There appears to be some overall substitution between each additional household member and the mother's contribution to the garden in the coastal area. In hinterland barrios the addition of household members increased the mother's gardening activities. A possible reason for these zonal differences is the trade-off between market and non-market consumption which is discussed below.

2. Food and Nutritional Consumption

The most interesting relationships which emerged from the analysis of weekly household food expenditures are the apparent trade-offs between in-kind and market food consumption relative to family composition. The average weekly household food expenditures are $6.74 and $5.48 in the coastal and hinterland barrios respectively. In contrast hinterland household consume annually about $25 of home garden produce contrasted with $11 for coastal barrio households. Hinterland households' consumption in kind from other household activities was also higher.

A complete consumption function was fitted using a log-log functional form (Table 3). In the coastal barrios, the addition of children age 0-3 was associated with a lowered food expenditure while the opposite was true for hinterland barrio children aged 0-3. The latter represents

a supposedly unexpected relation. The low income elasticities may reflect the underreporting of income which is felt by some economists to be characteristic of household income data collected by survey techniques in the Philippines. Most likely, the percentage of underreported income is positively related to the income levels of the households.

The effects of each additional child are related to the consumption component of these food expenditures. It is possible that younger hinterland children are fed more baby foods or market foods. The percentage of food expenditures attributed to the meat, fish, cereal, vegetable and other components was known, but there was no more specific data on these components.

The household size effect is most interesting. The elasticity of expenditure with respect to this variable is .70 and .07 in the coastal and hinterland barrios respectively. At the same time, the opposite relationship occurred when mother's time in the garden was analyzed (Table 2). There is thus a possible trade-off in that hinterland mothers work much more in the garden for each additional member while they purchase much less food for each additional household member. This is probably because there is a slight inverse decline in the contribution to gardening by household members

outside the nuclear family for increasing family sizes in the hinterland barrio. Overall these opposite effects would tend to lower slightly the market and non-market elasticity of consumption with respect to household size in coastal barrios and raise it for hinterland barrios. If education of the mother played an important role in nonmarket production, one would expect different functional forms and other changes in this equation to lead to big changes in the education coefficient. This did not happen and we conclude that the simultaneity problem was unimportant for this relationship.

The positive relationship between mother's labor force participation and food expenditures focuses attention on the trade-off between income and child welfare. Popkin has demonstrated that both the average and marginal propensities to consume food grains and meat are very high. This suggests that the income from women's work is possibly being spent on these commodities which may be substituted for the more time intensive vegetables.

Various health and nutritional factors have been analyzed to understand some of the effects of the mother's labor force participation on the child's welfare. The relationships are quite complex, and the results showed

age factors to be important but likely to vary between different environments. Feeding and taking care of children, especially young ones, are very time intensive.[9/] At the same time this is the period when the children are most vulnerable. Hence the same nutritional deficiency or health problem will usually produce a greater relative effect on the younger child.

In the Cebu sample, the calorie, protein, iron and vitamin A intakes of children whose mothers worked were lower (Table 4). This could reflect an imperfect substitution between the goods provided by the mother and her time or may reflect the goods constraint referred to earlier Both the frequency of the meals provided the child and their quality can vary. In many cases the child whose mother works was fed less frequently. In others, older siblings or grandparents fed the children.

The greatest differences occurred in the consumption of vitamin A. Most of these children's vitamin A comes from nonanimal sources; in fact, 83 percent of the vitamin A

[9/] Health care, if employed correctly, is also time intensive. In practice, however, it appears that health care is generally less time intensive than food preparation.

Table 3. REGRESSION: HOUSEHOLD WEEKLY FOOD EXPENDITURES ($)[a/]

	Rural Coastal (N = 151)	Rural Hinterland (N = 155)
Constant	.08	.37
Log size of household	.70* (.21)	.07 (.18)
Children age 0-3 (No.)	-.03 (.03)	.08* (.02)
Children age 4-6 (No.)	-.02 (.03)	.02 (.02)
Children age 7-12 (No.)	-.01 (.02)	.05* (.02)
Children age 13+ (No.)	.01 (.02)	.04* (.01)
Mother's education (age groups)	.06* (.01)	.02 (.01)
Mother's participation in labor force (0-1 dummy)	.03 (.04)	.05** (.03)
Log weekly household income per capita ($)	.05*** (.04)	.10* (.03)
Wealth (0-1 dummy)	.07** (.04)	.14* (.03)
R^2	.34	.46
F-ratio	8.30	13.57

a/Dependent variable is log (weekly food expenditures)

Standard errors in parentheses:

*Significant at 1% level.
**Significant at 5% level.
***Significant at 10% level.

of the coastal children and 93 percent for the hinterland barrio children comes from vegetables. This is important in that these children are not willing consumers of the vegetables and the manner in which the vegetables are produced (a soup) is relatively time-intensive. Thus it was not surprising that the consumption of vitamin A was much less for children whose mothers worked. When the mother is unavailable a simpler soup without vegetables is often provided or the child is more likely to be served corn porridge or another staple.[10/]

In order to partial out the effects of food expenditures and home gardening from that of the mother being absent from the home, a model was utilized relating vitamin A to its main components plus other demographic parameters. The results are presented in Table 5. In both ecological zones, the effects of the mother's labor force participation are clearly significant and the relative impact on the quality of the child's diet is similar for each zone.[11/] The sample size was too small to attempt to

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[10/] The frequency of vegetable consumption was lower for children whose mothers work but the differences are not significant. Therefore the size of the portion served is also important.

[11/] The average consumption level of vitamin A in the hinterland barrios is about 2.5 times that in the coastal barrios. The recommended daily allowance of vitamin A is 1000 IU for a 5-year old and 2417 for a 13-year old (Joint FAO/WHO standards).

Table 4. NUTRITIONAL INTAKE ASSOCIATED WITH EMPLOYMENT STATUS OF MOTHER

Ecological Zone	Nutritional Intake				Proportion of recommended daily allowance of vitamin A[a/]
	Calories	Protein (grams)	Iron (grams)	Vitamin A (IU)	
Rural Coastal					
Works outside home	1083	50	7	703	62
Does not work	1433	62	10	1126	95
Rural Hinterland					
Works outside home	1096	46	8	941	60
Does not work	1172	51	9	3251	209

(N = 130)

a/Based on age and sex for each child.

understand the impact of the mother's intensity of employment.

The family composition factors are interesting. In the hinterland zone, the vitamin A intake of children in the 13 plus age group is about 6000 IU above the intake of children in the 7-12 age group. The opposite is found in the coastal barrios although the coastal barrio effect is smaller. The reduction in vitamin A intake as family size increases is a result of the larger family's needs for more staples and the lower prestige and importance attached to the consumption of vegetables.

Discussion

There are numerous examples of the failure of nutrition or health programs related to the household time constraints or some proxy for this such as the distance a household must travel to use a program.[12] Nutritionists

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[12] Desai found that poorer children in India did not participate in feeding schemes because they were home tending younger siblings. Mellor points out that

> "Many of the public programs for health improvement assume available time on the part of the participants. Children must be free to attend activities where feeding is provided; women must be free to grow kitchen gardens to add to vitamin supplies; men must have access to ponds and time to fish to add protein; women must have time to prepare more laborious, but nutrition-conserving foods. All such programs have more potential in families of leisure than families of poverty. Thus unless time, for example through child care centres or foregone income, are provided to the poor, such programs probably to serve to widen rather than to lessen human welfare disparities."

Table 5. REGRESSION: DAILY VITAMIN A INTAKE OF CHILD
(International Units of Vitamin A)

	ECOLOGICAL ZONE	
	RURAL COASTAL (N = 34)	RURAL HINTERLAND (N = 26)
Constant	2260	9261
Male (0-1 dummy)	408 (617)	-3820* (1084)
Age 1-6 (0-1 dummy)	-438 (736)	117 (1105)
Age 13+ (0-1 dummy)	-1292 (1154)	6185* (1592)
Size of household	-96 (182)	-525*** (330)
Value of home garden	144 (395)	377*** (264)
Food expenditures	23 (64)	-66 (143)
Mother does work	-947*** (650)	-3205* (1093)
R^2	.123	.763
F-ratio	0.54	8.72

Standard errors in parentheses:

*Statistically significant at 1% level.
***Statistically significant at 10% level.

are particularly concerned about the decline in breast-feeding in low income nations (Berg). Breast feeding is a very time-intensive activity which requires 2-3 hours on a daily basis of the average Filipino mother's time.[13/] A decline in breast feeding is felt to be associated with large increases in infant mortality and protein-calorie malnutrition (e.g., Berg; Puffer). Time intensive activities such as feeding vegetables to Filipino children or breast feeding are expected to decline as the value of a woman's time increases.

Given the exploratory nature of this work, we would not attempt to suggest policy implications. Rather we only hoped to suggest a need to conduct research to examine these relationships in more depth.

We have shown that one might expect the children of working mothers in rural areas to have a lower health and nutritional status. This would not occur if there are adequate time or goods substitute for the mother's time.

[13/] Part of ongoing research by Popkin and Paqueo on determinants and effects of breast feeding.

Consequently research should concentrate on the goods and social services availability along with the intrahousehold allocation of time. While available data did not allow for analysis of labor market and seasonality questions, these are likely to be crucial and should be incorporated into future research. (Oshima)

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Appendix 1. Ordinary Least Squares Regression

FEMALE LABOR SUPPLY

	RURAL COASTAL	RURAL HINTERLAND
Dependent Variable	Women Work (LFPR's) (0-1) [b]	Women Work (LFPR's) (0-1) [b]
Constant	.41	.45
Wealth	.16**	.05
	(.09)	(.09)
Income of father	.00001	.00003
	(.00002)	(.0002)
Father's education (No. of years)	-.06**	.03
	(-.03)	(.03)
Income quartile 2 [a]	.13	.03
	(.11)	(.10)
Income quartile 3 [a]	.07	-.03
	(.11)	(.11)
Income quartile 4 [a]	-.03	-.16
	(.12)	(.14)
Children aged 0-3 yrs. (No.)	-.07	-.21*
	(.07)	(.07)
Children aged 4-6 yrs. (No.)	.10**	.03
	(.06)	(.05)
Children aged 7-12 yrs. (No.)	-.01	-.06***
	(.05)	(.04)
Children aged 13+ yrs. (No.)	-.08**	-.08*
	(.04)	(.03)
Children aged 0-3 yrs. (No.) if children in the 7-12 age group	.03	.16**
	(.08)	(.07)
Children aged 0-3 yrs. (No.) if children in the 13+ age group	.20*	.12***
	(.08)	(.08)
Mother's education	-.004	-.01
	(.08)	(.08)
R^2	.15	.13
F-ratio	1.91	1.58
Number of cases	152	156

[a]/This income parameter excludes the income of the mother.

Standard errors shown in parentheses:

*Significant at .01 level.

**Significant at .05 level.

***Significant at .10 level.

[b]/The normal statistical test, the t-ratio, may be incorrect with this equation.