

PRIPODE Workshop on Urban Population, Development and Environment in Developing Countries

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The Committee for International Cooperation in National Research in Demography (CICRED), through its Programme for International Research on the Interactions between Population, Development and Environment (PRIPODE) funded by the French Foreign Ministry, is organizing a workshop in Nairobi, Kenya from 11-13 June 2007 in collaboration with the African Population & Health Research Centre (APHRC), the Population-Environment Research Network (PERN), and the Center for International Earth Science Information Network (CIESIN) of Columbia University. The workshop is focused on urban population, development and environment (PDE) dynamics in developing countries. The selected papers represent policy-relevant papers that accurately present some aspect of the current PDE dynamics in a given urban agglomeration (i.e., case studies on specific cities based on original research), the findings of which can be applied to solving problems associated with rapid urbanization in contexts of high poverty and growing strains on the environment and natural resources, as well as to promote policies to achieve Millennium Development Goal 7 and its associated targets.

SELECTED PAPERS

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Household Response to Urban Encroachment on Rural Hinterland in Ogbomoso Urban Fringe.

One of the major consequences of increasing rate of urbanization in developing countries, Nigeria in particular, is the uncontrolled and or uncontrollable rate of urban spatial expansion as well as amorphous nature physical development in most cities. In both spatial extent and demographic characteristics, the cities have continued to grow without form, order or organized direction. While mechanisms and consequences of growth are not well understood, in most cases city expansion is surreptitiously encroaching into immediate rural hinterlands thereby overwhelming the natural environment, with serious implications for the economic base, socio-demographic characteristics, health and well being of communities at the urban fringes and even further. The strain on the natural resource base at the hinterland where the goods and services are derived and urban wastes are deposited is compounded by unwillingness or powerlessness on the part of political actors and urban managers to minimise negativities associated with city expansion. This paper therefore examines how households at urban frontiers of Ogbomoso, a pre-colonial but rapidly expanding city in S.W. Nigeria, respond to some negativities of city expansion such as increasing shortage of farmland, rising land rent/price, increasing house rent and spending on food as well as basic services. It first examines the issue of spatial changes in Ogbomoso city between 1914 and 2003, using GIS, to determine among others, the rate, pattern and direction of city development in the periods under consideration. The data required for this is the vegetation and land use map of Ogbomoso for different time periods. The earliest land use maps of the

city were those for 1914 and 1949, which were obtained from the Nigerian Baptist Theological Seminary as compiled by the Missionaries. Land use maps for the periods 1978 and 1995 were derived from the following imageries: Landsat MSS Imagery (1976-1978), SPOT XS Landsat TM (1993-1995), ERS-1 SAR (1993-1995). They were obtained from the Ministry of Agriculture and Natural Resources. Through fieldwork, the 1995 land use map was updated in 2005 to produce the current land use map. The above maps were digitized using ArcView 3.2a, while the pattern, direction, as well as rate of growth of the city for the years aforementioned were determined using IDRISI package. Although maps were obtained for very irregular periods, their outputs are sufficient enough to analyze changes in city spread and examine the implications of city growth on the rural hinterland. In order to examine the responses of households to urban encroachment, the study combines households and communities in Ogbomoso urban fringe as units of analysis. Data was collected with the aid of structured questionnaire and Focus Group Discussion. A total of 200 questionnaires were administered to randomly selected households in twelve communities of Aroje, Iluju, Eyeba-Ikose, Arinkinkin, Owolaake, Aduin, Abaa, Bayoje, Sanu Aje, Ladokun, Safejo and Aje ikose, to elicit information on socio-economic and demographic characteristics of the people as well as on impact of city expansion on their livelihoods. The choice of these communities was purposive. They were those at the city frontier and with established organic linkage with the city. The villages were categorized into three, based on their spatial extent and population size. 67 questionnaires were administered to category A, 83 questionnaires to category B and 50 questionnaires to category C. The questionnaires were randomly distributed to all the selected villages. The data collected with the questionnaire was subjected to cross tabulation, using SPSS to examine variations in household characteristics and responses across communities, while chi-square test was specified to test differences in community parameters. Also one session of Focus Group Discussions (FGD) was conducted among community elders (as a surrogate of life course model) in seven of the twelve communities to investigate the changing economic base of the communities. A content analysis of the FGD report was carried out to discuss the changing economic base of the communities as well as the response of households to impact of urban encroachment. The study reveals that between 1914 and 2003, as much as 260.7 hectares of the rural hinterland was engulfed by the city of Ogbomoso. The rates of change differ during the period. While it was just 6.8 hectares of rural hinterland that was encroached upon between 1914 and 1949, city expansion and rural encroachment increased steadily to 75 hectares in 1978, 75 hectares in 1995 and 84 hectares in 2003. Results further show that in response to changes in economic base of communities, households' occupation has shifted from farming and fishing to basically trading economy. In the opinion of community elders, "we can not farm around here as we used to do, any person wishing to farm must go far, that is why some of us are not working, but depend on whatever our children send for feeding". Also individual land holdings, with observed decrease in farm size/holdings, and increase in distance of farms is now widely adopted in response to changes in land tenure systems, from the customary/community ownership and increase in number of landless adults and that of dependants. As objects of positive policy, it is suggested that: government should establish farm settlements at designated places at the urban fringes and that land should be allocated to farmers based on need as well as provision of other farm input subsidies and necessary services. This will revitalize economic activities at the urban fringes and progressively improve the standard of living of the people as well serve as a check to prevent further spatial expansion of the city. At the same time it will encourage vertical rather than horizontal city development. It is also strongly recommended that urban growth boundaries could be demarcated by adopting the use of green belt area around the city. This will not only enhance the aesthetic value of the environment but also serve to slow down the rate of urban spatial expansion. Nevertheless there is the need for close monitoring of development in the northern part of the city, to forestall development of slum and squatter settlements. In this vein, urban development planning and management should assume a metropolitan status, where a holistic approach to development control, urban planning and management are pursued within a city-wide framework.

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Urbanization, Slum Development and Security of Tenure. The Challenges of Meeting Millennium Development Goal (MDG) 7 in Metropolitan Lagos, Nigeria

At the dawn of the third millennium, growing urbanization remains a global phenomenon. From the small towns of the past to the metropolitan conurbations of today, cities have become sophisticated, complex and dynamic aspects of the cultural heritage of human-kind. However, cities have been assuming dangerous tendencies by their contemporary characterizations, which in addition to its old attributes of attracting population, has also generated intense conflicts within the urban systems. Nigeria, with a land area of close to 1 million square kilometres, and a population of well over 125 million, has 43.5% of its population living in urban areas in the year 2000, up from 39% in 1985, with projections that the urban population will reach 50% by the year 2010, and 65% by 2020. The rate of urban population growth is thought to be 5.5% annually, roughly twice the national population growth rate of 2.9%. More than seven cities in Nigeria have populations that exceed 1 million, and over 5,000 towns and cities of various sizes have populations of between 20,000 and 500,000. There is no city which best epitomizes the characterizations of Nigeria cities than the metropolitan city of Lagos. Greater Lagos, the former national capital, has grown from 1.4 million in 1963 to 3.5 million in 1975. It is currently over 10 million, and is projected to be 24 million by 2020. It is estimated that 606 people enter Lagos per minute but nobody seems to know the number that leaves eventually. Greater Lagos has passed through several phases in its metropolitanization process but three are distinctly discernable: the 19th Century period (extending from 1851 to 1990); the period of rapid growth (1901 to 1950); and the period of metropolitan explosion, that is, the post 1951 period. Consequent upon the population build-up, it is not unexpected, therefore, to observe unusual pressure, leading to unprecedented demand for land. Through the pressure being mounted by the demand for land, it is a common phenomenon to see most 'undeveloped land' being taken over by the rural immigrants to satisfy their urban land needs. Such invasion usually leads to uncontrolled and unorganized developments, while such neighbourhoods/communities lack basic infrastructural facilities. The rapid rate of development, equally results to overall "planlessness" of these areas. It has been argued at various quarters that the insecurity of tenure contributed largely to the poor living condition and low standard of living of such residents. Since they are squatters, they do not have any legal title to such occupied land and are thus prevented from taking any mortgage loan from any bank, thus, compounding their problems. Within a short time, such residents create serious social problems to government because it becomes so difficult to either evict them or provide facilities for them. It is against this background that the research on which this paper is based examined the urbanization processes of metropolitan Lagos, its associated festering illegal, slum and squatter settlements, the social, economic and political problems they create and the evolved measures to solving the problems. One of the measures this research examined is security of tenure, its prospects and problems, all with a view to accommodating citizens' participation, access to and security of tenure while providing enabling environment for the enhancement of standard of living of the poor majority and thereby reducing poverty. The study adopted a case study research methodology design because it allows for the establishment of unique characteristics of the population and the ability to develop detailed profile and intensive knowledge of the case study. Most importantly, this design is adopted to further explore earlier studies conducted by the United Nations Development Programme (UNDP,1980), SNC-Lavalin [1995] and Stoveland Consult [2003] with a view to gaining richer insight into the characteristics of the squatters and their tenure status. Two principal data types – spatial and attributes – were considered for the study. These were elicited from the primary and secondary sources. An extensive reconnaissance survey of the revised 41 out of the 42 blighted areas identified by UNDP was carried out. This was complemented by the aerial photographs, topo-planning maps and photo mosaic of the study area for comprehensive trend analysis of the spatial pattern of development over time. Based on the reconnaissance survey of 41 identified areas, ten (10) areas with preponderance of squatters were identified by this study using the following indicators of urban blight: Tenancy, Availability of facilities and environmental issues. These areas are: Makoko, Badia, Ilaje, Ijora Oloye, Iwaya, Ajegunle, Sari – Iganmu, Amukoko, Okobaba (3rd Mainland

Bridge) and Ogudu Village. Eventually, 407 questionnaires were administered in the centrally located areas and 176 in peri-linear stretch at the edge of Lagos Lagoon for a total of 583 questionnaires administered in all the selected communities. The analysis of data was greatly enhanced by the descriptive analysis as well as quantitative and inferential analyses of the data. For instance, all the attributes or indicators of urban blight were considered and analyzed for each category of the blighted areas. In addition, logical and practical reasons were adduced for the pattern of occurrence that was observed. Some of the findings of the research show that: About two-thirds of the city population currently live in slums; Most of the developable land in the selected areas have been greatly developed and urbanized, and that the residual pockets of marsh and poorly drained plots are rapidly being filled and developed; Existing land registration process, which involves payment of several fees, documentation, and the engagement of professionals, is clumsy, tedious, time consuming and expensive to execute; tenure status in the study area had a major impact on poverty and the overall environmental quality as threat of forced eviction pre-disposes residents to negative attitude towards improving their environment. Insecurity of tenure deters investment, since the residents do not have access to mortgage facilities from bank, because of lack of collateral security for such loans. They are thus poor because they are poor. The interplay of all these factors has perpetually kept these groups of people in a vicious circle of poverty.

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Intra-urban transportation, gender and psychological distress in developing countries: Nigeria.

Abstract:

The trend of urbanization and city growth in developing countries are characterized by rapidity of urban increase, urbanization outpacing industrialization, and a high rate of urban population growth by natural increase and migration. In Nigeria, urbanization has a fairly long history in its growth and development. Historical account shows that extensive urban development in Nigeria predates the British colonial administration. Early explorers, missionaries and merchants estimates of population of towns show the existence of substantial human settlements in this part of the world in the 19th century (Mabogunje 1968). During this period, the major factors crucial to the growth and development of cities were trading, marketing and administration. The second half of the 20th century witnessed rapid rate of urbanization and emergence of cities in various parts of Nigeria due to a number of factors among which are: introduction of wheeled transportation, particularly railway and road; categorization of settlement into hierarchical order of township; introduction of monetized economy and consequently production of cash crops and exploitation of mineral resources; continuous geopolitical restructuring, through creation of states and local governments in 1967, 1976, 1987, 1991 and 1996,; and the industrialization process between 1960 and 1975, which was based on import substitution strategies and consumer market for imported goods and services. The pace of urbanization has been dramatic showing extraordinarily high rates of 5-10 percent per annum (Egunjobi 1999). Consequently, there has been rapid expansion of Nigerian cities' areal extent which is now sometimes ten fold their initial point of growth (Egunjobi 1999; 2002; Ogunsanya 2002; Oyesiku 2002). A crucial aspect of this is that city growth and expansion in Nigeria has been largely uncontrolled. Consequently, the scaring and unsatisfactory situations in the cities have been increasing at an alarming rate. Urban centres are under severe strains imposed among others by urban transport situation. Urban transport which serves as the sinew binding together various land-uses have not only remained inefficient, it has grown over the years to be expensive and dangerous (Egunjobi 1999). Although the situation of urban transport system in the Nigerian cities affects women and men, previous empirical and theoretical discussions most of the time assumed the universality of women's and men's experience. Hitherto, every attempt at solving intra-urban mobility problems was made without gender considerations. The assumptions have always been such that the solutions are applicable equally to both men and women. In most cases, pure traditional economic variables which

ignore crucial cultural roles and the salience of the life course are used to derive some of these solutions (Rosenbloom, 1993). Yet those missing variables are parts of our realities which of course need to be applied in formulating any transportation policy. The place of gender has been found to be very important in effective policy formulation because man and woman are not equal urban space users and actors (Short, 1996; Seager, 1992). In Nigeria, although research findings have shown that women's transportation patterns differ from men's, and a significant positive relationship have been found between intra-urban travel and psychological distress (Asiyanbola 2002; 2004), there is no empirical study that has examined gender differences in the effects of urban transport infrastructure condition and intra-urban travel on the psychological distress of women and men. The present work is an addition to the existing literature and an attempt to make contribution along this gap. The hypotheses tested in the paper are that: (i) there is no significant effect of urban transport infrastructure condition and intra-urban travel on women's and men's psychological distress and (ii) there is no gender difference in the effects of urban transport infrastructure condition and intra-urban travel on the psychological distress of women and men. Data used in the paper were obtained from a cross-sectional survey of 721 households in Ibadan, Nigeria. Information was collected on the variables used in the analysis. These variables are (i) Urban transport infrastructure condition variables (1 if bad, 0 otherwise). These variables are: neighbourhood road quality; neighbourhood public transport condition; neighbourhood street light condition; neighbourhood state of security; neighbourhood crime level; and neighbourhood drainage system; (ii) Intra-urban travel variables as indicated by weekly trips (total number). Respondents were asked to fill in all the number of the trips made for the immediate past week for the various purposes (secular work, children school, childcare, recreation, shopping, religion, fetching water, getting rid of household waste); and (iii) Psychological well-being information. Multiple regression and analysis of variance (ANOVA) statistical techniques were used to analyze the data. The study shows that urban transport infrastructure condition and intra-urban travel has significant effects on the psychological well-being of women and men. Gender difference is found in the effects of urban transport infrastructure condition and intra-urban travel on women's and men's psychological well-being. The effect are found to be more on working/nursing mothers, followed by nursing mothers, and, working women compared to the effect on working men. These findings suggest that urban transport infrastructure condition and intra-urban travel constitute a major threat to psychological well-being of women and men and the effect is more on the psychological well-being of women than of men due to gender differences in the socially prescribed roles. The issue of concern therefore is to make intra-urban transportation not only accessible, safe, affordable and appropriate, but also gender sensitive. Historically, transportation planning and engineering have been gender neutral. In order to meet the mobility needs of women and to address the inconveniences and stress being experienced at present, there is the need to develop transportation planning models that capture gender differences in trip purpose, frequency and distance travel, mode of transportation used and complexity of trip making. There is the need to improve public transport. This could be achieved through increasing subsidies in order to reduce fares or increase services, providing more buses, staff, stations and bus stops. Improving safety on the street is very crucial. Routes should connect homes with other activity centers. Therefore, there is an urgent need for planning. That is, urban development and transport have to be pursued together at the same time. Provision of efficient public transport should precede any major housing development. Measures should be taken to avoiding alienation of any existing right-of-way, especially in the dense areas. A design of integrated metropolitan transport master plans with a clear vision of train, bus and taxis as well as urban motorcycle and non-motorized transport roles is needed. Urban transportation policies which emphasize accessibility, that is, reducing the need to travel, should be pursued. Such policies relate to land use planning and decentralization of activity areas and the prioritization of walking and cycling over motorized transport.

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Towns in the jungle. Exploring linkages between rural-urban mobility, poverty and environmental degradation in the Amazon

Abstract:

The main objectives of this paper are a) to analyze the main determinants of rural-urban mobility in the Amazon frontier, particularly in the Northern Ecuadorian Amazon (NEA), and b) to understand how this mobility pattern has engendered a process of proto-urbanization in the Amazon which is articulated with growing degradation and depletion of natural resources, as well as failure to reduce poverty in either rural or urban areas and continuing deficits of infrastructure. By rural-urban mobility, this paper considers migration, or the permanent change of residence from rural areas to an urban area, and temporary forms of mobility, including, but not limited to, circulation and seasonal mobility. Recent evidence indicates profound changes in migration and urbanization patterns in the NEA. Following the earlier large-scale migration fluxes into the NEA from long-settled regions in the Highlands during the 1970's and 1980's, the most dramatic forms of population redistribution currently under way are within the frontier, including rural-urban movements that are engendering rapid urbanization in the middle of what is by far the world's largest tropical rainforest. This increasing proto-urbanization on the Amazon frontier involves recent rapid growth of some long settled river towns, the formation of new pioneer urban areas, and the incipient transformation of many tiny rural communities into towns, through population growth and acquisition of basic infrastructure. Increasing economic and social articulation is also evolving between larger and smaller urban communities, constituting an incipient but increasingly complex network of urban places in the Amazon (see Browder and Godfrey, 1997, on the evolution of cities in the Brazilian Amazon). Rural-urban mobility is a major catalyst of regional change, including in the Amazon (Bilsborrow, 1998). This paper analyzes rural-urban mobility in the NEA during the 1990's as an increasing strategy of risk diversification and income maximization by migrant colonist families. It also is directly linked to ongoing processes of deforestation, urbanization and changes in income and welfare. Moreover, population mobility and redistribution are becoming the dominant demographic factors in population growth in frontier regions such as the NEA since both fertility and mortality have fallen considerably as has natural population growth. The second generation of settlers will continue to reach adulthood and seek land or jobs, at the same time as farms are experiencing a declining capacity to sustain members due to decreasing soil quality and increasing intensity of use over time, and therefore declining agricultural yields. There is, thus, a population momentum in rural-urban mobility due to earlier high fertility, which along with continuing in-migration from elsewhere in the country due to the lack of expansion of employment opportunities, which assures a momentum in the urbanization process of the NEA. Previous evidence (Barbieri, 2005) shows that the increasing urbanization in the NEA has been mostly grounded on two simultaneous, interactive processes. First, rural plots have become much smaller over time (documented by data described below) as a consequence of population growth and resulting land fragmentation. Hence, more and more rural households see off-farm employment or migration to a nearby town of one or more family members as a way of getting more cash income and diversifying risk. The declining capacity of many farms to sustain their household members is evident as farm sizes shrink due to subdivision, environmental degradation due to soil or water contamination from oil spills and loss of soil fertility due to inherent deficiencies in soil quality and inadequate use have led to population surpluses available for employment in nearby growing urban areas. A second major ongoing process involves the effects of local and national governmental policies and the dynamics of regional, national and international markets on the economic sustainability of agricultural activities in the region, especially the negative impacts of falling prices of the cash crops such as coffee and beef, and the boom in urban-based economic activities. The paper draws upon a unique longitudinal data set of household and community data along with spatial data from satellite imagery. Thus data were collected from a scientifically representative sample of 408 farm plots in 1990 and 1999, from 61 communities in the region ranging from the four largest towns to tiny communities comprising little more than a primary

school and a church on a main road, to a time-series of satellite imagery from 1973 to the present. All farm households in 1999 along with roads, town centers and infrastructure, and forms of land use were geo-referenced with GPS. Results of statistical analyses of survey data show increasing off-farm employment, with farm surpluses and wages mostly invested in cattle, leading to a second “vicious cycle” of deforestation instead of increased adoption of more intensive land use practices. Consequently, there is further deforestation and lack of sustainability of farming systems and smaller returns to investments from rural-urban movers and their households in rural areas, thus decreasing average welfare and income in the NEA. At the same time, continuing rural-urban movements within the NEA are increasing pressures on public facilities and services in local towns and communities. Although the neoclassical economic model sees population redistribution as an “equilibrating mechanism” engendering a more efficient distribution of human capital and facilitating economies of scale in the provision of public services and infrastructure (Bilsborrow and DeLargy, 1990), urban infrastructure (e.g., treated water, sewage, and garbage disposal) often does not increase sufficiently to attend to the increasing demands for services of growing urban populations, generating negative impacts on human health and living standards. Given the selective nature of migration, rural production may also suffer from the loss of young and relatively educated manpower. Furthermore, previous work on the NEA suggests that important gender differences exist in out-migration from farms in the region, with young women more likely to leave their parent's households and also to choose urban destinations compared to young men (Laurian, Bilsborrow and Murphy, 1998; Barbieri & Carr, 2005). In order to analyze the main determinants of rural-urban mobility and the linkages between urbanization, poverty and environmental degradation, this proposes a conceptual framework and measurement and modelling strategies which capture the multi-scale nature of factors determining population mobility in the NEA. This approach allows the investigation of socioeconomic, demographic, and biophysical factors operating at multiple scales (individual, farm household, and community) and over time on patterns of population mobility within the Amazon. Two statistical models will assess the determinants of population mobility in the Ecuadorian Amazon: (a) a discrete-time hazard model of out-migration relying on panel data from individuals and farm households between 1990 and 1999, and community information from the 2000 community survey which includes retrospective data; and (b) a cross-sectional multilevel model of off-farm work using data from individuals and farm households in 1999 and communities in 2000. Both models include binomial and multinomial outcomes (moved or not in the former, and type of destination in the later), and both control for potential problems of clustered information (individuals nested within households, and households nested within communities). The paper will conclude with a discussion of results, focusing on how they inform policymakers about the effects of population mobility on urbanization, environmental degradation and poverty alleviation possibilities. These are key issues regarding the future of development in the Amazon, due to the importance of population mobility for both socioeconomic development and environmental sustainability.

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Population and spatial growth: diagnosis and implications for urban management of Bangui (Central African)

Located at 4°22' north and 18°36' east, Bangui the capital town of Central African Republic is bordering the Oubangui River. Emerged from fast-flowings of Oubangui on a roll of sandy bank in June 26th 1889, this colonial military post has moved by the time in search of land out of water between fast-flowings and the confluence of Mpoko upstream, before installing for good in 1892 on the rocky promontory where Oubangui hotel is towering up today. The site is stripped between hills to west escarped slopes in the east, the Oubangui River in the south and progressively expanded westward, the west south and the north in the marshy plain sector. The presence of Gbazabangui hills breaks through the continuity of the town from east with Ouango, Kassai and Gbangouma groups, and the west, with the marshy plain. At its

foundation in 1889, a century back ago, a weakness of the number of the population has been significant (12 military auxiliaries), it is of 22 400 inhabitants in 1939. After the World War II, several reasons account for the population growth: domestic migrations, remunerated work, concentrated housing, new structures etc. From 1946 to 1960 (independence of the country), the groups of Bangui's population passed from 39 800 inhabitants to 80 000 inhabitants. The 1975 census and that of 1988 counted respectively 279 792 inhabitants and 451 690 inhabitants. In 2003, the population is constituted of 622 771 inhabitants, this increase of the population in the time has incident on the spatial extension of a successive surface of 2,12 km² in 1912, then of 6,42 km² in 1945, the urban area reached 22,56 km² in 1960, 63 km² in 1990 and 67 km² in 2003. The urban suburbs covered a surface of 92,50 km² in 2002. This spatial extension did not consider the rationalization norm of soil occupation. Indeed, from the 1936's, the old administration moved the districts back in unoccupied of space or zones non-aedificandi, without the soil occupation being planned, to extend the administrative and shopping centre. Beyond, the administration wanted to control the crowd due to rural exodus and in sanitary dip as well. This mode of soil occupation was unwillingly perpetuated since the population, in view of the fact that they were not being required before certain norms establishing anywhere. This resulted henceforth in a spontaneous settlement of district housings, and then a 'legalization' of anarchism in the space occupation that would be at the origin of the alteration of water resources for example the absence of urban infrastructure. A diachronic analysis of Bangui's town enable to follow the discrepancy that characterized the spatial extension and the urban development in the time (1946-2002), parallel to the population growth. It takes into account the collected information on the plan, maps, areal photographs, satellite pictures, which archived the different clichés of the dynamic urban area temporal efforts of equipments of the city in infrastructures and of planning carried out proportionately to the population space growth (1889-2002). Beyond, it traces the diagnosis of urban territory where authorities, private traders and the population, who are the main actors, interact mainly. The urban morphologies acquired inside the time (1946, 1960, 1982, 1988 and 2002) by providing evidence, and integrate the anarchism which governed the colonization of soil upon the successive urban peripheries. The more outstanding periods of these transformations of urban territory distinguish themselves in 1946-1960 with an extension of 16,08 km² and in 1960-1982 where 51,13 km² of space has been captivated, because of not only of the population growth, but also of the land pressure. Because it is during those periods that unoccupied marshy or flooding land, and the old quarries of laterites have been irrationally occupied by the housing. One notes the anachronism of the issue of the mastery of urban area since the colonial era till today. Thus one can be comprehended by the persistence of the mode of spontaneous soil occupation, inducing a concentration of housings and persons on a given space with out any precise regulations. Because authorities can have resolved the anarchic soil occupation having given birth to peripheral districts. This means that they have recognized implicitly this non urbanization without really integrating these groups of districts which come from it in the process or new plan of development of the town. It results from it that the shortfall of planning in the aforementioned districts which constitute the 2/3 (two third) of urban area (44,6 km²), only have to marginalize them and to delay their integration in global process of urban development. This leads the non-urbanized districts having more human densities in Bangui's town (more of 200 inhabitants.km⁻²) are facing numerous problems: flood due to pluvial rillwash, weak access to drinking water and to systems of basic sanitation improvement (evacuation of domestic waste and human excreta), drainage of pluvial water, road and waterway networks and transport etc. These are not yet resolved, in view of fact that authorities lack of financial means. Thus, the increase of the urban population by arrondissement between 1988 and 2003, on the order of 171 081 inhabitants, could only dramatize, even make complex the development of Bangui's town. The 6th, 4th and 8th arrondissement of Bangui have highest growth rates from 68% to 87%, the weaker (15% to 24%) characterize the 1st, 3rd and 2nd arrondissement; only the 5th displays an average rate of 34%. The first group of arrondissement is determined by the strong demographic dynamisms and to relate to peripheral districts densely populated. The second distinguishes itself by the weak significant demographic dynamism in the urbanized districts. This opposition between groups of allotted districts and non-allotted districts accentuate the difficulties to solve, to favour a harmonious development of Bangui's town, in thinking again about a new vision of slums that lack urban infrastructures. Due to the combined population growth and spatial lead to an increase of inhabitants needs, only a re-examination of these peripheral districts would help on a permanent basis resolve this anarchic way of soil occupation and propose appropriate solutions to populations of these districts lacking of urban infrastructures hitherto. It would be based on the marking of precise boundaries of these (from one of streams) from pedestraized course, paths or alleyway suitable for motor vehicles, of streams, or

sometimes of major roads which border them. Owing to difficulties of urbanization of most of them, this marking of boundary of districts by arrondissement appears as a credible alternative becoming part of a spatial and efficient approach of abovementioned problems. It would in practical terms enable to limit and to target districts or landlocked sectors (areas) with aim to renovate. This perspective would create a new structure to the urban management of Bangui. It depends on authorities or local groups to support this approach in order to equip little by little these districts with useful equipments and to revitalize them in order to improve the life context, and the urban development of Bangui, the Capital town. It is in prelude to a new management of urban territory.

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Population, Household structures and Domestic water and sanitation in households: A gender perspective using survey data

There is a general consensus on the relationship between population, development and the environment. The debate about population increase started several decades ago, but to date the controversy surrounding the relationship between the three variables in terms of cause and effect is yet to be resolved. Different scholars explain the population effects on development and environment differently for various reasons. For instance, while some argue that population increase is the root cause of all problems others maintain that population growth is important for technological innovations. Among the former Malthus is the most prominent while among the latter Ester Boserup has been the most influential. Africa can be regarded as experiencing typical Malthusian theory. Population increase in Africa is perceived to significantly contribute to the prevailing poor economic growth. The impact of Africa's population size on the environment is also unprecedented. Changes that occur at household level also contribute to challenges that Africa is facing in terms of development and the environment. Such changes include changing household structures and composition. In recent years, sub-Saharan Africa has been experiencing a drastic change in household structure and composition for various reasons. Such changes attribute to development and environmental problems inherent in the continent. For instance the proportional of children, adults and other persons of working age and the elderly within a household have an impact on future population growth, development and the environment. Against this short background, the present study aims at analyzing demographic factors at a household level and relate to availability of water and sanitation, children schooling and economic activities by gender of head of households. Bongaarts (2001) analyzed DHS data for 43 developing countries which conducted DHS from 1990 to 1998 and found that the proportion of female headed households was substantial. Other studies also have documented an increasing proportion of female headed households in developing countries (Kossoudji and Mueller, 1983). Of a particular concern is the argument that female-headed households are generally poor, disadvantaged and associated with economic deprivation (Peters, 1983). Over the past few decades, notably since the UN decade for women (1975-85), women conditions have changed but significant difference between men and women still prevail. They include persistent poverty in female headed households. Poverty in such households affect household members differently as it is widely known that poverty does not have equal impacts across population groups. Children are noted to be disproportionately impacted by poverty in their households. Such impacts are reflected in, among other factors failure to attend school. Children raised in poor households also tend to be poor because they seldom have an opportunity to go to school. In the given premise, it becomes difficult for such children to break through intergenerational poverty. This in no way means that intergenerational poverty must be passed from one generation to another. However, there should be necessary factors which can make it possible for children raised in poverty to break through intergenerational poverty. Such factors include access to education. Unfortunately, this does not seem to be the case for children living in female-headed households. Two important issues are of particular interest in light of inability to educate children. These are; (i) difficult to attain economic development with uneducated population and (ii) the relationship between poverty and environmental degradation. Given population increase, changing household

structures and poor economic growth in many African countries it is very likely that more people will continue living in deeper poverty and consistently depend on natural resources to sustain life. Prevailing deeper poverty in most African countries has unprecedented impact on the environment. The reason behind is that poverty presents formidable challenges to what options that the poor segment of the population have to support life. As a matter of fact, poverty tends to encourage the poor especially in rural areas to mainly focus on the immediate needs rather than on benefits that may materialize in the long term. Poor households are also unable to access important services such as water and sanitation. This puts their lives and health at a continuous risk. This paper uses secondary data from Malawi, South Africa and Tanzania to analyze household structure, availability of domestic water and sanitation, main economic activity and children schooling by gender of head of household and residential areas and relate them to issues of development and the environment. The argument is that, focusing on family planning and reproductive health alone as means to address population, development and environment is not in itself enough. There is a need to assess household living conditions and relate to development and the environment. Policy implications will be drawn based on the findings of analysis of the mentioned factors.

Methodology The study uses secondary data from various surveys. It uses data from South Africa General Household Survey (GHS), Demographic and Health Survey data from Tanzania and Malawi to analyse gender differentials in household structure and relate with availability of water and sanitation, means of income and children schooling. Data analysis is mostly descriptive including percentages of variables as well as cross-tabulation. However, multivariate logistic analysis will also be employed. Principal component analysis is used to estimate wealth for households by gender of head. Information on ownership of goods and housing condition such as wall and roof material, toilet facilities and source of water and energy were collected in surveys. Such information and ownership of durable assets is used to proxy for wealth. However, the challenge in using this method lies on assigning weights to various assets. One way of assigning weight is based on the price of the goods if the surveys collected such information. The data used in the present study do not have such information. This challenge is overcome by using statistical procedure of principal components. Principal components is "a technique for extracting from a set of variables those few orthogonal linear combinations of the variables that capture the common information most successfully" (Filmer and Pritchett, 2001:117). Results Preliminary results indicate that there exist differences in household structures by gender of head of the household. Female headed households are more likely than male headed households to be large and extended. Logistic regression analysis indicated that children are more likely to live in female headed households than in male headed households. This phenomenon can be detrimental to children's welfare given the poverty levels in female headed households as was found in principal component analysis. The principal component analysis indicated that female headed households are generally poorer than male headed households. The study also found that there is significant relation between obtaining water from a safe source and socioeconomic condition of households. The same results were obtained in terms of sanitation. Results on logistic regression indicated that main source of income; household size and gender of head are strong predictors of living in a household which obtain water from a safe water source and sanitation. On children schooling it was found that children in female headed households are less likely than children in male headed household to go to school. The study is still in progress and is yet to analyze main economic activity by gender of head of household and by residential areas (rural and urban). However, so far the paper can fairly argue that there are practical challenges that female headed households are facing which have impacts on both development and the environment.

Policy implications Based on preliminary results presented above, it is recommended that various policies need to be in place in order to assist female headed household which live in poverty. These may include initiatives that specifically target female-headed households. These will have among other benefits (i) reduction of gender gaps in earnings (ii) assisting women to improve the welfare of children (iii) potential benefit of equal distribution of development resources among men and women (iv) device water and sanitation pricing that can be afforded by female headed households or develop means of assist them to access water and sanitation at a subsidized price.

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Brazzaville, croissance urbaine et problèmes environnementaux

Abstract:

Dans ce travail, il s'agit de mettre en exergue les problèmes environnementaux liés à sa croissance spatiale et démographique de l'agglomération de Brazzaville¹. Cette agglomération située sur la rive droite du fleuve Congo en aval du Stanley Pool, est fortement affectée au cours de ces dernières décennies par une dégradation de l'environnement physique et sociale. A partir des enquêtes menées dans le cadre du projet PRIPODE-CG1, auprès des ménages et des observations directes de terrains, nous voulons mettre en l'accent sur le triptyque relation occupation de l'espace, "pauvreté" et dégradation de l'environnement. Les données collectées ont été intégrées dans le Système d'Information Géographique sur la ville de Brazzaville. En effet, la superficie de Brazzaville a connu depuis 1980 une forte augmentation, consécutive à l'adjonction de zones périurbaines à la circonscription administrative d'origine. Ainsi, la superficie est passée de 72 km² en 1980 à 110 km² en 2005. La population de cette ville est passée de 585 812 habitants en 1984 à 805 410 habitants en 1996 (RGPH) et 1 159 445 en 2005. Elle constitue 30% environ de la population nationale. Les individus âgés entre 15 et 45 ans représentent environ 45% de la population de Brazzaville. L'analyse de la croissance de la population de Brazzaville, par ajustement exponentiel de la série chronologique allant de 1950 à 2005, montre que cet accroissement a connu un caractère exponentiel marqué sur les deux dernières décennies du millénaire passé. Cette augmentation traduit à la fois : i) Le croît naturel de la population, caractéristique habituelle des populations des pays en voie de développement marqué par des taux de croissance importants (3,2% pour la période 1975 - 2003)² ; ii) L'exode rural qui s'est accéléré dans les dernières décennies à cause des politiques d'ajustement structurel qui ont renforcé le désengagement de l'état des campagnes ; iii) Les déplacements de populations consécutifs aux violences et exécutions sommaires qui se sont perpétrés à très large échelle dans les zones sud de la République du Congo. Cette évolution de l'espace et démographique de Brazzaville, s'accompagne avec la dégradation de l'environnement : i) l'occupation des espaces insalubres (zones inondables ou à forte érosion) ; ii) la qualité de l'habitat (pression sur le logement en termes de taille des ménages, de nombre de personnes par pièce) ; iii) la sécurité ; iv) l'accès aux services et fournitures essentiels (eau, énergie) ; v) la pollution de l'air, de l'eau et du sol. Ces problèmes environnementaux sont pour l'essentiel liés à la paupérisation des ménages et à la mauvaise gouvernance municipale à savoir : Le problème de logement à Brazzaville est presque resté en entier. Brazzaville présente un paysage d'habitat qui s'échelonne d'insalubrité (dans les quartiers centre ville) à l'habitat précaire (vers la périphérie). La politique de logement à Brazzaville n'a jamais prise en compte le niveau de vie des ménages. La dégradation de l'environnement urbain par l'érosion hydrique prend une dimension inquiétante, voire dramatique pendant ces dernières années. Cette érosion trouve ses origines dans l'interaction entre les implantations humaines anarchiques et la fragilité du milieu naturel. La voirie n'assure plus l'évacuation des ordures ménagères et a fortiori ne contrôle plus les décharges. Le moindre terrain vague, les rues les moins passagères, les abords des habitations sont envahis par des décharges sauvages au détriment de la salubrité publique. En saison des pluies ces zones d'épandage se transforment en véritables cloaques dont les émanations pestilentielles nuisent grandement au confort et à la santé de la population. La gestion des déchets solides est caractérisée par une mauvaise organisation, un ramassage peu fréquent, des circuits de ramassage non déterminés et par des déversements non contrôlés le long des voies publiques, des places publiques ou des ruisseaux. Les établissements administratifs et commerciaux produisent surtout des déchets sous formes de papiers qui sont souvent brûlés sur place. Il en est de même pour les déchets hospitaliers qui devraient être régulièrement brûlés directement dans les services hospitaliers sont simplement déversés dans la nature. Malgré les potentialités énergétiques du Congo (pétrole, le gaz, le bois et l'hydroélectricité), Brazzaville connaît actuellement une crise énergétique sans précédent. Un des graves problèmes auxquels est confrontée la ville de Brazzaville est l'utilisation du bois énergie pour satisfaire la demande énergétique des ménages. On a là l'une des causes principales de la déforestation des petits massifs forestiers périurbains. Il est établi que la consommation énergétique par la population augmente

proportionnellement avec la croissance démographique. Basé sur les résultats d'enquêtes, Brazzaville connaît un besoin croissant en énergie domestique : la principale source d'énergie étant le bois énergie (bois de chauffe, le charbon de bois). Mots clés : Brazzaville, Croissance spatiale et démographique, problèmes environnementaux.

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Mumbai After 26/7 Deluge: Some Issues and Concerns in Regional Planning.

Importance of the study The incessant and torrential rains in the afternoon of July 26 2005, amounting to 94.4 centimetres within a span of only 14 hours not only caused deluge in Mumbai, but wrought equal havoc on the weak and the powerful. Why did Mumbai, the commercial capital of India, could not avert such an environmental disaster? The arguments put forward are unplanned development of the city, reclamation of low lying areas, negligence on part of the Brihanmumbai Municipal Corporation (BMC), builders' lobby encroaching areas of hills and mangroves, violation of coastal regulation zone rules (CRZ), choking up of Mithi river providing natural drainage to the city, massive migration into the city, irresponsibility of the city dwellers, no effective warning system, lack of disaster preparedness and presence of multiple administrative and development agencies with no clear co-ordination among them. The deluge kicked a new debate concerning the failure of the planning document called 'Vision Mumbai', which was prepared keeping in view the economic and quality of life goals to be achieved by 2013, without taking into consideration the likely demographic size, distribution and growth of population within the BMC, let alone the Mumbai Urban Agglomeration. This paper first tries to trace the role of natural, human and administrative factors, which either in isolation or in conjugation with other factors might have been responsible for this urban deluge. Coupled with this, the paper attempts to critically analyze the rationale for the Vision document in the context of demographic dynamics, as population is the most important determinant behind all urban plans. Methodology In the first part of the paper, the methodology adopted was simple analysis of 'environmental discourse' in order to identify the diverse factors behind this urban deluge. The primary focus was on the compilation and examination of contextual concepts, supplemented by documentary analyses of official reports and public documents. The second part employs integration of data from multiple sources (Census of India, meteorological and land use statistics, etc) for evaluating the Vision document mainly from demographic point of view. In this regard maps using GIS software brings out clearly how the population pressure in Mumbai city has shifted over the decades, signifying the decay of the core. Main findings The land use of Mumbai shows that the concrete city has pushed nature to the margins. During the 60 years period from 1924 to 1994, the built up areas of the city has increased fourfold from 12 to 52 percent, mainly expanding along transport corridors with improved connectivity. Simultaneous with increased concretization has been the drastic reduction in the green zones and open spaces, which are effective carbon sinks and dust filters helping to keep down pollution levels. Though the central forested area has helped to preserve some of the forest cover within the city, yet opening up of large areas for construction has led to the peripheral areas becoming degraded into scrublands. Even mangroves, which act as the city's sponges and support an impressive ecosystem, have shrunk from 235 sq km in 1924 to 160 sq km in 1994 around Mumbai, much of them in violation of the CRZ rules. Wetland and forest covering 28 and 60 percent respectively of the total land use of Mumbai in 1924 has come down to 18 and 30 percent respectively in 1994. The six drainage basins in Mumbai are gradually getting choked due to construction of roads, buildings and encroachment of slum areas. The real crux of the poor drainage system in Mumbai is that unlike the city proper, the suburban Mumbai has not yet developed a sound network of underground drainage system. The open gutters serve as outlets for both sewage and storm water flows. With the complete infrastructure failure during the floods of July 26 2005, it has been realized that the future lies in eco-friendly architecture, energy-sensitive and climate-sensitive structures that consume little energy. There is urgent need to create an efficient system of disaster forecasting and management for Mumbai, which

includes installing of a Doppler Radar to monitor cyclones and cyclone-like conditions. Further, it is also imperative to strengthen the planning powers of the BMC and establish a good understanding among the functionaries in urban and urban fringe planning. Visioning Mumbai in 21st Century – The Demographic Factor The Vision document, based on the neo-classical growth theory of development, proposes that an unshackled market force integrated with world economy has clear advantages for both the rich and the poor. However, it promises to fulfil the aspirations of the powerful sections of Mumbai ignoring the fact that more than half of Mumbai's population lives in slums. At the first instance, there is a need to understand what constitutes Mumbai today in order to solve its problem in the larger context and to find a sustainable solution. The Vision Mumbai document adopts a very narrow definition of city defined by the municipal boundary popularly known as the BMC. Internationally, the definition of city has its roots in the concept of Urban Agglomeration (UA), which has functional linkages and interdependencies between the main city and its adjacent urban centers. Any long term planning for the city cannot ignore the changes taking place in these adjacent towns. The Greater Mumbai UA is the largest in India in terms of population and in fact, has the distinction of being one of the largest cities in the world. According to Census 2001, the population exceeds 16 million, with the BMC alone contributing to nearly 12 million. The main satellite towns, each of which has a population exceeding one million, are Kalyan-Dombivli, Thane, Navi Mumbai, Mira-Bhayander and Ulhasnagar. The growth of the city core has declined substantially and the rate has become negative after 1981. But the tremendous growth of the suburban areas that were worst hit by the 26/7 rain has actually made the city grow. In addition, the influx of migrants into Mumbai UA has increased from 4.4 million in 1991 to 7.1 million in 2001. A noteworthy characteristic of population distribution within Mumbai UA is that bulk of the population is concentrated in the BMC area. The supporting towns constituted nearly 27 percent of the population of Mumbai UA in 2001, which is likely to increase to 36 percent by 2013. BMC's problem could only be ameliorated when a suitable planning strategy for supporting towns is also developed in tandem with the planning for the BMC. Policy Implication Planners, developers and most importantly, the governing authorities must not overlook the physical and natural aspects for the development and planning of Mumbai city. The destruction and misery brought by the torrential downpour on July 26 2005 could have been minimized if the existing contours of the land were taken into consideration while implementing the developmental plans. Any grass root level planning must begin with a situational analysis of environmental conditions and an assessment of quality of life at the ward level. Some of the short as well as long term action plans needed urgently are: desiltation and deepening of Mithi and Dahisar river followed by removal of material away from the river; removal of structures along the banks of two important rivers to a distance of 20 metres away; construction of high wall along the banks to prevent spilling out of flood water as well as to stop all encroachments; stopping the destruction of mangroves and completion of underground drainage system in the suburbs. Any vision of the development of Mumbai could only be realized when the city planning adopts a people centric approach.

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Economy, Population and Urban Sprawl A Comparative Study of Urban Agglomerations of Bangalore and Hyderabad, India using Remote Sensing and GIS Techniques

A variety of factors affect the supply of and demand for the land and its uses in an urban area. Supply is affected by such factors as location, laws related to land, structure of land, transportation facilities, market facilities, industrial development etc. However the ever increasing population influx in the urban areas and the physical expansion of the built up area beyond the city limits are envisaged as important factors for raising the demands for more land as well as land use changes. The employment potential of the region, the carrying capacity and the surplus it can generate determines the patterns of migration flows. The question whether population change resulting from change in migration will lead to land use changes is

important for India's urban future. In India big cities and urban agglomerations have been the magnets that attract investment, which leads to development of industrial and service sector, employment generation, migration and population growth. This process has significant implications in terms of land use changes especially in the context of privatization and globalization. Review of earlier work shows that separate studies are there pertaining to investment pattern, migration and land use, but very few studies the association between migration, and land use changes, to bring out the population aspect and its effect on land use. Taking into account the recent context of globalization and IT Boom, it was thought appropriate to select Urban Agglomerations (UA) of Bangalore and Hyderabad as study area since they have emerged as the new magnets for migrants and offering competition even to cities like Mumbai in attracting inflows from all over the country, especially in recent times due to the coming of age of Information Technology (IT) which, today is the prime driving force, fuelling the growth of the cities.. Both, Bangalore and Hyderabad, are today considered to be the leaders and 'crowning glory' of India's IT sector and having the potential to become global cities. Both the cities have history of more than 400 years. Starting from the humble beginnings as small trading centres they flourished as capitals of the kingdoms of different rulers. During all the 3 decades, for Hyderabad UA, inter-district migration has contributed more to the decadal growth than the other types of migrants while for Bangalore UA the contribution of both inter-district and interstate migrants has been equally important. International migrants are less than one percent of all migrants in both the UAs during the 3 decades. In both the UAs, nearly one fourth of all migrants came for employment during each of the 3 decades , except that the proportion was less for BUA during the last decade (18%). During the last decade, share of migrants coming for education has reduced to nearly half its share in the first 2 decades (from 8to4percent in BUA and from 6 to3percent in HUA). More and more rural persons have been migrating recently to both UAs. Among inter-district and interstate migrants who came for employment, percentage coming from urban areas has drastically declined in case of both the UAs. Among migrants who came for education, percentage coming from urban areas has increased substantially among interstate migrants to Bangalore UA and marginally increased among inter-district migrants to HUA and drastically declined among interstate migrants to Hyderabad UA. Migration of almost all types (by area of origin) has become more male dominated leading to lower sex ratio among migrants to both BUA and HUA, except interstate migration to HUA. Migration for education and employment continues to be heavily male dominated. In some educational categories , however, over the 3 decades, it has become less male dominated e.g. illiterates and literate but below SSC in both the UAs. Migration from U.P., West Bengal and Bihar to BUA and from Orissa and Bihar to H UA during the last decade was extremely male dominated (sex ratio 500-609). Migration to HUA from Maharashtra and Kerala during the last decade was female dominated (sex ratio 1037 and 1200 respectively). In case of BUA, percentage of migrants from Tamil Nadu had a drastic decline. In case of HUA, migration from all the neighbouring states Tamil Nadu, Kerala and Maharashtra declined. Census 2001 shows that nearly 30percent migrants to HUA come from Northern and Eastern states while for BUA, their share in migration is still only 18 percent. Both the UAs now have the same population size (57 lakhs in 2001) but in 1971, the population of HUA was bigger than BUA by 1.5 lakhs. During the last 3 decades, population of BUA increased more than 3 and ½ times while that of HUA increased slightly more than 3 times. BUA experienced rapid population growth during 1971 -81 while HUA had such phase a decade later. In the following decade however the growth rate of HUA drastically declined (2.81%). BUA experienced the decline in growth rate also a decade earlier (81-91)but during the last decade it is growing at a faster rate than HUA.(3.22). Three decades back 90 -92 percent population of both the UAs lived in the city area (Municipal Corporation) but in 2001 only 75percent of the BUA population and 63percent of the HUA population lives in the city. Population growth rate of non- MC areas was very high during 1971-81 for BUA (13percent per annum) and during 1981-91 for HUA (16 %). In both the urban agglomerations, decrease in agricultural land suggested both conversion of land to urban land use or discontinuation of agricultural activities in anticipation of conversion to urban areas. This is resulting in such lands being left undeveloped as vacant land or converted into layouts for considerable period of time to speculate higher land values. The urban growth not only explains the increase in urban built-up area and population but also the continuity of trend with much more accelerated pace since Bangalore and Hyderabad qualified as Mega City. The Scrub land declined only marginally. On the contrary in HUA the scrub land declined gradually in the first decade to 46percent and then drastically to 4 and 2 percent in the next two decades while crop land increased almost one and half times from six to nine percent. Due to clearance of cropland after 1981, the open land in Bangalore increased from 6 percent to 29 percent in 1991. There after it was utilized for non-agricultural uses and declined to

negligible proportion. On the contrary in HUA, due to clearance of scrub land after 1981, open land increased to 26 percent in 1991. There after due to utilization for non-agricultural open land declined to 17 percent. It implies, that conversion of open land into non-agricultural land after 1991 is much faster in BUA than in HUA. As a result of utilization of Land for non-agricultural purposes (residential and commercial), percentage of mixed built-up land has increased from 20 percent to nearly 70 percent in case of BUA. In HUA this process is very slow that is increase from 23 percent to only 37 percent. Proportion of industrial area in 2001 in both UAs is almost 4 to 5percent but the expanse is much larger in HUA because it is 5 percent of total area almost double that of Bangalore. Urban sprawl map of Bangalore and Hyderabad shows that Bangalore has grown in circles, where as Hyderabad has adopted a radial pattern of urban sprawl, mainly along the transportation corridors. Due to less price of land in the periphery areas included in the vast area of HUDA. The real estate investment in HUA had taken place in the outer areas. This has resulted in the development of scattered built up area leaving behind vacant spaces in between. This process is not very prominent. The urban growth intensified along main transportation corridors in all directions, but more apparent along National Highway no. 5 and 7 towards Northwest and Southeast in a radial pattern. This has created wedges within the built-up area with vacant lands where the process of intermittent infilling occurs leading to contiguous urban sprawl over a period of time. The city developed in a dispersed and low density pattern leaving pockets of vacant land or underdeveloped land within itself. As the city sprawl increased, the built-up land devoured the agricultural lands and water bodies. In case of Bangalore recommendations were made to seriously curb the growth in Bangalore Local Planning Area and encourage growth of other small and medium towns in the states. This has resulted in development of the city out growths in dense manner in circular pattern rather than radial. Area under parks and gardens in BUA has declined from 5 to 3percent while in HUA it shed an increased more than 2 and half times reaching 7 percent in 1991 and got stabilized there after. This is mainly due to Green Hyderabad Programme. It is noticed that the residential development has taken place on all directions in a contiguous pattern due to availability of land in all directions in case of Hyderabad. In short metropolitan planning in Bangalore has been more effective in the sense that Hyderabad Development pattern has been more haphazard manner in the non-Municipal areas, the while in Bangalore they have allowed the development to take place in dense manner around the core area. But the disadvantages of this pattern of development Bangalore is facing now in terms of strain on the transport systems, lesser availability of amenities etc. An important demographic feature in urban agglomerations of India is that the periphery including the outgrowths has been growing at a faster rate than the core city. While this feature is observed for most of the cities, Bangalore proves to be an exception where the core city has continued to register an exceptionally high annual growth during 1991-2001. The study clearly indicate how the technological developments and global forces leading to migration flows and rapid population growth can reshape the functional and spatial structure of urban agglomerations. Government policies are an important mechanism through which adverse effects of this process on quality of life can be mitigated to some extent. It can also encourage the land use changes first to change the location of opportunities of growth and divert the flow of capital and people in the desired directions. Growth of Bangalore has been more planned but the area under the Development Authority (BDA) was smaller as compared to HUDA of Hyderabad. HUA has on one hand has the advantage of larger area jurisdiction, but until recently its growth was unplanned and haphazard leaving behind vacant spaces in-between. Thus both need suitable policies to contain the rapid population growth and economic expansion as well as to provide space for future growth of population and urban sprawl. Available data shows that employment growth generated in ancillary activities (manufacturing, construction, trade & transport, communications as well as cleaning, catering, security and other jobs locally outsourced) due to expansion of IT sector is nearly 3 times the jobs created in the IT industries themselves. Both the UAs need to provide space and amenities keeping this multiplier effect in mind. Urgent steps to reduce the stress on infrastructural facilities in core areas are required in view of the problems faced at present such as traffic jams, water shortage, and narrow roads not equipped to handle the phenomenal growth of private vehicles, inadequate and irregular public transport. In both UAs, decentralization of economic activity has resulted into shift to non-municipal areas which do not have adequate facilities in terms of roads, transport network, water availability, electricity etc. High priority needs to be given to this aspect. Rapid and unplanned growth of construction sector calls for strict action to regulate the activities of private builders as well as to release more plots for development with well defined rules and regulations. Side by side the growth of high tech industries, both UAs have a sizable informal sector. Unless some action is taken to regulate it, effective land use planning is not possible.

Alarming increase in the built up area at the cost of water bodies and open space and loss of greenery pinpoint the need to provide green belts encircling urban growth to curb radial pattern of development along major transportation networks. Programmes of increasing greenery or 'Urban Forestry' to be undertaken in Bangalore similar to Green Hyderabad Environmental Programme (GHEP) of Hyderabad.

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Health and Livelihood Implications of Marginalization of Slum Dwellers in Provision of Water and Sanitation Services in Nairobi City

Background: Due to rapid urbanization amidst economic decline and poor governance, majority of urban residents in sub-Saharan Africa now live in abject poverty in slum settlements. UNHABITAT estimates that about 70% of urban residents in sub-Saharan Africa live in slums. Yet due to their illegal status, they are not provided with basic services such as water, sanitation and health care. Consequently, these services, characterized by poor quality, are provided by vendors at exorbitant prices. The slums are therefore characterized by very poor living conditions: there inadequate toilet facilities, poor quality health care services, lack of affordable clean water, poor garbage disposal and poor drainage. Objectives: The main objective of this study is to assess how inequality in provision of basic services affects health and livelihood circumstances of slum residents of Nairobi City. Specifically, we assess the ranking of health concerns in the community, describe the community concerns regarding water and sanitation services and describe the health and livelihood implications of poor water and sanitation services. Data and Methods: We use quantitative data from the ongoing Nairobi Urban Health and Demographic Surveillance Survey (NUHDSS) conducted in informal settlements in Nairobi by the African Population and Health Research Center (APHRC) since 2000 and the Nairobi Cross-Sectional Slum Survey (NCSS) carried out by APHRC in 2000. We use the 2003 Kenya Demographic and Health Survey (KDHS 2003) for comparisons. We also use qualitative data from focus group discussions from a study carried out by APHRC in Nairobi slums in 2004 to clarify the linkages between food security, child health, and schooling in urban slum settlements. We use descriptive analysis of quantitative data using Stata and qualitative analysis using Nudist software. Results: Sanitation (32%) and water (20%) were the most commonly reported health needs and were also leading among the general needs (after unemployment) among slum dwellers. Water and sanitation services are mainly provided by exploitative vendors who operate without any regulatory mechanisms and charge exorbitantly for substandard services. For instance, 94% of slum residents buy domestic water from vendors and pay about 8 times more for water than non-slum residents. Water supply is irregular and residents often go long periods without water; prices are hiked and hygiene is compromised during such shortages. Most households do not have toilets and residents have to use commercial toilets or to adopt unorthodox means, such as disposing of their excreta in the nearby bushes, or using plastic bags that they throw in the open. As a consequence of poor provision of water and sanitation services resulting in poor environmental conditions slum residents are sicker and more likely to die than non-slum residents. For instance, the prevalence of diarrhoea among children in the slums was 32% compared to 13% in Nairobi as a whole and 17% in rural areas, while under-five mortality rates were 151/1000, 62/1000 and 113/1000 respectively. Conclusions: The increase in urbanization and urban poverty warrants revision in government policies and focused attention on provision of basic amenities for slum residents. There is urgent need for regulatory mechanisms to protect slum residents from exploitation (e.g. pricing and quality of water, requirement for landlords to provide proper toilets). There is also need for research to determine best practices for improving basic amenities among the slum residents.

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Family migration: a vehicle of child morbidity in the informal settlements of Nairobi city, Kenya?.

Urban population growth in sub-Saharan Africa is driven by migration of young adults seeking better livelihoods in cities. Among these urban residents, 72% live in informal settlements. In the Kenyan capital city of Nairobi, the growth of the slums population is mostly fuelled by rural-urban migration. Most in-migrants come to Nairobi to escape rural poverty, but end up living in slums characterized by poor livelihood opportunities, environmental sanitation, overcrowding, social fragmentation, unstable livelihoods, poor health outcomes, and high levels of insecurity. Slum residents mostly rely on low paying and unstable petty trading and casual jobs which perpetuate abject poverty in the urban setting as compared to rural origin places. This study contributes to understanding the health consequences for children of a rapid urbanization amidst increasing urban poverty in African cities. The findings indicate that households who migrated together with their children in the slums of Nairobi experience higher child morbidity (43 per cent have at least one sick child in the last one month preceding the Nairobi Informal Survey in 2004) as compared to households who adopted the split migration strategy leaving children in their upcountry homes (31 per cent of morbidity rate). This is in line with existing descriptive evidences that children of migrants are safer upcountry even though not all households can afford this strategy. Households are able to choose this strategy only if they have strong social network in their origin community and/or they are big size households. This is an important finding in targeting the Millennium Development Goals because split strategy involves an important monitoring mechanism to be set in place upcountry. Alternatively households who own land or houses in Nairobi and are richer can afford also to leave families in the place of origin. Keywords: Childhood morbidity, Split migration, Incidental truncation, Informal settlements Nairobi, Kenya

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Urbanisation, environment, development and urban policies in Ho Chi Minh City, Viet Nam.

Ho Chi Minh City (HCMC) is the largest urban agglomeration in Vietnam with a population of over seven million in 2006. The development of private sector and foreign investments provoked a demand for the environment protection in the city which it is in a process of fast urbanization. Policies on urban management have to face the development with great dimension in the context of an economy in transition. It should be noted that HCMC is a city that attract a lot of foreign and domestic investments. So, HCMC has received the greatest number of migrants from rural areas in the phase of accelerated urbanization in the recent years (200,000 migrants/per year), due to liberalization of the economy and to removal of the controls on population movements. The concentrations of people and industries pose a fundamental challenge to the development of adequate infrastructure and the maintenance of healthy environments. A high density of the population in the inner city (more than 25,000 pers./km²) resulted in a lot of problems concerning the healthy environment such as traffic jam, air quality, garbage, water supply, living conditions in slums, etc. In this context, public authorities are confronted with problems of the degradation of urban planning in HCMC. The purpose of this paper is to provide an image of changes on job, income, education, health care, and other aspects of daily life inhabitants migratory flows, the population distribution and the intra-mobility between different zones of HCMC, the socio-economic and environmental impacts of the urbanisation process on inhabitants and to propose alternative solutions for population management in the context of the current economic evolution coinciding with the process of

fast urbanization. It aims to solve the current and potential problems on population and on environment of a future mega city. Hence, the population policies and the environment policies could not be applied efficiently without mentioning the urban management policies. The policies mentioned are based on the experience of urban management in recent years and the will of people through our research project "Economic Development, Population Growth and Environmental Changes: Relations and Policies" under the PRIPODE Programme. The core objectives of this project are studying the relations between economic development, population growth and environment changes in the context of the process of urbanization. A household survey has been conducted in three districts represent three levels of urbanization: District Go vap for the set of high urbanized district ; District Binh Tan for the set of medium urbanized and District 2 for low urbanized districts. In each district, two sub-districts have been chosen: the most urbanized and the less urbanized. The survey has interviewed two different groups of inhabitants: migrants and non-migrants. Migrants are those who have migrated to the actual sub-district five years ago. The year of the creation of new urban districts, 1997, is considered as the beginning of the process of urbanization. The objective of the survey is to study the changes of inhabitants in different zones on job, income, health care, children education, opinions on environment under the impacts of urbanization. 432 households have been interviewed. The hypothesis are the more the region has been urbanized the more the inhabitants have been changed in terms of jobs, income and other dimensions in daily life. Since 1997, the duration of the process of urbanization has been not enough long, less than 10years, to be considered the socio economic and environmental impacts, however some findings can be drawn as follows : - A population redistribution has taken place in HCMC with migratory flows from the inner city to the periphery. In the study regions, new districts, a lot of migrants have been found. The urbanisation regulate the density population in HCMC. - Even the investments from the state budget is limited, the resources from private and foreigner sector can make the "pull factor", create new jobs to attract new comers. New towns, new industrial zones, new commercial centre have contributed new urban figures. However, it also leads to in some extends what is called "savage urbanization". - A proportion of people has lost their traditional job, but they can change to other jobs or move to other place with their efforts and the help of local authorities and other institutions such as banks. Some of them get difficulties. The mobilities in labor market get stronger. More than that, young people can find easier a job when entering the labor market. Migrants from other provinces continued to come to these regions. - Living conditions have been improved, more schools, more health centre, more trades and services. Some residents got compensation from their land, have spent all their money in building houses and buying luxury equipments. -Even more schools, more classes, some children have preferred to get a job. They (or their parents) refused to continue the school. The professional training met difficulties. Few people engage in the professional training. -Urban infrastructures such as roads, water supply, collect of garbage have been improved but it has been far the demand of local residents and the criteria of an urban district. - The environment has been degraded every where and it follows strictly the level of urbanisation. It can be seen clearly in these three study regions. Air, water, ground are strongly polluted. - The role of local authorities is very important. It can be proved that where there are the intervention of authorities the situation becomes better. -The policies, at the city level, decide the results of the process of urbanization. A good policy in urban management can re-organize and solve problems from local levels. - Finally the implementation of existed regulations are also important. Inhabitants should respect laws and regulations.

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Forecasting City Population Growth in Developing Countries

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United Nations forecasts indicate that 90 percent of all world population growth over the next 30 years will take place in the cities and towns of developing countries. Yet much remains to be learned about how to forecast city growth in less developed countries. In particular, the simplistic methods currently in use do

not take advantage of survey data on urban fertility and mortality and are not generally spatially-explicit. Furthermore, demographic estimation also ignores the spatial dimension of change occurring in urban areas. Extending Montgomery, Balk, and Buettner (2006), we explore new econometric models of city population growth rates and develop probabilistic forecasts of growth, accounting for the explicit spatial locations and extents of cities. A wealth of new data has become available for developing countries, with considerable potential to improve city estimates and projections. Recent methodological advances have suggested new ways by which satellite imagery can be used to detect urban areas and measure their spatial extents (Balk et al, 2005a; Small, 2005). Far more spatially-coded data—such satellite sources among them—are available now than was the case 25 years ago. Moreover, urban data from demographic surveys have greatly strengthened the basis for estimating the demographic components of urban growth and will continue to do so. We base our econometric models on the latest United Nations Population Division's cities database and spatially-coded estimates from the Center for International Earth Science Information Network's Global Rural Urban Mapping Project (GRUMP) database which is derived from NOAA's Night-time lights DMSP data, linking the city growth series to urban total fertility rates and child mortality rates from over 150 household surveys (including the World Fertility Survey, Demographic Health Survey, and Multiple Indicator Cluster Surveys). We estimate a variety of econometric techniques (random-effect and fixed-effect panel-data specifications) and use these to develop the growth forecasts. Both classical and Bayesian statistical estimates are explored. Demographic projection of cities requires information at more than one point in time. The current GRUMP urban extents represent lights c. 1994/95. A key factor to making global urban remote sensing data relevant to the social sciences is to have comparative estimates over time. In this paper, we will evaluate and revise estimates of urban "footprints" as these are detected in the night-time lights imagery, including an assessment of whether the other night-time lights data products for 1992-93, 1994-95, and 2000 (and beyond) can be adapted for this use. Using a sample of about 100 cities, we will determine the extent of "overglow" in the night-time lights data relative to other measures of city area and shape. As a part of this work, we will compare the urban extents derived from night-lights imagery with those derived from Landsat and similar sources and implement the area correction as determined in the analysis of Small et al. (2005). This paper will highlight methodological advancement in integrating econometric, demographic and remote-sensing methods and data. In particular, initial results from the econometric estimation and remote-sensing spatial time-series estimation will be presented. But because this paper represents work in progress of a multi-year study undertaken by a team of social and earth scientist, we will address the challenges and strength associated with interdisciplinary work. Particular attention will be given to the issues associated with the satellite data and methods for integrating those data with social science data and methods.

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Mobility, urban sprawl and environmental risks in Brazilian urban agglomerations Challenges for the urban sustainability in a developing country.

Accordingly to United Nations projections, urban population in the world will reach more than 50% in 2007 and the most important change will occur in developing countries. Contemporary social theory has given much consideration to certain radical changes at the foundations of modernity; this globalization process may be destructive as well as the solution for perplexing paradoxes of modernity. The environmental dilemma is a major demonstration of this process in the 21st century because it carries in its demands the ambiguities of the production-consumption relation. Thus, environmental debate stresses the evidence of the 'side-effects' of industrial processes and products. The concomitant occurrence of these processes endangers basic conditions of survival, changes ways of life and puts into question the belief of the superior rationality of experts. This situation can be better observed in the complexity of urban contexts all around the world, including most of the urban agglomerations from developing countries. In Brazil, migration to urban areas have been occurred rapidly at the nineteen seventies and in the late 20th century begun to present signs of an important transformation. The former metropolitan areas that have grown before now losses the centrality. Now, new urban agglomerations begun to be the destination of

urban-urban migration. In this second “urban transition”, sprawl is one of the evidences of a new space production-consumption relationship. Brazilian sprawl-like contexts differs from similar ones in United States because there is an overlay of social processes that conducted to these urban forms. In the first urban transition, the most important migration process is in a rural-urban flow and the relationship between production and urbanization were mostly obvious. Nowadays, the urban-urban migration shows that new social forces are leading to new urban forms because consumption of the space is closest to a global urban tendency: regions and not cities are the most important scale of everyday life. The recent tendencies of the world urbanization process in a context of globalized markets point to a situation in which regions (as opposed to specific localities) emerge as economic and political arenas with greater autonomy of action at national and global levels. City-regions constitute nodes which express a new social, economic and political order which, far from dissolution of regional importance resulting from the globalization process, become increasingly central to modern life. Urbanization, then, widens its scope beyond the image of the chaotic city which grows like an amoeba. The image is replaced by one of a polynucleated city, fragmented, with low densities, over wide-ranging territorial extensions, but at the same time more and more integrated. The studies concerned with this uncontrolled expansion of land use mention innumerable social, economic and environmental impacts. Among the principal factors considered in terms of urban sprawl and the consumption of natural resources is the intensive use of individual automobile transportation. While this characteristic may be seen as both cause and consequence, the bottom line is that the greater the distances between different spheres of daily life, such as work, residence, study or shopping, the greater the demand for automobile transportation. This is part of the growth in demand for fossil fuels as the principal energy matrix of the modern world, a process with many different consequences. In the case of sprawl, the growing use of automobile transportation is also associated with an increase in air pollution. In this context, this paper discusses the recent changes that have occurred in Brazilian urban agglomerations, arguing that population mobility (migration and commuting) play an important role in determining demographic changes in particular sprawl-like urbanization processes. Most urban sprawl studies analyze the relationships between urbanization and environmental change, but there is a need for efforts to treat these questions in developing countries. So, this paper will focus on the relations between population mobility and urban forms in Brazilian urban agglomerations using demographic data provided by the National Census Bureau (IBGE) to assess the most sprawling areas and the relationships on the urban quality of life. Commuting information is not a traditional index in Brazilian's urban studies, probably because it hasn't seemed to be a relevant phenomenon until recent years. It begun to be used recently as it increased all around the country. The hypothesis is that the increasing commuting in Brazilian urban agglomerations is associated to the expansion of urbanized areas in a new urban form associated to the urban sprawl model. Then, despite the reduction of urban population growth, urban areas are now increasing in particular agglomerations of the country. A sprawl index was created to identify how much this process is advanced in each urban agglomeration. The index is formed with a conjunction of some sprawl factors identified in the international literature as important measures of sprawl-like situations. Geographic Information Systems (GIS) were also used to create spatial indexes, like urban density and spatial dissimilarity index. So, today's city has a structure more and more complex, above all considering the ramification of urban networks, the interaction of economic flows, the intensification of population mobility and changes in consumption patterns. An agglomeration may therefore take on different forms as it disperses in space and these different forms may have distinct social and environmental impacts. If we all expect to live in urban areas by the end of this century, what would be the best urban form for a sustainable world? What are the specific impacts of this kind of urbanization in developing countries? The analysis of the most known cities in terms of world prospects frequently doesn't consider the diversity of urban realities that turns more and more relevant into developing countries. Results appear to tell us that urban agglomerations in Brazil have an important commuting element that leads to a sprawling urbanization. These sprawling regions are transforming the land use, reducing the green and open spaces around cities and increasing automobile dependence, air pollution and costs of public services. So, new challenges are posed for urbanization in developing countries and if we can not be able to understand this process and its consequences in a short range time, we can expect to see the developing countries in a more difficult dilemma: solving its problems of urban poverty with the addiction of the developed countries urban sprawl problems.

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Role of Water Supply and Sanitation for Hill Area Development Using Remote Sensing and GIS Techniques. A Case Study of Shillong Urban Agglomeration, India

People's lives and livelihoods depend on water. Demand for clean water increases continually in line with world population growth. People in many areas of the world lack fresh, drinkable water essential to their survival. Unchecked population growth and the changing demographic profiles are affecting management of water resources in the towns and cities since the beginning of the twentieth century. At the turn of twentieth century only one percent of the population lived in the cities in most regions of the world. But as the urban population of the world has increased phenomenally during the century, so has the proportion that lived in the urban areas. Access to water is a fundamental need and constitutes one of the most important human rights. But most cities in the developing world and in hilly and mountainous regions suffer from acute shortage of water both in quantity and quality. Water supply and sanitation are two most important factors for development of any urban centre especially in the context of hill area development and in the context of rapid growth of urban population. Shillong is one of the most important urban centres in the hilly regions of North-Eastern India. Geographically, it is located in the Meghalaya plateau which at least surfacially is an extension of North-Eastern Himalayan range and only 55 km away from Mawsynram, the highest rainfall station in the world. Shillong is a small (25.4 square km) capital town of Meghalaya, supporting 26, 7662 people (Census, 2001) and with a density of 10538 persons per square kilometre. However, the city has witnessed unprecedented population growth in recent years largely due to a high fertility rate coupled with a heightened migration from the neighbouring states of India as well as across the border. The city has been attracting migrants since colonial times mainly for its congenial climate, better school infrastructure, jobs and tourist spots. The present paper aims at getting an insight into the effects of rapid growth of urban population on water supply situation with a particular emphasis on spatial aspects of hill area development since 1901. The paper examines changing demand for water and the sanitation system in the context of rapid growth of urban population in the city. The water supply in the town is mainly controlled by the SMB (Shillong Municipality Board) through PHE (Public Health Engineering) and Durbar (Local Community). There has been an unprecedented increase in demand for water (drinking and for other domestic purposes) and in comparison, the supply is very low in the urban agglomeration. In a large number of cases, the people are left with no other option but to make their own arrangements to meet their water requirements either by sending household members to the sources for collecting water or by hiring the services of private suppliers, who collect water from different springs and supply them by tins and tanks with very high price. The main sources of water in the city are controlled by only 7 main natural springs. Most of the springs are unprotected. The situation worsens in the dry months when the springs too dry up. The problem of water supply has been investigated with the help of a household survey. Over 30% of the households were selected by random sampling technique from each durbar as well as wards during the year 2005. Using remotely sensed data (Aerial Photograph) all households' structure (Residential and Institutional), location of springs, roads, rivers, pipelines etc were identified in the GIS platform (Arc GIS) and the surveyed data were profitably linked using GPS (Global Positioning System) for the study. A detail analysis was made based on sources of water, distance from the household, quality, quantity, demand, supply and cost of expenditure in the households, both for the residential as well as for the institution population. The study also investigated sanitation. Findings The findings of the study revealed glaring facts about the water supply and sanitation in this town. Over 80% households in Shillong received water supply from the SMB while 20% got it from the public sector. Over 70% households who used water from the SMB water reported very bad quality water in terms of test and colour. Interestingly over 60% households using water from the private sources were not even aware of the source of the water. Less than 30 % of the households received sufficient or adequate water from the municipality sources leaving a great majority of the population with little and grossly inadequate water. The disparity in mere availability of water was found to be phenomenal. Nearly 80 percent of the households having sufficient water from the municipality source have access to safe or treated water from the sources. About 21% of the households do not use treated water from the sources. Only 22 %

households have access to piped drinking water facility. The proportion with access to treated drinking water through pipes to the household increases with increasing income. Only 4 % of households in the lowest income quartile have access to safe drinking water sources compared to 62% in the highest income quintile. The implications of these findings need to be viewed seriously by policy makers. If people are to prosper, more secure and low cost water supplies are needed. The paper makes an attempt to provide policy guidelines in this direction.

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An assessment of urban environmental issues using remote sensing and GIS techniques an integrated approach: A case study: Delhi, India

Urbanization process has taken off in developing countries in a big way, but it is significantly different from the developed countries because of inherent social and economic differences. There is an unequal urban growth all over the world but explosive growth is occurring in the developing world especially Asia, Africa and Latin America. In 1800 A.D, only 3% of the world's population lived in urban centers. In 1900, 14% of the world's population was living in urban centers but today nearly 50% of the world's population is living in urban centers. In India there is a mass migration of population from rural to urban and also from smaller urban areas to bigger and metropolitan centers like Delhi. The current population of Delhi is about 13.8 million and is estimated to rise to 22.42 million by 2021. In 2001 the population density was 14,387 and 1,627 persons/km² in urban areas and rural areas respectively. There were 47.34% of Delhi's population lived in rural areas in 1901, which showed a gradual decline 17.60% in 1951 to 6.99% in 2001 (Census of India). With rapid urbanization, the Delhi's rural area is shrinking; it has reduced from 1157.52 sq km in 1961 to 591.91 sq km in 2001. On the other hand urban area has increased from 182 sq. km. in the 1970s to more than 750 sq. km. in 2001. Villages around Delhi, which have coexisted with the sprawling urban settlements, still retain a great deal of rural tradition. The major cause anticipated for this is the high in-migration due to better employment opportunities in Delhi in comparison to neighbouring states. This results in land transformation, urban expansion and also has its bearing on urban land use. The process of urbanization gained momentum with the start of industrial revolution and globalization. Forests were cleared, grasslands ploughed or grazed, wetlands drained and croplands encroached upon under the influence of expanding cities, yet never as rapidly as in the last decade. Each urban centre has a number of environmental problems with varying scale and scopes which are influenced by factors such as size of population and its density, climatic conditions, water resources and the flora and fauna in and around the urban centre (Hardoy et al., 1997). Similarly the state of environment over Delhi is also deteriorating so fast that the sustainability of the city is threatened. In Delhi, land environment is under stress due to population growth, industrial development, inefficient and inadequate traffic corridors, poor environmental infrastructure etc. are the main factors that have deteriorated the overall quality of the city environment. As the city gradually develops and population increases, the resources, which are limited, are shared. This physical development is mainly occurring at the expense of productive fertile agricultural lands. The rate of expansion is very fast and is totally unplanned some of them are illegal also. Mushrooming of illegal construction has become day-to-day phenomena in outskirts of the city. Delhi Development Authority (DDA) responsible for city development and planning has not come up to its mark due to bad governance, lack of geospatial data and most important corruption at all level. Housing, water supply, roads, drainage, transport, education, health services, police and fire services, etc. have not been able to keep pace with the prevailing urban growth rates. There has been tremendous growth of slum in Delhi from a meagre 12,749 in 1951 to over 500,000 in 2005. About 3 million population lives in 0.6 million slum dwelling units along the Yamuna river alone. There is a huge shortage of drinking of water supply and population is mainly dependent on the municipal water which is short in supply and erratic. Increasing levels of air pollution is responsible for higher incidence rate of respiratory diseases, cancer, and skin diseases in the city. About 40% of the total solid waste generation generated in the city is not properly disposed off. The number of registered vehicles has increased nine fold since 1971 and now

approximately 3.5 million motor vehicles are running on Delhi roads, which is likely to increase to 4 million by 2005. The results are clear, traffic congestion, air pollution, noise pollution and many other related problems. Urban transport and industrial emissions are the major factors for air pollution in Delhi. The maximum contribution (72%) is from vehicles alone. Delhi's polluted air (both outdoor and indoor) is blamed for 40% of the patients with breathing and heart complaints. With rapid urbanization, Delhi has progressively lost its green cover. It has merely 88 sq. km. of forest cover in the total 1,483 sq. km. of geographical area representing only 5.93% of the total area. To assess these urban environmental issues up to date data information pertaining to the dynamic processes within and around the city regions shall be of immense value for urban planners and city administrators. In this context remote sensing data with repetitive and synoptic viewing capabilities as well as multi-spectral capabilities can be a powerful tool to map and monitor the emerging changes in the urban core as well as in the peripheral areas of any urban centre. So in this paper an integrated approach using ASTER satellite data of 2003 and GIS will be applied in conjunction with socio-economic data collected from different government offices for assessing such urban issues. From the classified satellite image various information like detection of informal settlements, fast developing changes (built-up areas), open space spaces, and open green spaces etc. has been extracted. These data sets will be widely used by the local Governmental Bodies e.g. Municipal Corporation of Delhi (MCD) and Delhi Development Authority (DDAA) for preparing their developmental plans and for the establishment of new residential colonies etc. Previously the data on these aspects were not easily available but now RS & GIS application has made such task easy. The results shows that Delhi is developing very fast mainly in the W, S-W and Eastern side. The study clearly shows that there is a sharp rise in the impervious land, decrease in open spaces, reductions in vegetation cover, decrease in water bodies and shrinking of fertile agricultural lands. With this there is a sharp decline in the quality of urban environment and also has adverse health impact on the people of this capital city of India.

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Correlation between Pollutants Emission and Inhabitant's Morbidity. São Paulo City Study Case

São Paulo city has an increasing problem related with the atmospheric emission. Its major source is the vehicle fleet which runs around the city. According to Goldenberg (2000), 78% of the city's atmospheric emissions are due to that. Since the beginning of PROCONVE - Programa de Controle da Poluição do Ar por Veículos Automotores (Vehicles Air Pollution Control Program), a program created by the local government to reduce the atmospheric pollution problem, emissions measures have gone down. But this doesn't exactly mean that the actual standards aren't affecting human health. Children and eldest are the part of the population which is more effected by it. But, it is important to point out, that also adults and teenagers have respiratory problems increased by the pollutants emissions, as well as, the absences to work and school classes. So, the country ends up producing less than it could be done if there were fewer pollutants in the air, and spending more on public health which increases government expenses. The main objective of the study is to analyze the relation between pollutants emissions variation and the number of people looking for public health with respiratory problem. The study will focus on the following pollutants: PM 10 (particulate matter), NO₂ (nitrogen dioxide), SO₂ (sulphur dioxide) and CO (carbon monoxide). In the first part of the study, it will be established the spearman correlation between the number of people going to public health clinics monthly as well the monthly variation of each pollutant. The age groups will be divided as follow: less than 1 year old, between 1 and 4 years old, between 5 and 9 years old, between 10 and 14 years old, between 15 and 19 years old, between 20 and 59 years old, between 60 and 69 years old, between 70 and 79 years old and more than 80 years old. Then, the author will model the group of children under 1 year old and between 1 and 4 years old to using a generalized additive model, supposing that it follows a Poisson distribution. Through the modelling, it was able to conclude that May, June and July are the months that have higher concentration of children going to public health clinics. And that children under 1 year old are the ones more affected by the pollution. The

pollutants that really have some influence on children health are sulphur dioxide, nitrogen dioxide and carbon oxide. It's important to say that each case is one case, and that the modelling presented in this article can only be applied to children in São Paulo city. It is also good to emphasize that the article only intends to alert governments about the atmospheric pollution problem and that the actual emission standards are still affecting a lot people's health and life quality. And proposes that more rigid policies are used in this matter.

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Population, Mobility and Air Pollution in Ouagadougou

[abstract to be submitted]

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Urbanization and Environmental Quality: Insights from Ghana on sustainable policies

The paper offers a policy-oriented discussion of the relationship between population, environment and economic development. Our particular focus is on the relationship between urbanization and environmental change. Their impact is often represented as strongly negative. We examine the relationship between nutrient levels in coastal lagoons, examining the degree to which these impacts are linked to population density in the watershed. We supplement this with information about environmental attitudes collected from a stratified, clustered random sample of households in six coastal districts of the Central Region. We conclude with some speculations about the implications for environmental change in the years after the Johannesburg Summit.

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The evolution of China's in situ urbanization and its planning and environmental implications. Case studies from Quanzhou Municipality in China

The emergence and development of in situ urbanization has been one of the major characteristics of China's urbanization process since the 1980s. Different from the conventional city-based urbanization process dominated by rural-urban migration, in situ urbanization is a phenomenon where rural settlements and their populations transform themselves into urban or quasi-urban ones without much geographical relocation of the residents. It has brought tremendous structural and physical changes to vast rural areas, leading to increasingly blurred distinction between urban and rural settlements in China, especially in the densely populated coastal areas; and greatly promoted the emergence and development

of some 20,000 small towns in China, concerning more than 100 million employers and their family members engaged in rural non-agricultural activities. This urbanization pattern has important implications for population, development and environment (PDE) dynamics and related policy making. On the one hand, high population density is an important condition contributing to such a urbanization pattern. This in turn offers an alternative to the conventional urbanization models dominated by rural-urban migration and the growth of large cities, benefiting economically a large number of rural population often neglected in the development processes, and diverting many potential rural-urban migrants who would otherwise contribute to the growth of slum areas commonly seen in large cities of developing countries; on the other hand, it is often regarded as lacking the benefits of agglomeration economy of large cities, and has serious negative effects on the environment, although whether such negative effects are more serious than those seen in mega-cities of developing countries is not clear due to the lack of comparative studies. These implications raise a series of further questions, namely whether such a urbanization pattern is a short-lived phenomenon or a long-lasting trend; whether it is sustainable in both economic and environmental terms; and whether and how it can be incorporated in urban and rural planning if it is indeed inevitable in China's urbanization process. These issues have not been well addressed so far, due to the conventional rural-urban dichotomous approaches in settlement definitions and corresponding data collection processes, as well as in conventional urban and rural planning practices. Based on case studies from Fujian Province, especially its Quanzhou Municipality where in situ urbanization is well developed, and using most recent census and other statistical data and GIS technology, complemented by the author's own survey, this paper tries to tackle the above issues, and demonstrate the important PDE and planning implications of in situ urbanization in China. The main findings so far can be summarized in the following aspects: 1. Using GIS technology, the paper has divided Quanzhou Municipality of Fujian Province into four parts, namely conventionally defined urban areas, two quasi-urban areas with strong and less strong urban characteristics, and areas still predominantly of rural nature, based on the data of population density and employment structure of the township-level administrative units from the 2000 census and other statistical sources, and estimated their areas and populations. The results show that as a result of in situ urbanization for more than two decades, quasi-urban areas and populations are so well developed in Quanzhou that it has become the major component of rural-urban transition process in this regions. In fact, the populations undergoing such a process can be as large as the conventionally defined urban population covered by conventional urban statistics, and the land areas concerned are much larger than those of the officially recognized urban centres. 2. Analysis on the temporal trend of the above quasi-urban areas and populations shows that they are still in the process of expansion. The indices of concentration of employees absorbed by township and village enterprises (TVEs), which have been the major driving forces of in situ urbanization in China, are still in the process of declining in Quanzhou, suggesting that centrifugal forces in favour of in situ urbanization are still prevail over centripetal forces. The results of a survey on the locational intention of TVEs and the migration intention of their employees show that most of them wanted to remain where they were, supporting the above identified trend. Analysis on the spatial pattern of economic growth suggests that areas with well developed in situ urbanization have been the main sources of economic growth, accounting for nearly 80 per cent of the Municipality's GDP. 3. Analysis on the growth of mega-urban regions in Fujian and other coastal provinces shows that while these regions have become increasingly the focus of urban development in China, one of its important components is precisely in situ urbanization of the surrounding quasi-urban areas and populations of the major cities. The integration of these quasi-urban areas and populations into the planning of major urban centres, which has been identified by some Chinese urban planners as a daily issue encountered but unresolved in many fast developing coastal regions, poses a major challenge to the conventional rural and urban planning practices. This challenge, together with the above mentioned large scope of and long lasting temporal trend in situ urbanization, and its significant roles as well as its shortcomings in economic development, suggests the great importance of incorporating it into China's development and urban and rural planning, so that greatest benefits can be achieved from it and its negative consequences can be minimized. 4. A further analysis on provincial level data in Fujian Province shows that in situ urbanization has been directly or indirectly related to a great proportion of the conventional urban population growth during the period 1982 to 2000 censuses. It has also led to the strong position of small towns and small cities in the urban system, a situation at odd with those in many other developing countries. Thus the evolution and its mechanism of in situ urbanization are also important for the planning of the conventional urban centres and their populations. 5. The examination of the above results in an international context suggests that they are not unique to China.

Similar phenomena can be found in McGee's Desakota regions or Extended Metropolitan Regions in East and Southeast Asia (McGee, 1991), or Ruralopolises in South Asia (Quadeer, 2002), although China's in situ urbanization is much more developed and deserves particularly more attention. This suggests that in situ urbanization reflects changes in the rural-urban transition process since the last half century and is inevitable, and calls for new theoretical and planning approaches for the rural-urban transition in today's developing countries. In this context, the paper proposes to adopt the 'city region' approach as a conceptual framework in understanding and planning of both in situ urbanization in China and similar phenomena in other developing regions. The next step of this research is to assess the environmental consequences of in situ urbanization and their planning implications. The aim of such research is to provide hard evidence based estimate about such consequences in the context of comparison with those of conventional urbanization patterns, and to assess whether such consequences are inherent to this kind of urbanization patterns. Based on the above mentioned four part demarcation of Quanzhou Municipality, we will analyse changes of their major environmental indicators since the 1980s, and then try to make international comparison if possible to achieve better understanding. Such research will greatly benefit from the forthcoming seminar, which will provide much needed information from other urban areas of developing countries and a basis for international collaborative research.