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Vulnerability to Climate Change in Tanzania: Sources, Substance and Solutions

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Abstract

This paper examines vulnerability to climate change and its sources in Tanzania. The paper discusses the predicted changes in climate and climate change impacts, arguing that food production, land cover changes and human health require the closest attention in vulnerability analyses. The paper then suggests that human capital, technological alternatives, levels and sources of income, inequality, and social capital and quality of institutions are important sources of vulnerability. The paper analyses these sources vulnerability in the context of Tanzania, placing a special emphasis on the role social capital and quality of institutions. The paper concludes by underlining the importance of adopting a broad-based approach to vulnerability and adaptation that acknowledges issues such as water supply, energy supply, nutrition and health of rural and urban households, in addition to their production-related activities and their access to commodity, capital and insurance markets.

Keywords

Climate change, vulnerability, adaptation, institutions, Tanzania

1. Introduction

This paper examines vulnerability to climate change and its sources in Tanzania, focusing on the interaction of multiple sources of vulnerability and the role of state in reduction of vulnerabilities. Tanzania provides a good case study for understanding the interaction between multiple sources of vulnerability and the role of state. Tanzania is poor by all standards but it has achieved a good relative standing in human development. It has also

placed a strong emphasis on equality since its independence, which has resulted in relatively equal distribution of income when compared to other least developed countries. Yet the Tanzanian state is weak and perceived to be corrupt by international standards. However, it is far from grandly dysfunctional or dictatorial. The country thus repels naïve categorical judgements and invites into more careful analysis of determinants of vulnerability and challenges of just and effective adaptation to climate change.

This paper is informed by three distinct strands of literature and it seeks to bring their insights together in the case study on Tanzania. The first of these strands is the work of Amartya Sen (1987a, 1987b, 1998) and others (Nussbaum and Sen, 1993) on wellbeing, development and their measurement. In short, this literature calls for recognising wellbeing and development as consisting of multiple dimensions that cannot be brought together under any one parameter. The *Human Development Report* (UNDP, 2002) is informed by this line of thought: it seeks to characterise development by a number of indicators such as income, length of life and educational attainment. When applied to vulnerability, this line of reasoning underlines that sources of vulnerability are many and should be attended to simultaneously. For example, improved level of income does not automatically resolve vulnerabilities that originate from poor health and nutrition or lack of education.

The second strand of literature from which the paper draws is the work of economic historians such as Robert Fogel (1986, 1994) and others (e.g. Steckel, 1995; Szreter, 1997; Szreter and Mooney, 1998) on the role of nutrition and health in economic history. This literature indicates that nutrition has been an important determinant of health, and that the two factors influence the individuals' ability to generate income and the growth experience of whole nations. The historians' results give added twist to the pluralist arguments regarding wellbeing and development. Length of live, health, nutrition and educational attainment are

preconditions for attaining improved levels of income, and not automatic outcomes of adequate private and public spending. This means that sources of vulnerability are not simply complementary: they have complex synergistic relationships.

The third strand of literature informing the paper examines the relationships between institutions and economic growth (see North, 1981, 1990). Empirical research (e.g. Barro, 1997; Fedderke, 2001; Knack and Keefer, 1995; 1997) has demonstrated that the quality of institutions and social capital contribute to good economic performance. One important insight that has emerged from this research is that economic performance is related to state capacity and that the weakness of state may impair growth experience. However, state capacity does not only influence economic performance: it has an impact on the attainment of all social and political goals, including goals related to the environment and the reduction of environmental and other risks (Paavola, 2002). Therefore, the state can be both an instrument and an obstacle for the reduction of vulnerabilities.

Together the three strands of literature suggest that developmental outcomes as well as vulnerabilities are interlinked and that their attainment / reduction requires balanced attention to all of them, including state capacity. They also suggests that in the absence of strong and capable state centralised governance solutions may not be effective in reducing vulnerability and in assisting effective adaptation. This means that the lack of state capacity cannot be resolved by building the efforts to reduce vulnerability and to adapt exclusively on the individuals' own initiative and civil society organisations. Capacity and state building are necessarily a part and parcel of reduction of vulnerability.

In what follows, the second section discusses the climate impacts that are predicted to be experienced in Tanzania and East Africa in general. The third section discusses the sources of

vulnerability other than social capital and quality of institutions. The fourth section addresses the latter sources of vulnerability as aspects of weak state and lack of capacity. The fifth and final section draws together the observations and arguments presented in the previous sections and discusses their implications for both the analysis and reduction of vulnerability.

2. Climate Change and Impact Predictions

A brief overview of predicted climate changes and climate change impacts is necessary in order to understand their interaction with vulnerabilities. East Africa is predicted to warm by about 2 - 4 C° by 2100, somewhat less than the Mediterranean north-western Africa and the inner South Africa. The inner parts of East Africa and Tanzania are predicted to experience higher temperature increases than the coastal areas. Cold and dry seasons will warm more than warm and wet seasons. Rainfall is predicted to decrease by about 0 – 20 percent in the inner parts of the region and the country, with dry season(s) becoming longer and having less rainfall. In contrast, rainfall is predicted to increase by 30-50 percent in the coastal areas. The increase will take place during the rainy season and during the primary rainy season in the equatorial region which has two rainy seasons in a year. (Hulme et al., 2001; IPCC, 2001; Mwandosya, Nyenzi and Luhanga, 1998: pp. 1-24)

Tanzania experiences periodic droughts and flooding. Rainfall increases from normal in Africa in the first year of a two year El Nino episode and decreases from normal in the second year of the cycle. However, rainfall patterns in Tanzania follow the opposite cycle: first year of El Nino brings less than normal amount of rain and the second year brings more of it than usually. El Nino influences the length of rainy season and short fall rains in the equatorial region which experiences two rainy seasons in a year. La Nina reduces rainfall all over Africa during its first year and increases it in the second year. La Nina influences the amount of rainfall especially during the primary rainy season. However, its effects on

Tanzania are less pronounced than those of El Nino. Finally, variations in rainfall are strongly related to sea surface temperature (SST) variations in the Indian Ocean and the Atlantic which may sometimes alter standard oscillation outcomes. (Clark, Webster and Cole, 2003; IPCC, 2001; Nicholson, 2001; Nicholson and Kim, 1997; Nicholson and Selato, 2000)

Variability of rainfall is predicted to increase as the result of increased frequency of El Nino events (IPCC, 2001). Changes in the mean temperature and rainfall, and the increased variability of rainfall, are together likely to prolong the length of dry seasons annually and to increase the severity of periodic droughts. This will be pronounced in the interior part of the country which will be experiencing reduced rainfall. The coastal areas will be less exposed to droughts. However, there the increased mean rainfall, coupled with cyclical variation in it, is likely to result in more frequent and severe flooding. The predicted sea level rise of 0.10-0.90 metres is going to aggravate flooding in the coastal region.

Predicted changes in climate will have significant impacts on Tanzania's rain-fed agriculture and food production. Warming will shorten the growing season and, together with reduced rainfall, reduce water availability. Warmer climate can also increase crop losses caused by weeds, diseases and pests. Regional predictions indicate that Tanzania may suffer a loss of over 10 percent of its grain production by the year 2080 (Parry et al., 1999: S62-S64; see also Downing, 2002). The cultivation of maize – the most important source of carbohydrates providing about a third of the daily calorie intake – is going to be particularly hard hit. Maize is a staple crop grown by half of Tanzanian farmers for domestic consumption. If CO₂ concentrations will double and temperature increase by 2-4 degrees, the maize yield is likely to decrease on average by 33 percent by the year 2075. In the central Tabora-Dodoma region yields may be reduced by as much as 80 percent and the surrounding areas will also experience larger than average yield reductions (Mwandosya, Nyenzi and Luhanga, 1998:

181). In the light of increased frequency and severity of droughts, change of staple crops to millet and cassava may be necessary in the inner part of the country. There is considerable uncertainty regarding the effects of climate change on the yields of most important cash crops such as coffee, cotton and tea. However, changing climate is unlikely to reduce their yields in the future to the same extent as that of maize.

Predicted changes in climate and the increased frequency and intensity of fires caused by them will also induce shifts in geographic distribution of plant species and associations and thus land cover. For example, grassland savannah is likely to replace forests and woodlands in many places. Deforestation would have significant adverse consequences for economic and physical wellbeing in rural areas. Forests and woodlands are an important source of fuel in Tanzania, where biomass accounts for 90 percent of total energy use. About 80 percent of fuel wood is used for household consumption. The availability of fuel for cooking is important because it influences the nutritional value of diet (see Barany et al., 2001). The existence of markets for fuel wood and charcoal also offers a source of income. Moreover, forests are a source of poles and timber for construction, fodder and browsing for the livestock, as well as fruits, medicinal plants, gums, resins and meat. Clarke, Cavendish and Coote (1996) estimate that forest products account for about 20 percent of household income in southern Zimbabwe. Studies from Tanzania indicate that forest products may contribute even a half of total income of some households (Chikamai, Mbinu and Casadei, 2000).

Predicted changes in climate and climate impacts will also have direct and indirect impacts on human health. Warming is predicted to increase the incidence of insect-borne diseases such as malaria, schistosomiasis and trypanosomiasis in Tanzania. The increased frequency of droughts and flooding is in turn likely to increase the frequency and magnitude of epidemics of water-borne diseases such as typhoid and cholera, as well as to influence the

incidence of mosquito-borne diseases. There are also intimate connections between nutritional status and health. In general, malnutrition and food shortages will increase morbidity and mortality related to infectious diseases. Finally, warming will aggravate the impacts of air pollution on respiratory illnesses which already kill as many Africans as malaria and more than diarrhoeal diseases. (see IPCC, 2001; McMichael et al., 1996; Patz et al., 2002; however, compare Rogers and Randolph, 2000)

Tanzania will obviously face a number of other climate change impacts. For example, reduced runoff will diminish river flows and decrease the availability of water for irrigation and electricity generation. Wildfires may intensify and cause more damage as the result of greater biomass growth and longer dry seasons. Increasing temperature and rainfall patterns may in turn affect groundwater recharge and water supply both in urban and rural communities. Yet climate change impacts on agriculture, common-pool resources such as forests and pastures, and human health are the most threatening ones from the viewpoint of the majority of the people in Tanzania. In what follows, a closer look will be taken at factors that influence vulnerability to the above discussed climate change impacts.

3. Sources of Vulnerability

Vulnerability has been defined as “the capacity to be wounded” by climate change impacts. Vulnerability is the other side of adaptive capacity: vulnerability implies weak adaptive capacity and strong adaptive capacity means reduced vulnerability. Vulnerability can be described as a state and as a set of factors that constitute that state and dispose certain individuals and groups as “vulnerable” (see Adger and Kelly, 1999). Vulnerability also has a dynamic side to it – a change towards a more or less vulnerable state (Leichenko and O’Brien, 2002). In what follows, I seek to characterise the state of vulnerability in Tanzania and to indicate the changes in it that have taken place in the recent past and that are likely to

take place in the near future. Where appropriate, I will also briefly discuss the set of factors that constitute vulnerability and affect its change in the future.

Vulnerability and adaptive capacity are manifested in and influenced by a number of factors, including (adapted from IPCC, 2001: 895-897):

1. Human capital, aspects of which include longevity, health, nutritional status, literacy, education, skills and information.
2. Availability of and access to technological alternatives such as transport and telecommunication networks, public utilities and agricultural inputs.
3. Levels and sources of income.
4. Income and other forms of inequality.
5. Aspects of social capital such as trust, transparency, accountability, security of entitlements, and the quality of informal and formal institutions.

These sources of vulnerability in Tanzania will be described and discussed below in greater detail. The suggested list of sources of vulnerability and the following discussion is not exhaustive. For example, little attempt will be made to discuss forced migration and globalisation as independent sources of vulnerability despite the fact that Tanzania is not insulated from the effects of forced migration and globalisation. Forced migration currently affects western parts of Tanzania. The country has also suffered from decreasing world market prices and overproduction of its export products and is currently increasing its participation in international markets (see Leichenko and O'Brien, 2002). Despite excluding their independent treatment in analysis, forced migration and globalisation can be addressed within the suggested list to the extent that they manifest themselves through their effects on levels and sources of income and social capital, for example.

Poor health and nutrition increase the vulnerability of Tanzanians to environmental stress. Their life expectancy at birth is currently 46.5 years (WHO, 2002). Common causes of death among adults include AIDS, acute febrile illnesses such as malaria, pulmonary tuberculosis and diarrhoeal diseases (URT, 1997). Moreover, accidents are an important cause of death among males and maternal conditions among women. The infant mortality rate is still over 100 per 1000 live births and the mortality of children under five is 164 per 1000 live births. Almost half of the population is undernourished, with the result that 29 percent of children under five are underweight and 44 percent are under height for their age. Adult literacy rate is comparatively high 75.1 percent and the combined primary, secondary and tertiary enrolment rate was 32 percent in 1999 (UNDP, 2002). However, completion rates are much lower than the enrolment rates: while 90 percent of children start primary education, only 54 percent of children complete it (World Bank, 2002: 99). Completion rates are lower in rural areas and among the low income groups. The enrolment rate is low in secondary and tertiary education because of their high cost to the families of school children. Life expectancy, literacy and enrolment rates have all decreased over the past decade. The spreading of AIDS and fiscal constraints imposed by Tanzania's structural adjustment programme will make it difficult to alter these trends in the near future.

Many adaptive measures such seasonal weather forecasts are based on a presumption of the availability of and access to functioning communications technologies. There are indeed 278 radios per 1000 people in Tanzania – over twice as much as in neighbouring countries – and the national network of radio stations covering 95 percent of the county provide the main access to mass media (World Bank, 2002: 4). Private radio stations and private local TV stations provide some alternative outlets but there is not yet a national TV station network to speak of. There are only about 3 telephone connections and 5 mobile phone connections per 1000 people – the average in least developed countries (UNDP, 2002). Newspapers are

published and spread mainly in the urban areas. Radio will continue to be the primary means of disseminating information in the country in the near future.

The availability and access to transport infrastructure influences access to markets and e.g. vulnerability to food and fuel shortages. Tanzania's transport networks are sparse even by African standards (Platteau, 2000: 35-36). The country has less than 100 kilometres of classified roads for 1000 km² but only a fraction of roads are passable in all seasons and only about one percent of the total road network is paved.¹ There are two rail systems in the country. Tanzania – Zambia Railway Authority TAZARA provides access from Zambia, Malawi and Zimbabwe to the port of Dar es Salaam and Tanzania Railway Corporation operates lines from Dar es Salaam to Tabora and from Tabora to Mwanza and Kigoma. In total there is less than 4 km of railroad for 1000 km².² Transport infrastructure will continue to be a bottleneck in the future despite efforts to allocate more resources for its improvement.

Availability of and access to public utilities such as water, sewers and electricity influences health outcomes as well as the amount of time that can be used for income-generating activities. International figures indicate that about 90 percent of urban population and 57 percent of rural population has access to safe water and that 99 percent of urbanites and 86 percent of rural dwellers have access to adequate sanitation. About a quarter of urbanites and 1 percent of rural population have access to electricity. However, these figures give a too rosy picture. Ministry of Water and Livestock Development (URT, 2002: 9-10) estimates that only 50 percent of rural and 68 percent of urban population has access to clean and safe drinking water. Less than half of urban population has access to piped water and in rural areas only 4

¹ Densely populated western European countries have 1500-2500 km of roads for 1000 km². Less densely populated developed countries have 200-700 km of roads for 1000 km².

² Sparsely populated developed countries typically have about 15-30 kilometres and densely populated developed countries about 30-100 kilometres of railroad per 1000 km².

percent of people have access to it (Clarke and Wallsten, 2002). Sewer systems exist only in 18 cities where they serve about 17 percent of the population. Overall, less than 1 percent of rural population has access to anything else than traditional pit toilet and only about 7 percent of urban dwellers have access to ventilated latrines or flush toilets. The dominant water supply and sanitation solutions expose people to health threats. The use of pit latrines may pollute groundwater – often the most important source of drinking water – and cause epidemics when flooding occurs. Decentralised water supply systems are often the only affordable solution. However, they make it more difficult to guarantee a regular and safe supply of water at times of droughts and flooding.

The levels and sources of income add to vulnerability in Tanzania. Tanzania has the second lowest per capita income PPP US\$ 523 of the 173 countries analysed in the latest *Human Development Report* (UNDP, 2002). While the economy of Tanzania has grown by about 3 % in real terms between 1987-1998, its population has grown at the same pace. Therefore, per capita income level has stayed the same over the past fifteen years. Tanzania's economy depends heavily on primary production which forms almost a half of the GDP. Manufacturing accounts for less than 10 percent and the service sector for about a third of the GDP. Tanzania's economy is not very open. It exports about 10 percent of its GDP and imports about twice as much because of the significant amount of development aid it receives. Agricultural exports – the export of coffee, cashew nuts, cotton, tea, tobacco, and sisal – accounted for over a half of Tanzania's total exports but made up only about 10 percent of agricultural output in 1998 (World Bank, 2002: 269). The country's dependence on natural resource exports is, however, more pronounced because minerals are a growing export item. Moreover, a significant number of tourists are attracted to the country because of its wildlife and other environmental resources. Unfavourable price trends have plagued Tanzania's export in the past and continue to be a risk in the future, unless its export portfolio

becomes more diverse. However, the composition of Tanzania's GDP has been stable over the last fifteen years and is unlikely to undergo significant changes in the near future. This means that predicted climate change impacts will put the already low levels of income obtained primarily from agriculture under increasing pressure.

Inequality of income and other forms of inequality demarcate vulnerable groups and can undermine collective action in the reduction of vulnerability and adaptation to changing climate. Tanzania has strived towards equality since its independence quite successfully. Its most recent gini value of 38.8 – equal to that of United Kingdom – is the lowest the country has attained since its independence and makes the country relatively equalitarian among the countries of low human development (UNDP, 2002: 194-195). Tanzania's richest decile earns 10.8 times more than the poorest decile³ and the poorest quintile earns 6.8 percent of total income⁴. However, the relatively equalitarian distribution of income does not eliminate the effects of low level of income. Over half of the population is below the national poverty line and about 20 percent of the population lives with less than PPP \$ 1 a day (UNDP, 2002). Other forms of inequality pertain to the distribution of human development. The clearest divide in Tanzania in this respect is between the urban and rural populations. Rural communities suffer from lower developmental attainments in part because of their lower levels of income and in part because of their lack of access to public services. Under increasing fiscal pressures and market orientation inequality is likely to increase rather than to decrease, both in terms of income and human development.

³ These figures are about twice as high as the figures of most egalitarian countries such as Norway, Sweden and Canada. However, they are lower than those of many other countries of medium and low human development.

⁴ This figure again places Tanzania closer to the most equalitarian countries such as Japan and Finland than the most inequalitarian ones.

Social capital and the quality of institutional arrangements influence the capacity of state to reduce vulnerability and to assist its citizens to adapt. In what follows, the implications of social capital and the quality institutions will be discussed in greater detail.

4. Social Capital, Institutions and State

The concept of social capital and related concepts such as trust and the quality of institutional arrangements have been suggested for making sense of the contributions of civil society and the state to the collective good. Social capital is an attribute of collectives that facilitates individual and collective pursuits (see Sobel, 2002; Woodcock, 1998). Some consider trust an essential element of social capital while others find it in homogeneity of group membership or the quality of informal institutions evolved by a community. Concepts related to social capital can also be used in the analysis of vulnerability because weak civil society and state can be understood as sources of vulnerability for individuals and their communities as well as obstacles for reducing their vulnerability. While a clear distinction is sometimes made between the civil society and the state, the latter is always nested within the former. A dysfunctional civil society is unlikely to be able to support a functioning state. A functional civil society *may* be able to do it, provided that the balance of power and the attributes of institutional arrangements facilitate this outcome. Therefore, in what follows, the attributes of civil society are discussed first as the basic conditions of functioning state and then the attributes of state are examined in greater detail.

It is common to characterise the ability of people to act collectively with concepts such as homogeneity vs. heterogeneity, trust and social capital. Yet there are overlaps and tensions between these concepts. For example, while homogeneity is often considered to contribute to successful collective action (Bardhan and Dayton-Johnson, 2002; Schlager and Blomquist, 1998), it is by no means a necessity for trust and social capital. As Durkheim (1984) argued,

modern societies are based on organic solidarity between dissimilar members in contrast to mechanical solidarity that prevails between the homogeneous members of traditional societies. In fact, many examples of dysfunctional forms social capital such as the Mafia and other closed communities are based on the homogeneity of group members. That said, the manageability of heterogeneity is related to the rate at which heterogeneity changes. Values and informal and formal institutions need time to change in order to support trust among diverse individuals and groups in an evolving society.

The evidence regarding social capital in Tanzania is somewhat encouraging despite the fact that it has been strained on several occasions. Over long period of time, the integrity of communities and traditional authority structures has been strained by Islamic slave trade, natural disasters and colonialism. Islamic slave trade started a thousand years ago and gained momentum in the middle of 18th century when the demand for slaves increased in the Asian colonies of Portugal. The Ottoman rulers based in Zanzibar run a trade of 50 000 slaves in a year in the first half of the 19th century. Islamic slave trade is estimated to have dislocated the same number of people as the Atlantic slave trade – over 11 million people – with the consequence that Africa had only 50 million inhabitants in 1850 instead of 100 million it could have had (see Ewald, 1992). In the end of 19th century, rinderpest destroyed over 90 percent of livestock, an important cornerstone of livelihoods of both pastoralists and agriculturalists, and resulted in famines and depopulation of many previously settled areas. This disaster caused social unrest to which the German colonial power responded by military operations calculated to starve and exterminate entire tribes. The loss of human control over land increased wildlife stocks and consequently the spread of tsetse flies and trypanosomiasis. The end result was further large-scale population movements in the early 20th century (Kjekshus, 1977).

The modernisation projects of post-independence era have also strained the integrity of communities and their authority structures. The whole country was subjected to villagisation – reorganisation of settlements in the 1960s and 1970s – with an aim of increasing the size of local communities and lowering the cost of providing public services such as health care, education, water supply and transport (Pinkney, 1997: 92). A total of 13 million people are estimated to have been relocated during the villagisation voluntarily or involuntarily. The new ujamaa villages were not based on traditional bondages that had underpinned previous settlements. Traditionally people lived in relatively small groups of related families and looser connections prevailed over a larger geographic area between these small settlement units. The ujamaa villages did not evolve a new ground for trust and legitimacy either. The ruling party *Chama Cha Mapinduzi* (CCM) had an organisation that penetrated deeply into the structure of ujamaa villages. The party organisation started from ten cells and had a presence at the village, district, regional and national levels. The explicit purpose of this political organisation was to break up traditional authority structures and to create new ones, but it also served as an instrument for controlling and monitoring people. It also created tensions and conflicts between public administrative bodies and the party organisation (Yeager, 1989).

Despite the historical background of forced population movements and intermittent breakdown of communities, Tanzanian civil society has more strengths than those of many neighbouring countries. There is moderate heterogeneity in ethnic, linguistic, religious, economic and spatial terms but these sources of heterogeneity have not become deeply divisive. The government's egalitarian ethos is also based on more widely shared values and not simply imposed on people (see Pinkney, 1997: 87-88; Tripp, 1997). Tanzanians belong most frequently to church organisations, burial societies and farmers' groups (Narayan and Prichett, 1997: 9). These organisations accommodate heterogeneity at the local level and

work reasonably well according to their members (ibid: 11). The capacity of Tanzanians for collective action manifests itself in the grassroots cooperatives (as opposed to imposed ones). The early examples of influential cooperatives include the Kilimanjaro Native Planters Association and the Tanganyika African Association, the predecessor of TANU. Many villages also manage their resources collectively and have established a *sungusungu*, a neighbourhood watch, to protect public safety and property (Tripp, 1997). Thus Tanzanians are likely to be able to mobilise their social capital also for collective efforts calculated to reduce vulnerability and to adapt to changing climate.

We now move on to attributes of the state. African states are considered weak and dysfunctional, to the extent that they are seen as the primary reason for underdevelopment in the region (see Englebert, 2000). State is weak when it lacks *despotic power* (the capacity to make decisions unconstrained by special interests), *policy capacity* (to take decisions on the basis of comprehensive information and in a manner that involves the relevant government organisations), and *implementation authority* (to ensure that its decisions are complied with) (see Polidano, 2000: 809-810). For the purposes of this paper, it will suffice to focus on the political system and public administration as two central aspects of the state. The attributes and quality of formal institutions, accountability, and trust, as well as the outcomes that it has brought about are indicative of the state's capacity. The political system will be addressed first and the discussion on public administration will follow.

After the independence, political participation was possible only through the CCM until the party formally accepted the move to a multi-party system in 1992. While CCM grew out of a popular grassroots movement, it gradually turned into a non-responsive power monopoly (Pinkney, 1997). Yet while the party controlled the media and its membership and privileges were used and misused in various ways, the rule of CCM was never based on violence or

terror. While admittedly failing to achieve improved levels of income, its leadership contributed to the achievement of important developmental goals in the area of education, health and service provision. The party voluntarily accepted the move to multiparty system and has receded power in a controlled fashion, thus maintaining the preconditions for peaceful political life in the country.

These political developments are reflected in the international comparisons of political rights. Freedom House, a US non-governmental organisation dedicated for the preservation of democratic values and peace, has monitored political and civil rights across the globe over the past thirty years (see Freedom House, 2003). It assesses the situation with political rights and civil liberties in a country with scores from 1 to 7, the smallest score indicating broad rights and liberties and the highest score the absence of rights and liberties. It deems as “free” those countries that have a score of less than 2.5 for rights and liberties. Partially free countries have scores between 3.0 and 5.5. Countries are not free if their scores are higher than 5.5. Throughout the 1970s and the 1980s, Tanzania earned the score of 6 for both rights and civil liberties and was deemed “not free”. The country has improved its scores for both rights and civil liberties to 4 during the 1990s and is thus now deemed “partially free”. Political pluralism will make it easier for vulnerable groups to voice their concerns as well as to gain legitimacy for policies that are adopted to reduce vulnerabilities. However, more heterogeneous political constituency may make such decisions more difficult to attain.

Tanzania did not develop extensive public administration at the level of central government during the early years of independence, when the attention was focused on rural development and the reduction of inequality (see Pinkney, 1997). Local governments were established after the independence in 1962 and, despite a temporary loss of authority in the 1970s, are today responsible for the provision of increasing number of public services. The Arusha

Declaration of 1967 had several adverse consequences for the integrity of public administration. The adoption of *ujamaa* socialism and the establishment of state control over much of production and distribution placed the employees of administration and state-owned enterprises into powerful positions during a general scarcity of goods. The adoption of leadership code of conduct was meant to circumvent this problem by denying engagement in economic activities from party and state leadership. However, amidst economic difficulties the earnings of state employees fell to insufficient levels, creating incentives for engagement in other income-earning activities and corruption. Public administration and party organisation also became intertwined at all levels, which resulted in the misuse of political power through administrative and other favours as well as reduced the effectiveness of public administration. For example, local governments fail to collect up to half of the local poll taxes because of tax evasion (Fjeldstad and Semboja, 2001).⁵

Not surprisingly, the perceived level of corruption is high in Tanzania. Perceived levels of corruption are monitored by Transparency International and measured by the *Transparency International Perceived Corruption Index*. The index scores range from 0 (highly corrupted) to 10 (free from corruption). In 2002, Tanzania got the score of 2.7 which entitled it to the shared 71st position in the rank of countries, together with Côte D'Ivoire, Honduras, India, Russia and Zimbabwe (Transparency International, 2003).⁶ World Bank's 1997 survey ranked corruption only the fourth out of five serious obstacles for doing business in Tanzania. Level and complexity of taxes, inadequate supply of infrastructure, and export and import regulations were all deemed greater obstacles than corruption for business in the country. In

⁵ Tax evasion has its roots in poverty and mistrust of local governments which have a history of misuse of public funds.

⁶ While Tanzania's rank is not a good in overall terms, some of its neighbours, such as Uganda, Kenya and Zambia, did clearly worse.

contrast, in Uganda and Kenya corruption was deemed the second most important obstacle for business (World Bank, 2002: 132).

The weak capacity of public administration because of corruption and other reasons will complicate attempts to reduce vulnerability in the future. On one hand, it will reduce the effectiveness of state-centred responses. On the other hand, it will result in the use of responses where the outcomes do not depend crucially from state capacity. These solutions in turn have two problematic dimensions. First, these solutions may mobilise less resources than public policies would do and distribute them in the way that is not seen politically legitimate, thus introducing uncertainty regarding the permanence of these solutions. Secondly, they would divert attention away from the improvement of state capacity. Ongoing reforms have tried to address the problems that plague public administration in Tanzania but their success is not yet clear. For example, pay reforms in the public sector have resulted in pay increases but salaries are still below the levels required for subsistence.

5. Conclusions

Simultaneous consideration of climate change impacts and vulnerabilities brings up several important observations about priorities and solutions. In Tanzania, climate change will adversely affect food production and energy and water supply, which are preconditions for the physical well-being if not survival of rural households, the clear majority of the country's population. Moreover, predicted climate changes will have adverse consequences for their incomes. Rural populations are also more vulnerable than urban ones. Health and nutritional status as well as educational attainment is lower in rural areas than in the cities. Rural inhabitants also suffer more from the lack of access to technological alternatives and markets and have lower levels of income than their urban counterparts. Finally, local governments in

rural areas lack capacity and have fewer resources at their disposal. In fact, in Tanzania rural-urban divide is one of the most important manifestations of inequality.

The dependence of rural communities on environmental resources suggests that the governance of these resources in a sustainable manner should be one priority area for action in the future. Effective environmental governance could maintain a degree of self-sufficiency needed to overcome periods of drought, flooding and other periods of environmental stress. Because of the central government's lack of capacity, especially implementation authority, governance solutions have to build on user participation at the local level. The national forest policy has already delegated more management authority to local communities. There is scope for similar role for local communities in the management of land use, water resources and local infrastructure for water supply and flood protection. Decentralised environmental governance would also build capacity and social capital at the local level and thus benefit other private and collective ventures. However, the governance solution cannot be a completely decentralised one, in part because local collective entities cannot necessarily be trusted to function well and in part to facilitate the learning and transfer of lessons from one location to another one. Sharing of functions between the central government, intermediate levels of administration and local communities is likely to be the most feasible solution.

A strive towards greater self-sufficiency recommended above is an insurance against the worst possible outcomes and should not be considered an exclusive solution. Autarky would compromise the potential gains from access to markets and trade and hinder specialisation that is necessary for improved productivity. Thus efforts to safeguard access to and availability of local environmental resources should be complemented with efforts to strengthen the operation of national markets. The promotion of markets requires both infrastructure investments in communications and transport networks and institutional

reforms. The strengthening of markets can reduce vulnerability in several ways. Access to markets mitigates local shortages and limits the ability of local monopolies to misuse their power. It also extends the opportunities to engage in income-generating activities and to specialise so as to increase productivity.

The fragility of health and physical wellbeing and its importance for the attainment of other developmental outcomes underlines the importance of preserving and improving private and public services in this area. Mortality and morbidity have exacted a heavy toll from poor households in the past and AIDS is currently shattering the integrity of entire communities. Vice versa, efforts calculated to improve health and physical wellbeing can have a high social return. It is not impossible to mobilise local resources for health promotion. Yet if literacy rates and educational enrolment continue to decrease in the future, the effectiveness of educational campaigns and health promotion may decrease. Thus commitment to public spending and health provision will thus be important in the future, despite the fiscal pressures to curb public spending for social welfare programs.

Finally, a distinction should be maintained between the “state of vulnerability” and the set of factors that constitute it. That is, modifying the outcomes such as poor nutrition or lack of food that comprise vulnerability does not necessarily eliminate vulnerability. Reduced vulnerability requires the alteration of set of factors that lie behind for example poor nutrition or lack of food. Food aid may alleviate hunger and guarantee survival but it retains intact (and may aggravate) factors such as inequality or lack of access to markets that resulted in food shortages in the first place. This does not mean that the treatment of symptoms is wrong – it means that it is not enough. Deeper and permanent changes in institutions are needed to bring about sustainable reduction of vulnerabilities.

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