

GNH INDEX

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Coinciding with the coronation of the 5th King of Bhutan, His Majesty Jigme Khesar Namgyel Wangchuck, in November 2008, the Royal Government of Bhutan has adopted the GNH index. The index was inaugurated and launched by HM/PM of Bhutan on 24.11.2008. The purpose of the GNH index is to reflect GNH values, set benchmarks, and track policies and performances of the country. The GNH index was developed by the Centre for Bhutan Studies, a non-aligned and non-profit research institution based in Thimphu, Bhutan.

GNH Origin

The 5th King of Bhutan, His Majesty Jigme Khesar Namgyel Wangchuck, popularly known as King Khesar, proclaimed that fulfilling the vision of GNH will be one of the four main responsibilities of his reign in his Royal Address of 17 December 2006. His Majesty King Khesar underlined that the ultimate goal for social, economic, political changes in Bhutan is fulfillment of GNH. His Majesty the King has said that a GNH society means the creation of an enlightened society in which happiness and well-being of all people and sentient beings is the ultimate purpose of governance. He reemphasized that again in his Coronation Address on 7th November 2008.

The 4th King of Bhutan, HM Jigme Singye Wangchuck, promulgated GNH since the beginning of his reign in 1972. Happiness of the people was made the guiding goal of development. The exact phrase “Gross National Happiness is more important than Gross Domestic Product” was coined by His Majesty the 4th King of Bhutan, who is the author of GNH. The fact that he said GDP needed to be channeled towards happiness in 1970s and 1980s was quite new. Since then, GNH has attracted attention, and opinion around the world has started to converge on happiness as a collective goal.

In the reign of the 4th King, the actual road map for good development in terms of laws and policies consistent with GNH were developed. He believed that happiness is an indicator of good development and good society. He also believed in the legitimacy of public deliberation, public discussion, and public opinion in defining any goal, including GNH, through democracy and enlightened citizenship. Hence, full parliamentary democracy was introduced in 2008 with the declaration of the Constitution of the Kingdom of Bhutan, although decentralization policies prepared the people for parliamentary democracy from 1970s onwards.

Need for GNH index

Across the world, indicators focus largely on market transactions, covering trade, monetary exchange rates, stockmarket, growth, etc. These dominant, conventional indicators, generally related to Gross Domestic Product (GDP) reflect quantity of physical output of a society. GDP, along with a host of supporting indicators, is the most widely used indicator. Yet GDP is heavily biased towards increased production and consumption, regardless of the necessity or desirability of such outputs, at the expense of other more holistic criterion. It is biased against conservation since it does not register conservation or stocks.

Indicators determine policies. The almost universal use of GDP-based indicators to measure progress has helped justify policies around the world that are based on rapid material progress at the expense of environmental preservation, cultures, and community cohesion.

Indicators embody values. In general, policy makers tend to implement policies or programmes based on current international development trends, without taking into consideration the values that lie behind such trends. One way to overcome this tendency is by recognizing the fact that between values and policy implementation stand indicators. Values, policies and programmes are mediated by indicators.

Indicators capture the imagination and help convince lay people about the direction of the country's goals and development objectives, but it is not always easy for the people to discern that indicators are not value neutral, and that values and principles underlie and determine programmes and policies.

Indicators actually drive society in certain directions and even determine the policy agendas of governments. Not only decision makers, but ordinary citizens, tend to take social or economic programmes at face-value, and accept proposed policy implementation without examining the ultimate values underlying those programmes. But indicators can help bridge that gap.

As many contemporary indicators of progress and development do not reflect GNH adequately, the Royal Government of Bhutan directed the Centre for Bhutan Studies (CBS) to develop GNH index, which will provide appropriate indicators for Bhutanese development.

The Centre for Bhutan Studies constructed a single number index for Gross National Happiness that can be broken down into individual component indicators that are useful for different sectors for planning and technical purposes at the ministerial and departmental levels.

Although GNH is a complex concept and ideal, for practical application, GNH philosophy had to be translated into a metric system. The government expressed the need for GNH indicators because without some kind of measurement system, GNH cannot guide practical policies and programmes. Left at the level of inspirational discourse, imprecision will allow many conventional indicators to play unwitting roles in a GNH society.

GNH indicators are also needed to foster vision and a sense of common purpose. Left at the plane of vision, GNH cannot specify the practical programmes and resources needed to attain those visions in quantitative terms. In this respect, screening tools for projects and policies developed by the Centre for Bhutan are expected to be used for selection of policies and programmes, which are aligned with GNH. People clarify their vision by specifying targets and indicators that serve to point to areas of weakness and strength. Indicators serve as convenient instruments and yardsticks of evaluation over time.

GNH indicators can become tools of accountability. The sense of common purpose embodied in a coherent set of indicators enables ordinary men and women to more readily judge, hold accountable their leaders, by checking whether these the targets are being fulfilled. Without a common vision concretized through indicators, each individual merely looks to his or her own ends, even though welfare is a shared pursuit. Not only do GNH indicators assist in building vision, they are instrumental to that vision being held in common by all citizens, building a notion of greater interdependence across time and over space.

Once people are familiar with GNH indicators, they can have a practical effect on consumer and citizens' behaviour. The behaviour changing function can emerge in significant ways when there are appropriate indicators that direct attention towards both the causes of problems and the manner in which behaviour and decisions can prevent and solve those problems. This potential behaviour changing function of GNH indicators can be valuable. For example, certain indicators for GNH gauge the prevalence rates of negative and positive emotions, from compassion to anger. The level of trust, volunteerism and safety can also be tracked. Information on their prevalence rates will influence peoples' behaviour as they begin to gauge their own traits against the national trends.

To qualify as a valid indicator of GNH, an indicator with respect to any variable has to have either a positive or a negative influence on well-being and happiness. The direction of causality on happiness and well-being must be clear. For examples, less crime, illness, and air pollution have a more positive influence on happiness than more crime, illness, and pollution.

GNH indicators include both objective and subjective dimensions of life. The construction of an index should give equal weight to both the functional aspects of human society as well as the emotive side of human experience. To give just one example, people's perceptions of their own safety and security are as important in

determining happiness as objective crime statistics. That balance allows good representation of information between the objective and the subjective.

When measuring objective conditions such as educational and medical facilities, or room ratios etc., measure of the psychological or subjective experience that accompanies this condition is important. For example, a student attends a school that scores highly in the conventional educational statistics, but he/she subjectively views the educational experience as entirely deficient—the teachers might be oppressive, or the classroom tense. In other words, the process of obtaining the education, including the classroom experience, does not promote a sense of well-being in the student, despite the school's apparent high objective performance. Self reporting of experiences along with objective statistics therefore provides a more accurate picture of well-being than the objective statistics alone.

As indicators reflect values, and shape programmes, they become a vital link in providing feed-back on the effectiveness of existing policies and programmes and 'feed-forward' into programme implementation, thereby allowing the values they embody to be infused into policies and programmes in a broad based manner. Thus, in the case of using GNH indicators as evaluative tools, they can be used not only to check whether programmes are consistent with GNH indicators but also to create conditions for a coherent, organic relationship between professed values on the one hand and actual policies, programmes and projects on the other. The ramification of pursuing such an organic relationship should be recognized for the polity of Bhutan as a whole: if it is done successfully, it means that the country's economic, political, social, environmental, cultural and technological environments will be penetrated by GNH values, and that there will be a natural coherence to the country's policies that reflect its cherished values.

At the same time, from a Bhutanese cultural perspective, it must be understood that the subjective versus objective distinction is merely a heuristic device that does not in any fundamental sense represent what is basic to the nature of reality. The interdependence of all things, and the non-abiding self of everything, is a key concept. The conventional subjective versus objective division is an abstraction from what is actually inter-relational. For GNH indicators, this cultural concept means that seeing everything as relational is more useful than seeing them as separate categories. In fact, happiness itself dwells in the experience of quality of relationship. Thus, the various domains are not simply separate conditions of happiness in and of themselves. Rather, it is the intimate inter-relationship among these domains that is significant.

The GNH index construction aimed at a deeper representation of well-being than conventional indicators. The distinction between subjective and objective is but an abstraction from reality, given that from a Buddhist view, they do not exist. What exists in a fundamental way is relationality (as opposed to subject and object) at all levels, which can only be assessed by a broad range of social, economic, cultural,

and environmental indicators. Seen in this way, happiness and well-being is ultimately a way of being that is affected by and affects relational quality, which changes in meaning over time with deepening sensitivities to the world around us and with our understanding of what is important or valuable for us and for all sentient beings.

GNH as Goal

Happiness is a subjectively felt public good. Happiness is a public good, as all human beings value it. Hence, the government of Bhutan takes the view that it cannot be left exclusively to private individual devices and strivings. If a government's policy framework, and thus a nation's macro-conditions, is adverse to happiness, happiness will fail as a collective goal. Any government concerned with happiness must create conducive conditions for happiness in which individual strivings can succeed.

In this context, public policies are needed to educate citizens about collective happiness. People can make wrong choices that lead them away from happiness. Right policy frameworks can address and reduce such problems from recurring on a large scale.

There are many entities, such as the corporations and other organizations, above the individual level that make choices and decisions that impact collective happiness. Individuals are relatively less powerful to redress decisions of big organizations if they are contrary to the goal of collective happiness.

During the consumption of goods and services, the measure of what gives the people happiness will be relative, either to what others are consuming or to what one had the year before. This fact implies that there are negative externalities to happiness associated with consumption that needs to be curbed. Public policy instruments have to correct externalities when they are present in a large scale. At the same time, to cultivate a positive psychology which does not work always on invidious comparison is important for personal development.

Our understanding of how the mind achieves happiness affects our experience of happiness by influencing the means we choose in striving towards it. In some branches of the behavioral sciences, the mind is conceived of as an input-output device responding to external stimuli. One consequence of this model is that happy and pleasurable feelings are seen as dependent solely upon external stimuli. Happiness is perceived as a direct consequence of sensory pleasures. With such an overemphasis on external stimuli as the source for happiness, it isn't surprising that individuals are led to believe that being materialistic will increase their happiness.

But there is a contrary tradition to the external stimuli based happiness that point to a different source of happiness, showing that pleasurable feelings will be generated by shutting down sensory inputs and the related mental chatter. This involves secular meditation whereby the individual experiences the subject itself, as opposed

to the subject perceiving external stimuli. There is much less external input to happiness through contemplative method. Long enough meditation may lead the brain structure (neural pathways) to be changed such that calmness and contentment will be a personality trait. In other words, the mental faculties can be trained towards happiness. From a contemplative perspective, extreme reliance on externally derived pleasure distracts the individual from inner sources of happiness, elevating the latter.

When this cultural view is applied, stable and sustainable economies can be termed successful. An economy that is continually growing at an unsustainable rate may be seen as a failure due to its inability to promote detachment from the proliferation of wants. Sustainable and stationary economy may signal that stability in wants and psychological stability have been achieved among the consumers.

GNH encourages individuals to see all things as interdependent with all other things. In order to achieve collective happiness, the principle of interdependence needs to be taken on by everyone. Members of a GNH society would cultivate a third eye, which can elevate our vision beyond individual self-interest to address the happiness of all, as a collective goal. The third eye metaphorically represents our potential to see all things as interdependent across time and space. Equity is central to GNH. The perception of happiness that doesn't take into account the needs of others' happiness is irresponsible and egocentric, and the pursuit of such happiness is likely to be unethical. Happiness blossoms through enhanced relationships, arising unbidden when relationships improve. In this sense, the whole of development is a progress in relationships, not of individuals.

Institutions Implementing GNH

The constitution of Bhutan describes the state and the government as having responsibilities to pursue GNH. GNH should become a serious arbitrator of public policies and plans. Correspondingly, there are institutions to apply GNH to policy and programme formulation.

His Majesty Jigme Khesar Namgyel Wangchuck established a new institutional structure of GNH in January 2008 when the GNH Commission was founded in order to function as the apex strategic body for planning national development. The decision to open GNH committees at the ministerial, dzongkhag (district) and gewog (block) levels was also announced by the Prime Minister at that time. These changes more clearly define the structures and processes of decision making unique to a GNH state. These institutions and processes will forge stronger and clearer links between concepts of GNH and their application to policy and programme. Because of these initiatives, GNH will increasingly shape the nature of Bhutan's political economy, legal foundation, health and education systems much more distinctively in the course of time.

The ruling party, Druk Phuensum Tshogpa, have committed itself to pursuing GNH. The government is therefore fine tuning their policies and plans according to the development philosophy of GNH.

Survey for Developing GNH Indicators

The Good Governance Exercise carried out by the Royal Government in 2005 mandated the Centre for Bhutan Studies to develop indicators for Gross National Happiness (GNH). Financial support was obtained from the Royal Government of Bhutan and United Nations Development Programme, Thimphu, for both a pilot and the final survey. Between September 2006 and January 2007, the pilot survey was administered on randomly chosen 350 respondents aged 15 and above to test the feasibility and robustness of GNH pilot questionnaire. The districts surveyed were Paro, Chukha, Punakha, Trongsa, Bumthang, Mongar, Lhuentse, Sarpang and Thimphu. Initially, it took 7-8 hours to interview one respondent. The places surveyed ranged from remote, to semi-urban, to urban populations of Bhutan. It took three months to complete the pilot survey.

The pilot survey questionnaire, which was found to be too lengthy, was pared down to a questionnaire that took half a day to interview in the final survey carried out from December 2007 to March 2008. The survey was carried out in 12 of the 20 districts: Dagana, Tsirang, Wangdiphodrang, Samtse, Zhemgang, Pemagatshel, Samdrupjongkhar, Tashigang, Tashiyangtse, Gasa, Haa and Thimphu. Unfortunately, resources were insufficient to carry out surveys in the remaining eight districts. A total of 950 respondents were interviewed in the 12 districts. The questionnaire covered the key areas affecting the values and principles of GNH, roughly divided into the domains of psychological well-being, health, time use, education, culture, good governance, ecology, community vitality and living standards. The survey questionnaire included one hundred and eighty eight questions. The questionnaire consisted of a mixture of objective, subjective, and open-ended questions. The subjective voice that has been relatively neglected in social sciences as a whole and in indicators in particular has been restored in GNH indicators to produce a balanced representation of information between the objective and the subjective. The indicators of GNH were estimated from the primary data generated from the survey carried out from December 2007 to March 2008.

Dimensions and Indicators of GNH

The efforts towards developing a GNH index was undertaken to provide Bhutan with a valuable set of indicators that can be utilized in making its development efforts more holistic and harmonious in its goals and means.

The single number GNH index and its component indicators provide Bhutan with three different levels and types of indicators:

- GNH status indicators. Hundreds of such indicators have already been calculated from the primary data.
- GNH demographic indicators. These indicators show distribution of GNH dimensions across different social, economic and demographic groups.
- GNH causal and correlation indicators.

The GNH index been designed to fulfill various criteria which are needed for periodic national measure of happiness that is also relevant to national and district policy.

A measure of Gross National Happiness might be presumed to comprise a single psychological question on happiness such as “Taking all things together, would you say you are: Very happy, Rather happy, Not very happy, or Not at all happy.” Another measure is the subjective well being measure generated from a question such as “On the scale of one to ten, how would you rate yourself?” One is not a happy person and 10 is a very happy person. However, neither of these indicators are good multi-dimensional measures of happiness. The objectives of the kingdom of Bhutan, and the Bhutanese understandings of happiness, are much broader than those that are referred to as ‘happiness’ in the Western literature. Under the title of happiness, we include range of dimensions of human well-being. Some of these are quite traditional areas of social concern such as living standard, health, and education. Some are less traditional, such as time use, emotional well-being, culture, community vitality, or environmental diversity.

The Gross National Happiness index is generated to reflect the happiness and general well-being of the Bhutanese population more accurately and profoundly than a monetary measure. The measure will both inform Bhutanese people and the wider world about the current levels of human fulfillment in Bhutan and how these vary across districts and across time, and will also inform government policy.

The GNH indicators have been designed to include nine core *dimensions* that are regarded as components of happiness and well-being in Bhutan, and are constructed of *indicators* which are robust and informative with respect to each of the dimensions. The nine dimensions were selected on *normative* grounds, and are equally *weighted*, because each dimension is considered to be relatively equal in terms of equal intrinsic importance as a component of gross national happiness. Within each dimension, several *indicators* were selected that seemed likely to remain informative across time, had high response rates, and were relatively uncorrelated. The nine dimensions are:

1. *Psychological Well-being*
2. *Time Use*
3. *Community Vitality*
4. *Culture*
5. *Health*
6. *Education*

7. *Environmental Diversity*
8. *Living Standard*
9. *Governance*

In this perspective 'happiness' comprises having sufficient achievements in each of the nine dimensions.

Psychological

The domain of psychological well-being as an end includes satisfaction with all elements of life, life enjoyment, and subjective well-being. As collective happiness is the main goal in a GNH society, psychological well-being is of primary importance in gauging the success of the state in providing appropriate policies and services. Among component indicators of the psychological well-being domain, general psychological distress rate, prevalence rates of both negative emotions (jealousy, frustration, selfishness) and positive emotions (generosity, compassion, calmness), spiritual activities like meditation and prayers, and consideration of karmic effects in daily life were calculated.

The psychological well-being index covered three areas:

- General psychological distress indicators,
- Emotional balance indicators, and
- Spirituality indicators.

Time Use

The domain of time use is one of the most effective windows on quality of life, as it analyzes the nature of time spent within a 24-hour period, as well as activities that occupy longer periods of time. An important function of tracking time use is to acknowledge the value of non-work time for happiness. The time available for non-work activities such as sleeping, personal care, community participation, education and learning, religious activities, social and cultural activities, sports and leisure and travel can directly indicate diversity of activities that add to rich life and contribute to levels of happiness. Measurement of time, devoted unpaid work activities like care of children and sick members of household, and maintenance of household, can provide a proxy measure of contribution made by unpaid activities to welfare though the value of such activities are completely underestimated in national accounts. In the GNH index, time use component was divided into benchmark indicators of sleeping hours and of total working hours.

Community Vitality

The domain of community vitality focuses on the strengths and weaknesses of relationships and interactions within communities. It examines the nature of trust, belongingness, vitality of caring relationships, safety in home and community, and

giving and volunteering. These indicators can track changes in adverse affects on community vitality. The community vitality indicators consist of:

- Family vitality indicator,
- Safety indicator,
- Reciprocity indicator,
- Trust indicator,
- Social support indicator,
- Socialization indicator, and
- Kinship density indicator.

Cultural Diversity and Resilience

Maintenance of cultural traditions has been one of Bhutan's primary policy goals, as traditions and cultural diversity contributes to identity, values, and creativity. The domain of culture focuses on the diversity and strength of cultural traditions. The domain takes into account the nature and number of cultural facilities, language use patterns and diversity, and participation in community festivities and traditional recreations. The indicators estimate core values, and perception of changes in values and traditions.

The indicators of cultural diversity and resilience consist of:

- Dialect use indicator,
- Traditional sports indicator,
- Community festival indicator,
- Artisan skill indicator,
- Value transmission indicator, and
- Basic precept indicator.

Health

The health indicators assess the health status of the population, the determinants of health and the health system. Health status indicators show information on self-rated health, disabilities, body mass index, number of healthy days per month. Health indicators also cover the prevalence of knowledge about HIV transmission and breast feeding practices. Lastly, barrier to health services are assessed in terms of walking distance to the nearest health facility, which includes both western and indigenous systems. Thus the health index consists of:

- Health status indicator,
- Health knowledge indicator, and
- Barrier to health indicator.

Education

Education contributes to the knowledge, values, creativity, skills, and civic sensibility of citizens. A domain such as education is not intended merely to measure the success of education in and of itself, but rather to assess the effectiveness of education in working towards the goal of collective well-being. The domain of education looks at a number of factors: participation, skills, among others. However, in the education index, a limited number of variables could be included. The education index consists of:

- Education attainment indicator,
- Dzongkha language indicator, and
- Folk and historical literacy indicator.

Ecological Diversity and Resilience

By examining the state of Bhutan's natural resources, the pressures on ecosystems, and different management responses, the domain of ecological diversity and resilience is intended to describe the impact of domestic supply and demand on Bhutan's ecosystems. However, since most of the objective measurements of ecological diversity and resilience are surveyed by other agencies, GNH survey gathered information on perceptual data on ecology. The ecological diversity and resilience indicators consist of:

- Ecological degradation indicator,
- Ecological knowledge indicator, and
- Afforestation indicator.

Living Standard

The domain of living standards covers the basic economic status of the people. The indicators assess the levels of income at the individual and household levels, sense of financial security, room ratio, food security, house ownership. The indicators were also constructed for economic hardships as shown by inability to repairs houses, inability to contribute to community festivities, and purchase of second hand clothes. Thus the living standard indicators consist of:

- Income indicator,
- Housing indicator,
- Food security indicator, and
- Hardship indicator.

Good Governance

The domain of good governance evaluates how people perceive various government functions in terms of their efficacy, honesty, and quality. The themes of indicators include human rights, leadership at various levels of government, performance of government in delivering services and controlling inequality and corruption, people's trust in media, judiciary, and police. Therefore, the indicators of good governance consist of:

- Government performance indicator,
- Freedom indicator, and
- Institutional trust indicator.

Method for GNH Index Construction

The Gross National Happiness Index (GNH) is constructed in 2 steps, one of which pertains to identification and one to aggregation.¹ We also describe the mechanism for breaking the index down to report dimensional achievements for each district or group.

Identification

The *first* step is to define whether each household has attained sufficiency in each of the nine dimensions. This is done by applying a sufficiency cutoff to each dimension. As this is an innovative methodology, and is not familiar to most readers, we pause to explain.

In poverty measurement, it is quite common to apply a poverty line, which distinguishes people who do not have enough money from those who are non-poor. Of course income poverty lines are very imperfect, but the concept of being able to distinguish people who are poor is well-understood. Bhutan holds that it is possible to distinguish, additionally, between those people who have attained ‘sufficient’ level of achievement and those whose attainments fall short of sufficiency.

Sufficiency Cut-off

The first part of the Gross National Happiness measure applies a ‘sufficiency’ cutoff to each indicator. The sufficiency cutoff is set, naturally, at a higher level than a poverty line. In some indicators it is set at the top level of achievement for that indicator. In other indicators it is set at a level that is deemed ‘sufficient’ for most people. A person is identified as having a *sufficient* quality of life if his or her achievements in that indicator meet or exceed the cutoff. If the achievements do meet or exceed the cutoff, the person’s actual achievements are replaced by the ‘sufficiency’ level. For example, if actual income were 1,000 and sufficiency cut-off were 150, then the person would be treated as if they earned 150. Thus achievements *above* the sufficiency cutoff do not further *increase* someone’s quality of life score. The level at which the sufficiency cutoff is set is a value judgment, which can be a topic for public discussion, but the fact that it may be difficult to set an exact cutoff should not obscure the reasonableness of setting *some* sufficiency cutoff.

To give a simple example, suppose some might think 9 years of education to be sufficient. Others think that 16 years of education – a University degree – is

¹ For a detailed justification of this methodology please see Alkire, Sabina and James Foster. 2007. Counting and Multidimensional Poverty. *OPHI Working Paper 7*. www.ophi.org.uk

sufficient. But consider a person who has been in graduate school for 10 years but has still not finished a doctorate, that is, who has been studying for 27 years. Do these many years of schooling really contribute a great deal more to the person's happiness than the first 12 or 16 years of education? Is the long-time student better off than a genius who finished her doctorate in merely 3 years? The answer to this question varies by person. For some scholars it might be deeply meaningful. For others education might have been alienating. They will never finish the degree and later regard these years as 'wasted'. In this example, more years of education are not necessarily better. Still, it may be possible to identify some *sufficient* level of education, the attainment of which would correspond to increased well-being for most people in the population.

The Gross National Happiness Index takes the position that beyond a certain point, we don't need to keep adding in higher achievements to the quality of life mechanically; we confine our attention somewhat to a middle band of achievements that contribute significantly to human well-being for most people.

The sufficiency cutoffs are applied as follows: The value of each indicator in which a household attains sufficiency or above sufficiency is given a 0. Subsequently all achievements that are less than sufficient are replaced by the distances from the cutoffs. It is calculated by subtracting the actual achievement from the sufficiency cutoffs, and that difference is divided by the sufficiency cutoff itself. This way, the depth (distances from the cutoffs) will rise if any poor person drops further away from the sufficiency cutoff. For example, if the poverty line is 8 and the achievement is 6, the gap is $(8-6)/8$, or 0.25. Further, in order to take account of the severity of the insufficiency levels, the distances from the cutoffs are squared. This reflects the *inequality* of achievements among the persons below the cutoffs, thereby placing a greater penalty to low achievements.

Now how do we identify who is happy? The GNH takes what is known as the 'union' approach to identification in the literature on multidimensional measurement. That is, any shortfall from sufficiency that any household experiences in any indicator within any dimension is considered to depress Gross National Happiness. A person who has achieved sufficiency in all 9 dimensions is considered happy.

Aggregation

The *second* step is to aggregate the data of the population a decomposable measure that is sensitive to the 'depth' as well as 'severity' of achievements. That is, first we identify the shortfalls from gross national happiness and calculate the squared distances from the cutoffs. The resulting measure is the GNH.

GNH = 1- Average squared distance from cutoff

Break Down by Dimension

Having calculated the Gross National Happiness index, it is very easy to break down the index to identify how achievements in each dimension extend or dampen Gross National Happiness. The number of indicators in each of the nine domains is different and so, in order to avoid biasness the domains are attached with equal

weights. For instance, psychological wellbeing consists of 11 indicators. Each of the 11 indicators would be assigned a weight of 1/11. The domain index would then be 1- Average squared distance from cutoff for 11 indicators.

In sum:

We calculate the GNH. It will merely be one number. How can we make sense of the measure?

First, we compare the GNH in different districts surveyed, to see which districts have higher GNH scores.

Second, we can compare the GNH across time to see if GNH is decreasing or increasing after we conduct future surveys.

Third, we *decompose* the GNH by dimension (or indicator), by district, by gender, by occupation, by age group etc. In this way we can see how *shortfalls* in GNH vary across disaggregated levels. This information reveals immediately in what dimensions of life *shortfalls* from sufficiency are most acute.

Fourth, we track the decomposition of GNH across time, to see in which dimensions sufficiency is increasing, and also to track whether or not it is decreasing in any dimensions.

Fifth, we study the average severity of deprivations, to identify whether the *gap* below the sufficiency cutoff is deepening or narrowing across time.

In these ways, the GNH can be used as an instrument of policy, and can capture a great deal of interconnected information that can not otherwise be presented so succinctly.

Example of construction of the GNH

Step 1. Apply sufficiency cutoff to obtain insufficiency headcounts

Matrix A:

$$\begin{bmatrix} 1 & 3 & 30 & 4 & 3 & 4 & 3 & 1 & 2 \\ 1 & 2 & 30 & 3 & 3 & 10 & 2 & 2 & 2 \\ 1 & 2 & 24 & 3 & 3 & 50 & 2 & 2 & 1 \\ 1 & 3 & 30 & 4 & 3 & 10 & 2 & 2 & 2 \end{bmatrix}$$

Sufficiency cutoff

$$[3 \quad 3 \quad 26 \quad 3 \quad 3 \quad 11 \quad 3 \quad 2 \quad 2]$$

A person is insufficient if in a given indicator, the achievement is less than the respective cutoff. Whether the data are cardinal or ordinal, we construct the matrix A, by recoding the entries into either 1 i.e. if they fall below the sufficiency cutoffs and into 0 if they have achieved equal or above the cutoffs. For the above example, the matrix A would give the following B matrix.

Matrix B:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 1 & 0 & 1 & 0 \\ 1 & 1 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \\ 1 & 1 & 1 & 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 1 & 0 & 0 & 0 \end{bmatrix}$$

Step 2. Calculation of distance from cutoff

The distances from cutoffs are calculated for the entries of persons who are insufficient (denoted by 1) by using the following formula:

For variables where minimum are zeros such as voluntary days and amount donated, distance from cutoff is calculated by (sufficiency cutoff- actual) / (sufficiency cutoff).

For variables where minimum is one, distance from cutoff is calculated by (sufficiency cutoff- actual) / (sufficiency cutoff) - (one).

After calculation of distances from the cutoffs, Matrix B would generate Matrix C:

Matrix C:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & 0.64 & 0 & 1 & 0 \\ 1 & .50 & 0 & 0 & 0 & 0.09 & 0 & 0 & 0 \\ 1 & .50 & 0.08 & 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & 0.09 & 0 & 0 & 0 \end{bmatrix}$$

Step 3. Squaring distance from the cutoff

In order to give a greater weight to low achievements, and place a stronger value on equality, the distances from the cutoffs of each indicator may also be squared prior to aggregation to emphasize the severity of insufficiency.

Matrix D:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & .40 & 0 & 1 & 0 \\ 1 & .25 & 0 & 0 & 0 & .01 & 0 & 0 & 0 \\ 1 & .25 & .01 & 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & .01 & 0 & 0 & 0 \end{bmatrix}$$

Step 4. Compute the GNH Index.

Step 4a. GNH Index = 1- Squared Distance from Cutoff

Matrix E:

$$\begin{bmatrix} 0 & 1 & 1 & 1 & 1 & .60 & 1 & 0 & 1 \\ 0 & .75 & 1 & 1 & 1 & .99 & 1 & 1 & 1 \\ 0 & .75 & .99 & 1 & 1 & 0 & 1 & 1 & 0 \\ 0 & 1 & 1 & 1 & 1 & .99 & 1 & 1 & 1 \end{bmatrix}$$

Step 4b. GNH Index = Average(1- squared distance from cutoff) or 1- Average squared distance from cutoff

Hence in this case GNH Index is:

$$=(1+0.75+0.75+1+1+1+0.99+1+1+1+1+1+1+1+1+1+0.60+0.99+1+0.99+1+1+1+1+1+1+1+1+1+1)/36 = 0.808$$

Break Down by Dimension

Matrix D:

$$\begin{bmatrix} 1 & 0 & 0 & 0 & 0 & .40 & 0 & 1 & 0 \\ 1 & .25 & 0 & 0 & 0 & .01 & 0 & 0 & 0 \\ 1 & .25 & .01 & 0 & 0 & 0 & 0 & 0 & 1 \\ 1 & 0 & 0 & 0 & 0 & .01 & 0 & 0 & 0 \end{bmatrix}$$

Matrix D comprises of the squared distances from cutoffs. Let’s say the first four indicators corresponding to first four columns belong to psychological wellbeing dimension and the next five to culture. In order to give equal weights to each dimension, each of the four indicators in psychological wellbeing is assigned a weight of 0.25 and similarly, each of the five indicators in culture is assigned 0.2. Then the weighted Matrix D is as follows:

$$\begin{bmatrix} .25 & 0 & 0 & 0 & 0 & .08 & 0 & .2 & 0 \\ .25 & .0625 & 0 & 0 & 0 & .002 & 0 & 0 & 0 \\ .25 & .0625 & .0025 & 0 & 0 & 0 & 0 & 0 & .2 \\ .25 & 0 & 0 & 0 & 0 & .002 & 0 & 0 & 0 \end{bmatrix}$$

Next, the average squared distance from cutoff is calculated for each indicator in each dimension.

$$[.25 \quad .03125 \quad .000625 \quad 0 \quad 0 \quad .021 \quad 0 \quad .05 \quad .05]$$

So, GNH Index for psychological wellbeing is 1 – Sum of squared distances from cutoffs for four psychological wellbeing indicators. Here, instead of average the sum

of squared distances from cutoffs is calculated because the weights add up to 1 in each dimension.

$$=1 - (.25 + .03125 + .000625 + 0)$$

$$=1 - .281875$$

$$=.718$$

Likewise, for culture:

$$=1 - (0 + .021 + 0 + .05 + .05)$$

$$=1 - .121$$

$$=.879$$

To calculate the percentage contribution by each dimension to the final GNH index, one sums the squared distances from cutoff in each dimension and divides this sum by the total squared distances from cutoff experienced in the population.

The new methodology for Gross National Happiness Index consist of

- (i) a cutoff identification method that identifies sufficiency both in terms of achievements in each dimension, and achievements across a range of dimensions and
- (ii) an aggregation methodology that satisfies a range of desirable properties including decomposability.

The 'sufficiency' cutoffs are set so that any person who had achieved full sufficiency in every dimension would be regarded as fully 'happy'. The measure seems to be *understandable and easy to describe*, because it relies on a cutoff approach which is widely used in policy already. It can reflect "*common sense*" notions of happiness in that the dimensions and indicators directly were chosen because of their relevance in the Bhutanese context. Furthermore this measure is specifically geared not just to notice incremental changes over time, but also to *target, track changes, and guide policy*. This is because the measure is actually developed by considering the sector of the population who does *not* enjoy a sufficient quality of life at present, and scrutinizing the dimensions in which they fall short. The measure *can be decomposed* by variables such as district or language group, and the quality of life can then be broken down by dimension to *identify which dimensions show the highest shortfalls* in different regions or groups. This last characteristic makes it a good tool for tracking changes across time, or for guiding policies to address specific needs of different groups efficiently. It is *technically solid*, enjoying properties of dimensional monotonicity and decomposability.

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