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SHORT COMMUNICATIONS

Climate justice in lieu of climate change: a sustainable approach to respond to the climate change injustice and an awakening of the environmental movement

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Abstract The climate justice is the concept of ensuring fair treatment and freedom from any kind of discrimination against the negative impacts of climate change. Both individually and collectively, in the form of adaptation and mitigation strategies, we are building our capacity to respond to the climate change, but the dimensions of environmental justice, equal treatment in the policy making and even the clear definition of vulnerable groups are often neglected. The climate justice is an evidence-based response to the environmental injustice and helpful in creation of fair policies and strategies to address the impacts of global warming by empowering the vulnerable groups with required legal resources, provision to ensuring necessary funding and capability to deal existing discrimination in the society. Historically, the journey of climate justice had begun with its recognition by the international bodies and legal frameworks. In the year 1992, United Nations Framework Convention on Climate Change insisted the member states to work together to reduce the greenhouse gases emission and also emphasized on the equity dimension of climate justice by mentioning the 'common but differentiated responsibility' in the charter. It specifies the need of proactive participation of the developed countries to resolve the issue of global warming, which was fueled by their ambitions, and they should help the developing countries with technological advances and finance to respond to climate change. The dimension of climate justice for the individuals and the vulnerable groups is to achieve a fair, equitable and sustainable legal solution to deal with the existing injustice in the society. It is a new kind of environmental movement, which is advocating for achieving a socially responsible, scientifically sound and economically fairly distributed legal framework. Climate justice offers a fair treatment and equal platform to deal with the inconsistencies in the recognition of different vulnerable groups and lack of opportunities for involving in decision-making system. The paper discusses the sustainable approach to respond to the climate injustice, where the vulnerable groups, disadvantaged individuals and the least developed states, who contributed least in global warming, but likely to be most affected by its impacts. The paper explores the current research gaps and recommends the policies to prepare climate justice legal framework.

Keywords Climate change · Climate justice · Vulnerable groups · Climate vulnerability · Climate justice legal framework

1 Background

The climate justice is an environmental movement ensuring the social, ecological and economical justice for everyone, who contributed the least in causing of global warming, but is likely to be the most affected by it. The question arises that who should pay the price of consequences of the global warming (Aylett 2010) and how to ensure the equal treatment in policy making, inclusivity of all vulnerable groups and fair distribution of resources to respond to the impact of climate change. The answer is climate justice framework, and its first success is in acknowledging the existing injustice toward those who contributed the least in the causing, as well as in safeguarding their rights with strong evidence-based policy framework. For example, the vulnerable

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groups are likely to suffer most from the negative impacts of global warming, and in addition, they are also adversely affected by some policy responses from the government and decision-making processes, which often excludes them (Joseph Rowntree Foundation 2014). The idea of climate justice framework is the concept that embeds responses to the climate change within the legal system of society and basic human rights and responsibilities to protect the environment. According to 'The Mary Robinson Foundation' and Bulkeley et al. (2012), climate justice is the link to the development in order to achieve human well-being, safeguarding the rights of the most vulnerable groups and sharing the burdens and benefits of climate change. Preston et al. (2013) summarize that the present climate change policy must address a quadruple injustice whereby certain groups are impacted the most by climate change, and their contribution is the least to causing it. They pay money as a proportion of their income toward implementation of particular policy responses and benefit least from those policies (Bettini 2013). Historically, climate justice was embedded in the international legal frameworks in 1980s, where principles of fairness and equity are included in the 'common and differentiated responsibility' theory of United Nations Framework Convention on Climate Change (UNFCCC) and in the provisions of Kyoto Protocol (Soltau 2008), in particular considering the role of individual states in reducing greenhouse gas emissions. This provides the basic framework of climate justice at any level associated to resolve the challenges associated with unequal distribution of resources, distribution of responsibility, distribution of the costs and benefits of policies and responses to climate change (Benzie 2012). Considering the local level perspectives, Sheppard et al. (2011) argued that there is a lack of significant information about climate change, at the local level, or the procedures to engage the public in the decision-making processes. Costello et al. (2009) suggested that framing global warming information in relation to health rather than a 'green' or environmental issue would increase the engagement in climate change issues. We have seen that in the recent years, the environmental justice movement has broadened the scope to areas of justice to food, housing and transportation, as well as opposition to the commodification of the atmosphere through global carbon markets as well.

2 Climate change impacts

The Intergovernmental Panel on Climate Change (IPCC), leading international scientific body on climate change, states that greenhouse gas emissions must peak by the year 2015 and without the international coordination and cooperation, the world will not be able to avoid the worst ever impacts of climate change in near future. It calculates that maintaining average global temperatures between 2 and 2.4 °C over pre-industrial levels will require global emission cuts between 50 and 85 % over 2000 levels by 2050. Lindley et al. (2011) elaborately explained that climate change may increase the intensity and frequency of extreme weather events such as floods and heat waves. Defra (2012) summarizes that although there are potential opportunities that can be gained from the changing climate, they are far outweighed by the risks. These events result in the impacts that are either tangible, like property loss, or intangible, such as effects on mental health with implications for short-term or long-term perspective (Defra 2013a, b).

Figure 1a, b explains that the one who contributed the least in the emission of greenhouse gases will be the most impacted by the impacts of climate change. Figure 1a shows the countries around the world with carbon dioxide emission per capita, and we can see the developed countries with high emissions, and low emissions of greenhouse gases are by the least developed countries, so this can be inferred that developed economy was based on fossil fuels and which contributed to higher rate of greenhouse gases emission and that leads to climate change. Interestingly, the Fig. 1b shows the vulnerability of countries to the climate change in the world. By comparison, we can easily understand that the countries who contributed least to the greenhouse gases emissions are more vulnerable to the climate change (adopted from Samson et al. 2011).

For example, a report from World Bank (2012) suggests that annual per capita emission of carbon in 49 least developed countries is around 0.3 metric tonnes per capita of carbon emission annually, where only in China carbon emission per capita is more than 6.7 metric tonnes. IPCC assessment reports (2001, 2007, 2014) documented that the impacts of climate change are not only limited to the drastic changes in rainfall, weather events and rising sea levels, but also include ocean acidification (compromising fisheries, livelihoods and children's nutritional status), changes in vector-borne disease (extending malaria and other tropical diseases into highland populations for the first time), air pollution due to high ozone levels (affecting children's lung development and general health) and ecological imbalances (leading to crop failure, species extinction and humanity's diminished heritage) (Commission on Climate Change and Development 2009).

Another dimension of climate change impacts migration, broadly identified as the low availability of resources causing population movement, which might bring a range of infectious diseases to another part (Grynszpan et al. 2010). According to Houston and Dean (2011), currently about 5 % of the urban population is at risk of flooding by intense rainfall which is projected to increase up to more than 3.2 million people by 2050 under the changing climate trend which ultimately will also affect vital systems, such

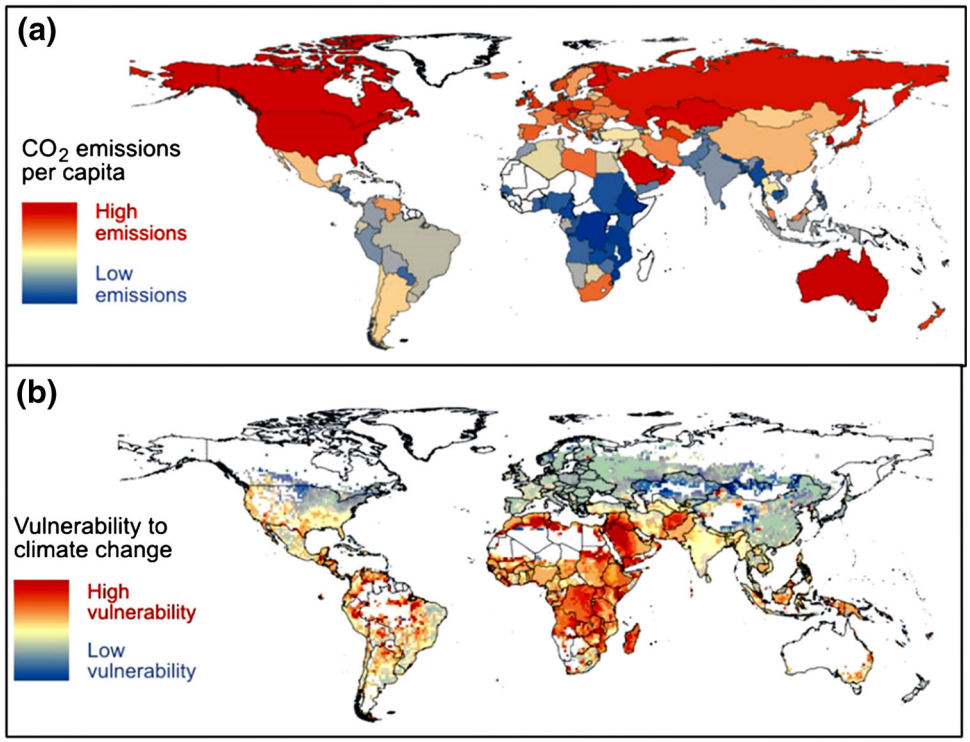

Fig. 1 Geographical distribution showing (**a**) per capita emission of CO_2 and (**b**) vulnerability to climate change throughout the world (Adopted from Samson et al. 2011)

as growing food and energy supplies around the world (FAO 2008). It is mentioned by Karl et al. (2009) that any changes in land use, land cover and climate variability will have a direct impact on food production and alternative economic activities. It is recognized that climate change may have a wider range of indirect effects on health, aggravating existing public health problems related to water availability, nutrition, mental health and well-being, displacement and migration, and health equity.

3 Equity dimension of climate justice

In lieu of changing climate, the classification of climate justice is based on the basic principle of equal treatment and fairness in society. The equal treatment is the basic human right, the basic building blocks of fairness in today's society required for society to function well (Brisley et al. 2012). It is well recognized now that in the course of the development, the groups with most benefits are from the high levels of emissions. So they have to take responsibility to ensure that other vulnerable groups should have equal opportunities to develop by reducing its own consumption, within a framework of justice, and making efforts to slow the pace of climate change. There are facts proving that some of the individuals and groups with the lowest levels of carbon emissions and opportunity to develop suffered the most severe consequences of global warming. As reported in WWF (2009), to foster the effectiveness and efficiency in society, it is important to treat communities with fairness, without any discrimination. Steele et al. (2012) suggested that there is no voice of the groups which are disproportionately affected by climate change impacts, and recommended to include the voice of vulnerable groups in the policy-making process in the world.

The climate justice builds on the platform of equitable development, human rights and political voice for everyone. It is an agenda that seeks to redress global warming by reducing disparities in development and policies that lead to climate injustice and discrimination in the society. This implies transformative changes and the needs to look beyond national boundaries to what is good for the humanity as a whole. In March 2010, discussion paper from the European Climate Justice Action network (CJA) explained that climate justice is linking all struggles together that reject neoliberal markets and working toward a world that puts autonomous decision-making power in the hands of communities (Cazorla and Toman 2000). The conclusion is that we cannot prevent further global warming without addressing the way our societies are organized, and that the fight for climate justice and the fight for social justice are one and the same. Currently, many strategies and action plans are recommended by academic or scientific communities, but the important part of climate justice is to understand that the need of urgent action to prevent climate change must be based on community-led solutions, inclusive of the well-being of local communities, indigenous peoples, global poor, as well as biodiversity and intact ecosystems with fair policies. All the profits, losses,

responsibilities and burdens associated should be equally shared and fairly allocated. This involves different responsibilities with a common goal in relation to mitigation or adaptation measure or strategies. The developed countries, based on fossil fuel economy should obligated to the people in the low income countries so that they have access to the opportunities to adapt to the impacts of impact change and be ready and embrace the low carbon climate resilient development in their country.

4 Climate justice for vulnerable groups

Correctly identifying the vulnerable groups is an integral dimension of the climate justice. Even for the communities or the groups, it is not always easy to understand that they are possessing risk or threat from changing climate or global warming. Wolf et al. (2009, 2010) discussed the case of older people that they (older people) never consider themselves in the vulnerable group to the higher temperatures. It was explained that they generally do not like to challenge common perception related to their vulnerability, but they believe that they are resilient toward climate change and independent. As far as we know, it is assumed that in the near future, people or communities, who live in isolations, are more vulnerable to the risks of changing climates. Today, billions of poor people are forced to live in poor conditions, unhygienic places and less safeguard from changing climate than others which made them more vulnerable to risks. The next level of threats came into picture when the other parameters involve such as gender, age, status of health, caste, ethnicity and demographic locations. As we see, mostly poor communities and few vulnerable groups are pushed outskirts of the cities to live, where they have to deal with all kinds of pollutions, low quality of life and with limited access in comparison with the people living in the city with better quality of life. Lindley et al. (2011) draw attention on the existing research, which are identifying the affecting societal, environmental and personal factors on the different effects produced by flood or heat waves as we have seen in the UK (ASC 2012). These are evident enough to understand and deal with the vulnerabilities and will be helpful in forming a framework for climate justice.

The most concerned area of discrimination is gender discrimination, which is responsible for widely known inequalities in the political, social and economic systems. Even today, women are the ones with a less powerful voice in politics, limited access of required resources and limited capacities to claim basic rights. According to the IPCC reports, in extreme weather conditions and natural disasters (e.g., flood) brought to us by climate change, women die at higher rate than men indicating their vulnerability.

The two most important resources which are most vulnerable to climate change are drinking water and fuel, and the women are the ones who collect and utilize the drinking water in most of the rural areas and collect resources for the fuel required to cook food at home. It is analyzed that in the rural areas, women are more dependent on the agriculture for food and basic requirements. This is one of the reasons that women have more need for access of energy and its related services for houseworks in both rural and urban areas. In some areas, women are responsible for forest resources management and contribute extensively in the farming or agriculture practices. As per FAO (2009) reports, in the developing countries, there are more than two thirds of female laborers and 45–80 % women are working as farmers in the food production areas. In African continent only, more than 90 % of women are working in the agricultural field (FAO 2009). In the context of changing climate, the food sources are becoming less predictable and production is getting lower. In many places, women participate in crop harvesting, which is the only source of income and which makes them more vulnerable. It is reported that the rise in food prices impacts women severely and particularly girls, because their health condition deteriorates more and faster than males in the times of food shortage, so this make sense to include women as a vulnerable group, and their inclusion in the decision making is necessary. Furthermore, exclusion of women from decision making on accessing the land use and resources are critical to their livelihoods (FAO 2009). Women as a vulnerable group have a strong focus in terms of equity for climate justice in lieu of climate change.

In the UNICEF reports, it is explained that children with poor nourishment put them at more risk of health and even death due to air-borne common infections and illness. According to the estimation of the International Food Policy Research Institute, by year 2050, there will be 20 % more malnourished children than would be the case, even without the impacts of climate change (Nelson et al. 2009). UNICEF reports mentioned that among children, more than 80 % of deaths were caused by a curable disease, malaria. These are the few strong reasons to understand higher mortality rate in children than the grown-ups, and climate change is increasing the risk of these kinds of diseases.

The World Bank estimation showed that by the end of 2050, even with the scenario in which the temperature rise is less than 2 °C, there will be 10 % of decrease in the crop yields (and by as much as 15–20 % with higher levels of warming). These estimates increase the food insecurity and malnutrition in 25–90 % of total children. Najat (2011) explained the capacity of assessing and addressing the vulnerability of children (sale or trafficking and other exploitations are limited by the absence of good qualitative and quantitative data). Like the other vulnerable groups,

children are a large chunk of the population, but never get chance to feature in the climate changes policies and debates. The current world's population is around 7.2 billion, and population under 18 is almost one third of whole population, with more than 85 % of which are in developing countries. The children suffer more of health issues from changing climate, and this amplifies because of physiological immaturity. The current main killers of children are malaria, diarrhea and malnutrition. Above all, children is the one group which is highly vulnerable to climate change, and climate justice is a way in future to secure their rights.

Indigenous people are the most vulnerable group from the climate change impacts. The group's heavily depend on the natural resources, as such tree, water, rivers, and mountains, for their day-to-day living, and these resources are most threatened by climate change. Ytterstad and Russell (2012) explained that groups that do not have appropriate indigenous lands have experienced violations of basic rights, displacement due to renewable energy generation projects. Although UN climate summit in Copenhagen in 2009, already called for climate justice and its reach to mainstream media, now this is the time to manifesting this in news media linking this particularly to indigenous people.

It is reported that research in climate justice is not significant and it overlooked most climate change challenges, especially the ones faced by indigenous people with valid demands (Watt-Cloutier 2004). Present commercial market that increased the value of indigenous land by monetizing it worldwide could not be in favor of indigenous groups and be disadvantageous for indigenous communities. They do not carry title or any power of attorney on lands and also have very limited economic access. The restricted access to the natural traditional resources could be among the important outcomes making the existing problem worse. In this case, climate justice brings a hope to give their basic rights and recognition that they do not contribute in emission or changing climate as others do and they deserve this consideration.

The UN Human Development Report (2007) explained that in between years 2000 and 2004, out of every 19 people in the developing world, one person was affected by the climate-related disaster. In OECD, the figure is one person in every 1500 people. In the year 2009, Oxfam studies attract the attention to the fact that every year around 250 million people are affected by the natural disasters, and out of them, 98 % are victims of drought and floods only. The prediction that chances are there that this could be increased to the 375 million people worldwide by the year 2015, explains the impacts of climate change in form of flood and drought. In a similar kind of study from Columbia University's International Earth Science Information Network, the prediction is that by the end of year 2015, the number of climate refugees will increase to 700 million people. ADB reports indicated that in last decade, four countries named India, Bangladesh, Vietnam and the Philippines lost more than 20 billion USD in order to fight with natural hazards, and this is estimated to grow in future with climate change. Based on modeling, Asian Development Bank estimates that even if measures of adaptation and mitigation will not take place by now then countries like Indonesia, Philippines, Thailand and Vietnam could lose around 6.7 % of their GDP growth by year 2100, which is more than twice of the global average economy (Asian Development Bank 2009a, b). There are countries, which are facing the danger of sea level rise, and the increased frequency of natural disaster increases the risk of sustainable future. In all these predictions, one point is clear that the people who are getting affected by these effects are contributed the least and poorly managed during crisis. The climate justice provides a sustainable approach and legal framework with a well-defined method to tackle the climate change injustice toward few vulnerable groups and also to ensure the economic help in order to prepare and mitigate changing climate impacts.

5 Research gaps and future scopes

There are a number of broad areas where the research in climate justice has been largely unvoiced due to a lack of efforts. Nonetheless, they are judged critical for future directions (Adams and Adger 2013). Any dimension of the justice incorporates the significant issues of access, the societal issues and the nature with perceiving the links between the natural world and anthropogenic actions. Hence, the climate justice has to incorporate the environmental, societal and economical aspects for the people who are not responsible for the damage but still paying the price (Adams and Adger 2013). There are massive gaps to understand climate justice, and hence there is scope of more research (highly recommended), and to completely capture the essence and approach on all levels to deal with climate change, it is a must to look for the further research areas.

There is a big gap in understanding the intangible and longer effects of the natural disasters or climate-related events on people behavior and well-being. The mental health, trauma and other long-term effects on the health are few of those. To explain further, the mental health gets affected after a flooding event occurs. The longer-term flood impacts at the neighborhood or community level are also poorly documented in various researches (Werritty et al. 2007). The questions like what would be the effect on development and mental state of groups in the region after a tornado hits or a flooding happens. To understand these long-term and short-term impacts are very important and highly recommended.

Due to the important role of social capital in climate change adaption, the research in social vulnerability and resilience places the highest priority. To understand better a few examples elaborated the urgent need of the research. The evidence on heat mortality in North America (Semenza et al. 1996) implies that belonging to a strong social network can have a protective effect against heat illness and mortality. Wolf et al. (2010) suggest that social networks are not necessarily supporting adaptation among vulnerable groups. There is also a need to be aware that vulnerable groups exist within communities that might be described as having high levels of resilience (O'Neill and O'Neill 2012).

Identification of vulnerable groups is another important aspect of research, which is little tricky sometimes to define the vulnerable groups and level of risk they possess. Lindley et al. (2011) explained that the current local work on mapping vulnerability is not enough to identify vulnerable households and individuals. The current situation expects and requires the methods to provide a rapid and targeted list of vulnerable people, communities and groups with cost-effective measures. This would be a very useful tool in order to have a long-term strategy and emergency response to any situation and prepare us in better way.

An important under-researched area in climate justice is the effects of climate-related impacts on the business-related activities, such as flooding on local businesses (Defra and EA 2004; Walker et al. 2006). Study carried out by Zurich Financial Services Group and Business Continuity Institute (Zurich Financial Services Group 2011) revealed that in the last year, around 51 % of business supply chains were affected by adverse weather. More than 49 % of businesses lost productivity, and revenue decreased by 32 % from climate-related disruptions (Haraguchi and Lall 2014). In coastal zones, climate change is likely to negatively affect the fishing industry and tourism, on which many locations rely. The reduction in the stock of fish can cause the food insecurity, and loss of tourism can cause unemployment, which can result in migration and communities displacement (Zsamboky et al. 2011). There is relatively little research on combined or multiple impacts of climate change (Curtis and Schneider 2011) based on demographics. For example, Lindley et al. (2011) investigated the vulnerability of neighborhoods to the simultaneous impacts of heat and flood and found that about two thirds of the most extremely socially vulnerable neighborhoods in the UK have joint climate-related social vulnerability in relation to heat and flood. It is really important to understand the ability of communities to cope up with potential impacts and what would be the response.

As discussed by Thrush et al. (2005) that communicating the right information with right perception is critical to ensure the community's proper response. There is a significant amount of research gap in the area of warning to communities and mode of action. The help of vulnerability maps, hazard maps and at times locally available maps can play an effective role in reducing the risk. Also, this is shown by Wolf et al. 2009, 2010) that social networks can both increase and decrease the resilience of vulnerable people. The mode of showing the information is also an interesting way. As in present world, the use of mobile technology, social networks, interactive games and software are interesting ways to reach people's pocket, educate them and send the right information at the right time, and the use of ICT can be very helpful, but needs more research in the area to identify the key impacts and results.

6 Conclusion and recommendation

To conclude, climate justice was embedded in international legal frameworks of fairness and equity. It was included with the common and differentiated responsibility principles of the United Nations Framework Convention on Climate Change (UNFCCC) and in the provisions of the Kyoto Protocol (Soltau 2008). The world development models and the governance are built around the notions of fair justice without any kind of discrimination, now, which needed to add the objective of fairness in well-being of people and ecological consideration in legal system in the form of climate justice. There is an important need of evening out the imbalances that are not sustainable in nature and urgent need for development of tailored policy responses for groups which are vulnerable to the impacts of climate change (Lindley et al. 2011). This paper explored the climate justice as an answer for the needs raised and provides an efficient tool to tackle climate change injustice. The recommendations are made for further research to bridge the gaps in the theory of climate justice, in which, the local authorities, trusted agencies and organizations that work with particular social groups and posse the local knowledge should collaborate to be the part of targeted information and advice on impacts of climate change for vulnerable groups (Johnson et al. 2010; Walker et al. 2006; Werritty et al. 2007).The spatial planning has the potential to get the right development in the right place in a fair and transparent way and to bring responses to climate change together in a local area (Henderson 2010). Another dimension explored is that in order to achieve climate justice, an approach is required that tackles climate change impacts and social vulnerability together (Walker et al. 2006).

Climate justice is a strong medium to awaken the society toward the impacts and issues of climate change. This provides a strong tool for the vulnerable group and shared responsibility for all to understand the importance of environment as a whole, and human well-being is directly proportional to environment.

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