DEVELOPMENT CHALLENGES OF THE FUTURE: A REVIEW OF THE LITERATURE

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ABSTRACT

The broad concepts of poverty, vulnerability and climate change form the focus of the article; an integration of all the three themes to form an effective 'development context' presents one of the key global challenges of the 21st century. The need for poverty reduction, that is, a decrease in the number of poor and the extent of their deprivation has long been recognised. In addition to poverty, future climate change has emerged as another challenge facing the developed and developing countries alike. The consequence of climate change will impact particularly developing countries, and poor and vulnerable household and communities within these countries. Explicit in the climate change literature and implicit in the poverty literature is the concept of vulnerability, a term that is in wide use with different connotations. A distinct link therefore emerges between poverty, vulnerability and climate change and this link has been explored in this paper.

Keywords: Adaptation, Climate change, Development, Poverty, Vulnerability

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THE MANY DIMENSIONS OF POVERTY

The concept of poverty has a long history of usage, and over time its meaning has been considerably broadened and expanded. In the 1960s, the main focus was on the level of income reflected in macro-economic indicators like Gross National Product per head while in the 1970s, the emphasis shifted to relative deprivation, inspired by the work of Runciman and Townsend. The concept of income-poverty was, thus, broadened to include a wider set of 'basic needs', and following the International Labour Organisation's (ILO) pioneering work in the mid-1970s, poverty came to be defined not just as a lack of income, but also as lack of access to health, education, and other services. This inspired policies like integrated rural development, and continues to influence current debates on human development.

The 1980s saw the addition of a number of significant new ideas to the concept of poverty. These were: (1) The idea of 'vulnerability' and 'security', associated with a better understanding of climatic seasonality, and the impact of shocks. Thus arose the importance of assets as buffers, as well as social capital, which again, led to new work on coping strategies. (2) A broadening of the concept of poverty to a wider construct, livelihood. The term 'sustainable livelihood' became popular after it was adopted by the Brundtland Commission on Sustainability and the Environment. (3) Greater attention was paid to 'participation', mainly as a result of the work of Robert Chambers (1983) on powerlessness and voicelessness. (4) The work of Amartya Sen (1981; 1985) emphasized that income was only valuable in so far as it increased the 'capabilities' of individuals, and thereby permitted 'functionings' in society. (5) The 1980s also saw a rapid increase in the study of gender and gender relations (Maxwell, 1999).

There was further expansion of the concept of poverty in the next decade. Thus, the 1990s saw the development of 'well being' as opposed to the prevalence of poverty, and there was greater emphasis on how the poor viewed their own situation. The UNDP (1997), inspired by Sen, developed its idea of human development: 'the denial of opportunities and choices to lead a long, healthy, creative life and to enjoy a decent standard of living, freedom, dignity and self-esteem' (pp 20). The focus, today, is on 'social exclusion' and 'multiple deprivation' (low income, poor access to services etc.), i.e., rights, resources and relationships are all important (Maxwell, 1999).

It is difficult to arrive at a universally acceptable definition of poverty as the concept is so widely used and understood; the following may, however, be seen as useful explanations of the term. The British sociologist, Peter Townsend (1970) was of the opinion that poverty was not just a failure to meet minimum nutrition or subsistence levels, but rather a failure to keep up with the standards prevalent in a given society. For Amartya Sen (1985), poverty is the failure of some basic capabilities to function. Rejecting attempts that tend to universalise the concept, modern day writers like Rahnema (1992), look at poverty as a culturally, geographically and historically variable notion. More recently, IFAD (2001) views poverty as a broad, multidimensional, partly subjective variable over time, comprising capabilities as well as welfare, and in part relative to local norms, comparisons and expectations. The World Development Report (2000/01) gives the following explanation of poverty: "to be illiterate and not schooled. But for poor people, living in poverty is more than this. Poor people are particularly vulnerable to adverse events outside their control. They are often treated badly by the institutions of state and society, and excluded from voice and power in those institutions (pp 15)."

Measuring poverty is important as it gives an overview of poverty prevalent over time. It aids the understanding of the causes of poverty, and enables a government, or the international community to set itself measurable targets for reducing poverty. The three dominant approaches to poverty analysis that have featured in the development literature are: the poverty line approach, which measures the economic 'means' that households and individuals have to meet their basic needs (determined by their income), the capabilities approach (Sen, 1985; Nussbaum, 2000) which explores a broader range of means (endowments and entitlements) as well as ends ('functioning achievements'), and participatory poverty assessments (Chambers, 1992, 1995), which explore the causes and outcomes of poverty in more context-specific ways.

Besides these measures of monetary poverty, an alternative has been to define poverty, especially in sociological literature, as relative deprivation, or as exclusion from participation in society. Thus, those who are poor suffer severe deprivation like unemployment, poor housing, poor health, inadequate education, lack of access to safe drinking water, low life expectancy, insecurity, and low self-esteem. The WDR, 1990 also broadened the notion of poverty to include vulnerability, and exposure to risk, as well as voicelessness and powerlessness. All these forms of deprivation severely restrict what Amartya Sen (1999) calls the "capabilities that a person has, that is, the substantive freedoms he or she enjoys to lead the kind of life he or she values" (pp

87). Therefore, poverty may be said to be multidimensional, with the different aspects of poverty interacting and reinforcing one another; this in turn raises problems with the weighting of different components (Maxwell, 1999).

The problem with defining poverty as multidimensional raises the question of how to measure overall poverty, and how to compare achievements in the different dimensions (World Bank, 2000). One approach may be to define a multidimensional welfare function or a composite index. Attempts have been made since the 1960s to identify indices, that combine different elements, and the main current measures and their components used by the UNDP are:

Table 1: UNDP Measures of Poverty

MEASURE	COMPONENTS
Human Development Index	Life expectancy at birth, adult literacy, education enrolment, GDP per capita.
Gender-Related Development Index	As above, adjusted for gender differences.
Gender Empowerment Measure	Seats in Parliament held by women, female administrators and managers, female professional and technical workers, women's share of earned income.
Human Poverty Index (developing countries)	People not expected to survive to 40, illiteracy, access to safe water, access to health services, underweight children.
Human Poverty Index (developed countries)	People not expected to survive to 60, functional illiteracy, population below mean income, long term unemployment.

Source: UNDP Human Development Report, 1998

The Human Development Index (HDI), a popular indicator of global multidimensional poverty, is a composite indicator covering the three dimensions of human welfare, viz., income, education and health. It provides a measure that goes beyond income, and is a barometer for changes in human well being, and for comparing progress in different regions. Another approach is to define as poor anybody who is poor in any one of the dimensions or anybody who is poor in all dimensions, and to define the intensity of poverty accordingly. The question of selection of

indicators remains a matter of debate though the UNDP measures have now been more or less accepted worldwide.

Though widely used by both social scientists and politicians, the concept of social exclusion (often viewed as an important dimension of poverty) varies among countries, different schools of thought, and different experts and researchers (Silver, 1994). It emerged as a discourse in France during the 1970s, and has since spread across the world. The key text in the genesis of social exclusion seeks to redefine poverty as an objective condition of relative deprivation wherein individuals, families or groups lack the resources for participation in the customary activities of the society in which they belong (Gordon, 1998). Poverty is looked at as a lack of resources (income, wealth, housing), and social exclusion as a consequence of poverty. The two terms may not, however, be used synonymously. This is because not all social exclusion (e.g., that arising from disability) results in poverty. The concept is, however, somewhat arbitrary and society specific; in the developing world, for example, it points to groups and structural characteristics of society, and begins to examine the causes of poverty.

Poverty can also be said to be gender-specific and time-specific (IFAD, 2001). Women often have less access to, and control of, land, credit, education and health, technology and skilled work. They also suffer discrimination in pay, and access to land, legacies and credit (IFAD, 2001). Moreover, survey and poverty assessments generally report the incidence of poverty at a particular point in time. Seasonal stress and shocks like illness, natural disasters or war are likely causes for movements in and out of poverty (Maxwell, 1999). Some analysts, therefore, include as poor those who are highly sensitive to shocks or are not resilient. It is rural people, especially in rural areas, who are generally much more vulnerable to fluctuations in well being than the urban (IFAD, 2001). Moreover, the socially disadvantaged (e.g., the SCs and STs of India), ethnic minorities, and racial groups often face higher levels of poverty.

In view of the widespread incidence of poverty, the reduction of poverty, that is a sustained decrease in the number of poor, and the extent of their deprivation, has become an issue of global importance. Though the need to reduce poverty has been recognised ever since the 1960s, international attention, today, is focussed more sharply on poverty reduction than ever before. The WDR, 2000/01, e.g., laid out a strategy for reducing poverty resting on three legs: opportunity, empowerment and security (World Bank, 2000). Reducing poor people's vulnerability and expanding their coping mechanisms were significant in this context. The report

advocated a comprehensive approach to attacking poverty. Many of the elements of this strategy could be found in earlier efforts to synthesize an overall approach to poverty reduction.

The latest manifestation of the International Development Targets agreed mostly at UN conferences in the early 1990s, and codified in 1996 by the Development Assistance Committee (DAC) of the Organisation for Economic Cooperation and Development (OECD) are represented by the Millennium Development Goals (MDGs). The goals have been commonly accepted as a framework for measuring development progress, being time-bound (to be achieved by 2015) and quantifiable (Millennium Declaration, 2000). The goals comprise 18 targets and 48 indicators; it is up to each individual country to set its own targets, and work together with the global partners to ensure that the fruits of development reach the abjectly poor.

Despite years of concerted effort at the global, national and sub-national levels, however, poverty eradication remains one of the key global challenges of the 21st century. The failure of poverty alleviation programmes to effectively tackle the problem of poverty particularly in the developing countries has often been attributed to the narrow focus of such policies that aim solely at income generation. In fact, since the 1980s, development practitioners in the West have emphasised the need to link ideas of 'vulnerability' and 'security' to broaden the concept of poverty especially as many of the world's poor are found in geographically vulnerable places, and live under vulnerable environmental, socio-economic, institutional and political conditions. The term 'vulnerability' referring to the relationship between poverty, risk and risk management was brought to the forefront of development policy dialogue by the WDR of 2000/01 that highlighted the interface between empowerment, security, opportunity – and poverty (Alwang *et al*, 2001). The understanding of human deprivation has thus moved from a static to a dynamic view of poverty, from ex-post poverty to ex-ante vulnerability.

In addition to poverty, future climate change has emerged as another global challenge facing the developed and developing countries alike. The consequences of climate change will impact particularly developing countries, and poor and vulnerable households and communities within these countries. A distinct link emerges, therefore, between poverty, vulnerability and climate change; this link is explored further in the following sections.

CLIMATE CHANGE AND ITS SIGNIFICANCE

The reflexive relationship between human society and the environment is manifest in changes brought about by human action on the environment. One of the negative impacts of human action is climate change, widely recognised today as a significant global environmental challenge. Climate change is a long-term shift or alteration in the climate of a specific location, a region or the entire planet. The shift is measured by changes in some or all the features associated with weather such as temperature, wind patterns or precipitation. A change in the variability of climate is also considered climate change, even if average weather conditions remain unchanged (Shukla *et al*, 2003). The term climate change, for the Intergovernmental Panel on Climate Change (IPCC, 2001a), refers to any change in climate over time whether due to natural variability or as a result of human activity. This differs from the definition in Article 1 of the United Nations Framework Convention on Climate Change (UNFCCC, 1992), where climate change refers to a change in climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere, and which is in addition to natural climate variability observed over comparable time periods (IPCC, 2001a).

In its Third Assessment Report (TAR), the IPCC (2001b) concluded that the globally averaged surface temperatures increased $0.6^{o} \pm 0.2^{o}$ C in the 20^{th} century, and this warming trend is expected to persist for the next century and beyond. Most of the warming is attributed to greenhouse gases such as carbon dioxide, methane and nitrous oxide released from anthropogenic sources. Their concentrations have increased considerably since pre-industrial times and the 1990s was the warmest decade in the last thousand years. Changes in the pattern of precipitation have also been observed, and this is consistent with the expectation of more extreme events in the 21^{st} century (Houghton *et al*, 2001). Projected changes in future climate include additional warming, increases and decreases in precipitation, and sea level rise besides changes in the intensity and frequency of extreme events. These changes will impact natural and human systems directly or in synergy with other factors to alter the productivity, diversity and functions of many ecosystems and livelihoods around the world.

However, the effects of changing climatic conditions will not be felt equally around the globe (O'Brien and Leichenko, 2000; Tol *et al*, 2004). Climate change will impact different regions and sectors differently based on their sensitivity and adaptive capacity, and therefore, vulnerability. Less developed and poor societies have a higher risk of bearing the adverse impacts of climate change. At stake are their habitats, food security, livelihoods, income

potentials and health. National water security, food security, economic development, forest covers, ecosystems, coastal infrastructure, and energy security may be under threat in many countries as a consequence of climate change. Thus, climate change is expected to stress both natural and human systems and many regions, it is expected, will experience a greater scarcity of natural resources (IPCC, 2001b; Tompkins and Adger, 2004).

The TAR (IPCC, 2001b) also assessed that 'the impacts of climate change will fall disproportionately upon developing countries, and the poor persons within all countries, and thereby exacerbate inequities in health status and access to adequate food, clean water and other resources'. A similar sentiment has been expressed by many others; Handmer *et al* (1999) and Smit and Pilifosova (2003), for example, opine that climate change and variability challenge countries, regions, sectors and communities that are most exposed and least able to respond or adapt to changing conditions, that is, those who are most vulnerable. Vulnerability or susceptibility to harm can be moderated by adaptive capacity – the ability to cope with change (Smit and Pilifosova, 2003; Yohe and Tol, 2002). There is general agreement that developing countries are deemed to be more vulnerable to climate change partly because of their exposure but mainly because of their limited adaptive capacity (IPCC, 2001b). Downing *et al* (1997) note that vulnerability of developing countries is higher in part due to their higher dependence on resources that are affected by climate (like fishing, forestry, agriculture) relative to industrialised countries (that is, they are more exposed). They also tend to have less economic, technological and other resources to deal with, adapt to and recover from hazardous exposures. Within countries, it is the poorer groups or communities who are more vulnerable, both because they are in more exposed livelihoods and locations, and because they have very limited capacity to adapt (Smit *et al*, 2005).

There are two principal response strategies to human induced climate change, namely, mitigation and adaptation. Mitigation attempts to prevent the climate change problem from occurring at all or getting worse by reducing the emissions of greenhouse gases (GHGs) while adaptation aims to cope with the problem of climate change impacts when they occur. Climate change was initially seen as likely to occur gradually in the medium or long-term future (between 50 to 100 years' time), and the policy priority in the short term (in the next 10 to 20 years) was, therefore, the reduction of the emission of GHGs through mitigation. Hence, the first decade of the negotiations under the UNFCCC focussed largely on elaborating mitigation commitments, and

related institutional and financial mechanisms to ensure that the main emitting countries took actions to reduce their emissions. The main emphasis of national and international climate policy was also on mitigation (Huq and Reid, 2004).

Explicit in the climate change literature, and implicit in the poverty literature, is the concept of vulnerability, a term that is in wide use with different connotations. An examination of the meaning of the term is necessary before a link between the three concepts can be established.

THE MEANING OF VULNERABILITY

The concept of vulnerability has been developed and employed with reference to various contexts including food security, environmental change, natural hazards, and climate change. Broadly, the term refers to susceptibility to harm (Smit and Pilifosova, 2003). In the natural hazards literature, vulnerability has been referred to as the 'degree of loss resulting from the occurrence of natural phenomena to a given element or set of elements' (UN Disaster Relief Organisation, 1982). More recently, Wisner *et al* (2004) seek to expand its scope to include the determinants of vulnerability, that is, the characteristics of a person or group and their situation, that influence their capacity to anticipate, cope with, resist and recover from the impact of a natural hazard or an extreme event. Looking at vulnerability from the food security point of view, the term is defined as 'the presence of factors that place people at risk of becoming food insecure or malnourished' (FAO, 1999). Authors like Swift (1989), Liverman (1994) and Adger and Kelly (1999) advocate the use of a political economy framework using the 'entitlements approach' developed by Sen (1981) in analyses of vulnerability. Thus, according to Bohle *et al* (1994), vulnerability becomes an aggregate of human welfare that integrates environmental, social, economic and political exposure to a range of harmful perturbations. In recent years, the term has gained wide popularity among the climate change community that defines vulnerability as 'the degree to which a system is susceptible to, or unable to cope with adverse effects of climate change, including climate variability and extremes' (IPCC, 2001b). Vulnerability has also been viewed as a human condition or process resulting from physical, social, economic and environmental factors, which determine the likelihood and scale of damage from the impact of a given hazard. Vulnerability can be assessed at many scales: individual, household, community and nation. Chambers in 1989, proposed a distinction between an 'external' and an 'internal' side

of vulnerability where the 'external' perspective refers mainly to the structural dimensions of vulnerability and risk (exposure to risk, shock) while the 'internal' dimension focuses on coping and action to overcome or at least mitigate the negative effects of economic and ecological change (manifest in defencelessness, insecurity).

Different disciplines tend to view vulnerability in different ways; e.g., each uses different outcomes as its primary focus, and is concerned with different forms of risk. Alwang *et al* (2001) provide a useful review of the literature. The relatively large body of literature that exists on poverty dynamics recognises that poverty status relates to a time reference (Jalan and Ravallion, 1998); however, poverty is looked at as a static outcome of a dynamic process, and is the primary policy focus. The dynamic process itself does not receive the same degree of attention, and the problem occurs when outcomes that are not easily measurable (like physical violence or illness), but at the same time contribute to welfare losses, are considered. Therefore, the concept of vulnerability is broader than the concept of poverty. Chambers (1989) sought to distinguish poverty, which he defined as 'deprivation, lack or want' from vulnerability described as 'defencelessness, insecurity, and exposure to risk, shocks and stress'.

The multidisciplinary asset-based approach to poverty analysis describes poverty as caused by inadequate access to tangible (natural, physical, human, financial) and intangible assets (social, institutional and political relationships, location). Vulnerability, therefore, is linked to asset ownership; the more assets people have, the less vulnerable they are, and the greater the erosion of people's assets, the greater their insecurity (Moser, 1998). A major conceptual focus of this literature is the ability of households to manage risk through enhanced responses to risk, which may be *ex ante* or *ex post*. In most cases, a combination of both is necessary. Several concepts related to vulnerability are widely used in this literature; these include susceptibility, resilience and sensitivity.

The sustainable livelihoods literature represents an important contribution to the understanding of household vulnerability; here, vulnerability refers to the probability that livelihood stress will occur – with more stress and higher probability implying increased vulnerability. Vulnerability is, thus, synonymous with livelihood vulnerability, and in this sense, is dynamic. Households that possess certain characteristics that make them vulnerable (like households with old and infirm

members or female headed households) are called structurally vulnerable while the condition of proximate vulnerability may change from year to year (Davies, 1996).

Vulnerability is looked upon as a state of 'food insecurity' in the well-established literature on food security that considers food production or consumption as the most important component of a livelihood (Maxwell *et al*, 2000). Sociologists have adopted the term 'vulnerability' as an alternative means of characterising poverty inadequately captured by measures of income or consumption. Factors such as capabilities, employment opportunities, deprivation and exclusion all help to determine poverty status and so vulnerability is often discussed as 'social vulnerability' as opposed to 'economic vulnerability'. Sociologists have also been responsible for extending the definition of assets beyond the physical and financial realms to include 'social capital' based on household relations (Moser, 1998). Social assets play a most important role for the most vulnerable populations, who as a rule, control very few economic, political, infrastructural, ecological and personal assets (Bohle, 2001).

A large body of literature addresses the relationship between human vulnerability and natural disasters. The focus is on risks that are described as natural disasters. Vulnerability is usually defined as an underlying condition and the literature explicitly recognises the roles of household assets and access to opportunity in determining vulnerability to natural disasters (Blaikie *et al*, 1994; Vatsa and Krimgold, 2000); the characteristics of the household in turn affect the mitigation and coping abilities of the people. The literature also incorporates a time dimension: the extent of a disaster cannot be measured without knowledge of the resilience of the affected groups, and this resilience plays out over time (Alwang *et al*, 2001).

A search of the environmental literature reveals the reflexive relation between the society and the environment. Thus, while human society affects environmental change, it is also vulnerable to these changes. The environmental literature therefore focuses on risks and outcomes; vulnerability is defined with respect to an outcome that is based on ecology-centric concerns as opposed to other approaches that are usually human-centric (Alwang *et al*, 2001).

The term vulnerability is also used to refer to nutritional vulnerability usually taken as a probability of inadequate food intake needed to live a normal and active life or the probability of suffering nutrition-related morbidity or mortality (Davies, 1996). A major theme in the literature examines the implications of malnutrition for outcomes such as educational attainment, adult

productivity etc. Recent efforts have tried to correlate nutrition and health outcomes with socio-economic status – as measured by a household's assets (e.g., Gwatkin *et al*, 2000).

In recent years, the concept of vulnerability has been widely used in the climate change literature. A common theme in this literature is the idea that countries, regions, economic sectors and social groups differ in their degree of vulnerability to climate change (Bohle *et al*, 1994), partly due to the fact that climate change impacts will be distributed unevenly around the globe, and also because resources and wealth are distributed unevenly. In the climate change literature, vulnerability is most commonly seen as a residual impact (or 'end point') of a specified climate change scenario, estimated for the purposes of gauging the seriousness or dangerousness of climate change (Kelly and Adger, 2000; O' Brien and Leichenko, 2003). Besides suffering from an inconsistent use of the term, this literature primarily focuses on the biophysical impacts of climate change, and to a lesser degree estimates implications on socio-economic and resource systems (Smit *et al*, 2005).

Certain common themes arise from a review of the literature. First, though most disciplines focus on only one or a limited number of sources of risk, households are vulnerable to a variety of negative outcomes that can be measured in different ways. The concept of multiple forms of vulnerability however causes problems of measurement – problems relating to the development of a single index encompassing the different dimensions, the attainment of objective measures for many subjective concepts, and the comparability of measures over space and time. Secondly, the poor are more vulnerable. This idea is well accepted and has been explained thus. The poor are, often because of their location, more exposed to risky events (such as natural disasters) and have less access to assets that can be used to manage risk (Blaikie *et al*, 1994; Devereaux, 1999; Sharma *et al*, 2000). The poor are less likely to call on social capital claims for ex post risk management, and because they tend to be politically disenfranchised, they are less likely to receive social services following a disaster (Narayan *et al*, 2000). Finally, evidence suggests that the poor are more likely to bear the brunt of human costs associated with risks (Benson and Clay, 2000).

The vulnerability literature also distinguishes between physical (or biophysical) and social vulnerability. Physical vulnerability is described as the sensitivity of the physical system, or the likelihood of exposure (Liverman, 1994; Cutter, 1996). The concept of social vulnerability emerged from the recognition that the existing social conditions enhance or reduce the

susceptibility to harm from hazardous events; marginalisation, equity, the role of institutions, food and resource entitlements, economics and politics (Adger 2000; O'Brien and Leichenko, 2000; Pelling, 2002) are considered attributes of a social system that increase exposure and/or limit adaptive capacity. Thus, Wisner *et al* (2004) state that an examination of social vulnerability includes an understanding of the use of and access to resources, which in turn determines the ability of an individual or society to cope with and adapt to change.

POVERTY, VULNERABILITY AND CLIMATE CHANGE IN THE CONTEXT OF DEVELOPMENT

Watson *et al* (1998) argue that the vulnerability of a region to climate change depends to a great extent on its wealth, and that poverty limits adaptive capabilities. According to the Second Assessment Report of the IPCC, vulnerability depends on the level of economic development and institutions. The Report argues that vulnerability is highest where there is 'the greatest sensitivity to climate change and the least adaptability'. Handmer *et al* (1999) on their part, posit that many regions and countries will be capable of adapting to climate change, but that poorer countries and regions will have difficulty in responding to climate change. These authors, therefore, argue that the study of adaptation to climate change should begin with the study of social and economic vulnerability.

It is clear then that the positive correlation between poverty and climate change impacts is widely recognised. Additionally, discussions of vulnerability and adaptation in developing country contexts often highlight the importance of poverty and inequality – or differential resource access (Adger and Kelly, 1999). According to Ribot (1996), inequality and marginalization are among the most important determinants of vulnerability. Kates (2000) argues that different groups and places within countries differ in their ability to adapt, and that divisions between the rich and the poor translate into differentials in people's ability to adjust, and in access to adjustments. Adaptive capacity, similarly, is context-specific, and varies from country to country, community to community, across social groups and individuals over time. The adaptive capacity of a community is a function of local processes and conditions, which in turn are influenced by broader socio-economic and political processes, and widespread resource availability (Smit *et al*, 2005).

The poverty and vulnerability dimensions often overlap. In terms of exposure, being forced to settle on or cultivate marginal lands, demographic pressures resulting in intensive utilisation of marginal lands, and inadequate access to safe lands are constraints to the poor in developing countries. Poverty dimensions like age, gender, and health conditions are factors influencing how sensitive people are to environmental stress. Children, the elderly, widows, the chronically ill, the disabled and women are among the groups frequently cited as most vulnerable (Narayan *et al*, 2000). The political, socio-cultural and protective capabilities are important for the resilience of people, for example, being marginalized politically means that people's interests are overlooked (Anderson, 2000). A similar sentiment is expressed by the UNDP (1997) when it states that being part of social networks, and building on trust and reciprocity can be a central resilience strategy in times of environmental stress. In addition, poverty as expressed through a lack of various assets can also lead to environmental stresses becoming more severe.

While poverty reduction has been an enduring objective of national and international development policy, the need for adaptation to climate change is of more recent origin in development thinking, and has not yet been given a great deal of attention to in most countries. The latter does not get a mention in the MDGs to be attained by 2015 and many development thinkers contend that adaptation to future climate change will occur automatically once the MDGs of poverty reduction, spread of literacy and education etc. are met. To them, a global concern like climate change that may manifest itself decades in the future compares unfavourably with more immediate, pressing priorities for development such as poverty security, sanitation and public health (Agrawala, 2004). Others warn that potentially adverse impacts of climate change will negatively affect development in a number of key sectors especially in developing countries, including water resources, agriculture and coastal zone management (Huq and Reid, 2004). According to them, linkages between adaptation and development occur at several different scales and levels, e.g., local, sectoral, national, regional and global.

Therefore, climate change is a potential threat to the achievement of development objectives particularly of developing countries, and successful implementation of poverty reduction and development policies, requires incorporation of potential climate change impacts into ongoing development strategies and plans at sectoral and national levels (Huq *et al*, 2003; Agrawala, 2004). Negative climate change impacts can put an additional burden on those communities and sectors that are already marginalised. Likewise, the negative impacts of climate change can

potentially offset the benefits enjoyed in certain areas due to economic globalisation. Without addressing climate change issues, therefore, much development policy and practice will be wasted (Huq *et al*, 2006).

The UNFCC and Kyoto Protocol both require that climate change be tackled within the wider context of sustainable development, and adaptation is increasingly moving to the centre of an emerging research agenda (Burton *et al*, 2002). Integration into other development and poverty reduction policies, planning and activities can help ensure that adaptation policies do not work counter to development efforts. Since the adaptive capacity of those most vulnerable to climate change ultimately depends on their access to economic, physical, social and human resources, steps must be taken to identify vulnerable communities, to understand the extent to which they may be vulnerable to climate change, and to reduce their multiple sources of vulnerability. According to Yamin *et al* (2005) then, vulnerability, long neglected by mainstream development approaches, should be given due importance; vulnerability analysis of communities, and strengthening of their institutional support will go a long way towards tackling the structural causes of vulnerability, and enhancing their long-term capacities for adaptation.

CONCLUSION

Poverty reduction is a global priority though potentially undermined by climate change impacts. Mainstreaming current and future climate vulnerabilities into development is an urgent prerequisite for sustainable development for developed and developing countries alike. Underlying the twin challenges of poverty reduction and adaptation to climate change is the concept of vulnerability. Vulnerability may be assessed with respect to a variety of outcomes; though it is unlikely that an aggregate measure will ever be attainable, vulnerability accounts may be produced for each form of vulnerability. A balanced picture of the multiple stresses affecting a community, and the differential access to resources, may be useful for understanding the causes underlying the state of poverty of a community. The bottom line is that neither the challenge of global poverty nor of climate change can be effectively met in isolation. Climate change impacts are already starting to be felt in many parts of the world, and therefore, adaptive policies to counteract these must be mainstreamed into poverty alleviation and development policies especially of developing countries. Playing a vital role in this whole process is current vulnerability assessment on the basis of which adaptive strategies may be designed in the future.

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