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Cartography of the segregation as a tool of decision-making aid for the fight against poverty: case of the town of Yaounde (Cameroon)

Marceline Nkwenkeu*, Chrispin Pettang, Paul Louzolo-Kimbembé

Laboratoire Aménagement Urbain, Ecole Nationale Supérieure Polytechnique, BP 8390 Yaoundé, Cameroun, France

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Abstract

The urban demographic explosion in the developing countries (DC) is generally accompanied by segregative phenomenon for the populations with low income and exposes them to several types of risks. This phenomenon of segregation, object of this study, is the result of the containment of the poor city dwellers in zones which are difficult to arrange, and in which the risks are numerous. This paper proposes a method of identification of the segregations and their domains of appearance, the analysis of the explanatory factors and their evaluation, using suitable mathematical tools. An application to the case of the town of Yaounde is used as illustration with our study. We charted the socio-spatial segregation in the town of Yaounde and implemented the characteristic elements of cartography of segregation in a given environment. We defined also the existence of the threshold of segregation and the intensity of a segregation associated with a domain.

Keywords: Segregation; Cartography; Element; Identification; Evaluation; Spontaneous habitat

1. Introduction

The town of Yaounde makes fast and unbalanced urban expansion. The production of decent housing is insufficient. The urban equipment (medical, educational, ludic, etc.) are insufficient compared to the real needs for the populations. However, they are also established in a disproportionate way in the districts of the town. This discordance between the urban development and the offer in urban services involves the recourse to the marginal solutions for the poor populations. The generalisation of this situation generates a segregation, which concentrates in the zones where the risks[1] exist the people located below the local poverty threshold. Any intervention in term of fight against poverty in these zones imposes a preliminary knowledge of the physical and socio-economic environment in order to propose effective and adequate solutions. In the aim to answer to this preliminary knowledge, we will consider the development of cartography of socio-spatial segregation of the town of Yaounde as a tool of decision-making aid. It is a question of establishing knowledge and the indicators on this segregation. Our approach of the problem consists by starting from the general study of a cartography of segregation and by establishing the various stages of the method [1], then to apply it to the town of Yaounde. The development of this socio-spatial cartography will obey the following plan:

- Determination of the basic elements;
- Identification of the segregation;
- Localisation of the segregation;
- Analysis of the explanatory factors;
- Evaluation of the segregation.

*Corresponding author. Fax: +33 00 237 222 4547.
E-mail addresses: tchabomarceline@yahoo.fr (M. Nkwenkeu), cpettang@yahoo.fr (C. Pettang), louzkim@yahoo.fr (P. Louzolo-Kimbembé).

[1]The risk is the insecurity in the human life (on the physical level) concerning nature of the occupied zones, the types of construction and the type of life.

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2. Determination of the basic elements

Let us note first that the segregation is the fact of the existence of a distinctive feature of situation within elements forming a unit and evolving in a given environment. The basic elements that we consider are as follows:

(a) Presentation of the town;
(b) Domain of the study of cartography;
(c) Constitution of an urban data directory necessary, attached to the field of study. The urban data make-up of quantitative and qualitative information, and of the charts [2];
(d) Identification of the elements in the medium of study and formulation in elements of a unit;
(e) Taken into account of the evolutionarily of the phenomenon.

The analysis of the urban data shows that their description can be attached to zones or the town as a whole. The non-localised data can reveal information on the town as a whole, and form different group of data. The localised data are related to homogeneous[2] zones resulting from a precise subdivision, or then on isolated homogeneous zones not allowing a particular division. A gird of classification will make it possible to index these data of study.

The segregation is a phenomenon associated with a precise functional field. Studies undertaken on the segregation show that its fields of predilection are various and varied according to the examined environment. Interesting work was carried out on the evaluation of the residential segregation [3,4]. Kymberly (2000) proposed a solution to make sure that all the departments of a service take part in an internal process of order, by using the segregation of the functions [5]. Parker (1999) worked about the segregation of the groups of individuals within the university campuses and proposes a solution to cure it [6]. Benenson et al. (2000), in their study of the phenomena of segregation, proposed a framework based on the hierarchical representation of urban residential spaces, the estimate and the comparison of the individual space segregation at various levels of the hierarchy [7]. Their approach allows the identification of the areas of homogeneity according to the average, the variation and other characteristics of a residential distribution, and provides a multidimensional view of the situation of segregation of a person. Concerning the segregation by the income, Zhang (2003) showed that this one explains only a small proportion of the high level of segregation, in the case of housing in the United States [8]. Indeed, the test, which he carried out, rejects the assumption according to which the inequalities of income alone are able to justify the high levels of segregation in the American urban zones. Thisse et al. (2003), being based on the interaction of the housing and labour markets, which depends itself on variables such as the externalities, outlined what they call the "theory of ghettos", after having presented a short outline in the way in which the economists apprehend the phenomena of discrimination [9]. The processes of dispersion of the households and segregation by the income within a suburban space [10] were explored by Caruso (2003). On another side, Selod (2003) studied the problem of social mixity for an attempt to stop the various processes of segregation [11]. In the field of the expenditure, the study of the segregation of cost [12] was undertaken by Adams (2003).

The segregation can be imposed or consequent, visible or be felt, conscious or not. The elements of the medium of study of segregation can be persons or entities, goods, animals or plants. Thus the elements represent various natures of a data when it is applied to the domain of study. The elements can be located, gathered or be represented. The localisation or the possible regrouping foresees the division of the town in isolated or juxtaposed homogeneous zones. To arrive there we used the test function, applied, respectively, to the localisation, the regrouping and finally to the representativeness. These operations lead to an overall enumeration of elements.

3. Identification of a segregation

To identify segregation in a zone, we compare the various statistics (corresponding to the elements) of a data to possibly discover a characteristic between two or several elements and to deduce the existence of a segregation threshold. We note that a threshold Se_i of a data D_i, for certain domains determining the segregation, is the average of all the values of the data. These information (statistical data, elements, time) are presented in a table.

We compare these statistics, either using a curve C_i (representing the numerical values of the data compared to the elements) and the threshold (it is the case of the quantitative data), or using the average value for a normal evolution of an element in its domain of evolution (it is the case of the qualitative data and the charts). The study of the segregation is done according to the time using the C_{E_k/e_k} curves, and of the threshold, where C_{E_k/e_k} represents the various numerical values (corresponding to E_k/e_k) of the data D_i, compared to the time; E_k and e_k respectively indicate the grouped elements and the element not grouped. The

[2]A homogeneous zone is a zone which shows as a whole about the same characteristics in all the points.