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THE ASSOCIATION

DEVELOPMENT PROGRAMMING: SUGGESTED CONCEPTUAL FRAMEWORK FOR STATISTICAL INQUIRY

By Gabriel Y. Itchon *

Conscious efforts of the government towards economic development have given rise to an increasing awareness of the need for efficient statistics, or of the inadequacy of available statistics in the Philippines. Demand for more and better quantitative information has also been boosted by the quickened entry of business activities into new economic horizons, requiring a certain degree of precision in planning and design.

This recognition of the need for statistics has been formalized in the development program that was drawn up for the government:

> "The general model around which the economic and social development program is built is the simple aggregative growth model.
>
> "While this simple model is not the only approach to the formulation of a development program, existing statistical data and technical know-how greatly limit the use of inter-industry (input-output) model."[2]

However, the awakening to the inadequacy of available statistics did not lead to the identification of the desired quantitative information—statistics necessary for indicating a possible direction of statistical research work.

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[1] The author is indebted to Prof. P. N. Rosenstein-Rodan of the Massachusetts Institute of Technology for his stimulating and inspiring lectures and discussion in a course on economic development. All errors in the paper are, of course, the author's.

[2] National Economic Council, **Three-Year Program of Economic and Social Development** (FY 1959-60 to FY 1961-62), Manila (subsequently to be referred to as THE PROGRAM), p. 23.

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DEVELOPMENT PROGRAMMING FOR STATISTICAL INQUIRY

This paper attempts to construct a possible conceptual framework for statistical inquiry, identifying the quantitative information that may be useful in the programming of economic development.

1.

The simple model of growth used in the program was adopted from the model set up by Professor Domar to indicate the growth in income required, under a condition of equilibrium between savings and investment, for full capacity utilization of the stock of capital resulting from investment. [2]

The model consists of two elements: the behavioral relationship between savings (S) derived from income (Y), as expressed by the propensity to save (s); and the technological relationship between investment (I) and increase in income (dY), as expressed by the coefficient R, called the capital-output ratio. These are combined into:

$$(1) \quad S = sY$$

$$(2) \quad S = I \text{ under equilibrium}$$

$$(3) \quad I = sY$$

$$(4) \quad dY = \frac{I}{R} = \frac{sY}{R}$$

$$\text{or } \frac{dY}{Y} = \frac{s}{R}$$

On the basis of this formulation, income would thus have to grow at a rate equal to the quotient of the propensity to save and the capital-output ratio for full utilization of capacity.

In the development program, the model was used to determine the volume of investment necessary for attaining an objective which is represented by an increase in real income.

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[2] E. A. D. Domar, **Essays on the Theory of Economic Growth,,** New York, 1957.

The Program set the objective at a 5.9 per cent annual increase in real income. Taking a 3 per cent annual rate of population growth, the objective is thus equivalent to a 2.8 per cent increase in per capita real income. The Program, finally, considers the capital-output ratio as a parameter, valued at 2.2.

On this basis, the required annual volume of investment was determined to be 13 per cent of gross real income (gross national product.) [3]

The crucial parameter in this formulation consists of the capital-output ratio. How was the value of the parameter determined? How can it be verified?

The Program did not indicate how the total investment, required for the attainment of the objective, was allocated among the different sectors of economic activity, i. e., agriculture, mining, manufacturing, etc.

It is possible that the objective (increased level of income) may have been broken down "arbitrarily" into a "desired" pattern of output by sectors. The "required" investment by sector may then be determined with the use of the same model. The total required investment can be obtained by summing up these sectoral required investments.

If this was the procedure followed, then two intriguing problems had to be faced: Firstly, how desirable is the "desired" pattern of output by sectors? Secondly, how refined was the calculation of the sectoral capital-output ratios?

But what would be a more interesting problem is whether this arbitrary breakdown of the objective increased level of income into a (further) desired sectoral pattern of output is necessary.

It may perhaps be possible to derive the "proper" pattern of output from the single objective of a higher level of income. If this can be accomplished, then the required investment may be determined by the same capital-output ratio technique.

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[3] The Program, p. 23-24.

If the objective of a 5.9 per cent annual increase in income is realized, income would increase by around 19 per cent in the three years covered by The Program.This growth in income would give rise to an increase in the final demand for commodities for consumption and investment.

Which particular commodities will be affected by the increase in final demand, and for what volume and value?

These problems require the determination of income elasticities; since the increment in income is in the order of 19 per cent, the income elasticities required would be arc elasticities.

To get a first approximation of the pattern of additional final demand that may be expected at the targeted higher level of income, we can (for example) make an estimate based on the following initial assumptions:

1) The percentage increase in total income will be realized by the families (spending units) as well;
2) The pattern of family demand is a function of a single variable—income; and
3) The increase in population will bring about a proportionate increase in the number of spending units.

On these premises, the increments in income and population—of 19.10 per cent and 9.27 per cent, respectively, over a three-year period—may be expected to bring about the following pattern of final demand:

PATTERN OF ADDITIONAL FINAL DEMAND

(Million pesos)
(Current year value)

Expenditure Items	At Current Income Level	At Increased Income Level	Increase in Final Demand
TOTAL EXPENDITURES	4,869	6,010	1,141
1. Food	2,513	3,089	576
2. Shelter	409	505	96
3. Utilities	243	325	82
4. Clothing	394	511	117
5. Miscellaneous	1,310	1,580	270

SOURCE OF BASIC DATA: National Economic Council and Bureau of the Census and Statistics, "The Philippine Statistical Survey of Households Bulletin," Manila, March, 1957.

The above data were derived by taking the average ₱1,471 income of the families during the period covered by the Survey (March 1, 1956 to February 28, 1957) as the current income;and increasing this family income to ₱1,603 corresponding to a 19.10 per cent increase in total national income and 9.27 per cent growth in the number of families. At these levels of income, the corresponding totals and patterns of expenditures were derived from the expenditure patterns indicated by the Survey for different ranges of income.

Increments in final demand for finer categories can be similarly derived if the data on expenditure patterns are available.

The assumptions used above for expository purposes are of course overly simplified. In actual planning, it may be necessary (for example) to increase the number of independent variables that influence the expenditure pattern like income distribution, shift in population from rural to urban, higher level of employment, etc.

The resulting pattern of the increase in finally demanded output arising from the attainment of the twin objectives of higher income and more employment can then be used to determine the required investment to produce these outputs by the use of capital-output analysis.

The above determined incremental output mix, however, constitutes only part of the total increase in output necessary to support the attainment of the twin objectives.

The increase in output of final products in turn creates a demand for intermediate products. These intermediate products are used as inputs to the production of the final products.

Examples already abound in the Philippines. Taking the particular case of textiles, a finishing plant would require

grey sheeting, dyes and chemicals for the production of textiles. Going a step backwards, a weaving plant would require yarn for the production of grey sheeting. The manufacture of yarn will in turn require raw cotton to be spun by the mills.

These production-connected increases in output are ideally indicated by the input-output table. This tableau would show the total requirements for the production of a specified final bill of goods.

The resulting array of output increments necessary to service the higher level of income and employment can then be evaluated with respect to the corresponding investments necessary to create the capacity for production. At the industry level, the capital-output relationship assumes a precision and definitiveness which cannot be attained at higher levels of aggregation.

Total investment requirement can then be easily determined by summing up these investments for the creation of capacity to produce the individual products. [4]

The natural sequence would lead to the evaluation of the economy's capacity to generate the saving which is needed for investment. Should savings be found short, a scaling down of the objectives may have to be made. On the other hand, the capacity to save may enable the economy to atempt a faster rate of development.

How much saving can be expected if income level targets are realized? How much more can be induced?

The analysis developed along the lines outlined above should also indicate the volume of imports required to service the requirements of the higher level of income. An increase in income, per se, may be expected to generate an increase in the demand for final import commodities. Besides the normal increase in final demand for imports, the portion of the increase in demand for final domestic products that cannot be satisfied by domestic production—due to either inadequate production or lag of production behind de-

4 Total investment here includes both fixed and calculating capital.

mand—may have to be met by foreign supplies. Similarly, an increase in domestic output may be expected to generate demand for imported intermediate goods, e, g., grey sheeting, yarn, and raw cotton. Finally, the erection of additional capacity for domestic production may be expected to generate demand for imported capital goods.

The total demand for imports generated by the higher levels of income and employment has to be serviced by the capacity of the economy to pay for these imports. The economy's capacity to import depends on export and invisible earnings of foreign exchange, on foreign borrowings, and foreign grants. This constitutes the second restraint on the pace of development that can be attempted by the economy.

To a large extent, a degree of substitution is possible between domestic production and importation—especially, the substitution of domestic output by imported goods.

Even if these two restraints—savings-investment and foreign exchange capability-imports equilibria—on the pace of development are satisfied,the leads and lags—arising mainly from different gestation periods—between demand for and supply of products may bring about fluctuations in price levels.

2.

The conceptual framework that has been constructed so far assumes that an increase in output is a function of a single variable—investment. This is manifestly an oversimplification in the case of the Philippines.

There exists a significant portion of the economy where costs and, to a lesser extent, revenues are not reckoned in market terms. A recently published study on household expenditures all over the Philippines indicated that more than 28 per cent of the reported ₱5 billion annual outlays of families consisted of non-cash expenditures. [5]

[5] National Economic Council and Bureau of Census and Statistics, "The Philippine Statistical Survey of Households Bulletin," Manila, March, 1957.

In the non-market—(fully oriented) economy, the scarce capital—pertinent to capital-output relationships—is to a large extent not yet a significantly necessary input determinant of an output increment. In this (investment-wise) "bargain" sector, a change in techniques and organization of production yields "extraordinarily" large increments in output although an infinitesimally small capital input is introduced into the production function.

This has been dramatically demonstrated in recent Philippine experience: the effective substitution of domestic output for imports of "'Virginia" leaf tobacco worth $13 million (f.o.b.) within two years—1956-1957. [6]

To what extent can the bargain sector be expected to provide the increment in output required by the higher levels of income and employment?

The country's commodity imports during the three years 1955-57 were equivalent to more than a quarter of the income originating from the domestically marketed output of our commodity producing sectors. Of the total imports, agricultural commodities accounted for (also) a quarter of the total value.

Since these bargains exist principally in agriculture, a first approximation can be gleaned from these data on imports.[7] This particular direction contains the additional advantage in the form of an existence, already, of a domestic market for the particular products. Is the market big enough?

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6 Statistics gathered by the Central Bank of the Philippines showed leaf tobacco imports dropping from $12.9 million to $0.1 million between 1959 and 1957.

7 It is in agriculture, mainly, where the cost-side of production is not integrated with the market. Here cost is reckoned directly in terms of work-leisure decisions.

3.

The conceptual framework outlined above tried to indicate a scheme which may be used in the programming of economic development.

It attmpted to show that the aggregative model (Domar's.") is not an alternative to (say) the input-output "technique". The aggregative model is a convenient summary of the final demand analysis and input-output tableau.

The framework would require, among others, an estimate of the increment in final products that may be consumed at the (aimed) higher level of income. Income constitutes one of the more important determinants of the consumption pattern; data for the estimation of income elasticities of demand will therefore be needed.

Shifts in the location of population groups from (say) rural to urban areas, and thence from provinces to Metropolitan Manila also exert an influence on the consumption pattern. Quantitative information on population trends with respect to location will therefore be required.

After the pattern of additional final output has been established, the supply side of the problem will have to be investigated. It is in this area where capital-output relationships will have to be established for the individual industries concerned.

Capital-output relationships have to be established at the different stages in the hierarchy of goods—starting from the final consumption of goods down to the most primary production of intermediate goods. This will fit neatly into an input-output matrix, which may serve as the ultimate goal of these studies for the particular purpose of the research work.

PATTERNS OF POPULATION CHANGE IN THE PHILIPPINES, 1939 TO 1957[1]

By Kathleen M. Jupp *

It is only in the last few years that detailed studies have been made of the population of the Philippines, and that a better understanding of the structure of the population has been reached as a result especially of the application of the methods of stable population analysis to the results of the censuses and of the Philippine Statistical Survey of Households. Nevertheless, the lack of accurate annual data of births and deaths makes certain types of demographic analysis impossible, and nothing can eliminate the uncertainty which surrounds the level of the vital rates, in particular the death rate, except an improvement in the system of registration and of reporting to the central office.

The problem is a regional one, as a study of any figures for the provinces will show. The issue has been clouded by a tacit assumption that the level of the crude birth rate is much the same in every province, whereas in fact there are differences in the structure of the provincial populations by age and by sex and by marital status which provide grounds for the expectation of considerable differences in the birth rates. The accuracy of birth registration can be assessed in various ways, but it is much less easy to estimate the accuracy of death registrations, the principal obstacle being the lack of data relating to internal migration.

There is therefore an element of circularity in some of the methods of analysis applied in this paper, it being necessary to make assumptions relating to mortality before the birth rate can be estimated. The particular death rate assumed for the Philippines can be defended as being appropriate to the stability of the structure of the population

[1] I wish to acknowledge the assistance of Miss Rosario Blaquera, of the Statistical Center, in the compilation of the data presented.

* U.N. Senior Adviser in Population and Related Statistics, the Statistical Center, University of the Philippines.

by age and the rate of increase of population, but the use of the same rate in all regions is arbitrary. In practice, the error involved will be small in relation to the total number of estimated births.

It is, however, not the primary purpose in the present instance to obtain estimates of any of the vital rates as such, but rather, by the use of such rates, to draw attention to regional aspects of population studies in this country, and this paper can be regarded merely as suggesting lines that might be further developed when the results of the 1960 Census become available.

In order to bring the study close to the present, the data collected in May 1957 by the Philippine Statistical Survey of Households have been utilized, for the ten regions into which the country was divided in the various rounds of the Survey. These regional divisions are:—

Region I — **Metropolitan Manila**

Manila	San Juan
Quezon City	Makati
Pasay City	Parañaque
Caloocan	Mandaluyong

Region II — **Ilocos-Mountain Province**

Abra	Mt. Province
Ilocos Norte	La Union
Ilocos Sur	

Region III — **Cagayan Valley-Batanes**

Cagayan	Nueva Vizcaya
Isabela	Batanes

Region IV — **Central Luzon**

Bataan	Pangasinan
Bulacan	Tarlac
Nueva Ecija	Zambales
Pampanga	

Region V — **Southern Luzon & Islands**

Batangas	Occ. Mindoro
Cavite	Or. Mindoro
Laguna	Palawan
Marinduque	Quezon
	Rizal

Region VI — **Bicol**

Albay	Catanduanes
Camarines Norte	Masbate
Camarines Sur	Sorsogon

Region VII — **Western Visayas**

Aklan	
Antique	Negros Occidental
Capiz	Negros Oriental
Iloilo	Romblon

Region VIII — **Eastern Visayas**

Bohol	Leyte
Cebu	Samar

Region IX — **Southwestern Mindanao**

Cotabato	Zamboanga del Norte
Davao	Zamboanga del Sur
Sulu	

Region X — **Northeastern Mindanao**

Agusan	Misamis Occidental
Bukidnon	Misamis Oriental
Lanao	Surigao

Census data for 1939 and 1948 have been grouped according to this regional division, as have registered births published by the Department of Health, Manila, for provinces and cities in 1957 and 1958 but, except for total population figures, it was necessary to combine the data for Metropolitan Manila and Southern Luzon because of the overlap between Metropolitan Manila and the province of Rizal. An unfortunate feature of the combination is the inclusion with Manila of areas such as Palawan, Mindoro and Marinduque which differ in many important respects from the metropolis. The sampling error of the estimates

of population for 1957 based on the Statistical Survey will distort the value of some of the conclusions drawn from the data, and, for this reason, as well as from considerations of the possible inaccuracy in the statements of age and sex in the three years 1939, 1948 and 1957, the results must be regarded with reservation.

The percentage increase in the population of each region in the periods 1939–48 and 1948-57, shown below, provides a first approach to an understanding of the differences between the regions.

Table 1 — Population in 1939, 1948 and 1957, and Percentage Increase, 1939-48 and 1948-57, by region

Region	Population			Percentage Increase		
	1939	1948	1957	1939-48	1948-57	
Total	16,000,303	19,234,182	23,009,000	20.2	19.6	
Ilocos-Mt. Province	1,101,473	1,129,793	1,409,000	2.6	24.7	
Cagayan Valley-Batanes	600,151	669,006	1,027,000	11.5	53.5	
Central Luzon	2,324,187	2,774,680	3,210,000	19.4	15.7	
Metropolitan Manila	829,341	1,335,347	1,926,000	61.0) 30.9	44.2) 31.4	
S. Luzon & islands	1,864,639	2,192,161	2,708,000	17.6)	23.5)	
Bicol	1,346,620	1,666,459	1,977,000	23.8	18.6	
Western Visayas	2,667,626	3,082,795	3,510,000	15.6	13.9	
Eastern Visayas	3,021,845	3,440,617	3,740,000	13.9	8.7	
S. W. Mindanao	1,194,634	1,567,290	2,025,000	31.2	29.2	
N. E. Mindanao	1,049,785	1,376,034	1,476,000	31.1	7.3	

Sources: Republic of the Philippines, Bureau of Census & Statistics:
(a) Census of the Philippines, 1939, Vol. 11, and 1948, Vol. III.
(b) Philippine Statistical Survey of Household, May 1957: Population by Age Group. Sex and Regions, for the Philippines (unpublished). The figures exclude an estimated 200,000 persons living in institutions.

The areas in which population growth was greatest between 1939 and 1948 were Metropolitan Manila, Mindanao and, to a less extent, the Bicol provinces. Between 1948 and 1957, the Cagayan Valley area, Southwest Mindanao, Metropolitan Manila and Southern Luzon experienced the greatest proportionate increases in population. The rate of increase in Metropolitan Manila had slackened in the second period, but when Manila is combined with Southern Luzon, it appears that the decline in the proportionate increase in population in the period 1948-57 was compensated by an increase in the neighboring areas, probably as a consequence of an outward extension of the city population. Under the government-sponsored resettlement programme, Southwest Mindanao has gained heavily by internal transfers of population since 1939, while the Cagayan Valley gained population by the same process after 1948. In Northeast Mindanao, the decline in the percentage increase in population between 1948 and 1957 seems to indicate a falling off of migration into the region; and, in fact, the increase was so low as to suggest a loss by migration since 1948. Complementary to the high percentage increase in population in the immigrant-receiving areas, there were low rates of increase in the Ilocos area up to 1948 and in the Visayas. Re-distribution of population by migration is not likely to be the sole explanation of differential proportionate increases in population, and in any case natural increase and migration, the components of population growth, are interrelated. Internal migration in the Philippines cannot be measured in any reliable way, and it is therefore the more necessary to attempt to estimate at least some of the demographic differences between regions, beginning with the crude birth rate.

Although birth registration is believed to be incomplete, birth rates based on the registrations are shown in Table 2 for 1957 and 1958, together with estimates of the crude birth rate derived from the 1939 and 1948 censuses and 1957 survey results. The number of persons aged 5-9 years was divided by the probability of surviving from birth into the age group 5-9 years, the probabilities being derived from model life tables giving an average expectation of life at birth of 42.5 years for 1939 and 1948, and 47.5 years for 1957. [2]

[2] United Nations, Department of Economic and Social Affairs; **Methods** for Population Projections by Age and Sex. (New York, 1956), pp. 80-81.

The numbers obtained by this method represented the children born in the five-year periods 1930-34, 1939-43 and 1948-52. Average annual crude birth rates were obtained by dividing estimated births by five times the estimated population at the mid-point of each five-year period. Because of the use of the same mortality values for every province, the estimates of the crude birth rate will be understated in areas where the actual level of mortality was higher than the rates used and overstated where the actual mortality was lower than the rates used. Differences between regions in the accuracy of enumeration of the age group 5-9 years will also affect the results.

Table 2 — Crude Birth Rates, 1930-34, 1939-43, and 1948-52 (estimated); and 1957 and 1958 (registered), by region.

	Crude Birth Rates				
	Estimated			Registered (1)	
	1930-34	1939-43	1948-52	1957	1958
Total	47.2	47.4	47.1	32.5	32.3
Ilocos-Mt. Province	38.7	39.7	44.7	28.8	30.5
Cagayan Valley-Batanes	47.3	43.0	54.8	36.2	34.9
Central Luzon	45.0	45.1	44.9	38.6	38.4
Metropolitan Manila	37.2	32.7	40.4	38.9	38.4
S. Luzon & islands				40.3 39.4	39.2 38.9
Bicol	49.3	53.3	50.3	37.8	34.3
Western Visayas	48.0	49.7	43.3	22.8	22.0
Eastern Visayas	49.2	48.1	41.1	30.7	31.4
S. W. Mindanao	55.7	57.5	59.1	28.4	27.0
N. E. Mindanao	55.7	53.2	43.3	30.5	29.7

[1] Based on provincial figures of live-births issued by the Department of Health, Manila, and total population figures by region from P.S.S.H., May 1957 and 1958. The Manila registrations include births to transients.

First, as to the possible completeness of birth registrations: the years of registration are not identical with the years of estimation but registered birth rates were notably lower than the estimated rates and, on the assumption of unchanging fertility in the period, some idea of the differing level of completeness of registration in the regions may be gained if registered birth rates in 1957 are compared with the estimated birth rates for 1948-52.

Table 3 — Registered crude birth rates, 1957, as proportion percent of estimated rates in 1948-52, by regions.

Region	Percentage
T o t a l	69.0
Ilocos-Mt. Province	64.4
Cagayan Valley-Batanes	66.1
Central Luzon	86.0
Metropolitan Manila)	
).....	97.5
S. Luzon & islands)	
Bicol	75.1
Western Visayas	52.7
Eastern Visayas	74.7
S. W. Mindanao	48.1
N. E. Mindanao	70.4

In the Philippines as a whole, about 69.0 per cent of births were registered, while in the Manila-Southern Luzon area, 97.5 per cent were registered, and in Central Luzon 86.0 per cent. In the Bicol area, Eastern Visayas and Northeastern Mindanao registrations were between 70 and 80 per cent complete. The most unsatisfactory area of registration was Southwestern Mindanao where less than half the estimated births were registered.. The proportion for Manila is inflated by the inclusion of births to transients, and the proportion in some other regions may be consequently deflated.

The estimated crude birth rates give surprisingly uniform results for the Philippines in the three periods considered, and the level of 47 per 1,000 conforms closely to other estimates of the Philippine birth rate in the period. It is amongst the highest birth rates in the world and its maintenance will continue to ensure not only high proportions in the youngest age groups of the populations but also high annual rates of population growth.

The constant estimated crude birth rate for the Philippines is not reflected in the figures for the regions, which varied from period to period, and in several cases diverged widely from the national average. Central Luzon showed the greatest stability with a birth rate of approximately 45 per 1,000, slightly below the figure for all regions combined. In the Visayas and Northeast Mindanao, the crude birth rate declined from 1930-34 to 1948-52, while in Luzon the tendency was in the opposite direction, except as already noted in Central Luzon.

Previous to 1948-52, there was a marked difference between Luzon and the remainder of the Philippines in respect of the level of the crude birth rate, the rates having been generally higher in the Visayas and in Mindanao than in Luzon. The Bicol provinces constitute the only important exception to the regional pattern, but by 1948-52 the north-south differential had become less pronounced because of the decline in the crude birth rate in the Visayas and Northeast Mindanao, and the increase in several areas in Luzon. With some exceptions, the areas with high crude birth rates have corresponded with the areas of high proportionate increase and vice versa. Part of the explanation lies in internal transfers of population, and perhaps over-or under-enumeration of children aged 5-9 years could account for some of the very high or very low estimated birth rates, but the correspondence of the birth rate and the rate of increase may well be spurious because the crude birth rate, as a comparative measure, fails to correct for differences in the com, ,ition of the populations of the various regions by age, by sex and by marital status. The differences between the regional populations in their composition by age can be seen in Table 4, in which broad age ranges have been presented to emphasize the proportion of children and the proportion in the reproductive ages of the population.

Table 4 — Proportion percent in broad age ranges of the population, 1939, 1948 and 1957, by region.

Region	AGE RANGES											
	1939				1948				1957			
	0-14	15-44	45 over	Total	0-14	15-44	45 over	Total	0-14	15-44	45 over	Total
Total	43.0	43.2	13.8	100.0	44.2	43.3	12.5	100.0	45.7	41.0	13.3	100.0
Ilocos-Mt. Province	38.4	44.5	17.1	100.0	40.5	42.3	17.2	100.0	42.0	40.1	17.8	99.9
Cagayan Valley-Batanes	42.5	44.0	13.4	99.9	43.0	44.0	13.0	100.0	44.3	42.6	13.1	100.0
Central Luzon	42.7	42.7	14.6	100.0	44.8	41.9	13.3	100.0	45.6	40.0	14.4	100.0
Metropolitan Manila)									41.9)	46.5)	11.6)	100.0
)	39.5	46.7	13.7	99.9	40.3	47.8	11.8	99.9	)44.1	)43.4	)12.4	
S. Luzon & islands)									46.3)	40.6)	13.1)	100.0
Bicol	45.3	41.6	13.1	100.0	47.4	40.5	12.1	100.0	49.4	38.2	12.4	100.0
Western Visayas	43.7	42.7	13.6	100.0	45.5	42.1	12.3	99.9	44.6	41.0	14.4	100.0
Eastern Visayas	44.7	41.0	14.3	100.0	45.0	41.8	13.1	99.9	46.4	39.6	13.9	99.9
S. W. Mindanao	44.8	44.6	10.6	100.0	46.8	43.4	9.8	100.0	48.9	41.6	9.5	100.0
N. E. Mindanao	46.0	42.8	11.2	100.0	44.6	44.9	10.5	100.0	45.8	43.1	11.1	100.0

In the Philippines as a whole, the proportion of children aged under 15 years was high throughout and showed a tendency to increase at each enumeration, while the proportion aged 15-44 years remained stable between 1939 and 1948 and declined in 1957. The proportion aged 45 years and over was slightly lower in 1948 than in 1939 or 1957. The age structure is typical of countries of very high fertility, with the interrelated high proportions of children and of persons in the reproductive ages balanced by the low proportions at the higher ages. By contrast, in the United States in 1957, for example, the proportion of the population aged 45 years and over was about 29 per cent as against 13.3 per cent in the Philippines.

The structure of the population by age does not exhibit the same pattern in every region, and there was a notable difference in 1939 and 1948 between the north and south of the country, with the proportion of children generally lower in Luzon (except in the Bicol provinces) than in the Visayas or in Mindanao. In 1957, there was a slight increase in Central Luzon and a decrease in the Western Visayas in the proportion of children in the population. Other regions showed evidence of change in 1957, the greatest difference occurring in Manila-Southern Luzon, where there was an increase in the proportion of children from 40.3 per cent in 1948 to 44.1 per cent in 1957, and a decline from 47.8 to 43.4 per cent in the proportion of the population aged 15-44 years. The Ilocos-Mountain Province area was changing in the same direction, but not to the same degree, as was the Manila-Southern Luzon area. If it were possible to isolate Metropolitan Manila in 1939 and 1948, the distribution by age would presumably reveal abnormalities associated with an inflow of young adults in search of employment and education, and in 1957, where the metropolitan area is shown separately, there were low proportions of the population aged under 15 years and 45 years and over, with a correspondingly high proportion aged 15-44 years. The high proportion of the population in the reproductive ages would lead to the expectation of a higher crude birth rate in Manila than elsewhere, and the relatively low estimated crude birth rate shown in Table 2 suggests a difference in fertility and/or a difference in the proportions married in Manila.

If the population is considered for the sexes separately, further differences between the regions appear. In the following table, the number of males per 1,000 population is shown, but is restricted to the age range 15-44 years, because of the importance of this group in relation to the probability of marriage and of reproduction.

Table 5 — Masculinity of population in the age range 15-44 years, 1939, 1948, and 1957, by region.

(Males per 1,000 population in the age range).

Region	1939	1948	1957
T o t a l	495	487	482
Ilocos-Mt. Province	461	461	489
Cagayan Valley-Batanes	493	490	503
Central Luzon	487	480	489
Metropolitan Manila)).	511	493	449))468
S. Luzon & islands)			483)
Bicol	504	493	500
Western Visayas	498	485	479
Eastern Visayas	475	478	469
South West Mindanao	538	511	501
North East Mindanao	501	504	476

There was a decline at each enumeration in the proportion of males in the population aged 15-44 years, a decline which can be accounted for in 1948 and 1957, but not in 1939, by war-time mortality of males. Under-enumeration of males, which frequently occurs in this age group, could be the explanation, but migration from the Philippines for education or employment abroad may also have reduced the proportion of males in the population. From the regional viewpoint, in Southwest Mindanao in 1939, males outnumbered females to a considerable extent, but the position changed over time, until in 1957 the sexes were almost evenly balanced. Manila-Southern Luzon was the only other area with any considerable excess of males, but that excess no longer existed in 1957; and the deficiency of males in the age range 15-44 years has continued to be a fairly consistent feature of the regional populations.

The immediate importance of the deficit is the relatively low probability of marriage for females in the provinces in which the females were more numerous, with consequently lower numbers of births than would otherwise have occurred; and in Table 6 the proportions per 1,000 of women aged 15-44 years who had ever married (that is, married, widowed and divorced or separated women) are shown for 1939 and 1948. Comparable data, though collected by the Philippine Statistical Survey of Households in 1957, are not available at present.

Table 6 — Proportions per 1,000 of women aged 15-44 years who had ever married, 1939 and 1948, by region.

Region	1939	1948
T o t a l	658	617
Ilocos-Mt. Province	606	608
Cagayan Valley-Batanes	691	656
Central Luzon	629	620
Metropolitan Manila)	647	575
S. Luzon & islands)		
Bicol	690	641
Western Visayas	648	606
Eastern Visayas	612	641
South West Mindanao	688	779
North East Mindanao	725	647

The 1939 census figures exclude a very small number of divorced women who could not be distinguished from those whose marital status was not reported. The 1948 figures are deflated by the proportion of women for whom marital status was not reported, but the effect is concentrated mainly in Manila and Rizal.

Even allowing for the high proportions of cases for which the information was not stated in 1948, there was a decline, no doubt as a result of the Second World War, in the proportion of women of reproductive age who had ever been married. This was true in every region except Ilocos-Mountain Province, the Eastern Visayas and Southwest Mindanao. In 1939 the proportions moved fairly consistently with the masculinity ratios in Table 5 above, except that in Manila-Southern Luzon the proportion was relatively low and in the Cagayan-Batanes area, relatively high. In 1948, in Manila-Southern Luzon and the Cagayan-Batanes area there was a similar difference from the expected pattern and, in addition, in the Bicol region and the Eastern Visayas the proportions "ever married" were high. Thus, at both censuses, in Cagayan-Batanes, the Bicol provinces and Mindanao, the proportion of women aged 15-44 years who had ever married was higher than the average, while in Ilocos-Mountain Province and Manila-Southern Luzon it was lower.

The regional differences in the proportions married presumably reflect differences in attitudes towards marriage; in particular, the greater competitiveness and insecurity of economic conditions in urban than in rural communities may account for the lower proportions of women in Manila-Southern Luzon who had ever been married, whereas in the Ilocos-Mountain Province regions, for example, the deficit of males is probably the controlling factor.

In order to eliminate the effects of differences between regions in age and sex and marital status, an approximation to the differentials between regions in the level of fertility of women can be made by calculating child-women ratios in the years 1939, 1948 and 1957. As the effect of proportions married cannot be eliminated for 1957 until further figures become available, the ratios of children to "ever married" women are presented only for 1939 and 1948, in the following tables. The ratios are based on children 5-9 years per 1,000 women (or "ever married" women) aged 15-44 years. The children aged 5-9 years were chosen in preference to those aged 0-4 years because of the greater accuracy of reporting of the older age group.

Table 7 — Replacement ratios, 1939, 1948, and 1957, by region. (Children aged 5-9 years per 1,000 women aged 15-44 years).

Region	1939	1948	1957
T o t a l	713	684	758
Ilocos-Mt. Province	566	632	723
Cagayan Valley-Batanes	685	652	747
Central Luzon	690	665	769
Metropolitan Manila)			554)
).....	602	499	)690
S. Luzon & islands)			808)
Bicol	783	815	905
Western Visayas	737	756	718
Eastern Visayas	775	743	756
South West Mindanao	837	812	917
North East Mindanao	816	717	712

Before commenting on these figures, it is necessary to emphasize that differentials between the regions in respect of mortality in early childhood will distort the reliability of the comparisons made. Moreover, because both mortality and migration may affect the results, the ratios are not strictly speaking measures of fertility — but fertility is so much the most important factor in determining the level of the rates as to justify their interpretation here as such, provided the qualifications are borne in mind.

As measured by these rates, fertility declined in the Philippines between 1939 and 1948 and then rose above the level reached in 1939, the ratios of children to women changing from 713 to 684 to 758 per 1,000. The regional differences reflect the differences in age structure referred to above: in 1939 and 1948 in all of Luzon (except the Bicol area), fertility was relatively low and especially so in Manila, whereas in the Bicol area, the Visayas and Mindanao, fertility was relatively high. In 1957, in Central Luzon and

Southern Luzon the rates were above the average for the Philippines, but in Metropolitan Manila fertility was very low. Northeastern Mindanao seems to be the only area of consistently declining fertility. It appears, therefore, that the prospects for population growth, in the past were greater in the Visayas and in Mindanao than in Luzon, but that the area of relatively high increase had spread northwards by 1957.

To predict a further extension of the area of high increase of population, or even a maintenance of the current rates of increase, would be risky in view of the variability of the marriage rate in response to social and economic change, to mention the most obvious of the factors influencing the level of fertility, and consequently the rate of growth of population. There were considerable variations between 1939 and 1948 in the proportions of females married by regions, as presented above, and it is therefore of interest to see to what extent fertility varied by regions amongst those women who had ever been married, by looking at marital replacement ratios for 1939 and 1948.

Table 8 — Marital replacemen ratios, 1939, 1948, 1957, by region. (Children aged 5-9 years per 1,000 women aged 15-44 years who had ever been married)

Region	1939	1948
T o t a l	1,085	1,108
Ilocos-Mt. Province	934	1,040
Cagayan Valley-Batanes	991	994
Central Luzon	1,098	1,073
Metropolitan Manila)		
).....	931	868
S. Luzon & islands)		
Bicol	1,134	1,271
Western Visayas	1,137	1,248
Eastern Visayas	1,213	1,209
South West Mindanao	1,181	1,074
North East Mindanao	1,126	1,107

The pattern is clear enough — the decline in fertility between 1939 and 1948 in the Philippines was not a decline in the fertility of married women, who were in fact slightly more fertile in the later year, the ratio of children aged 5-9 years to "ever married" women aged 15-44 years having risen from 1,085 to 1,108. In the Bicol area, the Visayas and Mindanao, marital fertility was higher than in the remainder of the Philippines at both censuses, though in Mindanao in 1948 the rates were slightly below the average in fertility, while in parts of Luzon there were some very low rates, and the range from the very low rates in Manila-Southern Luzon to the high rates in the Visayas suggests a very different pattern of family size in the two areas. However, the present data are inadequate for the correct interpretation of the results, for which it is necessary to have detailed figures of average number of children born to "ever married" women by their present age and by their age at marriage, in each region separately. It is reasonable to suppose that women marry at somewhat higher ages in Manila than elsewhere and that the size of the completed families of such women should be smaller than the average (and this supposition is supported by data for Metropolitan Manila in the PSSH in 1956), but other regional differences are not so easily dealt with. If detailed fertility tables are compiled from the 1960 census by province, a much more satisfactory account of regional differences will be possible.

Even then, it is unsatisfactory to know the statistics without an understanding of the social and economic factors which underlie the figures. It is worth noting the inverse relationship between density of settlement and fertility at least in 1939 and 1948 in the Philippines: density was greatest to the west and north and least in the south; fertility was low where the pressure of population was greatest. These areas of close settlement include the great rice-growing areas of the country, and parallel cases of relatively low fertility in densely-populated rice-growing areas are to be found, for example, in Malaya amongst the population of Malay descent,[3] but in the Philippines the areas in which fertility was lowest were not exclusively rice-cultivating regions.

[3] Smith, F. T.: **Population Growth in Malaya**, Royal Institute of International Affairs, Oxford University Press, 1952, pp. 41-48.

It was in the Ilocos-Mountain Province area, Cagayan-Batanes and Metropolitan Manila-Southern Luzon that marital fertility was lowest in 1939 and 1948 — areas within which there are great economic and cultural variations. From the apparent rise in fertility in certain areas in 1957, it appears that some form of control of fertility was being exerted, perhaps the Malthusian control of deferment of marriage, but that that control has been somewhat reduced in recent years. It is possible that increasing food supply has relieved the pressure of population against resources in parts of Luzon. On the other hand, of course, it may be that the differentials in fertility shown in Table 7 reflect substantial decreases in mortality in some areas, but whether it is increased fertility or decreased mortality which is the operative factor, the implied increase in the rate of population growth in certain areas remains as an indication of possible increased rates of population growth in the Philippines in the future.

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Recording Year of Admission

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