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SPATIAL DYNAMICS OF URBAN AGRICULTURE IN DRY SEASON IN THE REGION OF KORHOGO

***Avy Stephane Koffi*[1]**, (PhD, Assistant)

***Abderrahman Ait Fora*[2]**,(Professor)

***Koudou Dogbo*[3]**,(Assistant Professor)

***Hicham Elbelrhiti*[4]**,(Professor)

[1]Peleforo Gon Coulibaly Korhogo University BP 1328 / Department of Geoscience, Côte d'Ivoire. E-mail :

[2]Ibn Tofail University of Kenitra BP 133/ Geology Department, Morocco

[3]Peleforo Gon Coulibaly Korhogo UniversityBP 1328 / Department of Geography, Côte d'Ivoire

[4]Agronomic and Veterinary Institute Hassan II / Department of Basic and Applied Sciences, Morocco

ABSTRACT

The purpose of this study is to determine through the spatial analysis and the remote detection the areas where the urban agriculture is practiced during dry season in the town of Korhogo. Nowadays, the problem of the desertification in the sub-saharan share of Africa atteint year advanced level. This could be explained by the phenomenon of the climatic change. The present study is therefore about the spatial dynamics of the urban agriculture During dry season in the region of Korhogo, in the North of the Côte d'Ivoire. To this effect wo pictures of the Landsat 7 satellite will be used one dating of December 16, 2000 and the other one of November 15, 2006, and then, we will proceed to pictures' treatment. The technical of treatment by the index of normalized vegetation will be used. After Treated having thesis pictures, we will observe the behavior of the vegetation During dry season. As well as the areas of practicing the urban agriculture in this area.

Keywords: Urban agriculture, treatment, landsat, satellite, space dynamics, vegetation

Introduction

By 2030, world population will increase by 3 billion people, 95% in developing countries, food production will have to double, and the waste and effluent will be multiplied by four in the cities. Three billion people will lack of disposal facilitiess ewage ... These trends and their potential impact, as is the challenge of managing this impact will be particularly pronounced in inrapidly urban izingregions such as sub-Saharan Africa (Mougeot and Moustier, 2004, Mougeot, 2006). An activity that is involved in an urban environment in an integrated way in the

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fight against poverty and environmental sanitation is nothing but urban agriculture (Cissé and Moustier, 1999, FAO 2009, Eaton and Hilhorst, 2003; Parrot 2008a) in thatitis a source of income for disadvantag edit employs, and participates in the cleanup of citiesusing as fertilizerre cycled waste (Assogbakomlan, 2001, Compaoré et al. 2010), treated waste water (Gueye and Sy, 2001, Su 2009). The city of Korhogo is not immune to this problem. Territorial development is only very partially controlled by the authorities due to population growth combined with a low level of adequatere sources and the lack of planning and management instruments. Urban agriculture is in this city, a particularly interesting industry. However with the phenomenon of climate change of this study entitled "spatial dynamics of urban agriculture in the dry season in the town of Korhogo" will address the localization zones or practice urban agriculture in the dry season in that Common through spatial analysis and remote sensing from satellite images. The main objectives that have guided our work was to determine the spatial distribution of the sites of urban agriculture in the dry season in the town of Korhogo in 2000 and 2006 and to analyze the spatial dynamics observed in the activity.

Background and presentation of the study area:

Located 600 km from Abidjan in Northern IvoryCoast, the department of Korhogo area of ourstudy, is the capital of the Pororegion. It covers an area of 12,500 km² 3.9% of the national territorywith a population of 327,030 inhabitants (RGPH, 2014) and according to the new administrative division. The department has 16 sub-prefectures. (Figure 1).

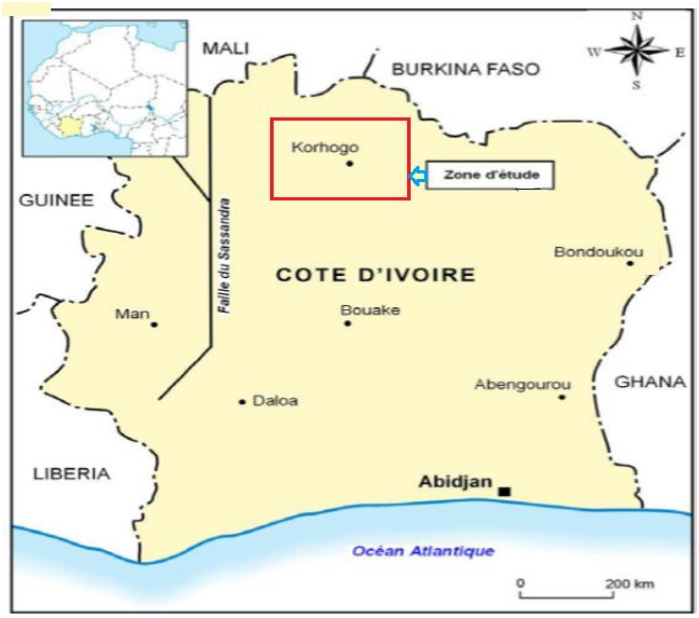

Figure 1. Study Area (Adapted from Marc Youan Ta et al, 2008)

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Materials and methods:

In our study, the technical equipment used consisted of data and hardware and field. The data consists of maps (topographic at 1/50000 scalegeological and soil 1/100000), two (2) dry season satellite images covering the study area. In addition, we used a picture from the satellite image Landsat 7 ETM +, 197/54 scene of the December 16, 2000 obtained on the NASA website:http://glcfapp.umiacs.umd.edu:8080/esdi/index.jsp. And the second image taken from the satellite image Landsat 7 ETM +, scene 197/54 of 15 November 2006 obtained on the NASA website:http://glcfapp.umiacs.umd.edu:8080/esdi/index.jsp. It acts specifically visible images extracted from the channels (ETM + 1, ETM+ 2, ETM + 3), near infrared (ETM + 4) and infrared (ETM + 5, ETM+ 7). This choice is guided by the spatial resolution (30 m. X 30 m.), Which allows, on the one hand to discriminate vegetated surfaces, barefloors, roads, tracks, and water ways. And secondly to have acceptable accuracy in locating phenomena (fracturing geological formations, etc.). We used as computer equipment and land for the execution of works, satellite image processing software ENVI 5.1.

Also we used the Paint software (desktop application) for the development and manufacture of cards. Finally a map of the Côte d'Ivoire for the location of the study area (Municipality of Korhogo).

The methodology used is based on various stages. Initially, the satellite image processing is done from index calculation and colorful compositions highlighting the baresoil and outcrops, hangouts breast plates.

Images were produced from the calculation of the normalized difference vegetation index (NDVI). The result of the NDVI is an image with a plant activity increasing gradient from black signifying the lack of coverage, the white that reflects a very high chlorophy llactivity. Therefore, it is used to discriminate the baresoil and vegetated surfaces. The calculation formula is shown by equation (Collet et al, 2001):

$$NDVI = \frac{ETM^{+}4 - ETM^{+}3}{ETM^{+}4 + ETM^{+}3}$$

Results:

In order to discriminate the baresoil and vegetation and areas of practice urban agriculture, we completed two (2) NDVI images from ETM + 3 and ETM + 4.

Thus, we obtained NDVI and field visits three entities:

- areas very clear to whitish gray color mark a very high chlorophyllactivity. They correspond to the savanna and gallery forests;
- areas with gray-dark gray color are indicative of a very lowchlorophyllactivity. They characterize the degradedsavannah;

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- areas of dark gray to black color reveals an absence or very little cover;

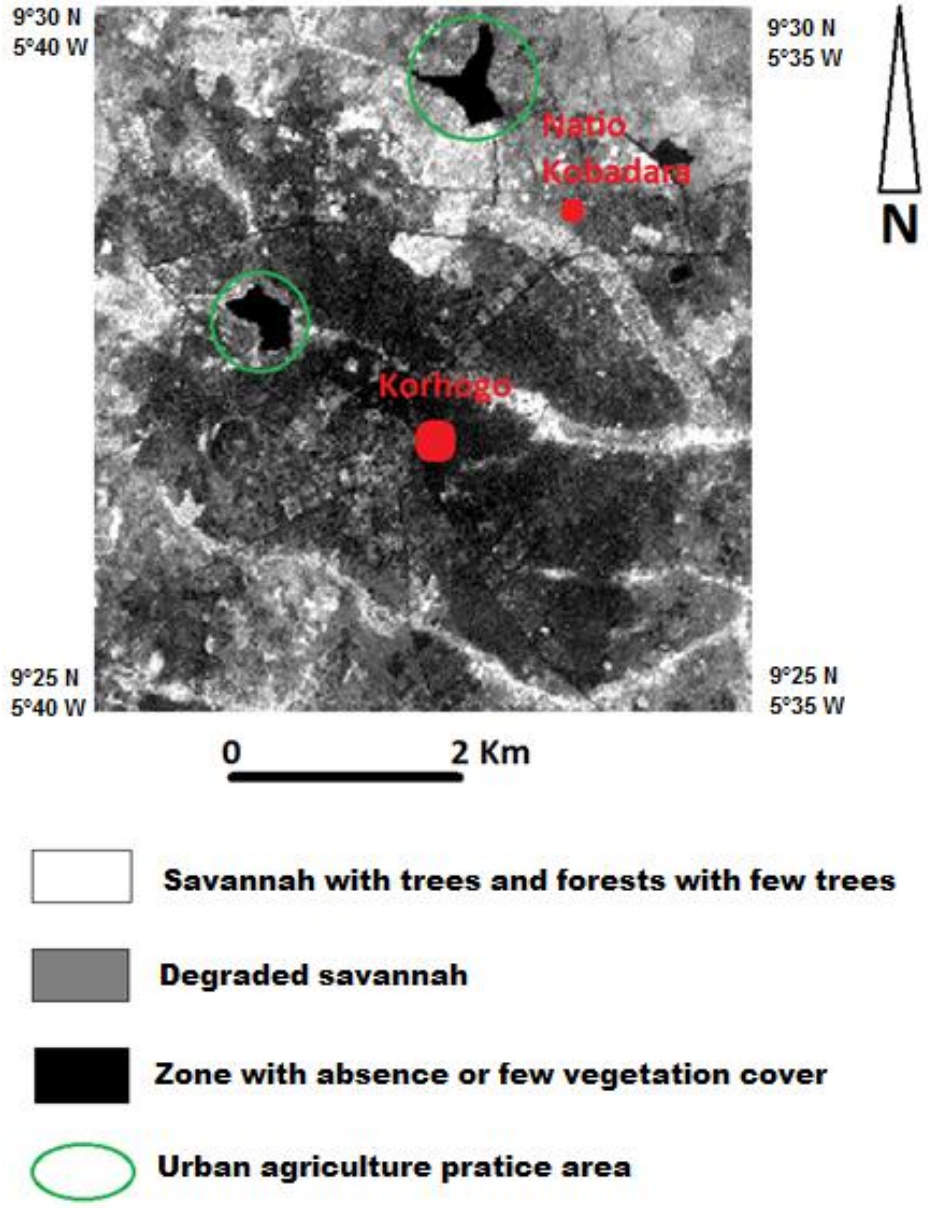

Figure 2. Map derived from NDVI image of 2000 Korhogo region

Thus, we obtained the NDVI and field visits three entities:

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- the clear areas of gray to whitish mark a very high chlorophyll activity. They correspond to the savanna and gallery forests;
- areas in gray-dark gray color are indicative of a very low chlorophyll activity. They characterize the degraded savannah;
- areas of dark gray to black color reveals an absence or very little vegetation. Therefore, they represent frames soils bare soils which are the preferred areas breastplates.

After our analysis and our documentation, we can déteminer a fourth entity regarding areas surrounded by the green color and are some sites where urban agriculture is practiced.

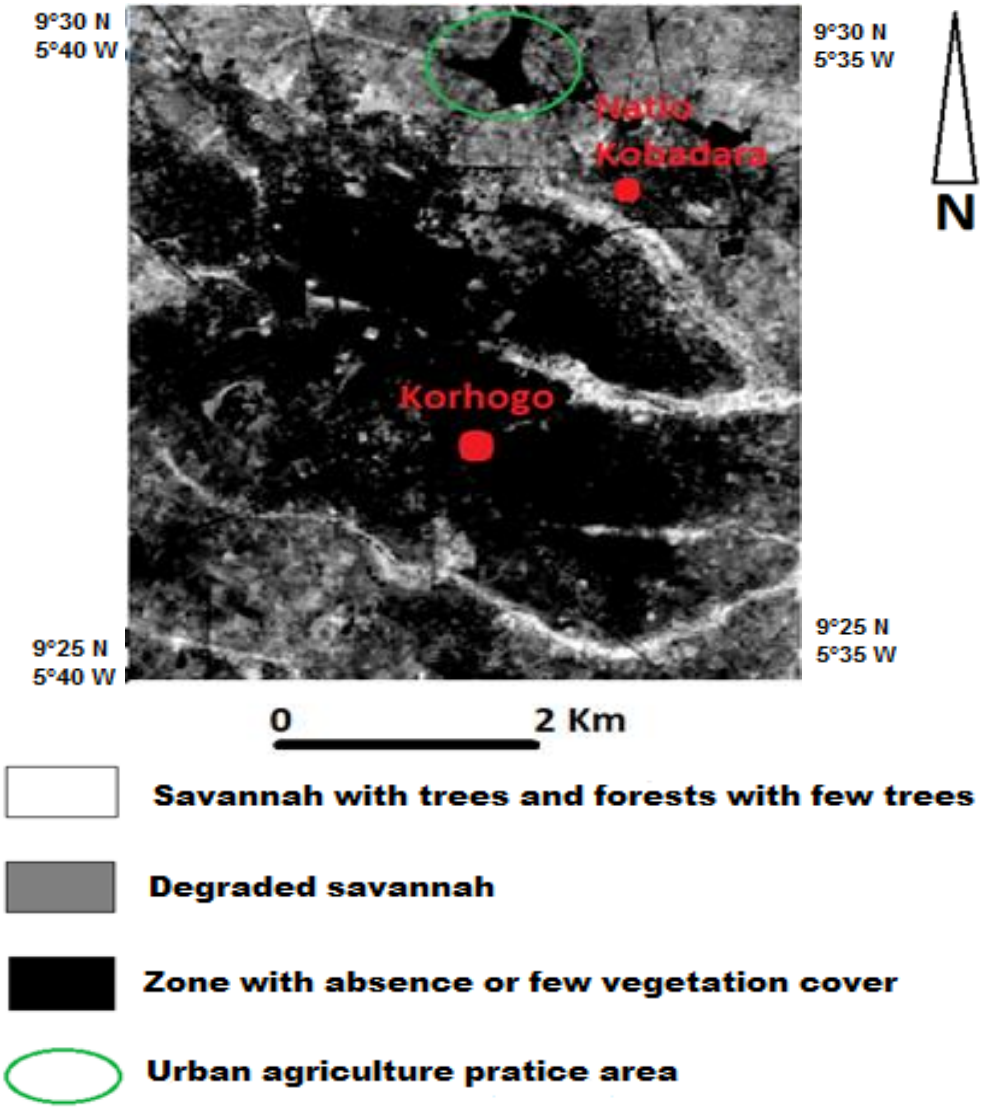

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Figure 3: Map derived from the NDVI image of the region of Korhogo 2006

The spatial dynamics will look specifically by the changes that took place between 2000 and 2006. We could also show urban agriculture practices of sites that would be here in our study limit. In 2000, according to the NDVI obtained we can say that the town of Korhogo in this period was still rich in practical area of urban agriculture, while in 2006 we are seeing a significant and progressive lack of vegetation cover which could state of climate change. (Figure 4). A macroscopic analysis leads to the finding that six (6) areas occupedby urban agriculture has declined. The locations occupied by this activity against, that is to say, sites and practice areas have decreased. It goes without saying that activity down while seeking to relocate. From a microscopic view we can say through these NDVI images that during these 6 years, sites have disappeared, some are maintained while decreasing efficiency. This leads us to a more detailed study of the spatial dynamics observed by entity, which will lead to the identification of sites or areas of practice of urban agriculture through the town of Korhogo.

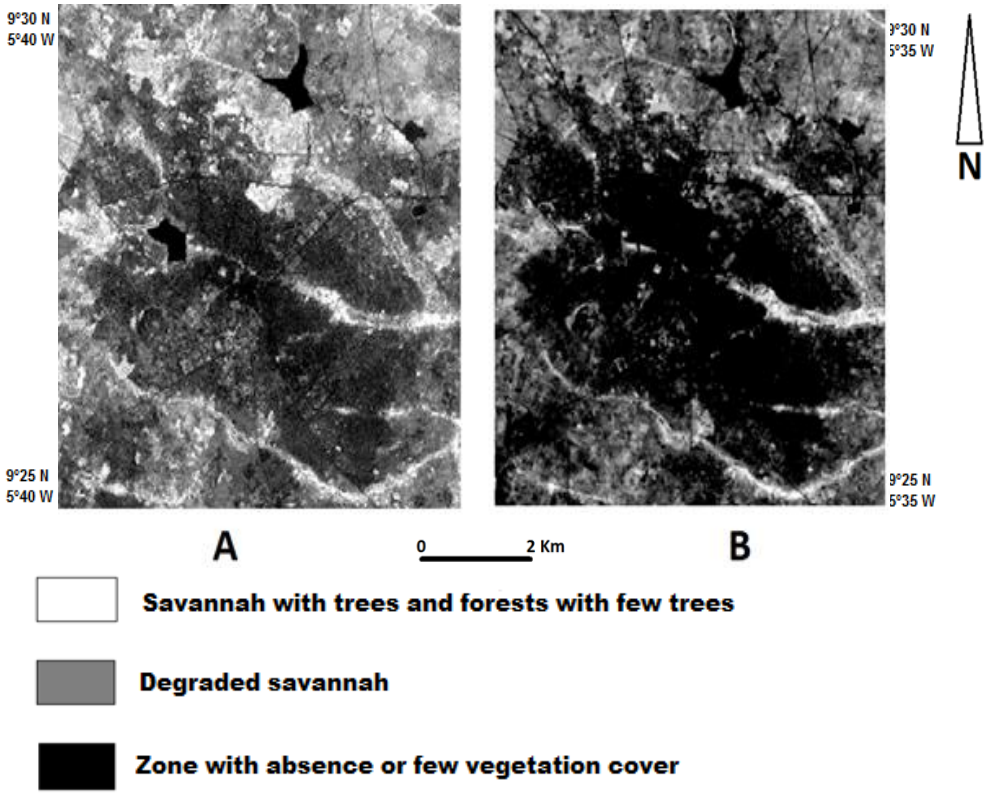

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Figure 4: Compared NDVI from Korhogo 2000 (A) and Korhogo 2006 (B)

Discussion:

Côte d'Ivoire specifically in the North (town of Korhogo) our study to observe the spatial dynamics between 2000 and 2006, this study showed the degradation of plant cover and the phenomenon of prominent climate change.As the Korhogo region becomes urbanized and more desertification intensifies, we find that urban agriculture practice sites have decreased. It is important to note that at this time of year (December), we are in the dry season, which is a good unfavourable period for urban agriculture. The northern soils of the Ivory Coast region of savannas consist of degraded savanna, wooded savannas and gallery forests, soils with low vegetation cover due to urbanization and the expansion of settlements. The study showed the normalized difference vegetation index the disappearance of several practice sites of urban agriculture between 2000 and 2006. It should always refer to the field and deep knowledge to confirm the results. It must protect its soil to prevent desertification, implementing reforestation policies to strengthen flora. However, another study in Burkina Faso showed thatthe spatial dynamics of gardening sites shows websites appeared primarily in peripheral and intermediate sectors of the city, missing websites dense urban areas and sites held in swampy areas around water bodies. These observations suggest, therefore, reflections to the salient features of these areas into the urban fabric of African cities: new citizens coming from rural areas and settling in periphery areas threatened by construction projects of the modern city, reconciliation between residences of farmers and sites, existence of potential consumer markets etc. This dynamic is thus observe a phenomenon against-intuitive but justified in the case of Ouagadougou which is that agriculture is encrusted in town as and as it progresses (Tallet 1999) where the land constraint (Gueye et al, 2009) permanent in which it is located.

Conclusion:

Urban agriculture in the town of Korhogo well known enormous difficulties, with the images of Korhogo 2000 and 2006 we see well the state of change. Indeed dry season urban agriculture is less practiced and both disappear. Climate change also promotes the disappearance of this activity, the phenomenon of urbanization can not be sidelined. The spatial dynamic between 2000 and 2006 shows a more pronounced lack of vegetation cover. Thus we can say that in 6 years several urban agriculture practices sites have disappeared due to urbanization and desertification. The approach presented was to bring out more information from the images of the normalized difference vegetation index (NDVI) Korhogo 2000 and 2006. The novelty of this study lies in the use of satellite technology for image processing Landsat 7. The methodology could be used, with appropriate adjustments, for other purposes of geological mapping elements.

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References:

Assogba-Komlan, F, 2001 Valuation of organic waste in the city for the production of vegetables in sandy soils of the coastal area: the site where the gardener ONEPI. In: Agricultural Research for Development. Proceedings of the scientific workshop. Niaouli, Benin. 144-161.

Avy Stéphane Koffi et alMap Of The State Of Covered Plant North Of The IvoryCoast To Go On Satellite pictures: Example Of The Area Of Korhogo European Scientific Journal October 2016 edition vol.12, No.29, pp 205-211.

Cisse O. and P. Moustier, 1999 Working Group Report methods. In: O. Smith (ed) Urban Agriculture in West Africa: contributing to food security and sanitation of cities. Ottawa, Canada, CTA, Crdi, p. 183-186.

Collet, C. and Caloz, R. (2001). Digital remote sensing image processing. Vol.3. Accurate Remote Sensing. (Pp. 229-236).

Coquery- Vidrovitch C., 1988. The pre-colonialcities of test definition and periodization.*in:* Coquery- Vidrovitch C. (ed.), UrbanizationProcess in black Africa. Paris, France,Karthala, p. 27-34.

Compaore, E, LS Nanema, S. and P. BonkoungouSedogo, 2010, composts quality assessment of solidwaste in the city of Bobo-Dioulasso, Burkina Faso for efficient use in agriculture in the Journal of Applied Bioscience 33: 2076 - 2083.

De Lattre A., 1994. Preface. In: Snrech S., A. De Lattre, Preparing for the future of WestAfrica: A Vision by 2000. Paris, France, Oecd, Bad, CILSS, p. 5-15.

Eaton, D. and T. Hilhorst, 2003 Opportunities for managing solid waste flows in the periurban interface of Bamako and Ouagadougou. Environment and Urbanization, 15 53-64DOI:10.1177 / 095624780301500110

FAO, 2009, Food for the Cities, [online] URL: www.fao.org/fcit/fcit-home/fr /

Gueye, NFD and Sy, 2001, the valuation of waste water for urban agriculture: the example of Dakar, Nouakchott and Ouagadougou "Urban Agriculture Magazine, 1.3: 30-32.

Gueye, NFD, S. Seck Wone and Sy, 2009, farmers in West African cities, land issues and access to water, IAGU, KARTHALA, CREPOS, 194P modifications

Jean-Luc Arnaud, spatial analysis, mapping and Urban History Collection Mediterranean Course, Territories Series Brackets-MMSH, 2008, 233 pages.

Maximy, 1988. All roads do not lead to Timbuktu. In: Coquery- Vidrovitch

C. (ed.), Urbanization Process in black Africa. Paris, France, Karthala, p. 11-25.

Jayathilaka PMS, P. Soni, Perret S. Jayasuriya HPW etSalokhe VM Spatial assessment of climate change effects are cropsuitability for major plantation crops in Sri Lanka Regional environmental change, 12 (1): 55-68, 2012.

Jean-Jacques Bavoux Laurent Chapelon, spatial analysis Dictionary, Paris, Armand Colin, 2014, 608 p. (ISBN9782200346782)

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ISSN: 2456-8643

Mougeot, LJA, 2006, Growing Better Cities: Urban Agriculture for Sustainable Development, IDRC, 116P.

Mougeot, LJA and P. Moustier, 2004; General introduction in sustainable development of urban agriculture in francophone Africa: Issues, concepts and methods, CIRAD, IDRC, pp 11-21.

OECD. "Climate Change and Agriculture: Impacts, Adaptation, Mitigation and Options for the OECD" [COM / TAD / CA / ENV / EPOC 2009.

Parrot, L. (Ed.), 2008a, Agricultures and Urban Development in Sub-Saharan Africa. Governance and urban supply, the harmattan, 208P.

Pelissier P., 2000. Opening Address. In: The rural-urban interactions. Dakar, Senegal, Cheikh Anta Diop University, 14 p.

Ruellan A. From local to global ... and vice versa, in KNOWLEDGE 2. The diplomatic world, pp. 34-35, 1998.

Samuel YapiAndoh. Impact of PoliticalRisks in International Marketing: the case of West Africa, University of Northern Washington, USA - MBA, International Marketing, 2007.

Snrech S., 1997. Population growth and urban development: impact on supply and Food demand. Rome, Italy, FAO, 15 p.

Su, M., 2009, Recycling waste water irrigation: fertilizing potential health risks and impacts on soilquality, PhD EPFL 178p.

Tallet, B., 1999. The gardening in Bobodioulasso: agricultural dynamism underurban influence. In Chaléard JL, Dubresson A., "Cities and campaigns in the South: Relations geography", Karthala, pp 47-64.

Tricaud PM, 1996. City and nature in the cities of Africa and Asia. Paris, France, Gret, Studies and texts, 103 p.