NATURAL CHANGES IN POPULATION

The values used are the mean birth rates (Map 1) and death rates (Map 2) for the years 1968 to 1973, thus centred on 31.12.1970, calculations being related to the population figures of the Census at that date. Natural increase (Map 3) is obtained by taking the difference between birth and death figures. Recourse has been made to a mean figure of six years because a great many communes have less than 1 000 inhabitants and annual figures fluctuate widely.

All these figures, as well as those of life expectancy (Maps 6 and 7), have been calculated by the Centre for Demography of the Free University of Brussels on the basis of figures published by the National Institute of Statistics.

The base network of 2 379 communes, the background of these maps, is that which existed on 31.12.1970. One problem arises from this, that is the joining together of communes between 1968 and 1973. Where such joining took place before 31.12.1970 the rate was calculated as if for the new entity; for an amalgamation after that date the calculation was made by extrapolating figures observed previously.

In these three maps the analysis by means of quantiles – in the present case, into octiles – is clearly justified since the distributions are normal and their values are represented according to the Laplace-Gauss law.

For birth rates, on the one hand, adjustments have been made to the class limits of the extreme quarters of the external inter-octiles, and the middle of inter-octiles 5 and 6 and, on the other hand, suppressed as limiting values those of the median, the 5th octile and the 3rd quartile. The classes on the map of death rates have been determined by a calculation of the median, mean and deviation with the extreme quartiles divided into three classes each. In the case of the natural rate of increase, the extreme inter-octiles have been divided into two and the two inter-octiles on either side of the median reunited into a single class with an adjustment from 0,0 to −0,2 in order to separate positive and negative values.

Birth rates, death rates and, consequently, the natural rate of increase are strongly sensitive to the age structure. Maps 1, 2 and 3 have brought out the distinctions which exist between the linguistic regions. The Campine is distinguished by a high birth rate, a low death rate and, as a result, a high natural increase in population. In the Flemish region only exceptionally are there low birth rates (below 11) but also barely any death rates greater than 13,7; the natural increase here is generally positive. The German-speaking area shows similar characteristics. Birth rates in the Walloon region seldom reach those of the Flemish region; they show however a large range; death rates (usually more than 11,1) are markedly higher than those of the Flemish region, so it is on Map 2 that the linguistic frontier is most strongly marked. Natural rates of increase are frequently negative and, where they do reach positive values, these are generally weak.

Map 4 represents, by arrondissements, the final descent, according to figures recorded in 1970-1971, for females aged from 15 to 49. The distribution is not a normal one, for which reason these statistics have not been analysed into quantiles; the central class (2 215-2 286) groups the values lower than the median, near or a little above the national indice.

The net rate of reproduction, after Kuczynski (Map 5), is a current index permitting the determination of the number of girls born to 1 000 women aged between 15 and 49 according to their conditions of fertility and the female death rate in 1970-1971; the intrinsic rate of increase, after Lotka, is that of a stable population the maintenance of the conditions of fertility and death rates of 1970-1971 would lead to. The distribution is not a normal one, one class being centred on the median and another on the national indice; the positive and negative rates are shown separately. The formulae for calculating these indices are given below. Maps 4 and 5 have been prepared from figures calculated by the National Institute of Statistics. With the fertility conditions observed in 1970-1971, population renewal would have been at a deficit in the arrondissements where the final descent would be less than 2 130 births per 1 000 women. In all cases the intrinsic rate of growth is effectively negative, which indicates a potential regression, since the continuance of the 1970-1971 fertility and death rate situations will lead to a decline in the population.

Another fact, the fertility rates of the Ardenne arrondissements have turned out to be higher than those of the Campine; the contrast between the linguistic regions has disappeared. Map 5 confirms this observation, the net rate of reproduction exceeding 1 200 °/₀₀ only in the Ardennes, which corresponds on Map 4 to a final descent of at least 2 600 children per 1 000 women.

The two maps of life expectancy at birth for 1969-1972 (Maps 6 and 7) have been constructed by dividing the two series according to octiles; only the extreme inter-octiles correspond to statistical classes, the six others having been regrouped two by two.

Attention is drawn to two facts : the lowest life expectancy for females (72,59 years) is markedly greater than the highest life expectancy for men (70,52 years), which indicates a higher death rate for men in all regions. The gap between the maximum and the minimum is 3,02 years in the case of women and 5,35 years for men, the geographical contrasts are more marked on the map for male life expectancy where the higher death rate of the Walloon area shows clearly.

Formulae :

Reduced total of births $S = \sum_{x=15}^{49} f_{(x)}$

Reproduction net rate, after Kuczynski $R_O = \frac{N_f}{N} \cdot \sum_{x=15}^{49} f_{(x)} \cdot s_{(x)}$

Intrinsic rate of increase, after Lotka $r = \sqrt[a]{R_O} - 1$

$f_{(x)}$: fertility rate of females at age x
$s_{(x)}$: probability of survival of females from birth to age x
N_f : females births; N : total births
a : mean age of mothers at childbirth