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Inequality and Environmental Sustainability

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ABSTRACT

This paper synthesizes the evidence of a negative correlation between income inequality and environmental quality. It shows that inequality exerts adverse impact on environmental outcomes through several channels, including the household, community, national, and international channels. These channels however overlap with one another and can thus reinforce the impact of inequality. Other dimensions of inequality, in particular gender inequality, also impact environmental quality negatively. The concept of the Environmental Kuznets Curve (EKC) is not that helpful in explaining the negative correlation between inequality and environmental quality. The findings of the paper suggest that reduction of inequality will have an important role in achieving environmental sustainability.

JEL Classification: Q56, Q58

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Inequality and Environmental Sustainability

1 Introduction

While much attention in recent years has been focused on the relationship of income inequality with economic growth and social development, its relationship with environmental sustainability has remained relatively unexplored.¹ Yet, there is now considerable empirical evidence showing that income and wealth inequality can be harmful for environmental sustainability. Many scholars have also offered theoretical formulations to help explain this relationship.

This paper discusses the evidence and arguments showing how income and wealth inequality can be harmful for environmental sustainability.² It begins (in Section 2) by providing evidence regarding correlation between income inequality and environmental outcomes across countries, using measures of bio-diversity loss, consumption of food and water, and generation of waste, as examples.

The paper next raises (in Section 3) the question of mechanisms that may explain the observed correlation. It identifies four channels through which income inequality may influence environmental outcomes. These are: (i) household, (ii) community, (iii) national, and (iv) international. The household channel of causality operates mostly through the consumption behaviour (Section 4). For example, the rich generally pollute more, simply because they consume more. However, the household channel

may work through the investment behaviour too. The community channel works via income inequality's negative influence on the mobilization of collective efforts necessary for the protection of common property resources (CPR), which often are also the environmental resources (Section 5). The paper notes that this issue has become more important in view of climate change mitigation and adaptation, both of which require collective efforts on the part of communities.

The national channel works via income inequality's impact on national decision making (Section 6). The rich, despite being a small social group in terms of number of people, can often skew national decision making towards their narrow interests, which may be more aligned with policies that are detrimental to the environment. Furthermore, inequality of political power arising from income inequality may allow the rich to 'dump' pollution on the poor and weak while insulating themselves from the consequences of pollution in various ways. As a result, income inequality may cause a society to have a higher *aggregate* level of pollution than would have been possible in a more equal society.

Before moving to the discussion of the international channel, the paper examines whether the often encountered notion of the 'Environmental Kuznets Curve (EKC)' is helpful for understanding the observed negative correlation between income inequality and environmental outcomes. This digression is necessary, because most of the available studies examining the validity of the EKC have employed cross-country data. This paper notes that, first of all, the empirical support for EKC is controversial, and second, even if the EKC were valid, it cannot help to explain the observed correlations between income inequality and environmental outcomes noted

¹ For example, *World Development Report* on "Equity and Development" (World Bank 2006) does not cover this issue. Similarly, the recent UNCTAD *Trade and Development Report* on "Policies for Inclusive and Balanced Growth" (UNCTAD 2012) leaves this issue out of its purview.

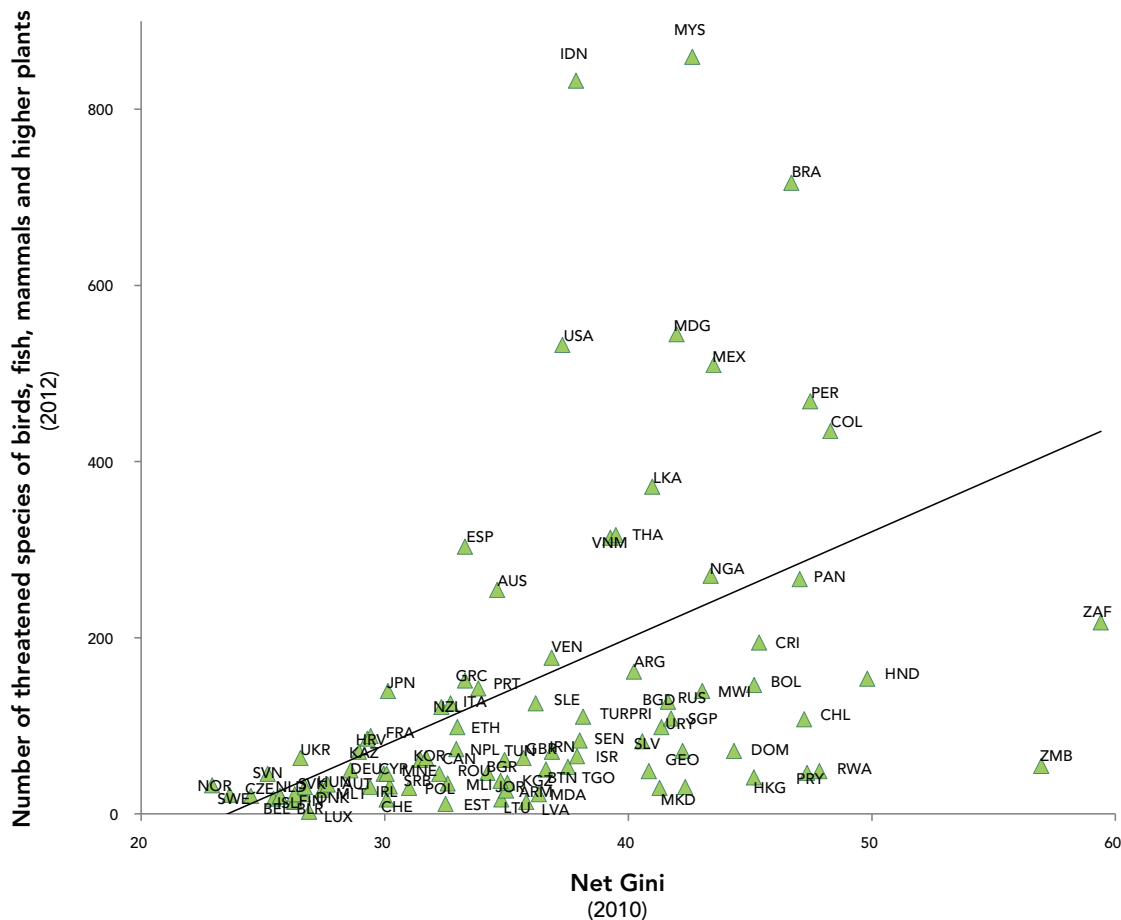
² In the following, for the sake of brevity, income equality will refer to both income and wealth inequality.

above. This further confirms the necessity of the multi-channel framework, put forward in this paper, in understanding the relationship between income inequality and environmental outcomes observed across countries.

The international channel works in ways similar to the national channel (Section 7). The paper notes that with time many global ‘public goods’ are acquiring the characteristics of ‘common property resources,’ so that mobilization of collective efforts for their protection is becoming more urgent and at the same time more difficult. The paper surveys the wide

disparity across nations with regard to Ecological Footprint and Greenhouse Gas (GHG) emissions, and notes that the unequal economic and political power situation at the international level is often hampering the mobilization of the collective effort necessary to reduce GHG emissions and to protect global environment in general. The evidence brought together in this paper illustrates the difficulties in changing international inequality through deliberate policies. At the same time, the paper highlights the changes that are taking place as a result of spontaneous economic forces and points to the necessity of

Figure 1
 Relationship between inequality and biodiversity loss across countries



Note: Definition of “Threatened species”: number of species classified by the International Union for Conservation of Nature as endangered, vulnerable, rare, indeterminate, out of danger, or insufficiently known. For country abbreviations see <https://www.iso.org/obp/ui/>

Source: UN/DESA, based on the Standardized World Income Inequality Database (SWIID) Version 4.0; and Index Mundi, environment indicators (biodiversity and protected areas), available from <http://www.indexmundi.com/facts/indicators/#Environment>.

harnessing these changes to prevent aggravation of climate change.

In addition to wealth and income inequality, there are other dimensions of inequality that have independent, additional effects on environmental outcomes. Prominent among them is gender inequality (Section 8). Drawing upon the ‘common property resources’ literature, the paper presents evidence showing that a greater presence of women in community decision-making bodies leads to a better protection of the common property resources, including forests. The paper therefore argues for the reduction of gender inequality as an important step toward environmental sustainability. Conclusions are presented in Section 9.

2 Inequality and Environmental Quality—Some Evidence

Researchers over time have put forward considerable evidence regarding the negative correlation between income inequality and environmental quality. This correlation has been observed with respect to many dimensions of the environment, including biodiversity.

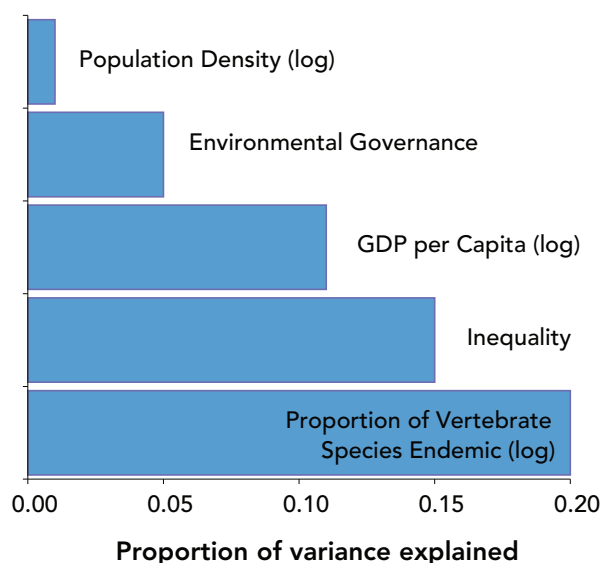
a. Inequality and Bio-diversity Loss

Recent evidence shows that greater income inequality is associated with greater loss of biodiversity. Studies highlighting this relationship include Mikkelsen, Gonzalez, and Peterson (2007) and Holland, Peterson, and Gonzalez (2009). The former conducts regressions on the basis of both cross-country data and data across the states of the United States of America (USA). For the cross-country regressions, the authors take as a dependent variable the ‘number of threatened plant and vertebrate species.’ They measure inequality by ‘Gini ratio of household income’ distribution and control for variations in ‘human population size’ and ‘GDP per capita.’ To account for the ‘stock effect,’ they control for the ‘total number of plant and vertebrate species.’

Based on the results, the authors conclude that “a 1% increase in the Gini ratio is associated with an almost 2% rise in the number of threatened species (Mikkelsen, Gonzalez, and Peterson 2007, p. 2).”³

For their cross-state regressions, Mikkelsen, Gonzalez, and Peterson (2007) use as a dependent variable “the number of threatened permanent resident species with statistically significant ($p < 0.10$) declines in abundance from 1966 to 2005.”

Figure 2
Independent effects of explanatory variables on biodiversity loss



Source: Holland, Peterson and Gonzalez (2009).

Income inequality is again measured by the ‘Gini ratio of family income’ distribution. The stock effect is controlled for by including the ‘total number of permanent resident bird species,’ and ‘human population size’ and ‘per capita income’ are included as additional control variables. The authors report results showing a positive association between the number of threatened bird species and the degree of income inequality across the states.

³ They conjecture that if this association was causal, a 3% expected increase in British inequality between 1989 and 1996 would result in a 5% increase in threatened species in that country by 2011 (Mikkelsen, Gonzalez, and Peterson 2007, p. 4).

Holland, Peterson, and Gonzalez (2009) study the relationship between income inequality and biodiversity loss at a more disaggregated level. They run regressions similar to those in Mikkelson, Gonzalez, and Peterson (2007), but separately for various taxonomic groups of species and for countries at different levels of development.⁴ Figure 1 presents the scatter of Gini ratio and percentage of species threatened, showing a general positive relationship between the two.

Based on their regression results, Holland, Peterson, and Gonzalez (2009) conclude that “greater inequality was associated with a greater proportion of species threatened (p. 1309).” They characterize inequality as a ‘key factor’ that explains variation in the proportion of threatened species across countries (p. 1310).⁵ Furthermore, they use their regression results to demonstrate the relative importance of inequality—compared with that of other factors—in explaining variations in bio-diversity loss. The outcome of this analysis is presented in Figure 2 that shows the proportions of variations in the percentage of species threatened explained by different factors. As can be seen, inequality ranks second in importance.⁶

It is well known that, while regressions can capture (partial) correlation, they per se do not establish causality. Furthermore, even if there are grounds to interpret the observed correlations as causality, regressions do not generally reveal the mechanisms through which the causality works. This is particularly true for regressions relying on ad-hoc

specifications that do not have theoretical models underpinning them.

The studies mentioned above are aware of these limitations. However, Mikkelson, Gonzalez, and Peterson (2007) believe that their regressions prove a ‘direct causal relationship’ between income inequality and diversity loss, because they control for possible common driving variables, i.e. variables that may cause both income inequality and the number of threatened species to increase simultaneously. The authors however agree that more refined analyses are needed to confirm the claimed causality. They also note that future studies are needed to reveal the mechanisms through which the causality works (p. 4).

b. Inequality and Consumption and Waste Generation

Another example of a negative correlation between income inequality and environmental outcome is observed via the consumption behaviour. For example, Dorling and other researchers examine the relationship of income inequality with personal consumption and generation of waste among affluent countries (see Dorling 2010a, 2010b, 2011 and Dorling, Barford, and Wheeler 2007).⁷ Their findings show that rich countries with higher inequality consume more resources and generate more waste per person.

Figure 3, 4, and 5 show the relationship between income inequality and per capita consumption of water, fish and meat, and generation of municipal waste, respectively. In these figures, income inequality is measured by the ratio of the income of the top ten per cent of the population to the income of the bottom ten per cent. In each case, it is found that higher level of inequality is generally

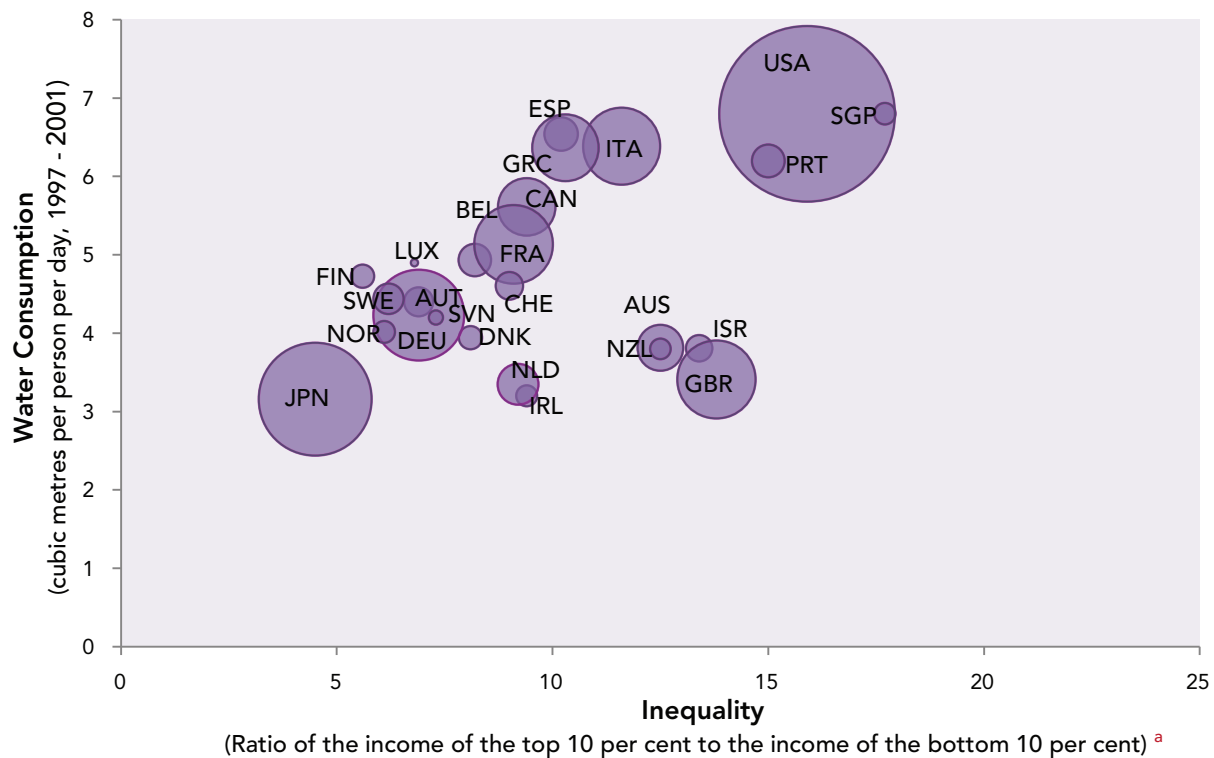
⁴ These authors have a somewhat larger sample size—50 countries instead of 45.

⁵ The authors present 0.019 to be ‘the most conservative’ estimate of the coefficient for the inequality variable (Gini ratio), and conjecture that a 5-point increase in Gini in the United States from 1990 to 1997 (from 44 to 49) “could eventually be associated with an increase in the proportion of species threatened in the USA from 2.7% (as it is now) to 3.0%, all else being equal (p. 1312).”

⁶ The bio-diversity loss (dependent variable) data used in producing Figures 1 and 2 pertain to 2007, and the data on explanatory variables pertain to 2005 and earlier years.

⁷ Dorling and his associates have created a website (www.worldmapper.org) compiling information about use of natural resources and the degree of (within-country) inequality.

Figure 3
Inequality and consumption of water across countries, 1997-2001



Source: Dorling (2014).

Note: Circle size corresponds to the size of a country's population. For country abbreviations see <https://www.iso.org/obp/ui/>

^a As reported in United Nations Development Programme (2009), statistical annex, table M.

associated with more resource consumption and more waste generation. For example, the per capita consumption of water increases from 3.2 cubic meter in Japan, where the income of the top ten per cent of the population is 4.5 times greater than that of the bottom ten per cent, to 6.8 cubic meter in the USA where the latter ratio is 16 (Figure 3). Similarly, while Japan's per capita annual consumption of fish and meat is limited to 43.9 kilogram, the analogous consumption in New Zealand, where the above income inequality ratio is 12.5, is 130.1 kilogram (Figure 4).

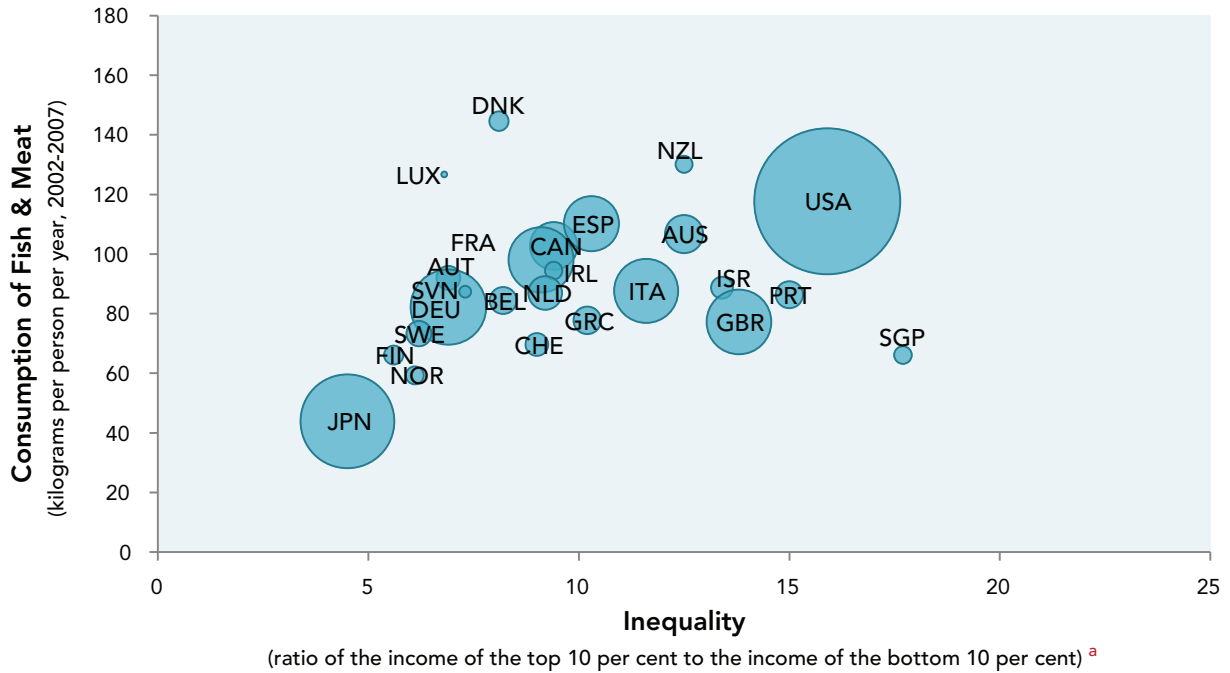
A similar situation can be seen with regard to waste generation. For example, in Sweden, where the above inequality ratio is 6, the per capita annual waste generated is 513 kg. However, the amount of per capita annual waste generated increases to 728 kg

in Switzerland, where the inequality ratio is 9, and it increases further to 1072 kg in Singapore where the inequality ratio is 18 (Figure 5).

What is noticed above is 'gross correlation,' because it does not control for many other factors that also might have influenced consumption and waste generation. For example, colder climate may lead to less water use, other things being equal. Further studies are therefore necessary in order to reveal the 'net correlation.'

Be that as it may, the evidence does point to a negative correlation between inequality and environmental quality. The next questions are, first, whether the observed correlation represents *causation*, and second, if it does, what explains the causation. In other words, what the *mechanisms* and *channels* are

Figure 4
Inequality and consumption of fish and meat across countries, 2002-2007

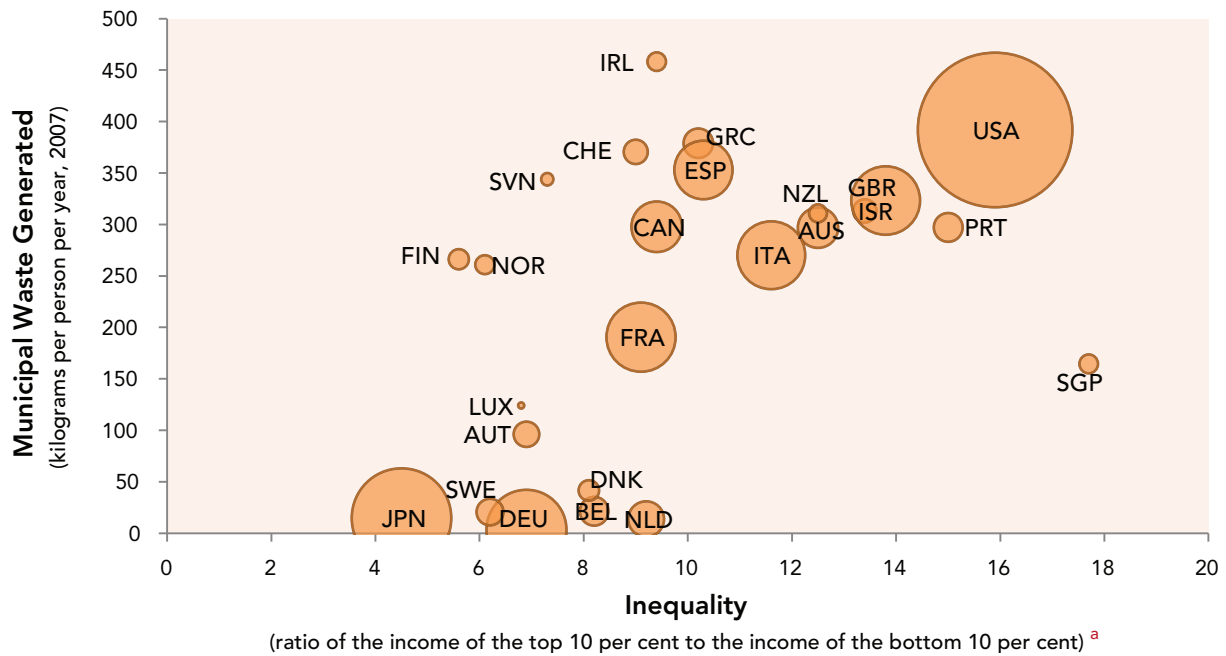


Source: Dorling (2014).

Note: Circle size corresponds to the size of a country's population. For country abbreviations see <https://www.iso.org/obp/ui/>

^a As reported in United Nations Development Programme (2009), statistical annex, table M.

Figure 5
Inequality and municipal waste generated across countries, 2007

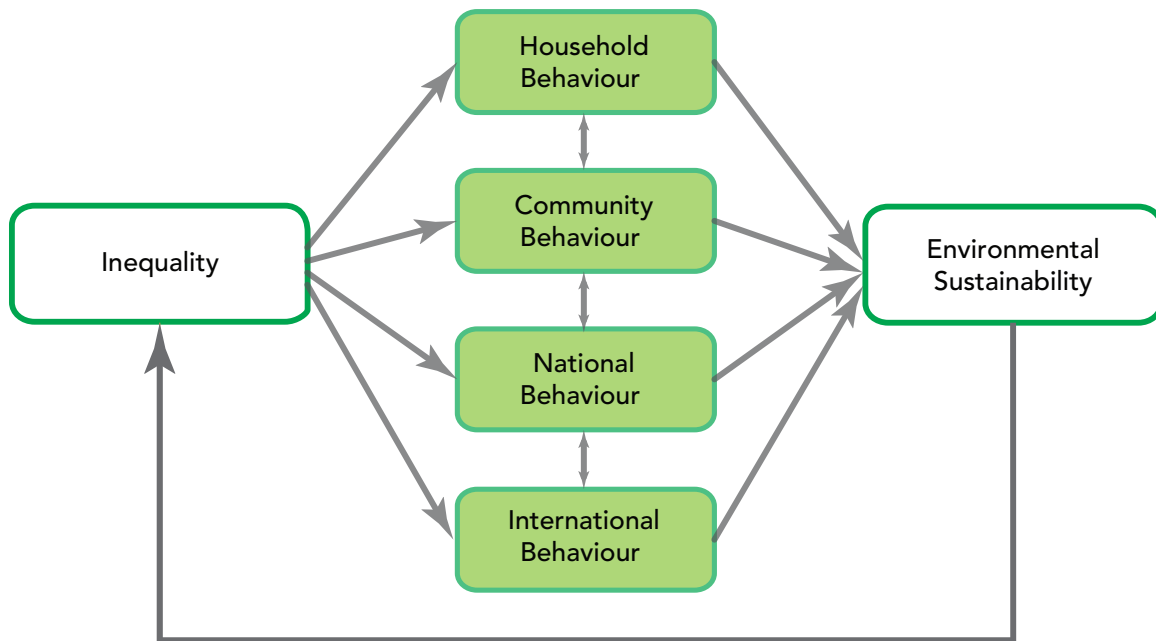


Source: Dorling (2014).

Note: Circle size corresponds to the size of a country's population. For country abbreviations see <https://www.iso.org/obp/ui/>

^a As reported in United Nations Development Programme (2009), statistical annex, table M.

Figure 6
Different channels of influence of inequality on environment



Source: Author.

through which inequality may exert a negative influence on environmental outcomes. Understanding these channels and mechanisms is necessary in order to formulate appropriate policies.

3 Four Channels of Influence of Inequality on Environmental Outcomes

Researchers generally think that there is causation behind the observed correlation between inequality and environmental quality. As noted above, Holland, Peterson, and Gonzalez (2009) conclude that they identified causation in their results. They also feel that it is necessary to try to reveal the mechanisms through which the causality may work. They distinguish between ‘individual’ and ‘collective’ effects (p. 1312). The former refers to the changes in individual behaviour and incentives brought about by increased inequality. The latter refers to changes in collective behaviour that are generally mediated through environment management institutions. Carrying these

ideas forward, this paper proposes the following four channels through which inequality may exert its negative influence on environmental outcomes (Figure 6):

- i. Household channel
- ii. Community channel
- iii. National channel
- iv. International channel

While the four-channel framework presented in Figure 6 is a useful analytical framework for understanding the mechanisms through which inequality exerts a negative influence on environmental outcomes, it is necessary to take note of the following.

First, the ‘household’ channel above subsumes the ‘individual’ behaviour. Ideally it is possible to add a separate ‘individual channel’ to the framework above, and there are some grounds to do that. Intra-household variations in consumption and waste

generation may be important in certain contexts. Sen (1990), for example, points out gender disparity in consumption within households. However, we ignore this issue in this discussion, mainly to keep things simple, and also because intra-household variations in consumption may not be that important from the viewpoint of the impact on environmental outcomes. It is worth remembering in this context that gender inequalities tend to be lower in more economically equitable countries, and this may reinforce the environment-favouring impact of reduction of inequality (see below for more discussion of the relationship between gender inequality and environmental quality).

Second, it may be noted that there is an essential distinction between the ‘household channel,’ on the one hand, and the remaining channels, on the other. The distinction concerns the role of collective action. While the operation of the remaining channels requires collective action, the problem of organizing necessary collective action is less serious within a household.

Third, the channels of influence identified above are not separate tunnels, insulated from one another. Instead, there are considerable overlaps and interactions among them (as shown in Figure 6). Some effects of reduction of inequality may work through multiple channels and thus get reinforced. For example, some processes that are macro in nature (hence, working through the national channel) may have influence on community and household behaviour too. Similarly, there may be some commonality among the factors that may either hinder or promote collective action necessary for the protection of the environment at the community, national, and international levels. However, there will also be specificity in the way these factors operate at different levels, as we shall see.

Fourth, while the attention here is focused on the influence flowing from inequality to environmental outcomes, the causality may run in the reverse

direction too (as shown in Figure 6). For example, depletion of forests and open capture fish stocks may decrease the resource base of the low income people, reducing their real income and thus aggravating inequality. Also, in an environment where resources have been depleted, an affluent minority may be able to secure monopoly profits through their control of most of the remaining resources. These feedback effects can thus add to the argument for reduction of inequality in order to protect the environment.

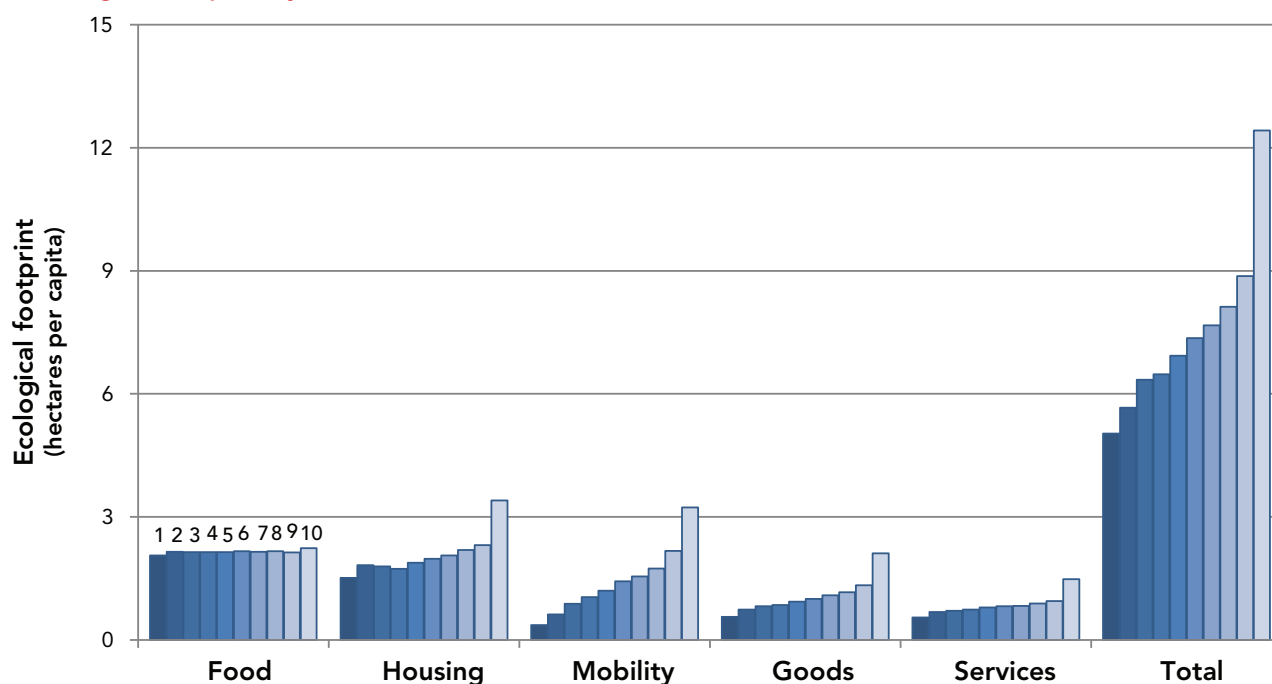
With the above qualifications in mind, it is now possible to proceed to the discussion of the various channels of influence of inequality on environmental outcomes, beginning with the household channel.

4 Household Channel of Influence of Inequality on Environmental Outcomes

An important way in which inequality can affect environmental sustainability is through its influence on household behaviour. The evidence of the household channel has to be sought in intra-country variation in environmental outcomes, because the inter-country variation relies on national level outcomes that embody the impact of other channels, in particular, the national channel. For example, there is evidence suggesting that more unequal countries have higher per capita ecological footprint than countries that are less unequal, even though they have similar levels of income. However, this may be the combined result of inequality’s influence working through both national and sub-national channels. To decipher the household channel it is necessary to consider variations in ecological footprint across people within the same country.

Fortunately, data on intra-country variation are gradually becoming available. For example, a recent study of Canadian households finds that ecological footprint varies with the level of income (see Mackenzie, Messinger, and Smith (2008)). The

Figure 7
Ecological footprint by sector and income decile, Canada



Source: Mackenzie, Messinger and Smith (2008), p. 13.

Note: Numbers above the bars refer to income deciles.

study looks at the total ecological footprint of households belonging to different deciles of the income distribution. It finds that the richest 10 per cent of Canadian households have an ecological footprint of 12.4 hectares per capita, which is 66 per cent higher than the national average of 7.5 hectares (Figure 7). The ecological footprint of the richest 10 per cent is about 2.5 times greater than that of the poorest 10 per cent. The study breaks down the total ecological footprint into its components arising from different sources, namely (i) food, (ii) housing, (iii) mobility, (iv) goods, and (v) services. Looking at these sources, the study finds that most of the difference in ecological footprint is due to differences in mobility (travel), with respect to which the footprint of the richest 10 per cent is 9 times higher than that of the poorest 10 per cent. This ratio is 3.75 for ‘goods,’ 2.7 for ‘services,’ and 2.25 for ‘housing.’ It is only with respect to food that the difference in ecological footprint across different income groups is not that pronounced.

The differences in ecological footprint across income categories are likely to be more pronounced in developing countries, where consumption of the rich often differs from that of the poor not only in *magnitude* but also in *kind*. The rich of developing countries generally emulate the consumption pattern observed in developed countries. As a result, their consumption basket generally includes more damaging to the environment components—such as various non-biodegradable materials—than is the case for the consumption of the poor.⁸

Determining the net impact of redistribution on environmental outcomes is however not that simple, because it depends on several factors. First, consumption forms a smaller part of income of the rich than is the case of the poor. Hence, the reduction of income of the rich may not affect their consumption by

⁸ See Frank (1999), (2007) and (2011) for discussion of “Emulating the Joneses” behavior and its detrimental effect on environment.

that much, unless the reduction is drastic. Second, increased income of the poor, resulting from the reduction of inequality, is expected to increase their consumption and hence their ecological footprint. In fact, since the marginal propensity to consume is greater for the poor, the consumption effect of increase in income for them may be greater. Therefore, any possible decrease in ecological footprint of the rich resulting from the reduction of inequality may be partly offset by the increase in the ecological footprint of the poor, assuming that the consumption baskets of the rich and the poor are similar.⁹

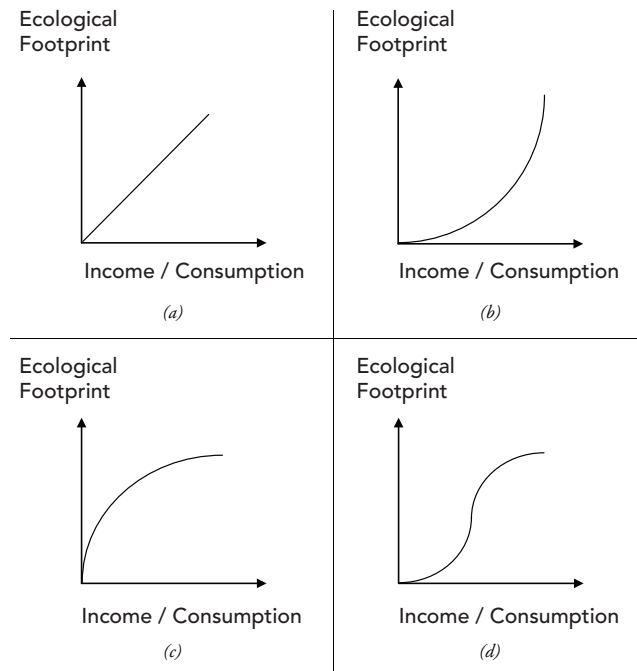
To see the above possibilities more clearly, suppose N_1 denotes the number of the rich and N_2 is the number of the poor. Also, suppose that the redistribution causes the ecological footprint of the rich to decrease (due to possible reduction in consumption) by R_1 per person, and that it causes the ecological footprint of the poor to increase (due to their possible increase in consumption) by R_2 per person. There will be an overall reduction in total ecological footprint if

$$N_1 * R_1 > N_2 * R_2$$

Since N_2 is likely to be much larger than N_1 , the inequality in the above equation will hold only if R_1 is much larger than R_2 . The values of R_1 and R_2 , in turn, depend on the nature of the relationship between income and ecological footprint. Three possibilities in this regard are (i) proportionate (linear), (ii) more than proportionate (convex), and (iii) less than proportionate (concave). These are shown in Figure 8(a), 8(b), and 8(c), respectively, with the horizontal axis denoting income/consumption level and the vertical axis denoting ecological footprint. It should be noted that this relationship may differ depending

⁹ The evidence that the rich consume more than the poor may suggest that redistribution of income may lead to reduction of aggregate consumption and hence of the resources that are required to produce the articles of consumption and of the waste that consumption generate. However, the actual outcome may depend on the details.

Figure 8
Possible relationships between income and consumption level and the ecological footprint



Source: Author.

on the particular item of consumption and also depending on the overall income level of a country.

The reduction of inequality will have the greatest effect in reducing the total ecological footprint of society if the relationship is convex (Figure 8(b)), i.e., if ecological footprint increases at a greater rate as income and consumption level increases. In this case R_1 will tend to be high and R_2 will tend to be low. The opposite will be the case if the relationship is concave (Figure 8(c)), i.e. if ecological footprint increases at a decreasing rate with increase in consumption. In this case, R_1 will be low and R_2 will be high.

Which of the different types of relationship between consumption and ecological footprints is more prevalent is an empirical question. The evidence from the Mackenzie, Messinger, and Smith (2008) study on Canada, as presented in Figure 7, suggests that the curve indeed gets very steep at the high end of the income distribution, supporting a convex (more than proportionate) type of relationship. If that is the

case, reducing inequality is likely to have a greater reduction of total ecological footprint.

Mikkelson (2013) however points out that the convex-interpretation of Figure 7 is not accurate, because the horizontal axis in this Figure represents 'deciles' of income distribution, and not 'income' itself. Since the income ranges of the upper deciles are much wider than those for the lower deciles, the shape of the relation when plotted against actual 'income' will be more drawn out and may be closer to being linear (beyond a threshold point) or even concave.

However, it may be noted that even the concave relationship does not negate the possibility of a positive impact of reducing inequality on environmental outcomes via consumption. As noticed above, the outcome will depend on the precise values of N_1 , N_2 , R_1 , and R_2 . It may be noted that since there are many more people belonging to the lower deciles (meaning N_2 being much larger than N_1), a redistribution may increase their average income by only a little. As a result, R_2 is likely to be much lower than R_1 even when the curve is concave. Thus, reducing inequality may be beneficial for the environment under concave relationship too.

Also, the nature of the relationship between income and ecological footprint may itself differ depending on the level of income. For example, this relationship may be of the 'logistic' type, suggesting that the relationship is initially proportionate, then convex, and finally concave (as shown in Figure 8(d)).¹⁰ The net outcome of reducing inequality through redistribution will again depend on the concrete values of N_1 , N_2 , R_1 , and R_2 , which in turn will depend on the segments of the curve in which the poor and the rich are located.

Sometimes an argument is made that poverty leads people to environment-destructive behaviour. For example, it is said that the poor may cut down trees (of publicly owned forests) in order to meet their fuel needs, or that they may encroach rivers and fill up wetlands in order to increase their arable land. The extent and significance of such behaviour is disputed. In fact, it is the rapacious rich loggers and land developers who are often more responsible for disappearing forests and wetlands. However, to the extent that environment-damaging influence of poverty is true, the case for reducing inequality in order to protect the environment becomes stronger. The evidence and arguments above therefore suggest that a more equal distribution of economic resources within each country may be helpful for environmental protection as it might reduce consumption of the rich and lessen the necessity of the poor to engage in environmentally harmful behaviour, if and when that is indeed the case.

However, the counterpart of lower propensity to consume by the rich (relative to that of the poor) is their higher propensity to save and invest. In fact, Mikkelson thinks that inequality exerts its harmful influence on the environment more through the investment behaviour of the rich than through their consumption behaviour. It may be noted, in this context, that the same amount of total savings can be generated either from large savings of a few or from mobilization of small savings of many. The first will be the case in a society with very unequal distribution of income, while the latter will apply to societies with more egalitarian distribution of income. However, the environmental consequences of investments made from savings generated in these two alternative ways can be very different, as will be discussed later. In considering the 'household channel' of the influence of inequality on environmental outcomes, it may therefore be necessary to use a *fuller model* including both consumption and investment behaviour.

¹⁰ The author would like to thank Wei Liu for drawing attention to the possibility of the logistic pattern of the relationship.

It is also important to note that the impact of reducing inequality on consumption has to be viewed from both *static* and *dynamic* viewpoints. For example, the reduction of inequality may create over time a more egalitarian social framework that is favourable for decisions promoting sustainable consumption and production.

The above discussion therefore does not account for the *total* impact on consumption of a reduction of inequality, because it focuses only on the household channel. As noted earlier, the channels of influence of inequality on environmental outcomes are not watertight tunnels. The reduction of inequality will have other effects, including changes in national policies and ideology. Some of these changes may influence the consumption pattern of both the rich and the poor toward lower ecological footprint, reducing the overall ecological footprint of society.¹¹ To explore the possibility of these broader outcomes, it is necessary to consider the community and national channels of influence of inequality on environmental outcomes.

5 Community Channel of Influence of Inequality on Environmental Outcomes

An important way in which the reduction of inequality can help environmental protection is through its influence on community behaviour. In particular, the reduction of inequality may be conducive to the collective efforts necessary for the protection of environmental resources that are owned or controlled by communities. This section discusses the community channel.

¹¹ In fact, Mikkelsen (2013) thinks that the influence of equality on environment along the individual consumption channel is negative, but this is outweighed by strong positive influences running through investment and collective channels.

a. Inequality and Common Property Resource (CPR) Management

Proceeding from the criteria of ‘rivalry’ and ‘excludability,’ goods and services have been classified in the economics literature into four categories, namely (i) private goods, (ii) club goods, (iii) common property resources, and (iv) public goods (Table 1). Inequality can affect the volume, distribution, and use of all of them. However, the precise way in which inequality affects, and the way in which these effects may be modified in order to protect the environment, differ depending on the category of goods. It is easy to see that many environmental resources fall under either the Common Property Resources (CPR) category or the Public Goods category. While inequality’s role in the protection of environmental resources that are in the public goods category has gained more attention in recent years, its role in the protection of environmental resources that are of the CPR category has been emphasized for a long time now.

An important consideration with regard to the CPR is the possibility of over-exploitation. Hardin (1968) dramatized this problem by coining the expression ‘tragedy of the commons’ and using it as the title of his paper. The idea is that, with access to a common property resource, each individual has an incentive to extract and/or use as much as possible of this resource, disregarding the fact that emulation of this behaviour by others will lead to exhaustion of the resource. Many initially saw the solution of this problem in privatization of the CPR. Accordingly policies geared to privatization were actively pursued, especially in the more economically unequal countries, in the 1970s through the 1990s.

However, researchers have shown that many communities found efficient ways of managing the CPR, preventing their overuse, without privatisation (see, for example, Ostrom et al. (1999)). Several factors that are found to be helpful in successfully managing the CPR are (i) definable boundaries of the CPR, (ii) the high degree of dependence of the

Table 1
Goods, services and resources by category

	Excludable	Non-excludable
Rivalrous	<i>Private goods</i>	<i>Common-property resources</i>
	(e.g., food, clothing, cars, electronics)	(e.g., commonly held fish stock, timber, fields for grazing)
Non-rivalrous	<i>Club goods</i>	<i>Public goods</i>
	(e.g., patented goods, satellite television)	(e.g., open radio transmission, national defence)

Source: Author.

community members on the CPR (so that its exhaustion would pose a significant threat to the welfare of the co-sharers, and there are no readily available substitute of the resource), (iii) the presence of a community that is small in number but stable and is characterized by dense social network and social norms, and (iv) the existence of community-based rules and procedures with built-in incentives for following the rules and punishments for violation. It is not difficult to see that the homogeneity of a community and the density of social network in it depend to a large extent on the degree of equality among the community members.

However, there is also the contrary view that, in certain situations, inequality may actually be helpful for the protection of the CPR (Olson 1965). This hypothesis is a corollary of the general proposition that collective action is difficult when the size of the collective is large, so that the possible benefit for each individual from the collective action is small in magnitude, and the scope for free riding is large. By contrast, collective action is more likely to materialize in a small sized collective, because the benefit from the collective action to be derived by each member of such a collective is likely to be large and the scope for free-riding is likely to be small. Thus, if it is the

case that only a few members of the community can reap bulk of the benefit from the protection of the CPR then they may offer the protection even if the rest of the community (who reap only a small part of the benefit) does not share the cost of protection. The 'large' members of the community will do so because the benefit reaped by them will exceed the cost of protection borne by them.

This proposition regarding beneficial effect of higher inequality on the protection of the CPR however has been challenged on grounds of both theory and empirical validity. The bulk of the research published to date has shown that equality is generally more conducive to collective efforts necessary for the protection of environmental resources under common ownership or control. For discussion of these issues see, for example, Baland, Bardhan, and Bowles (2007), Baland and Platteau (1996, 1999), Bowles and Foley (2006), Bromley and Feeny (1992), Colchester (1994), Dayton-Johnson and Bardhan (2002), Itya, de Meza, and Myles (1997), Ostrom (1990), Ostrom, Burger, Field, Norgaard, and Policansky (1999), Scruggs(1998), Tremplet (1995a, 1995b).

b. Inequality, Community Effort and Climate Change

The role of collective effort in the protection of the environment has become now more important in view of climate change. Successful mitigation and adaptation efforts require cooperation at the global, national, sub-national, and community levels. The cooperative effort is particularly vital for communities that live at the frontier of the climate change impact.

For example, many islands and low lying countries are getting partly submerged, and the people living in these areas have to either migrate or put up resistance to the processes and/or adapt to the new situation. While migration can be an individual response, resistance and adaptation require collective effort. Similarly, in many areas, climate change is drying up water bodies which are crucial for the survival of local communities. Again, collective efforts are necessary in those places to resist and adapt. Furthermore, experience shows that orderly migration requires collective action of both the migrants and the host population of the locations to which migrants are moving.

However, as noted earlier, cooperation and collective efforts becomes difficult when the members of the community are very unequal. Higher inequality hinders crystallization of a common purpose and creates obstacle to trusting relationship among the community members. Thus, by facilitating collective efforts, the reduction of inequality can help communities in confronting and coping with climate change.

6 National Channel of Influence of Inequality on Environmental Outcomes

Just as inequality can be a hindrance to collective efforts necessary for the protection of local environmental resources, so can it be a hindrance to

collective efforts required for the protection of national and global environmental resources.

It is well known from the ecological footprint literature that rich countries have much larger per capita ecological footprint than poorer countries have. The main reason behind this relationship is that people in rich countries on average consume more than the people in low income countries. What is less known is that even among similarly affluent countries, the ecological footprint in more equitable countries tend to be much smaller than in more inequitable countries. As noticed earlier, Japan is one of the more equitable of affluent nations while the USA is one of the more inequitable. The income of the top 10 per cent of the population is 4.5 times greater than the income of the bottom ten percent in Japan, while in the USA this inequality ratio is 15.9. The average per capita ecological footprint in Japan is roughly half of that of the USA.¹² A similar relationship can be observed with respect to inequality and per capita Green House Gas (GHG) emissions. Countries with less inequality tend to have less per capita GHG emission compared with countries that have similar per capita income but where inequality is high. For example, Canada, where the income of the top 10 per cent of the population is 9.4 times greater than the income of the bottom ten percent, had an annual per capita CO₂ emission (during 2010-2014) of 14.1 tons, whereas Sweden, where the above income inequality ratio is 6.2, had an annual per capita CO₂ emission during the same period of 5.5 tons.¹³ These findings should not be surprising, because we already saw in Section 2 that among the affluent countries those with higher inequality also had higher per capita levels of consumption (of water, fish, and meat) and of volume of waste generated.

¹² See Dorling, 2010a, <http://sasi.group.shef.ac.uk/presentations/rgs/> and <http://www.geography.org.uk/resources/is-moreequalmoregreen/>

¹³ See Dorling 2010a, <http://sasi.group.shef.ac.uk/presentations/rgs> for data on inequality and <http://data.worldbank.org/indicator/EN.ATM.CO2E.PC> for data on CO₂ emissions.

However, how to explain these facts? Mere variation within a country (working through the household channel) cannot explain these large differences across countries. To understand these facts, we need to consider the national channel of influence of inequality on environmental outcomes.

It is generally thought that, in choosing from different policy options, a society picks the option that maximizes the net benefit of the members of the society. The usual decision-rule that follows from this premise is generally known as the benefit cost analysis (BCA). Under this rule, a policy is chosen from among many if it maximizes the sum of the net benefit accrued to individual members of society. Thus, if b_i represents the net benefit accrued to individual i , the policy chosen should ensure

$$\max \sum_i b_i$$

In such a decision-making framework, preference of all citizens of a country receives equal weight. Researchers however have pointed out that the above view is simplistic. In reality, the preference of the rich gets more weight in social decision making. Emphasizing the broader influence of inequality on environmental outcomes, Boyce (1994, 2007) therefore put forward the notion of a “power-weighted social decision rule (PWSDR),” according to which the chosen policy will maximize the sum of *power-weighted* net benefits. Thus if w_i denotes the power enjoyed by the individual i , the policy chosen under PWSDR will ensure

$$\max \sum_i w_i * b_i$$

Clearly, decisions under PWSDR will favour the more powerful who will have higher values of w_i . Whether these decisions will be more or less environment-friendly (than those taken under BCA) will depend on several factors. If an environment-friendly policy were to benefit the more powerful, then PWSDR will obviously enhance the likelihood of that policy getting adopted. Unfortunately, the material interests of the rich may often be more aligned

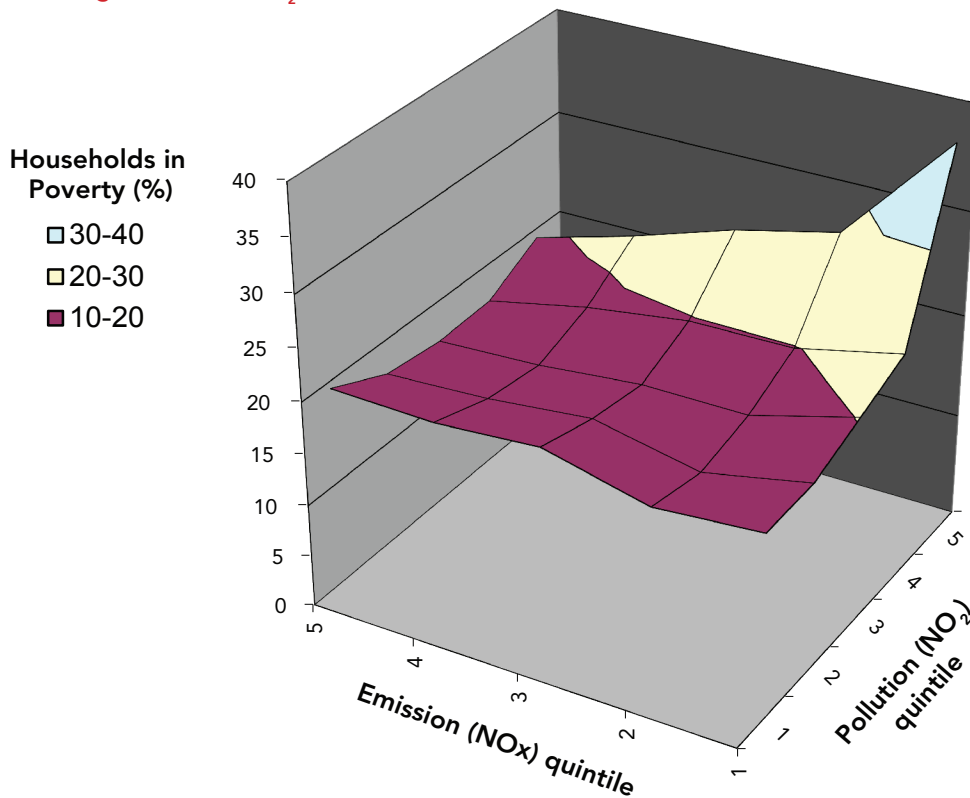
with environment-damaging policies, because of the following reasons.

First, on the consumption side, the rich generally consumes more than the poor, as seen in Section 4 above. Hence they should have more consumer surplus in the aggregate than the poor. Second, the rich are generally the ones who make investments. As a result, they are also the main beneficiary of the producer surplus. Thus, the interests of the rich are likely to be more aligned with policies that increase their consumer and producer surplus, even though these policies are damaging to the environment. This alignment becomes stronger if the rich can (as they often do) insulate themselves from the consequences of environmental degradation, for example, by ‘dumping’ pollution on the poor, living in exclusive neighborhoods that are far from pollution sites, and by adopting modes of life that are less affected by pollution (such as traveling in air-conditioned cars and thus be unaffected by air pollution), etc. It is clear that under the above situation, the aggregate level of resource consumption and pollution will be higher than it would be in a more equal society, where such dumping would be difficult and the benefits and effects and costs of pollution would be more equally distributed.

It is true that with more income, the marginal utility of environmental amenities may increase. It may therefore be argued that the rich put higher value on environmental protection than the poor do. Mikkelsen et al. (2007) and other researchers however point out that it is a misconception that rich value the environment more highly than the poor. In their view, it is the opposite. However, even if higher subjective evaluation of environmental amenities by the rich were true, it may get outweighed by their material interests in the producer and consumer surplus that environmental degradation can create for them. Also, the fact that the rich can insulate themselves from pollution may help them reconcile their preference for living in a better environment

Figure 9

Poverty rate of wards by quintiles of emission of and pollution by nitrogen oxide (NO_x) and nitrogen dioxide (NO₂)



Source: Dorling (2010b).

with their support for environmentally damaging policies (see Boyce 1994 and 2007 for further details).

Research by and large supports the above conjectures. For example, Boyce (2007) shows that many of the hazardous waste dumps and other environmental damaging sites in the US are indeed located in the neighbourhoods inhabited by the poor, people of color, and immigrants. Dorling (2010b) provides similar evidence from the United Kingdom. He conducts a study of more than 10,000 wards and finds that those having higher proportion of households in poverty were also suffering from higher degree of NO_x pollution (Figure 9).¹⁴ The fact that

higher degree of inequality creates the possibility of ‘dumping’ pollution on the poor has led to the call for ‘environmental justice.’¹⁵

Earlier, we noted the findings of Mikkelsen, Gonzalez, and Peterson (2007) and Holland, Peterson, and Gonzalez (2009) showing that countries with greater inequality witnessed greater loss of bio-diversity. The authors conjectured that the observed association was not only ‘statistical’ but also ‘causal.’ However, they did not offer clear explanations of the suggested causal connection. It is now possible to see that Boyce’s PWSDR proposition

¹⁴ Dorling therefore concludes that “Environmental justice requires social justice and social justice cannot be achieved without greater equality of income and wealth... Maintaining high income inequality will speed up global warming (Dorling 2010b, p. 13).”

¹⁵ For further discussion of ‘environmental justice’ issues, see Beckerman (1992), Bowles and Gintis (2011), Bowles (2012), Boyce, Narain, and Stanton (2007), Butler (2002), Herman (1990), Dobson (1998/2003), Gifford (2006), Haupt and Lawrence (2012), Roemer (1993), Wilkinson and Pickett (2010).

can offer one such explanation, because in a more unequal society the operation of PWSDR can lead to environment damaging policies, including those that cause loss of biodiversity.¹⁶

National policies are therefore very important for environmental outcomes. They can exert influence at several levels. By reducing inequality, they can influence household behaviour. They can also reduce inequality within communities (for example, through redistributive land reform) and thus facilitate collective efforts of the members of a community. National policies are vital to initiate environment-friendly macro processes. Recent research has shown that sustainable development requires sustainable consumption patterns.¹⁷ One of the important ways in which the reduction of inequality may help to protect the environment is through the adoption of national policies directed toward the promotion of sustainable consumption at all levels of society, both rich and the poor.

In addition to the above, national policies also determine what happens globally, because it is the national governments which jointly determine the international policies and bear the responsibility for implementing these policies in their respective countries. Environmental outcomes at the global level are affected by inequality at the global level. This brings us to the ‘international channel’ of influence of inequality on the environment. Before discussing this channel, it is however necessary to take note of a competing explanation of the variation across countries with regard to environmental quality. This explanation takes the form of the ‘Environmental Kuznets’ Curve.’

7 Inequality and Environmental Kuznets Curve

A concept that plays an important role in the discussion of cross-country pattern of environmental dynamics is the Environmental Kuznets Curve (EKC). As the name suggests, this concept is inspired by the Kuznets Hypothesis (KH) regarding the relationship between inequality of (income) distribution and the (average) level of income (as a measure of the stage of development) of a country. According to the KH, as a country grows inequality will first increase with rise in (per capita) income level and then decrease, yielding an inverted U-shaped relationship between inequality and the level of economic development (Figure 10a). The KH however remains controversial, on both theoretical and empirical grounds. In his recent book, Piketty (2014) reiterated some of the theoretical arguments against the KH. At the empirical level, it is well known that many East Asian economies have grown without any significant increase in inequality, defying the KH.¹⁸

Nevertheless, the EKC follows the KH to propose a U-shaped relationship between quality of the environment and the per capita income level of a country (Figure 10b).¹⁹ According to the EKC, at the initial level, when a country is still largely pre-industrial, it enjoys better, pristine environment, characteristic of pre-industrial societies. However, as it industrializes and its per capita income increases, its environmental quality deteriorates due to the adverse impact of industrialization. After it completes the industrialization process, it faces more domestic demand for quality environment and also becomes more financially and technologically capable to meet this demand. As a result of the combined effect of the two, the environmental quality of the country starts to improve.

¹⁶ Viewed from the other end, it may also be said that the findings of Mikkelsen, Gonzalez, and Peterson (2007) and Holland, Peterson, and Gonzalez (2009) offer support for Boyce’s PWSDR proposition.

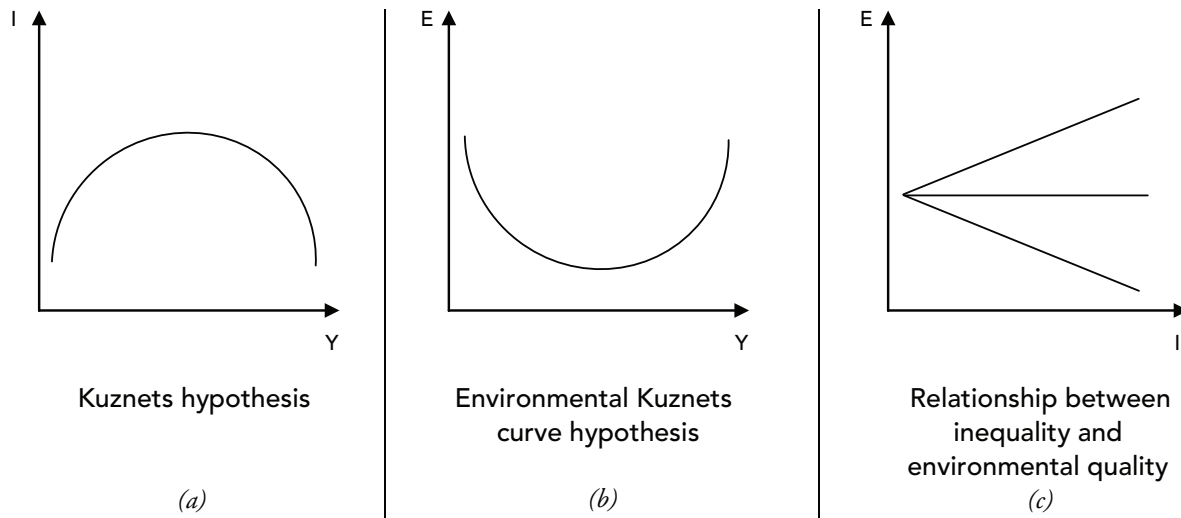
¹⁷ See, for example, United Nations (2013) and Islam (2013).

¹⁸ See Islam (2015) for a recent discussion of the dynamics of inequality in the East Asian economies.

¹⁹ EKC can be inverted-U shaped if pollution (instead of a positive measure of environmental quality) is plotted along the vertical axis.

Figure 10

Relationship possibilities between income and environment



Source: Author.

The EKC hypothesis is even more controversial than the KH. Although Grossman and Krueger (1995) present evidence showing that some pollutants displayed an EKC-type relationship, their evidence also shows that for many other pollutants this relationship did not hold true. Furthermore, several subsequent studies have shown that this relationship is not stable across regions and pollutants. These cross-country and case studies suggest that the concrete nature of the relationship between income level and environmental quality in a country depends largely on the policies pursued by that country and need not follow the U-pattern, postulated by the EKC (see, for example, Islam 1997 and Islam, Vincent, and Panayotou 1999).

More importantly, even if the KH and the EKC were valid, they do not suggest a U-shaped relationship between *inequality* and environmental quality (IE relationship, for short). Figure 10 can help to see this. Part (a) of this Figure shows that the relationship between inequality (I) and per capita income level (Y), as per the Kuznets Hypothesis, is of inverted-U shape. On the other hand, Part (b) shows that the relationship between environmental quality (E) and per capita income level (Y), as per the EKC, is

of U-shape. Given the opposite nature of these two curves, the pattern of relationship between environmental quality (E) and inequality (I) is likely to be indeterminate, as shown in Part (c) of the Figure.

The same conclusion can be reached algebraically as follows. Suppose, I stands for inequality, Y for per capita income, and E for environmental quality. We then have the following:

According to the original Kuznets hypothesis (KH):

$$I = f(Y)$$

According to the EKC:

$$E = g(Y)$$

Substituting therefore we have,

$$E = g[\text{inv } f(I)] = h(I)$$

The shape the $E = h(I)$ will obviously depend on the shape of the $I = f(Y)$ and $E = g(Y)$ curves. However, given that the first is assumed to be inverted-U shaped and the second to be U-shaped, the relationship

between inequality and environmental quality is likely to be indeterminate. Thus the EKC does not provide any basis to propose a U-shaped relationship between inequality and environmental quality.

Are there other arguments to postulate a U-shaped relationship between inequality and environmental quality? In the previous sections, we saw arguments and evidence of a negative correlation between inequality and the quality of the environment. This negative correlation may explain the downward sloping part (the initial half) of the U-curve. But, are there arguments for a subsequent upward sloping part (the latter half) of the U-curve?

One way to argue for an upward sloping curve (i.e. for a positive correlation between inequality and environmental quality) is to appeal to the Olson hypothesis mentioned earlier. Recall that, according to Olson (1965), if the distribution is highly unequal, the large owners (of common property resources) may offer to protect the common (environmental) resources even if the rest of the members of the community do not share the cost of protection. That being the case, the quality of environmental resources under common property may improve when inequality is pushed to a very high degree. However, as already noticed, most of the researchers have refuted the Olson hypothesis with regard to CPR on both empirical and theoretical grounds. Also, even if the Olson hypothesis were true, it is difficult to see why the curve (depicting the relationship between inequality and environmental quality) should become upward sloping after it has been downward sloping for a certain period of time.

Empirically too, researchers have not found a U-shaped relationship between inequality and environmental quality. For example, Holland, Peterson, and Gonzalez (2009) included the inequality variable in quadratic form to check whether there was any evidence for a non-linear relationship between bio-diversity loss and the degree of inequality. However, the coefficient of the quadratic term proved to be insignificant. Constatini and Martini (2010)

and Magnani (2000) also refute the proposition of a U-shaped relationship between inequality and environmental quality.

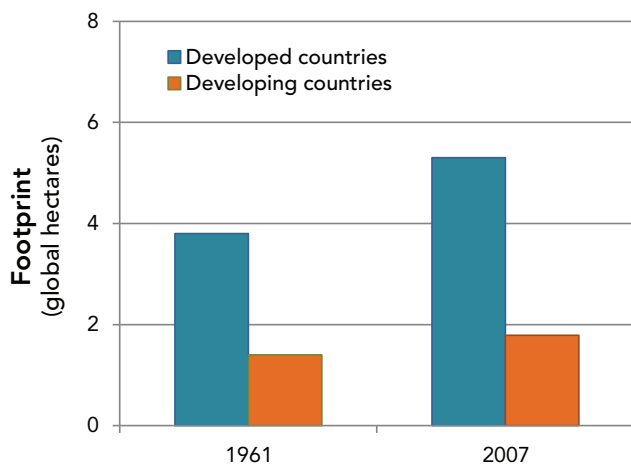
In short, neither the EKC nor any other theory supports the proposition that, as inequality increases, the quality of the environment will first deteriorate and then improve. In fact, EKC by itself cannot suggest any relationship between inequality and environmental quality. The evidence and arguments presented in this paper suggest that the impact of inequality on environmental quality is likely to be consistently negative. The previous sections have discussed how this negative influence is exerted through the household, community, and the national channels. The next section discusses the international channel.

8 International Channel of Influence of Inequality on Environmental Outcomes

In examining the 'international channel,' it is first necessary to note that one of the ways in which the world is changing is that public goods (resources) are often becoming common property resources (CPR). In other words, even if these resources remain non-excludable, they are no longer non-rivalrous. A prominent example of this change is the atmosphere, which used to be a classic example of a public good, because it was both non-excludable and non-rivalrous. However, now that safe limits on carbon concentration have been exceeded, the atmosphere is no longer non-rivalrous, because carbon emission by one country leaves less space for carbon emission by others, without aggravating climate change.

Similar is the situation with the oceans, another classic example of what used to be a public good (resource). One reason why oceans are becoming CPR (instead of a global public good) is the increased atmospheric carbon concentration, which is also causing increased acidification of the oceans. The

Figure 11
Average ecological footprint per person in developed and developing countries, 1961 & 2007



Source: New Economic Foundation (nef) (2006), *Growth Isn't Working: The Unbalanced Distribution of Benefits and Costs from Growth*, London: New Economic Foundation; Global Footprint Network's *Ecological Footprint Atlas 2010* (http://www.footprintnetwork.org/en/index.php/GFN/page/ecological_footprint_atlas_2010); and *World Population Prospects 2010 Revision*, UN/DESA.

rising atmospheric carbon concentration is also the reason why temperature of the oceans is increasing, leading to the expansion of water volume, rise in sea water level, and submergence of low lying islands and countries (See Nordhaus, 2013 pp. 100-115). As a result, the oceans are no longer non-rivalrous, if sea level rise is to be prevented.

The transition of oceans from the category of public goods to the category of CPR is also evident with regard to the fish stock. The ocean's fish stock once used to be so large compared to the annual amount extracted by humans that it was essentially non-rivalrous. With time, however, the volume of fish catch by humans has increased to such high levels that they exceed the ocean's replenishment capacity and has led to drastic reductions of the ocean's fish stock in many fishing areas. As a result, fishing by one nation now leaves less to be fished by other nations. Thus, issues concerning the role of inequality in obstructing

collective action necessary for the protection of common property resources have all become pertinent to the international arena.

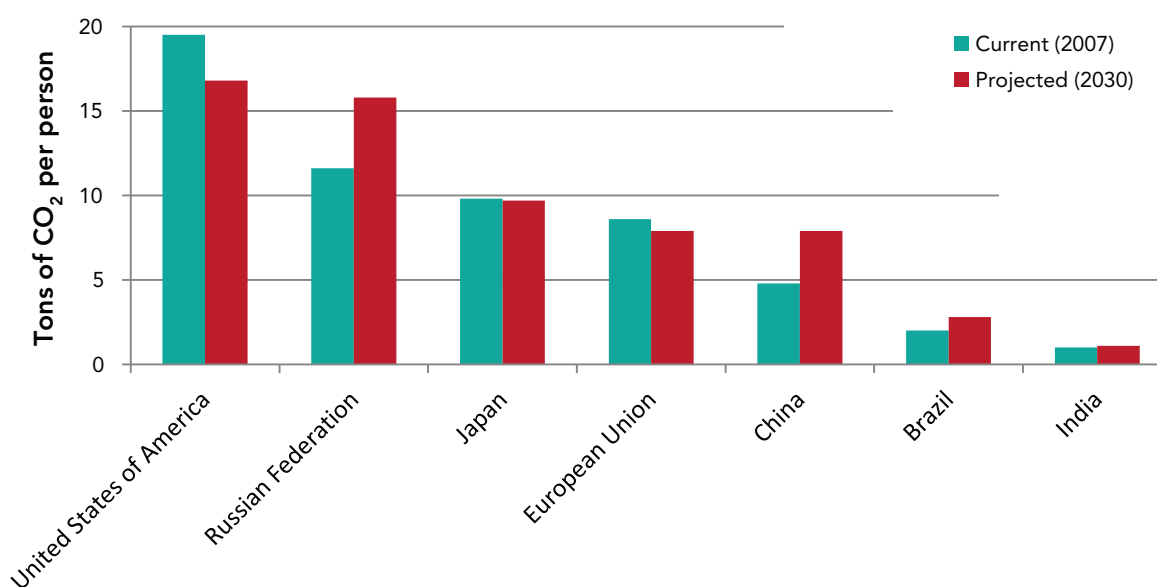
As noted earlier from the ecological footprint literature, developed countries have much larger per capita ecological footprint than developing, low income countries have (Figure 11). The main reason behind this is the difference in consumption levels and patterns. The people in rich countries on average consume more than the people in poorer countries. Furthermore, as noted earlier, the content of consumption in rich countries is often more damaging to the environment than it is in low income countries. An example is the greater presence of non-biodegradable plastic materials in the consumption basket in rich countries.²⁰ Also, in recent decades per capita ecological footprint in developed countries has increased by several times more than it has in developing countries (Figure 11).

While ecological footprint is a comprehensive measure of the environmental impact of human activities, the accuracy of this measure has been questioned (Toye 2013). However, cross-country disparity in the impact on the environment is apparent from other measures too. The most prominent in this regard is Greenhouse Gas (GHG) emissions, which is well-accepted and is a relatively accurate measure. Though GHG emissions may be a partial indicator (relative to say ecological footprint) of the environmental impact, its consequence—namely climate change—has the potential to destabilize the entire eco-system of the earth and put the very human civilization at a grave risk. From that point of view, GHG emissions are a no less important measure of environmental impact than ecological footprint.

²⁰ It may be noted here that, in recent years, developed countries have shifted much of their natural resource intensive, pollution creating industries to developing countries. See Peters et al. (2011) for a recent quantification of emissions transfers due to trade.

Figure 12

Per capita greenhouse gas emissions, select major emitters, 2007 and 2030 (projected)



Source: World Resources Institute. Available from <http://www.wri.org/resources/charts-graphs/capita-co2-emissions-select-major-emitters-2007-and-2030-projected>.

Figures 12-13 show the dramatic difference across countries with regard to current GHG emissions. On a per capita basis, developing countries emit only a fraction of what developed countries do. This disparity is sharper if historical contribution to the cumulative GHG emissions is considered. While developed countries have been emitting large volumes of GHG since the First Industrial Revolution (of the late eighteenth century), the emissions by the newly industrializing developing countries are of recent origin. Yet, developing countries are suffering and are expected to suffer more from the consequences of climate change. This is particularly true for the Small Island Developing States (SIDS) and other low-lying developing countries. Arguably these countries also have little power in the international arena.

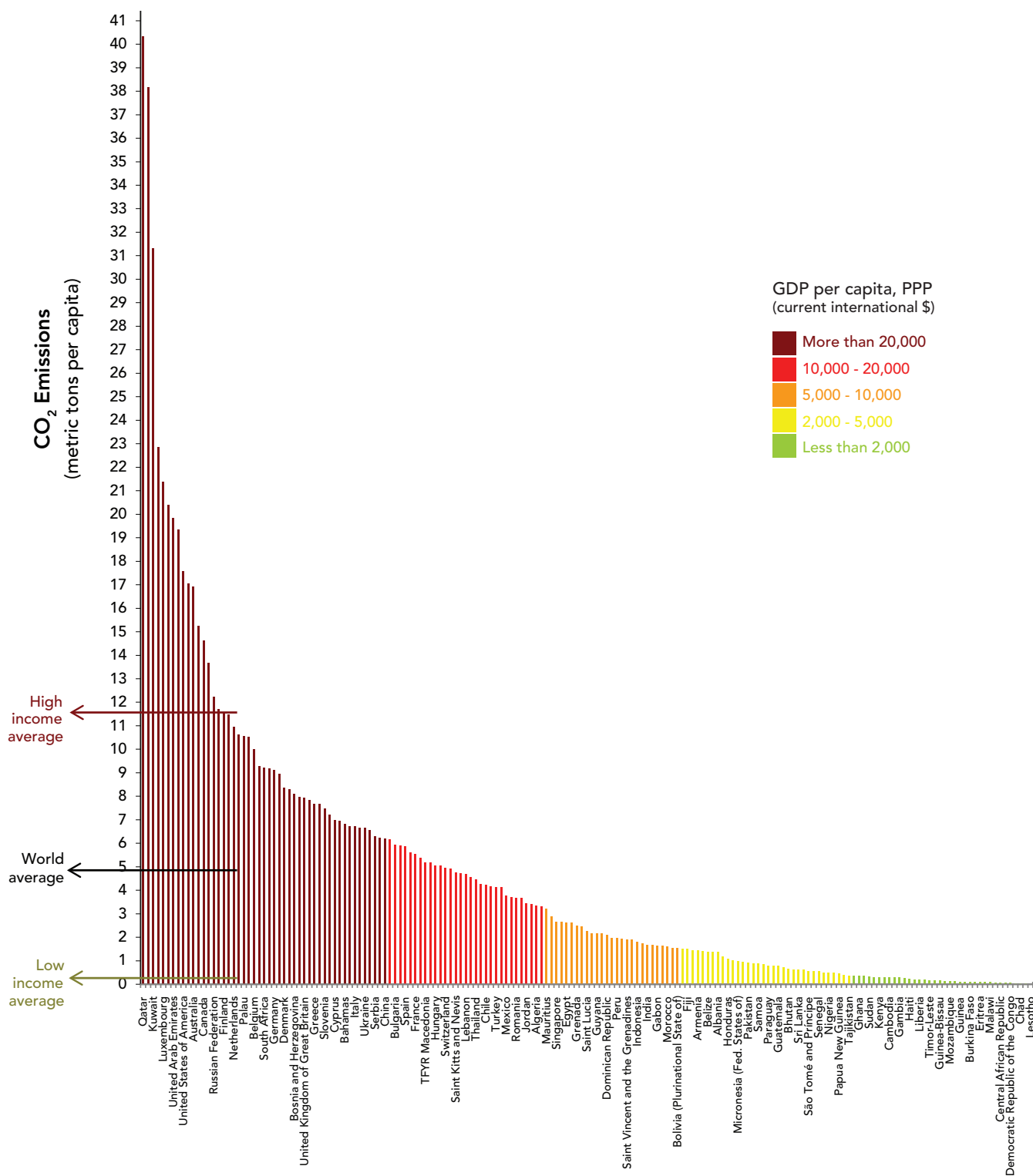
As the earlier discussed Power Weighted Social Decision Rule (PWSDR) suggests, the unequal international power situation is proving to be an obstacle to the mobilization of collective efforts necessary for confronting climate change. In fact, problems created

by inequality (with regard to responsibility for causing climate change, suffering from its consequences, and capacity for mitigation and adaptation) have proved to be an obstacle to achieving the goals set by the United National Framework Convention on Climate Change (UNFCCC) process in the recent decades.²¹

Reducing inequality across nations however is a much more challenging proposition than reducing inequality within a nation or within a community. Accordingly, facilitating the protection of the global environment through the reduction of international inequality can be a very ambitious agenda. However, even without reducing between country inequality, it is possible to design international institutions dealing with global environmental challenges in such a way as to enhance the voices and grant equal voting power to all members in decision making process of these institutions. The UNFCCC has indeed adopted the egalitarian principle of 'one country, one vote' for decision making. However, the problem of

²¹ See United Nations (2009) for discussion of these issues.

Figure 13
Per capita greenhouse gas emissions across countries, 2010



Source: World Development Indicators, based on United Nations Environment Programme/GRID-Arendal's "Vital Climate Change Graphics", p. 15.

inequality does not go away even then, because the decisions arrived in such egalitarian forums can be ignored by powerful nations, as happened in the case of the Kyoto Protocol. Thus, effective mobilization of collective efforts at the international level to meet global environmental problems remains a challenge.

However, it is instructive to note that the international inequality situation is changing, if not through deliberate policies, but as a result of spontaneous economic forces. For example, over the last several decades, many developing countries have become much larger economies. Their greater economic strength is translating now into their greater political role, as manifested in the formation of the G-20. The challenge now is to harness and use these changes for better protection of the global environment.

9 Gender Inequality and Environmental Outcomes

Income and wealth are not the only dimensions of inequality that affect environmental outcomes. In particular, gender inequality plays an important role in the protection of the environment. Clearly, gender inequality often works in combination with other dimensions of inequality. For example, gender inequality generally reinforces the income and wealth inequality. However, there are aspects of gender inequality that go beyond income and wealth inequality and often prove important for environmental sustainability.

The role of gender inequality has been discussed particularly in the context of collective efforts necessary for managing common property resources. Agarwal (2007), for example, provides detailed information about how gender inequality affects collective efforts aimed at the protection of forests under common and public property in India. In addition to extensive qualitative analysis, she conducts quantitative analysis. For example, she examines the multiple correlation between 'forest quality' and a

host of explanatory variables, including the variable 'WEC (Women in the Executive Committee),' which denotes the percentage of the local community forest group (CFG) executive committee members who are women. Agarwal finds that given the values of other variables, the higher this percentage the better is the quality of forests. Agarwal thinks that the observed positive effect of women's participation in the protection of forests can be enhanced further by ensuring their greater and more effective participation in CFG activities and decision making. Agarwal (2010) amplifies this argument further.

The beneficial impact of the reduction of gender inequality is not limited to the protection of environmental resources under common property. It rather has more general validity. As noted already, gender inequality is often a manifestation of unequal power situation rooted in unequal distribution of income and wealth and in social norms and tradition. Thus there may be synergy among efforts towards the reduction of income inequality and gender inequality. This synergy may be used for promoting the goal of environmental sustainability through different channels, including community and national channels.

10 Conclusions

This paper synthesizes recent findings about the relationship between economic (and also gender) inequality and the quality of environment, and provides an analytical framework to explain negative correlations between the two. Based on the extant evidence and the proposed analytical framework, the paper argues for the reduction of inequality as a way of protection of the environment.

While much attention has been devoted recently to the relationship between inequality and economic growth and social development, the relationship between inequality and environmental outcomes has been less discussed. This paper makes an attempt to fill up the lacunae. Over time significant

empirical evidence and theoretical arguments have surfaced regarding how inequality impacts environmental quality. This paper systematizes these evidences and arguments using a comprehensive analytical framework.

The paper identifies four inter-related channels through which inequality impacts the environment. They are: household, community, national, and international channels. The household channel works mainly through the consumption behaviour. The rich tends to consume and pollute more than the poor, and hence redistribution of income in favour of the poor households has the potential to be more favourable for the environment. The concrete outcome however depends on several other factors. The community channel works through the role of equality in facilitating collective effort necessary for the protection of common property (environmental) resources. At the national level, the reduction of inequality can create a more level playing field that is conducive to the adoption of more pro-environment policies. At the international level, more equal distribution of economic and political power among countries can make it easier to mobilize the global effort necessary to confront the global environmental problems, including the important problem of climate change. These different channels however are not water-tight separate tunnels. Instead, they overlap and thus can amplify the beneficial impact of reduction of inequality on environmental outcomes.

In addition to inequality in income and wealth, gender inequality is another important dimension of inequality that affects environmental quality. Since gender inequality is generally intertwined with inequality in income and wealth, there are synergies between reductions of income and wealth inequality and reductions of gender inequality. An important task is to make use of these synergies for the protection of the environment.

It is encouraging that the proposed Sustainable Development Goals (SDGs) put forward by the Open Working Group of the United Nations General Assembly includes the goal to “reduce inequality within and among countries” (Goal 10). This is a significant advance over the Millennium Development Goals (MDGs) that did not include reduction of inequality as a goal or target. In view of the links between inequality and environmental outcomes discussed in this paper, the inclusion of the goal to reduce inequality in the global development agenda is very appropriate.

Reduction of inequality however is easier said than actually done. Within a country the national government can take various fiscal and asset redistribution policies to reduce inequality. Fiscal policies involving taxes and transfers are more politically feasible than asset redistribution policies are. In most developed countries a significant portion of the national income (sometime exceeding fifty per cent) is indeed taxed and redistributed, so that the distribution of ‘net’ (or disposable) income is much less unequal than the distribution of ‘market’ (or gross) income. Such extensive and deep redistribution of income however is yet to be instituted in most developing countries.

Reduction of inequality at the international level through deliberative policies however is difficult to achieve, because there is no ‘global government’ with redistributive power similar to that of a national government. However, the international inequality situation is changing as a result of the operation of the spontaneous economic forces. The ‘Rise of the South’ and formation of G-20 are manifestations of these changes. An important task of the future therefore is to harness these changes and put them to work for environmental sustainability.

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