THE HOUSEHOLD DISTRIBUTION OF GOVERNMENT SERVICES FOR AGRICULTURE AND EDUCATION IN PENINSULAR MALAYSIA IN 1974

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The paper reports on several results from a comprehensive study of the household incidence of public expenditure in Peninsular Malaysia in 1974. The results for education show a pro-poor distribution of expenditure when measured as a share of household income. Using however the criterion of each according to his needs (that is the number of school-age children per household) reverses this outcome. In agriculture, because of the importance of land settlement, benefits from public expenditure distribute predominantly in favor of the poor.

The research differs from the usual study of this kind in that individual government outputs such as school years, or fertilizer loans, were defined, and in the case of education their unit costs estimated and their distribution across households measured. In the case of education, both the costs of services from capital and the households' out-of-pocket educational costs were added to the current subsidies. As one consequence, it was seen that total expenditure for education in Malaysia exceeds one-eighth of GNP, nearly double the conventional estimate. Equally important, for the poor the burden of private costs for education even within a public system were seen to be very high.

The contrasts between the strong results for education, a broad based social service, and the less conclusive results for agriculture, an economic service which impacts directly on production, were instructive in suggesting the limitations of such research in measuring the effects of government budget activity on distribution.

1. INTRODUCTION[1]

Recently the World Bank has become interested in income distribution as well as economic development. One consequence of this interest is the development of our research on the distributive effects of public expenditure in Malaysia.[2] This paper reports on several components of that research in three parts: (1) the introduction; (2) some findings for education; (3) some findings for agriculture.[3]

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[1] In this paper I speak solely for myself and in no way for the World Bank, the sponsor for this research.

[2] Malaysia is a federation of the two Borneo states and the nine states of Malaya. The latter account for over 80 percent of total population. The work discussed here involves solely Malaya. In Malaya, 55 percent of households (HHs) are Malayan; 35 percent are Chinese; 10 percent Indian. The Chinese are urban and highly developed with incomes nearly twice those of the Malays. The Indians, many of whom are rubber tappers, fall between the two. Political power concentrates among the Malays who are using public resources in an attempt to "catch up" with the Chinese. Associated with the racial distribution is a regional distribution. The 4 Northern states are overwhelmingly rural, Malay and the poorest region of Malaya. Chinese account for a larger share of the population in the remaining two regions, Selangor and "Other", where they are the majority in the cities, while Malays dominate in the countryside. The region of the state of Selangor contains Kuala Lumpur, the nation's capital. (A regional breakdown is given in Table 4.) It is the most developed state of the country, with Chinese the majority of the population.

[3] The detailed material on methodology, theory, institutional background and the results for the various expenditures studied, e.g. medical care, water supply, transfer payments, are contained in the basic typescript from which this paper is derived.

In contrast to earlier studies of the household distribution of public expenditure, the research was inductive. Two sets of data were developed: information on the costs and types of government outputs—such as school years or clinic visits—in each of several major programs; and a sample survey of the utilization of these outputs by households. We combined the cost and survey data and "blew up" the results to a Peninsular estimate of per household government spending for 1974.[4]

The sample survey included 1,465 households (HHs) in Peninsular Malaysia only. It was random in two stages, and developed in cooperation with Malaysia's Department of Statistics. A private firm did the survey in 1974 with a response rate of 80 percent. The survey question on HH income included imputed returns to owner occupied housing, nonmarketed production, income in kind and so forth. With the resulting data we developed our basic concept of household *per capita* income (HPCI), that is, HH income divided by number in HH. This eliminates a serious problem caused by simply using HH income which implies that the welfare of a HH is independent of the number of members; e.g., that a three person HH is economically no better off than a large HH with the same income.

As the paper indicates, this unit cost approach works well in distributing social services across HHs. However, the difficulties in deriving the incidence of economic services are made far clearer than in the "traditional" studies of this nature.[5] The results are also of interest in underscoring the importance of private costs as a determinant of the demand for public education, and the implications of failing to cost the services from public capital in measuring public expenditure.

2. EXPENDITURE ON EDUCATION

Enrollment ratios. Through the survey we generated enrollment ratios at each level by quintiles of HPCI. As shown in Table 1, at all 3 levels, enrollment ratios increase with income. However, as shown in the final row, current Federal costs roughly decrease with income, because HH size and specifically number of school-aged children per HH decrease with increasing income. (The quintiles are ordered by increasing HPCI with equal population per quintile. Average number of persons per HH in the first quintile is 6.64; in the fifth quintile the average number is 4.75. Were we to present these results not by HH but *per capita,* total cost *per capita* would reverse into a positive function of income.) Total costs per HH per quintile are the summed products of mean enrollments per HH and subsidies per student year at the various levels.

Private costs. We also collected information on out-of-pocket educational costs (OPEC) by student and HH. The principal components of these costs are books, informal school fees, examination fees, "tuck shop" (purchases, usually

TABLE 1

UNIT COSTS, ENROLLMENT RATIOS AT DIFFERENT LEVELS, AND TOTAL
CURRENT FEDERAL COSTS PER HOUSEHOLD BY INCOME QUINTILE

(Public Schools)

	Enrollment Ratios			
	Primary	Secondary	Post-secondary	Total Costs per HH[a]
Mean	0.90	0.40	0.031	$411
Quintile of HPCI				
1	0.85	0.33	0.007	$450
2	0.86	0.33	0.012	$396
3	0.93	0.40	0.023	$454
4	0.99	0.44	0.026	$384
5	0.90	0.48	0.055	$370
Federal current subsidy per student year	$238	$299	$3,197	

[a]Excludes scholarships and other assistance against HH out-of-pocket costs.

TABLE 2

MEAN ANNUAL HOUSEHOLD EDUCATIONAL OUTLAYS FOR ELDEST STUDENT BY LEVEL
AND INCOME QUINTILE AND MEAN HOUSEHOLD EDUCATIONAL OUTLAYS FOR SECOND
AND THIRD STUDENTS

(Public Schools)

Quintile of HH per capita Income	Primary		Secondary		Post-secondary	
	Payments to School	Total Out-of-Pocket Costs	Payments to School	Total Out-of-Pocket Costs	Payments to School	Total Out-of-Pocket Costs
Mean, eldest	6	123	73	295	340	569
1	5	99	35	208	3	49
2	4	106	54	235	80	163
3	7	119	76	307	324	486
4	8	150	91	328	268	472
5	7	176	108	398	435	733
Second oldest Mean	10	124	64	265	344	605
Third oldest Mean	6	121	67	273	327	476
Weighted mean	7	123	70	283	339	571

Source: Survey

Note to Table 2. To be consistent with our other cost concepts, out-of-pocket costs (OPEC) had to equal the payments HH's made in addition to any educational benefits received, be they in kind or in cash. The survey data presented no problem with respect to in-kind benefits. However, in the case of cash benefits, it was necessary to reduce the HHOPEC as coded by the cash received since the HH interviewer enumerated each outlay for education irrespective of receipt of cash payment. The total population of students in the post-secondary was very small (62 cases). (Excludes students overseas and those in private institutions.)

food, during lunch and/or recess), uniforms, occasionally shoes, transport and supplies. These components and their totals increase very substantially level by level as well as by form, particularly in the secondary. Table 2 presents the mean annual OPEC for the three oldest students by level and, in the case of the oldest student, by income quintile. The Ministry of Education also developed norms for these costs in 1973 based on information collected by school masters. In 1973, the Ministry norm was $114 in the primary and $295 in the secondary. This compares with means of $123 and $283 from.the survey for the three oldest students. The data for Table 2 exclude any public assistance received such as bursaries, scholarships and so forth. These averaged $2.4 per student in the primary and $12 in the secondary. Their inclusion brings the primary mean to $125 and the secondary to $295. Taking account of inflation in 1974, the Survey data are somewhat higher than the Ministry in the primary and lower in the secondary. However, the discrepancy is remarkably small.

Table 2 shows that OPEC increases with income, even when we hold level constant. At the primary level very little of this increase is associated with payments to the school. At the secondary level, this is no longer the case and 38 percent of the increased OPEC between the lowest and the highest quintile is accounted for by increased school fees. This reflects the increasing weight of the expensive, high quality schools—which formerly used English as the medium of instruction—as incomes increase as well as the higher educational attainment of the wealthier; i.e. higher average form of their students.

The OPEC per student is also very substantial relative to public current outlays. Recall that at the primary level mean public cost of a student place averaged $238. The OPEC corresponding to this is slightly greater than half. At the secondary, the OPEC ($295) very nearly equals the public current cost.

Equally interesting is the relative burden of OPEC on income. HHs in the lowest income quintile have a mean HH income per year of $1,152. In Table 2 the mean OPEC for a secondary student in the lowest income quintile was $208 per annum. This alone implies an educational burden of 13 percent of income. Even if all payments to schools were completely eliminated, the burden would still be 11 percent. Clearly, the "Bottom Forty" of the income distribution can ill afford the out-of-pocket costs of maintaining even two students in school, particularly if one is in the secondary. No doubt this is a major reason for the rapid decrease in enrollment rates as incomes falls.

Table 3 measures educational burden by race and income quintile.[6] (Burden is defined as the mean of the HH ratios of annual OPEC to annual HH income.) The burden of the lowest quintile is extremely high (18 percent of HH income) but rapidly falls off, and is less than 6 percent for the highest quintile. In racial terms, the concentration of government assistance to pay OPEC among the Malays does not nearly compensate for the far higher mean incomes of the Chinese. Thus, the mean burden of the Malays is 12 percent of income, a third higher than that of the Chinese.

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[6]Table 3 refers to all schools. Over 97 percent of all students were in publicly financed schools. Hence eliminating the private schools would have very little effect on our results.

TABLE 3

EDUCATIONAL BURDEN BY INCOME, QUINTILE AND RACE

(All Schools)

Quintile of HH per capita Income	(Out-of-pocket Costs) ÷ (Income)	Percentage of Quintile Burdened	Race	(Out-of-pocket Costs) ÷ (Income)	Percentage of Race Burdened
Mean	0.104	65			65
1	0.180	73	Malay	0.115	66
2	0.104	67	Chinese	0.087	64
3	0.096	71	Indian	0.088	62
4	0.075	66	Other	0.109	45
5	0.055	50			

TABLE 4

MEAN ANNUAL HOUSEHOLD EDUCATIONAL OUTLAYS, BY INCOME QUIN-
TILE, RACE, TOWNSIZE AND REGION

(All Schools)

Quintile of HH per capita Income	Households with Students		All HH's
	Total Out-of-pocket Costs	Percentage of Quintile	Total Out-of-pocket Costs
Mean	408	65	265
1	303	73	221
2	321	67	215
3	415	71	295
4	436	66	288
5	582	50	291
Race			
Malay	359	66	237
Chinese	525	63	331
Indian	358	62	222
Other	491	45	221
Townsize			
Metro	543	67	364
Urban large	473	62	293
Urban small	372	67	249
Rural	363	64	232
Region			
Selangor	491	64	314
Other	422	63	266
North	349	67	234

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Table 4 presents OPEC by HH in several partitions. In addition to a breakdown allocating OPEC for all HHs, it also presents the breakdowns for HHs with students. The usual pattern appears in both sets: outlays increase monotonically with income. In fact, the functional relation between income and OPEC suffices to explain all of the breakdowns, including race, townsize and region. One additional clear conclusion follows: although the educational burden of the rich is vastly lower than that of the poor, their spending per student far exceeds that of the poor. Educationally, being rich amounts to both having your cake and eating it.

To reduce the OPEC burden, both state and Federal governments provide assistance of various kinds, e.g. free books, payment of examination fees, payment for board and lodging in residential schools. However, most of this assistance (55 percent) is for students at the post-secondary. Secondary students receive 37 percent of the total. The concentration of assistance at the post-secondary—where very few students are from poverty HHs—explains why public aid for OPEC itself increases very rapidly with income. As shown in Table 5,

TABLE 5

PER HOUSEHOLD OUTLAYS FOR EDUCATION BY COMPONENTS

	(1) Current Public Subsidy		(2) Capital Service Costs	(3) Total Public Costs	(4) Household Out-of-Pocket Costs	(5) Total	(6) Public Costs as a Percent of HH Income
	Student Places	Aid for Out-of-Pocket Costs					
Mean	411	33	100	544	265	809	13
Quintile of HH *per capita* Income							
1	450	21	112	583	221	804	38
2	396	23	108	527	215	742	20
3	454	29	102	585	295	880	15
4	384	35	92	511	288	799	9
5	370	52	91	513	291	804	4

Note: Private school enrollments are very low relative to the public except in the post-secondary. By level, the mean enrollments per HH were

	Private	Public
Primary	0.005	0.94
Secondary	0.025	0.40
Post-secondary	0.005	0.021

Initially, we assumed that private students received the same private institutional subsidy as those in assisted institutions. This implied total private institutional subsidy equal to 6 percent of the public institutional subsidy. In fact such institutions rely chiefly on student payments, particularly at the relatively expensive post-secondary. Such costs are already included in the estimate of HH out-of-pocket costs. As a consequence, we decided not to attempt a separate estimate of private costs *per se* and assumed that the private institutional subsidy, although it may be considerable in individual cases, was generally too low to be worth estimating.

TABLE 6

ESTIMATED ANNUAL PUBLIC CURRENT SUBSIDY AND COSTS OF CAPITAL SERVICES BY LEVEL

	(1) Public Current Subsidy	(2) Costs of Capital Services	(3) Total	(4) (2)/(3)
Primary	238	48	286	0.17
Secondary	299	111	410	0.27
Post-secondary	3,197	512	3,709[a]	0.14

[a]Expected to decrease as enrollments increase.

public aid per HH in the top quintile is two and one half times as large as the poorest quintile ($21).

Capital service costs. Table 5 also includes capital service costs (CSC). To estimate these, we imputed the costs of the flow of services from public capital— buildings and equipment—used in producing the various student years. The flows were imputed using cost data for new capital facilities, to estimate the average cost of replacing the capital used per student place. For primary and secondary we compiled the actual average payments by the Ministry of Educa- tion for school construction and furnishings in 1973–74. For the post-secondary, we used summed historical cost less depreciation. We then imputed the annual CSC as 15 percent of the total capital costs of a student place. It covers the opportunity cost of capital plus annual depreciation. The results are the CSC per student year as in Table 6. Relative to current Federal subsidies these are very substantial magnitudes.

At the post-secondary level, our estimate of CSC as a percentage of total costs may be too low. Relative to the secondary level, facility costs per student should be substantially higher; e.g. libraries and laboratories. However, both faculty per student and faculty wages are far higher at the post-secondary than the secondary. Possibly the wage increase more than offsets the facility increase.

TABLE 7

PER HOUSEHOLD PUBLIC OUTLAYS FOR EDUCATION, ACTUAL AND NORM BY QUINTILE

	Norm				
	Current and Capital	OPEC	Total	Actual	Discrepancy
Mean	511	33	544	544	
Quintile of HH *per capita* Income					
1	652	42	694	583	−111
2	579	37	616	527	−89
3	581	37	618	585	−33
4	456	29	485	511	26
5	351	23	374	513	139

But we may also have overestimated secondary and primary facility costs: Facilities in use may be far lower in quality than those recently constructed. Rather than attempt to refine the data further, with no reduction in controversy likely, we remain with them as we are convinced that although rough, they are useful estimates of CSC by student and level in the Peninsula.

Aggregate costs. Table 5 above sums the cost components. Column (3) presents the total public costs including an imputed cost for capital services. Adding in capital service costs to total cost reduces the weight of the private cost component to a third of the total (Column (4) ÷ Column (5)).

On distributing public costs as percent of HH income, we have a clear and strong negative relation between costs and income (Column (6)). Studies of distribution focus on this measure, which implies an extremely pro-poor distribution of public educational outlays in Malaysia.

This suggests that benefit *should* be according to income and not according to need. An alternative need-oriented measure defines distributive neutrality (or the norm) as equal benefits per school-aged person by level. Table 7 presents the data in both normal terms (equal benefits per school-aged person) and the actual distribution. The final column in that table shows the discrepancy between norm and actual subsidy is highest at the lowest quintile, with a mean shortfall of $111 per HH, or 84 percent of the norm. At the highest quintile the excess over norm is $139, or 37 percent.

Expenditure for education in terms of the national accounts.[7] As indicated in Table 5, total *current* costs of public education per HH (excluding foregone earnings) were $709. With 1.682 million HHs in the Peninsula, the total outlay is $1.192 billion. This is 10.44 percent of Peninsular GDP at factor cost (11.422 billion) in 1973.[8]

Table 5 shows that CSC average $100 per HH. Included as a cost component, they equal one-eighth of the total. However, if we wish to include CSC in the total and estimate the new total education total as a percentage of revised GDP at factor cost, we need to increase the latter by the cost of total government capital services. No data exist for carrying out such an estimation.

However, we can make plausible estimates. Let conventionally defined GDP at factor cost (GDPFC)—that is excluding imputed services from government capital—equal Y_0 with value 1. If the capital services component per unit of value added of government $= 0.13$, and government value added as measured in G_0 equals $0.2Y_0$, then imputing services from government capital in GDPFC, where the new GDPFC $= Y_1$, gives

$$Y_1 = 1.03\,Y_0, \qquad \text{with} \qquad G_1 = 0.23\,Y_0$$

Per HH educational cost including an imputation for capital services equalled ($709 + $100) = $809, or 1.14 the original magnitude. If $Y_1 = 1.03$ and educational costs including capital service $= (0.1044)(1.14)$, or 0.119 then education costs as a percentage of GDPFC $= 11.55$. If we assume a government sector larger than $0.2Y_0$, the same approach implies education costs less than 11.55

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[7]This excludes expenditure on adult education, which is far below one percent of GNP.
[8]It was also 10 percent of Peninsular GNP.

percent of GDPFC, and *vice versa*. However, the percentage is quite insensitive to the likely relative size of the government sector.

Data on national income (NNP at factor cost) for the Peninsula are apparently not available for 1973. However, foreign capital is extremely widespread and national income is much less than GDPFC. Thus, we can conclude with confidence that resources (including imputed capital services) in Peninsular Malaysia devoted to formal education exceed 11 percent of national income.

In 1973, investment in Peninsular Malaysia for public education exceeded 1.2 percent of GDPFC.[9] These are conventionally included in estimates of educational expenditure. Thus, total expenditure in formal public education exceeded 12 percent of national income. In contrast, a UNESCO Report estimated educational outlay, including development, as 6.7 percent of GDPFC in 1974.

Were we to drop the national income concept and include an estimate of foregone earnings in total costs of education and measure this new total as a proportion of what national income would have been had those in schools been in their most economically productive immediate alternative, we would end with an even higher estimate of the proportion of total community resources used in education.

To conclude with the obvious, what is true of Malaysia is also true for countries in general: Total resources devoted to education are very seriously underestimated.

3. Agricultural Expenditure

Identifying beneficiaries. In Malaysian agriculture, diverse land tenure arrangements make it difficult to estimate the distribution of subsidies to factors used to produce an associated agricultural output. Although owner operators are the most common form of tenure, tenants, usually share croppers, account for about a fifth of all agriculturalists, while non-cultivating land owners account for another 12 percent. In addition, mixed tenure is common; e.g., 12 percent of all farmers own some but less than 80 percent of what they cultivate. The complexity of land tenure put any attempt at distribution of subsidized agricultural inputs as well as assets provided by government out of mind.[10]

There are additional problems as well. Throughout the study, we followed the common practice of distributing public costs by expected beneficiary, on the assumptions (1) that costs and the value of benefits to HHs were closely associated and (2) that governments need to know where their spending goes. It might be valid to assume the same with respect to subsidies and provision of assets to Peninsular Malaysia's peasant agriculture. However, the large number of inputs and capital provided, particularly land settlement, the bewildering array of public organizations providing them, plus the absence of any accounting

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[9]Treasury (1975), pp. vi and liv.

[10]Certain benefits would also be capitalized into increased land values. Change in ownership would mean that the original owners realize a monetary equivalent of the present value of future benefits. The new owners would not be the beneficiaries. No attempt was made to consider this aspect in the analysis.

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basis for calculating unit costs of inputs, meant that charging such costs to recipient HHs was out of question.[11] Further complicating the matter is the inability of rural people to distinguish between Federal and state governments as well as autonomous public entities; e.g. FELDA and RISDA. Villagers frequently combine all three categories under a single umbrella, "Government" (Kerajaan).

Another complication involves the public character of subsidies in the form of public drainage and land control works. These works provide services highly valued by producers *and* HHs as consumers. But because of their public character, any estimation of these values is out of the question. Moreover, even the distribution of costs on the basis of some *a priori* notion of the distribution of benefits was impossible. Finally, how to estimate the cost of the services from capital used in such work—analogous to what was done with respect to education—was equally beyond our means.

There is a further implication—and one generally ignored—of the existence of production subsidies be they monetary or in kind. If we assume perfect competition in markets which operate solely in the Peninsula, then any subsidy is forwarded to and "impounded" with the consumers of the subsidized outputs. (This is the usual treatment in national income accounting of production subsidies.) But in Malaysia, export prices determine value of the two major outputs, rice and rubber. This suggests that government subsidies, even where substantial, are to only limited degree passed forward to consumers. Benefits are probably largely impounded with producers. The implication is that in the case of simple production subsidies, e.g., fertilizer, whose effects are immediate and of short duration, incomes of subsidized producers already fully reflect the subsidy. Thus, their incomes already include the subsidy. Our data did not permit adjustments for such effects and agricultural incomes are somewhat overstated as a consequence. (In studies of budget incidence which compare hypothetical pre-government HH incomes with incomes after considering the effects of taxes and spending, the pre-government incomes should be reduced by the amount of the various subsidies. Thus far, no empirical country study has made this adjustment.[12])

[11] At the Federal level we have certain basic organizations such as the Federal Land Development Authority (FELDA); the Rubber Industry Smallholders Development Authority (RISDA) and the National Padi and Rice Authority (Lempaga Padi Nasional, LPN). Two other very important organizations are the Agriculture Bank (Bank Pertanian) which provides a substantial, if not the majority, share of public agricultural credit and the Ministry of Agriculture's Drainage and Irrigation Department (DID). The latter has expended hundreds of millions of dollars in the last two decades constructing, improving and maintaining a large number of irrigation, drainage and rural flood control facilities. There are also many small Federal organizations, most of which like DID are funded through the Ministry of Agriculture: the Malaysian Agricultural Research and Development Institute, the Federal Agricultural Marketing Authority, the Extension Service, and several authorities responsible for managing land development schemes such as the Muda and the Memubu Agricultural Development authorities. The cooperative movement is supported by the Federal government through the Farmers' Organizations Authority. In addition, the states have large numbers of different organizations, many of which are indirectly funded through the Federal Government. Their total no doubt greatly exceeds the corresponding Federal total.

[12] Many studies use a national accounts framework. The income concept is basically factor incomes with adjustments. This is precisely the wrong income concept. As implied above, a more nearly correct income would be NNP. See Meerman (1974).

Altogether this reasoning leads to the conclusion that, at best, we can only very crudely allocate costs to the various beneficiaries. Consequently, we made no attempt at distributive accounting. Instead, we examined those programs which were the largest users of public monies—land settlement, drainage and irrigation, provision of subsidized inputs, extension—and then developed questions to elicit information on their immediate distributive impact. In the basic Study, we then allocated the costs of activities—other than land settlement—to the agricultural sector at large. A broad-bushed and blurry picture, rather than sharply delineated analysis, is the outcome.

Findings. Our survey questions were formulated so as to permit coding of agricultural inputs. Table 8 lists these inputs—land settlement excluded—and their frequency for the entire sample.

Often agriculturalists are unaware or unable to measure subsidies on inputs moving through market channels.[13] Consequently, we made no attempt to estimate even the distribution of such subsidies. On the other hand, farmers would obviously know when an input they used was free to them and when it was a loan. Therefore, we asked about inputs received in terms of whether they were loans or "free". *Ipso facto* this procedure excluded one of the major agricultural programs, that is providing subsidized fertilizer to padi growers. However, often the subsidized fertilizer is coupled with a loan in kind.[14] Such cases were recorded in the survey. Notwithstanding this exclusion, it is interesting to note that 19.5 percent of our agriculturalists claimed receipt of fertilizer either free (10 percent) or as a component of a loan (9.4 percent). (See Table 8.)

In Table 8, agricultural extension services were defined as occurring only when an agent visited the farm of the agriculturalist. Land-owners who do not cultivate would therefore not be expected to have any such visits, although if increased returns to land result, they might well benefit. Where extension agents visited only selected farms, one could not conclude from a low density of agricultural extension visits that benefiting farmers were equally low in density. The "demonstration effect" of acceptance by a few farm leaders frequently plays a major role in extension work.

The questions concerned solely activities occurring in the 12 months previous to the interview. Loans made or extension services received were excluded if made more than a year earlier. This 12 month time frame is inappropriate for activities designed to have an effect over decades: one would not expect to make annual loans to plant tree crops. If—as indicated in Table 8—the extension service visits 9.4 percent of the agriculturalists in any year, it is quite possible that it visits more than half the agriculturalists in six or seven years. The same argument is obviously valid as concerns demonstration projects: if—as recorded in Table 8—8.8 percent of the agriculturalists are aware of demostration projects in any given year, it is feasible that something like half may be reached in a 7 year cycle.

The 12 month horizon also implied an apparent low density for receipt of oil palm and rubber seedlings. As Table 8 illustrates, in "the preceding 12

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[13]Agriculturalists were defined as owning or cultivating more than $\frac{1}{2}$ acre of cultivated land.

[14]Much of the subsidized fertilizer is purchased from government outlets with loans provided by the same outlets.

TABLE 8
FREQUENCY OF AGRICULTURAL INPUTS RECEIVED IN LAST 12 MONTHS

	Frequency	Percent of Total Agricul- turalists
Inputs received		
unplanted rubber seedlings	16	3.0
planted rubber seedlings	3	0.6
unplanted oil palm seedlings	3	0.6
planted oil palm seedlings	1	0.2
liquid fertilizer	5	0.9
dry fertilizer	104	19.5
free 54		
loan 50		
liquid insecticides	7	1.3
powdered insecticides	15	2.8
crop-seeds	14	2.6
fencing	4	0.8
non-agricultural items	3	0.6
firearms 1 (state loan)		
housing 2 (state loans)		
Cash grants and loans		
received *cash* as loan (13) or grant (9)[a]	22	4.1
rate of interest on loan:		
0%	9	
4	3	
10	1	
unknown	3	
purpose of loan:		
housing	1	
replant rubber	5	
buy fertilizer	7	
unknown	3	
Extension services (visits to farm only)		
advice offered by organization of advisor		
"Agricultural Officer"	27	5.1
FELDA	9	1.7
RISDA	8	1.5
"Rubber Replanting Officer"	3	0.6
District Officer	2	0.4
Farmers' Organization	1	0.2
	50	9.4
most advice given on		
use of fertilizer	17	9.2
methods of cultivation	14	2.6
planting crops	9	1.7
routine follow-up	6	1.1
set up farmers' organization	3	0.6
	49	9.2
Demonstration projects		
awareness of demonstration project		
in area by output		
padi	27	5.1
rubber	4	0.8
fruits	1	0.2
cattle	14	2.6
	50	9.4

[a]Many cash grants are from RISDA for replanting rubber.

months" only 3.6 percent of agriculturalists received rubber seedlings.[15] In the case of oil palm, the density is very low indeed, less than 1 percent of total· agriculturalists. However, the average life of a rubber tree is several decades. Hence, 3 or 4 percent annually of the sample recording receipt of rubber seedlings implies a very high level of public activity over several decades. And once we partition agriculturalists between those who grow rubber (44 percent) and those who do not (56 percent), our annual density rises to 8 percent, implying saturation over a period far shorter than the economic life of the tree.[16] One would hardly expect a very high density of activity for oil palm since this is a new crop requiring a substantial change in cultivating techniques and life style. It is also only suitable on certain types of land.

The general conclusion is clear: for the overwhelming majority of the activities listed in Table 8, a meaningful definition of density requires a multiyear measure and some measure of regional feasibility of cultivation. The annualized data are consistent with very high service density of longer time periods.[17]

Table 9 distributes the 7 activities with highest densities by basic partitions. The distributions contrast strongly with earlier material on education which had relatively lower densities of services in the under-developed North and among poverty HHs.[18] It will be useful to define relative incidence as the ratio of partition mean to general mean. Thus, in most developed Selangor, 4.3 percent of agriculturalists reported receipt of fertilizer against a Peninsular mean of 19.5 percent receiving fertilizer. Selangor's relative fertilizer incidence is therefore a low 0.22. In fact, Selangor has far below average relative incidence, defined as equal to 1, for all seven activities. In contrast, the North has an incidence above average for 6 of the 7 activities. Using this approach for the poor/not poor partition, we have, in general terms, the poor (lowest two HPCI quintiles) doing as well as the rich: The poor are above average for four of the seven activities. When we turn to the remaining partitions, no clear pattern is apparent. Tenants, with 65 percent of HHs in poverty, do about as well in receipt of activities as other groups. We get similar results by type of farm. However, the high subsistence farmers, with 66 percent of HHs in poverty, have above average incidence scores for every activity. But in no case is the difference in scores between high and low subsistence cultivators statistically significant.[19]

Land Settlement. In the sample, 3.7 percent of rural HHs (5.8 percent of agriculturalists) were in government-supported land settlements, that is land

[15]Those receiving planted seedlings did not receive unplanted seedlings. Thus, summing the two categories gives total density without overlap.

[16]Small-holder replanting lagged in the 1950s and 1960s so that now they are "catching up". In the future, the replanting rate should drop.

[17]We calculated a combined frequency for seven activities: receipt of fertilizer, receipt of extension visit, participation in demonstration project, receipt of insecticides or of seeds, and finally, receipt of cash loan. Eighteen percent of the agriculturalists received one activity; 8 percent two activities; 4 percent three or more activities. Thus 30 percent received one or more activities.

[18]The three regions ranged from the poorest North, the most developed state of Selangor with the national capital, and the remaining 6 states in the region, Other.

[19]The extremely low density of the final four activities (insecticides, seedlings and so forth) implies that they are Poisson distributions. Two tailed tests, assuming a simple random sample, at ninety percent of significance generated confidence intervals whose range exceeded the entire range of the estimated means for the partitions by tenure and type of farm. Since our sample was in two stages, actual confidence intervals would be considerably broader.

TABLE 9

ANNUAL DENSITY OF PUBLIC AGRICULTURAL ACTIVITY BY BASIC PARTITIONS

(in Percent)

		Partition	Dry Fertilizer	Visit of Extension Agent	Aware of Demonstration Project	Received Dry Insecticides	Received Unplanted Rubber Seedlings	Received Seeds	Received a Loan
Total		100	19.5	9.4	8.8	2.8	3.2	2.6	2.4
Region									
North (Perlis, Kedah, Kelant., Treng.)		49.3	23.2	11.0	12.6	3.1	1.5	—	3.0
Other		46.3	17.3	8.4	5.6	2.8	4.5	4.8	1.2
Selangor		4.3	4.3	—	—	—	—	0.8	—
Poverty									
Poor		49.6	20.4	11.0	4.9	3.7	3.6	2.3	1.9
Not poor		50.4	19.0	8.0	12.6	1.9	2.6	3.0	2.9
Subsistence									
Over 20% of income		39.9	21.6	10.8	8.9	2.9	3.3	3.4	2.8
Under 20% of income		60.1	18.4	8.4	8.6	2.7	2.5	2.2	2.2
Tenure	ratio of land owned to land cultivated								
Tenant	0	21.5	15.1	12.4	9.8	4.5	—	4.4	—
Owner tenant 1	?< 40	3.6	16.4	5.8	15.8	5.3	10.5	—	21.1
Owner tenant 2	40< 80	7.8	22.0	12.2	7.3	2.4	4.8	7.3	3.1
Owner operator	80<140	54.9	21.2	7.6	8.5	2.0	3.5	1.7	—
Landlord	140<?	12.2	20.3	9.4	7.9	3.1	3.1	1.6	—
Type of farm									
Padi/rubber		10.5	23.2	12.5	3.6	1.8	8.9	5.4	1.8
Padi[a]		36.7	20.4	6.6	13.3	2.0	0.5	0.1	2.0
Rubber[b]		31.5	20.2	10.7	7.1	2.4	5.4	3.6	4.3
Other		21.3	15.8	10.5	6.1	5.3	0.9	2.6	1.8

[a]More than 40 percent of cultivated land in padi.
[b]More than 50 percent of cultivated land in rubber.

recently bought into production for small-holder use. (Such settlements are usually in tree crops, either rubber or oil palm.) Ninety seven percent of the settlers were Malays. Presumably, all of these HHs were below the poverty line before joining the settlement. For the entire study, the range of monthly HPCI in the median quintile was $43 to $61. The mean HPCI in the land settlements was $56—much of it no doubt in form of the subsistence payments made to settlers before trees start producing in those settlements sponsored by the Federal government.

In spite of the large sampling error of our small sample, the resulting estimate of total families in settlement schemes is probably fairly accurate. Government estimates are that about two percent of the total population and over three percent of the rural population have been settled on new lands since 1956. According to one estimate, the settlements have also generated employment for about an additional seventeen thousand families. There is no doubt that the program has brought a significant decrease in total rural poverty, as well as increase in fairly productive employment.

Conclusions. After the dust settles, the conclusions with respect to agriculture are limited. Both the variety and density of public activity is high. Including landsettlers, 32 percent of agriculturalists reported one or more impacts from public activity in the preceding 12 months, a period far too short to be a meaningful "distribution cycle." In 5 to 7 years, public activity of some sort might well impact significantly on the majority of agriculturalists. There are substantial impacts on both poor and higher income farmers from public agricultural activity: poor farmers have both access and effective demand for many public agricultural services and inputs.

In brief, there is no pronounced pattern of discrimination of services between rich and poor.[20] This is also true with respect to type of farm and tenure. These conclusions may also hold with respect to drainage, irrigation and flood control works, which we have not discussed here but which account for a substantial share of public expenditure in rural areas.

The regional tables are turned: the North, the Malaysian step-child as concerns education, is a far above average beneficiary of public agricultural support. In contrast, in Selangor, public support to agriculture appears dramatically low in both diversity and density.

Racially, the situation is about as expected. The distribution network favors the Malays. When we summed the seven activities of Table 9 and distributed them by race, the relative incidence of the Malays was 1.05 (89 percent of activities/85 percent of agriculturalists), the Chinese was 0.73 and the Indian/Other 0.75.

Although much of the land-settlement subsidy distributes to non-poverty settlers, presumably a distribution of the present value of relevant charged costs to settlers in their initial years in land settlements would involve only poverty HHs. Since land-settlement accounts for nearly half of total Federal spending in agriculture and the poor are also substantial beneficiaries of other public activi-

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[20]There was no correlation of income with number of activities received as measured in Table 9.

ties in agriculture, we can conclude that over half of total Federal agriculture expenditure primarily benefits the poor.

However, outside of the land settlement schemes, although the poor benefit as frequently as the rich, probably the value of the benefit per HH very much depends on the combination of land owned and cultivated. For example, the amount of benefit from subsidized irrigation, or subsidized fertilizer or lime, is probably largely a function of land owned and/or cultivated. We need to note the extreme inequality in land tenure: the top decile owns half the cultivated land. One would, therefore, expect this decile to also reap much above average shares of public benefits which so frequently distribute *pari passu* with cultivated acreage.

CONCLUDING REMARKS

Hitherto attempts to measure the HH distribution of public expenditure have largely imitated those for taxes: in country studies both total taxes and total public expenditures are usually allocated across HHs. However, the complexity of benefit incidence of economic services suggests that perhaps we should give up working in terms of this tax/expenditure symmetry. For example, in agriculture, perhaps we should use a decade to analyse the effects of some expenditures. Further questions of access, of private costs, and perhaps of preferences for other public expenditure are fundamental to the distributive perspective. Thus, it would appear that future research could well turn away from the usual emphasis on the one year period and a tax/expenditure symmetry. As indicated above, the sample survey lends itself well to some of these new directions. For some outputs, particularly social services, a national survey appears ideal. But as we have seen, in the case of outputs with very few direct claimants, probably surveys of the clients of the service-providing unit are in order.

Finally, because of the complexity of economic services, and not just those in agriculture, we are uncertain as to who benefits from them. It is possible that certain expenditures are so convoluted in their effects that it never will be possible to charge costs to beneficiaries. Certain knowledge concerning these hopeless cases would obviously be very beneficial. Some attention to this issue would be a good idea.

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