

## Equity Index Outline Paper

### I. Background and Rationale

1. Addressing the further need for strengthening equity in education, the Government of Nepal has developed the Consolidated Equity Strategy for the School Education Sector, which was launched in December 2014. The main objectives of this strategy are to reduce the current disparities in (i) access & participation and (ii) learning outcomes for children in basic and secondary public education in Nepal. The strategy presents a two-fold approach in meeting these objectives:

- The Development of an Equity in Education Index (**Equity Index**), at least at district level, using both school sector data and population data.
- A **consolidation and further targeting of current strategies** deployed by the Government and Development Partners (including I/NGOs and CSOs) to strengthen an equity/need based approach.

2. Based on this, an Equity Index Option Paper (Option Paper) was developed. This Equity Index Outline Paper (Outline Paper) has been developed based on the consensus reached among Government and Development Partners informed by the possibilities presented in the Option Paper and on subsequent analysis and testing of available data.

A **composite index** such as the proposed Equity index is an indicator that summarizes complex, multi-dimensional realities by aggregating a set of individual indicators. Combining multiple indicators into a single index facilitates comparisons and informed decision making while considering several important factors at once.

3. The purpose of the Equity Index is to account for children's opportunity for school education as well as the equality of opportunity across children facing different circumstances/contexts. The equity index is intended to be the core planning and monitoring tool for the full-fledged implementation of the Consolidated Equity Strategy and is planned to be used to target the most disadvantaged districts for specific interventions. The aim is to ultimately provide tools that can be used at district, VDC and school level.

4. The development of the equity index and its utilization for providing targeted support to districts is planned to be one of the three stretch indicators for eligibility on the variable component of the GPE grant (US\$ 17.8 million or 30% of the total grant). The World Bank is the supervising entity for this Grant. The submission of the GPE Grant application is planned for March 2015 and the approval by GPE Board is planned for May 2015. The approval of the equity index -as well as the related revision of targeted intervention plans for out-of-school children are planned to be achieved before the end of FY 2015-16.

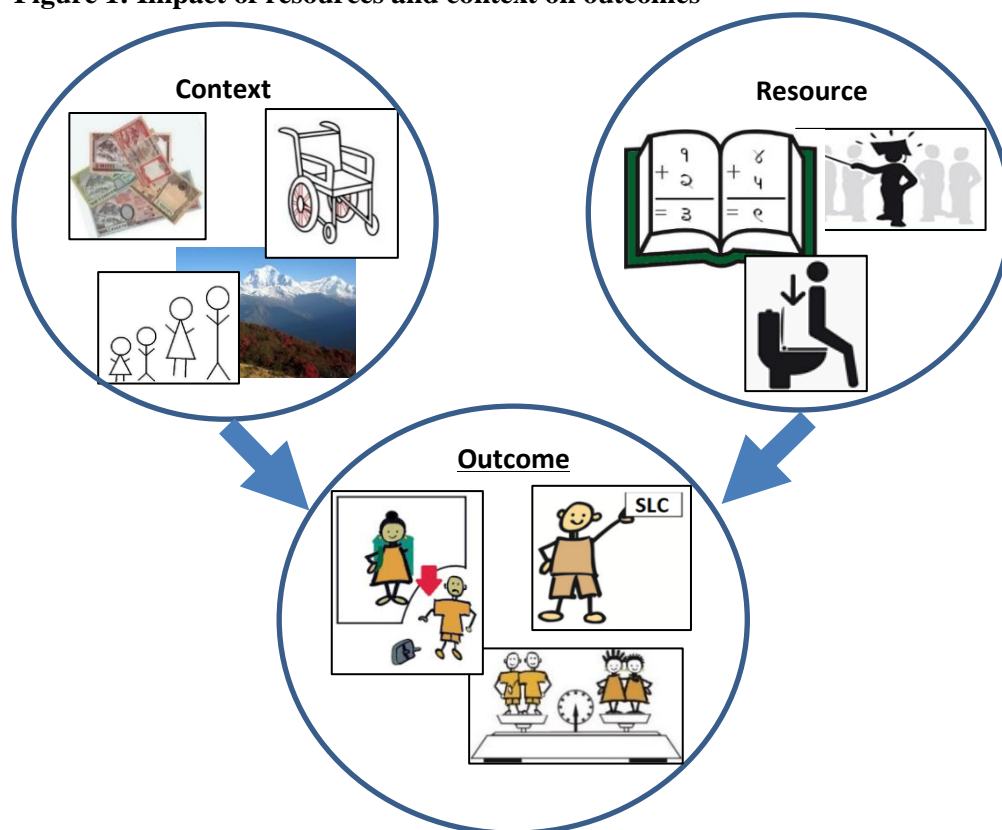
5. The Equity Index will be embedded within the Education Management Information System (EMIS)/Flash System, in the Department of Education and to support the Government in targeting equity based allocations within the Annual Strategic Implementation Plan / Annual Work Plan and Budget (ASIP/AWPB).

### II. Developing and interpreting the equity index

#### a. Understanding outcomes in light of context and resources

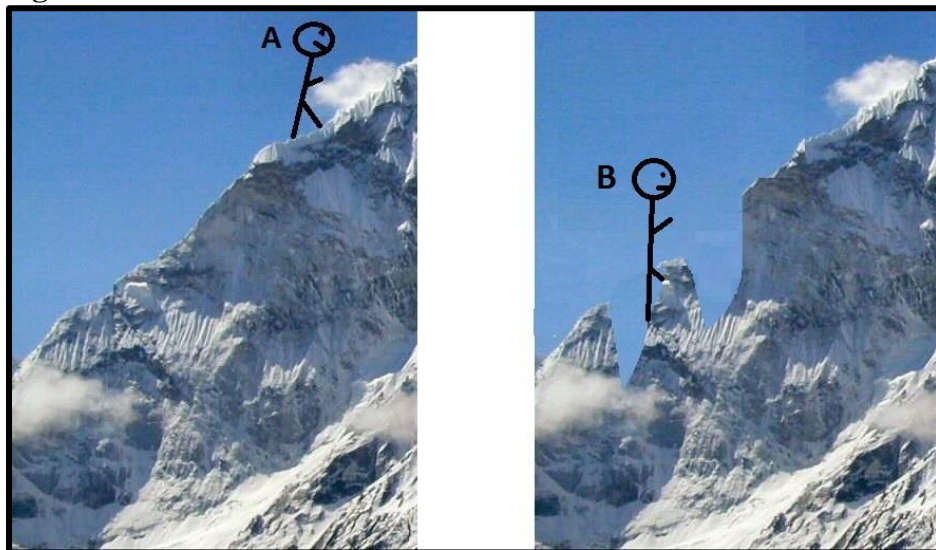
6. In order to understand children's outcomes, it is important to consider both i) the socio-demographic factors that are potential drivers of inequity across children, schools or districts and ii) human, material and financial resources allocated to schools and children, as summarized in Figure 1 below.

**Figure 1: Impact of resources and context on outcomes**



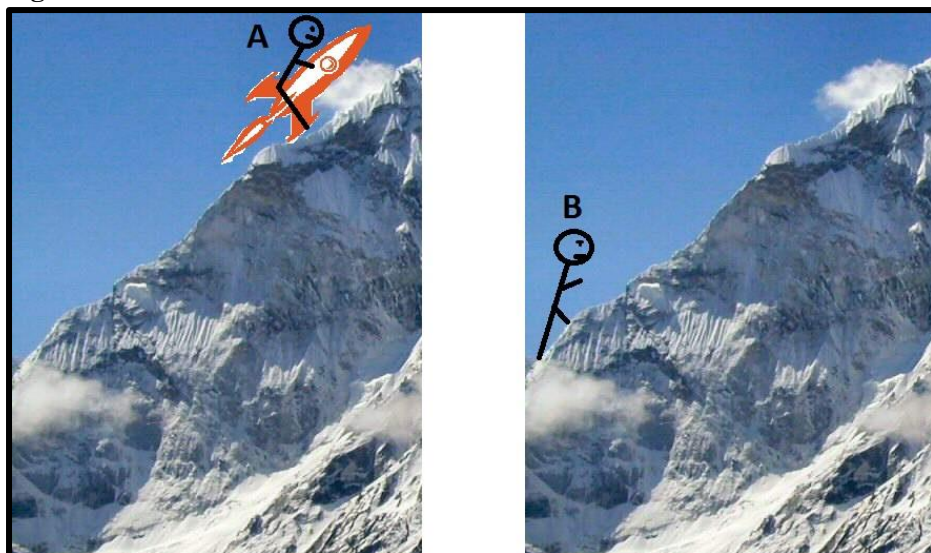
7. If only outcomes (results) are considered when comparing districts or schools, key information is missed. In *Figure 2* below *A* and *B* appear to have achieved very different outcomes: *A* has progressed much further up the mountain. However, *B* had to contend with, and overcome, more challenges. Given the difference in the two contexts we cannot expect the same outcomes. Given the more challenging context with an equity perspective, *B* will require more support.

**Figure 2: Context and outcomes**



8. In *Figure 3* below *A* has again progressed much further up the mountain, but in this scenario *A* has benefitted from more resources. The level of resources is not equitable and understandably has an impact on the equity of the outcomes achieved. Given the difference in the levels of resources we cannot expect the same outcomes. Given the lack of resources *B* will require more support.

**Figure 3: Resources and outcomes**



9. Consequently, at least three different elements should be taken into account when computing and/or interpreting the equity index: i) outcome; ii) context; and iii) resource. The sections below will propose options regarding ways of taking these into account.

#### **b. Components of the outcome equity index**

10. It was agreed, in order to reflect both children's opportunity for school education as well as the equality of opportunity across children facing different circumstances/context, that the equity index consist of a component reflecting average education outcomes, and another component reflecting disparities between different categories of children, in line with the methodological design of the index of the Human opportunity Index (HOI).

11. The index follows the formula below:

$$Equity\ index = C \times (1 - D)$$

Where C is the "Coverage" i.e. the average level of access to the opportunity and D is a dissimilarity index measuring inequality of opportunity.

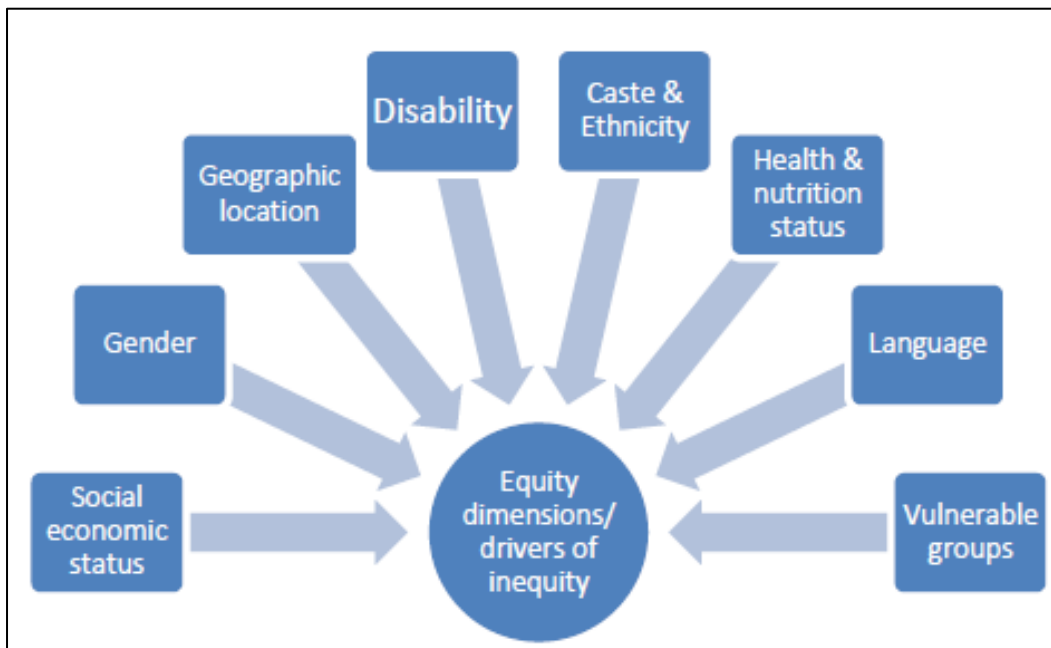
12. The index above captures average outcomes as well as discrepancies according to context. It does not capture, however, resources, which should be assessed through a separate "resource index" reflecting the level of resources within the district, VDC or school.

13. Options regarding the definition of education **outcomes** may include<sup>1</sup>:

- Access / participation / survival / repetition.
- Learning.
- Or a mix of the two.

14. **Inequity** relates to disparities along all or a set of the following **equity dimensions / drivers of inequity** (named "circumstances" in the HOI that were defined in the Consolidated Equity Strategy):

<sup>1</sup> The Consolidated Equity Strategy mentions access, participation and learning and the GPE grant working document from the World Bank mentions only out-of-school children (access/participation)



Source: Consolidated Equity Strategy For the School Education Sector in Nepal (2014)

15. Possible options were discussed based on the principles delineated in the options paper and reproduced below:

- Consistency with the Consolidated Equity Strategy and the SSRP.
- Usefulness for decision making.
- Availability of quality data.
- Should be underpinned by econometric analysis.
- Comparability across districts and over time.
- Frequency of measurement.
- Balance between analytical strength and ease of communication.
- Comprehensiveness vs. use of proxies for the drivers of inequity.

16. The list below provides a summary of the indicators that were considered as possible indicators/components of education outcomes and of the related discussion:

17. **Percentage of out of school children** (or NER): this indicator requires information on the population of school-age children in and out of school. As such, it cannot be computed based on EMIS data only. Household surveys (e.g. the 2014 MICS) are by nature sample based. The MICS was rejected as a possible source of information because it does not include representative samples at district level for all Nepal districts. The census does not have these disadvantages, but is (like MICS) not undertaken regularly. In addition, detailed census data is not presently available to DoE. What is therefore suggested is :

- i) Population projections by district, age, and gender are available and can be combined with EMIS data to compute an estimated out of school children rate for different years, and account for disparities along the gender dimension (making an HOI-type of computation using only gender as a driver of inequity). Despite the limitation regarding drivers of inequity, it is felt useful to capture out of school children in addition to information on flows within schools (e.g. survival rates) to capture children who never access school. This information can be used for regular monitoring.
- ii) If fuller census data become available, then a once-a-decade computation of an HOI based on out of school children rates and using different drivers of inequity (gender, location, caste/ethnicity, disability, wealth and mother's education) can be made. It would not be possible to update this HOI (as population projections by district, age, and for all population subgroups e.g. female rural Dalit poorest quintile disabled cannot be made in a reliable fashion), but the computation may be used to drill down more into drivers of disparities at district level at the baseline year. This indicator would not be used for regular monitoring.

18. **Repetition, dropout and survival:** these indicators can be computed using EMIS data only (enrolment and repeaters for two successive years), hence they can be updated yearly. The computation of survival combines information on repetition and dropout per grade, hence computing survival rates would be enough to capture flows within schools. Full information on gender, location and caste/ethnicity is available in the EMIS, so an HOI



accounting for disparities along these 3 dimensions may be computed. Partial information is available regarding children with disabilities (no information on repeaters) but it is proposed to add this dimension, making assumptions regarding repetition rates for these students. There is no information regarding wealth in the EMIS, however, even in the absence of an index based on wealth, income disparities may still be captured as long as existing dimensions (gender, location, caste/ethnicity and disability) are strongly correlated with wealth. Initial computations at the regional level using MICS data have shown that available information on: location (rural/urban), region, and caste was sufficient to predict around 60% of the variation in the wealth index. Further computations can be made, particularly if census data become available. Survival rate data complements the use of census data. Survival data will provide detailed, updated information on children who are out of school because they dropped out along the different dimensions (ethnicity, location, gender, disability). In a context such as Nepal, where most children access school (but do not necessarily complete it), these represent the largest share of out of school children. Census data, on the other hand, helps with the calculation of Out of School numbers – including children who never accessed school and those that dropped out, but information cannot be regularly updated and may only be available along the gender dimension.

**19. Learning outcomes:** SLC results are currently available by district and gender. Results by school and gender could also be available. In this context, SLC results can be used for an HOI-type of computation at the district level. This computation would reflect average outcomes and gender disparities and could be updated every year. There are some concerns that SLC results may vary from year to year. However, even though they vary from year to year, it seems that rankings would be stable even when pass rates change: the rank correlation between districts in different years is 63%. 8th grade district exam results may also be used if they are made available. These exams are only comparable within districts, so they would be used to compare VDCs or schools within districts but not to compare different districts.

**20. Levels of education:** it was felt important to differentiate between basic (1-8) and secondary (9--12) education, so indices would be computed for each of these levels.

**21.** It is proposed that the **outcome equity index** would include the following indicators:

Indicator	Source of data	Dimensions of equity	Level of disaggregation	Levels of education	Frequency
Out of school rate	EMIS and population census	Gender, additional dimensions (location, caste/ethnicity, disability, wealth, mother's education) if dataset is made available to DoE.	District only	Basic education (1-8)	Every year for gender, once for additional dimensions if they become available
Survival rates	EMIS	Gender, location, caste/ethnic groups using exact figures. Disability using available data on enrolment and estimates for repetition. Disability may be computed exactly once individual student information (or more disaggregated information) becomes available at central level.	District, VDC, school for average, district only for disparities along dimensions of equity	Basic education (1-8), secondary (9-12)	Every year
Learning outcomes	SLC 8th grade district exam data	Gender	District, VDC, school for SLC. VDC and school only for 8 <sup>th</sup> grade exams (no comparability between districts).	10th grade for SLC 8th grade for district exam	Every year

22.

- c. **Note on caste/ethnic groupings:** The Government of Nepal recognizes multiple castes and ethnic groupings in various official data. In the Census, the government identifies 1,250 caste and ethnic

groups.<sup>2</sup> In EMIS, grouping have been made, simplifying to: Dalit, Janajati, Brahmin/Chhetri, and Other. When considering which groupings to use for the Equity Index, an approach is needed that allows for large enough groupings to perform the calculations without losing the ability to identify the group (or groups) at most disadvantage. Using MICS data, a statistical analysis was done to compare wealth scores of Dalit, Janajati and Other, which found that Dalit were gross under-performers, while Janajati and Other did not statistically differ significantly in terms of wealth.<sup>3</sup> The literature on educational outcomes, in particular the NASA (2015) findings, also find that Janajati do not under perform in any of the tested subjects in comparison to Brahmin/Chhetri or Other. Dalits perform worse than both Janajati, Other and Brahmin/Chhetri. “Medhesi” and “Minorities” in the NASA results perform worse than Dalit, but these are currently not caste/ethnic groupings captured in EMIS, so are not available to include in the Index. When Census data is made available, further analysis of the Out of School indicator would be possible along more refined caste/ethnic groupings.

## Resources index:

23. To better interpret the outcome equity index, it is important to contrast it with resources available at district (or VDC or school) level. Information available on resources at school level include the PMEC (primary minimum enabling conditions) which relate to teachers, textbooks, book corner, classrooms and latrines at the Basic Education level. Minimum enabling conditions have not been defined at secondary level yet. In addition to PMEC-related data, further information includes: trained/qualified teachers, per pupil funding, scholarships, transitional language support, and desks, chairs, computers, electricity, internet and playground.

24. At primary level, an analysis was made of the correlation between different PMEC. Correlations appear very high hence an index reflecting the average number of PMEC available in school – something that is already computed by the DoE, would probably be a good reflexion of the availability of any PMEC.

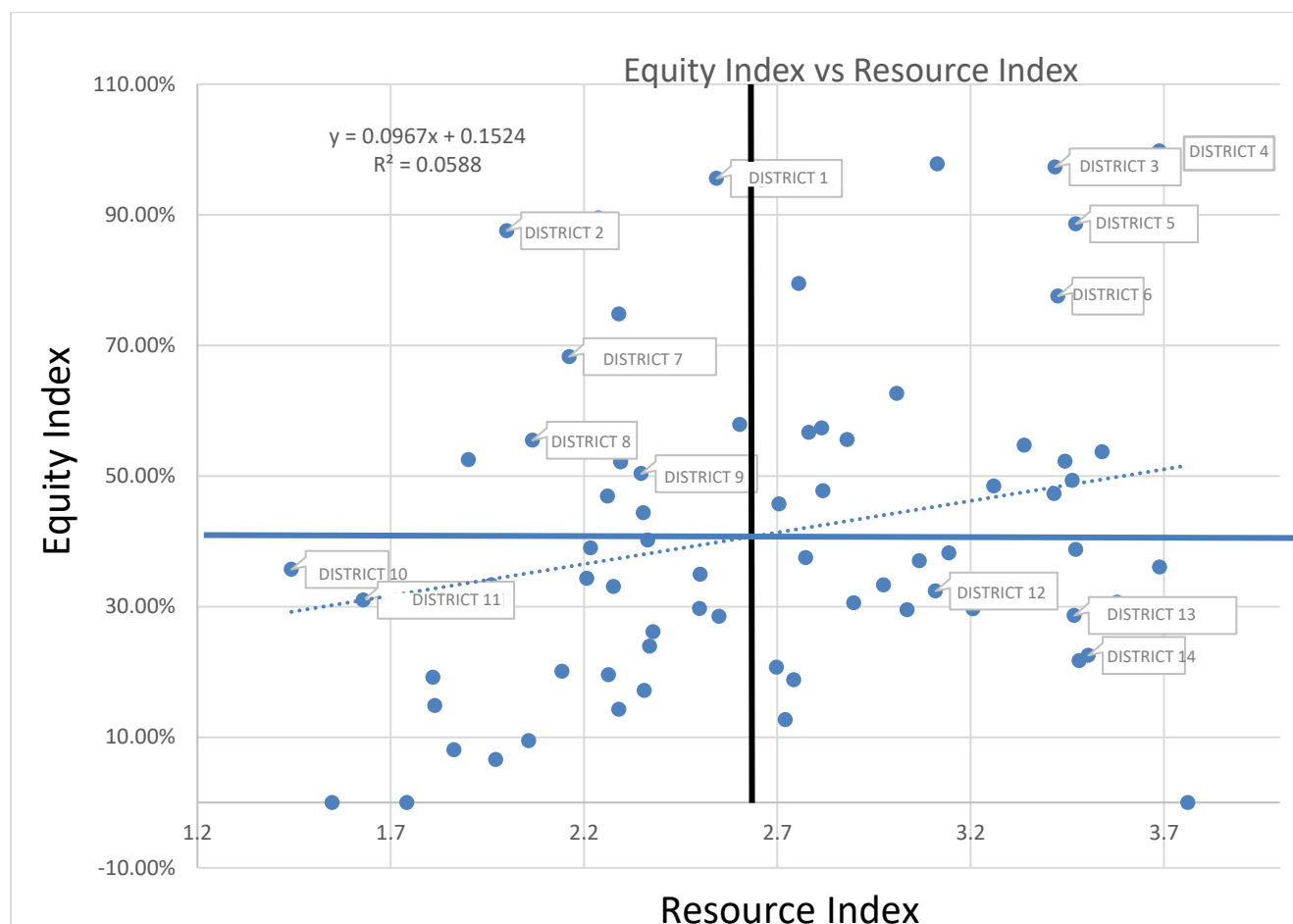
25. To improve this index, several options may be explored:

- Ways of better capturing nuances in the availability of resources, beyond having vs. not having the minimum enabling condition e.g. regarding teachers. This will however require to go beyond pupil to teacher ratios (that do not account for the fact that a very small school needs to have at least one teacher or for schools that have a number of teachers far higher than their expected needs) to define a more refined indicator.
- Capturing additional resource elements beyond PMEC, and considering how the difference between private schools (for which PMEC has not been computed though they are included in the HOI) and public schools may be accounted for.
- Work will also be done by the government to consider how PMEC apply beyond the basic education level e.g. teacher availability is calculated differently at the secondary level due to subject-wise teaching. Furthermore, the relevance of other resources may increase (e.g. science laboratory more relevant than book corners at the secondary level).

## Initial results:

<sup>2</sup> Population Monograph of Nepal Vol. II, (CBS, 2014), p. 1.

<sup>3</sup> Dalits (wealth score = -0.423); Janajati (0.055) and Other (0.064) – UNICEF MICS (2014)



**d. Possible alternative options / points for further investigation and discussion:**

26. **Dimensions of inequity:** including information on wealth, mother's education. This would require census data which have not yet been made available to the DoE, and would only be possible to update every ten years as new census data is available. However, it would be excellent to include this data, if accessible, to further investigate wealth and mother's education as drivers of inequity in education.

27. **Relation between performance at different levels of education (basic vs. secondary grades):** the main focus of the equity index is intended to be basic education, but a similar index would also be computed for secondary grades. One thing that would be worth investigating would be the correlation between performance at lower vs. higher grade levels.

28. **Developing a composite based on available indicators:** in order to identify low performing districts, a composite performance index that combines outcome indicators (e.g. survival and SLC) would be useful<sup>4</sup>.

29. **Resource index:** work to define (at secondary level) and refine (at the primary level) the resource index should be undertaken.

30. **Drilling down to the VDC and school level:** it is expected that a similar process will be used at the VDC and school levels. However, when the level of disaggregation becomes higher, the number of individuals in each subgroup (e.g. Dalit girl) can become very low – to the point that it is expected that for many subgroups there may be 0 students enrolled at a given grade level. This can affect the computation of the HOI and may require to consider only a “coverage” index (i.e. reflecting only the average level of performance), without the dissimilarity index assessing disparities between groups. Ways of ensuring that context still remains considered may have to be discussed (see below).

<sup>4</sup> Combining indicators has the advantage of facilitating comparison between districts by decision-makers. This does not exclude looking into each indicator separately. For example decision-makers may first look at the combined index to identify lowest performing districts then focus on separate indicators in these districts for a more nuanced understanding of the districts' performance.

31. **Context index:** contrasting the Equity Index and Resource Index will already help target resources to the lowest and least resourced districts. However, in a second phase, additional information on the context (profile of school age children e.g. urban/rural, caste/ethnicity) can help further understand the drivers behind outcomes. In particular, it may help districts with better planning of their support to schools, especially if at school level only average outcomes can be computed. It is therefore proposed that, in a second phase, a context index be built based on location and caste/ethnicity<sup>5</sup>.

### III. Using the equity index

32. The outcome equity index and related resource index will be used in different ways at national, district, VDC and school levels.

33. The first use of the equity index will be to identify district performance on the equity index in light of their level of resources to inform government and development partners' support (in terms of resources and/or pedagogical support) to districts. This may be done by:

- Ranking the districts according to their outcome equity index then identifying those that have the lowest outcome equity index – considering which of those have the lowest average resource levels vs which ones have high resources and low performance. A number of target districts may be identified for specific support. The work may also help define an equity-focused allocation formulation which may account for:
  - Numbers of students or classes to get a flat “financing per student/class” amount of funding.
  - Districts/VDCs/schools in difficult contexts and/or with particularly low resources which may be given extra funding.
  - Districts that have been progressing on their HOI (through higher average results / lower dissimilarity index) who may be “rewarded” through additional funding.
- For the districts with the lowest amounts of resources at least, there may be a need to drill down into what resources are missing – as support needed will not be the same if teachers are missing or if classrooms are. In addition, there may be a need for separate treatment of earthquake affected districts.
- Districts that have higher than average resources, but lower than average HOI who might need support to ensure resources are utilized and monitored or further pedagogical or technical support to improve the efficiency and use of the resources available.
- Looking separately at the two components of the index (coverage and dissimilarity index) to identify the origin of the low performance – overall low results, high inequity in outcomes (and along which dimension).

34. It should be noted that while the Equity Index attempts to utilize and synthesize the most representative and informative indicators and data sets to determine educational equity, in order to guide specific interventions, further analysis of the data of specific districts will be necessary to ensure the policies are properly targeted and designed. Firstly, as explained above, it will be important to look into the components of the equity index, to better identify for example whether the largest disparities relate to caste, gender, or location. It may also be important to undertake further data analysis e.g. there may be a need to analyse where within a given education level disparities are created for different categories or children or even to further decompose the caste and ethnicity groupings to bring more nuancing to the analysis and better target interventions.

35. The equity and resource indices will be utilized to contrast VDC and school performance and resources to identify targets for support at sub-district level. As such, they will inform planning and decentralized levels (district, VDC, school) including School Improvement Plans, District Education Plans, and District-level Annual Strategic Implementation Plans and district budgeting, and when viable Village Education Plans.

36. The equity index and resource index will also be used to monitor progress at district, VDC and school level. Progress may be monitored along two dimensions:

- Progress in the outcome equity index, which will measure progress both on average results and with regard to the reduction of disparities.
- Progress in targeting resources to the lowest performing districts, VDC or schools.

37. The equity and resource indices will also be reflected in the **school and district education profiles** that are being developed under the GPE-GRA ‘Data Must Speak’ initiative with the Department of Education.

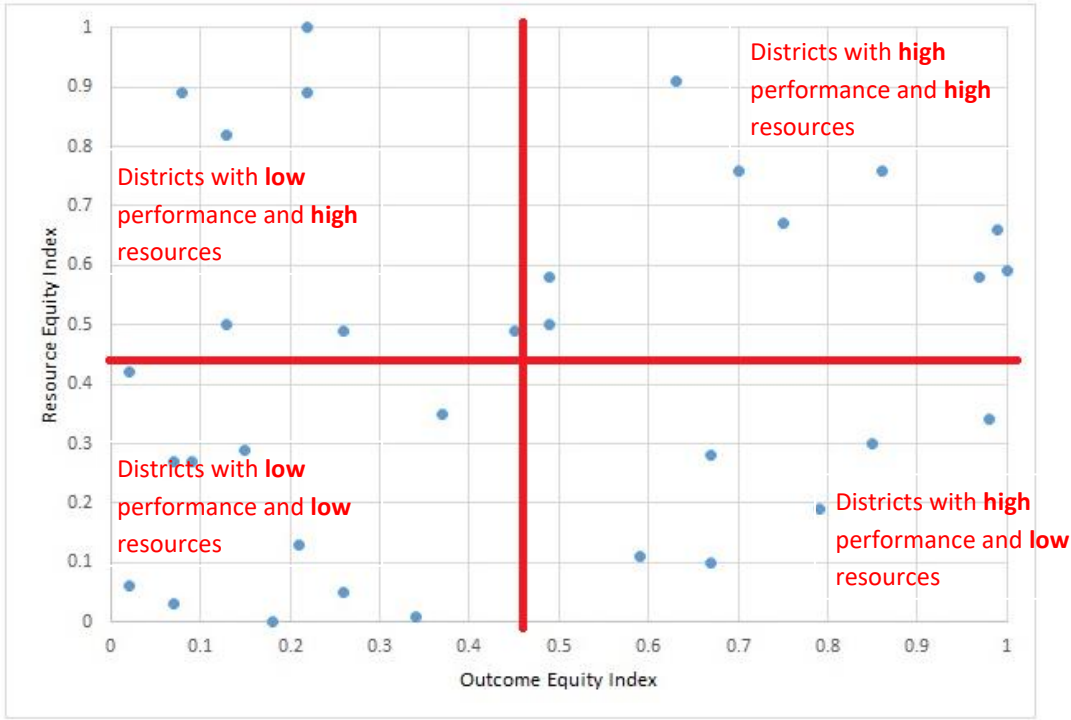
38. Finally the equity index can be used as a tool for advocacy and to gather financial and political support at country level.

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<sup>5</sup> Note that gender is not useful in a “context index” as districts / VDCs / schools are not expected to significantly differ in the proportion of girls in the school-age population, while the distribution of castes or urban/rural origin can vary markedly.



**Figure 4: mapping resources and outcomes**



39. Figure 4 classifies the districts into four categories:

- Districts with high performance and high level of resources: *Good districts* which can be used to support other districts by sharing their successful approaches and best practices;
- Districts with high performance and low level of resources: *Outstanding districts* which can be supported with more material resources and can support other districts by sharing their successful approaches and best practices.
- Districts with low performance and low level of resources: *Priority districts* to be supported in material resources and (potentially) pedagogical processes.
- Districts with low performance and high level of resources: *Inefficient districts* which require support but not in the form of material resources.

#### IV. Annex - Details on Index Computations

##### Outcome Index:

$$EI = C(1 - D)$$

Where,

$C$  = average survival rate in a district

$$D = \frac{1}{2C} \sum_{i=1}^h w_i |C_i - C|, \quad w_i = \frac{n_h}{n}, \quad h = 2^k$$

$C_i$  = average survival rate in a group  $i$ .

$h$  = number of demographic groups.

$k$  = number of dichotomous dimensions of inequity (e.g. gender, disability, location)

$n$  = total number of students enrolled.

$n_h$  = number of students enrolled in a group  $i$ .

### Resource Index:

$$RI = \frac{(\sum_{i=1}^5 i * N_i)}{N}$$

Where,  $RI$  = resource index;  $1 \leq RI \leq 5$

$N_i$  = number of schools who have  $i$  number of PMEC.

$N = \sum_{i=1}^5 N_i$  is total number of schools in a district.

### Survival Rate

$$s_{12} = \frac{p_{12}}{1 - r_1}$$

where,  $s_{12}$  is a survival rate from class 1 to class 2,

$p_{12} = \frac{P_{12}}{E_1^{2070}}$  is promotion rate from class 1 to class 2,

$r_1 = \frac{R_1}{E_1^{2070}}$  is a repetition rate in class 1,

$P_{12} = E_2^{2071} - R_2^{2071}$  is number of promoted students,

$R_1$  is a number of repeaters in class 1 in year 2071,

Average survival rate from class 1 to class 8 is computed as follows

$$C = \prod_{i=1}^7 s_{i,i+1}$$