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Economics, ethics, and well-being of nonhuman beings[1]

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1. INTRODUCTION

> If one shifts from being an observer of cultures to being a student of the history of ideas, one may trace a line of thinking that roughly suggests a movement from the ideal of 'progress' to that of 'development' and 'economic growth' and from these ideas to that of 'sustainable development'. Some of us hope for a further step along this line, from sustainable development to 'ecological development' to long-range 'ecosophical development' – with an emphasis on the need for wisdom (sophia) as much as on the need for science and technology.
>
> Arne Naess, 1990.

Is the process of human development anthropocentric? Does it ignore the interest of nonhuman beings? These are some of the unanswered questions, which gave a new thought towards solution of today's environmental crisis. However, in order to answer such questions, we must examine whether there exists some sort of bias in the process of human development. And if bias exists, we must know its relevant characteristics. On the theoretical side, such an exercise requires incorporation of ideas from economics and ethics. Though both economics and ethics deal with the question of value, there is a dichotomy between the two. As the relationship between the two schools of thought is dichotomised, the question is whether both could be brought together to address today's environmental crisis. On the practical side, we need quantification of levels of well-being of both human and nonhuman beings. Popularly, well-

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being of human beings is measured by Human Development Index. However, we are yet to see such an appropriate measure for nonhuman beings. The paper thus presents basic tenets of economics and deep ecology, tries to minimise their distance, and computes an index of well-being for living nonhuman beings utilising country level data from World Development Indicators 1999 and checks its relationship with human development in 106 countries in various phases of industrial transition.

1. 2. Basic tenets of economics and deep ecology

In neo-classical economics, value of a nonhuman life is equivalent to its price and the interest of nonhuman beings is taken care of by price mechanism. Price is market-determined – determined by availability (supply) and demand. A scarcity will lead to an increase in the price level, reduce consumption in the short run, and induce innovation and development of technologies in the long run (Joly, 1994). Though the solution provided in this model ultimately goes in favour of nonhuman beings, it has been criticised as the over all idea is anthropocentric. It looks at the interest of human beings only, and considers them as blind consumers who put nonhuman beings in their utility function as commodity or quantity. In this model existence or survival of other life forms is nothing but their escape from the attainable set of commodities of human beings thanks to higher price of their lives.

If we look at the recently developed literature on valuation of nature in ecological economics, we see various kinds of modelling on nature and man in an exchange economy based on game theoretic approach or bargaining solutions. Such models are based on the concepts of use value and exchange value. Though standard literature could not distinguish what human 'utility' and 'use' are, since humans are willing to pay for some-thing, it means they receive or increase utility. This idea postulates that as humans derive utility from nature, it can be evaluated in

monetary terms. Exchange values are thought to provide appropriate solutions on the questions of evaluation of nature through fair operation of market. Standard literature theorises that nature-values must most prominently qualify as objective exchange values and, in particular, they must be empirically retrievable (Nuppenau, 2002).

We will contrast the basic ideas of economics on the question of valuation of nature, as mentioned above, with those of deep ecology to understand similarities and dissimilarities between the both. In its simplest form deep ecology is a school of thought, which initiated a movement against anthropocentrism embedded in modern industrial culture. The first four principles of deep ecology, which roughly define the periphery of the school of thought, express a value priority system in favour of nonhuman beings. The principles are as follows (Naess, 1990; Drengson, 1997):

1. The flourishing of human and nonhuman living beings has value in itself. The value of nonhuman beings is independent of their usefulness to humans.
2. Richness and diversity of life forms contribute to the realisation of these values and are also values in themselves.
3. Humans have no right to reduce this richness and diversity except to satisfy vital human needs.
4. The flourishing of human life and cultures is compatible with a substantial decrease of the human population. The flourishing of nonhuman life requires such a decrease.

The first principle talks about value of life, which is neither use value nor exchange value. And so, it is totally free from any type of bargaining or market solution. Rather, it's a matter of deep reasoning that demands a change of our view – a shift of focus from quantity to quality of life or well-being of the nonhuman beings. On the other hand, by and large studies on

biodiversity, within the broad area of economics, focus on quantity or number of nonhuman beings only.

The second principle highlights importance of richness and diversity of life forms. This idea is similar to that of standard literature in economics. We may cite one important study on biodiversity and the existence of environmental Kujnets curve done by Schubert and Dietz (2001) where by biodiversity (or species diversity) the authors meant 'the number of different species'. Environmental Kujnets curve envisages an inverted U-shaped relationship between development, measured as income per capita, and various indicators of environmental quality, such that environmental quality first worsens and then improves with increasing income. The curve takes its name from Simon Kuznets, who hypothesised an inverted U-shaped curve for the relationship between income per capita and inequality of income distribution (Schubert and Dietz, 2001).

Though the first principle of deep ecology is contradictory with the basic tenets of neo-classical or ecological economics, the third and fourth principles indirectly support those by recognising demand for nonhuman beings (to satisfy vital human needs), and need for a decreased size of nonhuman population. As human beings are to satisfy their vital needs, obviously there could be a market for nonhuman beings with free and fair role of the market forces: demand and supply. Moreover, though deep ecology recognises vital human needs and need for a decreased size of nonhuman population, it has not given any criterion to define the limit of vital human needs and fix a desirable size of nonhuman population. However, if we rely on market forces or on different bargaining solutions, price will give signal on availability or scarcity of resources. From such signals we can have an idea on the acceptable limit of vital human needs and look forward towards a desirable size of nonhuman population. So, we have

seen that distance between the two schools of thought could be minimised and we could bring both of them together to address today's environmental crisis.

1. 3. Index of nonhuman development

In order to quantify level of well-being of nonhuman beings, we need to construct a new index, which may be termed as index of nonhuman development (NHDI). In a similar fashion of computing human development index (HDI), we may first focus on health and longevity of nonhuman beings. Such things of human beings are measured by life expectancy at birth, which needs data on age-specific death rates (ASDR) of a population for a particular reference period. ASDR for nonhuman beings are not easily available. Also life span varies from species to species. So, longevity, in true sense of the term, will have no meaning here. However, we may consider 'threat' that species receive and develop a measure based on it and which would be proxy to the index of health and longevity.

Secondly, in order to measure how far nonhuman beings are free to exercise their choices (in crude sense of the term), we may look at the forest area they get for roaming. As we are not interested in their numbers, instead of measuring per capita forest area we can measure per species forest area. Though forest alone is not the home for all species, for the sake of simplicity we can confine our study to forest area only. An index can thus be computed taking the per species forest area. Historically as economic development and deforestation go together, at least in the early phases of industrialisation making the lives of nonhuman being harder (see Gorve, 1995), such an index is supposed to convey some idea about the well-being of nonhuman beings.

Finally, as diversity enhances the potentialities of survival, the chances of new modes of life, the richness of forms (Naess, 1973), it will be plausible to assume that where the number of species is higher, quality of lives of nonhuman beings is higher. We can compute an index,

which will reflect diversity among nonhuman beings. A composite index may be made measuring level of well-being in three different dimensions as mentioned above.

2. DATA AND METHOD

2.1. Data

In order to compute the index, we have utilised country-level data (for 106 countries) on total number of species and number of threatened species (covering three categories: Mammals, Birds, Higher Plants), and forest area from the World Development Indicators 1999. Data on HDI and its components have been utilised from Human Development Report 1999.

2.2 Method

2.2.1. Index of threat-free life: We have data on total number of species and number of threatened species covering three categories. We may divide the latter by the former to get proportion of threatened species. The minimum and maximum values are 0.00357 (Ireland) and 0.39348 (Mauritius) respectively. The figures tell that on an average 0.357 per cent of the species' life in Ireland and 39.348 per cent species' life in Mauritius are endangered. Using these minimum and maximum values we can compute an index of threat-free life for the species in 106 countries and put them in 0 – 1 scale. In this case Ireland will be at the top of the scale with a score of 1.000 and Mauritius will stay at the bottom with a score of 0.000. We must note at this point that the minimum value of 0.00357 has been considered as an indicator of acceptable limit of vital human needs.

2.2.2. Index of freedom: To find per species forest area, forest area (in square kilometres) in a country can be divided by total number of species in that country. The minimum and maximum values are 0 (Egypt, Haiti, Kuwait, Lesotho, Mauritius, Oman, Singapore) and 0.629 (Canada)

respectively. Canada will score the highest, 1.000 and Egypt, Haiti, Kuwait, Lesotho, Mauritius, Oman, and Singapore will score the lowest, 0.000.

2.2.3. Index of diversity: If we add the maximum numbers of the three categories of species, we get 58360, similarly by adding the minimum numbers we get 257. The index of diversity has been computed with the assumption that there could be as many as 58360 species and also the number may be as low as 257. However, the observed minimum and maximum values are 275 (Kuwait) and 58101 (Brazil) respectively. So, in the 0 – 1 scale, Brazil will score slightly less than 1.000 and Kuwait will score close to 0.000.

The above indices will be computed using the following formulae:

Index = (maximum value - observed value) / (maximum value – minimum value) … … (1)

or

Index = (observed value – minimum value) / (maximum value – minimum value) … … (2).

Index of nonhuman development (NHDI) is the simple average of the above three.

2.2.4. Nonhuman and Human Development: In order to check the relationship between levels of nonhuman and human development, countries will be classified into four broad categories according to very high (0.900 and above), high (0.800-0.899), medium (0.500-0.799), and low (0.499 and less) scores in HDI, which also demarcates different phases of industrial transition. Pearson's correlation coefficients will then be computed HDI or its components and NHDI.

3. DISCUSSION

Table 1 shows the index values of nonhuman development where the countries are in descending order. Brazil has the highest score of 0.696 and Mauritius has the lowest score of 0.003. It means, among the countries, the condition of the nonhuman beings is the best in Brazil and the worst in Mauritius. The result of Mauritius recalls its history of environmental

degradation and consequent change in climatic condition in different phases of colonial expansion (Grove, 1995). In many developed industrial countries conditions of the nonhuman beings are worse than those of developing ones. The reason behind this fact is that in the process of industrialisation there is a tendency to neglect the interest of nonhuman beings. As a result, numbers of threatened species tend to increases. For continuous deforestation per species forest area also follows a declining trend and all these changes negatively affected on the survival of nonhuman beings. Low scores in NHDI of the developing countries also draw our attention. However, relatively these countries are in better position, as levels of human development are also significantly low – numerically similar to those of nonhuman beings. We will now move to the second phase of analysis to understand human responses to these situations.

Table 2 shows relationships between human development and well-being of nonhuman beings. If we consider all the countries together, there is no significant relationship between HDI and NHDI (results are not displayed in the table). However, relationships are significant when we arrange the countries according to HDI score. In the first category, there are 17 countries where education and over all human development are positively correlated with NHDI. We can postulate that these 17 countries are in post-industrial stage where interest of nonhuman beings is being acknowledged. As education and culture are closely related (Tagore, 1929), education in these countries reflects a post-industrial culture, which is favourable to well-being of nonhuman beings. In the second category, there are 12 countries where well-being of the human beings is negatively related to that of nonhuman beings. Health and life style (as reflected from life expectancy at birth), culture (as reflected from education), and economic activities (as reflected from GDP) – all tend to resist well-being of nonhuman beings. Most of the countries in this category are in industrial phase, and it is clear from the results that the industrial culture tends to

ignore the interest of nonhuman beings. In the third category, there are 53 countries where there is no significant or specific relationship between HDI and NHDI. In the last category, there are 24 countries with low scores in HDI. These countries are in the pre-industrial (agrarian) phase. In this category, education and over all human development are positively related to NHDI. So, pre-industrial culture also goes in favour of nonhuman beings. Ignoring methodological barriers if we project this horizontal (cross sectional) relationship vertically (over time), we can postulate that when a country transforms itself from an agrarian one to an industrialised one, well-being of the human beings increases in the process of transition; however, the same of nonhuman beings increases initially, reaches a plateau, and then declines; in the post-transition period, it rises again. This phenomenon clearly shows anthropocentrism rooted in modern industrial culture, one major issue which deep ecology tries to address.

Linear regression lines drawn from the scatter plots of the four different groups of countries are shown in figures 1 to 4. If we add the essence of these figures, we will get a curve as shown in figure 5. This curve is not similar to the inverted U-shaped environmental Kuznets curve mentioned previously (not even matches partially). In case of environmental Kuznets curve, damage or bad thing is measured along vertical axis. In figure 5, we have measured well-being (good thing) along vertical axis. At the best, we can say that the message of our findings (as summarised in figure 5), are partially opposite to that of environmental Kuznets curve. The curve looks like the N-shaped curve of figure 6 presented by Schubert and Dietz (2001), which shows relationship between carbon-dioxide emissions per capita and income. Again, message of our finding is completely opposite to that of the N-shaped curve, as we are measuring good thing along vertical axis.

4. CONCLUSION

We have seen that incorporation of economics and ethics have provided us with meaningful conclusion that education and culture in different phases of industrial transition is the main determining factor of the level of well-being of the nonhuman beings. The culture is favourable in pre-industrial and post-transitional stages, unfavourable in industrial phase, and neutral (or not specific) in mid-transitional stage. It clearly shows anthropocentrism embedded in modern industrial culture which deep ecology tries to endorse. However, the present paper moves a step further by distinguishing different phases of industrial expansion according to levels of human development, and contributed that pre-industrial and post-industrial cultures may be favourable to nonhuman beings. Though we have found the pre-industrial and post-industrial phases favourable to nonhuman beings, the situations may not be the same. Customarily, it is believed that in the pre-industrial societies economic forces (price or market mechanism) do not work properly for poor functioning of the complete system, prevalence of many cultural or noneconomic considerations, etc. It can be understood that in the post-industrial societies also market mechanism with respect to nonhuman beings may not work properly because of intellectual movements, implementation of various laws in favour of nonhuman beings (animal rights), etc. So, pre-industrial and post-transitional situations are not identical so far as market mechanism is concerned. However, the hidden culture, the value priority system or wisdom in both the phases may be identical. Instances of many intellectual or cultural movements may be cited from the experience of India, among which the most important was the *Chipko* movement that inspired the ecofeminists of all countries (Siva, 1988). Importance and success of such movements have greatly influenced recent policies in India. For example, the University Grants Commission, the apex funding agency and regulating authority of higher education in India has

made ‘Environmental Studies’ compulsory for all three-year bachelor degree programmes throughout the country. Indian Institute of Technology, Delhi made one course on ‘Environmental Ethics’ compulsory for post-graduate students in environmental engineering or related fields. We feel that such measures are more powerful to take us to long-range ecosophical development than any other elitist measure like protecting or fencing nature from us.

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Table 1. Index of Nonhuman Development

Sl. No.	Country	NHDI	Sl. No.	Country	NHDI
1	Brazil	0.696	54	Senegal	0.349
2	Colombia	0.633	55	Philippines	0.349
3	Canada	0.627	56	Guinea-Bissau	0.349
4	China	0.537	57	Rwanda	0.348
5	Venezuela	0.457	58	Latvia	0.348
6	Mexico	0.449	59	Lithuania	0.348
7	Bolivia	0.445	60	Dominican Republic	0.348
8	Peru	0.425	61	Ghana	0.347
9	Ecuador	0.422	62	Haiti	0.347
10	Finland	0.410	63	Kenya	0.346
11	Papua New Guinea	0.409	64	Niger	0.346
12	Congo, Democratic Republic	0.404	65	Switzerland	0.345
13	Sudan	0.404	66	Cote d Ivorie	0.343
14	Malaysia	0.404	67	France	0.343
15	Sweden	0.400	68	El Salvador	0.343
16	Indonesia	0.399	69	Denmark	0.342
17	South Africa	0.396	70	Trinidad and Tobago	0.342
18	Zambia	0.392	71	United Kingdom	0.342
19	Myanmar	0.388	72	Uruguay	0.341
20	Argentina	0.387	73	Ireland	0.341
21	Cameroon	0.387	74	Korea Republic	0.340
22	India	0.385	75	Gambia The	0.339
23	Iran IR	0.381	76	Netherlands	0.339
24	Thailand	0.380	77	Saudi Arabia	0.338
25	Tanzania	0.376	78	Hungary	0.336
26	Paraguay	0.376	79	Romania	0.336
27	Nicaragua	0.375	80	Congo Republic	0.336
28	Nepal	0.374	81	Tunisia	0.336
29	Namibia	0.374	82	Mauritania	0.333
30	Costa Rica	0.373	83	Albania	0.333
31	Uganda	0.372	84	Israel	0.333
32	Botswana	0.372	85	Singapore	0.332
33	Vietnam	0.371	86	Lesotho	0.330
34	Mozambique	0.370	87	Italy	0.327
35	Nigeria	0.370	88	Kuwait	0.324
36	Madagascar	0.366	89	Portugal	0.322
37	Germany	0.363	90	Australia	0.322
38	Ethiopia	0.363	91	Chile	0.320
39	Mali	0.362	92	Libya	0.317
40	Pakistan	0.360	93	Algeria	0.317
41	Honduras	0.360	94	Morocco	0.317
42	Norway	0.360	95	Oman	0.315
43	Guatemala	0.358	96	United States of America	0.310
44	Bangladesh	0.356	97	Egypt	0.309
45	Benin	0.355	98	Panama	0.294
46	Burkina Faso	0.355	99	Japan	0.281
47	Zimbabwe	0.355	100	New Zealand	0.279

48	Poland	0.354	101	Greece	0.277
49	Austria	0.352	102	Sri Lanka	0.246
50	Malawi	0.350	103	Spain	0.214
51	Lebanon	0.349	104	Turkey	0.213
52	Togo	0.349	105	Jamaica	0.168
53	Syrian Arab Republic	0.349	106	Mauritius	0.003

Table 2. Relationship between Human development and Nonhuman development

Countries (No. of countries)	HDI score	**Correlation coefficients between**			
		LE & NHDI	EDU & NHDI	GDP & NHDI	HDI & NHDI
Australia, Austria, Canada, Denmark, Finland, France, Germany, Ireland, Italy, Japan, Netherlands, New Zealand, Norway, Sweden, Switzerland, UK, USA (17)	0.900 +	0.156	0.339*	0.073	0.394*
Argentina, Chile, Costa Rica, Greece, Israel, Korea R, Kuwait, Poland, Portugal, Singapore, Spain, Uruguay (12)	0.800-0.899	-0.615**	-0.215	-0.389	-0.683***
Albania, Algeria, Bolivia, Botswana, Brazil, Cameroon, China, Colombia, Congo R, Dominican R, Ecuador, Egypt, El Salvador, Ghana, Guatemala, Honduras, Hungary, India, Indonesia, Iran IR, Jamaica, Kenya, Latvia, Lebanon, Lesotho, Libya, Lithuania, Malaysia, Mauritius, Mexico, Morocco, Myanmar, Namibia, Oman, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Romania, Saudi Arabia, South Africa, Sri Lanka, Syrian AR, Thailand, Trinidad and Tobago, Tunisia, Turkey, Venezuela, Vietnam, Zimbabwe (53)	0.500-0.799	-0.096	0.132	-0.035	-0.002
Bangladesh, Benin, Burkina Faso, Congo DR, Cote d Ivory, Ethiopia, Gambia The, Guinea-Bissau, Haiti, Madagascar, Malawi, Mali, Mauritania, Mozambique, Nepal, Niger, Nigeria, Rwanda, Senegal, Sudan, Tanzania, Togo, Uganda, Zambia (24)	Low-0.499	0.057	0.483***	-0.100	0.364**

LE: Index of life expectancy at birth, EDU: Index of education, GDP: Index of Income, HDI: Human Development Index, NHDI: Nonhuman Development Index.
Source of HDI and its components: HDR 1999.
*** p<0.01, ** p< 0.05, * p< 0.10.

Figures

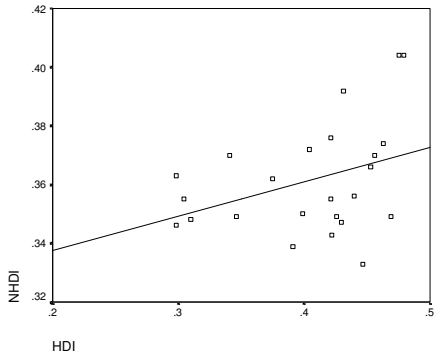

Figure 1. HDI and NHDI (Low human development)

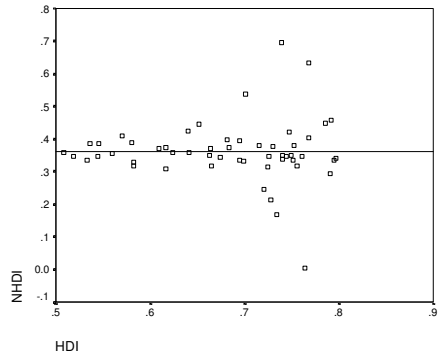

Figure 2. HDI and NHDI (Medium human development)

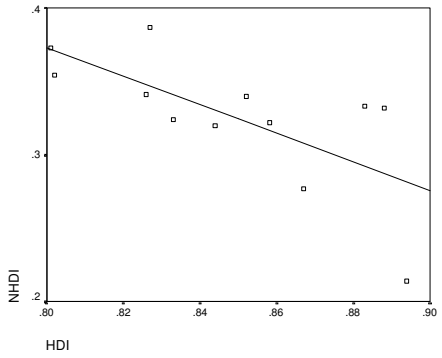

Figure 3. HDI and NHDI (High human development)

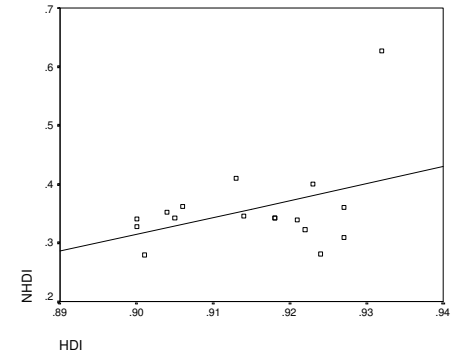

Figure 4. HDI and NHDI (Very high human development)

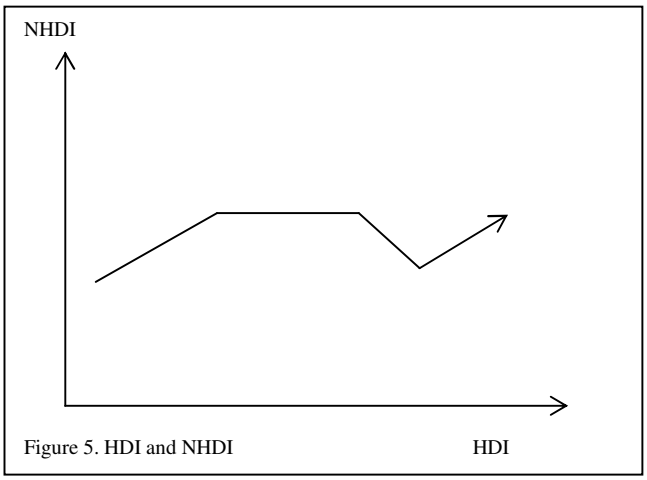

Figure 5. HDI and NHDI