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Summary

This paper looks at the question of fertility change in Papua New Guinea in the late 1960s, using evidence from the 1966 and 1971 Censuses. It questions the assumption - that national fertility levels have remained constant - which underlies the manpower projections being used for planning purposes by the government. The author looks at the social changes in Papua New Guinea which may have been associated with changes in fertility and cites several earlier studies. He suggests that two different patterns of fertility may have been operating during the late 1960s. Rapid social change may have led to an increase in fertility, as people progressively abandoned traditional practices and beliefs which favoured long birth intervals. At the same time fertility may have been declining in urban areas and in areas where population pressure on land is severe. The author cites evidence from the 1966 and 1971 Censuses which provides support for this contention. It seems that fertility rose slightly in the southern and northern coastal regions and fell in East New Britain and Central Provinces and possibly also in West New Britain and Chimbu Provinces. There was no clear pattern in other Highlands provinces. There is no way of knowing whether these trends have continued during the 1970s until data are available from the 1980 Census.

Until very recently it was assumed that fertility in Papua New Guinea was constant during the late 1960s. Indeed, the demographic projections underlying the manpower projections now in use by the National Planning Office[1] assume constant age-specific fertility by province and sector over the period 1966-1986.[2] Unfortunately the trend analysis upon which these projections were based has never been published and the rationale for the fertility assumption can only be inferred from the assumption itself.

In an unpublished paper circulated two years ago Rafiq (1977) undertook a re-analysis of the 1971 Census data on fertility, based on unpublished, unadjusted tabulations provided by the Bureau of Statistics. In addition his paper compared 1966 and 1971 fertility levels for the nation as a whole. His conclusion, based on 1966 and 1971 parity distributions and quasi-stable estimates of total fertility, was that both the level and the pattern of age-specific fertility were altered somewhat in the inter-censal period. He suggested that the total fertility rate, roughly equal to the mean number of children born to a woman by the end of her reproductive years, may have risen from 6.5 in 1966 to 7.1 in 1971 (Rafiq 1977: Table 5).

More recently, the author (McDevitt 1979) has uncovered some evidence suggestive of declining fertility in East and West New Britain, Manus and the North Solomons Provinces during the late 1960s. The emphasis in that paper however is on variation in fertility between provinces rather than on fertility change in the country as a whole.

In this paper I would like to take another look at the 1971 Census data with the aim of making more direct inferences about changing patterns of childbearing in the inter-censal period 1966-1971. Since acceptance of the results of the exercise will ultimately rest upon their plausibility in light of what is thought to be true of evolving patterns of intercourse and childbearing in the post-War period, it will be helpful to begin by placing the discussion within the wider context of continuing social change in Papua New Guinea.

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[1] See Castley (1977?).

[2] Personal communication from Andrew Elek, Department of Finance.

I. The context

The theme of progressive abandonment of or decreasing adherence to the traditional cultural practices governing frequency and timing of sexual intercourse and the customary usage of contraception and abortion (and - to a lesser extent - infanticide) appears in several places (Bulmer 1971; van de Kaa 1971; Papua New Guinea, Department of Public Health 1974). Bulmer argued that the main cultural factors limiting family size within marriage, restrictions relating to intercourse with nursing women and periodic taboos associated with ritual or ceremonial activities, are unlikely to persist in the face of rapid social change. He suggested that post-partum taboos are likely to become less effective to the extent that their functional usefulness declines. The advent of significant changes in domestic organization and female work routines should diminish the perceived disadvantages of short birth intervals. This should lead directly to a reduction in length of breastfeeding or indirectly to shorter birth intervals through the attrition of traditional beliefs in the negative effects of intercourse on the previous child.[1] With regard to periodic taboos on intercourse, restrictions on cohabitation and the like Bulmer (1971:156) wrote:

> ...periodic taboos on sexual intercourse for ceremonial or ritual reasons are, by definition, scarcely likely to be maintained essentially to limit family size. These are also the limitations most likely to break down...as warfare, major traditional cults, and ceremonial exchange systems break down.

The National Health Plan[2] cited a study of Lae residents which provides support for the expectation of shortened birth intervals in the context of a non-traditional living and work situation. Lae residents were found to have shorter birth intervals, on average, than rural populations. And families resident longer in Lae were found to have closer birth spacing than more recent migrants. Decreased birth intervals were attributed to shorter periods of sexual abstinence and reduced duration of breastfeeding.

Apart from Rafiq's paper, one previous attempt to evaluate the possibility of a post-War increase in fertility was made by van de Kaa

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[1] Bulmer (1971:157).

[2] Papua New Guinea, Department of Public Health (1974:278).

(1971:159-174) on the basis of 1966 Census data. Part of van de Kaa's discussion is worth quoting at length. In reference to restrictions on post-partum intercourse and traditional preferences for relatively long birth intervals he wrote (1971:159):

> How closely the ideals were followed and how effective the measures were is a matter for conjecture. But in combination with attempts at contraception, the use of abortifacients or the practice of infanticide, in the traditional situation they may have depressed family size. The missions, and in certain respects the Administration, tended to be opposed to crude attempts at family limitation, and to polygamy and very early marriage as well. Initially, the introduction of venereal disease may have had a more powerful effect upon fertility than the disappearance of certain fertility controls, but with the introduction of education, better sanitation and more extensive health services after the war, the balance may have changed. The widespread availability of antenatal care, the effects of large scale health campaigns against malaria and yaws, and the undoubted decline in mortality may well have exerted an upward pressure upon fertility. And, even though it has been reported recently that syphilis is spreading to the highlands along the Highland highway, it must be concluded that for the country as a whole some rise in fertility is not unlikely.

Lacking reliable fertility data for any period prior to 1966, van de Kaa was forced to assess the hypothesis of some increase in fertility by making a comparison of the 1966 age structure of the population of the country as a whole with age structures resulting from various sets of age-sex projections (each of which was based on a different assumption about mortality and fertility trends over the twenty-year period 1946-1966). He concluded (1971:174) that:

> ...the case for a fertility increase [over the period 1940-1966] of any significance is not strong. Although no extreme changes in the initial mortality level are required to accommodate a very small increase, even an amount of 7.5 per cent makes it obviously difficult to construct an age structure close to the reported one, without assuming a very high initial growth rate.

In contrast to the above vein of thought there is the alternative proposition that in more urbanized areas, in areas where mean educational levels have risen most and, perhaps, in areas where population pressure on land is most severe[1] fertility can be expected to begin falling. Apart

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[1] Cf. Bulmer (1971:158).

from whatever effect social change associated with an urban lifestyle has on traditional practices affecting intercourse and childbearing, the 'modern' urban environment itself imposes on parents a set of direct and opportunity costs of childbearing which they would not face in the village. Child-related costs are generally higher in urban areas, land for gardens (as a supplementary source of sustenance) is frequently unavailable to the urban household, and children tend to interfere with the mother's career if she is employed in the wage sector.

There is, of course, no reason why both kinds of effects cannot be operating simultaneously, resulting in some fertility increase in most provinces, fertility decline in one or more of the more highly urbanized provinces (Central, East New Britain, Manus[1] and Morobe) and in several of the provinces where land shortage is most keenly felt (Chimbu, Enga[2] and, again, East New Britain), and a constant or slightly rising level of fertility for the nation as a whole. But a mixed pattern would probably imply a different set of fertility assumptions from that now being used for planning purposes at the provincial level.

II. The data

The data presented here are from two sources. Parities of, or mean numbers of children ever born to, women in five-year age groups (15-19 to 45-49) have previously been reported for 1966 by van de Kaa (1971:Table 6.14). Comparable 1971 figures are from the unpublished, unadjusted tabulations referred to earlier which were used by Rafiq (1977) and, prior to that, presumably, by Lewis[3].

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[1] In this context, 'urbanized' refers to provinces in which a relatively high proportion of the population of the province lives in the urban sector. For Manus Province, the 1971 Census recorded this figure as 16 per cent.

[2] Data on Enga Province are not available separately for 1966 or 1971 as the province was created only in 1974.

[3] Most of the demographic analysis of the 1971 Census was carried out prior to 1977 by a team headed by Laurie Lewis. This work provided the basis for the population projections generated by the Population Section of the Bureau of Statistics. Unfortunately neither the methodology nor the analysis was ever published.

Because Papua New Guinea census data are subject to severe problems of age mis-statement and memory lapse it is unwise to rely on a comparison of a single indicator as a basis for gauging the constancy, or lack thereof, in fertility between two censuses. Four comparisons may usefully be made from the parity data presented in Table 1. These are:

(a) The parities (P_i) of women in five-year age groups 20-24 and above

(b) The parity (P_6) of women of age group 40-44

(c) The parity (P_7) of women of age group 45-49

(d) The ratio of the squared parity of the 25-29 year age group to that of the 20-24 year age group, P_3^2/P_2

If fertility is undergoing a general change it should be manifested in a clear shift in one direction or the other at every age (other than the first, which is generally unstable and unreliable). Because the parities of women below the age group 40-44 are sensitive to changes in timing of births as well as to changes in desired family size it is prudent to consider separately parities at the older ages as indicators of completed family size. Comparisons (b) and (c) are probably insufficient in and of themselves because of the known greater severity of memory lapse at older ages and the unknown degree of bias associated with it in 1966. Finally, P_3^2/P_2 has been shown by Coale and Demeny[1] to provide a reasonably good estimate of total fertility in populations using no birth control and (d) is considered here essentially as a check on the other figures.

The parity figures shown in Table 1 (excluding the 15-19 year age group) exhibit the general pattern one would expect in light of the discussion in the previous section.

1. Southern coastal region. In this region 1971 parities exceed 1966 parities in each age group and the ratios P_3^2/P_2 for 1971 exceed those for 1966 except in the Central Province where 1971 parities are less than 1966 parities in age groups 20-24 and 35-49. That the pattern is mixed probably accounts for the observation that implied total fertility rose over the inter-censal period even though parities in the age groups 40-44 and 45-49 have clearly fallen. On the whole the data for the

[1] See United Nations, Department of Economic and Social Affairs (1967:33-34).

southern coastal region suggest some increase in fertility during the late 1960s in four of the five provinces and the likelihood of fertility decline in the Central Province.

2. Highlands region. Parity comparisons exhibit no clear pattern in the Highlands provinces. At some ages 1971 parities exceed 1966 parities; at other ages the opposite is true. If any province stands out it is Chimbu, where four of the six 1971 parities P_2, P_3...P_7 are lower than the corresponding 1966 parities and the implied total fertility rate P_3^2/P_2 has fallen markedly. This strongly suggests falling, rather than constant, fertility in Chimbu in the inter-censal period.

3. Northern coastal region. Clearly, fertility probably rose very slightly in the provinces comprising the northern coastal region during the late 1960s. Morobe Province is the only area deviating in the slightest from the observed pattern of 1971 P_i > 1966 P_i, and there the evidence of change is weak.

4. Islands region. The figures presented in Table 1 generally support the hypothesis of fertility decline in East and West New Britain combined but not in the other island provinces. New Britain parities fell in all but one age group (30-34) in the late 1960s; only the 1966 P_2 exceeds the corresponding 1971 figure for the other islands.

III. Discussion

The data presented here call into question the assumption of constant intra-sectoral, intra-provincial fertility which underlies the population and manpower projections now being used for planning by government departments. It is clearly arguable that fertility rose slightly in the southern and northern coastal regions while falling in East New Britain and Central Provinces and, possibly, in Chimbu and West New Britain Provinces during the late 1960s. It is less clear whether these patterns have carried over into and throughout the 1970s.

Unadjusted census data on children ever born provide a general idea of patterns and levels of childbearing in a population; however comparisons of the type made in this paper can only suggest the direction and magnitude of fertility change. And more sophisticated

fertility measures developed to assess fertility levels in the presence of defective data are themselves sensitive to fertility change. From a methodological standpoint, a sensitivity analysis based on different fertility and mortality assumptions, credible population figures by age and sex for two points in time, and better data on migration than were available at the time of the 1971 Census would shed considerably more light on this subject. Unfortunately, the 1966 and 1971 Censuses are not able to provide the two baseline populations because of the much greater amount of adjustment carried out on the 1971 data.[1] Ultimately, then, the issue of fertility change in Papua New Guinea during the late 1960s, and during the 1970s, will have to wait for 1980 Census data.

[1] Indeed, Ronald Skeldon, United Nations expert attached to the 1980 Census organization, has written (1978:1) 'It is only a slight exaggeration to say that the 1971 published results were basically the 1966 Census projected to 1971 on the basis of a number of assumptions!.

Table 1

Mean number of children ever born (P_i) per woman of each age group (i) by area

Area	Census	Age group 15–19 i= (1)	20–24 (2)	25–29 (3)	30–34 (4)	35–39 (5)	40–44 (6)	45–49 (7)	P_3^2/P_2
Western & Gulf Provinces	1966	0.40	1.46	2.44	3.29	3.67	4.12	3.73	4.08
	1971	0.30	1.59	2.90	3.63	3.96	4.34	4.23	5.29
Central Province (incl. National Capital District)	1966	0.29	1.46	2.98	4.05	4.84	5.11	5.48	6.08
	1971	0.20	1.46	3.06	4.12	4.74	4.84	4.67	6.41
Northern & Milne Bay Provinces	1966	0.27	1.32	2.65	3.69	4.28	4.35	3.74	5.32
	1971	0.18	1.41	3.05	4.14	4.84	4.63	4.22	6.60
Southern Highlands Province	1966	0.31	1.36	2.57	3.48	4.01	4.01	3.91	4.86
	1971	0.15	1.25	2.53	3.56	4.20	4.51	4.27	5.12
Eastern Highlands Province	1966	0.35	1.38	2.82	3.84	4.57	4.63	4.56	5.76
	1971	0.19	1.32	2.84	3.80	4.52	4.85	4.93	6.12
Chimbu Province	1966	0.18	1.04	2.26	3.20	3.88	4.33	4.31	4.91
	1971	0.09	1.14	1.98	3.16	3.79	4.16	4.37	3.43
Western Highlands Province (incl. Enga)	1966	0.25	1.23	2.65	3.50	4.63	4.49	4.59	5.71
	1971	0.12	1.38	2.39	3.64	4.20	4.62	4.64	4.13
East Sepik & West Sepik Provinces	1966	0.30	1.41	2.89	3.81	4.42	4.56	4.26	5.92
	1971	0.23	1.75	3.29	4.08	4.69	4.72	4.57	6.19
Madang Province	1966	0.30	1.30	2.58	3.65	4.07	4.02	4.28	5.12
	1971	0.17	1.41	2.81	3.88	4.53	4.52	4.39	5.62
Morobe Province	1966	0.14	0.88	2.15	3.39	4.38	4.82	4.65	5.25
	1971	0.12	1.00	2.31	3.36	4.24	4.92	4.89	5.34

Table 1 (cont.)

Mean number of children born (P_i) per woman of each age group (i) by area

Area	Census	Age group 15–19 (1)	20–24 (2)	25–29 (3)	30–34 (4)	35–39 (5)	40–44 (6)	45–49 (7)	P_3^2/P_2
East & West New Britain Provinces	1966	0.21	1.64	3.28	4.40	5.14	5.90	5.60	6.56
	1971	0.20	1.23	3.13	4.45	5.05	4.97	5.34	7.96
New Ireland, North Solomons & Manus	1966	0.32	1.84	3.28	4.27	4.60	4.87	4.99	5.85
	1971	0.23	1.50	3.42	4.64	5.01	4.98	5.02	7.80
Regional Summary									
Southern Coastal	1966	0.31	1.45	2.72	3.74	4.30	4.64	4.50	5.10
	1971	0.23	1.51	3.01	3.89	4.41	4.53	4.25	6.00
Highlands	1966	0.27	1.26	2.60	3.51	4.14	4.38	4.38	5.37
	1971	0.14	1.30	2.45	3.58	4.20	4.57	4.57	4.62
Northern Coastal	1966	0.24	1.21	2.56	3.63	4.33	4.52	4.39	5.42
	1971	0.18	1.38	2.89	3.85	4.55	4.77	4.66	6.05
Islands	1966	0.27	1.61	3.08	4.10	4.64	4.94	4.66	5.89
	1971	0.21	1.35	3.27	4.55	5.03	4.97	5.17	7.92

Sources: for 1966, van de Kaa (1971:Table 6.14)
for 1971, unpublished 1971 Census tabulations

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