Crisis or adaptation? Migration and climate change in a context of high mobility

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ABSTRACT The impacts of climate change are likely to affect population distribution and mobility. While alarmist predictions of massive flows of refugees are not supported by past experiences of responses to droughts and extreme weather events, predictions for future migration flows are tentative at best. What we do know is that mobility and migration are key responses to environmental and non-environmental transformations and pressures. They should therefore be a central element of strategies of adaptation to climate change. This requires a radical change in policy makers' perceptions of migration as a problem and a better understanding of the role of local and national institutions in supporting and accommodating mobility.

KEYWORDS climate change / income diversification / migration / mobility / population distribution

I. INTRODUCTION

The impact of climate change on population distribution and mobility is attracting growing interest, as well as heated debate. Frequently cited figures estimate that by 2050, the number of people forced to move primarily because of climate change will range between 200 million and 1 billion.[1] Underlying these predictions is the view that migration reflects a failure to adapt to changes in the physical environment, and that migrants are a relatively undifferentiated group all making similar emergency responses and moving to unspecified destinations, including international ones. This is somewhat at odds with more nuanced views of migration as a key adaptive response to socioeconomic, cultural and environmental change. From this perspective, the specific characteristics of migrant flows – duration, destination and composition – are essential to an understanding of their impact on sending and destination areas and in developing appropriate policies.

It is likely that both extreme weather events (storms, floods, heat waves) and changes in mean temperatures, precipitation and sea level will in many cases contribute to increasing levels of mobility. However, there are inherent difficulties in predicting with any precision how climate change will impact on population distribution and movement. This is partly because of the relatively high levels of uncertainty about the specific effects of climate change, and partly because of the lack of

1. The 200 million figure is from Myers, N (2005), "Environmental refugees: an emerging security issue", Paper presented at the 13th Economic Forum, Prague, 23–27 May 2005. The 1 billion figure is from Christian Aid (2007), *Human Tide: The Real Migration Crisis*, Christian Aid Report, May, accessible at www.christianaid.org.uk.

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comprehensive data on migration flows, especially movements within national boundaries and in particular for low-income countries that are likely to be most affected by climate change.[2] Better information is important to inform appropriate policy responses at the global level and at the local and national levels.

At the same time, policies that build on existing strategies to support adaptation to climate change are among the most likely to succeed. There is growing evidence suggesting that mobility, in conjunction with income diversification, is an important strategy to reduce vulnerability to environmental and non-environmental risks – including economic shocks and social marginalization. In many cases, mobility not only increases resilience but also enables individuals and households to accumulate assets. As such, it will probably play an increasingly crucial role in adaptation to climate change. Policies that support and accommodate mobility and migration are important for both adaptation and the achievement of broader development goals. However, in most cases migration is still seen by many government and international agency staff as disruptive and requiring control and restrictive measures. The key argument of this paper is that what is needed urgently is a radical change in perceptions of migration and a better understanding of the role that local and national institutions need to play in making mobility be seen as part of the solution rather than the problem.

II. THE CONTEXT: POLICY MAKERS' PERCEPTIONS OF MIGRATION

There is a real risk that alarmist predictions of climate change-induced migration will result in inappropriate policies that will do little to protect the rights of those most vulnerable to climate change.[3] This would not be surprising: migration is generally perceived as problematic, and most policies try to influence the volume, direction and types of movement rather than accommodate flows and support migrants.

Environmental factors affect patterns of migration and mobility within a broader context of important changes in population distribution. Perhaps the most widely acknowledged such transformation is urbanization: since 2008, half of the world's population is estimated to live in urban centres and over 90 per cent of the world's population growth in coming decades is expected to be in urban areas.[4] This, of course, does not mean that all regions have similar levels or rates of urbanization. Moreover, while there is a strong statistical association between urbanization and economic growth,[5] the scale of urban poverty in many low-income countries is growing rapidly, while in many middle-income ones it now exceeds rural poverty.[6]

Rural–urban migration is often held responsible for the growth of urban populations and urban poverty. There is, however, little evidence to support such claims. According to available UN estimates, in the majority of the world's countries natural population increase (the net excess of births over deaths in urban areas) makes a larger contribution than the combined rural–urban migration and re-classification of settlements from rural to urban.[7] Moreover, in most countries rural migrants are not the majority of the urban poor,[8] nor are they the only residents of low-income informal settlements.[9] In addition, many nations with the largest

2. Kniveton, D, K Schmidt-Verkerk, C Smith and R Black (2008), *Climate Change and Migration: Improving Methodologies to Estimate Flows*, IOM Migration Research Series No 33, International Organization for Migration, Geneva.

3. GECHS (2008), *Disaster Risk Reduction, Climate Change Adaptation and Human Security*, Report 2008:3, University of Oslo, Oslo; also Piguet, E (2008), "Climate change and forced migration", Research Paper No 153, New Issues in Refugee Research Series UNHCR, Geneva.

4. United Nations Population Division (2008), *World Urbanization Prospects: The 2007 Revision*, (POP/DB/WUP/Rev.2007), United Nations Department of Economic and Social Affairs, New York.

5. There is also a strong statistical association between urbanization and increases in the proportion of GDP generated by industry and services and the proportion of the labour force working in these sectors.

6. Tacoli, C, G McGranahan and D Satterthwaite (2008), "Urbanization, poverty and inequity: is rural–urban migration a poverty problem or part of the solution?", in G Martine, G McGranahan, M Montgomery and R Fernandez-Castilla (editors), *The New Global Frontier: Urbanization, Poverty and Environment in the 21st Century*, Earthscan, London, pages 37–53.

7. There are exceptions and these include some of the most populous countries in the world, notably China and Indonesia. See United Nations (2008), *An Overview of Urbanization, Internal Migration, Population Distribution and Development in the World*, United Nations Population Division, New York.

8. Montgomery, M, R Stren, B Cohen and H Reed (editors) (2004), *Cities Transformed: Demographic Change and its Implications in the Developing World*, Earthscan, London, 552 pages.

9. See reference 6.

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contributions of rural to urban migration to urban population growth are the wealthiest or those with rapid economic growth.

Nevertheless, for most governments in low- and middle-income nations, migration has become a key policy issue and is perceived as a growing problem. A review of Poverty Reduction Strategy Papers (PRSPs) across Africa shows the depth of negative perceptions of migration, which is seen as putting pressure on urban areas, promoting the spread of crime and HIV/AIDS, stimulating land degradation and reinforcing both urban and rural poverty.[10] Between 1996 and 2003, the proportion of governments in low- and middle-income countries that implement policies to influence internal migration has grown from 51 to 73 per cent.[11] Most of these measures have had little success, however, and have often resulted in increasing hardships for the urban poor.[12] They also neglect the fact that most migrants do better than those that stay in the rural areas, and that their remittances are an important component of rural households' budgets. A concern with the possible impacts of climate change on population distribution needs to take into account a policy context that does not generally recognize nor support the positive potential of migration.

Despite the importance of urbanization, it is also misleading to assume that rural–urban migration is the predominant direction of movement within countries. To a large extent, the direction of migration flows reflects a country's level of urbanization (the proportion of its population residing in areas classed as urban) and the nature of its economic base. Rural–rural migration is prevalent in agriculture-based economies such as many low-income African nations, while urban–urban movement is more important in regions with high levels of urbanization, such as much of Latin America and the Caribbean. Rural–urban migration tends to be high in areas with high levels of economic growth and expanding industry and services sectors, but even in countries such as India and Vietnam, rural–rural migration flows remain large. In Vietnam, 37 per cent of the migration captured by the 1999 census was between rural areas, compared to 26 per cent between urban centres, 10 per cent from urban to rural areas and 27 per cent of rural–urban movement; in India, 38 per cent of recent migrants are estimated to move between rural areas.[13] Rural–rural migration tends to be dominated by the poorest groups, who often do not have the skills, financial capital and social networks to move to the urban centres.

It is also misleading to assume that movement from poor to rich countries is the predominant form of migration. International migration only accounts for a small proportion of all movement and much of it is within regions rather than towards high-income countries. At the global level, however, it is often assumed that climate change-related migration will be across borders, and from poor to rich countries. Given the contradictory views of international migration in destination countries, where the acknowledged need for migrant labour often goes hand in hand with attempts to curtail arrivals, especially from low-income countries, it is not surprising that the prospect of millions of climate refugees landing on the shores of rich countries is seen with alarm. In March 2008, the European Union High Representative for Foreign and Security Policy, Javier Solana, warned that "*…such migration may increase conflict in transit and destination areas. Europe must expect substantially increased migratory pressure.*"[14]

10. Black, R, J Crush, S Peberdy, S Ammassari, L McLean Hilken, S Mouillesseux, C Pooley and R Rajkotia (2006), *Migration and Development in Africa: An Overview*, Migration and Development Series, Southern African Migration Project, Cape Town, South Africa, and Kingston, Ontario.

11. United Nations (2004), *World Population Policies 2003*, United Nations Department of Economic and Social Affairs, New York.

12. UNFPA (2007), *State of the World Population 2007: Unleashing the Potential of Urban Growth*, United Nations Population Fund, New York; also see reference 7, United Nations (2008).

13. Skeldon, R (2003), "Migration and migration policy in Asia: a synthesis of selected cases", Paper presented at "Migration, Development and Pro-Poor Choices in Asia", Dhaka, Bangladesh, 22–24 June 2003.

14. Solana, J (2008), *Climate Change and International Security: Paper from the High Representative and the European Commission to the European Council*, European Commission, Brussels.

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III. CLIMATE CHANGE MIGRANTS: THE DEBATE AND THE EVIDENCE

The relationship between climate change and migration has been rightly defined as "complex and unpredictable"[15] and the scarcity of reliable evidence on the topic has contributed to the heated and highly politicized discussion around the potential existence of environmental refugees, as well as predictions on their numbers. The term "environmental refugee" was first formally used in the 1970s, and was heavily influenced by neo-Malthusian assumptions that population growth would lead to migration and conflict caused by resource scarcity. Such views were not supported by evidence, and environmental pressure as a fundamental cause of migration has been generally downplayed until recently, when increased attention to the impacts of climate change has refuelled the debate.[16]

The most frequently cited figure predicts that by 2050 there could be as many as 200 million environmental refugees, people forced to move because of environmental degradation resulting from climate change.[17] That this has become an unquestioned orthodoxy, especially among natural scientists concerned with climate change, is surprising in view of the widespread criticism of both the figure and its conceptual underpinnings, and perhaps even more so given the growing consensus on the importance of multiple and overlapping causes in most migration flows, including economic, social and political factors.[18] This recognition is reflected in the changing focus of the IPCC reports, from an earlier emphasis on human migration to the current stress on population vulnerability and adaptive capacities to climate change.[19]

The key problem with the concept of environmental refugees is the implicit assumption that there is a direct causal link between environmental change and migration. The figure proposed is an estimate of the numbers of people at risk – that is, of the populations living in areas most likely to be affected by the negative impacts of climate change – rather than the number of people who are effectively likely to move.[20] This oversimplified view is based on "common sense" rather than on an understanding of the complex relationship between environmental change (and perceptions of it) and human agency, which includes adaptation that reduces the need to move away from affected areas, as well as the multiple factors that affect migration decisions. It also overlooks the fact that migration requires financial resources and social support, both of which may decline with climate change, which may thus result in fewer rather than more people being able to move.

There is also little evidence that people who have already been exposed to environmental degradation do actually move in the ways and numbers predicted by the environmental refugees model. New research and reviews of existing information[21] are beginning to build a clearer picture of how climate change may affect migration. However, predicting future climate change is inherently uncertain. For example, while global warming in the twenty-first century will be more intense in Africa than in the rest of the world, with average temperature rise 1.5 times greater than at the global level, the results of rainfall projections remain uncertain, and no conclusions can be drawn for West Africa.[22] This clearly makes understanding and predicting the impacts of climate change on human societies extremely difficult, especially the long-term impacts, which are mediated

15. Brown, O (2008), *Migration and Climate Change*, IOM Migration Research Series No 31, International Organization for Migration, Geneva.

16. Massey, D, W Axinn and D Ghimire (2007), *Environmental Change and Out-Migration: Evidence from Nepal*, Population Studies Centre Research Report 07–615, Institute for Social Research, University of Michigan, Ann Arbor; also Morrissey, J (2009), *Environmental Change and Forced Migration: A State of the Art Review*, Refugee Studies Centre, Oxford Department of International Development, Queen Elizabeth House, University of Oxford, Oxford; and Zolberg, A R (2001), "Introduction: beyond the crisis", in A R Zolberg and P M Benda (editors), *Global Migrants, Global Refugees: Problems and Solutions*, Berghahn Publishers, New York and Oxford.

17. See reference 1, Myers (2005); also Stern Review Team (2006), *What is the Economics of Climate Change*?, HM Treasury, London.

18. Castles, S (2002), "Environmental change and forced migration: making sense of the debate", New Issues in Refugee Research No 70, UNHCR, Geneva; also see reference 3, GECHS (2008); Hugo, G (2008), *Migration, Development and Environment*, IOM Migration Research Series No 35, International Organization for Migration, Geneva; see reference 16, Morrissey (2009); and see reference 3, Piguet (2008).

19. Raleigh, C, L Jordan and I Salehyan (2008), "Assessing the impact of climate change on migration and conflict", Paper presented at "Social Dimensions of Climate Change",

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Social Development Department, the World Bank, Washington DC, 5–6 March 2008.

20. See reference 18, Castles (2002).

21. See reference 15; also see reference 18, Hugo (2008); see reference 16, Morrissey (2009); see reference 3, Piguet (2008); and see reference 19.

22. ECOWAS/SWAC (2008), *Climate and Climate Change*, Atlas on Regional Integration in West Africa Environment Series, ECOWAS and SWAC/OECD, Abuja and Paris.

23. IPCC (2007), *Summary for Policy Makers*, in S Solomon, D Qin, M Manning, Z Chen, M Marquis, K B Averyt, M Tignor and H L Miller (editors), *Climate Change 2007: The Physical Science Basis. Contribution of Working Group I to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change,* Cambridge University Press, Cambridge and New York.

24. McGranahan, G (2002), "Demand-side water strategies and the urban poor", International Institute for Environment and Development (IIED), London.

25. GRAD (Groupe Recherche/Actions pour le Développement) (2001), *Potentialités et Conflits dans les Zones Péri-Urbaines: Le Cas de Mopti au Mali*, Human Settlements Rural–Urban Linkages Series, Working Paper 6, IIED, London, 26 pages.

26. Findley, S (1994), "Does drought increase migration? A study of migration from rural Mali during the 1983–1985 drought", *International Migration Review* Vol 28, No 3, pages 539–553.

27. Henry, S, B Schoumaker and C Beauchemin (2004), "The impact of rainfall on the first out-migration: a multi-level event-history analysis in Burkina Faso", *Population and Environment* Vol 25, No 5, pages 423–460.

28. See reference 16, Massey et al. (2007).

29. See reference 27.

by adaptive capacities. With this in mind, the best approximation – with all its limitations – is to use past and current experiences as analogous to climate change-induced drought, desertification and land degradation, extreme weather events such as floods and hurricanes and, obviously to a much lesser extent, sea level rise.

a. Drought, desertification and land degradation

Freshwater availability is predicted to decrease, affecting between 75 and 250 million people in Africa by 2020, and up to a billion people in Asia by 2050.[23] These figures represent the number of people living (or more often estimated to live) in areas at risk, but not necessarily those directly affected by water shortages. It is important to note that water stress does not necessarily imply inadequate access to water for domestic purposes, especially for urban households. Statistically, households in countries facing water stress are no more likely than those in other countries to lack access to improved water supplies, and there is considerable case-specific evidence of cities with plentiful water resources where poor households do not have adequate access to affordable water, and cities with scarce water resources where poor households are comparatively well served.[24] Decreases in rainfall can, however, affect people in economic terms, for example through a decline in agricultural productivity, and thus be a contributing factor to mobility.

The links between drought, desertification and migration are complex, and much of the existing literature draws on analogies with the drylands areas of Africa, where climatic fluctuations as well as widespread mobility have always been a defining feature. Research in northern Mali in the late 1990s found that up to 80 per cent of households interviewed had at least one migrant member, but this high level of mobility was related to economic opportunities and the need to diversify income sources rather than the direct consequence of desertification and land degradation.[25] In the same region, the drought of 1983–1985 affected local migration patterns, with an increase in temporary and short-distance movement and a decrease in long-term, intercontinental movement.[26] Recent research in Burkina Faso suggests that a decrease in rainfall increases rural–rural temporary migration; on the other hand, migration to urban centres and abroad, which entails higher costs, is more likely to take place after normal rainfall periods and is influenced by migrants' education, the existence of social networks and access to transport and road networks.[27] These findings mirror those of research in other contexts: in Nepal, land degradation and environmental deterioration lead to mainly local movements, although the better educated tend to move to urban centres further away.[28]

These overall patterns are also internally differentiated, depending on individual and household circumstances. Gender is an important variable determined by the locally prevailing gender relations and divisions of labour. Hence, in the Sahel women are less likely than men to engage in short-term movement, since marriage is their main reason to move.[29] In Nepal, where women have primary responsibility for agricultural production, they are significantly less likely than men to move to distant destinations.[30] The migration patterns of wealthier, better educated and better socially connected groups seem to be relatively unaffected by

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environmental degradation. Younger, landless households with few dependents are more likely to move permanently than those who own land and property in the affected areas.[31] However, impoverished groups with limited capacity to invest in migration are less likely to move, and their ability to cope will be determined increasingly by the availability of locally based opportunities for income diversification.

The impacts of slow-onset climate change are also more likely to affect politically and economically marginalized groups, especially where local institutions are unable to mediate growing competition for resources. Pastoralist groups have long developed strategies to cope with unpredictable environments, and mobility of families or parts of families for pastoral production, including seasonal transhumance and movement to markets, is a key element of such strategies. However, decreasing rainfalls and more frequent droughts will put more pressure on pastoral resources, pushing pastoralists further away from their traditional migratory routes. It is often thought that this, in turn, will increase conflict between nomadic pastoralists and sedentary farming communities over dwindling resources, and Darfur is often cited as an example. However, in this case as probably in many others, conflict is the result of the combination of environmental pressures and the breakdown of traditional social structures and well-established local mediation and dispute resolution mechanisms.[32] Throughout drylands Africa, years of political and economic marginalization of pastoralist groups, inappropriate development policies that constrain mobility, a much lower access to basic services than national averages and limited opportunities for income diversification[33] are important factors in pastoralists' propensity to migrate to urban centres. Changes in traditional migratory routes and migration to seek alternative livelihoods are both valid responses to changing environmental contexts, and both need to be better supported.

b. Extreme weather events

Floods and hurricanes, especially when accompanied by landslides, in many cases force people to leave their homes, which become unsafe, and move to other areas. Displaced people are often extremely vulnerable, but in most cases experience shows that they return as soon as possible to reconstruct their homes and livelihoods.[34] Extreme events only become disasters when they affect populations with high levels of vulnerability. Repeated events and limited access to government and non-government support systems are important factors in increasing vulnerability. This is not only the case for low- and lower-middle income countries: poor communities in New Orleans were much worse affected by Hurricane Katrina than wealthier groups, partly because of the location and condition of their houses and partly because of lack of insurance. As a result, poor groups were the majority of permanent out-migrants from the city.[35] In contrast, in the aftermath of the Indian Ocean tsunami in 2004, out-migration was limited and mass migration never occurred. This is attributed to a variety of factors, not least the rapid humanitarian response and the substantial mobilization of diaspora groups to support victims at home.[36] Similarly, a study of the impact of the 14 April 2004 tornado in Bangladesh found that it had little, if any, effect on out-migration

30. See reference 16, Massey et al. (2007).

31. See reference 16, Massey et al. (2007); also McLeman, R and B Smit (2004), "Climate change, migration and security", Commentary 86, Canadian Security Intelligence Service, Ottawa.

32. Edwards, S (2008), "Social breakdown in Darfur", *Forced Migration Review* No 31, pages 23–24.

33. Hesse, C and L Cotula (2006), "Climate change and pastoralists: investing in people to respond to adversity", Sustainable Development Opinion Papers, IIED, London; also Oxfam International (2008), "Survival of the fittest", Oxfam Briefing Paper, Oxford.

34. Perch-Nielsen, S and M Bättig (2005), "Exploring the link between climate change and migration", Paper presented at the 6th Open Meeting of the Human Dimensions of Global Environmental Change Research Community, Bonn, 9–13 October 2005; also see reference 3, Piguet (2008); and see reference 19.

35. See reference 16, Morrissey (2009).

36. Naik, A, E Stigter and F Laczko (2007), *Migration, Development and Natural Disasters: Insights from the Indian Ocean Tsunami*, IOM Migration Research Series No 30, International Organization for Migration, Geneva.

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from the affected areas, as aid and recovery packages were distributed rapidly and fairly and the event itself was perceived as exceptional and unlikely to occur again.[37] The importance of effective coping strategies by communities and governments is illustrated by the different impacts of two natural disasters. After the Kobe earthquake in Japan in 1995, 300,000 people were displaced, but within three months only 50,000 had not returned home; in contrast, many of the people displaced by the eruption of Mount Pinatubo in the Philippines in 1991 were still in temporary camps or squatter settlements after several years.[38]

37. Paul, B K (2005), "Evidence against disaster-induced migration: the 2004 tornado in north–central Bangladesh", *Disasters* Vol 29, No 4, pages 370–385.

38. See reference 18, Castles (2002).

c. Sea level rise

Sea level rise is both a long-term, gradual process of inundation and a contributor to the severity of storm surges and flooding. This makes it a major threat for the inhabitants of small island states, especially those with low elevation above sea level, but also for those living in flood plains close to the sea or tidal rivers and those living in cyclone-prone coastal zones. More than 600 million people (10 per cent of the world's population) are estimated to live in coastal zones with an elevation of up to 10 metres (about 2 per cent of the world's land area). Of these people, 360 million live in urban areas (13 per cent of the world's urban population) and about 247 million live in low-income countries.[39] Obviously, the number at risk from sea level rise and storm surges over the next few decades is smaller than this but there are no reliable figures for the numbers or proportions within (say) two metres of sea level. Whether migration will be the main response to sea level rise will depend on the capacity of communities and governments to respond through a range of options such as increased protection infrastructure, the modification of land use, construction technologies, and managed retreat from highly vulnerable areas.[40] Ironically, some of the areas most at risk are also major migrant destinations, as they offer better economic opportunities through their concentration of industry and services. Measures to support a more decentralized pattern of urbanization and industrialization would help reduce the numbers of people living in areas at risk, and at the same reduce regional inequalities that are a root cause of migration.

39. McGranahan, G, D Balk and B Anderson (2007), "The rising tide: assessing the risks of climate change and human settlements in low elevation coastal zones", *Environment and Urbanization* Vol 19, No 1, April, pages 17–37.

40. Perch-Nielsen, S (2004), "Understanding the effect of climate change on human migration: the contribution of mathematical and conceptual models", Diploma thesis, Swiss Federal Institute of Technology, Zurich.

In summary, research on contexts that offer similarities with the predicted impacts of climate change suggests that environmental degradation does not inevitably result in migration. Where it does, it is likely that movement is predominantly short term, as in the case of extreme weather events and natural disasters, and short distance, as in the case of drought and land degradation. In the case of rising sea level, much less can be inferred from past experience, and the number of people forced to move will depend on adaptation initiatives as well as wider national planning strategies. The significance of non-environmental factors in migration, the uncertainty on the extent of changes in rainfall patterns and tropical cyclone/hurricane/typhoon frequency and strength as a consequence of climate change, and the fact that predictions only go as far as the next 50 years are serious limitations for any realistic long-term assessment of the link between climate change and migration. At the same time, however, there are clear pointers to the need to understand migration as one in a range of strategies that individuals and households can use to adapt to climate change.

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IV. INCOME DIVERSIFICATION AND CIRCULAR MOBILITY AS AN ADAPTIVE RESPONSE TO SLOW-ONSET CLIMATE CHANGE

The prevalence of short-distance, circular migration in the context of land degradation and desertification, especially in areas relying primarily on rainfed agriculture, is effectively a form of income diversification that may involve the same activity – farming – in different locations, or a temporary engagement in non-farm activities, especially when less labour is required in the fields. Household members may also move to urban centres, especially where there is demand for migrant labour, and send home remittances on a regular basis. It can be expected that, building on existing patterns and trends, such income diversification will become an increasingly important element of adaptation to slow-onset climate change.

There is little research that explores directly the impact of environmental factors on income diversification and mobility. However, there is much evidence showing that these interrelated strategies are substantial elements of the livelihoods of both rural and urban populations. In China, a survey by the Ministry of Agriculture suggested in 2004 that non-farm incomes and internal transfers from migrants to urban centres were about to overtake earnings from agriculture in rural household budgets.[41] In India, remittances account for about one-third of the annual incomes of poor and landless rural households.[42] Earnings from non-farm activities are also substantial and estimated to account for between 30 and 50 per cent of rural households' incomes in Africa, reaching as much as 80–90 per cent in Southern Africa,[43] about 60 per cent in Asia[44] and around 40 per cent in Latin America.[45] In Bangladesh, between 1987/88 and 1999/00, income from agriculture declined from 59 to 44 per cent of rural households' budgets, while income from trade, services and remittances grew from 35 to 49 per cent.[46]

Remittances and earnings from non-farm activities have proved to play a major role in financing innovation and intensification of farming in both Africa[47] and Asia.[48] On the one hand, income diversification provides the capital needed to invest in agricultural production – inputs, infrastructure and sometimes waged labour. On the other hand, income diversification also provides the safety net that enables farmers to take the risks inherent in changing long-held practices. As such, it is an essential element of agricultural adaptation to climate change.

The extent of temporary, circular and seasonal migration that often underpins income diversification is usually underestimated. In part, this is because these movements tend to elude national statistics and census data. However, estimates suggest that the numbers involved are striking. In Thailand, one-third of all internal migration in the early 1990s was estimated to consist of temporary movement to Bangkok's metropolitan region during the dry season, when labour demand for agricultural work decreases.[49] In India, an estimated 20 million people migrate temporarily each year.[50] Most of this movement is between rural drought-prone regions to rural areas of irrigated agriculture that require seasonal labour; however, there are signs that the combination of agricultural mechanization and demand for unskilled and semi-skilled workers in the construction sector is reorienting migrants towards urban centres and non-farm occupations. In northern Bihar, temporary movement to urban centres has grown from 3 per cent of the total in 1983 to about 24 per cent in 2000.[51]

41. Deshingkar, P (2006), "Internal migration, poverty and development in Asia", Paper presented at "Asia 2015: Promoting Growth, Ending Poverty", London, 6–7 March 2006.

42. See reference 41.

43. Ellis, F (1998), "Livelihood diversification and sustainable rural livelihoods", in Diana Carney (editor), *Sustainable Rural Livelihoods: What Contribution Can We Make?*, DFID, London.

44. See reference 43.

45. Reardon, T, J Berdegué and G Escobar (2001), "Rural non-farm employment and incomes in Latin America: overview and policy implications", *World Development* Vol 29, No 3, pages 411–425.

46. Afsar, R (2003), "Internal migration and the development nexus: the case of Bangladesh", Paper presented at "Migration, Development and Pro-Poor Policies in Asia", Dhaka, Bangladesh, 22–24 June 2003.

47. Tiffen, M (2003), "Transitions in sub-Saharan Africa: agriculture, urbanization and income growth", *World Development* Vol 31, No 8, pages 1343–1366.

48. Hoang, X, N Dang and C Tacoli (2005), *Livelihood Diversification and Rural–Urban Linkages in Vietnam's Red River Delta*, Human Settlements Rural–Urban Linkages Series, Working Paper 11, IIED, London, 31 pages; also Hoang, X, T Dinh and T Nguyen (2008), *Urbanization and Rural Development in Vietnam's Mekong Delta: Livelihood Transformations in Three Fruit-growing Settlements*, Human Settlements Rural–Urban Linkages Series, Working Paper 14, IIED, London, 64 pages.

49. Guest, P (1998), "Assessing the consequences of internal migration: methodological issues and a case study on Thailand based on longitudinal survey data", in Richard Bilsborrow (editor), *Migration, Urbanization and Development: New Directions and Issues*, UNFPA, New York.

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50. See reference 41.

51. See reference 41.

52. See reference 27.

53. See reference 48, Hoang et al. (2005).

54. Zhu, Y (2003), "The floating population's household strategies and the role of migration in China's regional development and integration", *International Journal of Population Geography* Vol 9, pages 485–502.

55. Kruger, F (1998), "Taking advantage of rural assets as a coping strategy for the urban poor: the case of rural–urban interrelations in Botswana", *Environment and Urbanization* Vol 10, No 1, April, pages 119–134; also Smit, W (1998), "The rural linkages of urban households in Durban, South Africa", *Environment and Urbanization* Vol 10, No 1, April, pages 77–87.

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The preference for urban destinations supports the view that increasing numbers of short-term migrants opt for employment in non-farm activities. In Burkina Faso, circular movement involving returning to home areas within two years is especially high among those engaging in cross-border migration but also rural–urban migrants and, to a lesser extent, rural–rural migrants.[52] In Vietnam's Red River Delta, it is increasingly common for farmers to move to the urban centres to work in the construction sector for a few months every year and then to return to their villages.[53] In China in 1999, about 60 per cent of registered migrants in the industrial and construction hubs in the coastal region had lived in their current place for less than one year, and only between 15 and 30 per cent intended to settle permanently.[54]

In urban centres in Africa, research shows that both wealthy and poorer groups tend to invest in property in rural areas, often their home villages, as a safety net against economic and political crises.[55] Recognizing these investments and ensuring that both short and long-term migrants retain rights in their home areas is important, especially for the groups most vulnerable to loss of property and income. The current economic downturn is showing just how important this is: in China in February 2009, the government estimated that 20 million, or 15.3 per cent of its rural–urban migrant workers, had been forced to return to the countryside because of job losses linked to the global economic downturn.[56] Rural safety nets also proved to be critical for urban residents in many African countries during the 1990s, and have certainly facilitated return urban–rural movements.[57]

Employment insecurity, the high cost of living and often unsafe and insecure accommodation in urban centres arguably act as contributing factors to circular migration, and overlap with environmental degradation in home areas in increasing people's mobility. The spatial distribution of economic opportunity will, however, remain the key determinant of migration directions and a primary focus for policy action.

V. ACCOMMODATING AND SUPPORTING MOBILITY: SMALL URBAN CENTRES AND INSTITUTIONS

Since climate stress almost invariably overlaps with other factors in determining migration duration, direction and composition, these other factors – socioeconomic, political and cultural – need to be integrated into adaptation policies. Moreover, agricultural adaptation initiatives should not assume that they ought to contribute to reduce out-migration, and especially rural–urban migration, as there is ample evidence to show that rural development usually has little effect on migration, and where it does it tends to encourage rural–urban migration.[58] This does not mean that rural development should not be a priority, especially where the majority of the population lives in rural areas. It means, however, that broader agricultural and rural development and specific climate change adaptation actions to support these should not be linked to the reduction of migration. Changing opportunities in urban centres as a result of economic downturns are more likely to affect migration patterns, as is currently the case.

Environmental degradation will, however, in all probability contribute to the growing need to ensure access to non-farm economic activities,

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either locally or involving some level of mobility. In many cases, local small towns or large villages are where these activities concentrate. Indeed, the potential role of small and intermediate urban centres in economic growth, poverty reduction and, more recently, adaptation to the impacts of climate variability has been attracting policy makers' attention since the 1960s. Small towns in agricultural areas are especially important for the livelihoods of the poorest groups, often landless and without the means to migrate to larger cities, by providing access to non-farm activities that require limited skills and capital.[59] They also play an important role in the provision of basic services such as health and education to their own population and that of the surrounding rural area, and this is likely to become increasingly important with both slow-onset climate change and the increase in frequency and intensity of extreme events. Moreover, small and intermediate urban centres are an essential component of national policies that aim to achieve a more decentralized pattern of urbanization across regions – and this is especially important in view of the concentration of large cities in low elevation coastal zones vulnerable to sea level rise.[60]

However, many of the policies for small town and regional development since the 1960s have had very limited success, partly because of their top-down nature, which neglected the importance of local characteristics, and partly because they have overlooked the critical importance of national macroeconomic policies in local development.[61] Hence, while small towns can play an important role in adaptation to climate change, this can only achieved within a broader approach to development and poverty reduction. Local small and microenterprises, in most cases the backbone of small towns' economies and where low-income groups concentrate, need access to markets, outside capital resources and technical knowledge. As important market nodes for agricultural production, small town traders are essential for smallholder farmers; however, they cannot replace access to land, credit and inputs that enable family farmers to respond to changes in demand.[62] Perhaps most importantly, in too many cases, local governments in small towns lack capacity, resources and support from higher level government.

One area where local governments in small towns need to improve their capacity is in the provision of services to migrants and the protection of their rights. Poor migrants in smaller urban centres can be more disadvantaged than migrants to the large cities because of the limited existence of civil society organizations that can support their interests. Hence, migrants are often paid less by their employers than non-migrants, partly because they may not be aware of the going wages and are usually not members of workers' unions and associations.[63] Their willingness to accept lower wages in many instances may put them at odds with non-migrants, resulting in further marginalization and occupational health hazards.[64] They are also less likely to be able to access public services that require registration with local authorities, such as ration cards in India. At the same time, however, they are often registered on voters' lists and manipulated by local politicians who do not represent their needs and priorities.[65] Overall, however, whether in large cities or in small towns, poor temporary migrants share many of the vulnerabilities of the urban poor. Perhaps the main difference is that they tend to be even less visible, and therefore have even less political representation and voice.

59. See reference 48, Hoang et al. (2008).

60. See reference 39.

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VI. CONCLUSIONS

Predicting the impact of climate change on population distribution and movement is fraught with difficulties. However, it seems unlikely that the alarmist predictions of hundreds of millions of environmental refugees will translate into reality. What is more likely is that the current trends of high mobility, linked to income diversification, will continue and intensify. Past experiences suggest that short-distance and short-term movements will probably increase, with the very poor and vulnerable in many cases unable to move. Underlying these trends is the growing need for the diversification of income sources, and the spatially unequal distribution of economic opportunities. The centrality of both these issues to adaptation initiatives cannot be overemphasized. What is also necessary is a radical change in perceptions of migration. Most migration management policies try to influence the volume, direction and types of population movement. However, policies might more usefully aim to accommodate changes in migration patterns that result from environmental degradation, economic growth or crisis and other wider transformations. This seems to be an essential element of adaptation to climate change and other development goals.

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