of the modules was as follows: [4]: Modules 3, 5, 8, 9, 11, and 12. Washington Group on Disability Statistics: Modules Washington Group on Disability Statistics [13] 7 and 10. Eurostat [7] and UNICEF [4]: Modules 1, 2, 4, 6, and 13.

At the initial stage of the study, the survey instruments were adapted to the Georgian context. During this adaptation process, particular attention was given to the structure and duration of the Georgian education system [18] the ethnic composition of the population [2] and various other social and economic characteristics of the country. A core component of the statistical survey is the assessment of foundational learning skills, which also serves as one of the system's key indicators. The learning skills and educational attainment of Georgian children will be evaluated on the basis of these foundational skills. Furthermore, the study framework incorporates the calculation of relevant Sustainable Development Goal (SDG) indicators, specifically: SDG 4.1.1a – Minimum proficiency in reading and mathematics (reading, grades 2/3) and SDG 4.5.1 – Equality Index [19].

### *3.2. Sample Design*

Given the diverse ethnic population residing in Georgia, the survey was conducted in several languages, specifically Georgian, Azerbaijani, and Armenian. According to the results of the 2014 General Population Census of Georgia, 86.8% of Georgia's population belongs to the Georgian ethnic group, 6.3% to the Azerbaijani, and 4.5% to the Armenian ethnic group, totaling 97.6%. Furthermore, the share of representatives from each of the remaining ethnic groups is less than 1% [20]. Accordingly, the children's task booklet was presented in all three languages, which allowed children participating in the study to complete the reading task in their preferred language and, in case of failure, to try again in another alternative language.

The research objective was a statistical study of the functioning and foundational learning skills of children living in Georgian households. Due to the limited budget for the statistical survey, it was planned to obtain representative data at least at the country level. According to the 2014 Population and Agricultural Census of Georgia, the country is divided into approximately 10,000 enumeration areas. To reduce interviewers' travel expenses, a three-stage cluster random sampling method was used, were the primary sampling unit (PSU) was the enumeration area, the secondary sampling unit (SSU) was the household address, and the tertiary sampling unit (TSU) was the children aged 7-14 living in the households. Additionally, stratification was introduced to reduce the sampling error.

The main indicators and questionnaires of the survey were compiled with questions having binary responses, which made it possible to determine the number of households to be surveyed in advance without conducting a pilot study. Therefore, the proportional variance formula was used to determine the variance:

$$VAR = p(1-p) \quad (1)$$

To determine the number of households to be selected, the case where the variance takes its maximum value was considered in order to obtain representative results. To maximize variance, we found the extremum point of equation (1):

$$\left(\frac{\partial VAR}{\partial p} = 1 - 2p = 0\right) => p = 0.5 \quad (2)$$

The sample size must be determined by taking into account the acceptable relative marginal error and the maximum value of the design effect.

Here Under the condition of an infinite population, the sample size is determined by Cochran [21]:

$$n = \frac{z^2 p(1-p)}{e^2} \quad (3)$$

Where z represents the critical value of the distribution, p the proportion of the corresponding event occurrence in the general population, and e is the margin of error.

For a finite population, the sample size adjustment will be Cochran [21]:

$$n\ adjusted = \frac{n}{1+\frac{(n-1)}{N}} \quad (4)$$

Where n represents sample size for an infinite population, and N is the population size.
The relative margin of error is calculated by the formula:

$$RME = \frac{e}{p} * 100 \quad (5)$$

Where $RME$ represents the relative margin of error, e is the margin of error, p the proportion of the corresponding event occurrence in the general population.

Considering equations (3) and (4) and the design effect, we get:

$$n_c = \frac{\frac{z^2 p(1-p) deff}{e^2}}{1+\left(\frac{z^2 p(1-p) deff}{e^2 N}\right)} \quad (6)$$

Where z represents the critical value of the distribution, p the proportion of the corresponding event occurrence in the general population, e is the margin of error, N is the population size, $deff$ is the design effect value, and $n_c$ is the adjusted sample size value.

Specifically, the maximum acceptable relative margin of error for the survey, taking the survey budget into account, was 10%. Furthermore, the design effect values for stratified household surveys conducted in Georgia are always less than 3 [18]. Additionally, the population of Georgia as of January 1, 2024, is 3,694,608 persons [22]. Accordingly, based on the modified margin of error formula, and using the acceptable maximum relative margin of error and the theoretically maximum design effect, we will get:

Relative margin of error:

$$e = \frac{RME*p}{100} = \frac{10*0.5}{100} = 0.05 \quad (7)$$

Based on the equations (6) and (7), sample size is determined as:

$$n_c = \frac{\frac{z^2 p(1-p)deff}{e^2}}{1+(\frac{z^2 p(1-p)deff}{e^2 N})} = \frac{\frac{1.96^2 * 0.5(1-0.5)3}{0.05^2}}{1+(\frac{1.96^2 * 0.5(1-0.5)3}{0.05^2 * 3,694,608})} = 1152 \quad (8)$$

$$n \approx 1200$$

Georgia consists of 13 administrative regions. Additionally, households in Georgia differ from each other by place of residence (households living in rural and urban areas). Therefore, stratification was implemented using these two corresponding variables (region and settlement type). Since the regions of Tskhinvali and the Autonomous Republic of Abkhazia are territories not controlled by the central government of Georgia, the sample was distributed among the remaining regions.

If the total sample size ($n_G$) were distributed proportionally to the population, the sample size for the relatively small regions (Guria, Samtskhe-Javakheti, Mtskheta-Mtianeti, Racha-Lechkhumi, Kvemo Svaneti) would be very small. Therefore, it was decided that the sample size should be distributed proportionally to the square root of the number of households ($H_i$).

The sample size in each region ($n_i$) is calculated using the following formula:

$$n_i = \frac{\sqrt{H_i}}{\sum \sqrt{H_i}} n_G \quad (9)$$

On the one hand, as sample surveys show, increasing the number of clusters leads to a decrease in the design effect. On the other hand, increasing the number of clusters is associated with interviewer travel problems, especially in mountainous settlements where villages are relatively small and a single village represents one enumeration area. Furthermore, due to the significant distances between villages and the poor condition of the roads, it would be a considerable problem to carry out the survey in a timely manner.

The number of enumeration areas to be selected was determined as 193 units. The number of surveyed households with children aged 7-14 was set as 5 per urban enumeration areas and 8 per rural enumeration area. In total, information was to be collected from all children aged 7-14 living in 1,200 households. Since children aged 7-14 years are not members of every household, 15 addresses were selected in each urban settlement type area and 24 addresses in each rural settlement type area. The interviewer was obligated to fill out a demographic questionnaire for all selected addresses and to fill out the main questionnaire in maximum of 5 households in urban settlements type and 8 households in rural settlements type. In the event that the specified addresses were not sufficient to survey the required number of households, the interviewer could select a household from the last address using a predetermined step (step: every fifth family) until the given quota was met.

Based on the goals of the survey, a listing and update of the addresses for the 193 selected areas was carried out. This involved listing households and recording their addresses. For the main field activity of the survey, the addresses were selected from the updated household database. The number of households to be surveyed (1,200 households) was distributed proportionally to the square root of the regional sizes, and within the regions, it was distributed proportionally to the population living in urban and rural settlement types.

**Table 1.**
Distribution of Households to be Surveyed.

| Regions | General population, household distribution | | | Sample population, household distribution | | |
|---|---|---|---|---|---|---|
| | Percentage distribution in Georgia | Percentage distribution within region | | Quantitative distribution by Regions | Quantitative distribution within region | |
| | | Urban | Rural | | Urban | Rural |
| Tbilisi* | 30.59% | 96.30% | 3.70% | 215 | 205 | 10* |
| Autonomous Republic of Adjara | 7.55% | 56.30% | 43.70% | 108 | 60 | 48 |
| Guria Region | 3.15% | 21.72% | 78.28% | 71 | 15 | 56 |
| Imereti Region | 15.24% | 47.85% | 52.15% | 155 | 75 | 80 |
| Kakheti Region | 8.92% | 23.77% | 76.23% | 118 | 30 | 88 |
| Mtskheta-Mtianeti Region | 2.69% | 19.27% | 80.73% | 58 | 10 | 48 |
| Racha-Lechkhumi and Kvemo Svaneti Region | 1.16% | 19.76% | 80.24% | 42 | 10 | 32 |
| Samegrelo-Zemo Svaneti Region | 9.15% | 40.01% | 59.99% | 117 | 45 | 72 |
| Samtskhe-Javakheti Region | 3.97% | 32.75% | 67.25% | 81 | 25 | 56 |
| Kvemo Kartli Region | 10.33% | 44.31% | 55.69% | 127 | 55 | 72 |
| Shida Kartli Region | 7.24% | 35.42% | 64.58% | 107 | 35 | 72 |
| Total | 100.00% | 56.66% | 43.34% | 1,199 | 565 | 634 |

**Table 2.**
Distribution of Selected Households.

| Regions | Number of Areas to be selected | | | Number of Demographic Questionnaires | | |
|---|---|---|---|---|---|---|
| | Quantitative distribution by Regions | Quantitative distribution within region | | Quantitative distribution by Regions | Quantitative distribution within region | |
| | | Urban | Rural | | Urban | Rural |
| Tbilisi* | 43 | 41 | 2 | 645 | 615 | 30* |
| Autonomous Republic of Adjara | 18 | 12 | 6 | 324 | 180 | 144 |
| Guria Region | 10 | 3 | 7 | 213 | 45 | 168 |
| Imereti Region | 25 | 15 | 10 | 465 | 225 | 240 |
| Kakheti Region | 17 | 6 | 11 | 354 | 90 | 264 |
| Mtskheta-Mtianeti Region | 8 | 2 | 6 | 174 | 30 | 144 |
| Racha-Lechkhumi and Kvemo Svaneti Region | 6 | 2 | 4 | 126 | 30 | 96 |
| Samegrelo-Zemo Svaneti Region | 18 | 9 | 9 | 351 | 135 | 216 |
| Samtskhe-Javakheti Region | 12 | 5 | 7 | 243 | 75 | 168 |
| Kvemo Kartli Region | 20 | 11 | 9 | 381 | 165 | 216 |
| Shida Kartli Region | 16 | 7 | 9 | 321 | 105 | 216 |
| Total | **193** | **113** | **80** | **3,597** | **1,695** | **1,902** |

***Note:** All settlements in the Tbilisi region were surveyed as urban-type settlements.

After the distribution, the number of target households with children of the appropriate age was 1,199, while the total sample size was 3,597 households.

### *3.3. Weighing Design*

Analysis of the indicator system for the statistical study of children's functioning and foundational learning skills in Georgian households determined the need to calculate 5 statistical weights (1 - household weight; 2 - personal weight; 3 - weight for children aged 7-14 years old; 4 - weight for parents/ caregivers of children aged 7-14 years old; and 5 - household weight for household questionnaire). It should also be noted that there are two types of weights in statistics: I - weights for aggregating the total number of the general population; II - standardized weights. UNICEF uses the second option in its surveys and standardizes weights by using the average weight within strata. As a result, the sum of the standardized weights is equal not to the general population but to the number of observations. Accordingly, it is necessary to calculate standardized weights so that the indicators calculated from the survey are internationally comparable.

A statistical weight represents the inverse value of the probability of a given observation object being selected in the survey. In a household survey, the probability of a cluster being selected is:

$$P(ij) = K_i \frac{N_{ij}}{N_i} \quad (10)$$

Where $K_i$ represents the number of clusters to be selected in the stratum i, $N_{ij}$ is the number of households in the area j of the stratum i (from the sampling frame), and $N_i$ is the number of households in the stratum i (from the sampling frame).

The probability of a household being selected in an enumeration area is:

$$P(u|ij) = \frac{n_{ij}}{N'_{ij}} \quad (11)$$

Where $n_{ij}$ represents the number of households selected in the cluster j of the stratum i, and $N'_{ij}$ is the number of households in the cluster j of the stratum i (from the survey database).

Based on equations (10) and (11), the probability of a household being selected in the survey is calculated as:

$$P(iju) = P(ij) \times P(u|ij) = \left(K_i \frac{N_{ij}}{N_i}\right)\left(\frac{n_{ij}}{N'_{ij}}\right) = \left(\frac{K_i n_{ij}}{N_i}\right)\left(\frac{N_{ij}}{N'_{ij}}\right) \quad (12)$$

As noted, the household weight represents the inverse of its probability of being selected, specifically:

$$W(iju) = \frac{1}{P(iju)} = \left(\frac{N_i}{K_i n_{ij}}\right)\left(\frac{N'_{ij}}{N_{ij}}\right) \quad (13)$$

Sample surveys are characterized by a level of non-response, which must be taken into account when calculating statistical weights. Specifically, weights should be adjusted according to the level of non-response. The adjustment coefficient was calculated at the cluster level and is given by the formula:

$$K_{iju}^{nr} = \frac{n_{ij}}{n'_{ij}} \quad (14)$$

Where $n'_{ij}$ represents the number of responding households in the cluster j of the stratum i.

Using equations (13) and (14), the adjusted statistical weight of a household, corrected due to non-response, is:

$$W_{iju}^{nr} = W(iju) * K_{iju}^{nr} = \left(\frac{N_i}{K_i n_{ij}}\right)\left(\frac{N'_{ij}}{N_{ij}}\right)\left(\frac{n_{ij}}{n'_{ij}}\right) \quad (15)$$

The statistical survey is specific because its goal is to calculate indicators for a specific group of children (aged 7-14). For proper data representativeness, further weight adjustments must be made taking into account the factor of the number of children in households. Households were divided into 3 groups based on the number of children. Let's denote the number of clusters in each stratum group as s. The household weight adjustment factor is determined by the following equation:

$$K_{ic}^{ch} = \frac{N_{ic}}{\sum_{j=1}^{s} n'_{ijc} W_{iju}^{nr}} \quad (16)$$

Where $N_{ic}$ represents the number of households in stratum i and group c in the general population, and $n'_{ijc}$ is the number of households surveyed in the area j of stratum i and group c.

Based on equations (15) and (16), the household weight adjusted for the number of children is:

$$W_{ijc}^{ch} = W_{iju}^{nr} * K_{ic}^{ch} = \left(\frac{N_i}{K_i n_{ij}}\right)\left(\frac{N'_{ij}}{N_{ij}}\right)\left(\frac{n_{ij}}{n'_{ij}}\right)\left(\frac{N_{ic}}{\sum_{j=1}^{s} n'_{ijc} W_{iju}^{nr}}\right) \quad (17)$$

Every statistical survey's non-response is characterized by the following circumstance: it is relatively more difficult to survey small-sized households than large-sized ones. When a household has 1 or 2 members, the probability of finding and interviewing at least one household member during the fieldwork period is lower than for large-sized households. The fact that the number of non-responding households is not proportionally distributed among households by size must be taken into account when calculating statistical weights. Households were divided into 5 groups (1, 2, 3, 4, and 5 or more) based on the number of household members. Let's denote the number of cluster groups in each stratum as v. The further household weight adjustment factor is determined by the following equation:

$$K_{ib}^{si} = \frac{N_{ib}}{\sum_{o=1}^{v} n'_{iob} W_{ijc}^{ch}} \quad (18)$$

Where $N_{ib}$ represents the number of households in stratum i and group b in the general population, and $n'_{iob}$ is the number of surveyed households in group b of the o cluster group (jxc) of stratum i.

Based on equations (17) and (18), the final household weight is calculated by the formula:

$$W_{iju}^{si} = W_{ijc}^{ch} * K_{ib}^{si} = \left(\frac{N_i}{K_i n_{ij}}\right)\left(\frac{N'_{ij}}{N_{ij}}\right)\left(\frac{n_{ij}}{n'_{ij}}\right)\left(\frac{N_{ic}}{\sum_{j=1}^{s} n'_{ijc} W_{iju}^{nr}}\right)\left(\frac{N_{ib}}{\sum_{o=1}^{v} n'_{iob} W_{ijc}^{ch}}\right) \quad (19)$$

It should be noted that information is collected about all household members from sampled households. Therefore, the probability of a person being included in the study is equal to the probability of the household being included, and the initial personal weight is calculated similarly to the household weight, using equation (19). The National Statistics Office of Georgia calculates the country's population annually, and the indicators are available by region and settlement type (the stratification variables of the survey). Accordingly, it is logical that the estimated population from the statistical survey (personal weights) should be corrected to match the country's total population. Based on this, the population adjustment indicator for personal weights in the strata is calculated using the following formula:

$$K_{i}^{pst} = \frac{P_{i}}{\sum_{o=1}^{v} p'_{iob} W_{iju}^{si}} \quad (20)$$

Where $P_i$ represents the number of people in stratum i in the general population, and $p'_{iob}$ is the number of household members surveyed in group b of the o cluster group (jxc) of stratum i.

Based on equations (19) and (20), the personal weight will take the following form:

$$W_{iju}^{pst} = W_{iju}^{si} * K_{i}^{pst} = \left(\frac{N_i}{K_i n_{ij}}\right)\left(\frac{N'_{ij}}{N_{ij}}\right)\left(\frac{n_{ij}}{n'_{ij}}\right)\left(\frac{N_{ic}}{\sum_{j=1}^{s} n'_{ijc} W_{iju}^{nr}}\right)\left(\frac{N_{ib}}{\sum_{o=1}^{v} n'_{iob} W_{ijc}^{ch}}\right)\left(\frac{P_i}{\sum_{o=1}^{v} p'_{iob} W_{iju}^{si}}\right) \quad (21)$$

To account for the country's population structure by sex and age, 16 groups were created. Let's denote the number of cluster groups as r. Based on the demographic data from the National Statistics Office of Georgia, an adjustment factor was calculated using the following equation:

$$K_{i}^{gst} = \frac{P_{g}}{\sum_{y=1}^{r} p'_{yg} W_{iju}^{pst}} \quad (22)$$

Where $P_g$ represents the number of people in the age-sex group in the general population, and $p'_{yg}$ is the number of household members surveyed in subgroup g of the y stratum-cluster groups (stratum i, area j, group c, group b (ixjxcxb)).

Based on equations (21) and (22), the personal weight, adjusted according to the sex-age structure, takes the following form:

$$W_{iju}^{pa} = W_{iju}^{pst} * K_{i}^{gst} =$$

$$\left(\frac{N_i}{K_i n_{ij}}\right)\left(\frac{N'_{ij}}{N_{ij}}\right)\left(\frac{n_{ij}}{n'_{ij}}\right)\left(\frac{N_{ic}}{\sum_{j=1}^{s} n'_{ijc} W_{iju}^{nr}}\right)\left(\frac{N_{ib}}{\sum_{o=1}^{v} n'_{iob} W_{ijc}^{ch}}\right)\left(\frac{P_i}{\sum_{o=1}^{v} p'_{iob} W_{iju}^{si}}\right)\left(\frac{P_g}{\sum_{y=1}^{r} p'_{yg} W_{iju}^{pst}}\right) \quad (23)$$

Since the population structure of Georgia is not available simultaneously by region, type of settlement, and sex-age group, it is necessary to perform an adjustment to the population size of the strata. This ensures that the aggregation of weights accurately reflects the population size within the strata.

$$K_{i}^{pst2} = \frac{P_{i}}{\sum_{d=1}^{e} p'_{id} W_{iju}^{pa}} \quad (24)$$

Where $P_i$ represents the number of people in stratum i in the general population, $p'_{id}$ is the number of surveyed household members in the d cluster groups (area j, group c, group b, group g jxcxbxg), and e is the number of cluster groups in the stratum.

And based on equations (23) and (24), the personal weight will take the following final form:

$$W_{iju}^{p} = W_{iju}^{pa} * K_{i}^{pst2} =$$

$$\left(\frac{N_i}{K_i n_{ij}}\right)\left(\frac{N'_{ij}}{N_{ij}}\right)\left(\frac{n_{ij}}{n'_{ij}}\right)\left(\frac{N_{ic}}{\sum_{j=1}^{s} n'_{ijc} W_{iju}^{nr}}\right)\left(\frac{N_{ib}}{\sum_{o=1}^{v} n'_{iob} W_{ijc}^{ch}}\right)\left(\frac{P_i}{\sum_{o=1}^{v} p'_{iob} W_{iju}^{si}}\right)\left(\frac{P_g}{\sum_{y=1}^{r} p'_{yg} W_{iju}^{pst}}\right)\left(\frac{P_i}{\sum_{d=1}^{e} p'_{id} W_{iju}^{pa}}\right) \quad (25)$$

Statistical weights for children aged 7-14 yeals old and their parents/caregivers were calculated using a similar methodology. Specifically, using personal weights ($W_{iju}^{p}$), the total number of corresponding people in the group was calculated within the clusters, and is divide to the number of interviewed individuals.

$$W_{ij}^{Parent} = \frac{\sum_{j=1}^{m} n_{jcbg} W_{iju}^{pa}}{n_j^{parent}} \quad (26)$$

$$W_{ij}^{child} = \frac{\sum_{j=1}^{m} l_{jcbg} W_{iju}^{pa}}{n_j^{child}} \quad (27)$$

Where $n_j^{parent}$ represents the number of parents/caregivers in the cluster j from the individual questionnaire, $n_{jcbg}$ is the number of parents/caregivers in subgroup g of subgroup b of group c of the area j, and $l_{jcbg}$ is the number of children from the demographic questionnaire in subgroup g of subgroup b of group c of the area j.

To calculate household questionnaire weights, the total number of households in the clusters is determined using the household weight. The household questionnaires are then generalized to this total. Specifically, the weight will take the following form:

$$W_{ij}^{HH} = \frac{\sum_{z=1}^{q} n'_z W_{iju}^{si}}{H_j^{Hou}} \quad (28)$$

Where $H_j^{Hou}$ represents the number of households in the cluster j from the household questionnaire, $n'_z$ is the number of households in subgroup b of group c of the area j in the stratum i from the demographic questionnaire, and q is the total number of corresponding groups.

Standardized weights are calculated by dividing equations (19), (25), (26), (27), and (28) by the average weights of the stratum.

### *3.4. Wealth Index*

The Wealth index is a composite statistical indicator, calculated by UNICEF, that involves both factor and regression analysis. From the survey's instruments, groups of variables were created that are related to people's wealth at the urban, rural, and national levels. In the next stage, binary variables were created from the pre-selected variables, taking values of 0 and 1, except for the income amount variable. Using the pairwise method of factor analysis, the statistically significant variables in the formation of the factors were identified.

**Table 3.**
Results of the Factor Analysis Using the Pairwise Method.

| **Urban** | | **Rural** | | **Country** | |
|---|---|---|---|---|---|
| HCH1_w | | HCH1_w | | HCH1_w | |
| HI1A_w | 0.460 | HI1B_w | | HI1B_w | |
| HI1B_w | | HI1C_w | | HI1C_w | |
| HI1D_w | | HI1D_w | | HI1D_w | |
| HI1E_w | -0.601 | HI1E_w | -0.521 | HI1E_w | -0.556 |
| HI1G_w | | HI1G_w | 0.288 | HI1G_w | |
| HI1H_w | | HI1I_w | | HI1I_w | |
| HI1I_w | | RC1_w | 0.315 | RC1_w | |
| RC1_w | | RC3_w | 0.321 | RC3_w | |
| RC3_w | | HC2A_w | 0.325 | HC2A_w | 0.303 |
| HC2A_w | | HC2B_w | | HC2B_w | |
| HC2B_w | | HC2C_w | 0.584 | HC2C_w | 0.625 |
| HC2C_w | 0.588 | HC2D_w | 0.371 | HC2D_w | 0.322 |
| HC2E_w | 0.519 | HC2E_w | 0.363 | HC2E_w | 0.405 |
| HC2F_w | 0.576 | HC2F_w | 0.530 | HC2F_w | 0.504 |
| HC2G_w | 0.371 | HC2G_w | 0.307 | HC2G_w | 0.372 |
| HC2H_w | | HC2H_w | | HC2H_w | |
| HC2J_w | 0.411 | HC2J_w | 0.424 | HC2J_w | 0.517 |
| HC2K_w | -0.287 | HC2K_w | -0.265 | HC2K_w | -0.444 |
| HC2L_w | 0.303 | HC2L_w | | HC2L_w | 0.277 |
| HC2M_w | 0.551 | HC2M_w | 0.475 | HC2M_w | 0.535 |
| HC2N_w | 0.279 | HC2N_w | | HC2N_w | |
| HC2O_w | 0.284 | HC2O_w | 0.563 | HC2O_w | 0.508 |
| HC3_w | 0.271 | HC3_w | | HC3_w | |
| HC4A_w | 0.485 | HC4A_w | 0.445 | HC4A_w | 0.490 |
| HC4B_w | 0.390 | HC4B_w | 0.328 | HC4B_w | 0.412 |
| HC4C_w | 0.255 | HC4C_w | | HC4C_w | |
| HC4D_w | 0.491 | HC4D_w | 0.422 | HC4D_w | 0.513 |
| HC4X_w | | HC4X_w | | HC4X_w | |
| HC5_w | 0.428 | HC5_w | 0.507 | HC5_w | 0.487 |
| RC2_w | | RC2_w | 0.315 | RC2_w | |
| HC1A_w | | HC1A_w | 0.410 | HC1A_w | |
| HC1B_w | | HC1B_w | 0.415 | HC1B_w | |
| income | 0.507 | income | 0.509 | income | 0.510 |
| Extraction Method: Principal Component Analysis. | | Extraction Method: Principal Component Analysis. | | HI1A_w | 0.363 |
| a. 1 components extracted. | | a. 1 components extracted. | | HI1H_w | |
| | | | | Extraction Method: Principal Component Analysis. | |
| | | | | a. 1 components extracted. | |

From the 3 factors created, 2 variables were formed: the first, the country factor, remained unchanged, while the urban and rural settlement factors were combined into a single urban-rural variable. In the next stage, an empirical linear regression model was implemented, where the country factor served as the dependent variable and the urban-rural variable and dummy binary variables for the settlement type served as the factor variables.

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**Table 4.**
Empirical Estimates of Factor Regression Coefficients.

| Coefficients[a,b] | | | | | | |
|---|---|---|---|---|---|---|
| Model | | Unstandardized Coefficients | | Standardized Coefficients | t | Sig. |
| | | B | Std. Error | Beta | | |
| | (Constant) | 0.376 | 0.005 | | 71.427 | 0.000 |
| | Fact_C | 0.910 | 0.004 | 0.909 | 256.869 | 0.000 |
| | fict | -0.688 | 0.007 | -0.341 | -96.366 | 0.000 |

**Note:** a. Dependent Variable: REGR factor score 1 for analysis 3
b. Weighted Least Squares Regression - Weighted by P_SD_Weight

For all coefficients of the model, the Student's $H_1$ hypothesis regarding the statistical significance of the coefficients is accepted with 99% confidence [23].

**Table 5.**
Coefficient of Determination and Adjusted Coefficient of Determination of Linear Factor Regression.

| Model Summary[b,c] | | | | |
|---|---|---|---|---|
| **Model** | **R** | **R Square** | **Adjusted R Square** | **Std. Error of the Estimate** |
| 1 | 0.979[a] | 0.958 | 0.958 | 0.17129467 |

**Note:**
a. Predictors: (Constant), fict, Fact_C
b. Dependent Variable: REGR factor score 1 for analysis 3
c. Weighted Least Squares Regression – Weighted by P_SD_Weight.

The Coefficient of determination and Adjusted Coefficient of determination have quite high values, which indicates the validity of the model.

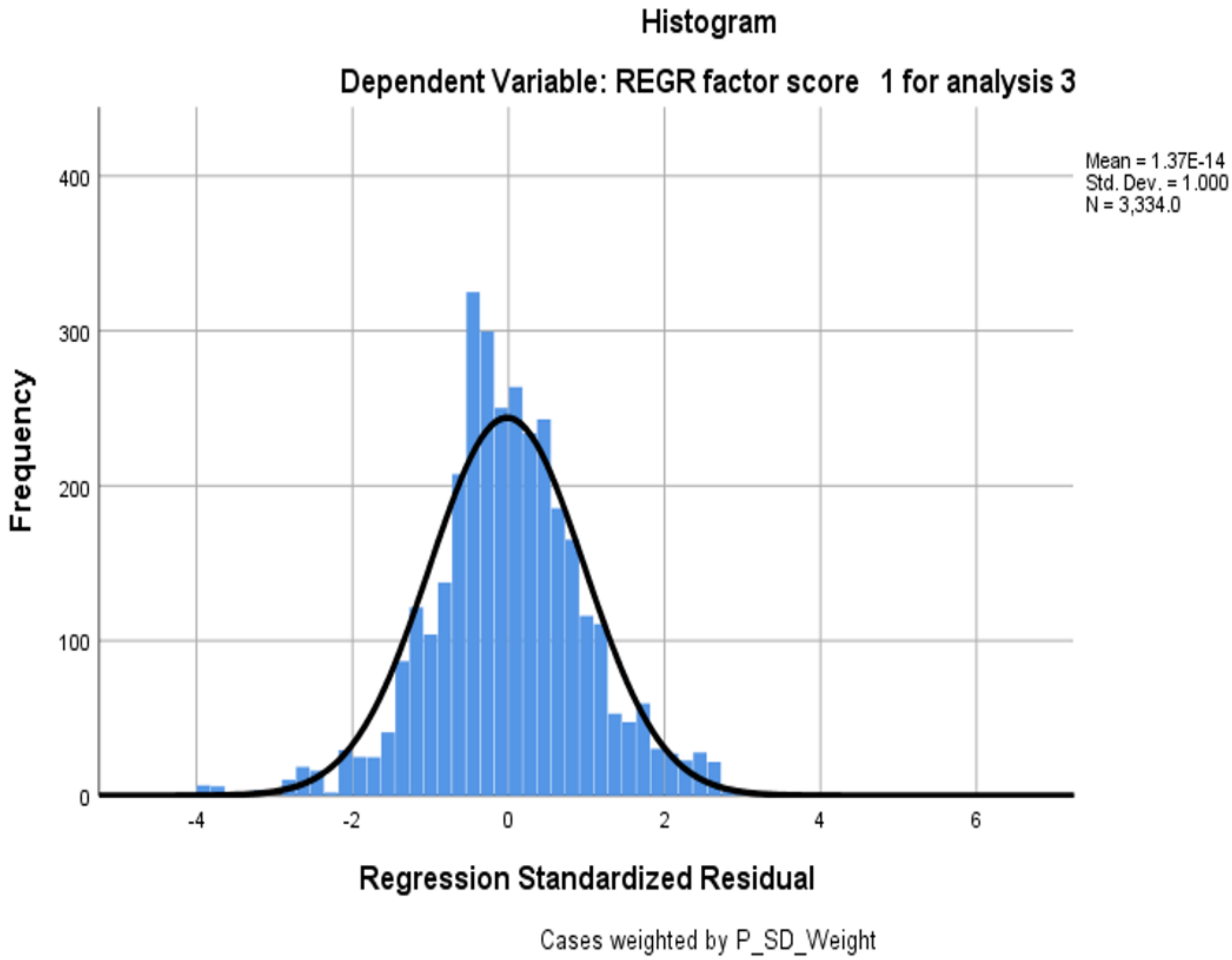


**Figure 1.**
Histogram of the Residual Distribution of Linear Factor Regression.

According to the Jarque-Bera test, the $H_0$ hypothesis regarding the normal distribution of the empirical model's residual term is accepted at a 95% confidence level [24].

**Table 6.**
Characteristics of Linear Factor Regression.

| **ANOVA**[a,b] | | | | | | |
|---|---|---|---|---|---|---|
| **Model** | | **Sum of Squares** | **df** | **Mean Square** | **F** | **Sig.** |
| | Regression | 2248.954 | 2 | 1124.477 | 38323.294 | 0.000[c] |
| | Residual | 97.738 | 3331 | 0.029 | | |
| | Total | 2346.691 | 3333 | | | |

**Note:**
a. Dependent Variable: REGR factor score 1 for analysis 3
b. Weighted Least Squares Regression - Weighted by P_SD_Weight
c. Predictors: (Constant), fict, Fact_C.

According to Fisher's F-test, the $H_1$ hypothesis regarding the statistical validity of the empirical model is accepted with 99% confidence. It should be noted that the $H_0$ hypothesis of White's test regarding homoscedasticity in the residual terms is also accepted at a 99% confidence level [23].


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In the next stage, the estimated values of the dependent variable from the linear regression empirical model were calculated and assigned ranked (1-5) values, which represent the Wealth index. It should be noted that, based on the statistical methodology of the Wealth index, the regression analysis was performed using standardized personal weights.

## 4. Results

Of the 3,597 households selected for the survey, 3,595 were inhabited. The overall household response rate was 56.9%, with 52.6% in urban settlements and 60.9% in rural settlements. By region, the lowest household response rate was recorded in Kakheti (47.2%) and the highest in Samtskhe–Javakheti (79.8%). During the sampling design stage, the target number of households with children aged 7–14 was set at 1,199. The response rate for this target group was 99.9%, with data successfully collected from 1,198 households. In total, 1,856 children aged 7–14 resided in the surveyed households, of whom 92.6% responded to the questionnaire. The children's response rate did not differ significantly by settlement type — 92.2% in urban areas and 93.0% in rural areas — with the rural rate exceeding the urban rate by 0.8 percentage points. However, regional variation was observed: the highest response rate was in Mtskheta–Mtianeti (100%), and the lowest in Imereti (81.6%) (Annex 1 – Table SR.1.1: Results of Household and Children Aged 7–14 Interviews).

In the Statistical Survey on the Functioning and Foundational Learning Skills of Children Living in Georgian Households, 9.8% of the surveyed household population were children aged 7–14, 3.6% were children aged 15–17, and 78.3% were aged 18 years and older. The percentage distribution of the population by five-year age groups is provided in Annex 5 – Table SR.4.1: Age Distribution of Household Population by Sex. Among surveyed households, 67.3% were headed by men and 32.7% by women. In terms of ethnicity, 90.5% of households were Georgian, 5.0% Azerbaijani, 3.4% Armenian, and 1.1% other nationalities. Household size distribution showed that 18.0% had one child, 20.8% had two, 18.3% had three, 17.9% had four, 12.7% had five, 7.8% had six, and 4.4% had seven or more children. By geographic distribution, the largest share of household questionnaires (15.9%) was collected in Tbilisi, while the smallest share (4.1%) was recorded in Racha–Lechkhumi and Kvemo Svaneti. Detailed information on household composition is provided in Annex 4 – Table SR.3.1: Household Composition.

Among children aged 7–14 surveyed, 52.0% were boys and 48.0% were girls. The largest proportion (16.7%) resided in Tbilisi, while the smallest share (3.5%) lived in Racha–Lechkhumi and Kvemo Svaneti. It is noteworthy that 6.6% of children in this age group had functional difficulties, while 4.2% of their mothers/caregivers reported functional difficulties. Detailed data are provided in Annex 6 – Table SR.5.3: Children Aged 7–14 Years – Background Characteristics.

In the Statistical Survey on the Functioning and Foundational Learning Skills of Children Living in Georgian Households, the population of households surveyed using the household questionnaire was evenly distributed across quintile groups of the wealth Index at the national level. However, settlement-type analysis revealed contrasting patterns. In urban settlements, the proportion of households increased progressively from the first to the fifth quintile. In contrast, in rural settlements, the highest share of households was recorded in the first quintile, and the lowest in the fifth quintile, with percentages decreasing as quintile rank increased. Detailed data on Wealth Index quintiles are provided in Annex 3 – Table SR.2.3: Income Quintiles.

According to the Statistical Survey on the Functioning and Foundational Learning Skills of Children Living in Georgian Households, 62.1% of the household population resides in overcrowded housing. The density indicator in urban settlements is 69.8%, which is 13.9 percentage points higher than the corresponding value in rural settlements. At the regional level, the highest density indicator is observed in Tbilisi (80.4%), while the lowest is recorded in Guria (36.7%) (Annex 2 – Table SR.2.1: Housing Characteristics). In terms of housing size, the majority of surveyed households (48.2%) have three or more bedrooms, 41.6% have two bedrooms, and 10.2% have one bedroom (Annex 2 – Table SR.2.1: Housing Characteristics).

## 5. Discussion

The research design presented in this paper differs from that of the Multiple Indicator Cluster Survey (MICS 2018 Georgia) conducted by the United Nations Children's Fund (UNICEF) in Georgia. The key differences are observed in: 1) Household sampling methodology, and 2) Statistical weights and their calculation procedures.

Household sampling method: The Multiple Indicator Cluster Survey (MICS 2018 Georgia) was a large-scale household survey with a sample size of 14,120 households—surpassed only by the Georgian Populations Census [2]. All eligible household members were interviewed using separate questionnaires. One notable limitation was that information on men aged 15–49 was collected from only one person per household. Nevertheless, the questionnaires for children, adults, and women covered all eligible household members. In the Statistical Survey on the Functioning and Foundational Learning Skills of Children Living in Georgian Households, budgetary constraints required a more targeted approach. Demographic data were collected for all households in each selected district; however, the full set of survey questionnaires was administered only to: 5 households meeting eligibility criteria in urban settlements, and 8 households in rural settlements. This approach is commonly applied by producers of official statistics. For instance, the National Statistics Office of Georgia employs the same method in the Household Survey on the Use of Information and Communication Technologies (ICT), the Statistical Survey of Foreign Visitors, and the Statistical Survey of Outbound Tourism. The validity of the results obtained through this sampling approach is statistically substantiated in the survey's sampling design (formulas 1–9), where the expected maximum marginal relative error and the minimum required sample size are described in detail.

Statistical Weights and Their Calculation Method: In the Multiple Indicator Cluster Survey (MICS 2018 Georgia), neither household weights for the household questionnaire nor personal weights were applied. In contrast, in the Statistical Survey on the Functioning and Foundational Learning Skills of Children Living in Georgian Households, household weights for the household questionnaire were essential due to the sampling method. This necessity arose because only one-third of the households included in the sample were interviewed using the full set of questionnaires (5 households in urban settlements and 8 households in rural settlements). Another key difference lies in the relationship between survey weights and population size. In MICS 2018 Georgia, the sum of non-standardized weights does not correspond to the actual size of the population. In the present statistical survey, however, the sum of personal weights is equal to the total population size, both by region and at the national level.

Overcrowding Rate: The paper presents the value of the Eurostat density indicator, calculated for the first time using data from Georgia. Direct and indirect validation of this value is challenging, as this type of data has not previously been compiled for the country. The calculation method fully adheres to the Eurostat methodology, and no additional assumptions were introduced during the research process.

Wealth Index: The methodology for calculating the wealth index follows the UNICEF approach; however, two important considerations should be noted: 1) As the method requires conducting factor and regression analysis based on survey data, it cannot be applied in exactly the same form across all countries. 2) Due to the sampling design, in which the full set of questionnaires was not administered in all households, the wealth indicator is skewed for the target household group.

## 6. Conclusion

The paper presents the design of the Statistical Survey on Functional and Foundational Learning Skills of Children Living in Georgian Households, the methodology for calculating the wealth index, and the statistical indicators derived from the study, including the overcrowding index. The sample size was determined using the Cochran formula for finite populations, taking into account the design effect. With a maximum marginal relative error of 10%, a probability value of 0.5 (extreme variation), and the maximum design effect observed in selective statistical surveys in Georgia (3), the required sample size for the target group was calculated at 1,199 households. A three-stage stratified cluster random sampling design was applied: Primary Sampling Unit (PSU): enumeration areas of Census, Secondary Sampling Unit (SSU): Household address, Tertiary Sampling Unit (TSU): Children aged 7–14 years living in the household. For fieldwork, 193 districts, 3,597 households, and 1,199 target households with children aged 7–14 were selected. Of the 3,597 households, 3,595 were inhabited. The overall household response rate was 56.9% — 52.6% in urban settlements and 60.9% in rural settlements. By region, the lowest response rate was recorded in Kakheti (47.2%) and the highest in Samtskhe–Javakheti (79.8%). The response rate was lower than that recorded in the Multiple Indicator Cluster Survey [2]. However, the target household response rate reached 99.9%. Based on these rates, the results are statistically reliable and representative both at the national level and at the level of individual strata. The sample allocation across regions was proportional to the square root of the number of households, ensuring statistical reliability of indicators at the regional level. Within each region, the sample was further distributed proportionally by settlement type. The response rate for children aged 7–14 showed no significant variation by settlement type — 92.2% in urban areas and 93.0% in rural areas.

The study calculates five statistical weights (1 - Household weight, 2 - Personal weight, 3 - Weight for a child aged 7–14, 4 - Weight for a parent/caregiver of a child aged 7–14, 5 - Household weight for the household questionnaire). In this context, statistical weights represent the inverse of the probability that an observation unit is selected in the sample. Their calculation accounts for non-response, the presence of children in the household, household size, population size, and the gender–age structure of the population. The robustness of the weighting methodology and the overall quality of the survey are evidenced by the alignment of household composition indicators with established benchmarks. Specifically, the percentage distribution of households by gender of the household head, age group of the household head, and number of household members is fully consistent with the results of the Multiple Indicator Cluster Survey [2]. It is noteworthy that household distribution percentages vary by region. This is expected, as the UNICEF methodology allocates regional samples proportionally to population size, whereas the present study applied allocation proportional to the square root of the number of households in each region. Furthermore, the percentage distribution of household members in the survey sample by five-year age groups is consistent with the demographic structure of Georgia's population.

The paper presents a methodology for calculating the wealth Index, consistent with the approach used by the United Nations Children's Fund (UNICEF). Variables from the statistical survey fieldwork instrument that were expected to be associated with well-being at urban, rural, and national levels were grouped for analysis. In the first stage, binary variables (taking values 0 or 1) were generated from the pre-selected variables, with the exception of the income amount variable, which retained its continuous form. Using the pairwise method of factor analysis, only those variables significant in factor formation were retained. Three factors were identified, of which two variables were constructed: The country factor, which remained unchanged, and an urban–rural variable, formed by combining the separate urban and rural settlement type factors. In the next stage, an empirical linear regression model was estimated, with the country factor as the dependent variable, and the urban–rural variable and settlement type dummy variables as predictors. The statistical significance of all model coefficients was confirmed at the 99% confidence level using Student's t-tests [23]. Both the coefficient of determination and the adjusted coefficient of determination indicated strong model fit, further supported by the Fisher F-test, which confirmed the statistical significance of the model at the 99% confidence level [23]. Residual diagnostics showed that the variance of residuals was constant, as the White test did not reject the null hypothesis of homoscedasticity at the 99% confidence level [23]. The Jarque–Bera test confirmed the normality of residuals, accepting the null hypothesis at the 95% confidence level [24]. The predicted values from the regression model were then assigned rank scores (1–5), forming the wealth Index indicator. The regression analysis was conducted using standardized personal weights, in line with the statistical methodology for wealth indicator. At the national level, the distribution of households across quintile groups according to the wealth Index was uniform. However, settlement-type analysis revealed differing trends: In urban settlements, the percentage of households increased progressively from the first to the fifth quintile. In rural settlements, the opposite trend was observed, with the highest proportion of households in the first quintile and the lowest in the fifth, showing a decline as quintile rank increased. These patterns are consistent with the results of the Multiple Indicator Cluster Survey [2].

According to the Statistical Survey on the Functioning and Foundational Learning Skills of Children Living in Georgian Households, 62.1% of the population residing in households lives in overcrowded housing. This figure exceeds the corresponding values recorded in Eurostat countries, which is not unexpected given that Georgia's economic situation lags behind that of countries included in Eurostat [25]. The survey also shows that the majority of households (48.2%) have three or more bedrooms, 41.6% have two bedrooms, and 10.2% have one bedroom. A comparison with the Multiple Indicator Cluster Survey [2] indicates an improvement in housing conditions. In the 2018 survey, only 26.2% of households had three or more bedrooms, 39.3% had two bedrooms, and 34.5% had one bedroom [2].

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**Annex 1.**
Results of household and children age 7-14's interviews.

**Table SR.1.1: Results of household and children age 7-14's interviews**

Number of household and children age 7-14's interviews by interview results, by area of residence and region, Statistical Survey on Functioning and Foundational Learning Skills of Children Living in Georgian Households, 2024

| | Total | Area | | Region | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Urban | Rural | Tbilisi | Adjara A.R. | Guria | Imereti | Racha-Lechkhumi and Kvemo Svaneti | Khakheti | Mtkheta-Mtianeti | Samegrelo-Zemo Svaneti | Samtskhe-Javakheti | Kvemo Kartli | Shida Kartli |
| **Households from Demographic** | | | | | | | | | | | | | | |
| Sampled | 3,597 | 1,725 | 1,872 | 645 | 324 | 213 | 465 | 126 | 354 | 174 | 351 | 243 | 381 | 321 |
| Occupied | 3,595 | 1,724 | 1,871 | 645 | 324 | 213 | 465 | 126 | 352 | 174 | 351 | 243 | 381 | 321 |
| Interviewed | 2,047 | 907 | 1,140 | 307 | 169 | 142 | 278 | 76 | 166 | 91 | 271 | 194 | 197 | 156 |
| Interviewed using the additional seeking[1] method | 567 | 291 | 276 | 108 | 51 | 19 | 85 | 31 | 70 | 31 | 15 | 19 | 42 | 96 |
| Demography completion rate | 56.9 | 52.6 | 60.9 | 47.6 | 52.2 | 66.7 | 59.8 | 60.3 | 46.9 | 52.3 | 77.2 | 79.8 | 51.7 | 48.6 |
| Demography response rate | 56.9 | 52.6 | 60.9 | 47.6 | 52.2 | 66.7 | 59.8 | 60.3 | 47.2 | 52.3 | 77.2 | 79.8 | 51.7 | 48.6 |
| **Households** | | | | | | | | | | | | | | |
| Sampled | 1,199 | 575 | 624 | 215 | 108 | 71 | 155 | 42 | 118 | 58 | 117 | 81 | 127 | 107 |
| Interviewed | 1,198 | 575 | 623 | 215 | 107 | 71 | 155 | 42 | 118 | 58 | 117 | 81 | 127 | 107 |
| Household response rate | 99.9 | 100 | 99.8 | 100 | 99.1 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| **Children age 7-14 years** | | | | | | | | | | | | | | |
| Number of children in interviewed households | 1,856 | 871 | 985 | 310 | 161 | 111 | 244 | 67 | 213 | 89 | 163 | 129 | 210 | 159 |
| Interviewed | 1,719 | 803 | 916 | 276 | 151 | 102 | 199 | 63 | 206 | 89 | 152 | 125 | 203 | 153 |
| Mothers/caretakers interviewed | 1,208 | 576 | 632 | 215 | 109 | 71 | 156 | 42 | 118 | 60 | 117 | 81 | 132 | 107 |
| Children age 7-14's response rate | 92.6 | 92.2 | 93.0 | 89.0 | 93.8 | 91.9 | 81.6 | 94.0 | 96.7 | 100.0 | 93.3 | 96.9 | 96.7 | 96.2 |

[1]The household tracing approach and the snowball method were applied

**Annex 2.**
Housing characteristics.

**Table SR.2.1: Housing characteristics**

Percent distribution of households by selected housing characteristics, by area of residence and region, Statistical Survey on Functioning and Foundational Learning Skills of Children Living in Georgian Households, 2024

| | | Area | | Region | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | **Total** | **Urban** | **Rural** | **Tbilisi** | **Adjara A.R.** | **Guria** | **Imereti** | **Racha-Lechkhumi and Kvemo Svaneti** | **Khakheti** | **Mtkheta-Mtianeti** | **Samegrelo -Zemo Svaneti** | **Samtskhe-Javakheti** | **Kvemo Kartli** | **Shida Kartli** |
| 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 | 100.0 |
| Internet access at home | | | | | | | | | | | | | | |
| Yes | 98.4 | 98.4 | 98.5 | 97.8 | 98.2 | 100.0 | 99.2 | 100.0 | 98.8 | 98.3 | 99.1 | 100.0 | 95.8 | 97.9 |
| No | 1.6 | 1.6 | 1.5 | 2.2 | 1.8 | 0.0 | 0.8 | 0.0 | 1.2 | 1.7 | 0.9 | 0.0 | 4.2 | 2.1 |
| Equipment used for internet access | | | | | | | | | | | | | | |
| Pc or laptop computer | 70.4 | 75.5 | 65.7 | 74.5 | 58.1 | 98.8 | 64.6 | 66.7 | 65.6 | 88.6 | 90.6 | 46.2 | 54.7 | 75.6 |
| Tablet | 27.4 | 34.1 | 21.3 | 28.8 | 29.5 | 17.3 | 34.7 | 30.4 | 7.3 | 26.5 | 22.7 | 27.4 | 21.5 | 52.4 |
| Mobile phone or smartphone | 97.5 | 97.5 | 97.5 | 97.4 | 97.3 | 98.7 | 98.6 | 100.0 | 97.8 | 98.3 | 99.1 | 97.3 | 95.1 | 95.1 |
| Digital tv | 66.6 | 75.8 | 58.2 | 76.4 | 66.9 | 66.4 | 71.3 | 83.3 | 52.2 | 92.7 | 33.6 | 47.8 | 76.0 | 74.7 |
| Other | 1.7 | 2.8 | 0.6 | 5.1 | 0.0 | 0.0 | 3.5 | 0.0 | 2.9 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| Rooms used for sleeping | | | | | | | | | | | | | | |
| 1 | 10.2 | 15.7 | 5.2 | 20.0 | 4.5 | 1.3 | 12.2 | 9.6 | 9.4 | 10.7 | 7.0 | 9.5 | 9.0 | 5.9 |
| 2 | 41.6 | 51.4 | 32.5 | 61.2 | 38.9 | 19.6 | 34.9 | 50.2 | 27.3 | 41.2 | 44.6 | 24.9 | 48.4 | 42.8 |
| 3 or more | 48.2 | 33.0 | 62.3 | 18.8 | 56.5 | 79.2 | 53.0 | 40.3 | 63.2 | 48.0 | 48.4 | 65.7 | 42.7 | 51.3 |
| Number of households | 1,198 | 575 | 623 | 215 | 107 | 71 | 155 | 42 | 118 | 58 | 117 | 81 | 127 | 107 |
| Overcrowding rate | 62.1 | 69.8 | 55.9 | 80.4 | 63.2 | 36.7 | 60.7 | 66.4 | 47.4 | 65.4 | 62.6 | 57.7 | 73.1 | 46.0 |
| Number of units (couples, Person aged 18 and more, children differented by sex and age, etc.) | 3,334 | 1,496 | 1,838 | 535 | 392 | 214 | 418 | 81 | 306 | 160 | 315 | 255 | 412 | 246 |

**Annex 3.**
Income quintiles.

**Table SR.2.3: Income quintiles**

Percent distribution of the household population, by income quintile, Statistical Survey on Functioning and Foundational Learning Skills of Children Living in Georgian Households, 2024

| | Income quintile | | | | | Total | Number of household members |
|---|---|---|---|---|---|---|---|
| | Poorest | Second | Middle | Fourth | Richest | | |
| **Total** | **20.0** | **20.0** | **20.0** | **20.0** | **19.9** | **100.0** | **3,334** |
| **Area** | | | | | | | |
| Urban | 10.2 | 12.1 | 19.5 | 25.1 | 33.1 | 100.0 | 1,496 |
| Rural | 28.0 | 26.5 | 20.4 | 15.9 | 9.2 | 100.0 | 1,838 |
| **Region** | | | | | | | |
| Tbilisi | 7.1 | 12.3 | 18.4 | 26.8 | 35.4 | 100.0 | 535 |
| Adjara A.R. | 16.2 | 25.4 | 12.5 | 20.8 | 25.1 | 100.0 | 392 |
| Guria | 18.5 | 27.7 | 20.9 | 19.6 | 13.3 | 100.0 | 214 |
| Imereti | 18.3 | 26.4 | 20.2 | 17.1 | 18.1 | 100.0 | 418 |
| Racha-Lechkhumi and Kvemo Svaneti | 32.5 | 21.2 | 13.5 | 24.8 | 7.9 | 100.0 | 81 |
| Khakheti | 23.7 | 20.3 | 19.5 | 19.9 | 16.6 | 100.0 | 306 |
| Mtkheta-Mtianeti | 18.8 | 13.5 | 35.6 | 19.7 | 12.5 | 100.0 | 160 |
| Samegrelo-Zemo Svaneti | 39.7 | 24.8 | 12.3 | 14.4 | 8.9 | 100.0 | 315 |
| Samtskhe-Javakheti | 36.1 | 16.0 | 26.7 | 15.5 | 5.6 | 100.0 | 255 |
| Kvemo Kartli | 19.2 | 18.4 | 19.1 | 19.7 | 23.7 | 100.0 | 412 |
| Shida Kartli | 9.7 | 15.3 | 31.5 | 20.5 | 22.9 | 100.0 | 246 |

**Annex 4.**
Household composition.

**Table SR.3.1: Household composition**

Percent and frequency distribution of households, Statistical Survey on Functioning and Foundational Learning Skills of Children Living in Georgian Households, 2024

| | Weighted percent | Number of households | |
|---|---|---|---|
| | | Weighted | Unweighted |
| | | | |
| **Total** | **100.0** | **2,614** | **2,614** |
| | | | |
| **Sex of household head** | | | |
| Male | 67.3 | 1,758 | 1,889 |
| Female | 32.7 | 856 | 725 |
| **Age of household head** | | | |
| <18 | | | |
| 18-34 | 6.7 | 176 | 209 |
| 35-64 | 54.4 | 1,422 | 1,578 |
| 65-84 | 35.9 | 938 | 774 |
| 85+ | 3.0 | 79 | 53 |
| **Area** | | | |
| Urban | 45.8 | 1,198 | 1,198 |
| Rural | 54.2 | 1,416 | 1,416 |
| **Region** | | | |
| Tbilisi | 15.9 | 415 | 415 |
| Adjara A.R. | 8.4 | 220 | 220 |
| Guria | 6.2 | 161 | 161 |
| Imereti | 13.9 | 363 | 363 |
| Racha-Lechkhumi and Kvemo Svaneti | 4.1 | 107 | 107 |
| Khakheti | 9.0 | 236 | 236 |
| Mtkheta-Mtianeti | 4.7 | 122 | 122 |

| | | | |
|---|---|---|---|
| Samegrelo-Zemo Svaneti | 10.9 | 286 | 286 |
| Samtskhe-Javakheti | 8.1 | 213 | 213 |
| Kvemo Kartli | 9.1 | 239 | 239 |
| Shida Kartli | 9.6 | 252 | 252 |
| **Education of household head** | | | |
| Pre-primary or none | 0.8 | 21 | 10 |
| Primary | 4.9 | 127 | 126 |
| Secondary | 46.3 | 1,210 | 1,225 |
| Vocational | 21.0 | 548 | 522 |
| Higher | 27.0 | 706 | 729 |
| DK/Missing | 0.1 | 2 | 2 |
| **Number of household members** | | | |
| 1 | 18.0 | 470 | 196 |
| 2 | 20.8 | 544 | 460 |
| 3 | 18.3 | 478 | 500 |
| 4 | 17.9 | 468 | 588 |
| 5 | 12.7 | 333 | 384 |
| 6 | 7.8 | 204 | 285 |
| 7+ | 4.4 | 115 | 201 |
| **Ethnicity of household head** | | | |
| Georgian | 90.5 | 2,366 | 2,353 |
| Azerbaijani | 5.0 | 130 | 130 |
| Armenian | 3.4 | 89 | 100 |
| Other | 1.1 | 28 | 31 |
| **Households with**[A] | | | |
| At least one child under age 7 years | 19.2 | 502 | 597 |
| At least one child age 7-14 years | 22.9 | 597 | 1,258 |
| At least one child age <18 years | 39.4 | 1,029 | 1,565 |
| No adult (18+) member | 0.0 | 0 | 0 |
| | | | |
| **Mean household size** | 3.9 | 2,614 | 2,614 |

**Annex 5.**
Age distribution of household population by sex.

**Table SR.4.1: Age distribution of household population by sex**

Percent and frequency distribution of the household population in five-year age groups and child (age 7-14 years) and adult populations (age 18 or more), by sex, Statistical Survey on Functioning and Foundational Learning Skills of Children Living in Georgian Households, 2024

| | **Males** | | **Females** | | **Total** | |
|---|---|---|---|---|---|---|
| | **Number** | **Percent** | **Number** | **Percent** | **Number** | **Percent** |
| **Total** | **4,927** | **100.0** | **5,193** | **100.0** | **10,120** | **100.0** |
| **Age** | | | | | | |
| 0-4 | 288 | 5.8 | 277 | 5.3 | 566 | 5.6 |
| 5-9 | 373 | 7.6 | 321 | 6.2 | 694 | 6.9 |
| 10-14 | 310 | 6.3 | 263 | 5.1 | 573 | 5.7 |
| 15-19 | 312 | 6.3 | 279 | 5.4 | 591 | 5.8 |
| 15-17 | 195 | 4.0 | 170 | 3.3 | 365 | 3.6 |
| 18-19 | 117 | 2.4 | 109 | 2.1 | 226 | 2.2 |
| 20-24 | 281 | 5.7 | 259 | 5.0 | 540 | 5.3 |
| 25-29 | 325 | 6.6 | 271 | 5.2 | 596 | 5.9 |
| 30-34 | 347 | 7.0 | 365 | 7.0 | 712 | 7.0 |
| 35-39 | 381 | 7.7 | 325 | 6.3 | 707 | 7.0 |
| 40-44 | 335 | 6.8 | 354 | 6.8 | 689 | 6.8 |

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| | | | | | | |
|---|---|---|---|---|---|---|
| 45-49 | 316 | 6.4 | 282 | 5.4 | 597 | 5.9 |
| 50-54 | 324 | 6.6 | 336 | 6.5 | 660 | 6.5 |
| 55-59 | 324 | 6.6 | 351 | 6.8 | 675 | 6.7 |
| 60-64 | 304 | 6.2 | 418 | 8.0 | 722 | 7.1 |
| 65-69 | 290 | 5.9 | 348 | 6.7 | 638 | 6.3 |
| 70-74 | 174 | 3.5 | 328 | 6.3 | 502 | 5.0 |
| 75-79 | 116 | 2.3 | 178 | 3.4 | 294 | 2.9 |
| 80-84 | 85 | 1.7 | 137 | 2.6 | 222 | 2.2 |
| 85+ | 43 | 0.9 | 100 | 1.9 | 143 | 1.4 |
| **Child and adult populations** | | | | | | |
| Children age 7-14 years | 530 | 10.8 | 461 | 8.9 | 991 | 9.8 |
| Children age 15-17 years | 195 | 4.0 | 170 | 3.3 | 365 | 3.6 |
| Adults age 18+ years | 3,761 | 76.3 | 4,161 | 80.1 | 7,922 | 78.3 |

**Annex 6.**

Children age 7-14 years' background characteristics.

**Table SR.5.3: Children age 7-14 years' background characteristics**

Percent and frequency distribution of children age 7-14 years, Statistical Survey on Functioning and Foundational Learning Skills of Children Living in Georgian Households, 2024

| | Weighted percent | Number of households with at least one child age 7-14 years | |
|---|---|---|---|
| | | Weighted | Unweighted |
| **Total** | **100.0** | **1,780** | **1,780** |
| | | | |
| **Sex** | | | |
| Male | 52.0 | 926 | 927 |
| Female | 48.0 | 854 | 853 |
| **Area** | | | |
| Urban | 46.9 | 835 | 835 |
| Rural | 53.1 | 945 | 945 |
| **Region** | | | |
| Tbilisi | 16.7 | 298 | 298 |
| Adjara A.R. | 8.8 | 157 | 157 |
| Guria | 5.8 | 104 | 104 |
| Imereti | 12.6 | 224 | 224 |
| Racha-Lechkhumi and Kvemo Svaneti | 3.5 | 63 | 63 |
| Khakheti | 11.7 | 209 | 209 |
| Mtkheta-Mtianeti | 5.0 | 89 | 89 |
| Samegrelo-Zemo Svaneti | 8.5 | 152 | 152 |
| Samtskhe-Javakheti | 7.1 | 126 | 126 |
| Kvemo Kartli | 11.5 | 205 | 205 |
| Shida Kartli | 8.6 | 153 | 153 |
| **Age** | | | |
| 7-9 | 38.0 | 676 | 667 |
| 10-14 | 62.0 | 1,104 | 1,113 |
| **Mother's education** | | | |
| Pre-primary or none | 0.1 | 1 | 1 |
| Primary | 6.8 | 122 | 118 |
| Secondary | 38.2 | 680 | 680 |
| Vocational | 16.8 | 299 | 304 |
| Higher | 37.9 | 675 | 673 |
| DK/Missing | 0.2 | 3 | 4 |
| **Child's functional difficulties** | | | |
| Has functional difficulty | 6.6 | 118 | 120 |
| Has no functional difficulty | 93.4 | 1,662 | 1,660 |

| | | | |
|---|---|---|---|
| **Mother's functional difficulties** | | | |
| Has functional difficulty | 4.2 | 75 | 67 |
| Has no functional difficulty | 95.8 | 1,705 | 1,713 |
| No information | | | |
| **Ethnicity of household head** | | | |
| Georgian | 89.0 | 1,583 | 1,593 |
| Azerbaijani | 6.6 | 118 | 118 |
| Armenian | 4.0 | 71 | 60 |
| Other | 0.4 | 7 | 9 |
| **Income quintile** | | | |
| Poorest | 21.0 | 374 | 379 |
| Second | 19.2 | 341 | 337 |
| Middle | 20.2 | 359 | 366 |
| Fourth | 19.6 | 349 | 346 |
| Richest | 20.1 | 358 | 352 |