Gender Sensitivity of Well-Being Indicators

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Summary

Development is based not only on economic growth, but also on the achievement of social goals, including gender equity. Indicators capable of reliably identifying gender differences in well-being are thus essential. In this paper the gender sensitivity of indicators of health, nutrition and education, and of some composite indices, is critically examined with reference to developing countries. The relationship between poverty and gender differences in these conventional indicators is also explored. The important issue of social processes which result in gender differences is, however, beyond the scope of the discussion.

The paper assesses indicators within the analytical framework of "functionings". In this framework, it is not the possession of a commodity or the utility it provides that proxies for well-being, but rather what a person actually succeeds in doing with the commodity and its characteristics. Findings are outlined below.

Indicators of health: Indicators of differential mortality and differential morbidity are assessed. Indicators of mortality (for example, life expectancy and age-specific mortality rates) are easily measurable and economically affordable relative to other social indicators. The reliability of some (such as life expectancy), which can mask gender differentials in specific age groups is, however, questionable. Among the age-specific indicators, juvenile sex ratios (particularly disaggregated into the female male ratio 0–4 and 5–9) appear to be gender sensitive and of greatest relevance. This has been assessed for India and is worthy of investigation in other developing countries. With respect to morbidity, reliable indicators are difficult to construct due to the inherent unreliability of the data.

Indicators of nutrition: Indicators are assessed in two groups: indicators of intake and indicators of outcome. Measurements of food intake and outcome both, however, suffer from a number of methodological and interpretation problems that make it difficult to construct reliable indicators.

Indicators of education: Indicators are assessed in two main groups: indicators of access (which include stock variables, such as adult literacy and mean years of schooling per person aged 25 and over, and flow variables such as enrolment and drop-out ratios); and indicators of content and purposes. Indicators of access appear to be important in identifying gender gaps in primary, secondary and tertiary education. In developing countries with a larger proportion of younger age groups, flow variables provide more reliable and up-to-date information than stock variables. While research at the global level suggests that enrolment ratios are reliable indicators of gender differences, micro-level research is required to compare the reliability of enrolment ratios with drop-out and repetition ratios. Indicators of content and purposes, like the gender segregation index, may be useful to assess gender differences in the field of education.

Composite assessment: Assessing indicators of particular single functionings (as above) may give the false impression of equality (if inequality is present in unassessed functionings). (In sub-Saharan Africa, for example, some countries may show a balanced female male ratio but have large gender gaps in enrolment rates.) Although a multidimensional approach to evaluation has many merits, the

current trend to compress multiple elements of a functioning vector into composite indices raises other issues. Value judgements have to be made about the components to be included (based on the intended use of the index) and excluded, and the weights to be allotted. However, composite indicators constructed with specific purposes in mind can be useful and have proved helpful for preliminary comparisons in global analyses. Currently available composite indices (for example, the Gender-related Development Index — GDI — and the Physical Quality of Life Index) may need to be adapted if they are to be used for comparing gender gaps among or within developing countries. Indicators used would have to take into account the young nature of the population. With respect to the GDI, for example, the use of age-specific disaggregated female male ratios (for the under-10 age group) rather than life expectancy, and an increase in the weight attached to average enrolment component of the education indicator relative to the adult literacy component, may be more appropriate. Furthermore, the income component of the GDI, if standardized for skills and supplemented by a "drudgery" indicator, could provide gender-sensitive information superior to that provided by the functionings components.

The relation between household poverty and gender discrimination: The limited evidence suggests that gender differentials in indicators of functionings do not necessarily conflate with differences in opulence indicators. Except for the gender gap in education, it is not evident that gender inequality is universally higher among lower income groups. The paper briefly reviews opulence indicators — largely in the form of income poverty — but it is very likely that property ownership would reveal the same lack of deterministic relationship.

The findings of the paper point to the importance of, first, the collection of gender-sensitive indicator data in national censuses (especially for the indicators identified as useful, as well as "time allocation") and second, the gender disaggregation of data for differing levels of income. However, research on social processes resulting in gender differentials (which is generally conducted at the micro-level) needs to be fed more effectively into policy making.

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Sommaire

Le développement ne repose pas seulement sur la croissance économique mais aussi sur la réalisation d'objectifs sociaux comme l'égalité entre hommes et femmes. Les indicateurs capables de faire apparaître de manière fiable les différences de bien-être entre hommes et femmes sont essentiels à cette fin. L'auteur de cette étude examine d'un oeil critique la sensibilité des indicateurs de santé, de nutrition et d'éducation et de certains indices composites aux disparités entre hommes et femmes pour ce qui est des pays en développement. Il se penche

aussi brièvement sur la relation entre pauvreté et disparités entre hommes et femmes dans ces indicateurs classiques. Toutefois, la question importante des processus sociaux entraînant ces disparités dépasse le cadre de cette étude.

Celle-ci évalue les indicateurs en les replaçant dans le cadre analytique des "fonctionnements". Dans ce cadre, ce n'est pas la possession des marchandises ou l'utilité qu'elles ont pour la personne qui fait office de bien-être mais plutôt ce que la personne réussit à faire des biens et leurs caractéristiques. Les résultats de l'étude sont exposés ci-dessous.

Indicateurs de santé: L'évaluation porte sur des indicateurs de mortalité différentielle et de morbidité différentielle. Les indicateurs de mortalité (par exemple l'espérance de vie et les taux de mortalité par groupe d'âge) sont facilement mesurables et relativement économiques par rapport à d'autres indicateurs sociaux. La fiabilité de certains d'entre eux, par exemple l'espérance de vie, est cependant contestable car elle peut masquer des écarts entre hommes et femmes dans des groupes d'âge donnés. Parmi les indicateurs spécifiques à certains groupes d'âge, les pourcentages filles-garçons (détaillés en particulier en deux groupes, les enfants de 0 à 4 ans et ceux de 5 à 9 ans) semblent être sensibles aux disparités entre les sexes et des plus révélateurs. L'analyse a été faite pour l'Inde et vaut la peine d'être réalisée dans d'autres pays en développement. S'agissant de la morbidité, il est difficile d'élaborer des indicateurs fiables à cause du manque de fiabilité des données elles-mêmes.

Indicateurs de nutrition: Pour les besoins de l'analyse, les indicateurs sont divisés en deux groupes: les indicateurs de l'apport alimentaire et ceux des résultats de l'alimentation. Toutefois, les mesures tant de l'apport alimentaire que des résultats de l'alimentation pâtissent d'un certain nombre de problèmes de méthodologie et d'interprétation qui rendent difficile l'élaboration d'indicateurs fiables.

Indicateurs d'éducation: Là aussi, les indicateurs sont répartis en deux grands groupes: les indicateurs de l'accès (qui comprennent les variables de stocks comme l'alphabétisation des adultes et le nombre moyen des années de scolarité pour les personnes âgées de 25 ans et plus, et les variables de flux comme les taux d'inscription dans les écoles et d'abandons d scolarité) et les indicateurs du contenu et des objectifs. Les indicateurs de l'accès semblent avoir le mérite de faire ressortir les disparités entre les sexes dans l'enseignement primaire, secondaire et tertiaire. Dans les pays en développement où la population compte une forte proportion de jeunes, les variables de flux livrent des informations plus fiables et plus actuelles que les variables de stock. Si les recherches effectuées au niveau mondial laissent à penser que les taux d'inscription dans les écoles sont des indicateurs fiables des écarts entre filles et garçons, il faut des recherches au micro-niveau pour juger de la fiabilité des taux d'inscription en les comparant aux taux d'abandon et de redoublement. Les pays où l'enseignement primaire est universel pourraient se servir d'indicateurs de l'accès à 1'enseignement secondaire. Les indicateurs du contenu et des objectifs comme l'indice de ségrégation sexuelle peut servir à évaluer les écarts entre filles et garçons dans les secteurs de l'éducation.

Evaluation composite: Le fait d'analyser des fonctionnements un à un comme on vient de le faire peut cependant donner une fausse impression d'égalité alors qu'il

existe une inégalité dans d'autres fonctionnements (par exemple en Afrique subsaharienne, certains pays peuvent avoir à peu près le même pourcentage de filles que de garçons mais accuser des différences marquées dans les taux d'inscription dans les écoles). Comme il est manifeste que l'ensemble des indicateurs d'un déséquilibre ne génèrent pas un seul ni même plusieurs indicateurs fiables, pour obtenir une image fidèle des disparités entre les sexes aux niveaux national et sous-national, il peut être nécessaire d'avoir une liste de contrôle où figurent tous les indicateurs de l'inégalité sexuelle dans les différents fonctionnements et de les analyser systématiquement un par un.

Si de nombreux arguments plaident en faveur d'une approche multidimensionnelle de l'évaluation, la tendance actuelle qui consiste à comprimer des éléments multiples d'un vecteur de fonctionnement pour en faire des indices composites soulève d'autres questions. Il faut bien porter des jugements de valeur sur les éléments à inclure ou à exclure (en fonction de l'emploi qu'on entend faire de l'indice) et sur les coefficients de pondération à leur attribuer. Il faut aussi les justifier. Mais des indicateurs composites élaborés avec des objectifs précis en tête peuvent être utiles et se sont révélés précieux dans les comparaisons préliminaires des analyses mondiales. Les indices composites dont on dispose actuellement (par exemple l'indicateur sexospécifique du développement humain ou ISDH et l'indice de la qualité de vie physique) peuvent nécessiter des adaptations si l'on doit s'en servir pour comparer les disparités entre hommes et femmes à l'intérieur d'un même pays en développement ou entre plusieurs de ces pays. Les indicateurs utilisés devront tenir compte de la jeunesse de la population. Par exemple en ce qui concerne l'ISDH, il peut être judicieux d'utiliser les pourcentages que représentent les populations féminine et masculine détaillés par groupe d'âge précis (pour les enfants de moins de 10 ans) plutôt que l'espérance de vie et d'attribuer à l'élément "taux moyen d'inscription" de l'indicateur d'éducation un coefficient de pondération supérieur à celui qui est attribué à l'élément "alphabétisation des adultes". En outre, l'élément "revenus" de l'ISDH, s'il est normalisé en fonction des qualifications et complété par un indicateur "travail pénible", pourrait fournir des informations sur les disparités entre les sexes allant au-delà de celles que livrent les composantes des fonctionnements.

Relations entre disparités entre les sexes et pauvreté: En ce qui concerne les relations entre la pauvreté et les écarts entre hommes et femmes, les quelques éléments réunis portent à croire qu'il n'y a pas nécessairement corrélation entre les écarts mis en évidence par les indicateurs des fonctionnements et ceux observés dans les indicateurs de richesse. A l'exception du déséquilibre entre filles et garçons en matière d'éducation, il n'est pas sûr que les inégalités entre hommes et femmes soient universellement plus marquées dans les catégories à faible revenu. Nous avons brièvement examiné les indicateurs de richesse, le plus souvent sous la forme de la pauvreté des revenus, mais il est très probable que la propriété révélerait la même absence de déterminisme dans les rapports entre pauvreté et inégalités sexuelles.

Sur le plan des politiques, que faut-il retenir de tout cela? Premièrement qu'il importe de recueillir dans les recensements nationaux des données se rapportant aux indicateurs sensibles aux disparités entre hommes et femmes (en particulier aux indicateurs existants reconnus utiles dans cette étude, ainsi qu'au paramètre du temps) et deuxièmement, des données détaillées par sexe et par niveau de revenu. Cependant, les responsables politiques ont besoin de recherches qui les

renseignent sur les processus sociaux générateurs de disparités entre hommes et femmes (elles sont généralement effectuées au micro-niveau) afin de pouvoir utiliser les indicateurs de manière plus efficace.*

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Resumen

El desarrollo no se fundamenta solamente en el crecimiento económico, sino que también en el logro de las metas sociales, como la equidad entre los sexos. La presencia de indicadores de bienestar capaces de reflejar fielmente las desigualdades en la distinción por género, es esencial para estos fines. Este documento contiene un examen crítico de la idoneidad de los indicadores de salud, nutrición y educación, y de algunos índices compuestos de la distinción por género, con referencia a los países en desarrollo. Se explora también la relación entre la pobreza y la discriminación entre hombres y mujeres en estos indicadores convencionales. No obstante, el importante punto de las prácticas sociales que resultan en discriminación por género, se encuentra fuera del alcance de este estudio.

Se evalúan los indicadores dentro del marco analítico de 'funcionamientos'. En este marco, no es el hecho de poseer un producto o la utilidad que éste entregue, lo que representa el bienestar, sino que más bien es lo que la persona logra hacer satisfactoriamente con tal producto y sus características. Las conclusiones se exponen más adelante.

Indicadores de salud: Se evalúan los indicadores de mortalidad diferencial y morbilidad diferencial. Los indicadores de mortalidad (por ejemplo, la esperanza de vida y la tasa de mortalidad a una edad determinada) son fáciles de medir y económicamente accesibles con relación a otros indicadores sociales. La exactitud de algunos, como la esperanza de vida, se presta a duda, porque puede ocultar diferencias entre hombres y mujeres en grupos de edades específicas. Entre los indicadores de ciertos grupos de edades específicas, la proporción entre los menores de ambos sexos (desglosada especialmente en dos grupos de menores de 0 a 4 y de 5 a 9 años) parece ser sensible en la distinción por género, así como de gran pertinencia. Se ha hecho una evaluación en la India y vale la pena realizar una investigación en otros países en desarrollo. Con respecto a la morbilidad, es difícil reconstruir indicadores fiables debido a la falta de fiabilidad inherente de los datos.

* Traduit de l'anglais par Martine Cullot.

Indicadores de nutrición: Los indicadores se evalúan en dos grupos: los indicadores de aporte alimentario y aquellos que resultan de la alimentación. No obstante, las medidas tanto del aporte alimentario como de los resultados de la alimentación, sufren de una serie de problemas de metodología e interpretación, que dificulta la elaboración de indicadores fiables.

Indicadores de educación: Los indicadores se evalúan en dos grandes grupos: los indicadores de acceso (que comprenden variables de stock, como la alfabetización de los adultos y la media de años escolares por persona de 25 años para arriba, y las variables de flujo como las proporciones de matrícula en las escuelas y el abandono escolar); y los indicadores de contenido y objetivos. Los indicadores de acceso parecen ser importantes para identificar la disparidad entre los sexos dentro de la enseñanza primaria, secundaria y superior. En los países en desarrollo con gran proporción de grupos de jóvenes, los flujos de variables ofrecen información más fiable y actualizada que las variables de stock. Si la investigación en un ámbito global manifiesta que los índices de matrícula escolar constituyen indicadores fiables de las diferencias entre los niños varones y las niñas, es necesario llevar a cabo una investigación a nivel micro, para comparar la fiabilidad de los índices de matrícula escolar con los índices de abandono y de repetición. Los indicadores de contenido y objetivo, como la indexación de la segregación sexual, podría ser de utilidad para evaluar las diferencias entre los niños varones y las niñas.

Evaluación compuesta: La evaluación de indicadores de un funcionamiento en particular, como el ejercicio anterior, puede dar la falsa impresión de igualdad - si hay presencia de desigualdad en los funcionamientos no evaluados – como por ejemplo, en el África subsahariana, algunos países pueden mostrar una proporción equilibrada entre los niños de ambos sexos pero hay diferencias marcadas en las tasas de matrícula en las escuelas.

Si bien un enfoque multidimensional a la evaluación posee muchos méritos, la tendencia actual de comprimir elementos múltiples de un vector de funcionamiento para hacer índices compuestos presenta otras cuestiones. Habrá que ejercer juicio de los valores sobre los componentes a incluir o a excluir (en función al uso que intenta dársele a la indexación) y sobre los coeficientes de ponderación a atribuirles. Sin embargo, los indicadores compuestos elaborados teniendo en mente objetivos específicos pueden ser útiles, y han constituido gran ayuda para las comparaciones preliminares en los análisis mundiales. Los índices compuestos de los que ahora disponemos (por ejemplo, el índice de desarrollo relacionado con el género y el índice de la calidad de la vida física) pueden necesitar de adaptación si habrá que utilizarlos para comparar las disparidades tanto dentro de un país en desarrollo como entre varios de tales países. Los indicadores utilizados tendrán que tomar en cuenta la naturaleza joven de la población. Por ejemplo, con respecto al índice de desarrollo relacionado con el género, podría ser más apropiado utilizar las proporciones que representan la población femenina y masculina desglosada por grupos de edades específicas (para los niños menores de 10 años) más bien que la esperanza de vida, y atribuir un coeficiente de ponderación superior al componente promedio de matrícula escolar, del indicador de educación, que el que se le atribuye al componente de alfabetización de los adultos. Además, el elemento ingresos del índice de desarrollo relacionado con el género, si se normaliza en función a las habilidades y se completa con un indicador de ‘trabajos fatigosos’,

podría entregar información sobre la discriminación por género, superior a la que pueden ofrecer los componentes de funcionamiento.

La relación entre la pobreza de la unidad familiar y la discriminación por género: La poca evidencia con que se cuenta nos muestra que las diferencias en función de género que señalan los indicadores de funcionamiento, no necesariamente tienen correlación con las diferencias que se observan en los indicadores de opulencia. A excepción de la disparidad entre los niños varones y las niñas en cuanto a la educación, no es evidente que la desigualdad entre hombres y mujeres es universalmente más alta que aquella entre los grupos de personas con menores ingresos. Se examinan brevemente los indicadores de riqueza, sobre todo en la forma de pobreza de ingresos, pero es muy probable que la posesión de propiedad revelaría la misma falta de determinismo en la relación entre la pobreza y la distinción por género.

Se concluye como de primera importancia recoger, en el consenso nacional, los datos sobre los indicadores idóneos para identificar la distinción por género (especialmente aquellos indicadores que este estudio ha reconocido como útiles, así como los parámetros de tiempo), y segundo, los datos desglosados por distinción de género para los diferentes niveles de ingresos. Sin embargo, la investigación sobre las prácticas sociales que resultan en desigualdades entre hombres y mujeres (generalmente conducidas a nivel micro), necesitan incorporarse de manera más eficaz en la determinación de las políticas.[*]

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[*] Traducido del inglés por Isolda Montero.

◆ Abbreviations and Acronyms

BMI	Body Mass Index
BMR	basal metabolic rate
FAO	Food and Agriculture Organization of the United Nations
FMR	female male ratio
GDI	Gender-related Development Index
GEM	Gender Empowerment Measure
GER	gross enrolment ratio
GESI	gender-equity-sensitive indicator
GNP	gross national product
HDI	Human Development Index
HDR	**Human Development Report**
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IMR	infant mortality rate
MMR	maternal mortality rate
PPP	purchasing power parity
PQLI	Physical Quality of Life Index
UNDP	United Nations Development Programme
WHO	World Health Organization

1. INTRODUCTION*

The Fourth World Conference on Women (Beijing, September 1995) built upon the anti-poverty momentum of the World Summit for Social Development (Copenhagen, March 1995). High on the United Nations agenda is a fight against poverty based not only on economic growth but also on the achievement of social goals, including gender equity. To translate such commitments into effective policies, indicators capable of reliably identifying gender differences in well-being are necessary tools. In this paper we contribute to that project by examining the gender sensitivity of indicators of health, nutrition and education, as well as some composite indices, with reference to developing countries.

Social indicators provide information necessary to stimulate analysis and discussion. They also provide essential inputs for the formulation of programmes and policies and can also be used to assess the social impact of these policies. They are useful in sounding the alarm when critical gaps are identified (Ghai et al., 1988). But the information provided by indicators is limited in various ways. For example, in the context of this paper, indicators may be able to demonstrate reliably that gender differences exist. But indicators are unable, on their own, to provide explanations for these differences. Such information on causality is an equally essential precondition for framing effective policies. Obtaining it requires separate, in-depth, investigation into the cultural, social, political, environmental and developmental context of the region and issue under study. Indicators are thus necessary, but not sufficient to devise and implement action towards the goal of gender equity.[1] In the following discussion the ability of indicators to identify gender differences in well-being is analysed. The issue of causality is, however, beyond the scope of our research.

The rest of the paper is organized as follows. The "functionings" framework within which well-being will be assessed is outlined first, in section 2. Then indicators of the basic "functionings" of being healthy (section 3), being nourished (section 4) and being educated (section 5), as well as some composite indices (section 6) which assess a combination of functionings, are critically analysed with respect to their sensitivity to gender differences. The relationship between poverty and gender differentials in these conventional indicators is also explored in each section. The concluding section (section 7) outlines some implications for policy and future research.

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[1] A quote by Sir William Petty, "to measure is the first step to improve", succinctly expresses the importance of indicators (taken from Morris, 1979).

2. ASSESSMENT OF WELL-BEING

Male and female well-being could be assessed on the basis of the commodities they possess, of what they succeed in doing with the commodities (functionings) or of the utility (happiness or desire fulfilment) that these give the person. The drawbacks of the commodities-based and utility-based approaches are discussed in Sen (1985). Briefly, despite an extension of measurements from "income" to "private consumption" goods, most commodity measurements are made on the household as a unit rather than the individual. Within this unitary model of the household, intra-household distribution is assumed to be determined by a single set of preferences benefiting the household as a whole. The household is modelled as behaving like a single entity with all its resources pooled and expenditure met from the pooled income (Haddad et al., 1994). Gender relations, however, affect the intra-household distribution so that such assumptions may not hold. More recently, new collective models have been developed in which individuals are allowed to have different preferences. Problems with existing collective models have, however, been highlighted by Haddad et al. (1994), Hart (1997) and others, most notably feminist anthropologists.[2] Besides, even if the difficulty of the unit of measurement is overcome, the commodities approach assesses well-being on the basis of possession of the commodities. But possession may not necessarily translate into well-being.

A utility-based approach suffers from the drawbacks of "physical condition neglect" and "valuation neglect" (Sen, 1985). "Physical condition neglect" is particularly important in the context of assessing class, caste and gender differentials. For example, a woman who is poor and undernourished, or has internalized cultural rules or norms such that she has no hope of getting a better deal, may resign herself to this state, be happy with small comforts, desire only what seems "realistic" or attempt not to desire at all. Judged by the metric of happiness or desire fulfilment, therefore, she may appear to be doing well although physically quite deprived. The reflective activity of valuation, for example whether the woman would value the removal of the deprivation, is also neglected (Sen, 1985).

Given these inadequacies, especially in the context of the assessment of gender differentials, we propose using the *functionings* framework pioneered by Sen.[3] This framework is based on an alternative notion of well-being directly concerned

[2] For example, there is a difficulty in separating the effects of individual preferences from that of differences in endowments and productivity. Further, a distinction between perceived and actual behaviour is rarely made in collective models. This is important; Sen (1990) suggests that one's bargaining position is strengthened based on the perceived contribution of the member. For example, female-earned income is perceived to be a contribution, whereas household work is not. Sen's bargaining framework is an attempt to accommodate the co-existence of contradictory relationships (co-operation and conflict) in a model of intra-household resource allocation. Feminist anthropologists have found reason to take the conflictual relations inside the collective unit of the household as being most important. See the notion of the conjugal contract in Whitehead (1984) and the patriarchal bargain in Kandiyoti (1985).

[3] It is beyond the scope of this paper to give the details of this approach — for this see Sen (1985); and see Dasgupta (1993) and Granaglia (1996), among others, for critical appraisals.

with a person's quality of life and driven by data availability, measured on the individual through a range of social indicators (Sen, 1985).[4] It is not the possession of the commodity or the utility it provides that proxies for well-being, but rather what the person actually succeeds in doing with the commodity and its characteristics. This is referred to as the "*functioning*". For example, the possession of food is not as important as the outcome, or *functioning*, of "being nourished". The person's utilization of the *commodities* in their possession, called a *commodity vector*, for example *[sack of rice, cycle]*, gives a list of functionings called a *functioning vector*, for example *[moderately nourished, mobile]*. The functioning vector captures a person's "state of being". Alternative uses of the same or other commodity vectors would result in other possible functioning vectors. In the example above, not using the cycle (and therefore energy) may give the functioning vector *[well-nourished, non-mobile]*. The set of all possible functioning vectors is referred to as the *capability set*. If the person in our running example only had access to the commodity vector shown, and was only able to choose between the utilizations mentioned earlier, the capability set is {*[moderately nourished, mobile]*, *[well-nourished, non-mobile]}*.[5] "Well-being" within this framework is a person's evaluation of a functioning vector. Depending on their evaluation, the person will choose one of the vectors out of the capability set. He or she thus has a particular level of well-being in this "chosen state of being". Since the process of evaluation and preferences varies from person to person, it would appear to confound any straightforward comparisons of well-being. For example, a person with a short life may have the same level of well-being as another with a longer life, if the former preferred a short but merry life (Lipton and Ravallion, 1995). Nevertheless, as pointed out by Sen (1985), it may be possible to agree on some minimal constraints on the different states of well-being. This is particularly the case when dealing with basic functionings. For example, all personal evaluations might agree that the well-being of a person with a functioning vector *[ill-nourished, mobile]* will be less than one with the vector *[well-nourished, non-mobile]*. A personal evaluation may be "partial" in the sense that it cannot distinguish the ordering between some vectors, for example *[well-nourished, non-mobile]* and *[moderately-nourished, mobile]*. This "partial" nature also extends to the minimal constraints that are agreed upon by a group. Well-being cannot thus be measured exactly but can be approximated.

[4] The first substantial United Nations document outlining some indicators for measuring the social aspects of development was published in 1954 (United Nations, 1954). Considerable research on social indicators was also done by the United Nations Research Institute for Social Development (Drewnowski, 1966; Baster and Scott, 1969; McGranahan et al., 1972 to name a few of the early studies mentioned in Ghai et al., 1988). These served to highlight the inadequacies of using income as the sole measure of development. Subsequently, Morris devised the Physical Quality of Life Index (PQLI), which combined the basic welfare indicators of infant mortality rate, life expectancy and literacy into a single index (Morris, 1979). Around the same time, some particular "functionings" were also being discussed not as "functionings" *per se* but as "basic needs" (International Labour Organisation, 1976, and Streeten et al., 1981).

[5] The person may have access to several alternate commodity vectors from which one will have to be chosen, and may also be able to choose between a number of different utilizations. For simplicity, we are restricting access to just one commodity vector and two possible utilizations.

Sen (1985) gives examples of functionings ranging from "elementary" ones, like being adequately nourished, being healthy, avoiding escapable morbidity, etc.[6], to "more complex" ones like having self-respect, taking part in the life of the community, etc. In this paper, we examine three subjectively identified "basic" functionings: being healthy, being nourished and being educated.[7] We adopt the position that in developing countries, gender differentials may persist even at the level of such basic functionings, and then proceed to analyse social indicators that can reliably capture gender differentials in these functionings. A complete assessment of well-being should include other functionings, such as human agency, power, autonomy, etc. (this point is cogently argued by Razavi, 1996 and 1997).[8] By including "being educated", we have moved one step beyond the conventional physiology-based functionings. The evaluation is, however, still restricted here to basic functionings and is in no way complete.[9] Further, while measures like income/consumption are considered aggregations, the measurement of individual functionings raises the question of aggregation over different functionings to assess the sum-total of well being (Lipton and Ravallion, 1995), an issue discussed in section 6.

The translation of gender differences in basic functionings, as assessed by appropriate indicators, to corresponding differences in well-being makes certain assumptions. First, the functionings considered are assumed to be so elementary as to be necessary for well-being. Second, a differential in any one of these functionings is assumed to result in a differential in well-being. For example, if an assessment of indicators of "being healthy" shows female health to be poorer than male, then female well-being is less than male well-being.

In the following discussion, we consider a "good indicator" to have the following properties. It should be easily measurable, affordable and reliable in identifying gender differentials. The reliability of an indicator can be judged by examining the types of errors it commits. An indicator which performs errors of commission (i.e., identifying a differential when it does not exist) is preferred to one that performs errors of omission (i.e., failing to capture a differential when it does exist).

[6] These depend on even more elementary amenities: having access to clean drinking water, being safely housed, etc.

[7] Strictly, within the functionings approach, well-being is to be assessed by examining the complete capability set. This is because the extent of the freedom to choose determined by the capability set may itself contribute, to some extent, to well-being. In practice, we are restricted by the fact that data are only available for the functionings actually achieved. By further restricting our study to the elementary functionings listed, this approach shares much with that of "basic needs", which has a separate intellectual history (International Labour Organisation, 1976).

[8] The lack of a gender differential in basic functionings, for example in developed countries, does not essentially indicate that discrimination does not exist. For example, in a study of infant and child mortality based in the Rafsanjan district in south-eastern Iran, Razavi (1997) shows a convergence of female (which were earlier higher) and male infant and child mortality rates. The author speculates that improvements in healthcare facilities and the general decline in mortality itself may have contributed to the convergence, rather than a fundamental change in discriminatory norms, which in fact appear to have been accentuated in the same period. In such situations other indicators, for example indicators of autonomy and power, may be required. In many developing countries, however, differentials still exist even in elementary functionings.

[9] Indicators of autonomy and power are the subject of another study recently commissioned by UNRISD and are beyond the scope of this paper (Kabeer, 1998).

(Desirable properties of social indicators have also been discussed in Ghai et al., 1988.) We are aware, however, that even if some "good" indicators are identified, a number of difficulties arise in the collection and processing of data, especially in developing countries. These issues are discussed by Ghai and Westendorff (1993) and McGranahan et al. (1993) and will not be elaborated here.

Studies from different levels of aggregation (micro-level studies as well as international country comparisons) are drawn upon where needed to illustrate or clarify a point. This is by no means an exhaustive review, however. Most research on health and nutrition concentrates on South Asia. Some studies in sub-Saharan Africa are also referred to in relation to nutrition. The discussion on indicators of education is largely confined to the global level due to the paucity of micro-level studies. The composite indices proposed in recent **Human Development Reports** have not been used extensively at the micro-level, and discussion of these is also restricted to the global level. A shortcoming in all sections is that the Arab states, and Latin American and Eastern Asian regions have not been covered in any detail. Further, studies covering indicators which are highly specific to particular situations have not been included. Rather we concentrate on indicators comparable among developing countries.[10]

3. BEING HEALTHY

The spectrum of health ranges from good health to morbidity to the state of fatal ill-health, i.e., mortality. Statistics that reveal a difference in mortality and morbidity between the sexes reflect a difference in their health.[11] A conclusion that this is caused by gender bias, however, can be arrived at only after accounting for differences that do not stem from social differences in healthcare, treatment and nutrition (for example, differences in male and female genetic constitution).[12] When interpreting the information provided by indicators, therefore, it is essential to ground it empirically in the context of local cultural and material factors (about which there is no established consensus), as well as take into account underlying "natural" sex differences in mortality and disease patterns.

[10] Indicators of well-being comparable across countries are quite slow to be created. Meantime, rapid economic and social change may be accompanied by swift alterations in the relative status of the genders. Such alterations may be highly specific (exemplified by the rising incidence of both female infanticide and excess female child mortality in South India, where the status of women was formerly relatively high). In such cases the indicators and evidence are likely to be highly specific and idiosyncratic, and the research participatory and activist. The United Nations, while unable to do more than act as an observer in such an arena, can at the least be seen to give legitimacy to such research.

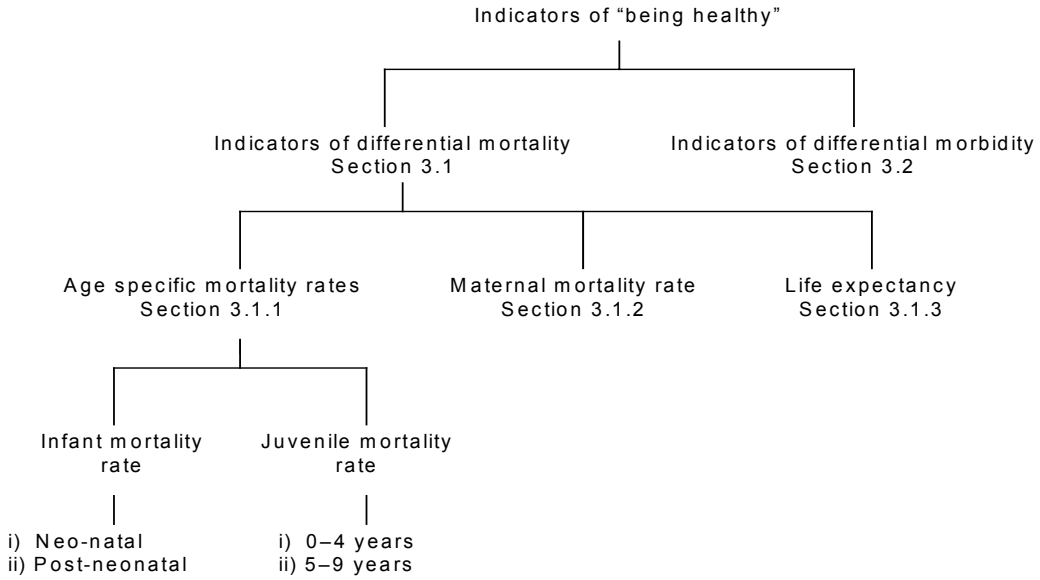
Internationally comparable indicators, although considered so, may have differing significance in different countries in specific social contexts.

[11] Sex is used in reference to the biological differences between men and women. Gender refers to the socially constructed differences.

[12] Differences in healthcare, treatment and nutrition are considered the proximate determinants of discrimination, while economic and cultural devaluation are considered the underlying causes, particularly with reference to excess female mortality in South Asia. Explanations for the perceived worth of women for India have been theorized in economic forms by Bardhan (1974) and Miller (1981), and in cultural forms by Dyson and Moore (1983) and Dasgupta (1987a) among others. Agnihotri (1997) reviews this entire literature.

Indicators of mortality are considered in section 3.1, followed by indicators of morbidity in section 3.2. Figure 1 outlines the indicators discussed in the two groups. Section 3.3 looks at the relationship between poverty and gender differentials in mortality and morbidity, and section 3.4 summarizes the discussion on the functioning "being healthy".

Figure 1: Indicators of "being healthy"



◆ 3.1 Differential Mortality Indicators

Biological factors ensure higher female survival than male, from the foetal stage onwards, given similar care. These differences in mortality are reflected in the ratio of females to males. The ratio is low at birth, with an average of 5 per cent more males born than females (probably to compensate for subsequent higher male mortality). Due to higher male than female mortality in infancy (females have higher resistance to infectious diseases) and adolescence (differences in sex hormones cause increased death rates in men by accidents and due to other violent causes[13]), the ratio is balanced by the age of 30 (Holden, 1987). Female survival continues to be higher than male in later years up to menopause, due to hormonal protection.[14] This causes the ratio to tip towards females.[15] Countries in Europe and North America have, on average, 105 females for every 100 males; sub-Saharan Africa has 102. There are, however, fewer females than males in a number of Asian, Middle Eastern and North African countries: Egypt and Iran with 97,

[13] Male hormones, particularly androgens, have been shown to contribute to aggressive behaviour (Schmidt and Thews, 1989).

[14] In middle age, the incidence of ischaemic heart disease in males is three to four times that in females. After menopause, however, the gap narrows. The reasons proposed to account for this are the loss of protective hormonal effect in women and loss of harmful effect in men, as well as the fact that male susceptibles could have already died (Weatherall et al., 1996).

[15] There is a debate on the extent to which female advantage in survival is culturally linked. Biological differences could be reinforced by social influences fostering risky behaviour in males and, until recently, higher tendency of men to smoke than women (Sen, 1995).

Turkey with 95, China with 94, India with 93, Pakistan with 92 and Saudi Arabia with 84 females per 100 men (Sen, 1995). Errors of enumeration, migration and the ratio at birth fail to explain such masculine ratios.[16] Increased female mortality (over that of males) seems to be the only reasonable explanation. Since women are hardier than men, and in societies with formally gender-neutral healthcare systems have a survival advantage right from the intra-uterine period, an explanation for the increased mortality is sought in social factors. The ratio of females to males can thus be seen as an indicator which gives a summary of gender inequality as it operates over a long time (Sen, 1995). Higher differentials in particular age groups may be responsible for the overall masculinization of the ratio, however, and the ratio in these groups may thus be a more reliable indicator than the aggregate ratio. Indicators of age-specific death rates are discussed in section 3.1.1. Maternal mortality, which also contributes to the masculinization of the female male ratio is discussed separately in section 3.1.2. Life expectancy, which is often used as an indicator of differential mortality, is discussed in section 3.1.3.

3.1.1 Age-specific death rates

Age-specific death rates are commonly calculated for groups of 5 years. The age groups which have a high impact on the female male ratio (FMR)[17] are 0–4, 5–9 and 15–34 (largely the impact of maternal deaths). The under-10 mortality rates are discussed here.

The under-10 age group is singled out for attention for two reasons. First, in developing countries, the age group with the most pronounced female disadvantage — and therefore highest mortality differentials — appears to be the juvenile, i.e., under-10 group (for India, see Chatterjee, 1990). Second, under-10s constitute a large proportion of the total population where mortality conditions are high. Differentials in mortality in this age group thus have a greater impact in influencing FMR than those among older males and females.[18]

Within the under-10 age group, the largest proportion of deaths occurs in developing countries in the first year of life. The infant mortality rate (IMR) is therefore distinguished from overall juvenile mortality rates.

Infant mortality rate: The average ratio of female to male infant mortality in developed countries is 0.8 (United Nations, 1995) as a result of the biological female advantage mentioned earlier. If females show infant mortality higher than

[16] Male migrant workers in Saudi Arabia are an exception (Sen, 1995). Identifying the actual ratio of females per 100 males (excluding the effect of migration), would thus involve using census data together with records of the number of migrant workers.

[17] Internationally, the term sex ratio refers to the number of males per 1,000 female population. In India, however, sex ratio denotes the number of females per 1,000 male population. In order to avoid confusion, the sex ratio in India is referred to in this paper as the female male ratio (FMR). The term juvenile sex ratio in the context of India refers to the number of females per 1,000 male population in the juvenile (under-10) age group.

[18] Concentration on the under-10-age group to obtain reliably gender sensitive indicators should not be taken as a signal for targeting intervention specifically in this age group, to the neglect of others. Rather, reliable indicators are considered capable of reflecting a larger discriminatory process, if one exists in a given society.

that of male infants, it can be inferred to be due to environmental disadvantages related to diet and healthcare (Waldron, 1983).

The IMR could, however, give a misleading picture because the factors affecting mortality differ between the neonatal and post-neonatal period.[19] Two divergent demographic trends could be concealed in the period labelled "infancy". For example, Sample Registration System results for India, quoted by Padmanabha (1982), showed a higher male mortality (19.5 per 1,000 compared to 16.8 per 1,000 for girls) among newborn infants (0–29 days). Post-neonatal mortality rates were higher for females (11.9 per 1,000 compared to 9.9 per 1,000 for boys). The overall infant mortality rates (29.4 per 1,000 for boys and 28.7 per 1,000 for girls), however, obscured these differences.[20] In such situations, juvenile (under-10) mortality rates are more transparent.

Juvenile mortality rates: Gender disaggregated data on juvenile mortality may not be easily available. An alternative measure which would largely capture similar information is the under-10 FMR, also called the juvenile sex ratio.[21] This ratio also has the benefit of eliminating the effects of sex-selective migration.

Harriss (1993), reviewing micro-level mortality literature in South Asia, supports a further disaggregation of the juvenile sex ratio and the use of the 1–4 ratio (i.e., FMR14) because it summarizes the experience of neonatal, infant and early childhood mortality.[22] Chen's (1982) research, carried out in Matlab Thana, Bangladesh in the 1970s, shows that by the fourth year female deaths exceeded male by 53 per cent then fell, but were always higher than male, peaking again during reproductive years. FMR up to age 4 thus captures the high differentials. Agnihotri (1996), however, argues that FMRs in the 0–2 and 3–9 age groups would be most appropriate to capture gender differentials. This is because the first would capture the excess male infant mortality, essentially a biological phenomenon (Waldron 1983), while the second would reflect the effects of any discrimination against the girl child. In practice, however, since there may be large inaccuracies in the reporting of age in developing countries, 5-year groupings (rather than smaller ones) are conventionally used to reduce the error. Data at the district level available to Agnihotri were therefore in the 0–4 and 5–9 age groups. Although the differences between these two age groups would not be expected to be as sharp as for the 0–2 and 3–9 groupings, Agnihotri suggests that FMR04 would reflect the excess male infant mortality as well as any excess female

[19] The general consensus in the literature appears to be that the neonatal mortality is primarily affected by endogenous factors which affect the foetus intra-uterine and continue to influence its survival for the first four weeks of life. Post-neonatal, however, is mainly determined by exogenous factors relating to the physical environment — for example, infections, or respiratory or parasitic diseases (Visaria, 1988). Since females have higher immunity to infections during infancy, a female post-neonatal mortality higher than that of males raises the possibility of behavioural discrimination.

[20] Infant mortality rates have also been proposed as useful indicators of the well-being of women. Inadequate nutrition and healthcare during and before pregnancy could contribute to poor foetal health and higher rates of infant mortality. This, however, is a different issue from the use of differential male and female infant mortality to assess bias in care in infancy.

[21] The term juvenile sex ratio in the context of India, in this paper, refers to the number of females per 1,000 males in the juvenile (under-10) age group.

[22] Juvenile refers to under-10, and child refers to under-5 years of age.

mortality by the age of 3 years. FMR59 would be expected to reflect mortality by the 5-and-beyond age group. Any excess female mortality in early childhood years (1–4) in which more females die invariably due to social factors, would have "stabilized" by the age of 5 and would be reflected by FMR59 (Miller, 1981 cited in Agnihotri, 1996). Furthermore, since 90 per cent of juvenile deaths occur in the under-5 group, Agnihotri contends that FMR59 is virtually unaffected by deaths in the 5–9 age group. A combination of FMR04 and FMR59 is therefore proposed for identifying mortality differentials in childhood, as well as identifying the age group at which differentials set in. Such disaggregation of the juvenile group is also important because differing combinations of FMR04 and FMR59 can give rise to apparently similar juvenile sex ratios. For example, consider a sample that shows a moderate to high FMR04 and a subsequent sharp drop to low FMR59 (indicative of a female child mortality that is higher than the male and which can be confirmed by examining mortality data). The overall juvenile sex ratio in this case could appear balanced, hiding the adverse survival conditions for the older girl child.

In the absence of discrimination, FMR04 would be expected to be above that at birth (i.e., above 960 for India according to the 1981 census figures) due to higher male infant mortality. Assuming that the care of the child is not gendered, and since males do not suffer any additional biological disadvantage in childhood, FMR59 would be expected to continue to remain the same as FMR04. Contradictions to such expected FMR04 and FMR59 values, however, point to gender differential mortality. Agnihotri's analysis of FMR04 and FMR59 of district level data from the 1981 Indian Census gave the following important results:[23]

- Some regions showed an unusually low FMR04 (below 910), suggesting very strong gender bias with high female mortality even in infancy.[24] Some showed an alarmingly low ratio (below 900). For example, Salem district, the only district in South India to show a FMR04 value below 900, has been in the news for a rise in the practice of sex-selective infanticide (George et al., 1992 cited in Agnihotri, 1996; Chunkath and Athreya, 1997). It is possible that assessing FMR04 could also be useful in identifying regions with lower than normally expected FMRs at birth. Such excessively masculine ratios at birth due to pre-natal selection and selective female abortion have been the subject of much recent research on China and South Korea. Use of FMR04 to reflect this is of particular relevance to countries like India, where such a practice has been shown to be on the rise and where data on the ratio at birth are not easily available (Sudha and Rajan, 1997).[25]

[23] In state-level averages, districts within the state with a high FMR are able to compensate for "rogue" districts with low FMRs (Agnihotri, 1997). Using districts as the unit of analysis prevents such "masking". An analysis of FMRs for different social groupings in the districts under study is also presented by Agnihotri (1996 and 1997).

[24] Agnihotri (1997) assigns four different levels to FMRs: low (below 910), moderate (910 to 960), high (960 to 1,000) and very high (above 1,000). The cut-off value of 960 was chosen as it was close to FMR at birth. Other values were chosen by examining the spatial distribution of FMRs, which revealed contiguous district clusters with these FMRs as cut-off points.

[25] Sudha and Rajan (1997) compared estimates of the ratio of males per 100 females at birth for different Indian states for 1981 and 1991. Their findings suggest that, even though

- Some regions showed a drop between FMR04 and FMR59.[26] These, as well as regions with a very low FMR59 (below 850), were shown to have high girl child mortality above that of male mortality and should be viewed with alarm.
- Some groups, despite showing a high IMR (and therefore high male infant mortality), were found to have low FMR04 and FMR59.[27] This was taken to be an indication of very strong discrimination against the female.
- Some regions showed unusually high FMR04 and FMR59 values (typically over 1,000). Rather than accepting this as an absence of female discrimination, a further investigation of the tribal population of 36 districts in these regions revealed poorer ante-natal care and immunization coverage than in other parts of the country. Agnihotri suggests that it is possible that this translates into excess foetal wastage and infant mortality. The high IMR with the accompanying high male mortality could result in unusually high FMR04 and FMR59 values. Such values should thus be investigated for excess male mortality during infancy and under 5 years of age.

These findings led Agnihotri to emphasize the distinction between high FMRs and balanced FMRs. This is particularly important since, ". . . currently both the academic and the policy mindset treat higher FMRs as necessarily better and reduction in FMRs as necessarily undesirable. It is time that a distinction is made between high FMRs and balanced FMRs. This analysis suggests a range of 960 to 980 [for India] as a balanced figure or 'norm'. Districts with FMRs below this level have to catch up with the 'norm', districts with FMRs above this need closer scrutiny" (Agnihotri 1997:140–141).[28] Similarly, a very high FMR at birth needs to be investigated for an unsatisfactory health delivery system — as it could be indicative of high male mortality *in utero* due to poor maternal health and care.

The above results suggest that FMR04 and FMR59 are reliable indicators of a gender differential in the functioning "being healthy". Data are available from certain censuses (such as the Indian ones) and are economically affordable and relatively easily measurable compared, for example, to indicators of "being nourished" (discussed in section 4). The accuracy of data can be eroded due to under-reporting, age-heaping and other kinds of age distortions which may be gendered (for example, the under-reporting of female deaths due to shame at the cause of death). Thus, however robust these findings are for India, it is important to repeat the analysis for other countries. Such analysis for Nepal is currently under way (Seddon, 1997).

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illegal, sex-selective abortions may have spread in India during the intervening period from urban areas in the north-west to rural areas and also to urban parts of other regions.

[26] Normally FMR59 would not be expected to be higher than FMR04 as a pattern of excess female mortality that sets in early is unlikely to be reversed in later years. Agnihotri (1997) suggests that such cases, if stray, could be indicative of data errors. If persistent, he suggests that detailed micro-level study is advisable. It could also be argued, however, that mortality rates for female children could come down in the wake of pre-natal sex selection.

[27] With an increase in infant mortality, male infant mortality would be expected to increase more compared to that of females since males are more vulnerable.

[28] Agnihotri draws attention to another important distinction: the decline in FMR through the reduction in IMR, and the decline in FMR through the increase in female mortality in excess of male — the former being desirable, the latter not.

3.1.2 A note on maternal mortality rate

The differential death rate is high between the ages of 15 and 34 in developing countries, largely due to maternal mortality (Chatterjee, 1990). Maternal mortality refers to deaths that occur during pregnancy or within 42 days of delivery (or termination), per 100,000 live births. The maternal mortality rate (MMR) constitutes one of the biggest North-South gaps. The 1997 **Human Development Report** gives the high figure of 471 for developing countries as compared to 31 for industrial countries (UNDP, 1997). Lack of care during pregnancy and delivery, as well as a long history of neglect with undernourishment leading to stunting and poor physical growth, all contribute to high MMR. It could be argued that an underinvestment in pregnancy-related health facilities is reflective of the gender bias institutionalized within the public health infrastructure. The prevalence of poverty and poor healthcare facilities — with or without gender inequality itself — could, however, be the factors responsible for the high MMR. In such sex-specific situations, since cross-sex data are not available for comparisons, it is not possible to reach a definitive conclusion on the question of gender differentials. MMR by itself cannot be used as a sole indicator of gender differences; but, as with other sex-specific indicators, it could have a corroborating role. Besides, MMR is not capable of assessing differentials in situations where male well-being may be lower than that of females.

3.1.3 A note on life expectancy

Life expectancy represents the mean length of time an individual is expected to live if prevailing mortality conditions persist throughout the person's life. It can be calculated for individuals at the time of birth or in any subsequent age group. Life expectancy at birth calculated for males and females is extensively used as a measure of gender differentials in well-being by both national governments and international institutions. Often, however, life expectancy evidence is based on model life tables rather than real data. Besides, in the context of gender differentials, it can be a misleading indicator. For example, the higher mortality of females in India up to the age of 35 is disguised by the estimated female life expectancy at birth, which is longer than that of males (Chatterjee, 1990). The higher life expectancy is largely the consequence of the greater survival chance of older women which "more than compensates (mathematically speaking) for the lower survival of younger females" (Chatterjee, 1990:7). This is illustrated in table 1, which shows the gain in life expectancy in India between 1970–75 and 1976–80 by age for males and females (Karkal, 1987). Column 3, row 1, shows the higher gain for females of 3.146 years, as compared to 1.966 years for males (column 2, row 1). Columns 4 and 5, however, show that the gain for males is distributed more evenly compared to that for females, which took place mainly in the higher age groups. The age group above 70 shows a significantly large share, 33.67 per cent, of the total gain in life expectancy for females (column 5, last row) as compared to 25.10 per cent for males (column 4, last row). It is thus misleading to conclude from the overall increase in female life expectancy that there has been an improvement in female health in younger ages, especially reproductive ages. In fact, the continuing high rates of peri-natal mortality and the large proportion of low birth weight were an indication of the poor health of women in India (Karkal, 1987).

Table 1: Gain in life expectancy in India between 1970–75 and 1976–80

Age group	Absolute		Percentage	
(1)	Male (2)	Female (3)	Male (4)	Female (5)
Total	1.966	3.146	100.00	100.00
0	0.014	0.006	0.73	0.18
1–4	0.034	0.052	1.70	1.65
5–9	0.086	0.098	4.35	3.12
10–14	0.095	0.106	4.84	3.37
15–19	0.095	0.114	4.83	3.63
20–24	0.096	0.120	4.90	3.82
25–29	0.099	0.126	5.04	4.02
30–34	0.106	0.136	5.42	4.32
35–39	0.115	0.150	5.84	4.76
40–44	0.120	0.161	6.11	5.13
45–49	0.125	0.176	6.37	5.60
50–54	0.132	0.198	6.69	6.29
55–59	0.130	0.211	6.61	6.70
60–64	0.120	0.212	6.09	6.75
65–69	0.106	0.220	5.38	6.99
70+	0.493	1.059	25.10	33.67

Source: Karkal, 1987, table 3; Computed from Sample Registration System Data

While overall life expectancy is useful as a measure of development, the use of male and female life expectancy to capture gender differentials in well-being could be misleading, masking age-specific differentials in mortality. This results in the undesirable property of errors of omission.

◆ 3.2 Differential Morbidity Indicators

Conditions that cause morbidity can be classified into two groups. The first group is comprised of sex-specific conditions including genetic predispositions (for example, rheumatoid arthritis in females) and reproductive disorders. Regional differences in climate could also be interacting with underlying sex differences, leading to differential morbidity. For example, male infant/child mortalities were found to be much higher than female (1.51) in the mountainous Bardsir region in Iran. Razavi (1996) speculates that this could be the result of the interaction between the environmental conditions (cold winters) and the greater vulnerability of male infants to respiratory disease due to the immaturity of their lungs. Concerning reproductive disorders, 2.5 per cent of female deaths in India are due to conditions related to "childbirth and pregnancy" with anaemia constituting the single largest group among these (Pushpangadan and Jayachandran, 1997). These reflect great neglect of underlying nutrition as well as healthcare. The use of such sex-specific morbidity as a sole indicator of gender differentials, however, suffers from similar types of constraints as those expressed with respect to maternal mortality rates in section 3.1.2.

The second group is comprised of conditions that affect both sexes These may, however, be found to have a greater preponderance in one sex than in another due

to occupations or environments that are gendered, or differentials in medical care and nutrition. Considering each of these in turn with respect to India, an example of morbidity associated with gendered occupations is the high incidence of eye strain among young women workers in the *zari* (gold thread) industry (Chatterjee, 1990). Caldwell and Caldwell (1987) investigate the gendered health environment in rural Karnataka. For the male, it is more out-of-doors, while for the female it centres around the "dark, smoke-filled kitchen" — in ways which suggest that exposure to infection may be gender-specific. Investigating differentials in healthcare, Dasgupta (1987b) and Pettigrew (1987) report gender imbalances in expenditure on health treatment in Punjab. Pushpangadan and Jayachandran (1997) analyse data on 51 major causes of death affecting both males and females in rural areas in all the Indian states. Thirty-eight of the 51 causes were found to have resulted in higher female than male mortality. Most morbidity and subsequent mortality resulting from these 38 causes was found to be unfavourable to females in the 0–29 age group. The authors also suggest that in the 0–14 age group, females received less clinical attention than males, particularly with respect to the preventable causes of death. For example, a high proportion of female deaths in the 0–4 group due to paralysis might have been reduced by timely vaccination against poliomyelitis. The authors speculate that differences in food allocation as well as medical care may have been responsible for the gender differential morbidity. Although indicators of morbidity thus reflect differences in underlying nutrition, healthcare and treatment (as well as gendered occupations and environments), reliable indicators of morbidity have not been developed for use by international agencies or governments because of the following limitations:

- First, "cause of death" data are quite difficult to obtain. When available in hospitals and/or primary healthcare centres in certain countries (for example India), their accuracy depends on the expertise of the recorder system of classification used, and the concepts of illness and cause of death of those reporting (Matthews, 1979; Kakar, 1982). Furthermore, they can only be employed for inferences about morbidity if it is assumed that sickness follows the same gender and age distribution as does death (Harriss, 1993).[29]
- Second, morbidity data — gathered through questionnaires — tend to suffer from major biases (Sen, 1995). A person's perception of illness can vary greatly depending on the medical care received and the extent of medical knowledge possessed. Sen gives the example of the state of Kerala in India with a relatively higher level of education and healthcare, as compared to Bihar which is towards the other end of the spectrum. Despite (or because of!) the state-level inequalities in medical care, the rate of morbidity is much higher in Kerala than the Indian average while that in Bihar is much lower. Medical care, while reducing actual morbidity, at the same time sharpens understanding and perceptions of one's illness (Sen, 1995). Furthermore, such subjectivity has particular implications when used to capture gender differentials. Women in West Bengal were reported as much more unwilling to perceive or declare their ill-health than were men (Sen, 1985). Caldwell and Caldwell (1987) report that

[29] "Cause of death" data may also be interrogated for gender specificity to gain information on differential mortality. In India, "death by social cause" appears to be an euphemism for infanticide, a gross crime perpetuated almost always on female infants. These have been mapped for Tamil Nadu by Chunkath and Athreya (1997) prior to activating social awareness against such discrimination. Cause of death data have also been used to draw inferences about bride-burning. While these are dramatic indicators, they are highly politically sensitive and far from universally available.

boys in Karnataka were believed to be sick more often on account of the perceptions of their relative weakness in childhood.

- Third, if subjectivity is overcome to some extent by using hospital records on the incidence of disease, the data would tend to reflect the availability of medical care. Sen (1995) gives the example of a village acquiring a hospital: more people would be treated, and more statistics would be available, giving the impression of a rise in morbidity. The data would also reflect information only with respect to those who had been taken to the hospital for treatment rather than those who were ill. Females appear to be referred less often than males for allopathic treatment. For example, in cases from north India, a marked gender imbalance in health expenditure and treatment has been recorded (for studies of Punjab, see Dasgupta, 1987b; Pettigrew, 1987).
- Fourth, even if reliable data on the incidence of disease were used, the results need to be interpreted with caution. Though no gender difference may be detected, there could well be gender differences in the duration and intensity of treatment (McNeill, 1986 in Tamil Nadu confirms Chen et al., 1981 and Koenig and D'Souza, 1986 in Bangladesh).
- Fifth, the bias in morbidity does not operate in a simple and consistent manner and could give misleading impressions. This is shown in an interesting analysis of eye disease (Cohen, 1987). Male infants from richer households were found to have a higher incidence of iatrogenic loss of vision than females or males from poor households, due to the use of harmful steroid eye cream. Similarly, xerophthalmia, common in infants and preschool children and resulting from vitamin A deficiency, afflicts males up to 1.7 times as frequently as females. Paradoxically, food behaviour — which assigns "cultural superfood" to weaned males during the post-neonatal period while keeping females fully breast fed — may be the source of deprivation of vitamin A.

◆ 3.3 The Relationship with Poverty

Poverty itself is a complex phenomenon varying in intensity, transitoriness, sporadicity and causes. Poor levels of the functionings considered here will feed back into poverty. In a forthcoming study of northern Tamil Nadu, for example, Erb and Harriss-White show how an individual becoming physically disabled presents a severe economic shock to their household. Here we present the findings of some studies investigating the relationship of poverty with gender differences in mortality (section 3.3.1) and morbidity (section 3.3.2).

3.3.1 Relationship of poverty with mortality

Conclusions of studies investigating the relationship between opulence criteria (which include income, expenditure, assets, wages and consumption) and gender bias in child survival differ. Two contradictory arguments about class position, poverty and mortality implicitly inform such studies. One is that the relative economic value of women is highest and patrilineal control over property is lowest among the assetless poor, so that, *ceteris paribus*, less gender bias would be expected (Harriss, 1992). Data from rural Bijnor district in Uttar Pradesh in India (Jeffrey et al., 1987) as well as Warrier's research on scheduled caste and tribal households in rural Purulia in West Bengal in India lend qualified support to this position (Warrier, 1987). This position is similarly supported by findings of less intense female discrimination in poorer households by Murthi et al. (1995) in a

district-level analysis (of 296 districts in India), and by Krishnaji (1987), who analysed census and rural labour enquiry data for India and showed sex ratios to be more balanced among agricultural labour households than the middle and big landowners in India. Furthermore, labour households with no land were found to have a higher proportion of females than those with some land. The opposite arguments are that it is among the poor that both the opportunity cost of healthcare in terms of income foregone and actual costs incurred are relatively (if not absolutely) the greatest, that under conditions of food scarcity females are discriminated against in order to preserve the patriline, and that it is among the poorest that any given level of discrimination is most likely to translate itself into mortality. For India, Dasgupta's (1987b) and Wadley and Derr's (1987) evidence in the Khanna region in Punjab and Karimpur in Uttar Pradesh and Warrier's (1987) case in Medinipur district in West Bengal lend support to these hypotheses. Some authors, however, suggest that poverty may not be a major determinant of bias in child survival (see Chen et al., 1981 on rural Bangladesh and Dasgupta, 1987a on rural Punjab, cited in Murthi et al., 1995). The relationship between poverty and gender differentials in mortality is therefore not clear-cut.

3.3.2 Impact on morbidity

As with mortality, the interaction between gender differentials in morbidity and poverty is not straightforward. If the sexual geography of hygiene were common to all members of a locality, then patterns of exposure to certain infectious diseases would not be expected to be related systematically to the economic status of households. Further, specific aspects of morbidity often show counter-intuitive trends (for example, the case of eye disease given in section 3.2).

◆ 3.4 Summary

Indicators of differential mortality and differential morbidity were assessed for their ability reliably to identify gender differentials in the functioning "being healthy". The findings are summarized as follows:

- **Mortality:** Indicators are easily measurable and economically affordable. Certain national censuses also provide the information used to construct the disaggregated indicators. The reliability of certain indicators (for example, life expectancy) is questionable when the indicator can mask gender differentials in specific age groups. Juvenile sex ratios (particularly disaggregated into FMR04 and FMR59) appear to be gender sensitive and of greatest relevance to developing countries.
- **Morbidity:** Reliable indicators are difficult to construct due to the inherent unreliability of the underlying data (hospital records, questionnaires, etc.).
- **Poverty:** Evidence on the relationship between poverty and gender differentials in health is conflicting. While some suggest that there is no link, others suggest higher differentials either in richer groups or poorer groups. The question always requires answers which are grounded empirically. No *a priori* generalizations are possible. Differentials in indicators of the functioning "being healthy" do not therefore appear to conflate all the time with differences in opulence indicators.

4. BEING NOURISHED

Indicators of nutrition are commonly divided into two groups — indicators of intake (section 4.1) and indicators of outcome (section 4.2). Before discussing these, some basic terminology is outlined below (details are provided in McNeill, 1985).

In order to survive and function, every human being (and animal) requires *energy* (measured in calories). Energy is obtained from the constituents of food — namely carbohydrates, proteins and fats (together referred to as *macronutrients*) which also perform other specific roles. The body is in *energy balance* when the energy input (derived from the macronutrients) is equal to the energy expended.[30] In addition to energy, adequate levels of *micronutrients*, namely vitamins and minerals (in small quantities) and fibre are required. Deficiency of any of the vitamins or minerals causes specific diseases: vitamin B deficiency causes beri-beri, for example, and vitamin C deficiency causes scurvy. A diet which supplies adequate energy normally supplies adequate quantities of micronutrients (and also protein). This paper does not discuss individual nutrient deficiencies but restricts itself to energy inadequacy, referred to here as *undernutrition*.

◆ 4.1 Indicators of Intake

Every micronutrient and macronutrient can be presented as an indicator. As mentioned above, however, we concentrate here on overall energy adequacy rather than individual nutrients.[31] For a calorie intake indicator, calorie intake is calculated (usually by noting the consumption of food) and compared against that required for the individual to be in energy balance.

This is a commodity-based rather than functionings-based approach, with the food consumption being a commodity-based indicator. For example, two persons of similar weight and performing similar physical activity may receive identical amounts of food. While one may be adequately nourished, parasitic infection may interfere with food absorption in the other. Although the characteristic *[nutrition]* of the commodity *[food]* remains the same, the differing properties of the persons involved result in different functionings: *[being well-nourished]* and *[being under-nourished]*. Although a dietary intake indicator does not, therefore, enable a determinate evaluation of a functioning, it will be addressed briefly in order to highlight the problems facing the issue of nutrition assessment in general.

Some problems facing the dietary intake method are the following:

- **Data collection:** An estimation of food intake (and the calculation of calories contained, using standardized conversion tables) is time-consuming, expensive

[30] Svedberg (1991) divides energy expenditure into the following components: (a) maintenance of internal body functions, such as cardiovascular and respiratory activities, i.e., the basal metabolic rate (BMR); (b) internal body activities during waking hours, such as increased muscle tone and food digestion; (c) external physical activity, such as manual labour; (d) body's generation of heat (thermogenesis); and (e) energy that leaves the body unutilized in urine and faeces. An additional component in children is growth.

[31] The recommended standards for micronutrients and proteins are also highly controversial.

and prone to error. The methods commonly used to estimate food consumption are the following (Svedberg, 1991). First, household members are asked to recall how much of different kinds of food they consumed over a 24-hour period. Minor items or snacks are, however, often forgotten, breast milk cannot be estimated by this method and the poor are likely to exaggerate their food intake in order to hide their deprivation. The second method is measurement of changes in food stocks, and conversion of this into "consumption" flows. The disadvantage here is that only main meals consumed at home are covered, individual consumption is masked and breast milk is not accounted for. The third method is weighing the equivalent of the food actually observed to have been consumed over a fairly long period of a week or more. The method may also involve direct weighing before consumption or the copying by the researcher of portions (raw or cooked) using standardized estimates for the weights of known volumes. Errors may occur with the use of published, but not standardized conversion factors between raw and cooked ingredients, (especially for micronutrients sensitive to the mode of preparation) and in the measurement of portions and classification of ingredients (Harriss-White, 1997). Further, there is widely alleged to be a trade-off between efforts to obtain high precision and modification to behaviour on account of being observed (see, for example, Abdullah, 1983).

Large errors could result if consumption by any of the above methods is measured on fasting or feast days (rather than "normal" days) and in just one season rather than over seasons (which involves strong assumptions about the lack of impact of seasonal variation in food availability).[32] An additional disadvantage with particular reference to assessing gender differentials concerns methodology: in practice, most measurements continue to be made on households and rather rarely on individuals.

- **Fixing the norm:** Relating the intake to a presumed per capita requirement norm is fraught with problems. A calculation of the required energy depends on three dimensions: (a) energy requirement for the basal metabolic rate per kilogram of body weight; (b) body size; and (c) work activity. The calculation of the "norm" for each of these dimensions is in dispute.[33] There is great

[32] Owing to the development of the rural non-farm economy, the pre-harvest season can no longer be assumed to be the nutritionally lean season (Harriss-White, 1997). But even the non-agricultural economy has a marked tendency to be seasonal.

[33] The issues under dispute with respect to each of these are discussed by Svedberg (1991) and are outlined here.

- Energy requirement for the basal metabolic rate (BMR) per kilogram of body weight: The BMR could show inter-individual differences among individuals of the same sex, weight and age. Possible explanations are (a) genotypic differences affecting the efficiency with which energy is metabolized; (b) changes in body composition with increase in weight or even between individuals of the same weight — for example, different ratios of fat to lean tissue, the energy expenditure for the maintenance of fat stores being lower than for the sustenance of functions of lean tissue; and (c) the controversial notion of adaptation to intake either by increasing energy efficiency or by reducing energy wasted by thermogenesis. Also under dispute is the form of the relationship between BMR and body weight: whether BMR increases linearly with an increase in body weight or if the relationship is quadratic (concave).
- Body size: Different body size norms could be used. One possibility is the use of the height and body weight of an average individual in an "observed" reference population (or a fraction thereof) which has adequate nutrition; the other is the average of an estimated range within which the weight can be changed without impairing health. The weight at the lower end of this range could also be used.

variability in these three dimensions at the individual level. The amount of energy expended and therefore required thus varies greatly between individuals. Nutrient requirements based on averages for populations could be abused if applied as cut-off points to individuals. Thus the FAO and WHO suggest that their requirement norms be used for "prescriptive" purposes and not as cut-off points for estimating undernutrition at the individual level.

When assessing gender differentials in nutrition, different norms should be used for males and females. WHO estimates suggest that an average male expends 36 per cent more energy per day than his female counterpart — due to differences in body weight (and therefore higher maintenance energy) and in the proportion of metabolically active tissue per unit of body weight. Since females need less of most nutrients than males, an assessment based on absolute amounts of food, rather than relative to the different male/female norms, could result in errors of commission (Harriss, 1990). Underestimating the workload of women, especially those involved in hard agricultural labour and heavy household work, could result in biases in the calculation of norms. This could result in an underestimation of any existing female disadvantage (an error of omission, which is a more serious error).

The problems mentioned above are reflected in the studies investigating gender differentials in intake. The conclusions of studies carried out using data from the same region, or even the same data set, differ depending on the assumptions made about intra-household distribution, norms and cut-off points, and the use of gendered or ungendered standards. For example, Harriss-White (1997) compares five studies (Ryan et al., 1984; Behrman, 1988; Behrman and Deolalikar, 1989; Behrman and Deolalikar, 1990 and Harriss, 1990). These studies were all carried out on the same nutrition database (from the International Crops Research Institute for the Semi-Arid Tropics — ICRISAT), which covers about 1,200 individuals of all ages (except wholly breast-fed babies) from 240 households in six villages from four agro-climatically different regions in the semi-arid tropics of India. Conclusions in all but Behrman's study ran counter to orthodoxy. The intra-household bias, if existing at all, was found to be against male children by Ryan et al. (1984) and against males by Behrman and Deolalikar (1989), whereas Behrman and Deolalikar (1990) reported a bias oscillating against and toward females depending on the supplies. Harriss (1990) found some village-specific scarcity bias which was significantly anti-children of whatever sex, some anti-adult male and some anti-female of whatever age. Age bias rather than gender bias was also found by Ryan et al. (1984), teenagers being most vulnerable.

Similarly, consider two studies in Bangladesh (Chen et al., 1981 and Abdullah, 1983) with a highly masculine sex ratio. Chen et al. concluded that male intake per caput exceeded that of females in all age groups. Abdullah (1983), however, made adjustments in male and female energy requirements for age groups over 5. The authors concluded that above 5 years of age there was no female discrimination (beyond that accounted for by male female differences in body size, activity and physiology). This highlights the importance of ensuring that gendered norms are

- Physical activity: With regard to the physical activity of the reference individual, economic return of physical work differs substantially depending on the land, capital, etc., owned. While international organizations base the norm on the "average" work activity, this actually differs for different people to enable them to survive economically and avoid undernutrition.

used. A review by Wheeler (1984) similarly concluded that there was no evidence of discrimination against women in the intra-household allocation of energy intakes (relative to energy requirements) in South Asian populations (cited in Gillespie and McNeill, 1992).

Published studies in sub-Saharan Africa with regard to gender differences in intake are few. Schofield's (1979) findings drawn from 11 villages suggested that there was no statistically significant difference between fulfilling established calorie requirements between males and females — adult males fulfilled 101 per cent and adult females 96 per cent of the requirement (cited in Svedberg, 1990).

◆ 4.2 Indicators of Outcome

Three groups of indicators are used to assess the outcome of calorie intake: biochemical, clinical and anthropometric. Biochemical and clinical indicators may not be useful in the early stages of undernutrition when energy shortage is not accompanied by micronutrient deficiencies or illnesses. Besides, data on these indicators are patchy and identification of causality is not straightforward, as there may be reasons other than undernutrition for clinical and biochemical findings. Furthermore, the number of clinical signs and symptoms is large (more than 30), involving difficulty in diagnosis.[34] Biochemical assessments are expensive, time-consuming and largely used to detect isolated mineral and vitamin deficiencies.

Anthropometric measurements are the most commonly used of the outcome measures. Children are normally assessed using height for age, weight for height and weight for age ratios.[35] For adults the height and the Body Mass Index (weight in kilograms for height in metres squared — kg/m^2) are used. Svedberg expresses succinctly the reasons for the popularity of the use of anthropometric measurements:

> The anthropometric approach rests on the presumption that people's physical appearance reflects their nutrition (and health) status, i.e., if their body intake and expenditure balance at too low a level, this will show in their body constitution. This means that neither energy intake nor the expenditure has to be measured. The anthropometric approach is therefore more direct and simple, and less reliant on data collection than the dietary approach (Svedberg, 1991:191).

Despite these advantages, some difficulties are outlined below.

- **Fixing the norm:** As with indicators of intake, fixing the "norm" is a controversial issue. Most national and international studies use the norms established by the United States Centre for Health Statistics. Such norms are obtained from Western populations assuming that the average child is on his or

[34] Svedberg, (1991) gives the example of a study where two experienced, well-trained experts examining the same population for clinical signs of malnutrition were in agreement in less than half of them as to which signs did and did not occur.

[35] Height for age is used as a measure of stunting; low measures indicate chronic growth retardation. Weight for height is a measure of wasting; low measures indicate recent or "acute" growth retardation. Weight for age is a measure of overall nutritional status and indicates both long-term and recent growth retardation; low measures are referred to as "underweight".

her genetic potential growth path and has a weight assumed to be optimal for health and various mental and physical capabilities (Svedberg, 1991). First, it is controversial whether these norms should be applied to all populations. This could be overcome by using norms derived from among a well-fed group in the local population. But if gender inequality already exists in such a group, using these norms would result in omission errors (Harriss-White, 1997). Furthermore, if age is wrongly reported such norms could give misleading results — for example, where women lie about the age of a daughter saying she is younger (as often is supposed to be the case in South Asia), shortfalls could pass unnoticed.

Opinions vary on choosing the "cut-off" point (Svedberg, 1991) below which the individual is classified as undernourished. For example, with regard to height for age, cut-off points vary from 10 per cent and two standard deviations below the median reference height, to below the fifth decile. Setting the cut-off close to the reference median would give high commission and low omission errors and vice versa. Mora (1984) showed that the share of children in a sample from Columbia classified as wasted or stunted was almost twice as big depending on the cut-off point used (cited in Svedberg, 1991).[36]

- **Adaptation:** The issue of adaptation is still unresolved. Svedberg (1991) discusses whether a low anthropometric score is a necessary and/or sufficient condition to label an individual as undernourished. For example, if a child reacts to nutritional stress by first reducing physical activity below the critical level, the child could be undernourished although anthropometric indicators remain normal. On the other hand, if food intake is lowered, the body could adapt in a number of ways (physiologically, behaviourally and metabolically) with costless adjustments to body size. While there is no disagreement about the fact that such adjustments cannot proceed indefinitely, there does not appear to be any agreement on level of the crucial cut-off point below which adjustment impairs health (Svedberg, 1991).
- **Multicausality:** Height and weight are affected by nutrition as well as the "public health" environment, the prevalence of infections and the availability of healthcare. For example, infections in the first 24 months have consequences for height trajectories, in particular growth deviations, which are now thought to be irreversible (Payne and Lipton, 1994). Height deficits relative to standards are often interpreted as indicators of chronic disadvantage, though they may be more accurately attributed to disadvantage in infancy (Harriss-White, 1997). Anthropometric measurements do not always reliably reflect differentials in healthcare and treatment. This is demonstrated by studies revealing a lack of overlap in gender differentials in anthropometry with those in mortality (see Basu, 1992 investigating data for Northern India, and Ahmad and Morduch, 1993 for Bangladesh — both cited in Klasen, 1996a). In both studies, excess female mortality was identified, but this was not reflected in anthropometric indicators. In Sri Lanka, however, which had a sex ratio adverse to females (1,040 males : 1,000 females), Perera (1983) presented anthropometric evidence suggestive of chronic discrimination against girls in all but two districts although no gender difference in acute malnutrition was identified. For Nepal, which had a sex ratio of 1,045 males per 1,000 females, Martorell et al. (1984) were unable to identify a difference in the degree of growth retardation. Anthropometric surveys could also have a selective bias, as severely

[36] It is a different but related point that not all those above the cut-off point are healthy. A proportion will have poor nutritional status due to obesity above the cut-off.

undernourished children could have died and thus would be omitted from a survey (Klasen, 1996a).

The use of anthropometric measures has the advantage of direct measurement on individuals and does not rely on recall or self-reporting. Intra-household differences in nutritional status of individuals, between males and females, for example, can also be assessed. Despite these advantages over intake indicators, outcome measures are prohibitively expensive and collecting them requires more skill than census enumeration data and mortality statistics. Moreover, they could be unreliable, giving rise to errors of either commission or omission depending on the norms and cut-offs used.

As with the dietary intake approach, the following studies, which use anthropometric outcome measures, fail to arrive at a consensus on the issue of gender differentials. In Chen's (1982) study in Bangladesh on children under 5, 14.4 per cent of the girls showed severe malnourishment (in the weight for age indicator) compared with 5.1 per cent of the boys; 59.9 per cent of the girls were moderately malnourished compared with 54.8 per cent of the boys. Abdullah's (1983) longitudinal study, also in Bangladesh but on a smaller sample, gave no clear gender differentials in anthropometric indicators for this age group. In fact, socio-economic factors were found to be more important than gender in determining nutritional status (cited in Watson and Harriss, 1985).

Findings in sub-Saharan Africa are similarly controversial. In a study of data on more than 50 populations in the region, Svedberg (1991) concluded that females irrespective of their age, were not at a disadvantage vis-à-vis males in anthropometric status. Klasen (1996a), however, questions this evidence and presents data showing an anti-female trend. Controversies on the consistency of findings due to problems with norms and interpretations are well-highlighted in the published correspondence between Klasen (1996a and b) and Svedberg (1996).

Our view that findings on gender differentials in nutritional status (assessed by both approaches) are inconclusive is shared by Basu (1993). Basu's thesis is that most research in this area starts with the biased view that gender differences in nutritional status must exist. She looks at primary data and critically reviews existing literature on sex differentials in childhood nutritional levels in South Asia, and suggests that the evidence on the relatively greater nutritional deprivation of girls in South Asia is inconclusive. She proposes, in fact, that the evidence points to very little difference in access to food between daughters and sons.

◆ 4.3 The Relationship with Poverty

The relationship between low calorie intake and income poverty is also not straightforward. In an extensive review of 14 studies (of intake and anthropometric measurements) extending from the north-western plains area of the Indian subcontinent to the Himalayan region, the eastern plains and the south, Miller (1997) concludes that a relationship between poverty and food allocation differentials exists, but in a counter-intuitive direction. Female disadvantage in food allocation was found to be more apparent in the propertied strata than the lower strata — particularly in the northern plains. As an explanation for this, she draws on the "poverty aversion" approach, which "takes into account the social fact that raising many daughters within the socio-economic context of the north-

western plains will indeed impoverish a family, while sons will enrich a family" (Miller, 1997:1692). But documentation of 24 methodologically unstandardized micro-level studies of individual nutrients intake in India and Bangladesh (Harriss, 1992) revealed the following findings. First, there did not appear to be a systematic age or gender bias (across villages within a region, even with respect to the landless class), with unambiguous implications for policy. Second, nutrient intake *per se* is not a good indicator of gender poverty.

Findings for anthropometric indicators also differ. Three studies in India (Levinson, 1972; Sen and Sengupta, 1983 and McNeill, 1984 cited in Watson and Harriss, 1985) found that anthropometric differences between the sexes were specific to social class. Differences between the sexes disadvantageous to women were greatest in the poorer Ramdasia caste (Levinson) the poorer landless caste (Sen and Sengupta) and the poorest socio-economic group (McNeill) than in the corresponding Jat landowning class, the landed castes and the population as a whole. The results suggested that the intensity of nutritional discrimination against females was greatest in the poorer socio-economic class. In contrast to this, anthropometric research on the ICRISAT database by Ryan et al. (1984) showed gender differences confined to the children of landless and small-farmer households, where it was boys rather than girls who were at a disadvantage. The tribal people in Andhra Pradesh studied by Gillespie (1988) showed gender bias in anthropometric status which favoured boys below 12 months and favoured girls between 12 and 60 months. Rather than income poverty at the household level, it was the participation in the labour force of the mother that was most closely and significantly associated with malnutrition. The author suggests that increased income from labouring is offset by reduced time for childcare and feeding in an agrarian regime where peak labour and peak disease incidence coincide.

◆ 4.4 Summary

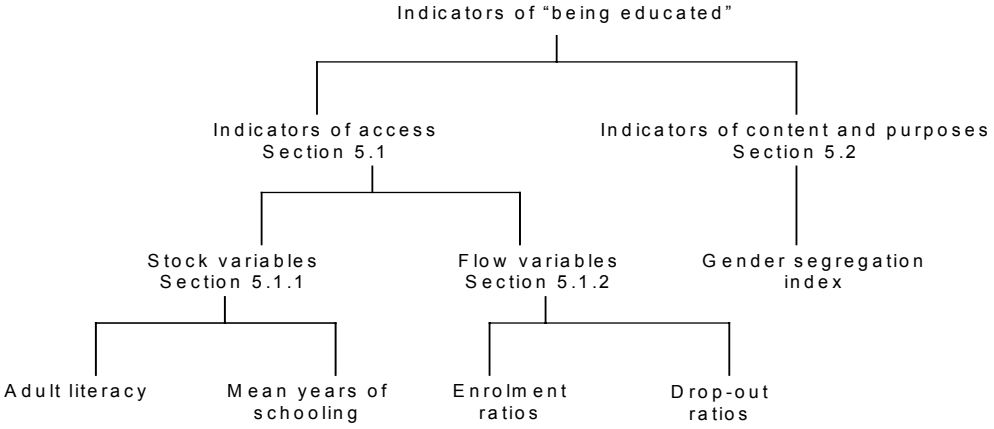
The findings in sections 4.1–4.3 can be summarized as follows:

- **Unreliable indicators:** Measurements of food intake and outcome suffer from a number of methodological and inherent problems which make it difficult to construct reliable indicators.
- **Poverty:** Assessing the true impact of poverty on gender differentials is confounded by the absence of good indicators and systematic research. Using the existing indicators, studies show contradictory findings. It is far from the case that differentials in nutrition always conflate with differentials in opulence indicators.

5. BEING EDUCATED

Indicators for assessing male-female differentials in education can be broadly divided into two groups — indicators of access or participation, and indicators of content and purposes (UNESCO, 1995). The first group is relevant to developing countries, where access is often unequal even at primary levels. The second is mainly concerned with gender differences in the nature and content of the education provided, and is relevant to developing as well as developed countries. The indicators in the two groups are shown in figure 2.

Figure 2: Indicators of "being educated"



An extensive literature search reveals that micro-level research concentrates first on the relevance of formal education to the daily lives of people, and second on the causes of low overall literacy as well as causes of gender differentials.[37] Gleaning information related to indicators requires the evaluation of micro-level literature, which is fragmented and not addressed to the issue in question. This is a massive task in its own right and outside the scope of this paper. The discussion here is thus forced to draw largely on UNESCO's global-level investigations.

◆ 5.1 Indicators of Access

Indicators of access are concerned with access to education, from basic literacy to tertiary education. They are sub-divided into stock variables (adult literacy, mean

[37] Gender gaps in education are the result of a number of factors. Khan (1993), reviewing studies in South Asia, identifies factors such as conservative social and religious norms, the demand for girls to take care of siblings and do household and farm work, lack of basic amenities in schools (such as lavatories) and rigid time schedules. Similarly, Hyde's review of sub-Saharan Africa identifies negative parental and community attitudes towards the Western education of girls; marriage and child-bearing, which compete with school for older girls; demand for girls to work at home and in the fields; the desire to protect girls; the poor quality of schools; and constricted curriculum choices (Hyde, 1993). Furthermore, the employment of girls in trade and informal sectors requires them to spend time learning from mothers and as apprentices with older women, while boys were identified as having a higher opportunity to enter formal labour markets after education.

years of schooling) and variables of flow (enrolment and drop-out ratios).[38] These are discussed, in turn, below.

5.1.1 Stock variables

Stock variables give information about the older members of the population. Adult literacy refers to persons (15 years and above) who can, with understanding, read and write a short, simple statement on everyday life. Illiteracy refers to those in this age group who cannot. The literacy rate of women is significantly lower than that of men in 66 countries (a third of the membership of the United Nations). According to UNESCO, few other indicators are capable of capturing as decisively the imbalance in the status of men and women in society as this simple measure (UNESCO, 1995). Literacy rates have attracted criticism on a number of grounds. First, the definition does not spell out either the "simplicity" of the text, or the degree of "understanding" being sought (Stromquist, 1997). Second, if literacy is defined only with respect to a major national language(s), it can result in under-estimation (King and Hill, 1993). Third, literacy rates are criticized for being self-reported rather than proved through test, and hence not entirely accurate. Fourth, when tests are deployed, they must be administered individually, making the procedure for assessing literacy time-consuming and expensive. Finally, anthropologists and social psychologists question the polarization into literate/illiterate people, given the "wide variation in the way literacy is used, perceived and mastered" (Stromquist, 1997:5).

The other stock variable, mean years of schooling, is the average number of years of schooling received per person aged 25 and over. Its use overcomes some of the problems associated with the literacy variable, yet both variables reflect past investment and access to education. Recent progress could be better captured by looking at changes over time in sex differentials in flow variables, as explained in section 5.1.2. This is particularly important in developing countries, where younger age groups constitute a larger proportion of the population.

[38] Information provided by indices of these indicators of "being educated" is more transparent than percentage values, which can be deceptive (UNESCO, 1994). As an illustration, see the table below, which shows gender disparities between male and female illiteracy rates for 1970 and estimated disparities for 2000, by region. Disparities are expressed in columns 2 and 3 as percentages and columns 4 and 5 as indices. On comparing 1970 and 2000, in columns 2 and 3 gender disparities appear to be diminishing in percentage points in most regions. The indices in columns 4 and 5, however, suggest that the gender gap will actually widen in all regions except Latin America.

Comparison of indices and percentages to assess gender disparities in illiteracy rates

Region	Female minus male illiteracy rate (per cent)		Number of illiterate women per 100 illiterate men (index)	
	1970	2000	1970	2000
(1)	(2)	(3)	(4)	(5)
Sub-Saharan Africa	9.3	20.6	129	169
Arab States	25.8	22.5	143	184
Latin America / Caribbean	7.4	2.4	133	123
East Asia / Oceania	28.6	14.6	187	246
South Asia	27.9	25.0	151	174

Source: UNESCO, 1994, table 2

5.1.2 Flow variables

Flow variables include gross enrolment, net enrolment and drop-out ratios at the primary, secondary and tertiary levels. The gross enrolment ratio (GER) for any level is the total enrolment in that level, regardless of age, divided by the population of the age-group which officially corresponds to that level. The net enrolment ratio only includes enrolment for the age-group corresponding to the official age group for that level. The GER actually measures ". . . the capacity of school systems relative to the population eligible to attend. A GER value of 100 indicates that a country is in principle able to accommodate all of its school-age population, but it does not indicate the proportion actually enrolled" (Colclough and Lewin, 1993:17). Consider the hypothetical case of a country with a primary GER (expressed as a percentage) of 100 per cent and a repetition rate of 12 per cent. The 12 per cent is most likely to also be the percentage of over-age enrolment. A GER of 100 here means that around 12 per cent of children of primary age would not be enrolled in school. GERs can therefore mask the extent of lack of access to education. This is especially the case in developing countries where repetition rates are high. In practice, however, despite this drawback, gross rates are used more commonly than net rates. Colclough and Lewin identify three main reasons for this. First, it is a matter of convention. Initially, targets were set up by UNESCO for Universal Primary Education (defined as a GER of 100 or more). It was supposed that over-age enrolment was a temporary phenomenon which would disappear once schools developed the capacity to enrol all school-age members of the population. Second, data for net ratios are less reliable, as parents and teachers both may have an incentive to alter the age of the child to bypass regulations regarding the appropriate age for attendance in appropriate classes in school. Third, it is easier to classify children by age group and report the GER, than it is to do a head count for net ratios. To our knowledge there are no micro-level studies investigating the extent of difference in developing countries between gross and net ratios. In developed countries, the two ratios largely have the same value.

The female/male participation ratio, which compares female and male gross enrolment (i.e., the female gross enrolment ratio divided by the male gross enrolment ratio) is often used to assess the gender gap (UNESCO, 1995). It can be calculated at the primary level in countries which have not yet achieved universal primary education. In those that have, participation ratios at the secondary level can be utilized. There is some concern that participation ratios could be misleading. First, in regions where a substantial number of girls are educated at home due to religious reasons, or in the case of élite women, or in monastery and temple schools, the restriction of evidence to enrolment in formal schools could result in an underestimation of females (Bowman and Anderson, 1982). Second, even in countries with legislation mandating primary school enrolment, enrolment does not invariably imply attendance, which can result in an over-estimation of females (Naik, 1982). For example, if girls miss school more often than boys in order to do household reproductive work or cannot give as much time as boys to their homework after school for the same reason, this means they have less access. Crude indices of such subtle measures of access, unaddressed by enrolment ratios, are the proportion repeating a grade or becoming early leavers (Bowman and Anderson, 1982). The extent of repetition/drop-out can be difficult to quantify if record keeping at schools is poor. In order to assess the relative reliability of indicators (enrolment or drop-out) of the gender gap, UNESCO (1995) conducted

a study using two indices, the school life expectancy and the school survival expectancy.[39] It was concluded that the main policy challenge in most of the poorest countries was less one of ensuring the retention of girls once in school than of increasing access by encouraging parents to send girls to school in the first place. Hyde (1993), however, provides evidence suggesting that girls have a low mean educational attainment in sub-Saharan Africa due to lower enrolment as well as high wastage (i.e., repetition and drop-out rates). In Bangladesh, drop-out rates for girls were found to be higher than for boys at all levels (Subbarao et al., 1994). Similar evidence across regions has been found in country-specific studies (Herz et al., 1991 cited in Subbarao et al., 1994). The conclusions at the global and national levels need to be further refined by micro-level studies explicitly investigating the reliability of enrolment ratios versus drop-out ratios in capturing gender differentials. Unfortunately, most work investigating this question has been conceptual rather than empirical.

Some studies also suggest caution when drawing conclusions about the narrowing of the gender gap based on indicators of access. In a study published in 1981, Weis demonstrates that while there was increasing female access to education in Ghana, this was largely concentrated in low-quality schools rather than the schools with high status. Comparing data from the 1960s with 1974, Weis shows that although females were proportionally better represented in schools in 1974 than in the 1960s, 57 per cent of the male sample attended high-status schools, while less than 14 per cent of females attended schools of a comparable quality. Similar findings were reported for Kenya by Eishwani (1982, cited in Hyde, 1993). These studies, although dated, make an important general point. Since students from high-status schools disproportionately occupy higher places in the economy, mere access to education in low-quality schools may not increase the social mobility of girls or rectify economic occupational discrimination. A related issue is that of gender differentials in fields of education, which is discussed in section 5.2.

◆ 5.2 Indicators of Content and Purposes

In most countries in South Asia and sub-Saharan Africa, gender gaps in education at the primary and secondary levels, which favour males, widen at the tertiary level. In many Latin American/Caribbean countries, however, there are no gaps at any level. In some instances where gaps exist, enrolments favour females at secondary and tertiary levels. While the main reason for this phenomenon in some Southern African countries (Botswana, Lesotho, Namibia and South Africa) is

[39] School life expectancy is defined as the total number of years of schooling which the child can expect to receive in the future, assuming that the probability of his or her being enrolled in school at any particular future age is equal to the current enrolment ratio for that age (UNESCO, 1995). The school survival expectancy is the school life expectancy for those persons *already in school*. Using these two measures, UNESCO observed the following for developing countries: first, the school life expectancies of girls were somewhat lower than boys, indicating that higher proportions of girls than of boys never got into school at all. Seventeen of the 52 developing countries included in the analysis, however, showed a slightly higher school life expectancy for girls than boys (particularly in the Latin American/Caribbean region). Second, countries with the gap in school life expectancies most in favour of boys were generally those with low school life expectancies both for boys and girls (particularly in sub-Saharan Africa). Third, countries with a very low school life expectancy for girls showed less of a gap between the school survival expectancies of boys and girls than in their school life expectancies.

thought to be early school leaving and migration of boys to search for work in mines and commercial agriculture, there is no ready explanation for Latin American and Caribbean countries or for countries in other regions, such as Sri Lanka, the Philippines, Qatar and the United Arab Emirates. In most of these countries, as elsewhere, women are concentrated in particular fields of study, typically the humanities, education and health sciences.

Differences in the fields of education in which girls and boys are concentrated begin appearing at the secondary level and become more pronounced at post-secondary and higher levels (UNESCO, 1995). This phenomenon is common to developing and industrialized countries.[40] Every country for which data are available to UNESCO shows a female share of enrolment in the natural sciences, engineering and agriculture that is less than the female share of total enrolment in all fields. The opposite tendency is apparent in the humanities. Case studies reveal that in secondary schools in which girls are enrolled science courses may not be provided at all — or if they are, they have less adequate infrastructure and less effective training than that given to boys. It is noticed that girls are actually directed towards subjects like domestic science, handicrafts and biology, while boys study vocational subjects or chemistry and mathematics (Eishwani, 1982 and Harding, 1985 cited in Hyde, 1993).

UNESCO has developed an index to assess the extent of such gender segregation (see the statistical notes in UNESCO, 1995). This Gender Segregation Index gives the percentage of persons who would need to change their fields of study for a "balanced" distribution of the sexes among the fields to be achieved (i.e., one where the ratio of females to males is the same in all fields). Low percentages indicate a low degree of segregation or gender-specific specialization. Conversely, high percentages indicate a high degree of segregation of the sexes. Calculation of the index for Bangladesh indicated that only 1 per cent of those enrolled in tertiary level education would need to change the field of study, while the corresponding figure for Finland was 23 per cent. This appears to indicate that there is less gender segregation in higher education in the former than the latter. But the indicator conceals the fact that there are proportionately fewer females in higher education (16 per cent of total students) in Bangladesh. The proportion of females in the different fields is close to the overall percentage of 16. In case of Finland,

[40]A number of reasons can be cited for the gender segregation in fields of study. In some cases, there may be actual restriction of opportunities offered by the education system for access to particular fields. In others, social convention may constrain the supply of female students. A combination of both is also possible. Perceptions of the compatibility of careers based on different subjects with marriage, household responsibilities and child rearing are also important in girls' attitudes to different fields of study. Even in industrialized countries, women retain the primary responsibility for childcare and household management. This affects both the kind of employment they are willing to accept, as well as what they are likely to be offered. Therefore, expectations and preferences concerning the nature of future employment are likely to influence the choice of fields girls make at the tertiary level (UNESCO, 1995). Differences in ability (whether females are better suited to particular fields; and similarly in the case of males) have also been raised as a possibility. There are, however, a number of problems with assessment, which is widely open to prejudice and misunderstanding (for further details, see UNESCO, 1995).

Given social conventions and certain perceptions, the scope for disagreements when translating a differential in higher education enrolment and segregation in education fields into a differential in well-being could be greater than for differentials in "being healthy", "being nourished" or for "being educated" at the primary or secondary level.

however, females are more proportionally represented in higher education but under-represented in certain fields (for example, natural sciences, engineering and agriculture). So, to obtain a full gendered picture, differential tertiary enrolment rates must also be assessed together with the Gender Segregation Index. Micro-level studies investigating the reliability of this index as an indicator of gender gaps have yet to be undertaken.

◆ 5.3 The Impact of Poverty

The UNESCO (1995) report looking at the relationship between national income and education reached the conclusion that while gender gaps in access are low in rich countries, gender gaps are not necessarily wide in all poor countries. The poorer countries with a GNP of less than US$ 500 per caput (1992 figures) showed a range of female-male participation ratios (per cent) in the primary level of education that varied from under 50 per cent for girls to nearly 100 per cent (for example: Guinea, 47 per cent; Benin, 50 per cent; Kenya, 98 per cent; Rwanda, 97 per cent). A study conducted by the Overseas Development Administration in six developing countries, however, concluded that the "economic factor, especially in terms of *poverty and hunger*, was found to be *the major underlying influence* acting against the participation of girls in formal education, in both direct and indirect ways" (Brock and Cammish, 1991:23, emphasis in original).

Since gender gaps in education are maximized in sub-Saharan Africa (a majority of countries with lagging female enrolment rates in primary education are in this region) and in South Asia, we look at some micro-level studies in these regions. Assie (1983), in a micro-level study in Côte d'Ivoire, concluded that the likelihood of a girl with a university-educated father being sent to secondary school was 35 times higher than that of a daughter of a man with no education. In the case of boys, the likelihood was only a tenth larger. Further, the study demonstrated that 25 per cent of the students in non-élite secondary schools that prepared students for entry into university were female, while this rose to 41.7 per cent in the élite secondary schools. Similarly, Weis's (1981) findings in Ghana show that at the secondary level, females were disproportionately drawn from educated families in comparison to males. At the tertiary level, women in Nigeria were found to be disproportionately drawn from families with a privileged background (Biraimah, 1987 cited in Hyde, 1993). In lower income urban families and rural families in Pakistan, however, educated fathers were found to play a more important role in the schooling of daughters than of sons (King et al., 1986 cited in Khan, 1993). In India, Rozensweig (1980) identifies a positive and significant association between rural female enrolments, and land size and non-earned income. In research on three villages in northern Karnataka, Subrahmanian (1997), however, suggests that parents make decisions regarding girls' education based on social risk (such as the risk of pregnancy or risk of lack of marriage), rather than based on economic conditions. In Bangladesh, Ahmed and Hasan (1984) show girls' education to vary positively with family income and landholding. National and micro-level evidence, therefore, tends to support the conclusion that family poverty in rural and urban areas is probably the most important reason for holding girls back from school or withdrawing them earlier.

◆ 5.4 Summary

The findings of sections 5.1–5.3 can be summarized as follows:

- **Indicators:** Indicators of access appear to be important in identifying the gender gap in education in developing countries. While global-level research suggests that enrolment ratios are reliable indicators, micro-level research is required to compare the reliability of enrolment ratios with drop-out ratios. In countries where primary education is universal, indicators of access to secondary school may be used. For some developing countries, especially in Latin America/the Caribbean, no gender gaps exist at all three levels. Indicators of content and purposes, such as the Gender Segregation Index, may be useful to assess gender differences in the subject fields of education.
- **Poverty:** Family poverty in rural and urban areas is probably the most important reason for holding girls back from school or withdrawing them earlier.

It is worth noting here that it appears contradictory that sub-Saharan African countries, with their balanced FMRs, should show the widest gender gaps in education right from the primary levels. It would seem that the same factors that are considered responsible for gender equity in nutrition and healthcare (reflected in balanced FMRs) may be responsible for anti-female bias in enrolment in school, i.e., the higher economic worth of girls and women. However, the relatively high participation of females in agriculture and rural trade and the requirement for young girls to take care of siblings and undertake other household reproductive work, when older women work in fields, could be contributing factors to low attendance in school.

Gender gaps in education in sub-Saharan Africa highlight the importance of not relying on a single indicator in the investigation of gender biases. Equality in one dimension of human functioning (for example, "being healthy" in sub-Saharan African countries as reflected by the balanced FMR) may not necessarily be accompanied by equality in others. The issue of composite indices, which combine indicators related to different functionings to obtain a comprehensive index of well-being, is the topic of discussion in section 6.

6. COMPOSITE ASSESSMENT

While well-being in each functioning can be assessed by separate indicators as discussed in sections 3 through 5, efforts have been made to identify a single indicator capable by itself of reflecting overall social development (social development is assumed to map on to well-being). Such an indicator would have great practical value. For example, consider countries where financial and other constraints result in limited data collection. A single reliable indicator which would allow the monitoring of changes in other unobserved sectors would be of great benefit. While efforts towards identifying such an indicator have been made, to our knowledge they have been unfruitful. Using a single indicator of one sector (or functioning) as a proxy for others will be misleading in certain situations (McGranahan et al., 1985). As was seen above, sub-Saharan countries show a balanced FMR, but the region still has the highest gender gap in education. Furthermore, correlations between indicators which may hold good in one region, may not do so in others.

In the absence of a single universal proxy indicator, attempts have been made to develop a composite index which combines indicators of key dimensions of development. The construction of such composite indices raises another set of issues. First, the dimensions represented have to be in large enough number to provide comprehensive information, but few enough to allow easy understanding. Value judgements have therefore to be made of the dimensions considered most important. Second, having selected the dimensions, a further act of subjective judgement may be involved in selecting the indicator(s) to represent the dimension. Third, the issue of using average values or values which take into account distributional differences needs to be addressed. Fourth, the question of the weights to be attached to each is highly contentious. Weights need to take into account the ". . . presumed relative importance of the component represented by the statistical indicator", as well as ". . . weighting in terms of the technical adequacy of the indicator and the quality of the data available for it" (McGranahan et al., 1985:297). Fifth, changes in all dimensions of development will not always move in the same direction as indicated by the composite index. Composite indices have thus been criticized for "concealing more than they reveal". Composite indicators, however, are much like averages over a range of variables and could play a role in general assessment before exploring particular components. Composite indices constructed for specific purposes (rather than to represent the whole of socio-economic development) could be quite useful.

The Physical Quality of Life Index (PQLI) designed by Morris in 1979, for example, is a composite of three indicators (Morris, 1979). At that time, comparisons between countries were being made based solely on their per capita GNP, which was thought to be a shorthand measure of well-being. In the mid-1970s, however, it became apparent that a number of countries with low per capita income were showing high social development. The PQLI was developed as a crude instrument to explore the questions surrounding differences in economic and social development. It was also intended for use alongside GNP, but as an explicit measure of social performance.[41]

[41] The three components of the PQLI are the infant mortality rate (to reflect social improvements in the home, especially women's well-being), life expectancy at age one (to

More recently, indices of human development have been developed by the Human Development Report (HDR) team of the United Nations Development Programme (UNDP). These are primarily intended to draw attention to the fact that comparisons of countries based solely on GNP (as in league tables published regularly by the World Bank and other agencies) do not take into account other aspects of human development. We concentrate here on composite indices that explore the issue of gender inequality: the Gender-related Development Index (and its precursor, the Human Development Index), the PQLI and the Gender Empowerment Measure.

◆ 6.1 The Human and Gender-Related Development Indices

The Human Development Index (HDI) was designed to focus on three essential dimensions of human life: longevity (or "being healthy"), measured using the indicator life expectancy at birth; knowledge (or "being educated"), measured by the indicators adult literacy and average primary, secondary and tertiary enrolment; and access to resources to enable a decent living standard, measured using the indicator per capita income adjusted for purchasing power parity (PPP).[42] Normalized values for indicators are obtained and averaged to give the HDI. This is thus considered a reflection of the combined well-being in the dimensions assessed and gives a value on a scale between 1 (maximum development) and 0 (minimum). Of particular interest to this paper is the Gender-related Development Index (GDI). The GDI is a special type of HDI which takes note of inequalities between any two groups. The two groups considered here are male and female (the

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reflect improvements in the external environment) and literacy (which crudely assesses the extent to which people can participate in shaping their environment). The word "Physical" is used to indicate the narrowness of the target the index aims to measure. It does not attempt to incorporate the other social and psychological characteristics of life like security, justice, freedom of choice, human rights, employment, satisfaction, etc. (Morris, 1979).

Although retrospectively these indicators can be seen as assessing "functionings", they were considered as reflectors of social performance, rather than measuring "functionings" *per se*.

[42] Details of the calculation of the HDI can be obtained from technical note 2 in the 1997 **Human Development Report** (UNDP, 1997). Briefly, for calculating the HDI, values for each component are first normalized to give an index. The general formula for the index X_i for each dimension i (i = 1 for longevity, i = 2 for education and i = 3 for income) for a country is as follows:

$$Xi = (\text{actual } x_i \text{ value} - \text{minimum } x_i \text{ value}) / (\text{maximum } x_i \text{ value} - \text{minimum } x_i \text{ value}).$$

Each indicator now has the following fixed minimum and maximum values: (a) life expectancy at birth at 25 and 85 years; (b) adult literacy at 0 per cent and 100 per cent and the average enrolment ratio at 0 per cent and 100 per cent. The education attainment index is obtained by combining adult literacy with a weightage of 2/3 and average enrolment with a weightage of 1/3; (c) real GDP per capita (PPP) at minimum PPP$ 100 and maximum PPP$ 6,154. The correct maximum is $ 40,000, but any value above the world average GDP of PPP$ 5,835 is discounted using a form of Atkinson's formula (details are given in technical note 2, UNDP, 1997). Thus the maximum is reduced to PPP$ 6,154.

Having normalized the values of each indicator on a 0–1 scale, the value of the HDI is obtained by averaging the indices for the three dimensions. Each index is given an equal weightage. Thus:

$$HDI = (X1 + X2 + X3)/3.$$

same index could, however, be used to assess the inequalities between groups of different castes, different ethnicity, etc.).[43]

The HDI and GDI have been designed for comparisons between countries at different stages of development.[44] If the GDI is to be used specifically in developing countries, certain adaptations may be required. We examine adaptations pertaining to each component of the index in turn.

- **Longevity:** This component (reflecting the functioning "being healthy") is presently measured by life expectancy, which was selected over other suggestions like infant mortality rate and potential lifetime (Desai, 1989 cited in UNDP, 1993).[45] This was because the IMR and potential lifetime were unable to distinguish between developed industrial countries. However, for our purpose of assessing well-being within and among developing countries,

[43] Details on measurement of GDI can be found in technical note 2 in UNDP, 1995. Briefly, the three dimensions assessed in the GDI are the same as the HDI. The main difference is that the HDI is concerned with overall achievement, whereas the GDI takes into account the extent of gender inequality. Indices for the three dimensions are thus calculated separately for male and female, i.e., X_f and X_m. These are then combined to give a gender-equity-sensitive indicator (GESI), calculated by $(p_f X_f^{1-\varepsilon} + p_m X_m^{1-\varepsilon})^{1/(1-\varepsilon)}$ where X_f and X_m are the corresponding male and female indices obtained by applying the Xi formula given in footnote 42 above to male and female indicator values separately; p_f and p_m are the corresponding male and female proportion of the population. ε can be considered a measure of aversion to gender inequality, which can be altered anywhere between 0 and ∞. 0 indicates that there is no aversion to gender inequality (the HDI implicitly assumes ε to be 0; when $\varepsilon = 0$, an *arithmetic* mean of male and female achievements is obtained). If $\varepsilon = \infty$, this indicates a very high aversion to gender inequality such that only the achievements of the group with the lower value are considered, while those of the other group are ignored. In the GDI, $\varepsilon = 2$, which expresses a moderate aversion to inequality. This is an arbitrary decision and the value can be altered depending on the degree of aversion to inequality the state decides on.

There is an additional difference between the HDI and GDI with reference to the income indicator. For the purposes of the GDI the shares of earned income for women and men are derived by calculating their wage as a ratio to the average national wage and multiplying this ratio by their shares of the labour force. Their shares of earned income are then divided by their population shares. This gives the two proportional income shares. The GESI is then obtained as explained above by combining the female and male indices (X_f and X_m.). This value is multiplied by the average real adjusted GDP per capita of the country. This gives a measure of GDP per capita that is now discounted for gender inequality. This is the actual (x_i) value used when calculating the index Xi for income as in the previous footnote. The GESI indices obtained for longevity and knowledge are then combined with the Xi for income. The average of the three indices gives the GDI.

While the GDI is disaggregated for gender, the distributional inequality within each group (male and female) is not taken into account. While this construction is therefore "based on disaggregation by groups, it is still at base an aggregative, and not distributional, index" (Hicks, 1997:1287).

[44] Technical note 2, table 2.4 in UNDP (1993) makes some suggestions for using different indicators to measure the three dimensions of the HDI for countries at similar stages (low, medium or high) of human development.

[45] Potential lifetime is defined as follows: Consider an individual of age I with a conditional life expectancy L_i. The remaining future life time of the person then is $(L_i – I)$ years. If a normative maximum longevity is defined (for all j of all I) as L, then the potential lifetime is given by:

$$PLT_j = R_j = (L_{ij} – I_j)/ (L – I_j) \text{ where } 0 < R = 1.$$

instead of life expectancy, an indicator reflecting mortality rates in younger age groups would be more appropriate. Furthermore, life expectancy at birth has little or no value as a measure of gender differentials (see section 3.1.3). As discussed in section 3, FMR04 and FMR59 may be the more appropriate gender-sensitive indicators of the functioning ("being healthy") that life expectancy proposes to capture. Some way of including the disaggregated FMR values in the index would need to be devised.

- **Knowledge:** This component (reflecting the functioning "being educated") is measured by combining the indicators adult literacy (2/3 weight) and mean primary, secondary and tertiary enrolment (1/3 weight). It has evolved from the first HDR in 1990 in which adult literacy (the percentage of literate people above 15) was used (UNDP, 1990). Since the adult literacy rate was also unable to distinguish between industrial countries, the mean years of schooling (average number of years of schooling received per person aged 25 and over) was added. However, since a majority of the population in developing countries is under 15, these stock variables were unable to capture the *flow* of educational attainment (Smith, 1992 cited in UNDP, 1993). Subsequently, in response to these criticisms, "mean years of schooling" was replaced by "average primary, secondary and tertiary enrolment". As discussed in section 5, enrolment is a useful measure in developing countries, as well as being fairly sensitive to gender differentials. Although micro-level studies are required to investigate the reliability of other measures of access, investigations by UNESCO at the global level suggest the reliability of enrolment ratios. But the 1/3 weightage given to the average enrolment measure in the GDI makes it subordinate to the adult literacy measure. It would be worth investigating empirically whether a reversal of weights — such that adult literacy accounts for 1/3 and the average enrolment for 2/3, would be more appropriate for use in developing countries.
- **Income:** For the purposes of the GDI, the shares of earned income for women and men are derived by calculating their wage as a ratio to the average national wage and multiplying this ratio by their shares of the labour force. Any differential in the income indicator therefore relies on two differentials: the ratio of female wages to male wages and the female to male ratio of the labour force. The income indicator does not aim to reflect women's access to income for consumption or other uses, as women who earn money may not have any control over it within the household. In other cases women who do not earn income could, in principle, control what is earned by male members of the household. Rather, the inclusion of the income variable is justified as a reflection of a family member's earning power, which is argued to be an important factor in economic recognition, independence and reward (UNDP, 1995).[46]

  Criticizing the conceptual basis and interpretation of the income component, Prabhu et al. express doubts about the empowering role of income in Third World economies. They suggest that while the work burden is very high for low caste and tribal women, their participation in the work force "is more an indication of their poor economic status than their empowerment" (Prabhu et al., 1996:WS-74). The income indicator has the potential, in theory, to play a role in providing inherent information over and above its current intent to

[46] The issue here therefore is of including income from waged work. Suggestions (for example Prabhu et al., 1996; Hirway and Mahadevia, 1996) about the inclusion of unpaid work are important. The information captured by such an indicator would, however, be different to that which the "earnings" are expected to capture.

reflect the earning power of women. For example, given equal productivity and holding all other aspects of employment constant, a lower wage rate for women for jobs standardized for skill is a clear indicator of overt discrimination. But the wage ratio part of the income indicator in the GDI is not standardized by skill, which makes it ambiguous to interpret.

Methodologically, the income component has shortcomings, particularly with regard to the data used (these are acknowledged in UNDP, 1995). For example, it is assumed that gender differentials in wages in the agricultural sector are similar to those in the non-agricultural sector. Also, income disparities based on non-labour resources, such as gendered control over land or physical capital, have been excluded due to lack of data. Some methodological problems that arise when the GDI is constructed at sub-national levels are discussed by Prabhu et al. (1996). These concern, in particular, difficulties encountered in measuring female workforce participation rates. Using five different measures of proportional income shares of women, for 15 Indian states, a variety of rankings of gender-related income attainment of GDI were obtained.

An exercise we consider worth pursuing is to either replace the income indicator or supplement an income standardized for skill (as suggested above), with a "drudgery" indicator, which captures the differential in the number of hours (paid and unpaid) that males and females work. The inherent information that such "time allocation" data provides could be seen as important in itself — rather than, as is conventionally proposed, to reflect the "true" economic contributions of males and females. In groups where differentials exist in the number of hours of work (intensity of work being similar), a translation into differentials in well-being would be apparent. Jain (1996) has some suggestions along similar lines. Problems with the collection of data could prove to be major impediments. However, in a study measuring time allocation at the state as well as village level in Rajasthan and West Bengal in India, Jain suggests that the collection of such data is not impossible.

The indicators currently used to construct the GDI thus reduce its ability to reflect gender inequality in developing countries. Further, the GDI value gives information about the level of overall development (HDI) discounted for gender inequality. To assess the extent of gender inequality, therefore, it is misleading to look at the GDI value alone. It has to be compared with the HDI value. This conversion is sometimes neglected in studies which use the GDI value of a country to indicate the extent of gender inequality. This Gender Inequality Value can be obtained by the following formula: [(HDI–GDI)/HDI] x 100 (UNDP, 1995). For example take the case of Tanzania, which has a GDI value of 0.352 on the 0–1 scale (UNDP, 1997). It would be wrong to conclude from this that the country has a large gender differential due to its low GDI value. Its HDI value is 0.357, and the Gender Inequality Value calculated following the formula mentioned above is 1.4 per cent. Compare this with Ireland, which has a "high" GDI value of 0.851 and a "high" HDI value of 0.929 . Despite higher overall development, Ireland's Gender Inequality Value is 8.4 per cent, reflecting a higher gender differential in the combined functionings of "being healthy", "being educated" and "income". (This is also apparent in table 3, below, where Gender Inequality Value rank and GDI rank can be compared.)

◆ 6.2 A Note on the Physical Quality of Life Index

Although the PQLI was not constructed specifically to assess gender differentials, it lends itself easily to this task, as its component indicators can be assessed on individuals. Morris proposed using the index to assess gender differentials in India in the 1980s (Morris, 1996).[47] It was suggested that the behaviour of the PQLI (and its components) between 1961 and 1971 would provide evidence of changes in the social condition of women in India, at least as characterized by the index, and allow an assessment of the impact of Indian development policies. Using data from the registrar-general of India, for the period 1961–1971, male and female PQLI values were calculated. The study demonstrated that while the absolute PQLI values for both males and females had improved during the decade, the standing of women relative to men had worsened. Unpacking the index revealed this to be mainly due to a superior decline in the male infant mortality rate compared to female. Literacy for the period for females had improved at exactly the same pace and female life expectancy had improved at a somewhat faster rate than for males.

The unreliability of each of the components of the PQLI (IMR, life expectancy and literacy) in assessing gender differentials has already been discussed in sections 3.1.1, 3.1.3 and 5.1.1 respectively. Moreover, the extent to which the information on gender bias obtained by two indicators of the same functioning ("being healthy") overlaps, possibly rendering one redundant, would be worth assessing.[48] Notwithstanding the need to alter the component indicators of the PQLI if it is to be used to assess gender differentials, the approach itself is quite simple and potentially useful for preliminary comparative analysis and for allowing an assessment of the impact of policies separately on male and female well-being.

◆ 6.3 The Gender Empowerment Measure

Though there may be gender equality in basic functioning vectors achieved, there could be inequality in taking advantage of other opportunities. The gender empowerment measure (GEM) has been formulated to assess such inequalities and examines whether men and women are able actively to participate in economic and political life, and take part in decision making. A discussion of this indicator of autonomy and power is, however, beyond the scope of this paper.

[47] Each of the three component indicators of the PQLI — infant mortality rate, life expectancy at age 1 and literacy — has equal weight and is first indexed on a 0 to 100 scale. 0 represents an internationally defined "worst" performance and 100 the "best". The PQLI is obtained by averaging the normalized value for each indicator.

[48] When the PQLI was originally designed for international comparisons, overall IMR was included to reflect social conditions in the home, especially women's well-being, and life expectancy at age 1 to reflect the external environment. In the context of assessing gender differences, however, the male and female IMRs are used as indicators of gender differential mortality as is the life expectancy indicator. A re-evaluation of the extent to which, first, each of these indicators reliably reflects gender differences in mortality in developing countries, and, second, an assessment of the extent of overlap of information provided, would be appropriate.

◆ 6.4 The Impact of Poverty

When using GDI and HDI values of countries to assess their relationship with income poverty, it is important to be aware, first, of the limited ability of the GDI to capture gender inequality, given the indicators used in its current construction. Second, the data used to construct such indices often suffer from a number of deficiencies. These have been comprehensively pointed out by Solon Barraclough of UNRISD (personal communication) and include, among others, the use of projections and estimates rather than real data, extrapolation from household/small surveys to the national level, and comparisons of non-comparable national indicators.[49] Third, the general caution expressed earlier with regard to the use of composite indices applies here.

With these limitations in mind see table 2, which shows the distribution of gender inequality across income groups. The entries in the table are arrived at as follows: for each of the 145 countries for which data were available in the 1997 **Human Development Report**, the value (HDI–GDI)/HDI was calculated to obtain a measure of gender inequality (referred to above as the Gender Inequality Value). Countries are placed in order of increasing inequality by this measure and divided into low, medium and high groups (using the same proportion of approximately 1/3 used by the UNDP for its HDI groupings). Similarly, countries were placed in low, medium and high income (real GDP in PPP dollars) groups. Table 2 gives the number (and in parentheses the percentage) of countries corresponding to particular income and Gender Inequality Value levels. This reveals some interesting trends.

Table 2: Gender Inequality Value versus GDP

			Income (real GDP) PPP dollars		
			Low	**Medium**	**High**
Gender	**Low**	**(1)**	16 (30)	21 (39)	17 (31)
Inequality	**Medium**	**(2)**	19 (35)	16 (30)	19 (35)
Value	**High**	**(3)**	6 (16)	15 (41)	16 (43)

Source: Gender Inequality Value calculated using data from UNDP, 1997

For both low and medium inequality countries (rows 1 and 2), income appears to be evenly distributed. Of the countries with low gender inequality, 30 per cent have low income, 39 per cent medium income and 31 per cent high income. Similarly, among countries with medium gender inequality, 35 per cent have low, 30 per cent medium and 35 per cent high income.

Countries with a high Gender Inequality Value (row 3), on the other hand, appear to be more likely to be in the high/medium income group. In table 2, among countries with a high Gender Inequality Value, only 16 per cent had low income while 41 per cent had medium income and 43 per cent high income.

The above relationships are also apparent in table 3, which shows countries with the top 10 and bottom 10 Gender Inequality Value ranks compared with their

[49] Murray in fact suggests that by giving a false impression of the availability of information in important spheres in all countries, the HDI may even devalue efforts towards obtaining "real and timely" information from developing countries (1993:60).

income, GDI and HDI ranks. Countries from Norway, with a high income (income rank 6), to Tajikistan, with a low income (rank 150), are included among the top 10 Gender Inequality Value ranks (i.e. countries with low inequality). Countries with high Gender Inequality Value ranks generally come from the medium and high income groups. This latter result cannot immediately be interpreted as suggesting that all high/medium income countries are associated with high gender inequality, as this tally is influenced by a number of high income middle Eastern countries like Bahrain, the United Arab Emirates and Qatar (see table 3).

Table 3: Gender Inequality Value rank versus income, HDI, GDI ranks

Gender Inequality Value rank	Income rank	HDI rank	GDI rank	Country
1	21	10	3	Sweden
2	127	103	83	Armenia
3	138	110	93	Moldova Republic
4	150	115	96	Tajikistan
5	147	121	101	Viet Nam
6	9	3	2	Norway
7	78	69	49	Bulgaria
8	114	100	78	Uzbekistan
9	14	5	4	Iceland
10	139	134	112	Kenya
…	…	…	…	…
136	77	72	73	Ecuador
137	96	94	82	Paraguay
138	66	78	84	Syrian Arab Republic
139	29	43	56	Bahrain
140	22	55	64	Qatar
141	27	44	61	United Arab Emirates
142	65	82	92	Algeria
143	57	64	77	Libyan Arab Jamahiriya
144	102	126	117	Iraq
145	41	73	95	Saudi Arabia

Source: Gender Inequality Value calculated and ranked using data from UNDP, 1997

Note: Gender Inequality Value ranks 1–10 are the top 10 with low inequality, and ranks 136–145 are the bottom 10 with high inequality.

Quite often it is the female income component of the GDI in these countries which is very low and which, in turn, lowers the GDI value and gives the country a poor Gender Inequality Value rank. For example, in both the United Arab Emirates and Qatar female achievements are higher than male in life expectancy as well as in education. But the percentage of female and male contributions to income are 10 per cent and 90 per cent in the United Arab Emirates and 9.7 per cent and 90.3 per cent in Qatar. Countries with such high differentials in the income component could thus have ranks indicating high overall inequality. These findings raise questions about the normative assumptions made in the GDI that differentials in unstandardized income reflect inequality or discrimination. They also raise the issue of the extent to which basic functionings (health and education) are used by

women to take advantage of other opportunities (like economic and political participation, decision-making power and control over economic resources), which is the focus of attention in the GEM (UNDP, 1995).

◆ 6.5 Summary

The discussion in sections 6.1–6.3 can be summarized as follows:

- **Composite indices:** In the absence of a single indicator that can proxy for others, composite indices combining information related to key indicators have been developed. While these have their own drawbacks, they can be useful if constructed for specific purposes. They have certainly been used frequently for preliminary, broad comparisons in global analyses by the United Nations and its agencies. Composite indicators for assessing gender differentials, such as the GDI (and the Gender Inequality Value derived from it) and the PQLI assessed for males and females, have some merit in drawing comparisons between countries away from evaluations based solely on income towards including other essential aspects of development. They are also useful within countries for preliminary comparisons of regions and assessments of the impact of policy. They could have the additional advantage over individual indicators of drawing attention to the existence of gender inequality on a broad plane, thus promoting policies with multiple prongs to tackle gender inequality, rather than concentrating on single functionings. The GDI may, however, need some adaptation if it is to be used for assessing and comparing human development taking into account gender gaps, specifically in developing countries. The following modifications may be worthy of further investigation: (a) replacement of life expectancy at birth in an appropriate manner by age-specific disaggregated FMRs (for the under-10 age group) to yield information about differentials in "being healthy"; (b) the reversal of weights currently attached to the adult literacy and average enrolment components of the education indicator, such that the former has a lesser weight than the latter; (c) use of the income indicator to provide inherent information over and above that provided by the functionings, by standardizing for skills; (d) supplementation or replacement of the income indicator by a "drudgery" indicator, i.e., the number of hours of work (paid or unpaid) by men and women. Similarly, appropriate indicators need to be included in the PQLI if used to assess gender differences.
- **Poverty:** Comparison of the extent of gender inequality and the income of countries suggests that countries with low and medium inequality are evenly distributed over a wide range of incomes. Countries with high inequality, however, generally came from medium and high income groups. This seems to be more a consequence of the indicators used to construct the GDI than a directly proportional relationship between income and gender inequality in all spheres of development.

7. CONCLUDING REMARKS: IMPLICATIONS FOR POLICY AND RESEARCH

This paper has examined indicators for their ability reliably to identify gender differentials in well-being. Well-being (a concept which defies easy comparison) was assessed within the functionings approach developed by Sen. Indicators relating to the elementary functionings of "being healthy", "being nourished" and "being educated" were examined. These dimensions are considered necessary for assessing gender differentials, but not exhaustive. Some composite indices were also examined, as was the relation of poverty to gender differentials in each of these indicator groups.

Of the indicators of "being healthy" reviewed here, the most useful from the perspective of gender disadvantage appears to be the disaggregated juvenile sex ratio, i.e., FMR04 and FMR59. These age-specific FMRs are relatively easily measurable, ought to be made available by census authorities and are reliable, whereas morbidity and nutrition indicators seem to rate low on all counts. While enrolment ratios appear to be useful indicators of "being educated" in developing countries, micro-level studies comparing enrolment and drop-out ratios are required to identify variables best able to reflect gender gaps in education. The Gender Segregation Index can give additional information on gender differences in fields of education in countries with no gender gaps in primary, secondary and tertiary education. Assessing indicators of a single functioning may, however, give the false impression of equality even if there is inequality in other functionings. (In sub-Saharan Africa, for example, some countries may show a balanced FMR but have large gender gaps in enrolment rates.) As it is evident that the set of indicators of disadvantage does not generate a single or even a few reliable proxies, in order to obtain a reliable picture of gender differentials at national and sub-national levels, it may be necessary to have a check-list of gender inequality indicators of different functionings, which require analysis one by one.

While a multi-dimensional approach to evaluation has many merits, the current trend to compress multiple elements of a functioning vector into composite indices raises other issues. Value judgements have to be made about the components to be included (based on the intended use of the index), and the weights to be allotted. They also have to be justified. But composite indicators constructed with specific purposes in mind can be useful and have proven helpful for preliminary comparisons in global analyses. Currently available composite indices (for example, the GDI and PQLI) may need adaptation if they are to be used for comparing gender gaps among or within developing countries. Indicators used would have to take into account the young nature of the population. For example, with respect to the GDI, age-specific disaggregated FMRs (for the under-10-age group) and an increase in the weight attached to average enrolment components of the education indicator may be more appropriate. Similarly, the income indicator — if standardized for skills and supplemented by a "drudgery" indicator — would provide information over and above that provided by the functionings.

With regard to the relationship between poverty and gender differentials, limited evidence has been reviewed. The evidence suggests that gender differentials in

indicators of functionings do not necessarily conflate with differences in opulence indicators. Except for the gender gap in education, it is not evident that gender inequality is universally higher among lower income groups. We have reviewed opulence indicators largely in the form of income poverty, but it is very likely that property ownership would reveal the same lack of deterministic relationship.

This paper has been confined to an evaluation of the reliability of indicators of gender differentials in particular aspects of well-being, and evaluation of policy processes were outside its scope. If the following recommendations for research and policy are to be implemented successfully, they would need to take such processes into account. Two points alone can be contributed at this stage.

First, the marginal cost of adding questions to national decennial censuses and to intermediate, census style surveys is assumed to be low. (It is worth noting here that even after gathering data for over 40 years, the United Nations does not seem to have an easily accessible manual evaluating the comparative skills required and costs involved in collecting social data.) If cost is indeed low, then there is a strong case for investing in the improvement of existing indicators in order to make them both systematic and appropriate to developing countries (rather than investing in the development of new composite indices). Census authorities need to make gender differentiated juvenile mortality data available in as disaggregated a form as possible (by region, income/property, by caste/ethnic and religious groups) especially for the age groups 0–4 and 5–9. While data for educational enrolment ratios appear satisfactory, systematic data on other flow variables and gender segregation in educational fields are desirable. Time allocation data, if made a regular feature of census data collection, would provide useful information for designing a "drudgery" indicator. Further, rather than make assumptions, gender disaggregated data need to be analysed at different levels — class, region, caste and others — as appropriate.

Second, micro-level research in education is presently at the pre-indicator stage. Since existing in-depth case study research is both fragmented and not addressed to the identification or creation of appropriate indicators, new micro-level studies comparing the ability of different flow variables (for example, enrolment versus drop-out ratios) reliably to capture gender differentials in access to education need to be undertaken.

The comparative use of indicators of well-being, while necessary for revealing bias, discloses nothing about their social meanings or about the social processes giving rise to gender differentials. In the absence of information on causality, policies could be restricted to specific interventions in the areas revealed by indicators to show gender difference to the neglect of underlying determinants, thereby addressing the symptoms rather than the causes. Indicators by themselves are necessary to direct interventions but they are not sufficient. Together with information on causality and the policy process, they serve as a powerful basis for policy action. It is thus extremely important to carry out research into the social processes of discrimination and the politics of access, control and empowerment. The evidence reviewed for this paper shows that little can be assumed about such relations of disadvantage. They require empirical specification which, in turn, requires micro-level research. While such research is useful *per se* for its contribution to understanding, it will always be possible for a policy maker to dismiss micro-level evidence about peoples' experience, process and/or relations.

It is therefore crucial that such research is supplied to other actors in the policy-making process (for example, the media, activist lobbies, political parties). At the same time, international (United Nations) support and legitimization for both the authority and value of a range of specific indicators, and for the detailed insights from analyses of process and access, would advance the use of indicators out of the arenas of ranking and comparison and into that of policy.

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