



SCHOOL OF ECONOMICS AND FINANCE

Discussion Paper 2007-06

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their Nutritional Implications**

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ISSN 1443-8593

ISBN 978-1-86295-429-8

**CHANGES IN INDONESIAN FOOD CONSUMPTION PATTERNS AND
THEIR NUTRITIONAL IMPLICATIONS^a**

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November 2007

^a Financial support for this study, provided by a Discovery Grant from the Australian Research Council, is gratefully acknowledged.

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Abstract

This study examines changes in Indonesian food consumption during 1996-2002 which included the period of the Asian financial crisis in late 1997/98. This paper analyses the nutritional implications of the changes in terms of the level and composition of calorie intake and the prevalence of undernourishment. The analysis reveals a divergence, during this period, between the magnitude and the movement of the undernourishment and food expenditure poverty rates. The results reveal a sharp divide between rural and urban households, and between calorie-deprived and calorie-satisfied households. While this period witnessed significant improvement in calorie intake, the dietary changes do not appear to have been large enough to address the issue of protein deficiency in the Indonesian diet. The results point to the need for policy interventions and information campaigns to ensure an increase in both the quantity and quality of the calorie intake.

KEYWORDS: Undernourishment, Calorie Shares, Processed Food, Kernel Density Plot.
JEL classification: I30, I32, O10, O16.
UTAS ePrints classification: 340200.

INTRODUCTION

As the most populous nation in Southeast Asia, and located in a region that witnessed rapid economic growth, Indonesia has occupied a position of considerable political and economic significance. As Hill (1996)'s authoritative study shows, Indonesia has made rapid economic progress in the decades since the early 1960s when it was characterised as a 'chronic economic dropout' to emerge as 'one of the developing world's major socio-economic transformations' [Hill (1996)]. While the mid-1960s marked a period of turbulence for Indonesia, another major roadblock to her economic progress was set up by the Asian financial crisis in late 1997. During the Asian financial crisis Indonesia was affected more severely than most other countries in the region. This has led to studies on the effect of the Asian financial crisis on Indonesian living standards [see, for example, Strauss, et.al. (2004)]. There is general consensus that the 1997 Asian financial crisis caused a setback to Indonesia's impressive record on poverty reduction in the period till then. As Maksum (2004, Table 1) reports, the number and percentage of poor people increased sharply in both rural and urban areas between 1996 and 1999. Although the proportion of poor people declined thereafter, the poverty rates and poverty numbers in 2002 were higher than in 1996.

Much of the published evidence on the effects of the Asian financial crisis on Indonesian living standards has been in terms of the expenditure or income based poverty measures. However, as Sen (1999, p. 87) argues, 'poverty must be seen as the deprivation of basic capabilities rather than merely as lowness of incomes, which is the standard criterion of identification of poverty'. Strong empirical support for such a shift in emphasis to a more encompassing approach has been provided by the Vietnamese evidence presented in Baulch and Masset (2003) which shows that monetary and non-monetary indicators do not always tell the same story. This is consistent with the Indian evidence presented in Ray and Lancaster (2005) and Ray (2007).

The present study extends the focus of the investigations on the effect of the Asian financial crisis on Indonesian living standards by providing evidence on changes in dietary practices, calorie intake and a calorie-based measure of undernourishment. In countries such as India, Indonesia and Vietnam, the poverty line was originally rooted in the idea of a minimum calorie requirement necessary for human survival. This points to a link between the prevalence of undernourishment (POU) and expenditure-based poverty (POV). However, as the Indian evidence presented in Ray and Lancaster (2005) and the Vietnamese evidence presented in Mishra and Ray (2007) show, this link has weakened considerably with the calorie price inflation diverging from cost of living indices which guide poverty line adjustments over time. This is due to changing food preferences and supply side factors. Consequently, the picture on undernourishment may be at variance with that on poverty, thus, providing the motivation for this study. The empirical evidence is presented both at regional levels and separately for rural and urban areas. The regional differences, that the present study draws attention to, highlight the need to devise specific regional initiatives to improve nutrient intake and reduce undernourishment.

The rest of the paper is organized as follows: Section 2 compares the food expenditure pattern between 1996 and 2002, and provides evidence on the key determinants of the changes during this period. Section 3 extends the investigation to calorie intake levels and reports on changes in the prevalence of undernourishment during 1996-2002. Section 4 reports the calorie composition, by food source, of the Indonesian diet, changes in that composition during our sample period, and some of the key determinants of the change. The paper ends on the concluding note of Section 5.

DATA SOURCE AND FOOD EXPENDITURE PATTERN

The present study is based on the 1996 and 2002 National Socioeconomic Survey (SUSENAS) datasets. SUSENAS is a series of large-scale multi-purpose socioeconomic surveys in Indonesia that were initiated in 1963-64 and fielded every year or two since then¹. Since 1993, SUSENAS surveys cover a nationally representative sample typically composed of 200,000 households. Each survey contains a core questionnaire which consists of a household roster listing the sex, age, marital status, and educational attainment of all household members, supplemented by modules covering about 60,000 households that are rotated over time to collect additional information such as health care and nutrition, among other variables. The choice of the 1996 and 2002 SUSENAS datasets was guided by the fact that 1996-2002 included the period of the Asian financial crisis, and allows us to study the effects of that crisis. The present investigation extends the analysis in Strauss, et al. (2004), which was based on the Indonesian Family Life Survey (IFLS) data and covered a shorter time interval (1997-2000). Note, also that, unlike SUSENAS, the IFLS is not national in scope, and there are several other key differences in sample design, questionnaires, to mention a few, between these alternative data sets.²

Table 1 defines the eight regions into which the whole of Indonesia was subdivided for the purpose of this study. It shows the provincial constituents of each region. A key consideration in deciding on this regional classification was the need to have a balanced breakdown of the total number of households across the eight regions. This meant that while the larger provinces such as Jawa Barat, DI Yogyakarta and Jawa Timur constituted regions themselves, the other regions were obtained by combining the smaller provinces. Table 2 shows the regional movement, disaggregated between the rural and urban areas, in the mean expenditure share of food between 1996 and 2002. The rural/urban difference is quite

¹ See Timmer and Alderman (1979), Pitt and Rosenzweig (1985), Van de Walle (1988) for previous analysis of Indonesian food consumption on SUSENAS data sets.

² See Strauss, et.al. (2004, pp. 10-12) for a comparison of the IFLS and SUSENAS data sets.

noticeable with the expenditure share of food decreasing sharply in the rural areas, in contrast to a modest increase in the urban.

A possible explanation for this lies in Table 3 which presents, in the top half, the per capita monthly consumption (in kg) of the major food items and, in the lower half, the expenditure share of all the food items in the total spending on food. There was a sharp increase in the consumption of rice in the urban areas in contrast to a marginal decline in the rural. This is reflected in reverse movements, over 1996-2002, in the share of rice in total food expenditure. Since rice is an inexpensive source of calories, this has nutritional implications that are discussed later. The share of spending on food items prepared from outside in total food expenditure increased sharply in the rural areas, consistent with the Vietnamese experience reported in Mishra and Ray (2007), but declined, almost as sharply, in the urban areas. There was an all round increase in the consumption of vegetables, fruits, meat and fish, with the increase in meat consumption being much larger in the rural areas. Since, as noted by Hill (1996, p. 199) and others, households' intake of animal based protein is low, the increase in meat consumption is quite significant in Indonesia. It helps to address the issue of micronutrient deficiency in the Indonesian diet that is associated with unbalanced food intakes and has been identified by Atmarita (2005) as contributing to an "emerging significant public health problem". Note, however, that in expenditure share terms, there was no evidence of the large shift from fish to meat and dairy products that has been predicted by Fabiosa (2005). On the contrary, Table 3 shows that dairy consumption has not matched the increase in consumption of items such as vegetables and fish and, consequently, there was a sharp decline in the expenditure share of dairy products over this period. The historically low consumption levels of dairy items in Indonesia³ and the sharp decline, especially in the urban areas, in their share of food spending, is a result of significant policy concern, since

³ To appreciate the low consumption of dairy products in Indonesia, note that in India [Ray (2007)] in 2002, the per capita (in kg) monthly dairy consumption was 3.94 (rural), 5.25 (urban), in contrast to 0.77 (rural), 0.25 (urban) in Indonesia.

inadequate intake of dairy products could be contributing to low -birth weight babies and maternal malnutrition that, according to Atmarita (2005), continue to pose significant challenges for the majority of the Indonesian population, especially for the poor. Table 4 provides additional insights into the changes in food consumption during 1996-2002 by reporting the results for only the subset of households who were unable to meet their minimum daily calorie requirement of 2100 kcals. A comparison with Table 3 shows that the divide between the calorie deprived households and the rest of the population is much sharper in the urban areas than in the rural. In addition, Table 4 shows that the increase in the consumption of the principal cereal items, rice and wheat, was much more modest for the urban, calorie-deprived households and, consequently, their share of spending in the total food outlay declined sharply, in line with the movement in the rural areas. Also, the dairy consumption of the urban, calorie deprived households fell sharply to insignificant amounts, unlike the other households. However, in an encouraging result, Table 4 also shows that the consumption of meat and fish rose appreciably for the calorie-deprived households, in rural and urban areas, consistent with the picture for the Indonesian population as a whole. A point of similarity between the rural and urban calorie-deprived households, that is apparent from Table 4, is that the expenditure share of processed foods; that is, meals prepared outside the home, increased sharply over this period. Atmarita (2005), who reported a similar result, suggests that two significant health problems in Indonesia; namely, obesity and overweight, could be associated with the increased reliance on processed food.

Table 5 reports the results of regressing the expenditure shares of the major items of food spending on a selection of households characteristics using SUSENAS 2002 data. To allow for greater flexibility in the expenditure response, we use an extension of the Working-

Leser functional form by including both log per capita⁴ total food expenditure and its square as regressors. The coefficients of the latter are highly significant in most cases pointing to non-monotonicity in the relationship between expenditure share of a food item and total food expenditure of the household. Table 5 confirms that, *ceteris paribus*, with an increase in household affluence, there is a switch from the major cereal items to Meat and Fish. The fact that this did not occur everywhere in Indonesia is due to the moderating influences of other household characteristics, most of which were also significant. Urban households spend a marginally larger share of their food outlay on rice but sharply lower shares on meat, fish and dairy products. Female-headed households rely more on cereals and dairy products and less on processed foods. The ethnic dummy coefficient is significant in all eight regions, thus, suggesting differences in dietary habits between the majority Javanese community and the other ethnic groups.

CALORIE CONSUMPTION AND UNDERNOURISHMENT

The median per capita daily consumption of calories in the various regions of Indonesia are presented in the top half of Table 6, while the lower half of that table presents the corresponding calorie consumption figures for households who are unable to meet the minimum daily calorie requirements of 2100 kcals. Notwithstanding the Asian financial crisis in 1997/98, there was a large and all round improvement in calorie consumption during this period. The improvement was of a larger order of magnitude in the urban areas than in the rural. Note, also, that the unevenness in calorie consumption between the regions in 1996 gave way to a more even spread and a balanced picture in 2002. This is possibly due to the effects of the *Impres Desa Tertinggal* (IDT) program during 1993-96 that, according to Akita and Szeto (2000, p.167), ‘appears to have been successful in improving the economic

⁴ As with the rest of the paper, we use equivalence scales, rather than unweighted household size, as the expenditure, quantity and calorie deflator to incorporate adult child differences in needs and consumption.

conditions of the poorer households and in reducing the overall level of inequality'. In each region, and for Indonesia as a whole, the rural households recorded higher calorie intake than the urban households at the start of our sample period, but the situation has reversed itself in the new millennium. The lower half of Table 6 shows that the improvement in calorie consumption extended to the calorie deprived households. It is worth noting that, by 2002, the calorie-deprived households recorded calorie consumption levels that were sharply higher than those recorded for all the households in 1996, that is, before the Asian financial crisis. The improvement in calorie consumption between 1996 and 2002 is also evident from Figures 1 and 2. Figure 1 provides the kernel density plots for the rural sector, from the SUSENAS 1996 and 2002 datasets. Figure 2 provides a comparison of kernel density plots for the urban sector over the two SUSENAS survey periods. There has been a rightward movement in the kernel density plots in both sectors, with the shift being more marked in the urban areas, consistent with the calorie consumption figures presented in Table 6. The density plots, also, suggest that the area under these curves that lies to the left of the 2100 kcals daily calorie requirement, which is used as the cut off point in calculating the poverty line in Indonesia, has decreased between 1996 and 2002.

This is confirmed by Table 7 which reports the POU rates, i.e. the proportion of households who are unable to meet the daily calorie requirement of 2100 kcals. There were impressive declines in the POU rates in all regions across Indonesia, with the urban areas recording proportionately larger reductions in the prevalence of undernourishment. The POU rates tended to converge across regions, consistent with our earlier observation on reduced regional disparity in calorie intake, possibly due to the IDT program.

Table 8 reports the expenditure based food poverty rates (POV) for each region. The food poverty line, calculated separately for each region, is defined as the median per capita household expenditure of all households in that region with per capita intake in the range of

2000 kcals to 2200 kcals. A household is defined to be “food expenditure poor” if the household’s per capita food expenditure is less than the relevant regional food poverty line. A comparison of POV with the undernourishment rates (POU) in Table 7 shows that the two sets of rural results are comparable in both magnitude and trend, even though they are at variance with the rural poverty rates reported in Maksum (2004, Table 1) which show an increase in rural poverty between 1996 and 2002. However, the urban food poverty rates in Table 8 are completely out of line with the urban POU rates in Table 7. The urban rates of undernourishment generally exceeded the corresponding food expenditure poverty rates before the crisis, but the situation reversed itself drastically in the new millennium. In other words, the picture on urban undernourishment was better than that on food expenditure poverty. A possible explanation lies in the fact that, through the crisis and beyond, the urban households met their calorie requirement and even increased their calorie intake by increasing their consumption of cereals, especially rice, which is an inexpensive calorie source, at the expense of qualitatively and nutritionally superior items such as vegetables, fruits and animal products. Hence, on the basis of time- and quantity-invariant calorie requirements, in 2002 the picture on urban expenditure looks far worse than that on undernourishment. If, however, one incorporates the trade-off between quality and quantity of cereals in setting the calorie requirements for a household, then the picture on the urban undernourishment in Indonesia would appear to be a lot worse than currently appears. Such an exercise, which has, also, been suggested by the Indian evidence presented in Ray and Lancaster (2005) and Ray (2007) is outside the scope of this study.

Further evidence on the reduction in undernourishment during 1996-2002 is contained in Table 9 which presents the POU rates across four expenditure percentiles. This table suggests that, while all the expenditure percentiles recorded reductions in the POU rates, the progress was uneven, varying from a spectacularly large reduction in case of the upper

expenditure percentiles in the urban areas to modest improvements in case of the lower expenditure percentiles in the rural areas. It is a matter of some concern that the reduction in the prevalence of undernourishment between 1996 and 2002 has been much less impressive for the bottom 10% of households in the expenditure distribution. Even in the new millennium, and well after the Asian financial crisis has ended, over half the households in the bottom expenditure percentile still suffer from hunger or undernourishment in both the rural and the urban areas.

CALORIE COMPOSITION AND ITS DETERMINANTS

The above discussion is somewhat restrictive in concentrating exclusively on the quantity of calories without taking account of the quality of the calories consumed. A diet that relies more on cereal items, which are inexpensive calorie sources, and less on animal products such as fish and meat that supply protein and other nutrients, is likely to produce qualitatively inferior calories than those obtained from a more balanced diet. Table 10 throws some light on this issue by reporting the calorie composition of the Indonesian diet between the various items of food spending disaggregated by rural/urban sectors and, separately, for calorie-deprived (that is, those consuming less than 2100 kcals per capita per day) and calorie-satisfied households (those consuming greater than 2100 kcals per capita per day). There has been a diversification of calorie source during the period, 1996-2002. The dominant role of rice as a calorie source declined for all household types. While there was a significant increase in the calorie share of vegetables, the increase in case of meat and fish was much more marginal. The calorie share of fruits declined for both types of households. The move towards a more diversified calorie source has been much greater for the calorie satisfied than the calorie deprived households. In case of the calorie-deprived, urban households, for example, there was hardly any increase in the calorie shares of the animal

products, namely, meat and fish and, more worryingly, a reduction in the calorie share of dairy products. Though an improvement over 1996, in 2002 the calorie deprived households continued to obtain their nutrients from an unbalanced diet which relied heavily on rice as a calorie source, with well over half the total calorie intake coming from rice alone. The nutrition problems in Indonesia, identified by Atmarita (2005), largely stem from households' reliance on rice as the only or major source of calorie intake. While 1996-2002 did witness a reduction in the calorie share of rice in the diet of the calorie-deprived households, the switch was overwhelmingly towards processed food prepared outside the home, and much less in favour of protein rich items such as meat, fish and dairy products. This switch has resulted in problems of obesity and overweight. Ironically, therefore, for several households, one could have moved from too few calories in 1996 to too many, and of the inferior type, in 2002. There is clearly scope for policy interventions in Indonesia of the sort that has been quite effective in Vietnam [Hop (2003)]. As the Vietnamese experience over a similar period demonstrated, it is possible to secure increase in calorie intake along with an improvement in the quality of the calories that is derived from a more diversified diet.

The above discussion raises the question: what are the principal determinants of the calorie shares and of the calorie intake level in the Indonesian household? Tables 11 and 12 provide evidence on this issue by reporting, respectively, the estimates from the instrumental variable (IV) and joint estimation of calorie shares of a five-item classification and the log of per capita calorie consumption on a selection of household characteristics including per capita food expenditure as a regressor. The latter regressor was instrumented to tackle potential endogeneity. An increase in the outlay on food consumption leads to a significant reduction in the calorie share of rice and increase in the calorie share of the composite items, fish, meat and dairy products, and, also, in that of alcohol, processed food and other items. The urban household relies more on the principal cereal items, rice and wheat, as a calorie

source, and less on fish, meat and dairy products than the rural household. The diet of the majority Javanese ethnic community is less reliant on rice and wheat as a calorie source, and more reliant on fish, meat and dairy products in relation to the other ethnic groups⁵. The sensitivity of calorie intake to household income or expenditure has attracted considerable attention in the literature [Bouis and Haddad (1992), Skoufias (2003)]. Table 12 provides Indonesian evidence on this issue by confirming that rising household affluence does lead to increased calorie consumption. The estimated coefficient of the log of the per capita food expenditure variable suggests a calorie expenditure elasticity of 0.30 which is in line with the range of elasticity estimates reported by Skoufias (2003, Table 4) for the various regions in Indonesia based on the 1996 and 1999 SUSENAS datasets. Table 12 shows that there are strong regional effects in calorie consumption, and that urban households and female-headed households enjoy superior calorie consumption levels compared to rural households and male-headed households, respectively. However, since the urban household is more reliant on rice as a calorie source at the expense of meat, fish and dairy products, as seen from Table 11, this suggests that urbanisation leads to the consumption of more calories but qualitatively inferior ones. This is clearly an area that requires policy intervention and information campaign to ensure a move towards a more balanced diet, with a greater role for fruits, vegetables, fish, meat and dairy products in providing a richer array of nutrients than is currently the case.

SUMMARY AND CONCLUSION

The Asian financial crisis in 1997 caused a temporary setback to Indonesia's progress on poverty reduction. The official statistics registered an increase in poverty rates during 1996-1999 and, though the published poverty rates showed a decline subsequently, the period 1996-2002 recorded a rise in poverty. The present study uses SUSENAS datasets to investigate

⁵ Note the parallel between these results and those on food expenditure shares (Table 5) discussed in Section 2.

whether this picture extends to the consumption of food grains in Indonesia and its nutritional implications in terms of calorie intake. An alternative definition of poverty line is employed to study the movement in the food expenditure poverty rates and a comparison made with the rate of undernourishment. While the poverty rates calculated in this study showed an increase in urban food poverty during 1996-2002, similar to the official poverty statistics, the rural food poverty rates registered a decline unlike those recorded in the published rural poverty rates.

There was a marked divergence between the magnitude and trends in undernourishment and in the conventional poverty rates in most regions during 1996-2002. Notwithstanding the Asian financial crisis in 1997/98, the period 1996-2002 registered an improvement in living standards as seen from an increase in the consumption of food grains, in calorie intake and, consequently, a reduction in the calorie-based rate of undernourishment. However, closer inspection reveals that this was achieved mainly by a large increase in the consumption of rice, especially in the urban areas, without a similar increase in non-cereals such as meat, fish and dairy products. This is particularly true of urban households who are unable to meet their daily calorie requirements. A sharp divide between the calorie-deprived and calorie-satisfied households in Indonesia with respect to their food consumption, calorie intake and calorie composition by food source is one of the features of the period, 1996-2002, that emerges from this study. Our analysis also reveals several examples of rural urban differences in the pattern of food consumption and in the movements in calorie intake and calorie composition by food source between the two sectors.

The relatively low levels of protein intake have been a feature of Indonesian diets. The period, 1996-2002, witnessed a distinct improvement in this picture due to increase in the consumption of fish and meat. The consumption of several non cereal items increased, and the dominant role of rice as a provider of cheap calories declined in favour of a more diversified diet. However, Indonesia does not appear to have replicated the success of

Vietnam in increasing the calorie share of meat and fish and in diversifying her diet to the same extent. The fact that much of the impressive increase in calorie consumption in Indonesia during 1996-2002 has come from rice, processed food, and drinks, rather than fruits, vegetables and meat, suggests that the deficiency in several micronutrients that has been identified as leading to chronic diseases continues to prevail even in the new millennium. The results of this study suggest that the country may have moved from a state of too few calories to too many without achieving a more balanced intake of micronutrients. There is scope and need for policy interventions, via price subsidies and information campaign, in order to ensure an increase in both the quality and the quantity of the cereal intake. Lessons can be drawn from how the Vietnamese have done so successfully over a comparable period.

Table 1: Definition of Regions as used in this Study

Region	Proportion (%) of Households Residing there		Provinces constituting the Region
	1996	2002	
1	14.46	11.42	Dista Ache, Sumatera Utara, Sumatera Barat, Riau, Jambi
2	12.87	17.90	Sumatera Selatan, Bengkulu, Lampung, DKI Jakarta
3	12.94	10.78	Jawa Barat
4	11.92	11.45	Jawa Tengah, Bali, Nusa Tenggara Barat, Nusa Tenggara Timur
5	12.82	16.20	DI Yogyakarta
6	13.93	13.38	Jawa Timur
7	10.41	9.02	Timor Timur, Kalimantan Barat, Kalimantan Tengah, Kalimantan Selatan, Kalimantan Timur
8	10.65	9.85	Sulawesi Utara, Sulawesi Tengah, Sulawesi Selatan, Sulawesi Tenggara, Maluku, Irian Jaya

Table 2: Mean Expenditure Share (%) of Food

Region	Rural		Urban	
	1996	2002	1996	2002
Region 1	76.15	62.96	65.86	72.61
Region 2	74.94	52.21	57.41	71.39
Region 3	70.59	59.07	59.91	67.55
Region 4	70.03	60.11	64.31	65.96
Region 5	71.03	57.41	62.48	68.69
Region 6	71.30	60.08	63.96	65.89
Region 7	75.93	60.62	65.00	73.80
Region 8	72.40	60.70	63.39	70.07
Overall	72.68	57.58	62.37	69.38

Source: Authors' Calculations.

Table 3: Per Capita Consumption (kg/month) of Food Items and their Share of Food Expenditure

Food Item	Per Capita Consumption			
	Rural		Urban	
	1996	2002	1996	2002
Rice	9.69	9.21	7.73	11.56
Wheat	1.60	4.24	0.89	2.33
Other Cereals	0.07	0.15	0.10	0.76
Vegetables	5.30	17.75	6.68	16.15
Fruits	1.79	3.46	1.92	2.93
Meat	0.67	3.89	0.85	2.74
Fish	1.12	4.84	1.21	5.26
Dairy Products	0.11	0.77	0.27	0.25
Food Item	Food Share of Total Expenditure (%)			
	1996	2002	1996	2002
Rice	21.24	16.16	13.72	25.16
Wheat	6.04	1.85	5.93	1.47
Other Cereals	7.01	0.19	11.40	1.02
Vegetables	12.76	11.56	12.56	13.13
Fruits	6.21	4.64	5.06	3.63
Meat	4.06	8.12	6.17	5.22
Fish	6.76	8.52	8.03	9.04
Dairy Products	7.45	2.65	7.28	0.91
Alcoholic Beverages	3.37	4.23	2.71	5.32
Prepared Meals, Processed Food, etc.	13.13	19.76	17.48	9.21
Other Items	11.97	22.32	9.66	25.89

Source: Authors' Calculations.

Table 4: Per Capita Consumption (kg/month) of Food Items and their Share of Food Expenditure for Calorie Deprived Households

Food Item	Per Capita Consumption			
	Rural		Urban	
	1996	2002	1996	2002
Rice	9.34	9.21	7.52	10.53
Wheat	1.53	2.02	0.91	1.14
Other Cereals	0.04	0.17	0.13	1.04
Vegetables	4.38	13.97	7.69	13.68
Fruits	1.35	1.69	2.36	1.88
Meat	0.39	1.93	1.12	1.78
Fish	0.82	3.29	1.42	3.90
Dairy Products	0.05	0.21	0.37	0.09
Food Item	Food Share of Total Expenditure (%)			
	1996	2002	1996	2002
Rice	24.26	9.21	19.46	10.53
Wheat	5.92	2.02	5.84	1.41
Other Cereals	6.48	0.17	8.71	1.04
Vegetables	13.15	13.97	13.86	13.68
Fruits	6.34	1.69	5.59	1.88
Meat	3.30	1.93	4.85	1.78
Fish	5.61	3.29	6.64	3.90
Dairy Products	7.68	0.21	7.61	0.09
Alcoholic Beverages	3.54	10.86	3.02	11.21
Prepared Meals, Processed Food, etc.	11.44	24.73	13.79	17.79
Other Items	12.28	31.92	10.63	36.69

Source: Authors' Calculations.

Table 5: OLS Estimates^{(a), (b)} of the Budget Share (in %) Equation of the Major Items of Food Spending^(c)

Variables	Food Spending Category ^(d)					
	Rice	Vegetables	Meat	Fish	Dairy Products	Meat Consumed outside home, processed food, etc.
Log of per capita food expenditure	-75.38 (0.00)	-6.49 (0.00)	36.98 (0.00)	32.62 (0.00)	-4.55 (0.00)	-27.13 (0.00)
(Log of per capita food expenditure) ²	2.49 (0.00)	0.05 (0.49)	-1.43 (0.00)	-1.39 (0.00)	0.26 (0.00)	1.42 (0.00)
Regional Dummies^(e)						
Region 2	-2.16 (0.00)	-0.47 (0.00)	0.46 (0.00)	-3.46 (0.00)	0.44 (0.00)	4.13 (0.00)
Region 3	0.64 (0.00)	-2.65 (0.00)	1.18 (0.00)	-5.32 (0.00)	0.40 (0.00)	4.02 (0.00)
Region 4	-3.41 (0.00)	-1.06 (0.00)	0.33 (0.00)	-6.27 (0.00)	0.28 (0.00)	6.83 (0.00)
Region 5	-0.86 (0.00)	-0.53 (0.00)	1.82 (0.00)	-5.83 (0.00)	0.39 (0.00)	4.87 (0.00)
Region 6	-3.57 (0.00)	-1.61 (0.00)	0.22 (0.04)	-4.63 (0.00)	0.43 (0.00)	4.34 (0.00)
Region 7	-2.82 (0.14)	-2.79 (0.00)	1.13 (0.00)	1.23 (0.00)	0.37 (0.00)	1.11 (0.00)
Region 8	-4.45 (0.00)	-3.03 (0.00)	-1.22 (0.00)	3.00 (0.00)	0.72 (0.00)	-0.08 (0.72)
Ethnic Dummy						
Jawanes	-2.29 (0.00)	1.81 (0.00)	0.48 (0.00)	-2.30 (0.00)	0.50 (0.00)	2.05 (0.00)
Household Characteristics						
Female headed household	0.72 (0.00)	2.92 (0.00)	2.32 (0.00)	2.06 (0.00)	0.92 (0.00)	-2.27 (0.00)
No. of adults	0.49 (0.00)	-0.42 (0.00)	0.17 (0.00)	-0.01 (0.63)	-0.01 (0.27)	-0.38 (0.00)
No. of children	0.13 (0.02)	-0.45 (0.00)	0.02 (0.64)	-0.29 (0.00)	1.61 (0.00)	-0.70 (0.00)
Married Dummy	0.87 (0.00)	2.43 (0.00)	2.29 (0.00)	1.64 (0.00)	0.82 (0.00)	-9.02 (0.00)
Urban Dummy	3.64 (0.00)	-0.11 (0.03)	-1.91 (0.00)	-0.69 (0.00)	-1.17 (0.00)	-7.15 (0.00)
R ²	0.53	0.23	0.11	0.28	0.13	0.24

(a) Data set: SUSENAS, 2002

(b) Number of observations = 64422

(c) p-values in parentheses

(d) These spending categories do not exhaust total food expenditure; the smaller categories are not reported for space reasons.

(e) Region 1 is the omitted region

**Table 6: Median Kilo Calories Consumed (per capita per day)
by Various Population Groups^(a)**

All Households				
Region	Rural		Urban	
	1996	2002	1996	2002
Region 1	2144.55	2540.69	1621.70	2712.70
Region 2	1766.10	2458.51	1323.04	2552.44
Region 3	1584.16	2468.43	1343.86	2584.08
Region 4	1433.08	2327.77	1259.04	2331.26
Region 5	1746.89	2485.55	1438.47	2599.32
Region 6	1455.23	2317.44	1280.05	2315.24
Region 7	1766.21	2505.37	1397.42	2661.29
Region 8	2065.62	2603.08	1760.77	2578.45
Overall	1703.70	2451.24	1405.25	2530.53
Calorie Deprived Households^(b)				
Region	Rural		Urban	
	1996	2002	1996	2002
Region 1	1647.50	1830.53	1475.97	1871.79
Region 2	1550.54	1819.27	1260.46	1869.37
Region 3	1471.99	1796.47	1295.03	1826.00
Region 4	1376.15	1838.90	1235.14	1850.70
Region 5	1535.25	1841.20	1327.80	1843.82
Region 6	1392.76	1833.66	1251.58	1844.04
Region 7	1556.30	1847.53	1334.27	1816.95
Region 8	1624.13	1831.49	1498.63	1864.67
Overall	1492.86	1821.60	1320.99	1850.33

(a) Source: Authors' Calculations.

(b) A 'calorie-deprived household' is one which is unable to meet the minimum per capita daily calorie requirement of 2100 kcals.

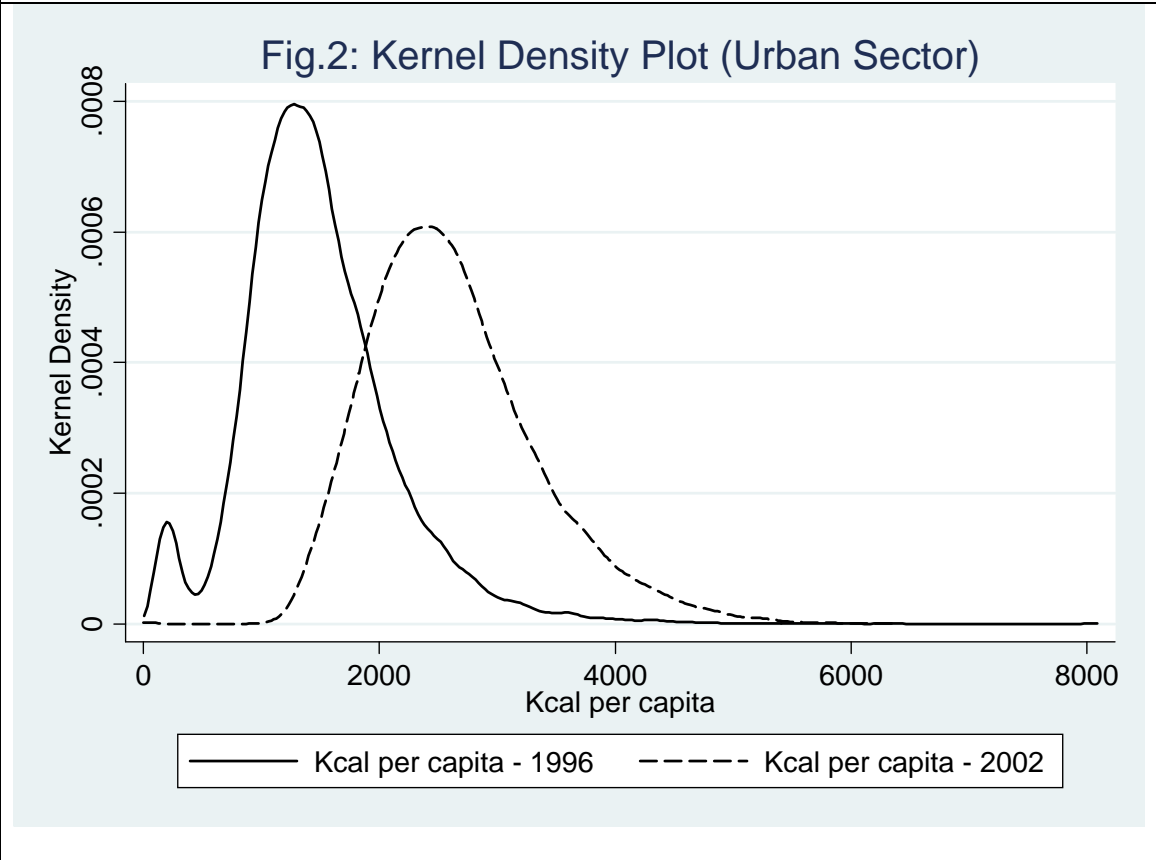
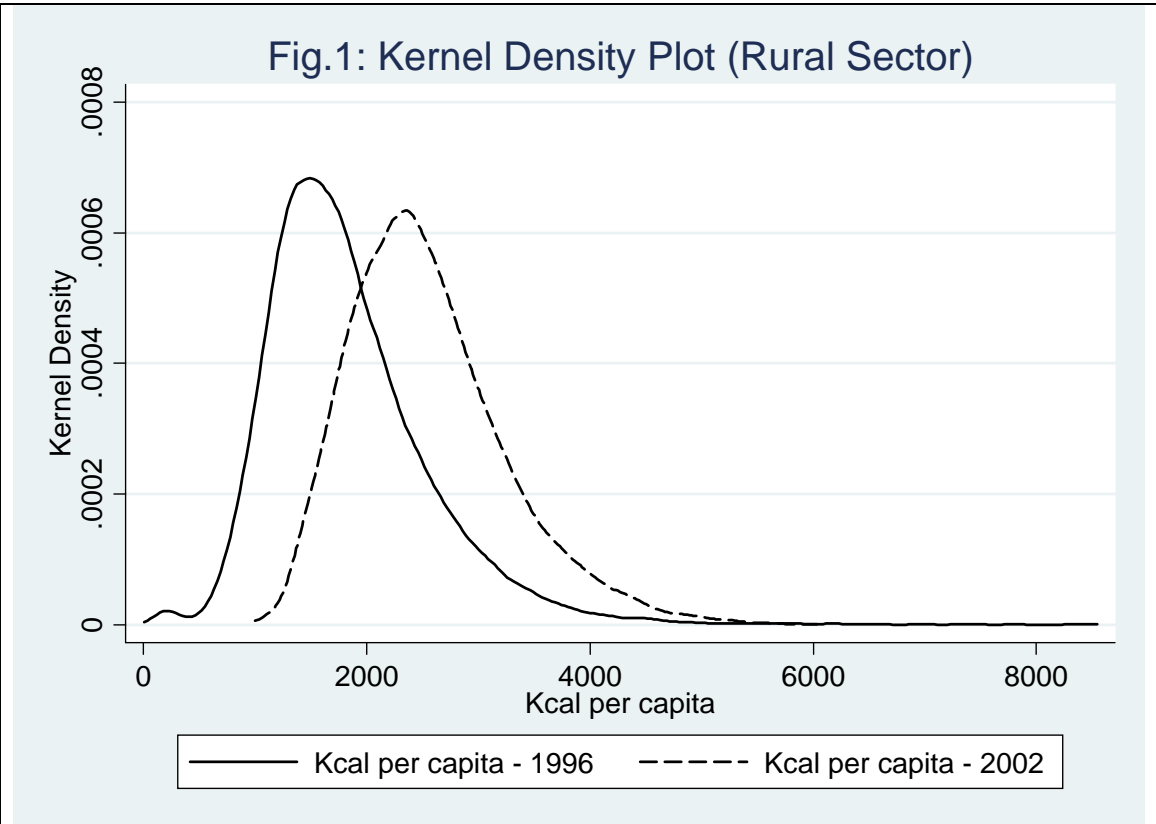


Table 7: The Percentage of Households that are Undernourished: POU Rates

Based on (Actual Calories<Required Calories) Criterion				
Region	Rural		Urban	
	1996	2002	1996	2002
Region 1	47.69	23.55	78.25	15.83
Region 2	69.79	27.82	89.22	23.68
Region 3	81.14	27.61	92.18	22.67
Region 4	89.57	34.03	94.96	32.38
Region 5	71.07	27.37	85.09	21.37
Region 6	88.27	34.45	94.00	33.68
Region 7	69.74	25.93	87.91	19.31
Region 8	51.74	20.06	68.19	23.87
Overall	71.56	28.19	86.38	24.22

Source: Authors' Calculations.

Table 8: The Percentage of Households that are Food Expenditure Poor^(a): POV Rates^(b)

Region	Rural		Urban	
	1996	2002	1996	2002
Region 1	45.83	13.47	32.40	26.10
Region 2	64.03	10.61	25.94	50.40
Region 3	64.23	21.80	46.73	41.07
Region 4	77.73	36.03	58.43	61.00
Region 5	68.47	24.60	44.03	54.59
Region 6	75.93	31.44	50.46	59.83
Region 7	55.25	12.05	22.99	28.40
Region 8	63.06	21.29	41.44	47.99
Overall	64.31	20.51	39.45	47.06

(a) A household is "food expenditure poor" if its per capita food expenditure is less than the food poverty line.

(b) Source: Authors' Calculations.

Table 9: Percentage of Undernourished Households in various Expenditure Percentiles^(a)

Expenditure Class	Rural		Urban	
	1996	2002	1996	2002
Bottom 10%	86.24	79.95	95.38	59.16
Middle 40%	67.61	32.69	88.03	12.72
Upper Middle 40%	57.51	19.72	83.60	5.99
Top 10%	54.25	15.07	81.41	6.30

(a) Source: Authors' Calculations

Table 10: Share (%) of Calories from Various Food Items^(a)

	Calorie Deprived Households ^(b)			
	Rural		Urban	
	1996	2002	1996	2002
Rice	69.48	53.75	71.12	55.53
Wheat	8.40	1.57	5.58	1.58
Other Cereals	0.30	0.51	0.36	3.61
Vegetables	2.26	7.81	2.91	8.91
Fruits	5.35	1.45	6.18	1.68
Meat	0.36	2.19	0.63	1.14
Fish	0.98	2.37	1.33	2.39
Dairy Products	0.15	0.54	0.35	0.18
Alcoholic Beverages	0.08	6.23	0.08	5.84
Other Items	11.77	13.60	9.84	13.09
Eating Out	0.87	9.97	1.64	6.04
	Calorie Satisfied Households ^(b)			
	1996		1996	2002
Rice	61.47	40.89	57.83	51.21
Wheat	7.08	2.75	4.67	1.91
Other Cereals	0.62	0.17	0.78	1.04
Vegetables	2.96	6.93	3.99	7.93
Fruits	7.20	2.23	8.31	2.37
Meat	1.11	4.43	1.99	2.55
Fish	1.73	3.12	2.11	3.31
Dairy Products	0.52	1.86	1.29	0.65
Alcoholic Beverages	0.08	6.64	0.11	6.63
Other Items	14.88	14.14	11.11	13.87
Eating Out	2.34	16.81	7.81	8.52

(a) Source: Authors' Calculations.

(b) A 'calorie-deprived household' is one which cannot meet the per capita daily calorie requirement of 2100 kcals, while a 'calorie satisfied' household is one which can.

Table 11: IV Regressions^(a): Calorie Shares^(b),^(c)

Food Spending Category^(d)					
Variables	Rice	Wheat and Other Cereals	Fruits and Vegetables	Fish, Meat and Dairy	Alcoholic Beverages, Processed Food, Other Items
Log of per capita food expenditure	-18.15 (0.00)	0.03 (0.16)	0.77 (0.00)	8.53 (0.00)	8.82 (0.00)
Regional Dummies^(e)					
Region 2	-5.13 (0.00)	1.85 (0.00)	0.87 (0.00)	0.51 (0.00)	1.91 (0.00)
Region 3	-1.62 (0.00)	0.79 (0.00)	0.71 (0.00)	0.66 (0.00)	-0.54 (0.00)
Region 4	-9.91 (0.00)	2.81 (0.00)	2.76 (0.00)	0.75 (0.00)	3.59 (0.00)
Region 5	-6.76 (0.00)	2.75 (0.00)	2.26 (0.00)	0.51 (0.00)	1.23 (0.00)
Region 6	-9.75 (0.00)	4.29 (0.00)	2.61 (0.00)	1.23 (0.00)	1.62 (0.00)
Region 7	-3.21 (0.14)	1.44 (0.00)	0.18 (0.12)	1.23 (0.00)	0.37 (0.07)
Region 8	-7.37 (0.00)	3.21 (0.00)	2.00 (0.00)	2.28 (0.00)	-0.12 (0.56)
Ethnic Dummy					
Jawanese	-4.92 (0.00)	-0.55 (0.00)	1.33 (0.00)	0.21 (0.00)	3.93 (0.00)
Female headed household	-0.35 (0.22)	-0.28 (0.05)	1.62 (0.00)	3.34 (0.00)	-4.33 (0.00)
No. of adults	1.09 (0.00)	0.10 (0.00)	-0.11 (0.00)	0.33 (0.00)	-1.41 (0.00)
No. of children	0.32 (0.00)	0.21 (0.00)	-0.12 (0.01)	0.82 (0.00)	-1.24 (0.00)
Married Dummy	4.35 (0.00)	-0.26 (0.04)	1.80 (0.00)	2.77 (0.00)	-8.67 (0.00)
Urban Dummy	3.02 (0.00)	1.14 (0.00)	1.47 (0.00)	-0.44 (0.00)	-5.19 (0.00)

(a) Data set: SUSENAS, 2002

(b) Number of observations = 64406

(c) p-values in parentheses

(d) These spending categories do not exhaust total food expenditure; the smaller categories are not reported for space reasons.

(e) Region 1 is the omitted region

Table 12: IV Regression^(a): Log Per Capita Calorie Consumption^(b)

Variable	Coefficient Estimate^(c)
Log of per capita food expenditure ^(d)	0.30 (0.00)
Regional Dummies^(e)	
Region 2	-0.03 (0.00)
Region 3	0.01 (0.05)
Region 4	-0.00 (0.59)
Region 5	0.03 (0.00)
Region 6	-0.03 (0.00)
Region 7	-0.02 (0.00)
Region 8	0.04 (0.00)
Ethnic Dummy	
Jawanese	-0.02 (0.00)
Household Characteristics	
Female headed household	0.10 (0.00)
No. of adults	-0.00 (0.03)
No. of children	-0.00 (0.00)
Married Dummy	0.09 (0.00)
Urban Dummy	0.13 (0.00)

(a) Data set: SUSENAS, 2002

(b) Number of observations = 64406

(c) p-values in parentheses

(d) Sample size is lower than 64422 due to use of selected instrumented variables

(e) Region 1 is the omitted region

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