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# Urban and peri-urban agriculture and forestry: Transcending poverty alleviation to climate change mitigation and adaptation



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## ABSTRACT

A range of published and grey literature over the last three decades has underlined the importance of urban and peri-urban agriculture and forestry (UPAF) in cities of developing regions. The focus in the published literature is on livelihoods, poverty reduction and ecosystems services at multiple city scales. Cities of developing regions, particularly in Africa, are searching for ways of addressing the unavoidable impacts of climate change and UPAF has demonstrated scalable adaptation and mitigation potential. However, evidence of UPAF's role in mitigating and adaptation to climate change is scattered in various reports and has not been synthesized for its potential role in developing urban adaptation strategies. Building on the earlier poverty reduction focus of UPAF research, this paper contributes to UPAF knowledge regarding mitigating and adapting to climate change in urban and peri-urban areas in East and West Africa. The paper reports a synthesis based on a systematic review of the available literature on these regions, and selected sources on other parts of sub-Saharan Africa. The paper also examines the extent to which literature conveys any evidence for UPAF playing a role in mediating the effects of climate/environmental change. Limited empirical verification was undertaken in Kampala and Ibadan, but this does not form the basis for systematic generalization. The key emerging areas of adaptation and mitigation include enhanced food security,

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productive greening, ecosystem services and innovative policy for urban resilience and transformation.

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## 1. Introduction

An estimated 40% of Africa's total population live in urban areas (UN-HABITAT, 2009, 2011). Although urbanization rates vary between and within countries or regions, literature shows a demographic shift toward an increasingly urban populous across the continent. The demographic change will have both social and environmental implications within urban areas and their resource providing regions (Potts, 2012a). Currently, only a modest proportion of net urbanization in Africa is related directly to climate and environment-induced migrations, but this is likely to increase in the future (Biermann and Boas, 2010). Already, some cities in the Sahel region, such as Dakar are experiencing higher net rural-urban migration due to weakened rural livelihoods exacerbated by a variable and changing climate (Cissé et al., 2005). Future urbanization trajectories pose both challenges and opportunities for addressing climate change impacts. While climate variability and environmental change impacts are well-documented in rural areas, literature is increasingly pointing to impacts in cities and their hinterland regions (UN-Habitat, 2011). There are concerns about climate change impacts reinforcing poverty, exacerbating food insecurity and increasing vulnerability of urban populations (UN-HABITAT, 2009; Simon, 2013; Satterthwaite et al., 2007).

Many city regions in Africa are experiencing or are at risk of sea level rise, storm surges, saline water intrusion, coastal erosion, floods, and droughts (Niang et al., 2002; Grimm et al., 2008; Rosenzweig et al., 2011). These impacts are likely to have implications for urban systems, urban infrastructure, public health, economic development, local environmental resources, food security, and water supplies and will affect disproportionately the vulnerable urban poor, women, elderly, and the young (Satterthwaite et al., 2007; Adejuwon, 2000; Adelekan, 2009; Roberts et al., 2011; UN-HABITAT, 2006). Since urbanization exacerbates these vulnerabilities, there is growing evidence that urban and peri-urban agriculture and forestry (UPAF) can play a role in poverty alleviation and potentially reduce vulnerability to climate change (Lwasa et al., 2009; Asomani-Boateng and Haight, 1999; International Development Research Centre (Canada), 2011; Lee-Smith, 2010; Ricci, 2012; Masashua et al., 2009). The relationship between poverty and UPAF has been well studied and emerging knowledge points to UPAF's potential to address climate risks (Dolan and Walker, 2004; Mougeot, 2000a). Several studies of UPAF point to benefits of nutrition improvement, food security, livelihoods, and the provision of ecosystem services along the urban-rural gradient, as well as contributions to mitigation of climate change at the macro-scale (Lwasa et al., 2009; Padoch et al., 2008; Swalheim and Dodman, 2008). This paper systematically analyses the evidence, focusing on eight cities in East and West Africa of Kampala, Addis Ababa, Dar es Salaam, Douala, Ibadan, Nairobi, Dakar and Accra, although drawing on relevant studies elsewhere in sub-Saharan Africa where appropriate. Limited empirical verification of the literature was undertaken in two of these cities, Kampala and Ibadan, but these are not used as the basis for broader generalization. The objective is to identify scalable strategies of UPAF for climate change mitigation and adaptation. The paper also analyses the limitations of UPAF in the context of intra-urban vulnerabilities differentiated by socio-economic structure and the power relations that are created by invariant urban policy (Action Aid, 2006; Frayne et al., 2012; Douglas et al., 2008).

## 2. Framing UPAF in the context of climate change

Studies on UPAF have often focused on the issues of livelihoods, poverty reduction, environmental pollution, health risks and urban policy. These studies often emphasize how cities can better provide safeguards from the negative consequences of UPAF, particularly biological-chemical risks, such as use of grey water and heavy metal contamination from fuel and oil residues that enter the food chain (Nabulo, 2002; IWMI, 2006). The scales of assessment range from household to city-regional scales and these have aided understanding of production, distribution, access and utilization of crop, animal

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