

Climate Change and Migration in Nairobi

- Environmental Migration and its Urban Manifestation at the Local Scale -

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Introduction

- ▶ The study focused on **environmental migration** in Kenya
- ▶ Personal interviews conducted with random sample in 2 Nairobi slums
Assumption: Rural migrants are likely to stay in affordable settlements
- ▶ Migrants are classified as **environmental migrants if they mentioned at least one environmental related issue as a reason for their migration**
- ▶ Main environmental reasons are **lack of rainfall/drought & floods**
- ▶ **Spatial pattern** was found where droughts were mainly mentioned by people from southeastern region and floods by those from western region in Kenya
- ▶ Statistical significant changes in temperature & rainfall levels between 1960-1989 and 1990-2008 are associated with increased number of environmental migrants since 1990
- ▶ Paper argues **there is evidence of environmental migration in Nairobi**

Literature Review

- ▶ **Population migration** is the process of changing residence from one place to another on a permanent or temporary basis (Kliot 2004)
- ▶ **Push-Pull model** (Black et al. 2004; Kliot 2004; Renaud et al. 2007) suggests the presence of two contrasting forces: **stressing factors** that push individuals out of their place of origin; and **incentives** that pull individuals into a different location
- ▶ Kliot describes un- or underemployment, ethnic and religious tensions and natural disasters as significant pushing factors whereas labor opportunities, political and religious tolerance, medical and social provisions and environmental security (availability of natural resources) are mentioned as potential pulling factors
- ▶ **Environmental migration is often referred as change of residence due to resource scarcity and/or natural disasters.**
- ▶ Beniston (2004) argues that “under adverse conditions, it can be surmised that the severe depletion of an essential resource could lead to out-migration, with persons moving from a region affected by resource loss to regions where the resource is still sufficient to sustain both the local and the migrant populations”. **Environmental adversity acts as the pushing factor that motivates people to relocate**

Literature Review (Cont..)

- ▶ However **not every migration case under adverse climatic conditions should be considered as 'environmental migration'**. For instance, nomads from Kenya's arid northern region migrate as part of their pastoral livelihoods; this behavior should be understood as part of community tradition (Clarke & Noin 1998; Berger 2004)
- ▶ Despite terminologies, indeed **people could be streaming out of rural areas due to environmental stresses (broadly defined) in an involuntary basis**
- ▶ As more labor opportunities and access of education & health services concentrate within cities, it is expected that people will consider relocating to those areas
- ▶ As Hanna (1969), Hope (1998) Landau and (2007) have argued, **migration is one of the main reasons for urban growth in African countries**
- ▶ In the presence of **changes in climate**, the question is whether **environmental migration should be also considered as a potential factor of rapid urbanization (or slum growth rates) in Kenya**
- ▶ **Slums are informal settlements that configure the poorest portions of the city.** UN-Habitat has identified slum-dwellers as urban households lacking one or more of the following: 1) Durable housing (2) Sufficient living area (3) Access to an improved water source (4) Access to improved sanitation (5) Secure tenure

Literature Review (Cont...)

- ▶ Usually neglected by the local authorities, slums are crowded places in which people inhabit under adverse hygienic and social conditions
- ▶ **60% of the population that lives in Nairobi are slum-dwellers** (Commission on Social Determinants of Health 2008) who **occupy just 5% of the city's residential land** (Henry, Yongsheng et al. 2006)
- ▶ The social and physical conditions have serious implications in terms of environmental health, human security and urban services; in addition, they are often correlated with urban income inequalities
- ▶ **Persistence of urban poverty will ultimately augment the number of slum-dwellers** within cities; and Nairobi is not the exception
- ▶ El-Hinnawi (1985) and Jacobson (1988) classified migrants according to the extent of new residence (temporal or permanent) and the environmental stress (progressive, permanent or temporal). **International Organization for Migration** (1992) included this classification and also included speed as another variable (emergency or slow-onset movements) as well as whether the movement was internally or internationally
- ▶ Suhrke (1993) categorized environmental migration by source - whether it was induced by deforestation, rising sea levels, desertification and drought, and land, water and air degradation (Black 2001)

Methodology

- ▶ Survey was conducted in 2 main slums in Nairobi: Kibera and Mathare
- ▶ Aim was to obtain realistic assessment of environmental migration in Kenya
- ▶ 500 random and representative interviews were administered **by staff from Umande Trust** from 6-17 May 2009
- ▶ Study specifically assumed that internal migrants will face economic limitations; therefore it is presumed internal migrants will settle down in slums, at least temporarily
- ▶ Sample size was based on Salant et al (1994) estimation for a population of one million or more considering a $\pm 5\%$ sample error tolerance and 50%-50% weighted distribution (Salant and Dillman 1994)
- ▶ For this study rural-urban migrants are defined as those individuals who declared themselves as Kenya nationals - it excluded foreign migrants or people that did not mention their place of origin
- ▶ Environmental migrants are classified as rural-urban migrants and mention at least one environmental factor as a reason to relocate

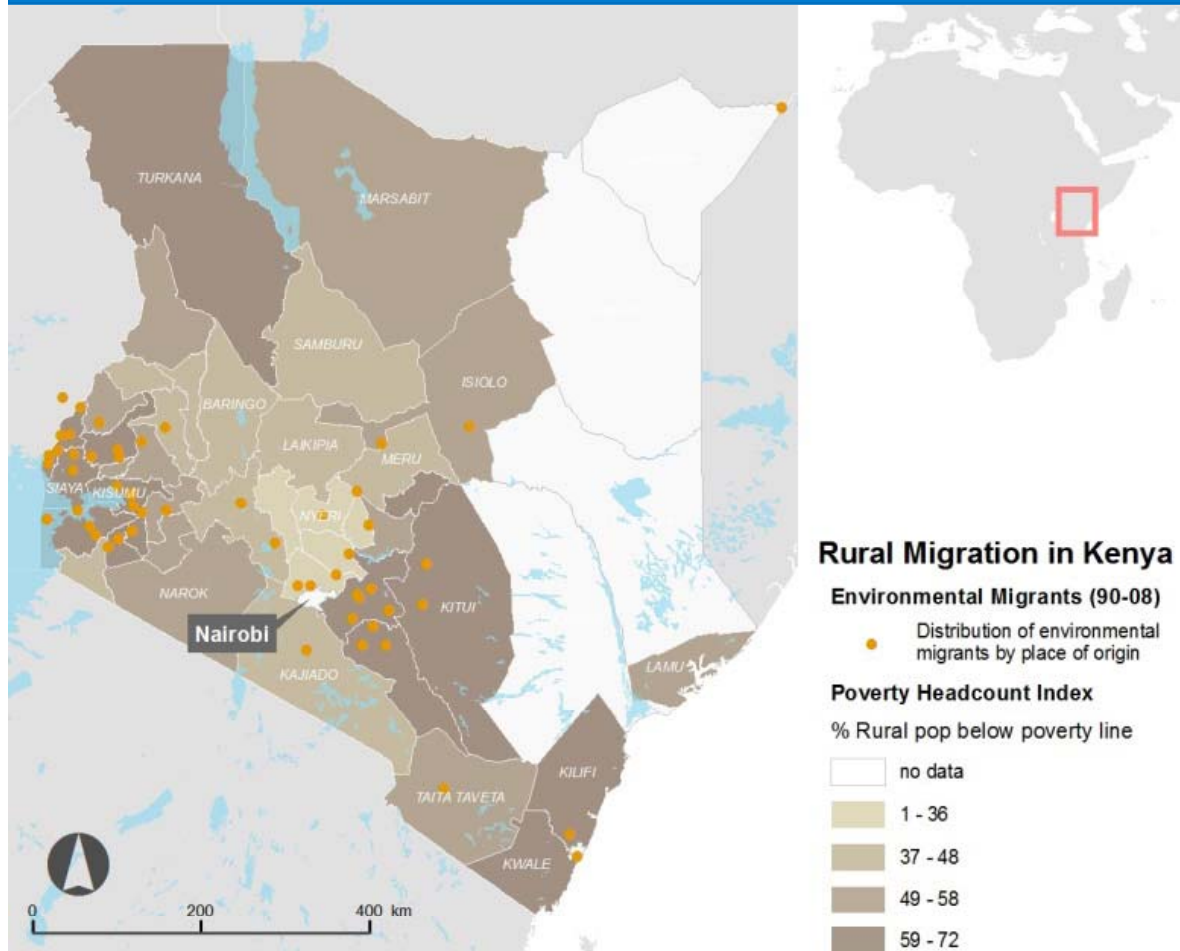
Methodology (Cont..)

- ▶ **Several external data sources were consulted** to compare & contrast results
- ▶ Geographic positioning of places of origin mentioned during the survey was located using Google Earth and spatial analysis was done in ArcGIS
- ▶ **Umande Trust (UT) is a local NGO headquartered in Olympic Estate, Kibera. UT works at the community level, mainly at urban and peri-urban area, promoting environmental awareness and sustainable development**
- ▶ There are **no official records for current population in Nairobi or in Nairobi slums**
- ▶ **Slum population was estimated** following UN Population Division figures for 2005
- ▶ **Assuming 60% of population in Nairobi are slum-dwellers** (Commission on Social Determinants of Health 2008) then 1.653 million people lived in Nairobi slums
- ▶ Salant et al (1994) estimates a 380+ sample size for a population ranging from one to ten million; hence **a sample size of 500 seems appropriate.**
- ▶ The **Livestock Early Warning System (LEWS) data set includes 109 monitoring points spread throughout Kenya except for Nyanza and western region;** hence it only monitors climatic conditions from the north, south and central parts of the country (**Texas A&M University 2008; Universite Catholique de Louvain 2008**)

Results

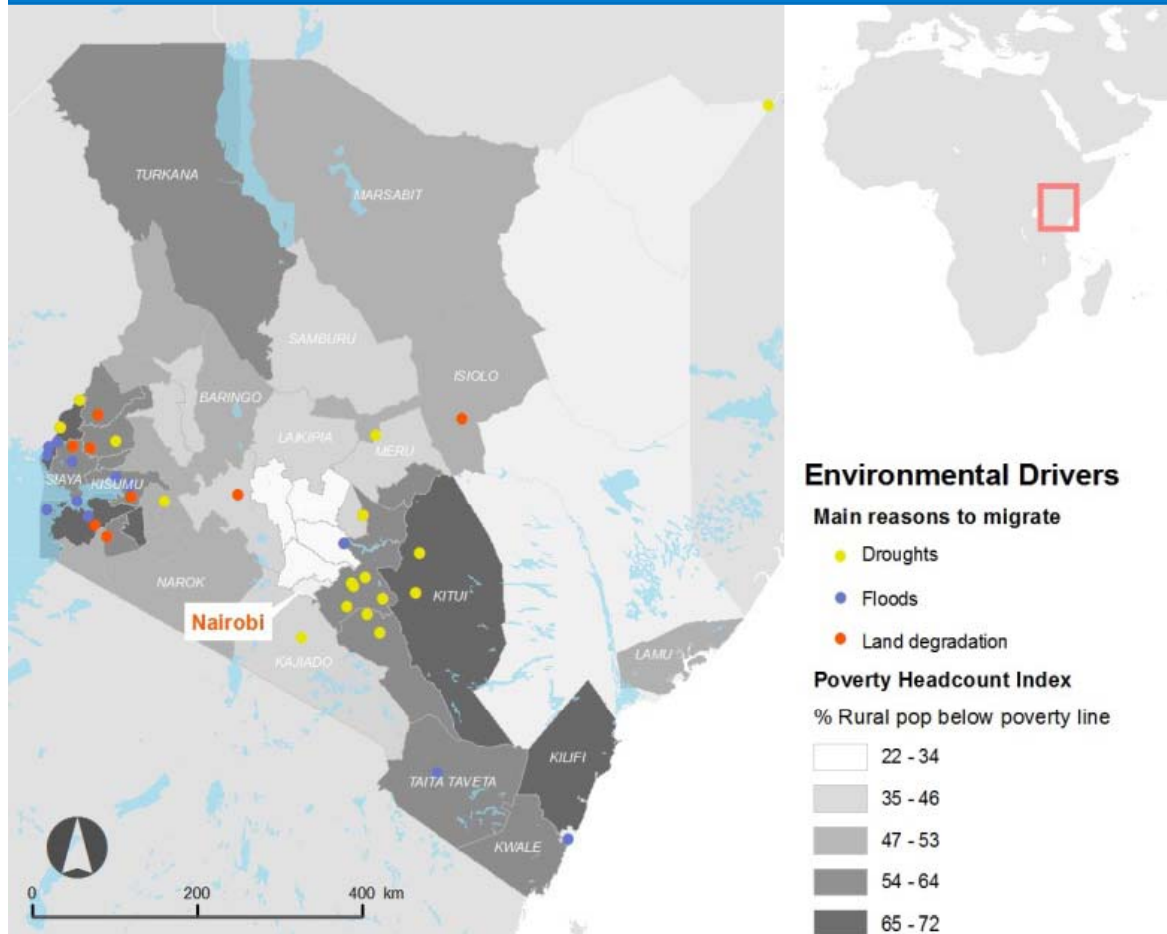
- ▶ From a total 500 surveys conducted only **485 surveys were valid**; the rest had too much missing information to complete the analysis
- ▶ Valid data set **comprised a population of 51% females and 49% males** with an **average age of 40 years** for both groups on 1st January 2009
- ▶ **Evidence of rural-urban migration was found in 88%** of the valid cases, excluding foreign migrants (3%) and Nairobi naturals (8%)

Figure 1: Distribution of Environmental Migrants by place of origin



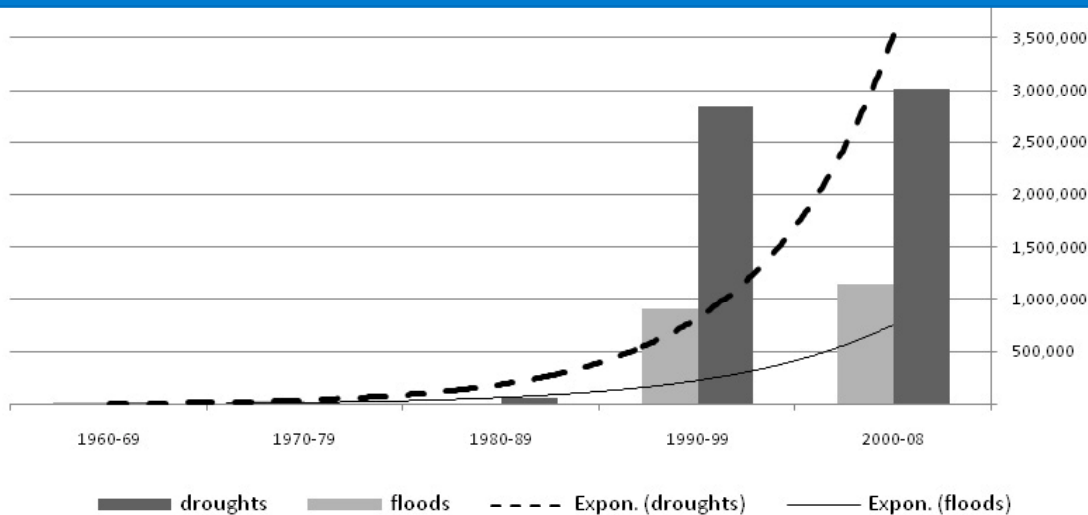
- ▶ There is **multiplicity of reasons** that household members take into consideration when they decide to migrate.
- ▶ Primary reason given as motivation to migrate is desire to increase wealth and other income related opportunities (76%), followed by **environmental factors (44%)**
- ▶ **Interviewees mentioning at least one environmentally related issue as a reason to migrate** - crop failure, natural disasters, lack of wood for cooking, land degradation, inadequate access to safe drinking water, or other if applicable - **were considered environmental migrants**

Figure 2: Main Environmental drivers as reasons to migrate



- ▶ When interviewers asked to **qualitatively describe the particular circumstances that environmental migrants faced in their places of origin**, drought, rainfall unpredictability or lack thereof was mentioned by 43%; floods were mentioned by 17%
- ▶ Thus the **main environmental reasons to migrate to Nairobi were persistent droughts and floods**

Figure 3: Total Population affected by drought and floods in Kenya



► The 2 main environmental drivers that severely affect the Kenyan population are droughts and floods. Within this set, **a temporal divide between the periods 1961-1990 and 1991-2007 can be observed**. Increased frequency of droughts & floods suggests a significant change in temperature and rainfall levels between those periods, thus a statistical t-test of average annual temperature and precipitation was conducted to validate the latter

Table 1 Results from the t-test (paired sample)

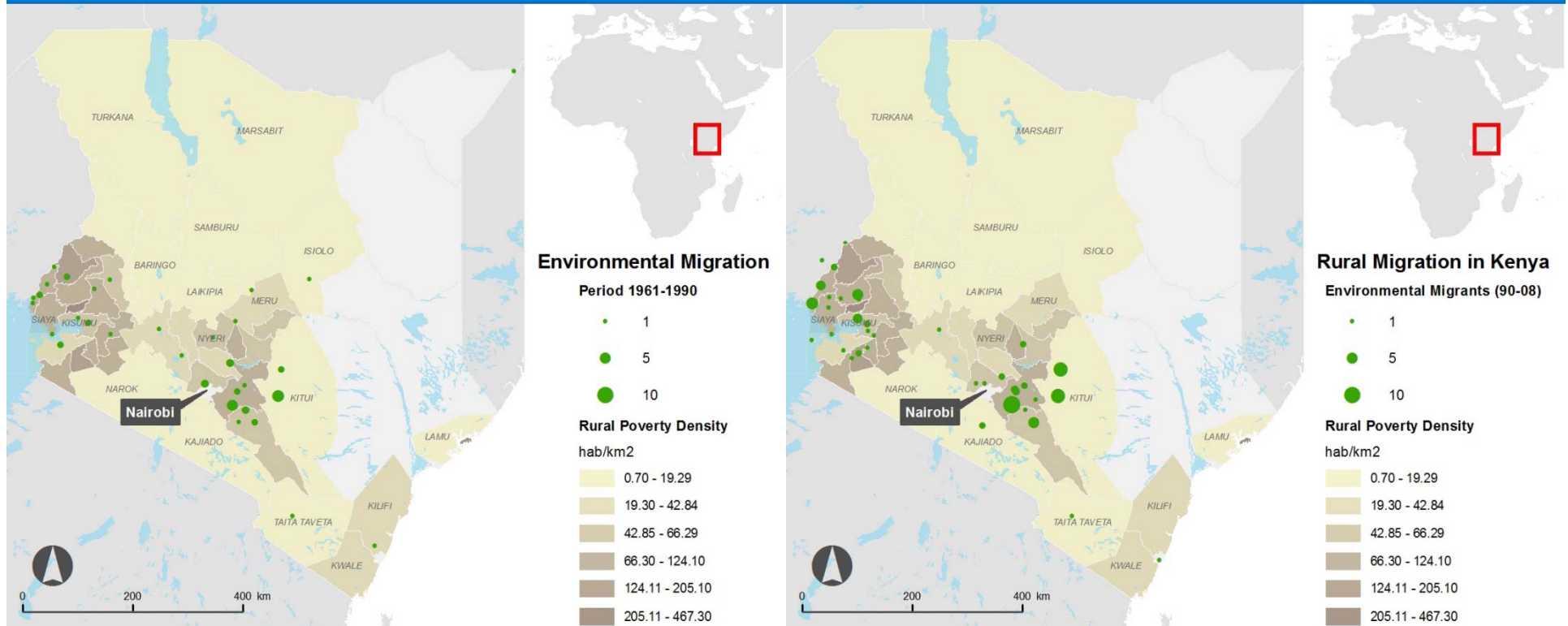
	Paired differences			Paired samples test		
	Mean	Std Deviation	Std Error Mean	t	df	Sig (2-tailed)
Pair 1 Temp (before)- Temp (after)	-.0638325	.2404387	.0230299	-2.772	108	.007
Pair 2 Precip (before)- Precip (after)	.0415703	.0330042	.0031612	13.150	108	.000

► In regards to temperature, assuming variance homogeneity and normality, it can be observed that on average, **there is a statistical significant difference in the temperature between 1961-1990 (before) and 1991-2007 (after)** with a confidence level of 99.993%. The difference in means from 109 independent observations suggest that **on average the post 1990 period in Kenya was 0.0638°C hotter** than before with a standard deviation equal to 0.2404°C

► Similarly, **there is a statistically significant difference in precipitation between 1961-1990 (before) and 1991-2007(after)** with a confidence level of 99.999%, assuming variance homogeneity and normality. The difference in means from the same 109 independent observations suggest that **on average the post 1990 period in Kenya was on average 4.157 mm drier per day**, with a standard deviation equal to 0.33 mm

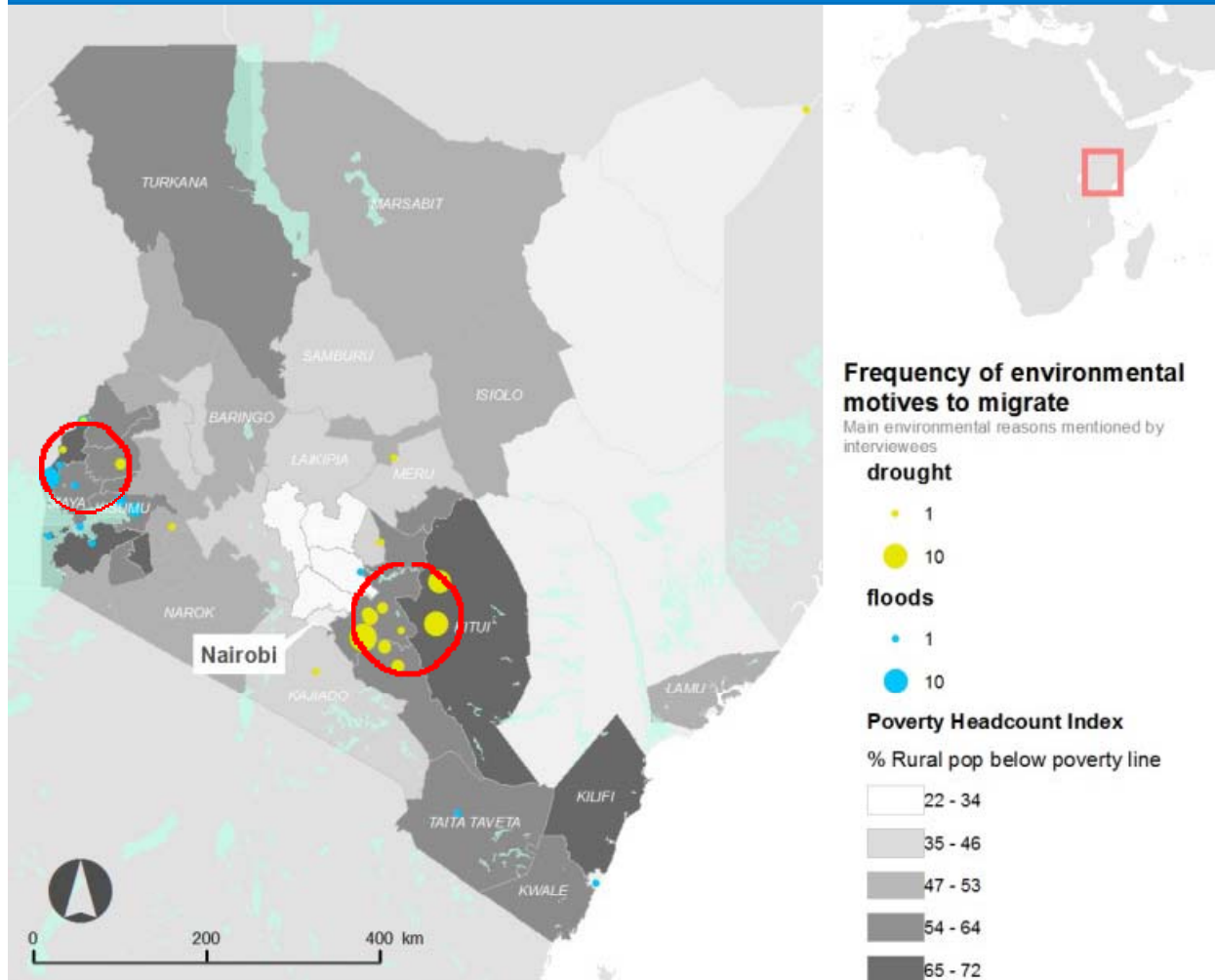
► Therefore **there is strong confidence that the post 1990 period has been hotter and drier than before**; hence the sample of environmental migrants was also temporally divided to see if any change could be denoted

Figure 4: Environmental Migration in Kenya



- ▶ **74% of environmental migrants arrived to Nairobi between 1991 and 2008** whereas 26% did so before 1990, consequently the number of migrants has increased in the last 20 years
- ▶ However it would be misleading to assume that the change in climatic conditions is the only reason that the number of environmental migrants has increased
- ▶ It is possible that environmental migrants from the pre-1990 period returned to their places of origin or migrated to other urban settlements. It is also probable that the rapid population growth that Kenya has been experiencing in the past 50 years accounts also for this increasing trend (UN-Habitat 2006).
- ▶ Nevertheless, **an association between the increased number of environmental migrants and the change in climatic conditions can be assumed**

Figure 5: Droughts & Floods as main reasons to migrate



► Besides the temporal pattern, a spatial pattern between droughts and floods –the two main environmental drivers- can be inferred.

► **Figure 5** shows a prevalence of **drought** motivation in the **southeastern region** whereas **floods** were mainly mentioned in the **western region**

Discussion

- ▶ As mentioned there might be an association between climatic conditions and the increasing number of environmental migrants in Nairobi
- ▶ **Environmental migrants seemed geographically clustered** according to its specific motive to migrate, particularly in regards to droughts and floods
- ▶ However, **when mapped with socioeconomic variables, environmental migration might evidence other associations** as well
- ▶ The desire for a better income level act as a pulling factor, not only for environmental migrants but for rural-urban migrants in general. The **majority of environmental migrants (65%) declared that household income levels were better** from what they used to have in the countryside, whereas only 3% mentioned that it was worse and 2% that it was the same than before
- ▶ In addition, **88% of environmental migrants responded to have in overall a better living standard** in the city than what they had back home; 5% considered it was the same and 5% that it was worse
- ▶ The latter evidences that although there are strong environmental reasons behind the motivation to migrate, there are also socioeconomic components embedded into that dimension. Therefore, it can be misleading to treat the environment as the sole reason to migrate; rather it should be considered as part of a set of motivations

Conclusions

- ▶ Temporal and spatial pattern was found in relation to environmental migration to Nairobi
- ▶ **Temporal pattern refers to the association between the significant change of climatic conditions between 1961-1990 and 1991-2007 and the increase in the number of environmental migrants to Nairobi for the same periods**
- ▶ **Spatial pattern relates to the 2 main environmental factors mentioned by migrants.** Droughts have been a persistent motivation to relocate for the population of the southeast region whereas floods are a constant reason to migrate for the people of the Nyanza and western districts.
- ▶ It has been evidenced that **environmental stresses act as pushing factors for environmental migrants**
- ▶ **A similar association can be made when environmental migrants are mapped together with poverty figures**
- ▶ **The desire for a better income level act as a pulling factor,** not only for environmental migrants but for rural-urban migrants in general

---The End---
Questions?