Hunger of the Body, Hunger of the Mind: The Experience of Food Insecurity in Rural, Non-Peninsular Malaysia

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Hunger of the Body, Hunger of the Mind:
The Experience of Food Insecurity in Rural, Non-Peninsular Malaysia

by

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A dissertation submitted in partial fulfillment
of the requirements for the degree of
Doctor of Philosophy
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Sarawak, Malaysian Borneo

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If the misery of the poor be caused not by the laws of nature, but by our institutions, great is our sin.

-Charles Darwin, *Voyage of the Beagle* (1839)

Now one thing’s for certain
And two things for sure
Being poor is a disease
Gotta hustle up a cure

I truly believe that fieldwork made me an anthropologist. All metamorphoses are painful, and Malaysia has been my crucible. The people of Kpg. Trusan Jaya and Kpg. Tanah Hitam helped sustain me throughout this often difficult process, offering me humor, kindness, protection and even friendship – small, fleeting spaces to be just myself. Their lives and examples reminded me of the beauty and endurance within these communities and inspired me to persevere in my own way.

Even from across the ocean, my family has accepted my absences, given me freedom and support, and somehow managed to love me through both mistakes and successes.

In the end, academics have only words and thoughts. Although you deserve more, this dissertation is dedicated to each of you:

Normah bt. Abdullah
Nenden
Sabtuyah bt. Ass
Sulastrri bt. Rajak
Jaibah bt. Hj. Lajit
Mohtadi b. Masli
James Elliott Williams, Jr.
Linda Byrd Williams
Sarah Caroline Williams
Doris Byrd
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## TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>LIST OF TABLES</th>
<th>v</th>
</tr>
</thead>
<tbody>
<tr>
<td>LIST OF FIGURES</td>
<td>vii</td>
</tr>
<tr>
<td>LIST OF IMAGES</td>
<td>ix</td>
</tr>
<tr>
<td>ABSTRACT</td>
<td>xii</td>
</tr>
<tr>
<td>CHAPTER ONE: INTRODUCTION</td>
<td>1</td>
</tr>
<tr>
<td>Statement of the Problem</td>
<td>2</td>
</tr>
<tr>
<td>Theoretical Orientation: A Biocultural Synthesis</td>
<td>4</td>
</tr>
<tr>
<td>Specific Research Objectives (SROs) and Related Hypotheses (H)</td>
<td>6</td>
</tr>
<tr>
<td>Brief Results Overview</td>
<td>8</td>
</tr>
<tr>
<td>Organization and Chapter Contents</td>
<td>9</td>
</tr>
<tr>
<td>Significance of the Research</td>
<td>10</td>
</tr>
<tr>
<td>CHAPTER TWO: THE MALAYSIAN CONTEXT</td>
<td>11</td>
</tr>
<tr>
<td>General Overview of the Nation and its History</td>
<td>11</td>
</tr>
<tr>
<td>Physical Environment and Climate</td>
<td>11</td>
</tr>
<tr>
<td>Population</td>
<td>14</td>
</tr>
<tr>
<td>Health and Relative Development</td>
<td>16</td>
</tr>
<tr>
<td>Politics and Government</td>
<td>19</td>
</tr>
<tr>
<td>Historical Overview</td>
<td>22</td>
</tr>
<tr>
<td>Thematic Assessment: Broad Trends and Implications</td>
<td>29</td>
</tr>
<tr>
<td>Malaysian (Ethnic) Political Identities and Socioeconomic Policy</td>
<td>29</td>
</tr>
<tr>
<td>The Developmental Divide with Malaysian Borneo</td>
<td>33</td>
</tr>
<tr>
<td>Public Health Programming</td>
<td>35</td>
</tr>
<tr>
<td>Program Pemulihan Kanak-Kanak Kekurangan Zat Makanan (PPKZM)</td>
<td>37</td>
</tr>
<tr>
<td>CHAPTER THREE: METHODOLOGY</td>
<td>41</td>
</tr>
<tr>
<td>Background to the Research Design</td>
<td>41</td>
</tr>
<tr>
<td>Research Assistants</td>
<td>47</td>
</tr>
<tr>
<td>Research Site Selection Rationale</td>
<td>49</td>
</tr>
<tr>
<td>Timetable for Data Collection</td>
<td>49</td>
</tr>
<tr>
<td>Specific Methodologies Employed</td>
<td>52</td>
</tr>
<tr>
<td>Community-Based Data Collection</td>
<td>52</td>
</tr>
<tr>
<td>Assessment of the Total Survey Population</td>
<td>52</td>
</tr>
</tbody>
</table>
CHAPTER FOUR: THE COMMUNITY FIELDSITE

A Brief Local History 78
Development Efforts over Time 83
The Villages Today 87
Composition and Income Measures for Study Households 87
Social Roles and Age Distributions 88
Monthly Household Income Estimates 91
Contextualizing Household Income 94
Perceived Need 94
Occupation and Alternative Measures 96
Food Insecurity Rates for Study Households 104
Nutritional Status, Illness, and Health-Related Interactions 108
Child Nutritional Status and Anthropometric Indices 108
Child Illness Incidence and Perceptions of the Clinic 114
Clinic-Based Nutritional Information and Services (PPKZM) 116
Overview of Child Feeding Strategies and Perceptions 117

CHAPTER FIVE: TECHNIQUES FOR DATA ANALYSIS 120

Free Lists 120
Meaningfulness of the Domains and Boundary Selection 121
Justification of Aggregation: Cultural Consensus Analysis 122
Formal and Informal Consensus Analysis 124
Justification of Informal Consensus Analysis 126
Informal Consensus Analysis Procedure for Free-Listing Data 129
Patterns of Difference among Participants 130
Comparing the General and Child-Specific Food Domains 133
Pile Sorts 135
Creating the Similarity Matrices 135
LIST OF TABLES

Table 2.1: Contents of the PPKZM Food Package ................................................................. 38
Table 3.1: Research Design Overview ................................................................................... 44
Table 3.2: Timetable for Data Collection .............................................................................. 51
Table 4.1: Comparison of Income Estimates and Related Government Poverty Standards ................................................................................................. 93
Table 4.2: Village Occupations ........................................................................................... 96
Table 4.3: Women’s Alternative Income Generation and Livelihood Strategies .............. 102
Table 4.4: Household Assets ............................................................................................... 104
Table 4.5: Household Food Insecurity Rates ....................................................................... 106
Table 4.6: Household Food Insecurity Status ....................................................................... 108
Table 4.7: Classification Scheme for Household Food Insecurity Status ......................... 108
Table 4.8: Distribution of Nutritional Indicators (Z-Scores) ............................................ 111
Table 4.9: Prevalence of Undernutrition by Sex (Z-Scores) ............................................. 111
Table 4.10a: Prevalence of Low Height-for-Age (Stunting) by Age Group ...................... 113
Table 4.10b: Prevalence of Low Weight-for-Age (Underweight) by Age Group ......... 113
Table 4.10c: Prevalence of Low Weight-for-Height (Wasting) by Age Group .......... 113
Table 4.11: Common Rationale for Most Recent Clinic Visit ....................................... 115
Table 4.12: Perceived Clinic Functions ............................................................................. 115
Table 4.13: Benefits Received from the Clinic ................................................................. 115
Table 4.14: Strategies Used to Encourage Children to Eat ............................................. 117
Table 4.15: Common Rationale for Providing a Varied Menu ....................................... 119
Table 4.16: Archetypal Child Foods .................................................................................. 119
Table 5.1: Conceptual Example of Respondent-by-Respondent Agreement Matrix ........................................................................................................ 125
Table 5.2: Major Differences between Formal and Informal Cultural Consensus Analysis ............................................................................................................ 126
Table 6.1: Ten Most Frequently Mentioned Items in Each Domain (Basic Listing) ...................................................................................................................... 149
Table 6.2: Ten Most Frequently Mentioned Items in Each Domain (Extended Listing) ...................................................................................................................... 149
Table 6.3: Card Manifest for Pile-Sorting ................................................................. 154
Table 6.4: Differential Frequency Scores by Domain................................................. 157
Table 6.5: Degree of Processing for Pile-Sorting Stimuli............................................ 186
Table 6.6: Time of Day for Consumption for Pile-Sorting Stimuli ......................... 187
Table 6.7: Perceived Price for Pile-Sorting Stimuli...................................................... 189
Table 6.8: Perceived Healthiness for Pile-Sorting Stimuli........................................... 193
Table 6.9: Community-Perceived Effects of Specific Food Items on Appetite ............ 203
Table 6.10: Community Evaluations of Belief Statements Regarding Child Undernutrition................................................................. 208
Table A.1: Standard HFIAS Questionnaire Format...................................................... 282
Table A.2: Locally-Adapted HFIAS Questionnaire (English)....................................... 284
Table A.3: Locally-Adapted HFIAS Questionnaire (Malay).......................................... 286
## LIST OF FIGURES

<table>
<thead>
<tr>
<th>Figure</th>
<th>Description</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Figure 2.1</td>
<td>Malaysia’s Location within Southeast Asia</td>
<td>12</td>
</tr>
<tr>
<td>Figure 2.2</td>
<td>Detailed Map of Malaysia</td>
<td>13</td>
</tr>
<tr>
<td>Figure 2.3</td>
<td>Global Comparison of Malaysia’s HDI over Time</td>
<td>18</td>
</tr>
<tr>
<td>Figure 3.1</td>
<td>Rating Scale Visual Aid</td>
<td>71</td>
</tr>
<tr>
<td>Figure 4.1</td>
<td>Detailed Map of Sarawak (Kuching and Samarahan Divisions)</td>
<td>77</td>
</tr>
<tr>
<td>Figure 4.2</td>
<td>Local Timeline (Kpgs. Trusan Jaya and Tanah Hitam)</td>
<td>80</td>
</tr>
<tr>
<td>Figure 4.3</td>
<td>Community Age Distribution by Gender</td>
<td>90</td>
</tr>
<tr>
<td>Figure 4.4</td>
<td>Child Age Distribution by Gender</td>
<td>90</td>
</tr>
<tr>
<td>Figure 4.5</td>
<td>Per Capita Monthly Income Comparison (RM)</td>
<td>94</td>
</tr>
<tr>
<td>Figure 5.1</td>
<td>Hypothesized Models for Respondent-by-Respondent Similarity</td>
<td>133</td>
</tr>
<tr>
<td>Figure 5.2</td>
<td>Response Similarity for Salient General Foods Marked by Income</td>
<td>134</td>
</tr>
<tr>
<td>Figure 5.3</td>
<td>Response Similarity for Salient Child Foods Marked by Income and Child Health Status</td>
<td>134</td>
</tr>
<tr>
<td>Figure 5.4</td>
<td>Standard Partitioning Models for MDS Interpretation</td>
<td>141</td>
</tr>
<tr>
<td>Figure 5.5</td>
<td>Illustrated, Community-Derived MDS Plot of Local Food Classifications</td>
<td>142</td>
</tr>
<tr>
<td>Figure 6.1</td>
<td>Item Frequencies for General, Local Foods Free-Listing</td>
<td>152</td>
</tr>
<tr>
<td>Figure 6.2</td>
<td>Item Frequencies for Local Child Foods Free-Listing</td>
<td>152</td>
</tr>
<tr>
<td>Figure 6.3</td>
<td>Scatterplot and Regression Line for Differential Domain Frequencies</td>
<td>156</td>
</tr>
<tr>
<td>Figure 6.4</td>
<td>MDS Results for Community-Based Pile Sorts</td>
<td>160</td>
</tr>
<tr>
<td>Figure 6.5</td>
<td>Typology Organization of Community-Based MDS Results</td>
<td>161</td>
</tr>
<tr>
<td>Figure 6.6</td>
<td>Nutrition Related Organization of Community-Based MDS Results</td>
<td>163</td>
</tr>
<tr>
<td>Figure 6.7</td>
<td>Organization of Community-Based MDS Results by Site of Purchase</td>
<td>167</td>
</tr>
<tr>
<td>Figure 6.8</td>
<td>Organization of Community-Based MDS Results by Degree of Processing</td>
<td>168</td>
</tr>
<tr>
<td>Figure 6.9</td>
<td>Organization of Community-Based MDS Results by TimeConsumed</td>
<td>170</td>
</tr>
<tr>
<td>Figure 6.10</td>
<td>Price Related Organization of Community-Based MDS Results</td>
<td>174</td>
</tr>
</tbody>
</table>
Figure 6.11: Satiety Related Organization of Community-Based MDS Results........175
Figure 6.12: Organization of Community-Based MDS Results by Emic
Cosmology ........................................................................................................176
Figure 6.13: MDS Results for Clinic-Based Pile Sorts ..............................................178
Figure 6.14: Interpretations of Clinic-Based MDS Results ........................................179
Figure 6.15: PROFIT Analysis of Perceived Degree of Processing for
Community-Based MDS Results ............................................................................197
Figure 6.16: Conceptual Dendrogram of Hierarchical Cluster Analysis Results
for the Community Pile Sorts ..............................................................................200
Figure 6.17: Conceptual Dendrogram of Hierarchical Cluster Analysis Results
for the Clinic Health Worker Pile Sorts ..............................................................202
Figure 6.18: Tag Cloud Visualization of Community-Derived, Child-Specific
Recipes ..................................................................................................................210
Figure 6.19: Tag Cloud Visualization of Community-Derived, General Family
Recipes ...................................................................................................................211
Figure 6.20: Comparative Tag Cloud Visualization for Community-Derived,
Child-Specific and General Family Recipes .......................................................212
Figure 6.21: Tag Cloud Visualization of Clinic Recipes ...........................................214
Figure 6.22: Comparative Tag Cloud Visualization for Clinic and Community-
Derived Recipes ....................................................................................................215
LIST OF IMAGES

| Image 4.1: | View of Kpg. Tanah Hitam from the Sematan Pier | 97 |
| Image 4.2: | Off-Shore Fishing Trip | 98 |
| Image 4.3: | Local Fishermen Display their Catch | 98 |
| Image 4.4: | Collecting Wild Tapioca Shoots *Pucuk Bandung* | 100 |
| Image 4.5: | Collecting Remaining Oil Palm *Kelapa Sawit* Kernels Post-Harvest | 101 |
| Image 4.6: | Home Garden of Participant Household in Kpg. Tanah Hitam | 101 |
| Image 7.1: | Sematan Fruit and Vegetable Market | 230 |
| Image 7.2: | Sematan Market Stalls | 230 |
| Image 7.3: | Sematan Grocery Shops | 231 |
| Image B.1a: | Assorted Cakes *Kuih-Muih* | 288 |
| Image B.1b: | Assorted Cakes *Kuih-Muih* | 288 |
| Image B.2: | Indian Mackerel *Ikan Kembong* | 288 |
| Image B.3: | Tuna *Ikan Tonkol* | 288 |
| Image B.4: | Pomfret *Ikan Duey* | 289 |
| Image B.5: | Market Chicken *Ayam Pasar* | 289 |
| Image B.6: | Village Chicken *Ayam Kampung* | 289 |
| Image B.7: | Local Spinach *Bayam* | 289 |
| Image B.8: | Cabbage *Kobis* | 289 |
| Image B.9: | White Leaf Mustard *Sawi Putih* | 289 |
| Image B.10: | Long Beans *Kacang Panjang* | 290 |
| Image B.11: | Chili-Prawn Salsa *Sambal Belacan* | 290 |
| Image B.12: | Mango *Asam* | 290 |
| Image B.13: | Local Orange/Lime *Limau* | 290 |
| Image B.14: | Spanish Mackerel *Ikan Tenggir* | 290 |
| Image B.15: | Grouper *Ikan Kerapu* | 290 |
| Image B.16: | Tapioca Shoots *Pucuk Bandung* | 291 |
| Image B.17: | (Chinese) Cucumber *Timun Cina* | 291 |
| Image B.18: | Angled Loofa *Ketola* | 291 |
| Image B.19: | Wild Fern Variety *Midin* | 291 |
Image B.20: Bean Sprouts [Taugeh] .......................................................... 291
Image B.22: No English Term [Cangkuk] ............................................. 292
Image B.24: Green Leaf Mustard [Sawi Hijau] ................................... 292
Image B.25: Loafed Bread [Roti Paun] ................................................ 292
Image B.26: Fried Noodles [Mee Goreng] ......................................... 292
Image B.27: Okra [Kacang Lendir] ..................................................... 292
Image B.28: Dayak Cucumber [Timun Dayak] .................................... 292
Image B.29: Chinese Eggplant [Terung Panjang] ............................. 293
Image B.30: Local Eggplant [Terung Asam] ....................................... 293
Image B.31: Wild Fern Variety [Paku] ................................................ 293
Image B.32: Papaya [Betik] ................................................................. 293
Image B.33: Ray [Ikan Pari] ................................................................. 293
Image B.34: Shark [Ikan Yu] ................................................................. 293
Image B.35: Red Snapper [Ikan Merah] ............................................ 294
Image B.36: Croaker [Ikan Gelama] ..................................................... 294
Image B.37: Dried Anchovies [Pusuk] ................................................. 294
Image B.38: Trevally [Ikan Mayok] ...................................................... 294
Image B.39: Squid [Sotong] ................................................................. 294
Image B.40: Locally-Produced Crisps [Keropok] ................................. 294
Image B.41: Commercial Crisps [Keropok 20sen] .............................. 295
Image B.42: Dried, Salted Fish [Ikan Masin] ....................................... 295
Image B.43: Dried Shrimp [Bubuk Kering] ......................................... 295
Image B.44: Mangrove Crab [Ketam Kalok] ....................................... 295
Image B.46: Herring [Ikan Parang] ...................................................... 295
Image B.47: Tiger Shrimp [Udang Rimau] .......................................... 296
Image B.48: Malay “Salad” Herb [Pegaga] .......................................... 296
Image B.49: Rambutan [Rambutan] .................................................... 296
Image B.50: Rice Porridge [Nasi Bubur] ............................................. 296
Image B.51: Assorted Candy [Gula Batu] .......................................... 296
Image B.52: Bracelet Cakes [Kuih Gelang] ........................................ 296
Image B.53: Cookies/Crackers [Roti Macam] ..................................... 297
Image B.54: Powdered Milk [Susu Tepung] ....................................... 297
Image B.55: Condensed Milk [Susu] ................................................... 297
HUNGER OF THE BODY, HUNGER OF THE MIND:
THE EXPERIENCE OF FOOD INSECURITY IN RURAL, NON-PENINSULAR MALAYSIA

Elizabeth Elliott Cooper

ABSTRACT

Supplementary feeding continues to be a widespread strategy for child health promotion though its efficacy remains contested. The long-standing, Malaysian national food assistance program for children – Program Pemulihan Kanak-Kanak Kekurangan Zat Makanan (PPKZM) – fits this pattern, receiving severe criticism for its limited impact on child nutritional status. Still, the program remains, producing a seeming paradox and prompting questions of how it fits into (1) the larger political context of national health policy and (2) more localized village and clinic environments. This research combines historical inquiry with the in-depth, ethnographic study of two predominantly Malay coastal villages in Malaysian Borneo, where child anthropometry and household food insecurity rates establish a clear need for the PPKZM despite low coverage rates. This study assesses the ways in which common, local foods are perceived and categorized and the degree to which these understandings are shared both (1) within the communities and (2) between the communities and the clinics that serve them.

Community members do not share a single core set of well-known food items. Instead, multiple microenvironments within the fieldsites likely dictate differential diets and prioritize distinct sets of foods. Agreement is more pronounced among clinic workers, who display a simple food classification system based almost exclusively on taxonomic differences with the rationale for these distinctions expressed in nutritional terms. Although community members recognize the same constitutive kinds, their categories are more nuanced and reflect the concerns of day-to-day practice, encompassing when
and how a food item is encountered; its origins, relative expense, and common usage; and who will likely consume it.

The dissertation relates cultural models for food classification to health education messages, PPKZM programming guidelines, community conditions, and food beliefs and practices. It facilitates an understanding of place – as viewed through the lens of food security – and addresses the relative fit of current nutritional programming within this context. The study offers concrete design recommendations for a successful, child-specific food package in the short-term while arguing for a more holistic, household-level solution.
CHAPTER ONE

INTRODUCTION

*One cannot think well, love well, sleep well, if one has not dined well.*

- Virginia Woolf, *A Room of One’s Own* (1929)

Woolf (1989:18) is addressing a more privileged class in another place and time far removed from the absolute scarcity experienced within rural Sarawak. Still, this sentiment speaks to me, drawing forth memories from my time in the villages [kampung] of Trusan Jaya and Tanah Hitam. I remember watching my friend Kak Kamsiah¹ absent-mindedly unwrapping a block of instant noodles, sprinkling them with the included flavor packet, and then handing them over to her small son to be consumed raw, all the while forcefully insisting that instant foods contain dangerous chemicals that “make young bodies thin.” I remember Nurul and Amira – both as the playful, inquisitive girls, who “tested” my equipment and co-authored countless silly stories in the interest of improving my Malay grammar, and as the detached, angry young women they were forced to become in the face of their father’s increasingly violent behavior and their mother’s recognized work in the local sex trade. I remember animal cruelty and neglect, scars and accounts of domestic violence, and at the lowest point in my fieldwork, feeling betrayed and truly threatened by the knowledge that a participant, one I had considered a friend, had accepted money in exchange for compromising my safety.

When confronted by desperate situations and desperate people so far removed from one’s own experiences, there is a need to see them as somehow qualitatively different – to question their humanity. It would be comforting on some level to draw on older social theories, channeling Benedict (1934) and her cultural configuration concept in order to characterize community members as a group enculturated toward violence. Yet just as Woolf (1989) notes that the potential lives and achievements of women are limited by

---

¹ All names are attempts at realistic Malay pseudonyms.
their access to resources, so are the possibilities for kindness and positive social relationships within Kampung (Kpg.) Trusan Jaya and Kpg. Tanah Hitam.

Countless acts of self-sacrifice do occur within the villages each day. Kak Timah routinely rises before dawn with less than five hours of sleep so that she can make preparations for her family before returning to her work at the food stall, and though he wants to stop and socialize, Bang Fendi will pass by the coffee shops after a long day of cutting grass and clearing brush so that he can use his wages to buy vegetables, and maybe a bit of chicken, for his children. Still, it is difficult not to be overwhelmed by the challenges and the darker expressions of human nature. What must be remembered is that incidences of violence do not occur in isolation. These events stem from larger forces – what Farmer (2003:40) terms structural violence, suffering that is “structured by historically given (and often economically driven) processes and forces that conspire – whether through routine, ritual, or, as is more commonly the case, the hard surfaces of life – to constrain agency.” Hunger and food insecurity are an important component of this system of inequality. The emotional impact of food deprivation and its physical consequences place constraints on the ability of community members to “be good to one another” and fulfill their potential as parents, neighbors, workers, citizens, and individuals. Given the breadth of the problem, proposed nutritional interventions must be equally comprehensive and acknowledge the broader context in which they are administered and experienced.

Statement of the Problem

Described by Sguassero and associates (2005:1) as the “provision of extra food to poor children and families beyond the normal ration of their home diets,” supplementary feeding continues to be a widespread strategy for child health promotion. Yet despite the prevalence of these programs, there is no clear indication of their overall efficacy as a means of promoting physical growth, whether growth is measured as mean improvement in weight-for-age, height-for-age, head circumference, mid-upper-arm circumference or skinfold thickness values or as a reduction in the prevalence of underweight, stunting, or wasting (Beaton and Ghassemi 1982, Sguassero et al. 2005). Randomized controlled trials (RCTs) have been relatively rare and their results potentially confounded due to high dropout rates and the common use of supplementary feeding as part of a “complex package” (i.e., in combination with nutritional education or
cash incentives). As nutritional education has been shown to significantly improve the status of moderately malnourished children even in the absence of supplementary feeding (see Roy et al. 2005), the tendency to group these interventions presents a special challenge for evaluation. Still, Sguassero and colleagues (2005) identify four RCTs conducted from the early 1970s to the late 1990s – a Jamaican and an Indonesian study with formal assessment of malnutrition at baseline and two studies without formal baseline assessment conducted in Indonesia and Guatemala. Study results were mixed with no significant growth among the Indonesian children in either study and only length improvements among the Jamaican and Guatemalan samples. In contrast, Bhandari and associates (2001) recorded small impacts on weight gain without any significant increases in length. Numerous additional studies outside of the RCT gold standard note a similar failure to produce statistically or clinically significant improvement in the physical growth and development of target children (e.g., Henry and Cooper 1986, Simondon et al. 1996, Begum et al. 2007). Taken together then, the current literature echoes Beaton and Ghassemi’s (1982:910) summation concerning the “surprisingly small” benefits produced by supplementary feeding as measured in anthropometric terms.

The long-standing, Malaysian national food assistance program for children – Program Pemulihan Kanak-Kanak Kekurangan Zat Makanan (PPKZM) – fits this general pattern. In 2003, an internal national evaluation conducted jointly by the Institute for Medical Research (IMR), the Malaysian Ministry of Health (MOH), the State Health Departments (SHDs) and the Public Health Institute (PHI) severely criticized the PPKZM for its limited impact on child nutritional status, particularly child weight-for-age measures. Citing the lack of significant improvement and the relatively high expense for measured benefit, the evaluation concluded: “The cost of rehabilitation was astronomical by any estimate, and there was just too little effect to warrant the program’s continuation in its present form” (Foo Li Chien 2003:79).

The program has continued, however, producing a seeming paradox and prompting questions of how the PPKZM fits into (1) the larger political context of national health policy and (2) the more localized village and clinic environments in which it is managed.

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and experienced. These issues are addressed by combining historical inquiry with an in-depth, ethnographic study of two predominantly Malay coastal villages in Malaysian Borneo, where previous clinic case mapping and assertions by Sarawak SHD staff indicate a concentration of nutritional problems. More specifically, this research in Kpg. Trusan Jaya and Kpg. Tanah Hitam assesses the ways in which common, local foods are perceived and categorized and the degree to which these understandings are shared both (1) within the communities and (2) between community members and the maternal and child health (MCH) clinics that serve them. Documented cultural models for food classification are then related to clinic health education messages, PPKZM programming guidelines, community conditions, and food beliefs and practices. The overall objective is to facilitate an understanding of place and experience within the villages as viewed through the lens of food security and to address the relative fit of current nutritional programming within this context.

**Theoretical Orientation: A Biocultural Synthesis**

This work is intended as a contribution to the biocultural synthesis proposed by Goodman and Leatherman (1998) and can be read as an attempt to describe the unavoidable dialectic engagement of biology and culture (see Levins and Lewotin 1985). The ways in which we understand the relationship between our genetic heritage and life experiences form one of the essential tensions in anthropology. At one extreme, social acts are viewed as the outcome of long-term biological processes and are explained in terms of Darwinian fitness. At its worst, this perspective results in a unidirectional biological determinism, which reduces individuals to little more than the sum total of their DNA. Likewise, the excesses of social constructionism threaten the relevance and potential applications of cultural anthropological and are an insult to those persons for whom hunger and violence are unquestionably real (see Hacking 1999). Even Cronk’s (1999) more balanced approach centers on the explanation of behavior, asking to what extent our actions are influenced by culture and biology. There is an undeniable importance to this question, but it is not the primary focus of this work. Instead, this dissertation approaches the relationship between the biological and cultural elements of human experience by documenting (1) the impact of sociocultural and political-economic processes on human biologies and (2) the ultimate outcome of such “compromised biologies” for local communities (Goodman and Leatherman 1998:5). Essentially, the
question is reversed. Rather than interrogating the extent to which biology shapes individual actions, I address how cultural institutions shape personal biologies.

This approach is not new. The link between morbidity, mortality and social inequality was established over 150 years ago with the dialectical materialism of Friedrich Engels and Rudolf Virchow. More specifically, Engels emphasized how the conditions of production systematically eroded the health of the working class (e.g., Engels 1973) while Virchow highlighted the physical impact of unequally distributed social resources, analyzing patterns in poverty, unemployment and malnutrition rates; political disenfranchisement; educational deficits; and access to medical care (Waitzkin 2005).

Though Marx and Engels had yet to fully develop a theoretical paradigm by the mid-1940s, there are clear conceptual ties between the early work of Engels and Virchow, classic Marxism, and the more contemporary expansions and reformulations of Marxism that directly inform political economy. A clear understanding of these larger structural forces is no less essential today. Yet what differs in the “bioanthropological political economy” envisioned by Goodman and Leatherman (1998) and adopted in this study is that here the materialist perspective is not enough. Biocultural synthesis is concerned not only with the negotiation of culture and biology but also with the tension between structuralist explanations and those that privilege individual agency.

Bourdieu’s work has traditionally been cited as a framework for reconciling the opposing causal forces of mental agency and material structures. By focusing on the production of power at the individual level, Bourdieu attempts to demonstrate how social norms are enacted in “real practices and real time to create real inequalities among real people” (Knauft 1996:112, Bourdieu 1990a, 1990b). His work is uniquely powerful in that it prioritizes subjective experience and gives renewed relevance and importance to the anthropological project. To accept Bourdieu and his practice theory is to accept both the constraining role of macro-level forces and the necessity of addressing specific, locally-contingent expressions of power. Research that fails to document this ‘internalization of the external’ – to paraphrase Goodman and Leatherman (1998:13) – can never move beyond the purely descriptive to demonstrate the ways in which power and meaning are constructed, thus the emphasis on the intersection of local and global systems seen

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4 If we define culture using Tylor’s (1871:1) classic formulation as “that complex whole which includes knowledge, belief, art, morals, law, customs, and any other capabilities and habits acquired by man as a member of society” then individual actions by definition are an element of culture.

5 In particular, see Bourdieu (1977).
throughout critical medical anthropology and biocultural works more generally (e.g., Whiteford and Manderson 2000, Farmer 2003, Krieger 2005) and within the following pages.

Although practice theory provides a clear justification for the detailed ethnographic description of concrete actions, Bourdieu’s own writing lacks this type of empirical grounding.\(^6\) His ‘thin’ description and overreliance on hypothesized events and abstract individuals is rectified by Ortner’s (1984, 1989, 1995) ethnographically informed reinterpretation of practice theory and in later work by Farmer (2003), which uses detailed and intensely personal vignettes to illustrate the harsh constraints of structural violence according to a technique termed “bearing witness.” Whether conceptualized as structural violence (Farmer 2003), embodied inequality (Krieger 2005), or the biology of poverty (Thomas 1998), this is a theoretical commitment that applies a political economy perspective to the understanding of human biology. It is not, however, political economy in its traditional sense but rather a more critical response to it – one that abandons a “capitalism-centered view of the world” in favor of a greater attention to the local, privileging the village environment and “real people doing real things” (Ortner 1984:142, 144).

Specific Research Objectives (SROs) and Related Hypotheses (H)

SRO1. To evaluate the local need for nutrition-based public health interventions such as the PPKZM. This involved the assessment of child anthropometry and household food security. The collection of child weights and heights allowed for a direct comparison of the study \textit{kampungs} with current national and state-level statistics, while food security measurements updated these results to reflect current public health best practice for the evaluation of nutritional interventions (see Coates \textit{et al.} 2007).

H1. Child anthropometric measures for village children between the ages of six-months and six-years demonstrate a higher prevalence of undernutrition than the statistics recorded at the district, state, and national level.

\(^6\) Knauff (1996:124-125) cites the untranslated \textit{La Misere du monde} (1993) as a possible exception, noting its substantive descriptions of the lives of French blue-collar workers, shopkeepers, immigrants, homeless youth and the unemployed.
H2. Household food security measures are (a) correlated with child
anthropometry and (b) further support the need for a nutrition-based
public health intervention within the two target villages.

SRO2. To document the most salient local food items for village respondents and
determine how these items are classified by villagers and nursing staff at the
district and subdistrict MCH clinics. This involved collecting (1) free lists and
ratings from within the villages and (2) similarity data from both community
members and health workers.

H3. There is a core set of food items well-known to the community as a whole
as represented by findings of a single factor solution through cultural
consensus analysis.

H4. Within this overall consensus (H3), there are distinct patterns of subgroup
variation within the community based on household income and child
nutritional status.

H5. Food item classifications are qualitatively different for clinic staff than for
the local families they serve with health workers focusing largely on the
food items’ nutritional aspects and community members emphasizing
health in addition to alternative, as yet undefined factors.

SRO3. To assess how nutritional beliefs and food categorizations are applied to food
acquisition and preparation, household management, and childcare strategies.
This involved participant observation, exploratory ethnographic interviewing,
the collection of common family and child-specific recipes, and the
administration of a structured survey.

H6. Salient classification principles applied by community members are
reflected in their day-to-day practices.
SRO4. To evaluate the degree of fit between current PPKZM programming and community needs and belief systems and to offer recommendations for improved program design. This involved eliciting understandings and evaluations of the program from participants, community members, and health officials and assessing these perceptions with respect to the local context.

H7. The documented lack of impact for the PPKZM is related to a disconnect between underlying program assumptions of how foods are used and organized and local realities concerning their use.

Brief Results Overview

This research uses child anthropometry and household food security measurements to establish the need for a nutrition-based public health intervention such as the PPKZM, thus supporting Hypotheses 1 and 2. It further demonstrates dismal coverage rates for the PPKZM – the only nutritional invention available to Malaysian children prior to their entry into the school system. The initial assumption of a single core set of food items well-known to the community as a whole (H3) is ultimately rejected. The collected data are accurate and reliably capture the range of variability for salient local food items, but it remains likely that some of the more peripheral foods are of greater importance to an as yet undefined group within the community, which is based on neither income level nor child nutritional status despite the proposed importance of these variables asserted in Hypothesis 4. Instead, the multiple microenvironments contained within the fieldsite likely dictate differential diets and prioritize distinct sets of food items.

The hypothesis that health workers emphasize foods’ nutritional aspects while community members take into account a larger set of factors in addition to health (H5) is overwhelmingly supported. Overall, the local clinics of Lundu and Sematan display a simple classification system based almost exclusively on taxonomic differences with the rationale for these distinctions expressed in nutritional terms. Although community members recognize the same constitutive kinds or types – fruit, vegetables, meat, fish and seafood – their categorizations are far more nuanced and reflect the concerns of day-to-day practice (H6), encompassing when and how a food item is encountered; its origins, relative expense, and common usage; and who will likely consume it.
The PPKZM was not operational for six of the nine months that I spent on-site within the
villages making it impossible to directly connect its failures within Kpg. Trusan Jaya and
Kpg. Tanah Hitam to a disconnect between underlying program assumptions of how
foods are used and organized and local realities concerning their use (H7). However,
the clinic-based, nutritional services that are received – largely health education and
cooking demonstrations – do exhibit the anticipated lack of fit with community food
beliefs and practices. Noting this disconnect, the final chapter combines the earlier,
national evaluation of the PPZKM conducted by Foo Li Chien (2003) with the on-site
ethnographic research to consider the program’s design in a larger sense, addressing its
relevance for the rural, coastal Malay populations of southwest Sarawak.

Organization and Chapter Contents

The dissertation is organized as a monograph with chapters that contribute to an overall
picture of community conditions and related food conceptualizations, beliefs, and
practices within Kpg. Trusan Jaya and Kpg. Tanah Hitam. Following this introduction,
Chapter 2 draws on secondary sources to provide a basic introduction to Malaysia with
special attention to (1) the dominant political ideologies that shape socioeconomic policy
(e.g., bumiputera privilege), (2) the unique position of Sarawak’s Malays as a powerful,
favored majority at the national level, living as a minority in a historically underdeveloped
state, and (3) the development of child health policy, particularly the PPKZM. Chapter 3
profiles the suite of methods employed for data collection, providing the objectives,
process description, and rationale for each technique. With this background in place,
Chapter 4 introduces the first set of primary sources, combining collected census and
survey data with oral histories and the reports of the Kpg. Trusan Jaya Village
Development and Security Committee [Jawatankuasa Kemajuan dan Keselamatan
Kampung, JKKK] to provide a detailed description of the local community fieldsite. In
Chapter 5, I elaborate on the analysis for cognitive methodologies, supplying additional
justification and explanation for less familiar techniques and non-traditional applications
of the cultural consensus model (Romney et al. 1986, 1987). Chapter 6 presents the
belief-related results, outlining community and clinic understandings of food and
nutrition. I conclude with Chapter 7, which combines clarification, synthesis, and
application by (1) communicating the main research findings in a concise format, (2)
inTEGRATING AND INTERPRETING THOSE FINDINGS WITH RESPECT TO THE OVERALL GOAL, SPECIFIC
research objectives and hypotheses, and then (3) translating these findings into a set of grounded policy recommendations and suggestions for further research and elaboration.

Significance of the Research

As Pelto and Backstrand (2003) note, most existing social research in nutrition focuses on either “power-related” variables (i.e., economic, material and political factors) or “belief-related” variables (i.e., psychological, cultural, and attitudinal factors). The ethnographic approach adopted here is more holistic, taking into account household economic resources and constraints and agency/recipient interactions as well as the relationship of cultural beliefs – specifically food categorizations – to household practices and nutritional outcomes. It builds on the recent use of cognitive methods in nutritional research (e.g., Coates et al. 2003, Coates 2004, and Monarrez-Espino et al. 2004) and adds to anthropological literature on how disjunctions in belief systems impact health intervention activities (see Whiteford and Manderson 2000). On a practical level, the collection of sociodemographic data, child anthropometry, and local histories provides essential background on an understudied region, while the major findings can be applied to offer a set of grounded short- and long-term policy recommendations.
CHAPTER TWO
THE MALAYSIAN CONTEXT

General Overview of the Nation and its History

Physical Environment and Climate

Malaysia consists of two primary landmasses, separated at the closest point by approximately 864 kilometers of the South China Sea: (1) the Malay Peninsula to the south of Thailand and (2) the larger north coast of Borneo, which comprises 60 percent of the total land area and contains the states of Sarawak and Sabah bordering on both Brunei and Indonesia (Ross-Larson 1980:10, Faaland et al. 1990:2). This is depicted visually in Figures 2.1 and 2.2, which follow.¹ In total, its land area is 329,750 square kilometers, making the nation roughly equivalent to the size of New Mexico (CIA 2009). Malaysia is divided administratively into 13 states [negeri] – Johor, Kedah, Kelantan, Melaka, Negeri Sembilan, Pahang, Perak, Perlis, Penang (or Pulau Pinang), Selangor, Terengganu, Sabah, and Sarawak – and a federal territory consisting of the official capital of Kuala Lumpur, the administrative capital of Putrajaya, and Labuan.² The country’s climate is uniformly warm and humid, ranging from 78 to 91 degrees Fahrenheit, with the exception of higher altitude areas (Kaur and Metcalfe 1999:1). Seasonal variation is essentially a change in rainfall as the heavier northeast monsoons from the South China Sea dominate weather patterns from November to January, then give way to a drier transitional period and then the milder southwest monsoons from June to October. Malaysia’s topography consists of coastal plains and equatorial forests rising to meet a mountainous interior. The Borneo states are similar but with pronounced alluvial deposits along the shorelines and more gradual foothills leading into the primary mountain range that marks their border with Indonesia.

¹ See pages 12 and 13.
² While most government offices have relocated to Putrajaya, Kuala Lumpur continues to be the social and cultural heart of the nation as well as the site for parliamentary meetings.
Flying into Kuching, Sarawak’s capital, one is still struck by the expanse of vegetation uninterrupted except for the dark, winding rivers that cut through it. As both trading routes and resources in of themselves, rivers have traditionally created favored settlement sites in both peninsular and non-peninsular Malaysia. This emphasis is reflected in naming conventions with most of the peninsular states drawing on their principle rivers as namesakes (Kaur and Metcalfe 1999) – a tendency repeated on a variety of levels within Sarawak (e.g., Sematan, Kpg. Trusan Jaya). As often heard in the Bornean states, “water unites but land divides,” creating a historic, tripartite settlement pattern in which (1) the coastal, estuarine belt served as a meeting place and link between the interior and the coast, providing a site for premier settlements and major economic activity; (2) the inland rivers offered access to fishing and swidden agriculture in addition to preferred trading and settlement sites; and (3) the upland
zones, beyond the river’s navigable limits, supported unique, nomadic hunter-gatherer livelihoods among groups such as the Penan (Harrison 1949, Kaur 1999:122). The Malays are believed to have arrived in subsequent migratory waves, becoming coastal settlers involved in wet rice cultivation or traders, who specialized in the collection of sea products.

Unlike the peninsular states and Sabah, which were under the colonial control of the British and the British North Borneo Chartered Company respectively, Sarawak was a “private colony” ruled from 1841 to 1941 by the Brooke dynasty, whose administrative legacy included the neglect of land transport development (Kaur 2001:xlii). Outside of a brief construction period during the 1930s – prompted by unrest among the Dayak indigenous group and the related need for improved roads and transportation – the Brookes sponsored the construction of little more than four to five foot wide grass tracks and short, largely-unsurfaced roads (Cho 1990:63, Kaur 1999:148-149). As a result, the population remained dependent upon river transport for far longer with important implications for concepts of local identity and the state’s development prospects.³

³ See following section, The Developmental Divide with Malaysian Borneo, on pages 33-35.
Population

Returning to the national level, Malaysia’s current population is estimated at 25,715,819\(^4\) with a sex ratio of 1.01 – indicating a slightly higher percentage of men – and an annual growth rate of 1.72 percent (CIA 2009). Despite the infamous 70 million population target for the year 2100 released by then-Prime Minister Dr. Mahathir bin Mohamed (Mahathir) in the March 1984 *Mid-Term Review of the Fourth Malaysia Plan* (see Jomo 1990:205-207, Hartmann 1999:53),\(^5\) population rates continue to decline, slowing from the annual average of 2.5 percent recorded between 1991 and 2003 (WHO n.d.: 3). The country’s median age is 24.9 years with 63.6 percent of the population between the ages of 15 and 64 years; the Malaysian life expectancy at birth is currently estimated as 71.7 years for males and 76.5 years for females with a healthy life expectancy of 62 years for males and 65 years for females, as of 2003 (Department of Statistics Malaysia 2009, CIA 2009, WHOSIS 2009).

Malaysia is routinely described as an ethnically diverse nation – “Asia in microcosm” – a trait which has been interpreted as both a liability and strength, threatening ethnic conflict while simultaneously serving as a draw for tourism, presumably offering all the “wonders of Asia in one exciting destination” (Anwar 1996:24, Tourism Malaysia 2009). Most references report its ethnic make-up as some variation on a tripartite division according to Malay (*bumiputera*), Chinese, or Indian origin. Such classifications are problematic for two main reasons: (1) they represent an artificial simplification derived from post-World War II political identities in the peninsula (largely ignoring the Bornean states)\(^6\) and (2) their inconsistencies pose significant challenges for statistical reporting. For instance, Wade (2008:1) and the WHO (n.d.:3) estimate Malaysia’s ethnic composition as 65 percent *bumiputera*, 26.1 percent Chinese, and 7.6 percent Indian.\(^7\) Given that the *bumiputera* classification encompasses both Malays and the indigenous

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\(^4\) Official Malaysian figures – last updated September 5, 2008 – are higher, citing the total population as 27.73 million (see [http://www.statistics.gov.my/eng/](http://www.statistics.gov.my/eng/)).

\(^5\) As outlined by Jomo (1990) and Hartmann (1999:53), Mahathir advocated a five-fold population increase by promoting a five-child Malay family, using the slogan, “Go for five!” This pronatalist policy was ostensibly a means of expanding the domestic market to support heavy industrialization but also served as an implicit critique of the neo-Malthusian population policies then mandated by many international aid organizations (e.g., World Bank) and – according to some critics – a method of expanding his predominantly-Malay political base.

\(^6\) See Historical Overview section beginning on page 22.

\(^7\) Wade (2008) rounds his figures while the WHO (n.d.) does not.
populations of Sarawak and Sabah (e.g., the Iban, Budayuh, Melanau, Penan, and Kadazan) but not the indigenous peoples of the peninsula,8 we are left to assume that these orang asli are represented by the 1.3 percent unaccounted for in these figures. Gomez and Jomo (1997:1) add support to this assumption with their presentation of the 1996 distribution, which categorizes one percent of the population as “other.” A different picture emerges when we consider current CIA (2009) numbers, which disaggregate the bumiputera category. In this estimate for 2004, only 50.4 percent of the national population was Malay, while 23.7 percent were Chinese, 11 percent indigenous, 7.1 percent Indian, and 7.8 percent other. These classifications have important implications for the distribution of resources and the monitoring and evaluation of government programs, particularly those associated with the National Development Policy (NDP) as further discussed in the following section on Malaysian political identities and socioeconomic policy.9

As noted by Kaur (2001:196), religion is a “key element” of ethnic identity. In fact, Article 160 of the Malaysian Constitution defines a Malay in fully behavioral terms as one who can trace his or her ancestry to Malaysia at the point of independence and: (1) professes the Malay religion [Islam], (2) routinely speaks the Malay language, and (3) follows Malay customs [adat]. This close association has prompted Gomes (1999:81) to assert that “Islam is the most important factor in Malay identity as a source of solidarity among members of the community and a form of ethnic differentiation from non-Malays.” While there is certainly a significant minority of Indian-Malaysian Muslims in addition to some Chinese-Malaysian converts, in general, most citizens of Indian origin are Hindu while the majority of Chinese-Malaysians adopt a syncretism of Confucianism, Taoism, or Buddhism or turn to Christianity. Christianity, particularly in its evangelical forms, has also become popular among many indigenous communities throughout Malaysia. The current distribution of religious affiliation is 60.4 percent Muslim, 19.2 percent Buddhist, 9.1 percent Christian, 6.3 percent Hindu, and 2.6 percent practitioners of Confucianism, Taoism or an unspecified traditional Chinese religion (CIA 2009). While Islam is recognized by the federal constitution as the country’s official religion, alternative belief

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8 See Dentan et al. (1997) for a critical review of the history and rationale behind this exclusion. The authors also discuss potential inaccuracies in the list of Sarawakan native peoples recognized in Article 161A (7) of the federal constitution.
9 See pages 29-33.
systems and forms of worship are explicitly protected, and Malaysia is considered a secular state.\textsuperscript{10}

\textit{Health and Relative Development}

The WHO (2007:1) characterizes Malaysia as having a “relatively high overall standard of health” with an adult disease profile that nearly mirrors that of developed nations, a declining infant mortality rate (IMR) of 5.9 deaths per 1,000 live births,\textsuperscript{11} and a maternal mortality ratio (MMR) of 0.3 per 1,000 live births – citing data from 2004 for both the IMR and MMR. Access to primary care services – defined as having a fixed facility within five kilometers – was available to over 96 percent of the population of peninsular Malaysia, 76 percent of Sabah residents, and 61 percent of Sarawakians as of 1996 (WHO 2007:1). Still, communicable disease persists in many rural areas; the risk of bacterial diarrhea, dengue, and malaria remains high; filariasis has yet to be fully eliminated; and vector-borne diseases are being encountered as co-infections with tuberculosis (TB), which itself had a recorded incidence rate of 103 cases per 100,000 in 2006 leading to Malaysia’s classification as a country with an intermediate-TB-burden (WHO 2007, n.d., WHOSIS 2009, WHO Regional Office for the Western Pacific 2009a, CIA 2009). HIV/AIDS is also a growing concern with an estimated 75,075 cases recorded as of March 2005 (WHO 2007) in addition to a potential for co-infection with TB. Response to this disease has had moral overtones with official publications emphasizing the concentration of infection rates among injecting drug users (73% of cases) and the threat of spread from this group to the general population. There is also an emerging infectious disease risk in Malaysia. The country experienced a Nipah virus outbreak from 1998 to 1999, which devastated the pork industry and claimed 104 lives, as well as a Severe Acute Respiratory Syndrome (SARS) outbreak in 2003, and was further threatened by avian influenza.

\textsuperscript{10} While still acting as Prime Minister, Mahathir claimed that Malaysia was an Islamic state in his infamous “929 Declaration” on September 29, 2001 prompting criticism from the Democratic Action Party (DAP) in particular and prompting the Malaysian Chinese Association (MCA) to defend his statement by asserting that Malaysia was in fact a “secular Islamic state” – a concept that was appropriately criticized as a hopeless oxymoron. Despite Mahathir’s incendiary claims, the country continues to be categorized as secular often on the basis of the Malaysia’s “historic bargain” (see Cheah Boon Kheng 2004, Sriskandarajah 2005).

\textsuperscript{11} CIA (2009) figures dispute these statistics, currently estimating a total of 15.87 deaths per 1,000 live births.
What is less clear is the state of national child health, particularly undernutrition. The annual Health Facts summary publications produced by the Malaysian MOH Planning and Development Division do not include information on the population’s nutritional status, while international figures are dated and vary widely. For example, the WHO nutritional profile for Malaysia, submitted on behalf of the Malaysian MOH by Parman (2009:1), provides two separate estimates of child nutritional status: (1) the 2002 National Nutrition Survey which states that 12.6 percent of children under five years of age are moderately to severely underweight and (2) a 1999 cross-sectional household study (n=5108) which classified 19.0 percent of children less than five-years-old as underweight, 15.6 percent as stunted, and 13.3 percent as wasted. A recently released UNICEF (2007:121) report showcases more optimistic findings, citing the prevalence of underweight children under the age of five as 8.0 percent. Meanwhile, documentation on the WHO Global Database on Child Growth and Malnutrition indicates that updated information for Malaysia is no longer available and instead provides a more detailed results table derived from the 1999 cross-sectional study outlined by Parman (2009). Local scholarship fails to clarify the situation as the bulk of nutritional research is either highly localized or concerns overweight and obesity or specific micronutrient deficiencies. When issues of protein-energy malnutrition are addressed, past prevalence rates are routinely recycled without comment (e.g., Khor 2002, 2005).

While there does appear to be a general consensus in the literature and among higher-level public health staff that Malaysia is experiencing a dual burden of malnutrition – persistent undernutrition among poor and rural households in combination with an emerging prevalence of urban obesity – quantifying the issue remains a challenge.

Though still awaiting “developed country” status, Malaysia continues to perform well according to its UNDP-assigned human development index (HDI) of 0.811; it was ranked 63rd out of 177 countries for which data was available and 16th among the 118

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12 The UNICEF (2007:121) report is relatively vague regarding its data sources, noting that its figures refer to the most current year available for the time period 2000 to 2006 and draw on Demographic and Health Surveys (DHS), Multiple Indicator Cluster Surveys (MICS), and WHO and internal UNICEF data.

13 Khor’s work is a particularly egregious example. She published two nearly identical articles in 2002 and 2005 asserting that the rural rates of underweight and stunting ranged from 20-30% and 25-35%, respectively based on a review article which she submitted in 1997 (see Khor 1997). No reference was made to this five to eight year time gap, and I was unable to identify the data source for the 1997 publication, which may be considerably older, as the Malaysian Journal of Child Health does not appear to be operating or on file with any major databases.

14 The HDI scale is expressed as a value from zero to one.
developing nations evaluated (UNDP 2009). In effect, the HDI is a composite scale based on a country’s average achievement along three essential dimensions: (1) health, as measured by life expectancy at birth; (2) education or knowledge, as measured by adult literacy and school enrollment at the primary, secondary, and tertiary levels; and (3) standard of living, as measured by the *per capita* gross domestic product (GDP), alternatively referred to as purchasing power parity (PPP). As noted by the UNDP (2009), the HDI is not comprehensive and excludes a number of important indicators, including income inequality. Nevertheless, it does indicate Malaysia’s aggregate progress and favorable position in respect to the larger South and East Asian regions as demonstrated in Figure 2.3 (below). This advancement builds upon a series of

![Figure 2.3: Global Comparison of Malaysia's HDI over Time (Source: UNDP 2009)](image-url)
“spectacular and sustained increases in human development over the last three decades,” including a period (i.e., 1990-2001) during which Malaysia was second only to Chile and the Republic of Korea in terms of increasing per capita income among developing countries (UNDP 2003:28, Sriskandarajah 2005:66).

Politics and Government

Like many former colonies, Malaysia inherited its political structure from the British and operates as a constitutional monarchy with a bicameral Parliament consisting of an appointed upper (Dewan Negara) and elected lower (Dewan Rakyat) house. The largely ceremonial government figurehead, known locally as the Yang di-Pertuan Agong, is selected on a revolving basis every five years from among the hereditary rulers of nine peninsular states, and the position has been held by Sultan Mizan Zainal Abidin (Tuanku Mizan) of Terengganu since December 13, 2006. The sultans – all classified as ethnically Malay – both govern their respective states and select 18 of the 70 representatives for the upper house of Parliament with the Agong selecting an additional 44 representatives independently. Thus, while the Agong has limited legislative powers as monarch, his position does allow him to exercise considerable control over the membership of the upper house. Being without sultans, Melaka, Penang, Sabah, and Sarawak are served in the Dewan Negara and at the state level by government appointees.

Executive power is held by the Cabinet with its membership determined through appointment by its head, the Prime Minister. Though requiring approval from the Agong, the position of prime minister is ultimately determined in the aftermath of the legislative elections as the leader of the dominant party15 adopts this role. The Prime Minister then selects his Cabinet from among the members of Parliament, meaning that the members of the executive branch are also members of the legislative branch. As Fadzal (2005:1)

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15 Since independence, this has been the United Malay National Organization (UMNO), making the internal UMNO elections the real contest for Malaysian political power.
observes, “The term [sic] executive and legislature in the Malaysian context actually refers to the same entity exercising different functions.”

At present, Malaysian politics are dominated by two political alliances – Barisan Nasional [National Front] and Pakatan Rakyat [People’s Alliance]. Barisan National (BN) has a lengthy history as Malaysia’s leading political force, originating in 1955 as the Alliance Party formed when the Malaysian Indian Congress (MIC) joined with the existing partnership between the United Malays National Organization (UMNO) and the Malaysian Chinese Association (MCA). Following on the 1969 race riots, then-Prime Minister Tun Abdul Razak bin Hussein Al-Haj (Tun Razak) expanded the original alliance, forming BN in order to accommodate – or perhaps mitigate the impact of – emerging opposition parties as well as political parties from Sarawak and Sabah. This move ostensibly contributed to national stability by moving “processes of communal bargaining within the confines of government” – a strategy furthered by the Constitution Act of 1971, which prohibited public debate concerning citizenship rights, the national language, bumiputera privilege, and the sovereignty of rulers (Kaur 2001:15,210).

BN was and continues to be dominated by UMNO, which has been the source of the alliance’s leadership since independence. Occupying this role has enabled UMNO to (1) allocate parliamentary seats within the BN, (2) veto candidates proposed by any of the constituent parties, and (3) nominate at its discretion the chief minister of any BN-controlled state. At present, the BN is comprised of 13 member parties (CIA 2009) and effectively opposed only by the Pakatan Rakyat (PR) – the latest reincarnation of the political union of the Parti Keadilan Rakyat [People’s Justice Party, PKR], the

16 The Malaysian judiciary is slightly outside the scope of this brief overview. Interested readers are referred to Fadzal (2005) for a critical summary of executive, legislative, and judiciary roles and interactions.

17 At the time of the merger, the MIC and MCA were referred to as the Malayan Indian Congress and the Malayan Chinese Association respectively.

18 The BN parties are as follows: Gerakan Rakyat Malaysia Party (PGRM), Liberal Democratic Party (LDP), Malaysian Chinese Association (MCA), Malaysian Indian Congress (MIC), Parti Bersatu Rakyat Sabah (PBSR), Parti Bersatu Sabah (PBS), Parti Pesaka Bumiputera Bersatu (PBB), Parti Rakyat Sarawak (PRS), Sarawak United People's Party (SUPP), United Malays National Organization (UMNO), United Pasokmomogun Kadazandusun Murut Organization (UPKO), People’s Progressive Party (PPP), Sarawak Progressive Democratic Party (SPDP).

19 While the Sabah Progressive Party (SAPP) withdrew from BN during the 12th General Elections of 2008 to establish itself as an independent party, it was overwhelmingly defeated as BN maintained 24 of Sabah’s 25 parliamentary seats (Daily Express 2008).
Democratic Action Party (DAP), and the Pan-Malaysian Islamic Party (PAS), now joined by the Sarawak National Party (SNAPP) following its expulsion from BN in 2004. Neither alliance has a coherent political platform, aiming instead to either secure (BN) or contest (PR) the concentration of power within Malaysia.

Prior to the 12\textsuperscript{th} General Elections of 2008, BN had been overwhelmingly successful in its efforts, maintaining a two-thirds majority within the elected lower house and supplying each of Malaysia’s prime ministers. This two-thirds “super-majority” is highly significant as Article 159(3) of the federal constitution – the country’s supreme law – states that the constitution can be amended with a two-thirds vote in each House of Parliament (see Poh-Ling Tan 2001, Fadzal 2005, and Twomey 2007). Given UMNO’s influence within the BN and the Malay sultanate’s control of the upper house, this has virtually guaranteed Malay political dominance for much of the nation’s history – a fact well-recognized by the Malay political elite. As Malaysia’s first Prime Minister, Tunku Abdul Rahman (1981, cited in Lee Hock Guan 2001:31) noted with respect to the formation of federation, “We knew we were going to be in power with an overwhelming majority and if any changes appeared necessary we would amend the constitution.” The Malaysian constitution was, in fact, amended a total of 43 times, producing 643 separate amendments, from 1957 to 2003 (Twomey 2007:4).

Malaysia’s political landscape has been shaped not only by Malay dominance [\textit{ketuanan Melayu}] in general but in particular by the 22-year term (1981-2003) of the charismatic, yet controversial former prime minister, Dr. Mahathir bin Mohamed (Mahathir) – as discussed more thoroughly in the historical overview which follows. Mahathir’s short-lived successor, Abdullah bin Ahmad Badawi (Abdullah) has generally been regarded as a more liberal figure than the authoritarian Mahathir\textsuperscript{21} but failed to effect any lasting change and was replaced as of April 3, 2009 by Mohamed Najib bin Tun Abdul Razak (Mohamed Najib). This transfer of power was prompted in large part by the BN’s unprecedented losses during the 2008 general elections in which it failed to retain both its two-thirds majority and five of the 13 state legislatures: Kelantan, Selangor, Perak, Kedah, and Penang (BBC News 2008). While the BN coalition has maintained its

\textsuperscript{20} Some exceptions apply; most notably, those amendments which challenge the constitutional position of either Sarawak or Sabah require the approval of the governor of the state involved (see Twomey 2007).

\textsuperscript{21} This reputation is due in large part to his decision to free former Deputy Prime Minister Anwar Ibrahim, who has imprisoned by Mahathir in 1997 following an internal government dispute.
legislative majority, its margin of victory was slim at 50.3 percent, and Mohamed Najib has already begun to introduce economic measures intended to placate the opposition – measures which significantly include a scaling back of *bumiputera* privilege: a reduction in the Malay investor quota from 30 to 12.5 percent for all listed companies (CIA 2009, Burton 2009). Still, rural Sarawak remains a solid supporter of the BN, and it remains to be seen how these political shifts will impact life at the village level.

**Historical Overview**

Although the state of Malaysia was not formally established until 1963 with the union of Malaya (now peninsular Malaysia\(^{22}\)), Singapore, Sarawak and Sabah, the country cannot be fully understood without considering the preceding colonial period.\(^{23}\) The British “sphere of influence” was formally established in 1824 in the Anglo-Dutch Treaty with the Netherlands. In what was effectively a division of the Malay world, the British allocated Java, Sumatra and other islands to the south of Singapore to the Dutch in exchange for Melaka (Andaya and Andaya 2001). These terms not only established the modern boundary separating Indonesia and Malaysia but also permanently divided the Riau-Johor kingdom, arbitrarily ending the cultural unity of east coast Sumatra and the peninsula and providing yet another historical example for Anderson’s (1991) contention that national borders are imagined, not real or natural, not given but made (particularly in the wake of colonial influence).\(^{24}\)

Continuing on this theme, Cheah Boon Kheng (1999) asserts that the British creation of the Straits Settlements in 1826 – the administrative union of Penang, Singapore, and Melaka – unintentionally introduced the elements of a nation for the first time. Once joined, the colony’s port system and consequent prosperity supported migration from Indonesia, Borneo, the Philippine islands, China, India, the Middle East, and Europe

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\(^{22}\) During the early 1970s, the terms East Malaysia and West Malaysia were dropped in favor of peninsular and non-peninsular designations. In the wake of the Bangladesh (formerly East Pakistan) succession in 1971, these labels were considered politically charged (see Kaur and Metcalfe 1999).

\(^{23}\) This focus still omits the notable Srivijaya civilization of the seventh to the fourteenth centuries and the influential Malaka sultanate. This oversight is a reflection of limited time and space constraints and should not be interpreted as an attempt to portray Malaysians as a “people without history” in the absence of a Western presence (see Wolf 1982).

\(^{24}\) Though perhaps the most recognized theorist, Anderson is not alone or original on this point. As Kelly and Kaplan (2001:420) note, Marriott raised this same issue in 1963. It is also voiced in Gellner’s (1983) *Nations and Nationalism* and Hobsbawm and Ranger’s (1983) *The Invention of Tradition* as well as countless other texts post-Anderson.
while simultaneously inspiring further Western colonial pursuits. Tin was becoming a commodity of interest as world demand increased throughout the 1840s, steamships were introduced, and the opening of the Suez Canal in 1869 enhanced trading potential (Kaur 2001). Pursuing opportunities in the peninsula’s tin-rich western states, Great Britain annexed Perak, Selangor, and Sungai Ujong, granting them protectorate status. By 1896, the British had established a federal system – the Federated Malay States – based in Kuala Lumpur, by working in conjunction with the sultans of Perak, Selangor, Negeri Sembilan and Pahang. Control of Kedah, Perlis, Kelantan, and Terengganu was obtained through the Bangkok Treaty with Siam in 1909. These states then joined with Johor to create the Unfederated Malay States, which were united with the Federated Malay States and the Straits Settlements in 1914 to form Malaya – the area currently referred to as peninsular Malaysia.

Throughout this period of acquisition and expansion, British interaction focused on the Malays, consistently portraying them as the “indigenous masters of the country” (Cheah Boon Kheng 1999:100). This characterization was politically useful for both groups as it legitimized their treaty system and emerging power structure. In fact, Mahathir (1970:126) has cited this early negotiation as proof of the international recognition necessary to establish the Malay identity as Malaysia’s national identity and justify ketuanan Melayu. Drawing parallels to Australian and U.S. history, he states, “The definitive people are those who set up the first governments and these governments were the ones with which other countries did official business and had diplomatic relations.”

Colonial relationships did not emerge in a vacuum, however, and Malay governance would have been extremely beneficial for the British as well, as the established Malay feudal system was easily co-opted to support colonial projects. As related by Lord William Malcolm Hailey in his capacity as advisor to the Colonial Office, the resulting system was “practically one of direct official rule, under the façade of ‘advice’ to the Malayan rulers” (Wade 2008:3). By suppressing the practices of forced labor, debt-bondage, and slavery, which had traditionally supported the Malay sultanate, and introducing land taxes in their stead, the colonial administration was able to create a dependent Malay ruling class. It further reinforced the existing feudal system among the Malay peasantry with its educational policies, support for the formalization of Islam, and
by limiting population mobility with the introduction of land registration and private ownership under the Torrens system (Abraham 1986).

In contrast to the peninsula, Borneo was not directly mentioned in the Anglo-Dutch Treaty, leaving the territory open for the eventual claim of “middle-class English adventurer,” James Brooke (Andaya and Andaya 2001:128). Arriving on the island at an opportune time, Brooke was able to take advantage of Brunei’s declining regional power to secure his own personal fiefdom. The Brooke family – James (1841-1868), Charles (1868-1917) and Vyner (1917-1941) – would rule Sarawak for one hundred years as the famed “White Rajas” before losing the territory to Japanese occupation during World War II (Ooi Keat Gin 1997). Throughout this period of private control, Brooke governance contributed to the formation of distinct ethnic labor patterns in which increasing numbers of Chinese immigrants were concentrated in trade and mining operations and Malay groups worked primarily in administration and agriculture, typically as independent small holders. Other indigenous groups were also directed toward cultivation with the exception of the Iban\(^{25}\) who were recruited as a specialized police force, the Sarawak Rangers, and used to control Chinese economic activity, particularly the Bau gold mining operations.

These labor divisions mirrored larger events within the Straits Settlements and Federated Malay states\(^{26}\) more generally, as numerous Chinese and Indian migrants were recruited to serve as laborers for tin mines and rubber plantations respectively (Faaland et al. 1990, Gomes 1999, Henderson et al. 2002). As a concession to the Malay sultans, the Malay population was largely exempt from the colonial project and continued to practice traditional subsistence agriculture. Ironically, this exclusion from capitalist exploitation ultimately led to a parallel exclusion from the industrializing capitalist economy, such that by the time of independence, Malay groups were largely geographically and occupationally segregated in the underdeveloped, agricultural north and eastern states of peninsular Malaysia (Faaland et al. 1990, Henderson et al. 2002).

Colonial administration also prompted the formal classification of Malay ethnic identity with the 1913 Federated Malay States Enactment (no. 15), which broadly defined

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\(^{25}\) The Iban were commonly referred to as “Sea Dayaks” during his era (see Gomes 1999:83-84).

\(^{26}\) The Unfederated Malay states had a greater degree of freedom from British rule, although similar labor patterns did eventually develop.
“Malay” as “a person belonging to any Malay race who habitually speaks the Malay language …and professes the Muslim religion.” While a product of the colonial administration, this largely “behavioral” definition encompassed numerous immigrants from the Malay Archipelago, providing them with land grants and an “ethnic identity” that would later be reaffirmed and reified in the federal constitution as *bumiputera* [sons of the soil]. Within this classification, groups such as the Javanese, Bugis, Acehnese, Boyanese, Rawa, Mandailing, and Minangkabau were homogenized as “Malay” and then conceptually linked to the indigenous peoples of Sarawak and Sabah (Gomes 1999).

The British colonial project of the late eighteenth and nineteenth centuries ended as the British colonies and protectorates fell under Japanese control from 1942 to 1945. This period exacerbated ethnic tensions as a result of the strained economy and strong Japanese suspicion and persecution of Chinese-Malaysians. The Occupation also gave rise to the first pan-Malayan organizations and a budding Malay nationalism, expressed primarily in linguistic terms. Ahmad Kamal Abdullah and associates (1992) encapsulate the sentiment with a poem from the period published in the Japanese newspaper, *Sinarum Matahari*, “Through *bahasa* [language] the *bangsa* [race] is successful...through *bahasa* the *bangsa* is known.” This poem reflects both the role of Japan in early nationalist movements and the centrality of language – a theme that repeats itself throughout the post-colonial period, particularly in educational policy.

Though the British returned to Malaya, Sarawak, and British North Borneo (now Sabah) in the aftermath of the war to begin rehabilitation efforts, it was clear that the Japanese occupation had served as a catalyst, prompting Great Britain to reassess its role in the region. The Malayan Union Scheme – introduced in 1946 – was the initial blueprint for self-governance and was an inclusive document that extended citizenship to any person born within the proposed Malayan Union or residing there for at least a decade (Wade 2008). It further truncated the power of the exclusively Malay sultanate, largely limiting their authority to religious matters. As Cheah Boon Kheng (2002:2) asserts, if fully adopted, this proposal would have resulted in “more of a ‘Malayan’ nation-state than a ‘Malay’ nation-state.” Yet British colonial policy quickly shifted in the face of Malay opposition and the Malayan Union was replaced with the Federation of Malaya within two years. This revised plan restored the sultanate’s prewar powers and jurisdiction...
over their own states while effectively weighting the legislature toward Malay interests (Kaur 1999, Wade 2008). Although opposition groups such as the Pan-Malayan Council of Joint Action (PMCJA) and Pusat Tenaga Rakyat [Center for the People’s Power, PUTERA] organized multiple protests and even jointly drafted an alternative constitution, their concerns were largely ignored due in part to their desire to include Singapore in the proposed union. The 1947 census had demonstrated that the Chinese population would achieve ethnic majority status when Malaya and Singapore were considered as a single unit (Wade 2008:9). At this junction, the loss of Singapore would not only have threatened Britain’s strategic interests in Southeast Asia but undermined the validity of a series of treaties and colonial policies based on Malay standing as the “majority race.” Thus, acting in its own interest and under pressure from the increasingly powerful UMNO, Great Britain moved quickly, establishing the Federation of Malaya on February 1, 1948.

Wade (2008:14) has delicately suggested that the “British failure to include Chinese aspirations” in this process may have facilitated the armed rebellion initiated by the Malayan Communist Party (CPM) in mid-1948. What is clear is that this insurrection – the “Emergency” – further exacerbated existing ethnic divisions according to place of residence and occupation. The Chinese population had been heavily engaged in urban commerce previously, but small-scale tin mining and agriculture remained routine prior to the forced relocation of hundreds of thousands of rural Chinese under British resettlement schemes intended to isolate Communist guerillas from civilian support (Ross-Larson 1980:15, Kaur 2001). Following the relocation, this group became exclusively urban and moved progressively toward a singular “ethnic bloc,” which glossed over provincial and ethnolinguistic diversity in the face of post-World War II political necessity (see Horowitz 1975, Abraham 1986, and Gomes 1999).

The extended Emergency period (1948-1960) also significantly altered the British perspective on Singapore. In the Cold War atmosphere of the early 1960s, the union of Singapore and the Borneo territories with Malaya was viewed as a means of stabilizing

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27 The British had already withdrawn from India and Burma in August of 1947.
28 These barbed wire-enclosed settlements were euphemistically referred to as “New Villages.” A total of 70 were created, each with a population of approximately 2,200 individuals – meaning that almost 10 percent of the total population of peninsular Malaysia was resettled (Kaur 2001:166).
29 Nine major subgroups of Chinese origins are typically recognized: Hokkien, Hakka, Cantonese, Teochew, Hainanese, Hockchew, Kwongsai, Henghua, and Hokchia (Gomes 1999:82).
the region and suppressing communist influences in the former areas. The Malay political elite were willing to accept this proposal as it enabled them to maintain a sizeable ethnic majority by reclassifying the indigenous peoples of Sarawak and Sabah as fellow *bumiputera*. Negotiations of ethnic boundaries and privileges during this period gave rise to the often cited “historic bargain” in which non-Malays (with the exception of the natives of the Bornean states) accepted the special position of the *bumiputera* and the need to accelerate their socioeconomic progress in exchange for citizenship within a secular state and the right to use and study their “mother tongues” (Cho 1990, Halim Saleh 2000, Cheah Boon Kheng 2004:45, and Sriskandarajah 2005).

The modern nation-state of Malaysia was thus formalized in 1963 as the combination of Malaya, Singapore, Sarawak, and Sabah. The country’s legitimacy was challenged from its inception with (1) the Philippines making claims on Sabah and (2) Indonesia condemning the nation as thinly-veiled, neocolonial maneuvering on the part of the British (Weisburd 1997). Indonesian objections soon translated to armed conflict beginning at independence in 1963 with a series of small-scale guerilla operations in northern Borneo, which escalated and shifted to the Malay peninsula by the early fall of 1964 and formally concluded with a signed peace treaty in August of 1966 (see Weisburd 1997). These threats served to intensify the need for an established national identity, a need which Cheah Boon Kheng (2002:1) asserts has yet to be met.

Communalism and Malay ethnonationalism – the uneasy combination of Malay nationalist ideology and Islam – became increasingly common in the wake of the dissolution of the two-year union with Singapore and continued economic disparities. Singapore’s expulsion from Malaysia in 1965 can be read as a rejection of “communal equality” and the vision of a “Malaysian Malaysia” espoused by Singaporean leader Lee Kuan Yew (Cheah Boon Kheng 1999:107). Citing the interplay of political and financial factors, Mahathir (1970) has blamed Malaysia’s interethnic difficulties on corruption, arguing that the rise of UMNO created a regime based on patronage and coercion, breeding disillusionment and providing entry for opponent groups seeking to capitalize on racial divisions. This explanation glosses over an extensive history of divide and rule colonial policy supported by differential labor patterns and educational policy. Yet

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30 Communalism is defined as the “phenomenon of every ethn tic or ethnic group working for its own self-interest” (Cheah Boon Kheng 2002:2).
whatever the source of ethnic tension, the resulting May 1969 race riots in Kuala Lumpur prompted further ethnonationalist legislation based largely on racial distinctions, including the New Economic Policy (NEP) of 1970, which aimed to remove the association of ethnicity with economic function by using *bumiputera* policies that privileged ethnic Malays and indigenous groups over the market-dominant Chinese minority in terms of education, employment, and government contract quotas. Rural poverty and living conditions did improve in the wake of this legislation as Malaysia established universal primary education and demonstrated tremendous economic success and improvements in child and maternal health. However, it is unclear how much of this economic growth was a result of redistribution under the NEP as opposed to a general secular trend prompted by the discovery of important oil and gas reserves.

Malaysia’s more recent history has been dominated by the 22-year term (1981-2003) of former prime minister, Mahathir bin Mohamad. A leading proponent of the incompatibility of “Asian values” and Western liberal democracy, Mahathir has consistently argued for a unique brand of Malaysian governance based on strong, stable leadership, social harmony, broad state intervention and the primacy of the collective good (Gomez and Jomo 1999, Khoo Boo Teik 2002). This influence was felt throughout the region as Mahathir voiced his “Look East” philosophy in a series of international forums, establishing the concept as a talking point as well as an official government policy, which urged the use of Japanese and South Korean economic models to achieve newly industrializing country (NIC) status (Jomo 1990, Cheah Boon Kheng 1999).32 Through a series of what were defined as Asian value campaigns, Mahathir would push for “clean, efficient, and trustworthy” [*bersih, cekap, dan amanah*] government, leadership by example [*kepimpinan melalui teladan*] and the assimilation of Islamic values [*penyerapan nilai-nilai Islam*]. The impact of his message can be seen in official statements by the Committee for a New Asia (1994:35), in particular their assertion that permanent democracy in an Asian society “must be deeply embedded in Asian values and mores and embrace institutions and processes special to specific cultures.” While multiple authors have questioned the authenticity of the Asian values argument, often

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32 Interestingly, of the four East Asian NICs – Taiwan, Hong Kong, Singapore, and South Korea – Mahathir explicitly cited only South Korea as his model. Critics have suggested that this decision was based on Mahathir’s desire for an example of success not affiliated with an ethnic Chinese population, although Jomo (1990:202) defends him on this point.
depicting it as an ideological construct in defense of authoritarian rule (e.g., Ichiyo 1995, Kim 1994, Lummis 1995, Tonnesson 1996, Nagengast and Velez-Ibanez 2004), it has been the dominant political paradigm in Malaysia for some time and the basis of Mahathir’s influential development policy with its combination of anti-labor, nationalist, and capitalist elements (see Jomo 1990:201-205). The direction of modern Malaysian history post-Mahathir has yet to be determined as Mahathir’s immediate successor, Abdullah bin Ahmad Badawi (Abdullah), had limited policy impact during his short stint in office from 2003 to 2009, and current prime minister, Mohamed Najib bin Tun Abdul Razak (Mohamed Najib), was only recently appointed. Still, based on recent events it seems plausible that Mohamad Najib will usher in a new era, reconsidering longstanding elements of the New Economic Policy (NEP) and bumiputera privilege (see Burton 2009).

**Thematic Assessment: Broad Trends and Implications**

*Malaysian (Ethnic) Political Identities and Socioeconomic Policy*

As noted with reference to Malaysia’s historical development, a defined political system was necessary to support the British colonial policy of indirect rule, and the existing feudal structure of regional Malay sultanates was considered ideal. The British thus legitimized their presence through a series of treaties with this established ruling class. Noting that the relatively sparse population could not supply the necessary surplus labor (Abraham 1986), British immigration policies encouraged an influx of migrants, who were sorted into occupational and residential niches that prevented social interaction, thus segregating Chinese miners from Indian public works and plantation laborers. Combining ideology with bureaucratic practicalities, such as the census, colonial administrators were able to manipulate racial identities in order to maintain both (1) the “Malay” majority necessary to justify the existing treaty system and (2) a level of divisiveness sufficient to prevent large-scale anti-colonial resistance. For example,

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33 Additional detail beyond the scope of this brief overview can be found in Milne and Mauzy (1999) and Khoo Boo Teik (1995, 2003).
34 The NEP was renewed in 1991 as the National Development Policy (NDP) with some minor changes in focus, including: (1) an increased reliance on privatization, (2) an emphasis on human resource development, and (3) specific attention to economic inequality and the “hard-core poor” (Kaur 2001:160-161). It remains an essentially pro-Malay policy (Roslan 2001).
35 See Alatas (1977) for a critique of the “lazy native” ideology propagated in the Malay Archipelago.
Nagata (1979:44) notes that in 1901 as the British were still seeking to expand and secure their hold on the region the Straits Settlement census classified peninsular Malays and Sumatrans separately from the Javanese, Bugis, Boyanese, Acehnese, Dayaks, and Filipinos. Yet as xenophobia mounted in the face of unrestricted immigration the British attempted to mitigate the issue by creating an aggregate Malay category with more numerical weight.

As Appadurai (1996:133) asserts, “statistics are to bodies and social types what maps are to territories: they flatten and enclose.” The ethnic markers and distinctions emphasized between (and obscured within) Malay, Chinese, and Indian subpopulations are no more natural or authentic that the geographic demarcations of the Anglo-Dutch Treaty – both were motivated by the exigencies of colonialism. Ultimately, what we are seeing is not a stronger racial or even cultural continuity but rather the long-term impact of differential labor allocation. A Javanese migrant was accepted as Malay while a Tamil worker was marked as “other” largely because of the latter’s identification with the plantation system. The “Malays” were understood as those who remained outside of the colonial structure under the protection of the sultanate. Almost by definition, Malay areas – such as the “Malay belt” extending through the north and eastern states of the peninsula (see Faaland et al. 1990) – were areas in which British colonial investment was limited and the population continued to focus primarily on subsistence agriculture. Understandably, this exclusion from the colonial labor pool resulted in a parallel exclusion from the emerging capitalist economy, and as a result, only one-third of the increase in national income experienced during the first decade of Malaysian independence was directed toward Malay groups, despite the fact that they constituted over half of the country’s population (Faaland et al. 1990:38).

In the aftermath of the 1969 race riots the inter-ethnic disparity in poverty prevalence was particularly troubling. As Ikemoto (1985) notes, 65.9 percent of the Malay population was classified as impoverished in 1970 in comparison to 40.2 percent of Indian-Malaysians and 27.5 percent of Chinese-Malaysians. It has been well-established that political conflict and violence are fueled by this type of between group (i.e., horizontal) inequality (Stewart 2001, Cramer 2003), particularly when a nation-state

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36 Faaland and colleagues (1990:4) chart the rise of the migrant population from 250,000 individuals in 1800 to two million in 1900 and 6.3 million at independence in 1957.
is transitioning to democracy (Chua 2004). The NEP was intended as a redistributive effort to correct this imbalance and prevent the type of atrocities committed in the Philippines, Zimbabwe, and South Africa (Faaland et al. 1990, Chua 2004). Yet the Malay disadvantage was largely a function of their status as a rural population, primarily associated with agriculture, and despite its political salience, inter-ethnic inequality constitutes only a small part of Malaysia’s total income inequality – a fact true at the inception of the NEP (13-18%) and equally true in 1989 (9%), the last date for which statistics are available (Sriskandarajah 2005:71).37

Major gains have occurred under the plan as Malaysia halved its poverty rate by the official end of the NEP in 1990 and then halved this new rate during the fifteen subsequent years under the National Development Policy (NDP) revision (Sriskandarajah 2005, WHO n.d.). The Malay population achieved a 12-fold increase in its number of registered professionals between 1970 and 1995, demonstrated a marked increase in gross enrollment rates for tertiary education, and increased its share of capital ownership to nearly 20 percent by the 1990s (Gomez and Jomo 1999:168, Malaysia Economic Planning Unit 2001:63, Roslan 2001, Kuhonta 2002, Sriskandarajah 2005). Moreover, annual growth in mean income has been well above the national average among the bumiputera (Malaysia Economic Planning Unit 2001:60). The NEP was undoubtedly successful in accomplishing its stated intent (Ikemoto 1985, Chowdhury and Islam 1996, UNDP 2003, Sriskandarajah 2005).38 As described by Mahathir (1998:33-34):

*The NEP was not concerned with making all the bumiputeras earn equally, or share equally, the wealth distributed amongst them… The institution of the NEP was to create in the bumiputera community the same division of labor and rewards as was found in the non-bumiputera communities, particularly the Chinese… The equitableness was not to be between individuals but between communities.*

37 Sociodemographic data disaggregated by ethnicity has been limited since 1990 (see Sriskandarajah 2005).

38 *Redistribution* was successful, but again it remains unclear how much of the economic growth experienced during this period was the result of the NEP rather than the discovery of important oil and gas reserves.
According to this standard, the NEP performed well, diminishing inter-ethnic disparities as intended. Yet, it simultaneously intensified the degree of inequality among Malays, particularly in rural areas. Focusing on data from the peninsula, Mehmet (1986:152) uses the ratio of mean to median income to demonstrate how “elitist income concentration” compounded from 1970 (1.43) to 1979 (1.50), and he is hardly alone in this observation. Drawing on work by Gomez and Jomo (1999), Roslan (2001), and Sriskandarajah (2005), it is apparent that improved poverty prevalence rates are masking the fact that the Malaysian poor are getting poorer and the majority of this income inequality is occurring not between but within supposed racial groupings, prompting arguments that Malay ethnonationalism, as expressed through the NEP and NDP, has become “an instrument for the accumulation and concentration of corporate wealth in the hands of a few” (Halim Saleh 2000:133, Cheah Boon Kheng 2004).

Despite the failure of current bumiputera policy to benefit the broad base of impoverished, rural Malays, it continues to receive their political support, perhaps due in part to its high visibility. Under the NEP, funding dramatically increased to multiple economic and social institutions with missions that incorporated rural projects, including: the Federal Land Development Authority (FELDA), the Food and Marketing Authority (FAMA), and the Malaysian Agricultural Research and Development Institute (MARDI). NEP support also made possible a series of arrangements between the People’s Trust Council and the Malaysian Industrial Development Foundation (MIDF), Credit Guarantee Corporation (CGC) and Bank Bumiputera to extend credit and advice facilitating the creation of physical infrastructure. Moreover, a total of 91 additional federal organizations and 56 state boards were created in the decade following the introduction of the NEP (Rajakrishnan 1993, Kok Swee Kheng 1994, Stafford 1997, Roslan 2001). Based on ethnographic interviews and my own observations within Sarawak, this preponderance of agencies has resulted in multiple, highly-publicized efforts that focus on infrastructural investment and initial incentive schemes. These projects experience early success, which dwindles when artificial subsidies are removed, and then fade into

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39 As the Malaysian government has ceased to publish intra-ethnic income distribution figures, it is difficult to quantify this phenomenon post-1990. However, there is widespread acceptance of this trend among the cited authors and their respective sources.

40 The process through which trusteeship and subsequent privatization have operated in close connection with UMNO to create a targeted patronage system is aptly detailed by Gomez and Jomo (1999), Yoshihara (1999), Perkins and Woo (2000) and Doraisami (2005) and will not be repeated here.
relative obscurity as they are replaced by new development initiatives. Local residents shift from one project to the next, experiencing only small, short-term improvements in socioeconomic status as the real profits accrue to government contractors. These token gains when combined with a political culture of Malay solidarity promote acceptance of the status quo and generate feelings of loyalty and satisfaction with the government despite its failure to raise the population out of poverty.

Again, this is not an attempt to dispute the fact that the Malay population continues to be a disadvantaged group. As evidenced by Sriskandarajah (2005:75), Malay income is below the national average – and the Chinese-Malaysian average in particular – while Malays are underrepresented among registered professionals and overrepresented in rural occupations. In combination with the indigenous groups of Sarawak and Sabah, they were also more likely to be living in poverty than any other ethnic class as of 1990 (Sriskandarajah 2005:75). However, Malay ethnic identity is not an acceptable proxy measure for socioeconomic disadvantage and bumiputera targeting has blunted the impact of redistributive efforts under the NEP and NDP. Not only has this focus excluded an emerging Indian underclass41 but it falsely assumes a “trickle-down” effect within ethnic categories – one which it explicitly rejects at the national level. As Mehmet (1986) has asserted, more egalitarian distribution patterns are compatible with the trusteeship system – now continued under the NDP – all that is required is a shift from categorical to mean-based eligibility criteria. Unfortunately, the recent changes proposed by Prime Minister Mohamed Najib seem more likely to dismantle rather than redirect the country’s redistributive system (see Burton 2009).

**The Developmental Divide with Malaysian Borneo**

Despite its close proximity, Malaysian Borneo is developmentally worlds apart, continuing to rely on logging, agricultural processing, and petroleum production and refining long after the peninsula’s transformation from a raw material producer to an emerging multi-sector economy with a strong focus on electronics (CIA 2009). Sarawak in particular demonstrates the continued impact of the Brookes’ governing philosophy, a deliberate restriction of economic development in the interest of preserving the “indigenous way of life” (Kaur 1999, 2001, and Andaya and Andaya 2001:223). The

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41 Indian-Malaysians constitute less than eight percent of Malaysia’s population but 41 percent of its beggars (Pereira 2001).
state’s remote location, lack of natural harbors, relatively poor soil and climate, and
difficult terrain in combination with conservative ‘closed-door’ policies on the part of the
Brookes served to limit foreign investment, adversely affecting the development and
expansion of agriculture, mining, and other key sectors (Ooi Keat Gin 1997). Attempts
at colonial noninterference contributed to disparities in wealth, infrastructure, and even
health outcomes as Western medical facilities were considered an encroachment on
native lifeways. Yet to a large extent, the Brookes did manage to protect indigenous
interests. Sarawak’s native population continues to exert considerable control over state
governance and is included in the privileged *bumiputera* category unlike their
counterparts in the peninsula.

The trade-off has been extended underdevelopment. While the NEP had a high relative
impact in both Sarawak and Sabah, decreasing the percentage of impoverished
households from 56.5 percent in 1976 to 31.9 percent in 1984, the provision of basic
services has been lacking (Cho 1990:35). In 1985, Sarawak and Kelantan were the only
states in which less than half of the population had access to piped water, while
Sarawak was one of three states – with Pahang and Sabah – where electricity was
unavailable to more than one-third of the population (Cho 1990:36). While conditions
have certainly improved, tensions remain over the low-levels of economic development
and the continued ability of the national government to appropriate revenues derived
from petroleum, gas, and mineral extraction. Malaysia has a much stronger
centralized government than most federations (*i.e.*, the United States, Canada, and
Australia) as issues of states’ rights have been obscured in favor of a focus on the ethnic
power balance (Fadzel 2005:4). Since independence, this has given *Barisan Nasional*
the ability to oust disfavored state representatives as demonstrated in 1966 with the
removal of Sarawak’s Chief Minister, Stephen Kalong Ninghan when he agitated for
greater state autonomy. This context places Sarawak’s Malays in a unique position.
They are a powerful, favored majority at the national level, living as a minority in a
historically underdeveloped state, which continues to be disadvantaged through
inequitable trade relations with the peninsula. Political support for the ruling coalition –
BN – thus requires them to privilege their Malay identity over a competing Sarawakian

\[42\] This leaves Sarawak with control over only timber-based export earnings and tax revenue, contributing
to the deforestation threat.
identity with important implications for the evaluation of local health and development policy.

Public Health Programming

Health planning under the Ministry of Health (MOH) began in 1956 with the First Five-Year Malaya Plan, and continues to operate on a five-year cycle, setting Malaysia’s medium and long-term goals. National public health services were instituted early on with the Second Five-Year Malaya Plan adopted in 1961, which extended social and public health services to rural populations (Cho 1990:55). By the time of Sarawak’s incorporation into national planning efforts – under the First Malaysia Plan (1966-1970) – health policy was narrowly fixated on “effective family planning to reduce the demographic pressure”43 (Malaysia 1965:2). With the introduction of the NEP in 1970, subsequent development plans tended to focus on poverty, restructuring, and a “careful balancing of the ‘races’” (Cho 1990: 72, Ong 1990:259), thus overshadowing health concerns to a large extent. Commenting on the decade following NEP inception, Snodgrass (1980:260) evocatively characterizes health policy as a “placid millpond” in comparison to education policy and its “stormy sea of controversy.” While he portrays health’s lack of “fundamental importance” for the citizens, politicians, and analysts of the time as a product of classism, it is more likely that health issues were simply less charged, limiting their usefulness as a rallying point for communal politics. Whatever the reason, the need for a national health policy remained unacknowledged until the midterm review of the Sixth Malaysia Plan, and it was not until 2005 that the Malaysian National Health Policy (MNHP) was formally drafted, citing three main concerns: (1) population health, (2) national capacity for building health, and (3) national capacity for competitiveness in the health market (WHO Regional Office for the Western Pacific 2009b). The MNHP was reviewed and approved by the MOH Planning and Policy Committee in 2007.

Today, the MOH remains the primary provider and financier of Malaysian health services despite increases in the private sector over the past few decades. Care is provided either freely or for a nominal fee in government hospitals and clinics throughout the

43 This is an odd emphasis given the nation’s noted labor shortages and reliance on immigrant workers (see Abraham 1986). As previously noted, Mahathir would reject this strategy, introducing pronatalist policies in 1984.
country, and national policy is guided by the Ninth Malaysia Plan (2006-2010) and its overall focus on the consolidation of services. This document explicitly cites overnutrition, obesity, and diet-related, non-communicable diseases as “emphasized risk factors” yet fails to mention undernutrition, giving the impression of a country that has completed the epidemiologic transition (see Malaysia Economic Planning Unit 2006).

Nutritional interventions have been in place since the 1960s when they were begun under the aegis of the United Nation’s Food and Agriculture Organization (FAO) (Khor 2005). In 1996, Malaysia established the National Plan of Action for Nutrition (NPAN) and began to manage its own multi-sectoral, nutritional programming through the National Coordinating Committee for Food and Nutrition (NCCFN). Following on these organizational efforts, Malaysia devised its National Nutrition Policy in 2003, subsequently updating this document in 2005. Mirroring the focus of the Ninth Malaysia Plan, this policy aims to “strengthen inter and intra sectoral linkages in the development and implementation of all nutrition and related activities” while enhancing nutritional well-being and ensuring household food security (Kementerian Kesihatan Malaysia 2005:12). Citing earlier successes and existing interventions in the areas of undernutrition and micronutrient deficiency, it further recommends a shift in emphasis to issues of overweight, obesity, and diet-related, non-communicable diseases. As outlined by Khor (2005), these interventions are undertaken primarily by the Malaysian MOH with assistance from the Ministry of Education and the Ministry of Rural Development. Although a variety of programs exist to meet the nutritional needs of vulnerable populations only two initiatives currently address children between the ages of six-months and six-years: (1) full cream milk powder distribution and (2) Program Pemulihan Kanak-Kanak Kekurangan Zat Makanan (PPKZM) – the Program for the Rehabilitation of Undernourished Children from Hardcore Poor Households. Official policy states that one kilogram of full cream milk powder is to be distributed on a monthly basis for each underweight child between the ages of six-months and seven years, regardless of family income, for a minimum period of three months (Khor 2005:S283). However, key informant interviews and observations within the Sematan and Lundu clinics, which service the fieldsite, have shown that demand routinely exceeds supply, and this has prompted clinic staff to limit milk distribution to PPKZM participants effectively merging the two programs.
Program Pemulihan Kanak-Kanak Kekurangan Zat Makanan (PPKZM)

The PPKZM is a form of food supplementation, an intervention commonly defined as the “provision of extra food to poor children or families beyond the normal ration of their home diets” (Sguassero et al. 2005:1). It was launched in 1989 under Mahathir’s direction in response to “two long-term developmental challenges,” namely the need to improve health status and eradicate poverty (Foo Li Chien 2003:9). Since its inception it has focused on four primary areas: (1) food and micronutrient supplementation, (2) the provision of sanitary facilities and clean water, (3) health and nutrition education, and (4) the enhancement of broader development initiatives. Strictly speaking, however, the PPKZM is designed to supply a standard set of food items on a monthly basis, deliver nutritional advice, and conduct growth monitoring and evaluation at the clinic or through in-home visits. Its other stated goals are to be accomplished through referrals to outside programs such as the Program Pembangunan Rakyat Termiskin (PPRT), which provides access to clean water and sanitation facilities. When the PPRT is not an option, families are to be referred to their local District Office (DO) for assistance.

Eligibility for the PPKZM is both means tested and categorical, restricted to infants and young children with the majority of participants (95 percent) less than four years of age (Foo Li Chien 2003:27). To qualify for inclusion, children must also be either underweight by the standards of the U.S. National Center for Health Statistics (NCHS) or physically or mentally handicapped, and they must come from designated “hard-core poor” households beneath the official poverty line (Foo Li Chien 2003). PPKZM participants receive food aid (see Table 2.1 overleaf) for a minimum of six months, after which time assistance becomes contingent on the child’s failure to maintain a weight-for-age within two standard deviations of the reference norm for three consecutive months.

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44 De-worming is also a stated service said to occur at six-month intervals. Yet, formal evaluation of the PPKZM (see Foo Li Chien 2003) found little evidence of its implementation and project staff in the Kuching and Sarkei divisions of Sarawak, who were consulted during my preliminary (2006) and doctoral (2007-2008) fieldwork, were not aware of any schedule for antihelminthic administration.

45 “Means testing” as described by Marchione (2005:888) is the use of a factor, typically household income or child nutritional status, to establish need through comparison to the population distribution. In contrast, categorical selection establishes blanket eligibility for a given group (e.g., inhabitants of a particular geographical area or members of a vulnerable demographic).

46 NCHS standards define underweight as more than two standard deviations (-2SD) below the weight reference for children of the same sex and age.
Table 2.1: Contents of the PPKZM Food Package*

<table>
<thead>
<tr>
<th>Quantity</th>
<th>Standard Item</th>
<th>Approved Substitutes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 kg.</td>
<td>rice</td>
<td>glutinous rice</td>
</tr>
<tr>
<td></td>
<td></td>
<td>instant cereals</td>
</tr>
<tr>
<td></td>
<td></td>
<td>rice vermicelli [bihun]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>dried egg noodles</td>
</tr>
<tr>
<td></td>
<td></td>
<td>sago</td>
</tr>
<tr>
<td>4 kg.</td>
<td>wheat flour</td>
<td>rice flour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>glutinous rice flour</td>
</tr>
<tr>
<td>1 kg.</td>
<td>dried anchovies [ikan bilis]</td>
<td>canned sardines</td>
</tr>
<tr>
<td>1 kg.</td>
<td>green lentils</td>
<td>dhal</td>
</tr>
<tr>
<td></td>
<td></td>
<td>red lentils</td>
</tr>
<tr>
<td></td>
<td></td>
<td>chickpeas</td>
</tr>
<tr>
<td></td>
<td></td>
<td>soybeans</td>
</tr>
<tr>
<td></td>
<td></td>
<td>peanuts</td>
</tr>
<tr>
<td>3 kg.</td>
<td>sugar</td>
<td></td>
</tr>
<tr>
<td>2 kg.</td>
<td>cooking oil</td>
<td></td>
</tr>
<tr>
<td>2 kg.</td>
<td>crackers</td>
<td></td>
</tr>
<tr>
<td>1 kg.</td>
<td>full cream milk powder</td>
<td></td>
</tr>
</tbody>
</table>

*Based on Foo Li Chien (2003). Observations within the Lundu and Sematan clinics suggest greater flexibility with food package contents, including unapproved substitutions with margarine, eggs, and dried beancurd sticks.

Food supplementation may also be stopped when a child begins school around the age of seven. These cutoffs underscore the intent of the PPKZM as a short-term measure focused on child nutritional “rehabilitation.”

Adopted during the massive build-up to the 1990 World Summit for Children – a UNICEF event at which Malaysia was represented (see UNICEF 2006) – this program clearly reflects the major tenets of the globally-promoted UNICEF Child Health Revolution, including the suite of low-cost, technical solutions popularized in the mid-1980s with the acronym GOBI-FFF: growth monitoring, oral rehydration techniques, breast feeding, immunization, food supplementation, female literacy, and family planning. While Malaysia has consistently underscored its dedication to national self-reliance – refusing to actively pursue external financial aid and accepting only a single social sector loan from the World Bank in 1997 and no subsequent assistance from the World Bank, International Monetary Fund, or the Asian Development Bank – it has routinely accepted technical advice (WHO 2007). Given this background and Justice’s (2000) historical research on the ways in which American congressional funding for UNICEF and other
international organizations molded the child survival movement along U.S. policy lines, it is certainly plausible that the Malaysian PPKZM reflects this global movement away from the imperatives of social justice and large-scale change included in the primary health care (PHC) model introduced in 1978 with the Declaration of Alma-Ata and towards a selective primary health care of directed medical interventions (see Walsh and Warren 1979, Cueto 2004). Ultimately, the same themes evident in 1970s era U.S. nutritional interventions (e.g., WIC) can be seen in the 1989 design of the Malaysian PPKZM. As a result of lobbying and funding streams, the American emphasis on cost-effectiveness and child welfare was writ large in the international arena through UNICEF’s GOBI-FFF strategy (Justice 2000). Malaysia adopted this near-exclusive focus on growth monitoring and food supplementation with its narrowly-defined, quantifiable goal of documented weight gain and limited, “deserving” target population. Yet the extent to which this common mandate applies in such a dramatically different context must be questioned.47

Unfortunately, the success of the PPKZM has been largely unstudied. The program was not formally assessed until 2003, when an internal national evaluation conducted jointly by the Institute for Medical Research (IMR), the Malaysian MOH, the State Health Departments (SHDs) and the Public Health Institute (PHI) severely criticized the PPKZM for its limited impact on nutritional status, particularly child weight-for-age measures. According to this study, the PPKZM conferred no apparent benefit on roughly 25 percent of the studied participants and only “miniscule” improvements of “little practical importance” among the remaining three-quarters (Foo Li Chien 2003:77). Returning only two percent of its participants to a satisfactory weight-for-age within two standard deviations of the NCHS reference, the program was unable to produce outcomes that were significantly different from those for non-participants in the hard-core poor community at large (Foo Li Chien 2003:78).48 Children were typically enrolled in the supposedly short-term program for over two years while continuing to demonstrate grossly inadequate intakes of key nutrients. Moreover, 14 percent of these children had been enrolled for four years or more (Foo Li Chien 2003:79). The authors associate this

47 See Whiteford and Manderson’s (2000) edited volume for further discussion of this false assumption of “uniformity of context” – what the authors term the “fallacy of the level playing field.”
48 Due to poor program coverage rates, Foo Li Chien (2002) was able to compare participants with other eligible individuals who were not detected and enrolled.
failure with food basket design issues and in particular, concerns that the items distributed are overstandardized, nutritionally deficient and promote improper usage such as waste and “leakage” to non-targeted family members. Such criticisms require a larger understanding of the local environment in which the program is administered and experienced, evoking a need for ethnography and an attention to context.
CHAPTER THREE
METHODOLOGY

Since Malinowski, anthropology and its ethnographic approach have been defined by participant observation and extended residence among the population of interest (Salzman 2002). Studies that push beyond this individualistic, experiential approach in favor of more systematic data collection with testable hypotheses are routinely labeled positivist and contrasted with humanistic orientations. My own research rejects this false dichotomy, using a mixed methods approach to facilitate an understanding of place and experience in two rural Malay kampungs as viewed through the lens of food security. The methodology outlined in this chapter assumes that participant observation is a necessary but not sufficient component of anthropological research design. Given this technique's longstanding prominence within the discipline, I begin with a review of its benefits and limitations, leading into a justification and description of the selected study design.

Background to the Research Design

Ethnographic methodologies consistently emphasize “being there” – a commitment to bodily experience in some other place validated through a Forsterite glorification of interpersonal connection (see Bradburd 1998, Watson 1999). Ethnography is thus repeatedly described as the result of an encounter – the product of an understanding fostered through interaction, empathy, and interpretation (Kirk and Miller 1986:68, Emerson et al. 1995:vvi, Brockington and Sullivan 2003:57). This interaction takes place outside of the realm of the ethnographer’s own experience, occurring either literally or metaphorically in “their own territory… in their own language on their own terms” (Kirk and Miller 1986:9). While the classic demarcation of “us” and “them” is problematic, it is hard to deny the beauty of the sentiment, particularly Goffman’s (1989:125) striking characterization of fieldwork as the process of “subjecting yourself, your own body and your own personality, and your own social situation, to the set of contingencies that play
upon a set of individuals, so that you can physically and emotionally penetrate their situation."

Though inspiring, this vision of anthropology is somewhat artificial. Entering the kampung to live in similar conditions and close proximity to local residents cannot provide a true sense of how it feels to be a hungry child or arbitrate decisions about who eats within a resource-constrained household. Romanticizing fieldwork as the realization of another’s experience risks trivializing that individual’s life and emotions (Fernandez and Herzfeld 1998:108) – making ethnography a more fraught and awkward process perhaps better described by Van Maanen (1988:ix) as the "peculiar [emphasis added] practice of representing the social reality of others through the analysis of one’s own experience in the world of these others.” This strangeness results from the unavoidable reductionism involved in seeking to understand individuals and societies in terms of our own observations. In isolation, this process threatens to become an ahistorical method of inquiry, operating outside of time in the ethnographic present, while ignoring the contingencies of power relations.¹ Practiced as such, ethnography strips its subjects of their history and broader context, creating simulacra – representations so removed from reality that they stand alone as copies without models. It is impossible to adequately represent cultural phenomena exclusively through our own temporary experiences with them, making it imperative for modern anthropology to pair its unique gift of the body with more direct analysis and confirmatory testing.

“Being there” (i.e., conducting participant observation) is admittedly a critical component of any anthropological research design, which works to expose the common sense, taken-for-granted physical indicators that are routinely overlooked as self-evident (Douglas 1975, Fernandez and Herzfeld 1998). Yet, what is contested here is the assumption that this engagement with the community is self-validating. Traditionally, it has been assumed that the fieldworker’s emerging hypotheses are “continually tested in stronger and stronger ways in the pragmatic routine of everyday life” purely by virtue of the ethnographer’s placement in “territory controlled by the investigatees” (Kirk and Miller 1986:30-31). Along these same lines, assumptions about meaning and situations are made ‘at your own risk’ such that survival becomes a proof of accuracy and further

¹ See di Leonardo (1998). In particular, she uses the phrase “specializing in Borneo” as a conceptual shorthand to reference essentializing ethnographic portrayals which have cast Borneo as a metonym for the non-American other.
supports the myth of the field-tested anthropologist (Emerson et al. 1995, Bernard 2006). In contrast, this research design begins from the belief that participant observation is necessary but not sufficient. As Webb and colleagues (1966:174) note:

The most fertile search for validity comes from a combined series of different measures, each with its idiosyncratic weaknesses, each pointed to a single hypothesis. When a hypothesis can survive the confrontation of a series of complementary methods of testing, it contains a degree of validity unattainable by one tested with the more constricted framework of a single method.

Drawing on Johnson (1990), this study aims to rethink ethnography, defining it not as a process or a product (see Sanjek 2002) but rather as a strategy – a strategy that can and should involve several methods that retain the meaningfulness of the qualitative approach while still allowing for testing and falsification. These methodological commitments are balanced by a recognition of time and funding limits and my own individual capabilities and knowledge gaps to produce a study design which addresses issues of: (1) limited time in the field, (2) limited language proficiency and (3) the need to balance experiential observations with data more amenable to numerical analysis. Trotter (1991:181) insists that a minimum 12-month fieldwork commitment is required with full 24-hour-a-day dedication to the project. This standard was unattainable. Language training, administrative and permitting issues, and miscellaneous setbacks combined to limit village-based fieldwork to a total of nine-months. This timeframe was not unexpected, and systematic elicitation techniques (e.g., free-listing, pile-sorting) were deliberately incorporated to increase the efficiency of data collection by rapidly amassing a large volume of high-quality ethnographic data including emic categories (see Weller and Romney 1988, Trotter 1991, LeCompte and Schensul 1999, Handwerker 2001). Basic language skills are less of a liability with these techniques as their aim is to establish a relevant, shared vocabulary, and much of the analytic work involves visual plots and quantitative assessments, which are directly testable through secondary techniques.

In summary, the intent of this study is to facilitate an understanding of place and experience in two rural Malay kampungs as viewed through the lens of food security. Quantitative detail is provided through census and structured surveys; spatial
understandings are enhanced with the use of Global Positioning System (GPS) data; hunger is interrogated as both experience and physical reality; local cultural models are directly and systematically evaluated; participants are encouraged to tell their own stories in their own words through ethnographic interviewing; and data is contextualized with the experiences of local, state, and national health workers and the act of “being there” in the villages as summarized in Table 3.1 (overleaf) and described in detail in the sections that follow.

<table>
<thead>
<tr>
<th>Table 3.1: Research Design Overview</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objective(s)</td>
</tr>
<tr>
<td>To serve as an introduction to the community, collect basic demographic data, and provide a basis for dimensional sampling.</td>
</tr>
<tr>
<td>To ensure accurate identification of households and individuals, assist in the location of remote structures, and facilitate subsequent spatial assessment of patterns of food insecurity and child undernutrition in relation to plotted food-related resources (2-5) and access to health care (6).</td>
</tr>
</tbody>
</table>

2 House numbers are not displayed in the village and most homes are situated off of one of a series of small, intertwining footpaths. GPS mapping was necessary in order to accurately locate these structures and connect them with the correct data sets as family members used a multitude of formal and informal names. Recognizing the value of this data, I decided to plot additional points of interest with the intent of assessing spatial distributions using Geographic Information Systems (GIS) software. I have yet to develop this skill set and aim to pursue these research questions in subsequent publications when I am better prepared to conduct this type of analysis. At present, the mapping data – informally assessed using a simple scatterplot created in Microsoft Office Excel 2007 – has served to orient my understanding of the physical layout of the village and informs my discussion and analysis.
<table>
<thead>
<tr>
<th>To assess the prevalence of wasting, stunting, and underweight among village children determining the children’s current health status and long-term nutritional history.</th>
<th>Child Anthropometry</th>
<th>Child heights and weights were measured using a portable scale and stadiometer.</th>
</tr>
</thead>
<tbody>
<tr>
<td>To assess the prevalence of hunger and food insecurity at the research site along with its emotional impact.</td>
<td>Household Food Insecurity Access Scale (HFIAS)</td>
<td>Nine yes/no occurrence questions and nine follow-up frequency questions were used to assess: (1) feelings of certainty regarding food access, (2) perceived dietary quality, and (3) perceived dietary intake.</td>
</tr>
<tr>
<td>To provide a sense of the research participants’ lived experiences (i.e., an emic perspective) as background for the development of interview questions and additional working hypotheses.</td>
<td>Participant Observation</td>
<td>“Learning by Doing”: Involvement in routine village activities such as food acquisition, preparation, and consumption, market purchases and wild food collection, and food-based income generating activities.</td>
</tr>
<tr>
<td>To provide context for the interpretation of free list, pile sort, census, HFIAS and child anthropometry data; To generate new insights and confirm the role of major hypothesized factors; To develop a qualitative base for survey construction by operationalizing factors and creating variables for further analysis.</td>
<td>Ethnographic Interviews</td>
<td>Predetermined, open-ended questions concerning childcare, food and nutrition, the daily schedules of primary caretakers, family health, and government programming and assistance were posed to community members and health workers at the local, state, and national level.</td>
</tr>
<tr>
<td>To ensure that subsequent data collection techniques focused on appropriate food items and determine if the same group of foods was equally important (salient) to all participants.</td>
<td>Free-Listing</td>
<td>Participants were asked to name all of the items they knew of in a particular category (domain). For example, “What are all of the foods that people here eat?”</td>
</tr>
<tr>
<td>Purpose</td>
<td>Method</td>
<td>Description</td>
</tr>
<tr>
<td>--------</td>
<td>--------</td>
<td>-------------</td>
</tr>
<tr>
<td>To determine how community members and health workers think about and categorize important (salient) local foods.</td>
<td>Pile-Sorting</td>
<td>Participants were asked to group 55 color photographs of local foods according to their similarity such that images in the same piles were more similar than images in different piles.</td>
</tr>
<tr>
<td>To allow for the statistical validation (property fitting analysis, PROFIT) of visual interpretations of the pile-sorting data.</td>
<td>Rating Scales</td>
<td>Participants were asked to rate on a scale of one to four the relative processing, price, healthiness, level of satiety produced, and time of day consumed for a set of 55 local foods.</td>
</tr>
<tr>
<td>To improve the accuracy of initial demographic information and facilitate hypothesis testing based on previously collected data.</td>
<td>Household Survey</td>
<td>Questionnaire collected information on (1) household employment and income-generating activities; (2) estimates of household income, assets, and monetary needs; (3) potential appetite enhancers and suppressants; (4) child health and feeding, (5) perceptions of the local health clinics; and (6) 28 true/false belief statements on the topic of child undernutrition.</td>
</tr>
<tr>
<td>To assess how nutrition beliefs are applied to cooking strategies and create a more comfortable rationale for entry and observation within village kitchen environments.</td>
<td>Recipe Collection</td>
<td>Title, yield, ingredients and method of preparation were recorded for common family and child-specific recipes.</td>
</tr>
<tr>
<td>To provide an objective comparison for perceived food prices (rating task) and evaluate the relative cost-effectiveness of village and health department recipe sets</td>
<td>Community Price Survey</td>
<td>Prices were recorded for 300 local food items over the course of a four-day window.</td>
</tr>
</tbody>
</table>

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3 See page 74 for a discussion of the relative timing of the data collection and strategies used to overcome its failure to account for seasonal variation.
Research Assistants

Initially, attempts were made to recruit two social science first-degree holders within Sarawak in the Kuching and Samarahan Divisions.\(^4\) The rationale for this selection criterion was that the planned cognitive and systematic data collection training was more likely to be meaningful to these individuals as a form of professional development, contributing to the broader impact of the project. Recruitment fliers were distributed throughout the Social Science Department [Fakulti Sains Sosial] at the main campus of the Universiti Malaysia Sarawak (UNIMAS) in Kota Samarahan, and referral requests were made to previous contacts at the Sarawak State Health Department (SHD); the Kuching-based non-governmental organization, Angkatan Zaman Mansang (AZAM); the Sarawak Development Institute (SDI); and the Sarawak Department of Agriculture (DOA). After approximately three months, it became apparent that this was not a realistic candidate pool for on-site work within the village.

In January 2008, the focus of the search was shifted to the identification of literate, work-available community members in consultation with AZAM and the Sarawak DOA. At that time, both organizations still maintained a strong presence in the area as a function of their involvement in the second phase of the Mangrove Rehabilitation Project sponsored by the Global Environment Facility (GEF) Small Grants Program (see Chapter 4, Development Efforts over Time). Dr. Mhd. Ikhwanuddin Abdullah – a DOA employee, liaison to AZAM, and the project’s Principal Technical Advisor – was consulted regarding potential research assistants in the local vicinity. He suggested Sulastri bt. Rajak, a bilingual native Sarawakian, resident of Kpg. Trusan Jaya, and mother of two. With no expectation of further UNDP-GEF funding the project was slated to dissolve by the time of my arrival in the community, leaving Sulastri newly jobless and available for full-time data collection. English-language literacy is a rare skill in the area, and no additional candidates were identified.

For this reason, Sulastri was employed as the primary research assistant and compensated at a daily rate for five days per week for an average work-week of forty-five hours. We ultimately developed a close personal relationship as well, and Sulastri often accompanied me to social events and invited me into her home on an informal

\(^4\) See local area map in the following chapter (Figure 4.1).
basis without monetary payment. Sulastri lacked formal post-secondary training, but her intelligence, overwhelming candor, life experience and extensive knowledge of the local area allowed her to contribute meaningfully to project planning and preliminary on-site data analysis in addition to her transcription and translation duties. More specifically, Sulastri assisted with the following tasks: (1) translation, adaptation, and administration of the household census, Household Food Security Access Scale (HFIAS), and final household survey; (2) collection of child heights and weights; (3) recording free list, pile sort, and rating scale results; (4) ethnographic interviewing and recipe elicitation; (5) coding and standardization of the free-listing data; and (6) interpretation of visual plots produced through multidimensional scaling (MDS) analysis. She also conducted a price survey of local area markets independently. Training and feedback were provided through daily briefing and debriefing sessions in which the day’s tasks were discussed and modeled through role-play.

In order to maximize the amount of time spent on data collection, the majority of the transcription and the translation of approximately 34 hours of digital audio resulting from the more formal, taped ethnographic interviews was outsourced to Ernisa bt. Marzuki, a lecturer and Master’s degree student in pragmatic linguistics at UNIMAS. On-site, Rajak b. Tahot of the Kpg. Trusan Jaya Development and Security Committee (Jawatankuasa Keselamatan dan Kemajuan, JKKK) transcribed and translated this same body of material to serve as an independent accuracy check. This work was performed on a contract basis, allowing Ernisa and Rajak to work at their own pace over the course of several months.

In instances where Sulastri was unavailable or unable to assist with an activity, I was accompanied by Jaibah bt. Hj. Lajit, a well-respected older woman from Kpg. Trusan Jaya who had served as the head of the DOA Women’s Economic Development Unit (WEDA) and maintained close ties to the village surau. Additional assistance with food identification and labeling was provided by the following community members: Sabtuyah bt. Ass, Mohtadi b. Masli, and Hasiah bt. Suni. Each of these individuals was recruited from within the study population based on his or her availability and knowledge of local food items as demonstrated through free-listing and early ethnographic interviews. Thus, a total of seven individuals were compensated for their assistance with this project: one primary research assistant (Sulastri bt. Rajak), two contract-based

Research Site Selection Rationale

Two adjacent, predominantly Malay coastal villages within the Sematan sub-district of Lundu, Sarawak (Kpg. Trusan Jaya and Kpg. Tanah Hitam), served as the focus of community-based data collection. This relatively homogenous site was chosen in order to capitalize on my existing connections in the area and provide a natural control for ethnic and religious differences. As Kahn (2005) notes, research competence among contemporary Malay populations consists in large part of the ability to establish rapport, thus emphasizing the benefit of my pre-existing connections to the villages, which were developed over the past three years both as an active participant in the UNIMAS/University of South Florida (USF) Educational Partnership and during fieldwork in the summer of 2006 in collaboration with the Sarawak SHD, AZAM, and the Fisheries Development Branch of the Sarawak DOA.

As further discussed in Chapter 4, malnutrition continues to be an issue in Lundu despite significant improvements over the course of the past decade (Yahya 2006). Clinic case mapping indicates that the concentration of undernutrition in the Kpg. Tanah Hitam and Kpg. Trusan Jaya area is the highest among Malay settlements within the Sematan sub-district, second only to the (indigenous) Selako village of Pueh. This clear nutritional need underscores the potential importance of the PPKZM to the local population and invites further analysis. Moreover, the relatively small populations of the two villages make this a manageable site for dissertation-level research.

Timetable for Data Collection

I arrived in Malaysia in mid-November 2007 to begin language training with an individualized Intensive Malay Language Proficiency Course (IMLPC) offered by the Institute of the Malay World and Civilization at the Universiti Kebangsaan Malaysia (UKM) in Bangi. I remained in peninsular Malaysia until late January 2008 completing the equivalent of 200 contact hours of instruction and reaching intermediate level proficiency. I also commuted to the Malaysian Ministry of Health (MOH) in Putrajaya during this time for primary document collection and interviewing. I then spent approximately one month on-campus at UNIMAS in Kota Samarahan commuting to the
Sarawak State Health Department (SHD) in Kuching and organizing state and local level research approvals and study logistics such as housing and transportation. I officially moved into Kpg. Trusan Jaya on February 22, 2008 and began work on the first study component, including: participant observation, household census and mapping activities, child anthropometry, assessment of household food security, selection of the quota sample, ethnographic interviewing, free-listing and pile-sorting. Data collection relating to the census and child anthropometry was initially prioritized in order to inform quota sample selection and was completed by the start of April 2008. Preliminary analysis of the remaining data began in earnest in July 2008 leading to (1) the creation of the final structured survey and (2) the selection of five dimensions of food classification to be testing using rating tasks. Though participant observation and informal interviewing continued throughout the field session, survey and rating task administration was prioritized during the final three months from August to October 2008. This timetable for data collection is represented visually in Table 3.2 (overleaf).
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*Cross-hatching indicates that data collection occurred for less than 15 days out of the month
Specific Methodologies Employed

Community-Based Data Collection

Data collection focused primarily on the village fieldsites as reflected by the extended nine-month time period spent living and working within Kpg. Trusan Jaya and Kpg. Tanah Hitam. The community-based techniques employed in this study can be roughly divided into three main categories based on the targeted respondents: (1) assessment of the total survey population, (2) data collection based on sampling, and (3) secondary methodologies. Each method set is organized chronologically and detailed below.

Assessment of the Total Survey Population

Household Census and Mapping

Community-based data collection began in late February 2008 with a household census, which included: (1) the name of each household member; (2) his or her age, sex, occupation and relationship to the reported head of household; (3) an estimate of combined household income; (4) the respondent’s baseline understanding of Program Pemulihan Kanak-Kanak Kekurangan Zat Makanan (PPKZM); (5) whether the family was a current or past program participant; and (6) the location of the household as determined using a handheld GPS (Garmin GPSMAP 76). The intent of the census was to provide an introduction to the area and to the local residents, establish a sampling frame, and elicit the information necessary to select respondents for a 25-household quota sample based on the dimensional sampling technique outlined by Arnold (1970) and Johnson (1990). GPS mapping was included at this stage to provide a concrete means of identifying individuals and family groups – many of whom used a wide variety of names – and to assist in locating more remote structures situated on footpaths away from the main road. GPS mapping is quicker and more accurate than mapping by hand, and moreover the GPS unit provides interactive instructions that can be used to navigate from one’s current location to any plotted site, thus affording me greater security and the ability to work independently prior to fully mastering the layout of the local area. In addition to these practical concerns, the resulting spatial data provided an enhanced physical understanding of place as described and recommended by Fernandez and Herzfeld (1998) as well as the opportunity for subsequent data analysis using Geographic Information Systems (GIS) software.
Entry to the primary fieldsite was hindered by mishandled visa paperwork, delayed state-level research permissions and the unexpected relocation of my primary contact at the site. To compensate for lost time, the planned full census of both villages was abandoned to concentrate on households with legal standing (i.e., citizens and documented immigrants\(^5\)) that included at least one child between the ages of six-months and six-years – the categorical age requirement for PPKZM participation. Households meeting these criteria were identified with the help of two local research assistants (Sulastri bt. Rajak, Jaibah bt. Hj. Lajit) and key informants including the Development and Security Committees (Jawatankuasa Keselamatan dan Kemajuan, JKKKs) from both villages.\(^6\) In addition, three systematic village walkthroughs were conducted in an attempt to discover new constructions or arrivals. In these cases, direct inquiries were made to determine eligibility, but no additional families meeting the above specifications were found.

A total of 72 households were identified and mapped – 50 in Kpg. Tanah Hitam and 22 in Kpg. Trusan Jaya. Of these, all but one provided verbal consent and participated in the subsequent census. The University of South Florida (USF) Institutional Review Board (IRB) had previously approved a waiver of written informed consent based on the study’s status as minimal risk research and the limited literacy and documented suspicion of foreign academics in the field setting (see Kahn 2005). Potential participants were provided with a set of information sheets written clearly and simply in the local Sarawak dialect.

**Child Anthropometry**

Height and body weight were measured for each child between the ages of six-months and six-years within the 71 participating households identified during the initial census. These measurements are safe and noninvasive and can be quickly and easily obtained by previously untrained personnel without a loss of accuracy. Moreover, child height

\(^5\) As it imposed substantial risk and no direct benefit, I decided it was unethical to collect information from undocumented immigrant families. It was also impractical as these individuals were ineligible for PPKZM benefits and therefore fell outside of the scope of the research.

\(^6\) The stated mission of the JKKK is to promote peaceful relations within the village and coordinate development efforts. Within rural areas, it serves as a major decision-making body and is often tasked with collecting census information for the sub-district office. While its official relationship to the headman is solely advisory, the JKKK’s members are necessarily engaged with the community and well-informed concerning its population.
and weight measures are the only indicators reported in Foo Li Chien’s (2003) national evaluation of the PPKZM, and information on alternative anthropometric indicators (e.g., mid-upper-arm circumference (MUAC) and skinfold measurements) is not routinely collected, limiting their usefulness for comparative purposes.

As anthropometric assessment was my only direct, study-related involvement with the village children – a recognized vulnerable population – it was particularly important to safeguard their emotional health by ensuring that the experience was no more awkward or stressful than a typical monthly visit to the community clinic and thus posed no risk greater than those encountered in the children’s daily lives. Recognizing myself as a stranger in the community and therefore a potential stressor, I postponed the physical assessments, conducting them separately from the census during a second household visit. This delay allowed time for greater integration into the community as I became a regular sight at the markets, local coffee shops and petrol station. In addition to this general community presence, my initial living arrangement with an older couple in Kpg. Trusan Jaya gave me consistent access to their five grandchildren – ranging in age from two to 15 years. Due to the girls’ curiosity and extensive social networks in the area, I was able to meet a large percentage of the village children informally by organizing English-language study sessions and activities. I made a point to have the anthropometry equipment visible at these times and often invited the children to measure household objects, pets, and one another. As a result, most of the children I encountered during the anthropometry phase had anticipated my visit, were somewhat familiar with the process, and were eagerly awaiting the arrival of their new balloons and pencils.

Heights and weights were collected within the children’s homes using the standard anthropometric measurement procedures outlined by Cogill (2003) with equipment selected for its resemblance to familiar devices currently in use within the Sematan and Lundu health clinics. As recommended, infants and children from six to 23-months (n = 37) were measured to the nearest 0.1 centimeter using a SECA 210 baby length measuring mat, while children over 23-months of age (n = 67) were assessed with the SECA Road Rod 214 portable stadiometer to the nearest 0.1 centimeter. Thus for

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7 Clinics equipment was viewed and photographed in 2006 during a set of preliminary visits to the area as a guest of the Sarawak Health Department (SHD) Nutrition Division.
children under two-years of age, the measuring mat was positioned on the floor with the primary research assistant kneeling behind the baseboard of the mat where the child’s head was to be located. With the help of the research assistant and the child’s primary caretaker, I positioned each child in the center of the mat so that he or she was looking straight up with the crown of the head touching the baseboard to create a line of sight perpendicular to the measuring mat (i.e., the Frankfurt plane). Legs were held straight with the toes pointing upward, and the child’s feet were placed flat against the footpiece of the mat to determine the recumbent height measurement. Children two-years and older were measured barefoot as they stood vertically in the middle of the stadiometer platform with feet flat and together against the back and base of the measuring board. The research assistant kneeled to the side of the stadiometer positioning her hands as necessary on the child’s shins (just above the ankles) and knees in order to ensure that the legs remained straight with the heels and calves flush against the back of the board. The head was positioned in the Frankfurt plane with the shoulders level, hands at the child’s sides and the shoulder blades and buttocks against the measuring board. In cases where the child was restless and had trouble maintaining the appropriate head position, I used a home-made sock puppet to direct the child’s line of sight while simultaneously lowering the headpiece with my left hand to obtain the measurement.

Body weights were determined to the nearest 0.1 kilogram with the SR241 portable weigh system, a safe, battery-powered model which negated the possibility of electric shock and allowed for combined weighing to further reduce potential child anxiety. Infants and children incapable of or uncomfortable with standing independently were weighed together with their caretaker – typically the mother or an elder sister. The caregiver was then measured on her own and the difference in the two weights was recorded as the weight of the child. As young children wear minimal clothing within the home and Malay etiquette dictates that shoes are removed prior household entry the impact of such items on child weight measures was minimal.

For each indicator, two initial measurements were taken. Provided that the measurements were within 0.5 kilogram of one another for weight or 1.0 centimeter for height, the two numbers were averaged to provide a final figure. In instances where the measurement discrepancy exceeded this accuracy standard (see Cogill 2003:36) both measurements were discarded and the procedure was repeated.
Within the 71 participant households, a total of 103 children were assessed. An attempt was made to confirm the child’s date of birth using clinic records in any instance where a caretaker was unable to provide the child’s home-based health card for verification. For the small group of children without health cards or clinic listings, age was verified by eliciting the date of birth from two separate household members on two separate occasions. Four identical reports were accepted as validation in the absence of written records. All but one reported birthdate was verified using these methods, and the unconfirmed data was excluded from the analysis. Once accuracy was confirmed, the sex, date of birth, and average height and weight of each child was entered into Epi Info 3.4.3 (Epidemiology Program Office 2007) to calculate weight-for-age, height-for-age and weight-for-height values based on the standard population distributions contained in the 1978 Centers for Disease Control and Prevention (CDC)/WHO growth curves.

This process determines each child’s nutritional health in relation to other children of the same age and sex from a known sample. Following the standard of the international nutrition community (see Cogill 2003:40), the data is presented as z-scores or standard deviation (SD) units, which capture the level of disparity between a child’s measurements and the median value of the reference population in relation to the total range of variation for that reference population. Children who are more than two standard deviations from the median (-2 SD) are considered undernourished. When this deficiency concerns the child’s relative height (or length) in relation to age, he or she is deemed stunted; when it concerns weight in relation to age the child is categorized as underweight; and when it concerns weight in relation to current height, wasting is the term applied. As noted by Himmelgreen and Crooks (2005), these indicators give insight into both the child’s current status and his or her long-term nutritional history as further elaborated in the following chapter.

*Household Food Insecurity Access Scale (HFIAS)*

Himmelgreen and colleagues (2000:335) note that strictly physical indicators are incapable of distinguishing between malnutrition caused by poverty-related hunger,

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8 The child’s family relocated during the course of the study and could not be reached for verification purposes.

9 The rationale for selection and relative benefits of the CDC/WHO growth standards are discussed in detail in Chapter 4, pages 108-114.
In response to this noted limitation, the concepts of food security and its absence (food insecurity) have emerged over the past two decades as a complementary, experience-based means of measurement. As phrased by Anderson (1990:1560), food security is:

\[
\text{access by all people at all times to enough food for an active, healthy life, and includes at a minimum: a) the ready availability of nutritionally adequate and safe foods, and b) the assured ability to acquire acceptable foods in socially acceptable ways (e.g., without scavenging, stealing, and other coping strategies).}
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For the purposes of this study, food security was assessed within the total survey population using a Malay language translation of the cross-culturally validated Household Food Insecurity Access Scale (HFIAS, Version 3) outlined by Coates and colleagues (2007). This brief questionnaire consisting of nine occurrence and nine follow-up frequency-of-occurrence questions assesses three separate domains\(^{10}\) of food security – certainty, quality and intake – which have been successful in distinguishing the food secure from the insecure in multiple countries and cultural contexts providing empirical support for their acceptance as universal domains of hunger experience. The HFIAS represents current “best practice” for measuring food security and combines knowledge gleaned from previous qualitative studies among low-income groups in the United States (Radimer \textit{et al.} 1990, 1992 and Wehler \textit{et al.} 1992), experiences with the U.S. Household Food Security Survey Module (US HFSSM) in domestic (Hamilton \textit{et al.} 1997) and international settings (Melgar-Quinonez 2004, Perez-Escamilla \textit{et al.} 2004) and additional independent studies seeking to directly measure food insecurity with reference to experiential household data (Webb \textit{et al.} 2002, Coates \textit{et al.} 2003, Frongillo and Nanama 2003).

The HFIAS is further distinguished from comparable instruments such as the Radimer/Cornell food insecurity measure and the US HFSSM by its lack of child-referenced questions. Most standard scales operate under the assumption that adults

\(^{10}\) Domain is operationalized by Coates and colleagues (2006) as the “most core experiences of food insecurity that are common across countries and cultures” – a usage distinct from the standard definition of domain developed in cognitive anthropology (see D’Andrade 1995:34) and employed in the systematic data collection procedures employed in this study.
attempt to buffer children from the worst effects of scarcity, often voluntarily bearing the brunt of food shortages. Food insecurity is understood as a “managed process with a general sequence as the problem worsens... [in which] child hunger, characterized by decreases in the quantity of food eaten by children, is the last stage” (Kendall et al. 1996:1020). In this scenario, child hunger is the most severe manifestation of household food insecurity and tends to be assessed separately with its own question set (e.g., items 8-10 of the Radimer/Cornell instrument). Yet Messer (1997) notes that at the global level most household decision-making actually preferences income-earning adults (see also Cassidy 1987, Engle and Nieve 1995, and Rogers and Schlossman 1990). Without clear documentation of the intrahousehold food allocation strategies favored among Sarawak’s rural Malay population, the HFIAS is a preferable tool as it asks about all household members and avoids drawing age-based distinctions.

Preparation of the Malay language HFIAS began with my initial translation. This draft document was back-translated by Sulastri bt. Rajak, a native speaker, community member and the primary research assistant for the study. Discrepancies were discussed and resolved before presenting a second Malay language draft to a five person panel, consisting of Sulastri, myself, and three members of the Kpg. Tanah Hitam JKKK. The resulting small group discussion followed Coates and associates’ (2007) guidelines for key informant interviews, eliciting locally-relevant phrases, definitions and examples to further adapt the standard HFIAS document. The questionnaire was then refined through pretesting with three mothers outside of the survey population and then back-translated again by the study’s bilingual transcriptionist, an advanced linguistics student and lecturer at UNIMAS. For comparative purposes, the standard HFIAS instrument is presented in Appendix A along with the final Malay-language survey and its English translation.

While Coates and colleagues (2007:8) recommend the use of eight to ten individuals representative but outside of the survey population, this standard was not feasible given the sensitive nature of the survey and the difficulty of accessing mothers in surrounding villages in the absence of existing relationships. I opted to end the pre-testing phase

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11 Items 8-10, which assess food insecurity at the child level, are as follows: (8) I cannot give my child(ren) a balanced meal because I can’t afford that; (9) My child(ren) is (are) not eating enough because I just can’t afford enough food; (10) I know my child(ren) is (are) hungry sometimes, but I just can’t afford more food (see Himmelgreen et al. 2000:336).
after three interviews when no additional information or revision recommendations were forthcoming. Despite the limited beta testing, respondents’ comprehension of the questions was uniformly high, and I remain confident that the instrument was both valid and meaningful in the village setting.

The final version of the adapted HFIAS was administered to a total of 70 households within a one week period during May 2008. One family had declined to participate in all study activities and a second had relocated for economic reasons in the months following the initial census. Due to the inherent sensitivity of the questions posed, interviews were conducted in private within the respondents’ homes as approved by the USF Institutional Review Board. The data were summarized as outlined by Coates and colleagues (2007) to create (1) dichotomous occurrence and ordinal frequency variables for each question, (2) frequencies for each food insecurity access domain (i.e., anxiety, food quality, and food quantity), and (3) household insecurity scale scores that could be analyzed as continuous variables.

Household Survey

The preceding assessments carried out with the entire survey population were intended to establish a sense of local context, facilitate entry into the home by providing a concrete purpose for initial visits, and cultivate trust and familiarity to aid in subsequent sampling leading into the exploratory and hypothesis testing phases. While the original project design envisioned a 60-household disproportionate stratified random sample for the final survey, the smaller than expected survey population (n=72) and subsequent funding from the National Science Foundation made it feasible to extend onsite data collection and conduct the survey with the entire eligible population. As such, the methodology is outlined here as an assessment of the total survey population.

The final survey was constructed in situ drawing on data from the ethnographic interviews, participant observer experiences and the systematic data collection techniques profiled in the following section. It consists of six main components: (1) household employment and income generating activities, (2) estimates of household income, assets and perceived monetary needs, (3) evaluation of proposed appetite enhancers and suppressants, (4) child feeding and health data, (5) perceptions of the local health clinic, and (6) a set of 28 representative true/false statements intended to
assess belief structures on the general topic of child undernutrition (see Johnson and Griffith 1996, Johnson and Weller 2001). Survey language was developed in consultation with the primary research assistant, evaluated for clarity in a small group environment with three members of the Kpg. Tanah Hitam JKKK, and pre-tested with three volunteer mothers outside of the survey population. The resulting instrument was used to collect data from a total of 63 households during early to mid-October 2008. In terms of nonparticipants, five families relocated during the fieldwork period and could not be reached for follow-up; a total of three declined to participate; and one mother was excluded due to prolonged illness and pregnancy complications.

Data Collection Based on Sampling

Following completion of the initial census, a 25-household quota sample was selected from the 71 eligible, consenting village households based on the dimensional sampling procedure outlined by Arnold (1970) and Johnson (1990). The intent of this technique is to select a set number (quota) of households that vary according to a defined set of variables, which are thought to influence the study phenomenon. If no significant differences are identified among this highly varied group – where they would be expected – the researcher can reasonably assert that no significant differences exist in the general population. This strategy mirrors Cook and Campbell’s (1979) deliberate sampling for heterogeneity, similarly assuming that findings of commonality in the face of diversity are a stronger proof of a shared cultural model – a sentiment echoed by Johnson and Griffith (1996) and more recently modeled by Dressler (2005) and his associates (2005).

This selection technique is further supported by work from Handwerker and colleagues (Handwerker et al. 1997, Handwerker and Wozniak 1997), which empirically differentiates between life experience markers (i.e., sociodemographics) and cultural data, the associations we attach to these labels. The authors note that while their simple, random sample was unique in its ability to produce an accurate estimate of the population parameters, it yielded findings identical to those of the convenience sample. Thus as directly stated, “the socially constructed nature of cultural phenomena makes the classical sampling criterion of independent case selection not only impossible to attain but also undesirable” as both random and non-random sample selection produce identical cultural data at the aggregate level and only dimensional sampling allows for
the selection of informants whose unique narratives and perspectives encompass the full range of experiential variability (Handwerker and Wozniak 1997:870).

Recognizing that a family’s food environment and experiences with hunger and food insecurity are likely to be strongly related to income, the children’s nutritional status, and participation in assistance programs such as the PPKZM, these variables were selected as the “dimensions of interest” for sampling purposes and to the extent possible, five households were chosen for each potential variable combination. A total of five groupings were created: (1) higher income families with healthy children, INCOME_HEALTHY (IH); (2) higher income families with underweight children, INCOME_UNDERWEIGHT (IU); (3) low-income families with healthy children, POOR_HEALTHY (PH); (4) low-income families with underweight children excluded from the PPKZM program, ELIGIBLE_NOT_ENROLLED (ENE); and (5) PPKZM-participating families (PPKZM). Due to the limited number of local families enrolled in the PPKZM program (n=3), I expanded my operational definition to include both current and past participants in order to meet the established five household quota. While not unbiased, the dimensional approach uses a researcher’s a priori analytic framework to select a sample with what Johnson (1990:27) terms “theoretical representativeness,” and it is considered appropriate in the study of cultural domains (Handwerker et al. 1997, Handwerker and Wozniak 1997, Bernard 2006:188).

Ultimately, dimensional sampling provides a set of guidelines for sample selection by specifying a minimum number of participants for each subgroup of interest. These criteria work to maximize the amount of variation a researcher is able to capture within a given study population while still providing the flexibility to preference those research relationships with higher levels of rapport and personal connection. Over the course of the study, I identified 30 families who were comfortable with the research and willing to grant me high levels of access to their lives and to their kitchens – nine IH households, nine IU households, seven PH households, five ENE households and five PPKZM households. Additional families beyond the set quota (n = 25) simply allowed me greater flexibility in scheduling for these groups during the exploratory phase. This sample served as the focus of my participant observation activities, ethnographic interview sessions, free list elicitations and pile-sorting as detailed in the following sections.
Participant Observation

Participant observation centered on household activities, particularly food acquisition, preparation, and consumption for both daily meals and celebratory events such as weddings and religious holidays. During the early stages of the project, the majority of these sessions were paired with more structured data collection techniques as community members were initially more comfortable when my household visits had a clearly defined purpose. After gaining entry into the home and beginning a structured task, our exchanges progressed naturally toward more interactive forms of engagement like participant observation.

Within the local village environment, families indicate their presence in the home and willingness to accept visitors by leaving front-facing doors and windows open. This practice allowed me to quickly gauge availability and develop an efficient timeline for general data collection. Standard research activities began around 8:30am, Monday through Friday, allowing time for the mothers to complete their early morning washing and transport their children to school. As predicted by the primary research assistant, attempts at earlier home visits were uniformly unsuccessful and quickly abandoned. In addition, no new in-home research was initiated for a two-hour period, between noon and 2:00pm. This time is typically used for eating, religious observances, sleeping, and bathing – a series of relatively private acts shared between family members. On occasions where I was already in the home – often engaged in food preparation activities such as pounding spices or cleaning pusuk [dried anchovies] – I was typically invited to remain and share in the noon meal, observing and participating in interactions during this part of the day. As my research assistant had her own family responsibilities to attend to in the early afternoon, I was unaccompanied at these times and reliant on my own language skills. No further structured research visits were initiated (1) after 6:00pm, (2) on either Saturday or Sunday, or (3) during Ramadan (the Islamic month of fasting, forgiveness and purification) and Hari Raya Aidilfitri (Eid ul-Fitr, the celebratory end of Ramadan). These limitations were imposed out of respect for local cultural norms and in recognition of practical constraints such as the availability of the primary research assistant and my own need to reserve time for writing and reflection throughout the fieldwork process.
With time and increased language proficiency and social connections, I was able to conduct participant observation independently beyond the confines of this established work schedule. I spent numerous weekends exploring the local markets; collecting seashells and shellfish along the coast and within the mangrove swamps; fishing and hunting for *ketam batu* [rock crab]; and gathering uncultivated local foods such as wild ferns, tapioca and bamboo shoots, water spinach, *pandan* [fragrant palm], and *jering* [strong-smelling local fruit encased in a hard, black seed pod]. I also devoted significant time to understanding the food-based, income-generating activities of village mothers and other child caretakers. For instance, I volunteered at the Kpg. Trusan Jaya jellyfish processing plant, assisted with a participant’s catering business, prepared drinks at a local market stall, and spent several days with a successful entrepreneur in Kpg. Trusan Jaya learning about the development and operation of her in-home business and helping to cook and package *keropok pisang* [fried banana chips] and *kuih bahulu* [a traditional local cake variety]. It was simply socially unacceptable for an unaccompanied woman of my age to visit homes with male occupants after nightfall, limiting my exposure to evening activities. I was able to observe female-headed households with small, male children and attend community events (*e.g.*, pre-marriage celebrations) and government-sponsored functions (*e.g.*, the Malaysian-Indonesian Friendship Concert, the Sematan Crab Festival). In addition, the week-long *Hari Raya* festivities included nightly home visits, which I participated in fully. However, as a time of celebration with special foods and activities, related observations cannot be expected to be representative of day-to-day life. I also observed health education sessions and interactions with staff members at the Sematan and Lundu clinics; one *Cukur Jambu* [baby’s first haircut ceremony]; and three weddings – one within my fictive family allowing me to contribute to meal preparation and the blessing of the bride and groom.

Field notes were recorded based on the conceptual framework outlined by Emerson and colleagues (1995), namely that: (1) the observed is inseparable from the observational process, (2) indigenous meanings and concerns receive priority, and (3) contemporaneous writing is essential. While not an instruction manual *per se*, these tenets do highlight the need for daily documentation, the substitution of concrete, sensory details for evaluative wording (*i.e.*, writing a description of an individual’s facial expression rather than simply characterizing it as “angry” or “sad”), and the free incorporation of feelings and impressions. In practice, this has meant a single file of
completed notes consisting of a basic layer of paraphrased dialogue and description punctuated by parenthetical asides, commentary, and in-process memos. Evaluative and emotional notations of the latter type were added in subsequent reflection and revision stages. As predicted by Pelto and Pelto (1978), Weller (1998), and Schensul and colleagues (1999), participant observation provided essential background for the development of interview questions and additional working hypotheses.

**Ethnographic Interviews**

Drawing on the quota sample described above, a total of 41 semi-structured ethnographic interviews in the Malay language were conducted at the participants’ homes using local dialect and vocabulary and the assistance of a bilingual, native speaker. To ease respondent burden, formal, taped sessions consisted of a series of short encounters averaging less than 50 minutes in duration. Over 34 hours of digital audio were independently transcribed by two bilingual research assistants. Any inconsistencies or gaps in the two transcript sets were resolved with reference to my daily field notes. Completed transcripts were translated in collaboration with two community members employed as research staff, and the resulting English language transcripts were entered into Atlas.ti 5.2 (Muhr 2004) for coding and analysis based on grounded theory – the iterative identification of categories, exemplars and emergent themes (see Glaser and Strauss 1967, Lonkila 1995, Strauss and Corbin 1990, Bernard and Ryan 1998). This data was supplemented with informal interview sessions, which were recorded through jotting (see Emerson et al. 1995) and incorporated into the field notes.

**Free Lists**

Free-listing is a simple, pencil-and-paper technique for eliciting cultural information: something outside of the individual respondent that he or she shares with other people (Borgatti 1999). This method uses a single prompt to obtain a list of locally-relevant examples for a predetermined category of interest or “cultural domain,” where domain is understood as a coherent set of related words, concepts or sentences at the same level of contrast (Weller and Romney 1988). While the researcher may choose to impose a time limit or cap on the number of items listed (restricted free-listing), respondents are generally free to produce as many examples as they can think of in a self-directed
manner, thus the term *free*-listing (Ross 2004). As Gravlee (1998:¶4) notes, this technique reflects a “commitment to defining the subject of study in emic terms – [that is] using the language, concepts, and categories of the people being studied.” Ultimately, free-listing is a quick, easy means of systematic data collection, which requires no previous expertise in the domain on the part of the researcher yet yields high-quality, quantifiable data (Quinlan 2005). It is most commonly used to ensure the cultural relevancy of subsequent methods (Bernard *et al.* 1986) and to determine the boundaries of what is being studied (Weller and Romney 1988) – in this case, what items are recognized as local foods.

Two separate free lists were collected from the primary caregiver – occasionally assisted by additional family members – in each of the 30 households in the expanded quota sample (see pages 60-61) in order to determine what food items were consumed (1) by all community members and (2) by all local children. The lists were obtained orally and recorded verbatim using a set of two prompts: (1) What are all of the foods that people here eat? [Apa semua jenis makanan yang orang makan sini?]? and (2) What are all of the foods that children here – that is, children between the ages of six-months and six-years – eat? [Apa semua jenis makanan yang kanak-kanak yang berumur ‘nam bulan hingga ‘nam tahun makan sini?]. This local Malay phrasing is deliberately informal, modeled on day-to-day community speech patterns rather than grammatical standards, and the term “food” [makanan] is intentionally vague to promote broad coverage of the domain. Quinlan (2005:223-224) has voiced concern that this sort of nonspecific free-list prompting can result in omissions. Yet as the intent of this method was to select highly salient items rather than create an exhaustive listing, Quinlan’s critique is not directly applicable. Moreover, both prompts meet the minimum item test for suitability suggested by S. Weller (personal communication, July 17, 2007), consistently eliciting a list of at least 12 items during pre-testing.

Initial lists were collected using only the basic prompts cited above. Then the redundant questioning, non-specific prompting, and alphabetic and semantic cues outlined by Brewer (2002) were introduced to encourage more complete reporting and standardize the process. While self-written responses are the preferred form of data collection for most U.S. populations (Borgatti 1999, Quinlan 2005), oral elicitation was warranted in this instance due to low levels of literacy in the community and the widespread use of a
localized bahasa rojak, an informal, typically unwritten, mixed dialect with a Malay base, which presents clear spelling and standardization challenges. Oral data collection allowed for immediate clarification and lessened the respondent burden. As Quinlan (2005:222) notes with respect to her work in rural Dominica, oral lists do tend to be “less formal and less independent” with participants often receiving help from other individuals in the immediate area – solicited and otherwise. This difficulty was resolved by conducting the activity solely within the respondents’ homes and expanding the unit of analysis from the primary caretaker to the household, effectively conducting a series of group interviews as described by Weller and Romney (1988).

Estimates of the required sample size for free-listing range from 20 to 30 participants (Weller and Romney 1988, Borgatti 1999). These figures are based on a conservative estimate of agreement that assumes an average degree of agreement between 50 and 60 percent and requires 95 percent validity or response accuracy (Weller 2007). However, there is still an expectation that the researcher will monitor item frequencies in situ to ensure that the order has stabilized (i.e., additional data has no appreciable impact). This is accomplished by computing the frequency count for approximately 20 randomly selected participants and then again for 30 participants. If the relative frequencies of the top items remain unchanged, one can safely assume that no more informants are needed as the last 10 respondents had no noticeable effect on the outcome (Borgatti 1999). Based on the above sample size estimates, it was initially believed that the 30 households in the expanded quota sample would be sufficient. However, frequency monitoring indicated a need for additional data, and the sample size was increased to 44 households for the general food free list and 37 households for the child food free list.12

The final set of participants was a convenience sample. Bearing in mind that free-listing prompts refer to cultural information (i.e., the researcher is asking, “What do ‘people here’ do?” rather than “What do ‘you’ do?”), the use of a randomized convenience sample to expand data collection is unlikely to threaten validity, particularly with the range of variation already captured through the use of dimensional sampling. Following

12 Subsequent reliability analysis confirmed that the sample (n=44) for the general local food listing was sufficient to produce good reliability (Cronbach’s alpha = 0.82) and 90.44 percent validity. Assessment of the child food free list sample (n = 37) produced a sufficient, albeit lower than expected, reliability coefficient (Cronbach’s alpha = 0.64) and validity (79.81%).
on this rationale, 30 household codes were randomly selected from the master list using a variation of the volatile function for random number generation (RANDDBETWEEN) in Microsoft Office Excel 2007. Households were visited in the order selected over the course of one working day, omitting those homes in which the primary caretaker was unavailable. Following data collection, frequencies were recalculated confirming stability and indicating that no further free-listing was warranted. Data were entered into ANTHROPAC 4 (Borgatti 1996b) to identify the most salient food items from both the general and child lists for inclusion in the pile-sorting task.

**Pile Sorts**

Unconstrained (free\(^{13}\)) similarity pile sorts were performed with a total of 33 community members using a deck of locally-obtained photographs that were cross-checked for validity by two independent informants. Each of the images was taken within 20 kilometers of the two villages, and the Sematan and Lundu open-air markets were the primary photography sites. One of two community research assistants was on-hand during the photography process to assist with food item identification, and the second assistant reviewed the images prior to printing to confirm the accuracy of the assigned labels. Each of the printed cards was given a unique numeric identifier (recorded on the back of the photograph) to facilitate data recording and entry.

Pile-sorting – or card-sorting as it is routinely referred to in the health-based literature (e.g., Morse and Field 1995, Luniewski et al. 1999, Neufeld et al. 2004) is a technique often employed to elicit similarity judgments and attributes used to distinguish among items (Borgatti 1999). In this instance, a locally-produced set of 55 color photographs was shuffled and presented to respondents. Boster and Johnson (1989) have demonstrated that there is some danger that the use of images can bias informants toward similarity groupings based on physical attributes such as size, color and shape. Yet both Atran (1999) and Lopez and colleagues (1997) have documented their success using picture cards among illiterate groups of Itza’ Maya, and moreover with a low-literacy population such as this one, text-based stimuli are simply not a viable option. Each individual was therefore asked to review the images, consider the characteristics of the food items depicted, and then group the cards creating as many piles as they saw fit.

\(^{13}\) Unconstrained sort is the term favored by Weller and Romney (1988) and is synonymous with “free sort” as used by Borgatti (1999).
based on self-defined aspects of similarity (i.e., to determine what cards were most like one another). Essentially, the objective of this activity is to group the stimuli so that those items in the same pile are more similar than those items in different piles. With an unconstrained sort such as this one, this is done without reference to any specific criterion (e.g., an attribute or a predetermined number of groups). Upon completion of the task, participants were asked to reflect on each pile and create a name for the grouping. These names and any related dialogue produced during the naming process were recorded and transcribed.

Pile-sorting data is assessed by creating a dichotomous item-by-item matrix for each individual. When reading across any given row, a “1” indicates that the row item was placed in the same pile as the column item whereas a “0” indicates that the two items were placed in separate piles. Thus for any given individual, we can only know whether they considered two items to be alike or different. We cannot determine the degree of similarity without aggregating the data and assessing the overall group response. For this reason, Weller and Romney (1988:25) characterize the dichotomous data produced by pile-sorting as relatively sparse, noting that this technique requires sample sizes of at least 20 to obtain stable, replicable results; while Borgatti (1999) states that convention calls for at least 30 participants. Beyond these minimums, a sample size of 30 to 40 is generally capable of achieving reliabilities of over 90 percent (Weller and Romney 1988:25), with Romney and associates (1979) demonstrating high levels of stability across four replications. While sample size requirements for pile-sorting are more demanding, this technique was considered preferable to both triadic comparisons and rating scales due to its ability to accommodate large numbers of items and visual stimuli. In fact, Weller and Romney (1988:25) assert that it is perhaps the only method that will “allow for the collection of judged similarity data among over 100 items.” Moreover, pile-sorting tends to be less tedious, more game-like, and even enjoyable for participants (Bernard 2006).

Data collection began among the 30-household quota sample, yielding a total of 26 completed pile-sorts. Preliminary analysis revealed no significant differences related to either household income or child health status. Based on concerns that existing income guidelines and child z-score cut-offs might not be particularly meaningful markers, data from the initial household census was reviewed to ensure that families representing the
extremes of household income and child nutritional status had been sampled. Pile-sorting was conducted with an additional seven households such that five of the six lowest income families, five of the seven highest income families, the families of five of the eight most severely undernourished children, and the families of all seven of the children with the highest relative body weights were included. These additional sorts raised the final sample size to 33, which is within the range for high-level reliability.

**Rating Scales**

Visual interpretation of the pile sort data using multidimensional scaling (MDS) analysis suggested five underlying classification dimensions for local food items: (1) degree of processing, (2) time of day for consumption, (3) level of satiety, (4) price, and (5) healthiness. By estimating the parameters of a set of models that relate each dimension to the items' positions on the MDS plot – an analysis known as property fitting or PROFIT – it becomes possible to objectively assess the role of each of these attributes in the classification process (Borgatti 1996a). To do so, it is necessary to create a regression in which the map coordinates are the independent variables and the proposed dimension is the dependent variable – requiring a measurement of the relative processing, price, healthiness, etc. for each food item included in the pile sort. Rating scales were introduced for this purpose.

As Weller and Romney (1988:38) note, the rating scale is more reliable when delivered in a written format to literate respondents. Part of the issue is that reliability increases along with the number of steps in the scale up to a maximum of 20 steps, although the relative benefits begin to level off between seven and 11 steps (Guilford 1954, Dawes 1977, Nunnally 1978:595). With oral administration, however, anything beyond a four-point scale becomes difficult to manage, requiring a “complex concept of ordination” (Weller and Romney 1988:42). Moreover, the scale’s anchor points (the endpoint designations typically represented either numerically or linguistically with adjectives and modifying adverbs) can lose their meaning between items and between individuals, exacerbating the potential for response bias. There is also the need to present each participant with a random ordering of items to cancel out the order of presentation bias at the aggregate level (Borgatti 1996c).
With attention to these concerns, rating scales were constructed using the vector questionnaire format in ANTHROPAC 4 (Borgatti 1996b). Drawing on its basic mathematical definition, a vector is an object that can be added or multiplied – that is “scaled” using numbers (see Brown 1991). In creating a questionnaire that asks respondents to rate an item on a given attribute using a numerical scale, you are essentially collecting a vector of numbers from each respondent. In recognition of this fact, the ANTHROPAC software terms this questionnaire type the “vector questionnaire.” While the resulting formatting is not particularly visually pleasing with its distinctly DOS-like appearance, ANTHROPAC is the preferred means of generating questionnaires due to its ability to create a researcher-defined number of individually randomized forms and then automatically unscramble the responses at data entry. It does this by assigning a unique identification number to each questionnaire and then using it as a seed for the sequence of random numbers employed to generate the random ordering of items on that questionnaire (see Borgatti 1996c).

Based on this procedure, a total of 25 unique questionnaire forms were created for each of the five proposed classification dimensions. The four-point scale was presented separately in a large graphical format consisting of four boxes, each of which combined a numeric signifier with a simple image and a descriptive phrase (Figure 3.1 overleaf). Respondents were read the name of each food item from their individual questionnaire and asked to point to the block which best described that item. The text in the selected box was read aloud to the informant for confirmation and the corresponding number marked on the survey form. The pile-sorting photographs were on-hand throughout the process, and an image of the food was provided in any instance in which the respondent expressed uncertainty about the identity of the named item.

The oral administration of rating scales is faulted due to the tendency for informants to repeat either the first or the last choice (Weller and Romney 1988:42). Ostensibly, this is the result of an overreliance on memory. However, I believe that by continually drawing participants’ attention back to the scale through the physical act of pointing, the scale is reinforced to the same extent that it would be when presented alongside each item as recommended for literate informants.
The intended use of property fitting (PROFIT) analysis to assess proposed visual interpretations of the pile-sorting results as outlined above requires an independent sample from the same population and a minimum sample size of 20 for each hypothesized dimension (Borgatti 1996a, C. Maxwell, personal communication, August 8, 2007). With a total of 45 non-sampled households remaining (following pile-sorting) and a need for 100 completed rating scales, each targeted household was asked to complete three separate rating tasks. The 45 eligible households were separated from the total sample population and randomly assigned three possible classification dimensions for assessment, again using a variation of the volatile function for random number generation (RANDBETWEEN) in Microsoft Office Excel 2007. Following the recommendations of Weller and Romney (1988) each of the 55 items was rated on a single dimension (e.g., price, satiety) before proceeding to the additional two dimensions. This technique prevents the multiple rating scales from interfering with one another. No special consideration was given to the order of administration for each
individual task as Brewer (1993) has demonstrated with two separate studies that multiple rating tasks are free of order effects. A total of 105 rating tasks were completed, assessing the degree of processing \((n = 20)\), time of day for consumption \((n = 21)\), level of satiety \((n = 20)\), price \((n = 23)\), and healthiness \((n = 21)\) of each food item.

**Additional Methodologies**

A limited number of supplementary data collection techniques were introduced while on-site, including the collection of general and child-specific recipe sets, a pricing survey of major food items, and community mapping using a handheld GPS.

**Recipe Collection**

The rationale for recipe collection emerged in May 2008 with the discovery of an undated publication by the Sarawak State Health Department (SHD) which profiled a set of 43 recipes for local clinic cooking demonstrations (see *Unit Pemakanan Seksyen Pembangunan Kesihatan Keluarga* n.d.). This collection was used as a reference at both the Sematan and Lundu clinics and presented the opportunity for a comparative analysis of how nutrition beliefs were applied to cooking strategies at both the clinic and household level. In addition, the process of recipe collection was itself useful, offering a means of circumventing – to some extent – the standard researcher/informant power dynamic. Due to my relationship with the SHD and previous participant observation during clinical home visits in 2006, I was concerned that my presence in the household was being interpreted as a form of evaluation. The similarity of my anthropometric techniques and health-based interests likely contributed to this impression. Recipe collection had the unexpected benefit of emphasizing my status as a young woman of child-bearing age living in an unfamiliar environment. The focus on cooking cast me in the role of apprentice, encouraged the development of fictive kin relationships, and created a more comfortable rationale for entry and observation within the kitchen environment. Recipes were formally recorded with participants providing the title, yield, ingredients, and method of preparation along with a brief commentary on the origins and benefits of the recipe. An average of four recipes was elicited from 18 community respondents, producing a total of 71 child-specific recipes. As the distinction between child and adult foods became more pronounced in the ethnographic interviews, an additional 70 general family recipes were obtained from a set of 14 respondents.
Community Price Survey

To enhance understandings of the local food economy, determine the accuracy of participants’ relative cost estimates for the 55 pile-sorting images (collected through rating scales as outlined on pages 69-72) and provide an objective means of evaluating the comparative cost-effectiveness of the village and health department recipe sets, prices were recorded for 300 local food items, noting the unit of sale and price per unit. These foods included: (1) the 55 pile-sorting items, (2) commodities distributed in the monthly PPKZM food basket, (3) foods highlighted in the clinic and community recipes and (4) items of interest emerging from the ethnographic interviews. Information was gathered independently by the primary research assistant over the course of a four-day period beginning on August 4, 2008.

Food prices are relatively uniform within the community, which allowed the research assistant to elicit prices from market locations visited during her daily routine. A set of 20 items was randomly chosen from the list the following week as a spot check on accuracy, and price variations were within 50 sen (approximately 0.14 USD) for each item among three separate vendors. Admittedly, this data is limited by its failure to account for seasonal price variations, particularly for fish and other seafood. This difficulty was offset to some extent by classifying the seafood according to more constant cost categories based on relative size and availability. Thus while an average annual price for each individual fish is unavailable, it is possible to accurately quote the cost of a small, in-season fish or a medium-sized high-prestige fish. Moreover, with respect to comparability, the timing of the price survey intentionally overlapped the administration of the rating scales ensuring that any emerging differences between the two would not be attributable to seasonal price variation. When considering this data in a larger sense, it should be noted that both perceived and actual food costs were assessed in the wake of the Asian rice crisis and likely reflect the impact of the 30-year inflation adjusted high reached during the previous four months (see Timmer 2008, Slayton 2009).

14 Fruit and vegetable prices are largely static as seasonality tends to impact availability rather than cost.
Additional Community Mapping

As previously noted, 72 household locations were plotted during the initial community census in order to accurately identify family members, facilitate the location of more remote structures, and enhance the researcher’s understanding of local physical spaces. In respect to this final rationale, food resources constitute an important part of the village environment, and community mapping efforts were soon expanded to include market locations (n = 7); roadside stalls (n = 4); government-sponsored “food court” developments (n = 3) and independent restaurants (n = 5); grocery (n = 26) and sundry shops (n = 8); fishing and boat access points (n = 3); and the major collection sites for uncultivated food resources (n = 9). Maternal and child health facilities at the district and sub-district clinics (n = 2) were also plotted. Again, this data will be further assessed through subsequent analysis and serves primarily to orient my own understanding of the villages’ physical environment, providing an additional depth to the analysis and discussion.

Data Collection at the Ministry of Health, State Health Department, and Local Clinics

The aim of the initial research design was to select a purposive sample of 30 health professionals at the Ministry of Health (MOH), State Health Department (SHD) and the local district and sub-district clinics using existing contacts and chain referral (i.e., snowball sampling) as recommended by Bernard (2006:192) for elite groups. This sample size was ultimately untenable given the limited number of employees actively involved with the program. At the national level, all PPKZM-related activities are assigned to the Assistant Director of Nutrition, who oversees this program along with two others (Fatimah Zurina, personal communication, December 17, 2007). There is no direct involvement with the PPKZM and oversight consists largely of monitoring state-reported program statistics. At this point, primary responsibility for the PPKZM has devolved to the state level. Within Sarawak, a total of three individuals are employed to deal with the full range of nutritional programming, and the PPKZM is primarily handled by a single nutrition officer (Yahya b. Ahmad, personal communication, February 19, 2008). Meanwhile rural clinic staffing is plagued by high turnover with a reported average commitment of six-months as most workers enter the clinic as part of a short-term student attachment (Yahya b. Ahmad and Andrew Kiyu, personal communication,
February 19, 2008). In light of these conditions, meaningful data collection with a large sample (i.e., n=30) was considered unrealistic, shifting the focus of the study to the village. However, limited ethnographic interviews were still conducted at the national (n=2), state (n=2) and local levels (n=4) and supplemented with (1) clinic-based observations of health education sessions, child health monitoring, and food basket distributions, and (2) the collection and analysis of nutrition-based policy documents and procedural manuals.

In addition, attempts were made to conduct unconstrained judged similarity pile sorts (see Johnson and Weller 2001:510) with the Lundu and Sematan nursing staff, identical to those performed with community members. However, despite multiple clinic visits, adequate sample sizes could not be achieved even with the inclusion of student attachment workers. A total of 17 pile sorts were obtained. Sampled workers from the Sematan sub-district clinic included five individuals: two clinic workers who had been on staff for approximately three years, the newly promoted Head Nurse with nearly a decade of experience, and two student workers in the midst of the first month of their attachment. Participants from the district clinic at Lundu included four long-term staff members who had been on-site for over five years, four student attachment workers with two months of clinic experience, and four newly-arrived student workers. As these numbers fail to meet the minimum sample sizes set by either Borgatti (1999), n = 30, or Weller and Romney (1988), n = 20, these pile sort results can only be interpreted with caution.
CHAPTER FOUR
THE COMMUNITY FIELDSITE

On the southwest coast of Sarawak approximately 114 kilometers from the state capital at Kuching sit two self-described Malay fishing villages – Kampung (Kpg.) Trusan Jaya and Kpg. Tanah Hitam (see Figure 4.1 overleaf). There are few physical or social barriers between the two adjacent villages. Residents of Kpg. Trusan Jaya routinely walk or ride their motorbikes through Kpg. Tanah Hitam to reach the nearby fish and vegetable markets, shops, and coffee stalls of Sematan, often pausing to purchase petrol and visit with relatives. Like the majority of Malays in this area, the villagers view fishing as the foundation of local livelihoods, and the fishing family is a longstanding regional identity as evidenced by Harrison’s (1970) earlier ethnographic observations, historical research by Ahmad Zainal and Salleh (2002), Zamri and Azman’s (2006) recent survey findings, and Suhaidi Salleh’s work (2006) on occupational change through successive generations.

Although rural, the villages are easily accessible by road. The paved highway, which connects the small district capital of Lundu with the sub-district seat at Sematan, bears right as it approaches the coast of the South China Sea and narrows into a one-lane blacktop. It extends eastward for just over a kilometer serving as the primary road for Kpg. Tanah Hitam before leading out past the now largely defunct timber docks1 and the Sarawak Department of Agriculture (DOA) Inland Fisheries Division Compound. The road ultimately culminates with a loop of housing referred to in the DOA publications as Trusan Jaya Hilir – the downstream side of Kpg. Trusan Jaya. Official writings tend to distinguish this village’s upstream and downstream segments – currently linked by a stable wooden bridge – by characterizing Trusan Jaya Hilir as the more developed area with piped water, sufficient drainage, and electricity (see Rangu 2002). Residents, however, do not acknowledge this division and are quick to note that at present all

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1 The area surrounding the timber docks is formally referred to as the Sematan Industrial Area, but in light of the current economic situation such terminology is misleading and sadly ironic.
Figure 4.1: Detailed Map of Sarawak (Kuching and Samarahan Divisions)

Source: Sarawak Tourism Board (n.d.); Scale 1:1,000,000
villagers are supplied with piped water, while there are still families on both sides of the bridge which lack electricity and experience sporadic flooding.

In contrast, the infrastructure in Kpg. Tanah Hitam is more developed with extensive drainage and near universal access to electricity. Among targeted households – those with legal standing and children between the ages of six-months and six years\(^2\) – 93.2 percent of families in Kpg. Tanah Hitam currently had electricity in the home compared to only 57.9 percent in Kpg. Trusan Jaya – a disparity which is believed to be representative of the communities as a whole. However, electricity cannot be interpreted simply as a proxy for relative wealth. A number of low-income families in Kpg. Tanah Hitam readily admitted to illegally “borrowing” their electricity from a neighbor’s supply, while moderate income groups in Kpg. Trusan Jaya indicated that they could afford the monthly usage fees for this utility but not the large installation expense. Access to electricity therefore appears to be more closely related to household location rather than income.

**A Brief Local History**

Information about the history of the villages is limited to word-of-mouth, brief asides in more recent DOA publications, and the collected knowledge of the communities’ Village Development and Security Committees (*Jawatankuasa Kemajuan dan Keselamatan Kampung*, JKKK). In large part, the JKKKs are self-monitoring bodies and the quality – even the existence – of many of their reports is based on the enthusiasm of individual committee members. As such, this history draws heavily on the work of Abdul Razak bin Tahot (2006),\(^3\) a passionate amateur historian and the vice-president and secretary of the Kpg. Trusan Jaya JKKK. Due to the paucity and particular focus of the available sources, this narrative will concentrate on Kpg. Trusan Jaya. Yet the constant movement of families and individuals between these village sites and the shared administrative system, which lasted until October 1996, make this history more widely applicable to all of the study’s participants. To facilitate understanding, a concise

\(^2\) The Household Census and Mapping section of the Methodology Chapter further details the criteria and rationale for the selection of study participants.

\(^3\) For citations involving Malay authors, I have chosen to abbreviate by using personal names in text and omitting paternal names (typically denoted with bin [son of] or binti [daughter of]). Honorifics and repetitive elements will be limited to the full reference. The bibliography is alphabetized according to the given name used in text. In ambiguous cases, I have used the Western standard as a default.
timeline of relevant local events is presented in Figure 4.2 (overleaf) and then elaborated in the following discussion.

Rangu (2002:3) reiterates the standard narrative offered by employees of the DOA Inland Fisheries Division: Kpg. Trusan Jaya came into being in 1997 with the official recognition of its fourteen-member JKKK, a split-off from the nearby Kpg. Tanah Hitam. This recognition followed on a brief four-year history as an emerging site for crab research and development during which time the expanding fisheries facilities attracted economic migrants from the surrounding areas. Yet in underscoring the importance of the fisheries complex to the local community, this history seems to overstate the role of the agency and its projects. At the height of corporate involvement from 2000 to 2002, the DOA’s private partner, Muhandis Industrial Services, employed a total of six local workers (Rangu 2002:6), and the Sematan Fisheries Center itself could hardly have provided gainful employment to the additional 183 households recorded in the area at that time (Daerah Kecil Sematan 2002). Moreover, community outreach was not a component of the research and development stage, meaning that independent, artisanal fishermen would not have received project support.

While not discounting the influence and appeal of the Fisheries Center, it seems more likely that nearby groups were simply returning to a well-situated environment, which had been temporarily abandoned as overtaxed and potentially unsafe, thus following on the local land use pattern of build-up and exodus documented by Kaur (1999) and Lian (1993). According to Abdul Razak (2006), an Australian bauxite company was active in this area approximately 60 years ago, operating washing plants in the upper regions of the Trusan River and ultimately polluting the river with a reddish dust causing problems for early settlers in the Beuku Promontory – where both Kpg. Trusan Jaya and Kpg. Tanah Hitam are currently located. Not unlike more recent times, many individuals relied on existing natural resources and harvested shellfish, crab, fish, and mangrove timber – often processing the wood to create charcoal, poles, and *samak*, a type of preservative applied to fishing nets and other fishing equipment. Agricultural activities were limited with Abdul Razak (2006) noting that even standard flavor-enhancers such as ginger and lemongrass were not routinely cultivated. By the time of Sarawak’s incorporation into the newly formed state of Malaysia in 1963, this dependence on gathering activities was no longer sustainable for the majority of the population, forcing
Figure 4.2 Local Timeline (Kpgs. Trusan Jaya and Tanah Hitam)

- **Early 1960s**: Local population relocates to Kpgs. Temaga, Siru, and Sungai Kilong
- **1963**: Sarawak joins with Singapore, Sabah, and Malaya to form modern Malaysia
- **1950s**: Pollution from bauxite mining and extensive gathering taxes natural resources
- **1950**: Kpg. Trusan Jaya area surveyed; formal distribution of land begins
- **1965**: Conflict shifts from northern Borneo to the peninsula; migrants from Kpg. Pugu return to establish small-scale rubber holdings
- **1963-1966**: Indonesian Confrontation Campaign
- **1987**: Kpg. Trusan Jaya established as an independent village
- **1992**: Initiation of mudcrab aquaculture projects (DOA)
- **1997**: Kpg. Trusan Jaya area surveyed; formal distribution of land begins
- **1992-1995**: Aquaculture activities expanded with corporate partner (Muhandis)
- **2000-2003**: Aquaculture activities expanded with corporate partner (Muhandis)
- **2000-2003**: Initial GEF-SGP Grant (Mangrove Rehabilitation Project)
- **2004**: Shift in WEDA leadership
- **2003-2005**: Initial GEF-SGP Grant (Mangrove Rehabilitation Project)
- **2006-early 2008**: Renewed GEF-SGP Grant (limited impact)
many residents to relocate to the nearby villages of Temaga, Siru, and Sungai Kelong in search of food and more secure livelihoods.

The Beuku Promontory was further depopulated by the “conflict with Indonesia” – likely the Indonesian confrontation campaign, spanning from 1963 to 1966. Voicing concern that the union of the former British colony Malaya with the current British colonies of Sarawak, Sabah, and Singapore was simply a veiled colonialist agreement that would allow Britain to maintain military bases within the area, Indonesian President Sukarno opposed the formation of Malaysia from its inception (Weisburd 1997, Cheah Boon Kheng 2002). Drawing on the rhetoric of the Indonesian Communist Party (PKI), Sukarno quickly adopted the provocative slogan “Ganyang Malaysia!” [Crush Malaysia!] (Hooker 2003:219) and continued to maintain this aggressive stance in spite of independent findings and conciliatory recommendations put forth by the United Nations (Weisburd 1997). Indonesia ultimately withheld diplomatic recognition from the new nation and instead began a series of small-scale guerilla operations in northern Borneo. Although the focus of the campaign had shifted to the Malay peninsula by the early fall of 1964 – due in part to an inability to generate popular support among local inhabitants – the majority of residents in the area that was to become Kpg. Tanah Hitam and Kpg. Trusan Jaya had already fled. Long-established bauxite mining activities were also terminated during this period due to concerns over profitability given the area’s increasing instability (Abdul Razak 2006).

Local histories locate the end of the Konfrontasi in 1965, the time at which families from nearby Kpg. Pugu began to arrive in the area with the intent of establishing rubber

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4 Scholars such as Wade (2008) and Tan Tai Yong (2008) argue that the British intent to establish the larger state of Malaysia, inclusive of Singapore and the Borneo territories, was explicitly a Cold War strategy and one made public in the speeches of then-Chief Minister Tunku Abdul Rahman. As part of the British “Grand Design” for Southeast Asian integration in the wake of decolonialization, the proposed nation-state would have been legitimately concerning for Sukarno (see Tan Tai Yong 2008:20-25).

5 While collected local narratives and authors such as Weisburd (1997) agree on this point, more general histories (e.g., Hooker 2003) present a conflicting image of popular support for Indonesia. I have chosen to emphasize community perspectives on the past as they are more representative of the situation in the immediate vicinity. Larger histories tend to focus instead on the peninsula, excluding the unique position of the Borneo states.

6 The formal agreement ending the conflict was not signed until August 16, 1966, although the confrontation did lose much of its intensity in the fall of 1965 as a failed leftist coup and anti-leftist response left President Sukarno effectively powerless (Weisburd 1997: 110). Prompted by Indonesia’s need to access Western foreign aid, the peace agreement made limited demands on Malaysia, asking only that the residents of northern Borneo reaffirm their decision to be affiliated with Malaysia through the
Documented rubber-motivated migration from Pugu continued steadily for the next two years, although it is unclear what ultimately became of these business interests as rubber tapping is no longer pursued in the immediate area. At that time, only Kpg. Tanah Hitam was recognized as a village, and the small collection of approximately 100 houses and gardening huts scattered throughout the mangroves in the area that was to become Kpg. Trusan Jaya was not administratively distinct. It was not until April 23, 1987 that Kpg. Trusan Jaya was formally surveyed and declared a new village, part of the sub-district of Sematan within Lundu district.

Despite formal recognition, Kpg. Trusan Jaya remained unnamed and under the administrative control of the headman of Kpg. Tanah Hitam, Tahir bin Jaya. While village autonomy had yet to be achieved, the survey process was significant in that it allowed for the formal distribution of land through state grants for temporary occupation licenses (TOLs). As part of the Malaysian National Land Code, state land may be designated for individual use without conveying ownership rights to the new user. As Salleh (1991) notes, the TOL system was a common strategy for encouraging agriculture among rural Malays and offered the potential for a full grant after long-term occupation and use. A total of 56 licenses were issued in the future Kpg. Trusan Jaya. Forty-three were given to residents within the Sematan sub-district who did not currently occupy their own independent homesites, while the remainder was distributed to a group of squatter families living in the vicinity of the sub-district resthouse (Abdul Razak 2006:3). This licensing prompted a period of community growth with new construction, renovations to previous squatter sites, and the establishment of the village surau.7

July 31, 1989 is the first recorded incidence in which the name “Trusan Jaya” was applied to the village. In this case, sub-district administrators used the name to clarify location by referencing the Trusan River – a tributary of the Sematan River which flows through the area. The village was known as Kpg. Trusan Jaya thereafter, ultimately separating from Kpg. Tanah Hitam on October 1, 1996 to come under the independent leadership of Abdul Rahman bin Buang. By January of the following year, the village had established its own JKKK, intended to promote peaceful relationships and coordinate local development efforts.

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7 The surau is a Muslim place of worship, and the term can be effectively glossed as a small mosque.
Development Efforts over Time

Development – in the form of a series of DOA Inland Fisheries Division projects – had ostensibly come several years earlier with the introduction of the mud crab\(^8\) pen culture system in 1992. In the local context, pens were constructed in logged areas of the mangrove swamp and then stocked with immature crabs that were fed daily until reaching a marketable weight of approximately 300 grams (Rangu 2002:5).\(^9\) This crab grow-out technique was heralded as a potential source of supplementary income for area fisherman and briefly piloted. Yet as these activities depended on a continued harvest of juvenile crabs, project expansion was constrained until research on wild crab stocks in the Sematan River estuary could be completed. The resulting study (Mhd. Ikhwanuddin 1996) was conducted over a one-year period from 1995 to 1996 and was guardedly optimistic in its conclusions, stating that harvesting could be sustained with some level of control and oversight.

This was enough reassurance for the Sarawak DOA to begin a three-year joint venture with Muhandis Industrial Services to develop mud crab aquaculture at the Sematan Fisheries Center and within the mangroves at Kpg. Trusan Jaya. Beginning in October of 2000, this project arrived during a period of extreme need. The previous year Mhd. Ikhwanuddin and Oakley (1999) had asserted that “nearly 100 percent” of the village population was living below the poverty line\(^10\) while at the district level Lundu was one of ten districts with child malnutrition rates greater than 20 percent from 1999 to 2003 (Yahya 2006:4). Operating within this context, the benefits to the local community were continuously highlighted both in terms of employment and oddly, ecotourism. Although the partnership was focused on seed production (i.e., reproducing juvenile crabs in captivity), grow-out culture technology, and feed formulation, local community participation was envisioned as “eco-tourism project activities such as homestay… or camping within the mangrove forest, touring of the crab pen culture, river cruising within

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\(^8\) The targeted local varieties of mud crab have been identified as *Scylla olivacea* and *Scylla tranquebarica* (Mhd. Ikhwanuddin 2001).

\(^9\) A fuller explanation and critique of mud crab aquaculture is beyond the scope of this writing. Interested readers are asked to refer to Keenam and Blackshaw (1999) for a good review of the state of the art during this era and Mhd. Ikhwanuddin and Oakley (1999) on the role of the Sematan Fisheries Center in research and development.

\(^10\) The authors’ characterization is based on poverty line standards set by the Sarawak State Economic Planning Unit for 1999.
the mangrove, fish and crab fishing, mangrove birds [sic] watching and jungle trekking” – in each instance “the flora and fauna of Sematan mangrove forest would be the main attraction” (Rangu 2002:7).\textsuperscript{11} The Muhandis collaboration was thus significant for the communities of Kpg. Trusan Jaya and Kpg. Tanah Hitam in two primary respects: (1) it marked the beginning of an eight-year period of high-level aquaculture investment and (2) it was a well-documented example of an emerging developmental paradigm which saw locally available natural resources as a panacea.

As the project progressed, efforts were made to secure further funding from alternative sources, namely the Global Environment Facility (GEF) Small Grants Program (SGP) administered by the United Nations Development Program (UNDP) and funded by a collaborative partnership among the UNDP, the World Bank and the United Nations Environmental Program (UNEP). The eligibility criteria for the UNDP-GEF partnership require both that requesting organizations be non-governmental, community-based, and grass roots-oriented and that proposed sites and interventions correspond to set GEF operational programs (GEF-SGP 2008). Mirroring these guidelines, the application for funding submitted by the Kpg. Trusan Jaya JKKK in April 2002 envisioned mud crab aquaculture as one component of a larger alternative income generation scheme intended to replace mangrove logging with more “sustainable” activities. Framed as such, the project now aligned with the guidelines provided by the GEF Convention on Biological Diversity in its promotion of “the conservation and sustainable use of the biological diversity of coastal and marine resources under threat,” and its explicit incorporation of four funding-eligible sustainable development activities: (1) impact assessment of mangrove forest logging, (2) sustainable use awareness activities, (3) community capacity building, and (4) the provision of alternative livelihoods\textsuperscript{12} (GEF 2008:2-1, 2-7, 2-8). The proposed two-year project was duly funded and officially began in February 2003 as a collaboration between the Kpg. Trusan Jaya JKKK, Sarawak DOA, Muhandis, and \textit{Angkatan Zaman Mansang} (AZAM), a development-oriented, non-governmental organization (NGO) based in Kuching. AZAM ultimately served as the

\textsuperscript{11} Evidence of this focus can also be found in the Sematan Mud Crab Culture Project brochures on file in the Sematan Fisheries Center offices.

\textsuperscript{12} As one of the four original biodiversity focal areas for the GEF, the operational program guidelines for coastal, marine, and freshwater ecosystems would have been available prior to the April 2002 submission date on the Kpg. Trusan Jaya funding application, making it temporally plausible that the project was shaped by these funding guidelines.
grant administrator for the project, although I was unable to determine if its involvement was the result of ambiguity over the JKKK’s status as an NGO or simply the DOA’s reluctance to release funds directly to the village.

Though referred to as the “Mangrove Rehabilitation Project\textsuperscript{13},” logging concerns were largely peripheral, particularly in the JKKK accounts, and aside from early, small-scale reforesting activities\textsuperscript{14} and the provision of six personal computers and a combined printer and scanner for community use (budgeted as “capacity building”) the UNDP-GEF project was essentially an income generation scheme. Following the successful completion of a written application, prospective participants were interviewed and evaluated by a four-man panel consisting of the Kpg. Trusan Jaya headman, the DOA Principal Technical Advisor, the DOA Project Manager, and a Muhandis representative. A total of 44 candidates were able to submit applications during the four-day window, and 21 individuals were ultimately selected for inclusion: four project assistants and ten ecotourism, two food production, and five mud crab aquaculture participants (UNDP-GEF Kpg. Trusan Jaya Project 2003a:6-7).

Proposed ecotourism activities proceeded along the same lines as those envisioned during the earlier collaboration with Muhandis. It was believed that with basic facilities and proper education the village and its surroundings could support successful nature tours, mangrove trekking, and fishing, river cruise, and homestay operations. Initial planning talks were held with representatives of the Sarawak Ministry of Tourism, Sarawak Tourist Board and the privately-operated Borneo Inbound Tour and Travel, yet few tangible outcomes were realized. Although funds were made available for renovations and supplies to upgrade and furnish the boats and homes of selected participants, the anticipated tourism training classes were continuously rescheduled and ultimately postponed indefinitely. Meanwhile, the anticipated fees for ecotourism-related services continued to rise to increasingly unrealistic levels, particularly for the homestay facilities. These high profit margins never materialized, however, and outcomes were limited to basic infrastructure improvements and equipment acquisitions. Mangrove and

\textsuperscript{13} The formal program title is listed with the UNDP-GEF as “Sustaining the Mangrove Ecosystem Biodiversity in Providing Sustainable Livelihood for the Local Communities in Sematan.”

\textsuperscript{14} Community members were paid RM1 for each mangrove sapling that they planted within a set of designated areas during the first four months of the project. Fruit tree seedlings were also offered to individuals who planted at least ten trees.
fishing excursions became increasingly rare, and the homestay facilities were never used (see UNDP-GEF Kpg. Trusan Jaya Project 2003a, 2003b, 2004a, 2004b, 2004c, 2005).

From the outset, responsibility for food processing activities was shifted to the DOA Women’s Economic Development Unit (WEDA), which was tasked with the production of short-term crops and traditional and fish-based foods. This mandate was quickly expanded to include handicrafts derived from locally-obtained materials (e.g., seashells, mangrove flowers and leaves), and the women were soon producing a variety of crafts in addition to corn, vegetables, dried salted fish (*ikan masin*), and a salted shrimp condiment known as *cencaluk*. In 2004, WEDA leadership shifted from an older woman with close connections to the village’s major religious figures to a young divorcee employed by the DOA with JKKK family ties. Perhaps as a result of her closer relationship to the UNDP-GEF partners or due to her need to gain legitimacy, the newly appointed WEDA head ushered in a period of high-level activity and visibility for the organization, providing farming equipment, seeds, and chickens to WEDA participants and taking possession of the newly constructed RM45,000 headquarters (UNDP-GEF Kpg. Trusan Jaya Project 2004a, 2004b). This structure would ultimately become home to the grant-funded computer center and was outfitted with a set of computer desks in addition to worktable seating, a refrigerator, fans, and cooking equipment.

Meanwhile, the five selected mud crab aquaculture participants were each supplied with five 200-square meter crab pens from the Muhandis crab farm estate established within Kpg. Trusan Jaya during the 2000 to 2003 collaboration. In addition to the pens, participants were able to make use of existing facilities such as the generator, waterpump, and walkways without rental fee requirements. Muhandis continued to provide for general maintenance and repairs as well as security and technical assistance services. The DOA made storage facilities available for both grant-purchased trash fish and harvested crabs awaiting market transport. Moreover, costs associated with stocking were covered for up to 50 percent of pen capacity (UNDP-GEF Kpg. Trusan Jaya Project 2003a). Participants thus contributed only their labor, and all monies received from the sale of the crabs were considered profit. Unsurprisingly, an additional seven participants were enrolled within five months, taking possession of all the

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15 Grant funds were used to purchase 500 juvenile crabs for each pen.
remaining pen allotments.\textsuperscript{16} Yet despite this initial success, crab aquaculture activities dropped off sharply during 2004 as grant funding for project inputs was suspended. Though project performance was questionable in some respects, the Kpg. Trusan Jaya JKKK was invited to apply for a second UNDP-GEF grant in 2005, which they did, submitting another DOA-authored funding application. The application was successful.

\textbf{The Villages Today}

Information on grant-related activities for the 2006 to early 2008 period is limited due in part to an ongoing dispute over compensation for community participants and the unexpected relocation of a key program official. Still, observations within the community make it clear that the project’s goals remain unrealized. Earlier crab aquaculture activities could not be revived in the absence of subsidies and new attempts at soft-shell crab production – the aim of the project’s second phase – proved unviable. The WEDA headquarters building now stands empty as its cooking and food processing equipment gather dust and the tourists have yet to arrive. Child malnutrition rates within the district as a whole have improved slightly, declining to 17.8 percent as of 2005, yet Lundu continues to be cited by the Sarawak State Health Department as an area of particular concern (Yahya 2006:7, personal communication, February 19, 2008). The concentration of undernutrition in the Kpg. Tanah Hitam and Kpg. Trusan Jaya area remains the highest among Malay settlements within the Sematan sub-district, second only to the (indigenous) Selako village of Pueh.

\textit{Composition and Income Measures for Study Households}

The following characterizations are based on households (n = 72) which (1) had legal standing as either citizens or documented immigrants within the community and (2) included at least one child between the ages of six-months and six-years.\textsuperscript{17} Drawing on population figures provided by the subdistrict office, this demographic makes up approximately 13.3 percent and 37.9 percent of the total number of households in Kpg. Tanah Hitam (n=375) and Kpg. Trusan Jaya (n=58), respectively (Daerah Kecil Sematan 2007). The intent here is not to represent the communities as a whole but rather that subset of families with small children which is the ostensible target of any child nutrition

\textsuperscript{16} The final six participants to enroll were given three pen allotments each rather than the original five pen allotment due to restricted availability.

\textsuperscript{17} Further details on sample selection and data collection were provided in Chapter 3.
program put forth under the aegis of the Malaysian Ministry of Health (MOH). Of these eligible households, 69.4 percent (n = 50) were located within the larger village of Tanah Hitam.

As outlined in the preceding methodology, demographic data were collected at the start and end of the fieldwork period through the use of an initial household census and final ethnographic survey. Participation rates were high in both instances: 98.6 percent (n = 71) for the census with a single non-participating household and 87.5 percent (n = 63) for the final survey. Nine households were ultimately excluded: three declined to participate, four relocated outside of the village, one was unavailable due to illness, and one household was omitted due to safety concerns.

**Social Roles and Age Distributions**

The majority of the data presented here focuses on the household as the unit of analysis. Yet, it is important to note that community members do distinguish between this household concept [*isi rumah*] and that of the family [*keluarga*] – using the former term to refer to the occupants of a shared residence and the latter to denote a set of defined social roles that largely fits the standard ideal of the patriarchal, nuclear family. When asked to delineate the number of families living within the household and define each occupant’s family role, 99.0 percent of the surveyed population was labeled as either the head of the family (22.4 percent), the head’s wife (20.2 percent) or the head’s child (56.3 percent)\(^\text{18}\) while only 8.2 percent of targeted families had a female family head. Both household and family groupings imply kinship, and there was no clear agreement as to whether or not families were differentiated within the household when allocating sleeping space and food resources. The total number of family units occupying a household ranged from one to four with an average of 1.53 families (SD = 0.65), while the total number of household members ranged from three to six individuals with a mean of 6.81 (SD = 2.37).

Age distributions are presented separately for children under six-years-old as more detailed, verified data were collected for this group. Self-reported information for the remainder of the sample indicates a mean age of 28.4 years (SD = 17.03) with a median

\(^{18}\) The remaining one percent was defined as mothers, younger siblings, or grandchildren in relation to the head of the family.
age of 26.0 years and a sex ratio of 96.4, denoting a slightly higher number of women (50.9%). The age structure diagram in Figure 4.3 (overleaf) is a broad-based pyramid reflecting a young population. This is to be expected given that study households were selected on the basis of having at least one child who was born within the past six years. This criterion guarantees an overrepresentation of individuals, particularly women, in their childbearing years. Given the particular focus of this study, this is considered to be a strength rather than a limitation. However, it should be noted by individuals wishing to apply these results in other contexts or compare them with less targeted regional data.

Among village children between six-months and six-years old (n = 103), the mean age was 34.7 months (SD = 20.55) with median age of 33.0 months and a sex ratio of 87.3, reflecting a higher number of female children (53.4%). The general age distribution is roughly bimodal demonstrating larger birth cohorts in the six- to ten-month and 51-month age ranges. The accompanying age structure diagram in Figure 4.4 (overleaf) shows this distribution by gender, highlighting the larger number of three and five-year-old girls.

\[19\] Data for village children under six-months of age within the targeted households (n = 10) is excluded from this analysis as such children are officially considered outside of the scope of child nutritional programming by the Malaysian MOH and its affiliates. For this reason, I did not invest the time necessary to validate age estimates provided by household respondents. The data remains suspect and therefore unreported.
Figure 4.3: Community Age Distribution by Gender

Figure 4.4: Child Age Distribution by Gender
Monthly Household Income Estimates

Accurate household income estimates were difficult to obtain – due in part to the relatively low levels of wage work within the village. Only 18.2 percent of working-age individuals were salaried employees, while 36.9 percent were classified as self-employed and 44.9 percent as unemployed. With the absence of set wages and concomitant reliance on temporary work opportunities and variable fishing returns, respondents found it difficult to specify a set monthly income, often characterizing these resources as uncertain [sik tentu]. For this reason, two separate income estimates were obtained: (1) in the initial household census conducted from late February to early March 2008 and (2) during the final household survey conducted from August to early October 2008. These periods represent the start and end of the fishing season respectively and are times typified by variable weather and low fishing yields. Without a full year on-site in the villages, data collection at these two points captures the most equivalent time periods and offers the best opportunity for verifying household incomes at a seasonal low point.

Initial monthly income estimates ranged from RM80 to RM2,600 – the approximate equivalent of $23 to $742 using current market rates – with a median income of RM600.00 and an average of RM735.30 (SD = 550.73) or $209.29. The per capita median was RM100.00 and the average was RM114.74 (SD = 90.58) or $32.74. These aggregate figures clearly exceed the current Sarawak SHD guidelines for “hard core” poverty and food assistance eligibility – standards which are capped at RM271.50 per household or RM54.30 per capita within Sarawak (Jabatan Kesihatan Negeri Sarawak 2004). Nevertheless, problems are evident when we consider conditions on a household-by-household basis, where self-reported income estimates place fully one-quarter (n = 18) of the surveyed population in the hard core poverty range. Results

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20 While my observations at UNIMAS, the Sarawak Development Institute (SDI), AZAM, and the Sarawak SHD indicate that these response categories (i.e., salaried, self-employed, and unemployed) are the standard for locally-administered surveys, they do have the potential to be highly misleading. Further discussion follows.

21 Reported currency conversions are based on the mid-market rates provided by the XE.com Quick Currency Converter (http://www.xe.com/) accessed on June 13, 2009.

22 “Hard core” is the standard English-language description for abject poverty applied by the Malaysian MOH and affiliated social welfare agencies.
become more disturbing when we consider the dramatic disparity between the currently applied Sarawak SHD poverty line standards and those promoted by the Malaysian MOH.

The definitive reference manual for state-level program guidelines, which I again reviewed and confirmed on-site at the SHD offices in Kuching in October 2008, includes PPKZM standards constructed and approved internally by the SHD in 2004. This publication is based on a dated 1997 report from the Prime Minister’s Economic Planning Unit\textsuperscript{23} and fails to take into account subsequent cost of living changes occurring over the course of more than a decade. Correspondence to each of the state health departments from the MOH Family Health Development Division (Palaniyappan 2007) indicates a much higher poverty threshold for Sarawak – one based on the revised income estimates contained in the Ninth Malaysian Plan (see Economic Planning Unit 2006). These figures establish a per capita monthly minimum of RM104.78 ($29.89) within the state of Sarawak and effectively classify 61.1 percent of the village households as both poor and income-eligible for food assistance.

Final monthly household income estimates ranged from RM50 to RM5,000 – the approximate equivalent of $14 to $1,427 – with a median of RM550.00 and a mean of RM876.98 (SD = 824.30) or $250.21. The per capita median was RM88.89 with a per capita average of RM138.89 (SD = 130.71) or $39.63. Again, the relatively high aggregate figures serve to mask extreme need at the individual household level where 26.6 percent (n = 17) of the surveyed population was considered hard core poor according to the highly-conservative SHD poverty line standards and 54.0 percent were income-eligible for food assistance as defined by MOH best practice guidelines. Poverty standards and income estimates for both data collection points are presented below in Table 4.1 to facilitate comprehension and comparison.

Reported incomes were higher for all households for the later (August to early October 2008) survey administration, increasing on average by RM280.60 (SD = 322.95) or

\textsuperscript{23} Referred to in Malay as the Unit Perancang Ekonomi (UPE), Jabatan Perdana Menteri (JPM).
<table>
<thead>
<tr>
<th>Income Estimates</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Household Mean</th>
<th>Per Capita Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>RM80 ($23)</td>
<td>RM2,600 ($742)</td>
<td>RM735.30 ($209.29)</td>
<td>RM114.74 ($32.74)</td>
</tr>
<tr>
<td>Final</td>
<td>RM50 ($14)</td>
<td>RM5,000 ($1,427)</td>
<td>RM876.98 ($250.21)</td>
<td>RM138.89 ($39.63)</td>
</tr>
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</table>

<table>
<thead>
<tr>
<th>Poverty Standard</th>
<th>Household Limit</th>
<th>Per Capita Limit</th>
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<tr>
<td>Sarawak SHD</td>
<td>RM271.50 ($76.96)</td>
<td>RM54.30 ($15.40)</td>
</tr>
<tr>
<td>National MOH</td>
<td>N/A</td>
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</tbody>
</table>

$79.60.²⁴ Proportionately, this is a large disparity. To some extent, it reflects seasonal variations despite best attempts to minimize this tendency. Still, the initial census was conducted at the end of the rainy season and the final household survey at the start of the season. Drawing on a classic study by Sudman and Schwarz (1989), which demonstrates higher respondent accuracy over a shorter recall period, one can infer that more recent events have a greater saliency. Essentially, our responses are influenced more by the immediate past. The authors further note that common, long-term behaviors are not remembered per se but rather estimated (Sudman and Schwarz 1989). Routines of casual labor and market transactions clearly fall within this category, and we can expect that monthly income estimates following a period of monsoon-induced scarcity will be more conservative than end-of-the-season estimates even if the yields at both points in time are roughly equivalent.

Despite the relatively large mean increase in individual income estimates, the average monthly per capita income for the villages was not significantly different according to the performed paired-samples t-test (t(62) = -1.748, p = 0.085 (two-tailed)), nor was the frequency with which individuals were classified as poor and income-eligible for food assistance. The McNemar test (McNemar 1947, Somes 1983) indicates that the differences in poverty classification over time were insignificant with respect to both the SHD ($\chi^2 (1, n = 63) = 0.10, p = 0.75$) and MOH ($\chi^2 (1, n = 63) = 0.94, p = 0.33$) standards. Thus despite variations in individual reporting, these results present a clear and consistent image of village conditions overall.

²⁴ A single household demonstrating a RM3,400 income disparity without any noticeable lifestyle change was omitted as an outlier. The original estimate was collected from the household head’s daughter-in-law, and it is believed that the income difference here reflects this woman’s more limited knowledge of household finances rather than a change in circumstances. All other outliers were households that had become involved in the latest Sarawak Economic Development Corporation (SEDC) income-generating project and were retained in the sample.
Contextualizing Household Income

Perceived Need

With markedly different official standards for household income and the persistence of subsistence farming and gathering activities outside of the monetized sphere, it is difficult to contextualize these figures, *i.e.*, to know just how much money a household really requires. The most direct method for obtaining the necessary benchmark is simply to ask. Participants reported monthly income needs ranging from RM150 to RM2,300 – the approximate equivalent of $43 to $652 – with a mean of RM581.59 (SD = 429.16) or $164.85. When adjusted for household size, these figures produced a *per capita*
estimate of RM93.23 (SD = 74.11) or $26.42. Perceived monthly income needs thus far exceed the poverty line cut-off applied by the SHD but would still place a household below the poverty line established by the MOH.

With regards to reports of actual monthly income, there is considerable overlap in the per capita distributions, although the average estimate of need was generally lower than reported income as demonstrated in Figure 4.5 (above). Paired-samples t-tests were conducted to determine the extent to which estimates of realized and necessary monthly per capita income differed. There was no significant difference between the means for perceived income need and the estimates obtained during the initial census (\( t(62) = 1.91, p = 0.06 \) (two-tailed)). However, the final per capita income estimate was significantly higher (\( t(62) = 3.54, p = 0.001 \) (two-tailed)).

Moving to the household level, it is possible to calculate a “disparity measure”: the difference between the average reported household income from both data collection points and respondents’ perceived need. Overall, actual income estimates exceeded reported need by an average of RM224.56 (SD = 516.05) or $63.62. There were, however, significant differences between income groups. Independent-samples t-tests were conducted to compare disparity measures for (1) households classified as below (\( M = 67.21, SD = 334.87 \)) and above (\( M = 409.03, SD = 626.26 \)) the MOH-defined poverty line (\( t(41.24) = -2.64, p = 0.012 \) (two-tailed)) and (2) households classified as below (\( M = -151.35, SD = 269.33 \)) and above (\( M = 363.48, SD = 517.69 \)) the SHD-defined poverty line (\( t(53.84) = -5.13, p = 0.000 \) (two-tailed)). The magnitude of the difference in means for MOH poverty classifications (mean difference = -341.83) was in the moderate to large range (eta squared = 0.102)\(^{25}\) while the magnitude of the difference across the SHD-defined “hard-core poverty” demarcation (mean difference = -514.83) was extremely large (eta squared = 0.301). These results highlight the fact that it is only the most impoverished households that report income scarcity (i.e., an average deficit of RM151.35 or $42.93) and suggest a general attitude of coping and acceptance of low-income conditions except in the most extreme cases where poverty cannot be normalized.

Occupation and Alternative Measures

As previously noted, 44.9 percent of working-age individuals in the villages were unemployed; an additional 36.9 percent were self-employed, leaving only 18.2 percent as salaried employees. Table 4.2 (below) disaggregates these data, providing frequencies for specific occupations. The number of villagers working as fishermen is surprisingly low. Even calculated as the percentage of active workers – i.e., excluding all individuals currently outside of the labor market – only 29.37 percent of participants were fishermen despite the often-cited political power and high visibility of the Kpg. Tanah Hitam Fisherman’s Association and language in the official Kpg. Trusan Jaya JKKK profile defining it as “a fisherman’s village” directly dependent upon the “catch from the sea and from the mangrove swamps” (Abdul Razak 2006:1). Early ethnographic work on Sarawak’s coastal Malays conducted by Harrison (1970:79)

<table>
<thead>
<tr>
<th>Occupation</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fisherman</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Small-scale</td>
<td>37</td>
<td>16.8</td>
</tr>
<tr>
<td>Large-scale</td>
<td>33</td>
<td>15.0</td>
</tr>
<tr>
<td><strong>Business Owner</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Independent Business</td>
<td>16</td>
<td>7.3</td>
</tr>
<tr>
<td>Out-of-Home</td>
<td>11</td>
<td>5.0</td>
</tr>
<tr>
<td><strong>General Laborer</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Construction Worker</strong></td>
<td>12</td>
<td>5.5</td>
</tr>
<tr>
<td><strong>Office Worker</strong></td>
<td>10</td>
<td>4.5</td>
</tr>
<tr>
<td><strong>Shop Assistant</strong></td>
<td>9</td>
<td>4.1</td>
</tr>
<tr>
<td><strong>Carpenter</strong></td>
<td>7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Food Service</strong></td>
<td>7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Farmer</strong></td>
<td>6</td>
<td>2.7</td>
</tr>
<tr>
<td><strong>Soldier or Police Officer</strong></td>
<td>4</td>
<td>1.8</td>
</tr>
<tr>
<td><strong>Security Guard</strong></td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Teacher or Instructor</strong></td>
<td>3</td>
<td>1.4</td>
</tr>
<tr>
<td><strong>Other</strong></td>
<td>8</td>
<td>3.9</td>
</tr>
<tr>
<td><strong>Unemployed, Housewife</strong></td>
<td>73</td>
<td>33.2</td>
</tr>
<tr>
<td><strong>Unemployed, Non-Housewife</strong></td>
<td>14</td>
<td>6.4</td>
</tr>
<tr>
<td><strong>Ineligible for Work (retired, elderly, disabled)</strong></td>
<td>7</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>220</td>
<td>100.4*</td>
</tr>
</tbody>
</table>

*Total percentage exceeds 100 as some respondents reported more than one occupation. These data were assessed using the multiple response command (see Argyrous 2005) in SPSS 17.0.
asserts a much higher estimate, suggesting that at that time 42 percent of the population were directly involved in fishing activities and an additional four percent indirectly linked to the industry through boat and net repair. More recent survey work conducted within 15 villages (n = 800) in the Kuching and Lundu districts from June to July 2003 as part of an interdisciplinary research effort at UNIMAS (see Abdul Halim Ali et al. 2006) presents a more slightly more conservative figure of 35.9 percent. Interestingly, 64.8 percent of respondents indicated that their grandfathers had worked as fishermen and fully 86.9 percent viewed fishing as the foundation of their village's livelihood (Zamri and Azman 2006:45). Given the greater association with fishing among the previous generation, it is unsurprising that my more limited sample of predominantly young adults in their childbearing years would yield a lower percentage of active fishermen. The local literature also supports my observation that strong fishing identities persists in spite of relatively low and perhaps declining rates of personal involvement. This noted visibility of fishing and fishing-related activities is highlighted in Images 4.1, 4.2, and 4.3 presented in the following pages.

Image 4.1: View of Kpg. Tanah Hitam from the Sematan Pier
Image 4.2: Off-Shore Fishing Trip

Figure 4.3: Local Fishermen Display their Catch
The primary occupations held in Kpg. Trusan Jaya and Kpg. Tanah Hitam largely mirror those reported for the district as a whole (see Suhaidi 2006) with a few basic exceptions. Essentially, there is an underrepresentation of both farmers and teachers and an overrepresentation of construction workers within the villages. The lack of farmers and educators can be explained to some extent by the villages' location, which is remote in relation to area schools and situated in part within the mangrove swamp. Wooden planking, elevated structures, and the extensive application of large quantities of wood chips have made it possible to construct housing well into the mangrove areas, allowing residents of Kpg. Trusan Jaya access to a variety of aquatic resources. However, the lack of soil renders agriculture impossible. Soil quality in Kpg. Tanah Hitam – literally, the village of black [fertile] earth – is locally recognized as productive, making the lack of farmers in this area more difficult to explain. One can link the disproportionately large number of construction workers to a pair of major building projects, which were underway in the Sematan sub-district over the course of the fieldwork period.

Construction is considered a higher prestige and skill-level position than that of general laborer. In fact, this latter term is often used within the village context as a euphemism for unemployed or under-employed men, blurring the standard tripartite distinction between unemployed, self-employed, and salaried workers. Typically, as projects arise, more desirable workers are recruited to fill these immediate labor needs. Village men can thus cycle through multiple employment categories, performing wage work when they are lucky, working for themselves as they take on odd jobs, and becoming unemployed in the interims. Labor categories are thus far more fluid than these figures imply.

Unemployment numbers are particularly suspect and represent to a large extent the gendered division of labor and ultimately the devaluing of women’s work. Female family members are routinely labeled as “unemployed” housewives in spite of their extensive involvement in the informal economy. A sampling of these activities and their related frequencies are presented in Table 4.3 (page 101). In over half of the study households, women are supplementing the available diet through gathering (66.6%) or cultivation (50.7%), while 10.6 percent engage in crabbing or fishing activities (see Images 4.4, 4.5, 26

26 Official national figures also record a relatively low rate of female participation in the formal economy (47%) – one which has remained largely unchanged for the past twenty-five years (see WHO n.d.:4).
and 4.6 on the following pages). Of those involved in homegardening, 22.45 percent (n = 22) produce fruit; 21.43 percent (n = 21) produce green, leafy vegetables or shoots; 19.39 percent (n = 19) produce seasoning plants or herbs such as lemongrass, ginger, chillies or turmeric; and 15.31 percent (n = 15) produce corn or some form of beans. On average, the women collect wild foods 2.90 times (SD = 2.29) per month, although this figure ranges as high as 12 times for some families. According to an independent-samples t-test, the mean number of collection events did not differ significantly between individuals gathering exclusively for home use (M = 2.78, SD = 2.36) and those gathering for both home use and sale (M = 3.80, SD = 1.64); t(40) = -0.93, p = 0.36 (two-tailed).

Image 4.4: Collecting Wild Tapioca Shoots [Pucuk Bandung]
Image 4.5: Collecting Remaining Oil Palm [Kelapa Sawit] Kernels Post-Harvest

Image 4.6: Home Garden of Participant Household in Kpg. Tanah Hitam
Table 4.3: Women’s Alternative Income Generation and Livelihood Strategies

<table>
<thead>
<tr>
<th>Strategy</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Collect Jungle Produce/Wild Foods</td>
<td>42</td>
<td>66.6</td>
</tr>
<tr>
<td>For Household Consumption Only</td>
<td>37</td>
<td>58.7</td>
</tr>
<tr>
<td>For Household Consumption and Sale</td>
<td>5</td>
<td>7.9</td>
</tr>
<tr>
<td>Cultivate a Homegarden</td>
<td>32</td>
<td>50.7</td>
</tr>
<tr>
<td>For Household Consumption Only</td>
<td>20</td>
<td>31.7</td>
</tr>
<tr>
<td>For Household Consumption and Sale</td>
<td>12</td>
<td>19.0</td>
</tr>
<tr>
<td>Make Ocean-Derived Products for Sale (e.g., dried, salted fish or handicrafts)</td>
<td>17</td>
<td>27.0</td>
</tr>
<tr>
<td>Prepare Food Items for Sale (e.g., local cakes or satay)</td>
<td>15</td>
<td>23.8</td>
</tr>
<tr>
<td>From Home</td>
<td>8</td>
<td>12.7</td>
</tr>
<tr>
<td>With Licensed Food Stall</td>
<td>7</td>
<td>11.1</td>
</tr>
<tr>
<td>Collect Recyclables</td>
<td>11</td>
<td>16.7</td>
</tr>
<tr>
<td>Sell Items from Home (e.g., grocery items, clothing, or cloth)</td>
<td>9</td>
<td>14.2</td>
</tr>
<tr>
<td>Licensed (separate store and living area)</td>
<td>4</td>
<td>6.3</td>
</tr>
<tr>
<td>Unlicensed</td>
<td>5</td>
<td>7.9</td>
</tr>
<tr>
<td>Crabbing or Fishing</td>
<td>7</td>
<td>10.6</td>
</tr>
<tr>
<td>Sewing</td>
<td>5</td>
<td>7.6</td>
</tr>
<tr>
<td>Other Income-Generating Activity</td>
<td>6</td>
<td>8.0</td>
</tr>
</tbody>
</table>

It was initially hypothesized that the women’s alternative livelihood strategies were scalable, representing a unidimensional continuum of economic need that could serve as a proxy for income and further validate the existing estimates. Basic frequencies, displayed in Table 4.3 (above), show decreasing levels of participation when moving from generally accepted female activities (e.g., gathering, gardening, and handicraft production) to more stigmatized pursuits such as the collection of recyclable materials, crabbing, and fishing. At the outset of the analysis, it seemed plausible that these activities would form a cumulative scale, such that housewives would first engage in gender-approved economic behaviors and then take on additional income-generating schemes as financial pressure mounted. A woman involved in a higher number of activities than her neighbor would thus participate in all of her neighbor’s activities plus one or more additional activities.

The Guttman scaling routine in ANTHROPAC 4 (Borgatti 1996S) was used to assess the accuracy of this assumed underlying dimension of economic hardship (see McIver and Carmines 1981:40-71, Johnson 1998, Bernard 2006:321-327). Essentially, the program identifies errors – instances in which either (1) households involved in a large number of activities fail to participate in a high-frequency activity or (2) households involved in a small number of activities are found to participate in a rare activity. This procedure
produces a coefficient of reproducibility (CR) which measures the degree to which data match the proposed underlying, cumulative index. More specifically:

\[ CR = 1 - \frac{\text{number of errors}}{\text{total number of responses}} \]

As noted by Johnson (1998:114), convention states that a Guttman scale analysis is valid when the coefficient of reproducibility is 0.90 or greater. In regards to women's alternative livelihood strategies, \( CR = 0.746 \) with a total of 96 errors, providing no significant supporting evidence.

While additional research is warranted, the observed association between less desirable or unconventional alternative income-generating strategies and extreme poverty is likely still legitimate. However, as the Guttman scale analysis indicates, it is noncumulative. Often without access to surplus fish, high-quality land, start-up funds, or crafting supplies, impoverished households may lack the resources necessary to participate in many mainstream supplementary income activities. In contrast, fishing, crabbing or collecting cans and scrap iron from the recently abandoned timber processing plants requires only time and sufficient motivation. Rather than conceptualizing extreme poverty as iteratively pushing households to adopt increasingly unpopular strategies to satisfy an earning deficit, it may be more accurate to say that the condition of poverty precludes these households from participating in all but the most marginal pursuits.

Basic household assets were also assessed as a potential index and income proxy but with an equal lack of success. Data were collected on the availability of electricity and ownership of goods related to food acquisition and general transportation as displayed in Table 4.4 (overleaf). In this instance, the Guttman scale analysis yielded a coefficient of reproducibility of 0.799 with a total of 114 errors, indicating that this particular set of items fails to produce a useful scale of the "material-style-of-life" (see DeWalt 1979, Bernard 2006) for these villages. As Bernard (2006:326) notes, this type of scale likely has "its analog in nearly all societies" and simply requires that the researcher find the appropriate list of material items. Clearly, more focused research is needed to establish such a measure for Kpg. Trusan Jaya and Kpg. Tanah Hitam.

The chosen indicators do provide important information on participants' relative access to food resources. In comparison to the survey results presented by Zamri and Azman (2006) for the Kuching and Lundu districts, the overall availability of motorized
Table 4.4: Household Assets

<table>
<thead>
<tr>
<th>Item Owned</th>
<th>N</th>
<th>Percent</th>
<th>2003 Regional Figures (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Electricity</td>
<td>52</td>
<td>82.5</td>
<td>75.0</td>
</tr>
<tr>
<td>Cold Storage Appliance (e.g., refrigerator or freezer)</td>
<td>45</td>
<td>71.4</td>
<td>74.1</td>
</tr>
<tr>
<td>Fishing Equipment</td>
<td>50</td>
<td>79.4</td>
<td>(no data)</td>
</tr>
<tr>
<td>Boat</td>
<td>33</td>
<td>52.4</td>
<td>(no data)</td>
</tr>
<tr>
<td>Food Animals*</td>
<td>27</td>
<td>42.9</td>
<td>(no data)</td>
</tr>
</tbody>
</table>

  - Chicken                                  | 23  | 34.8    | (no data)                  |
  - Duck                                     | 3   | 4.5     | (no data)                  |
  - Goat                                     | 3   | 4.5     | (no data)                  |
  - Goose                                    | 1   | 1.5     | (no data)                  |
| Bicycle                                   | 52  | 82.5    | (no data)                  |
| Motorcycle or Scooter                     | 48  | 76.2    | 46.5                       |
| Car                                       | 17  | 27.0    | 17.8                       |

*Number of households reporting ownership. Multiple response allowed for specific type of animal owned.

*Source: Zamri and Azman (2006:54-56)

Transportation and electricity is higher in the villages, although refrigeration rates lag behind. It is important to note, however, that despite the more recent publication date the authors are relying on data collected during the summer of 2003. Given the five-year time lapse, improvement is a reasonable expectation, particularly in terms of electricity. For the 17.5 percent of households still without access to this basic resource and located primarily on the swamp-like periphery of Kpg. Trusan Jaya, promises of change continue to be made and broken. Most recently, workers employed under the Improving the Standards of Rural Infrastructure Scheme Electricity Project visited the village with buckets of orange paint, marking trees for removal and providing an estimated project completion date of May 2007 (see Abdul Razak 2006). As of October 2008, the workers had yet to return.

Food Insecurity Rates for Study Households

Despite the sensitive nature of the Household Food Insecurity Access Scale (HFIAS, Version 3), participation rates were overwhelmingly high at 97.2 percent (n = 70). Only a single, eligible household chose not be involved in this data collection task, while a

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27 As detailed in Chapter 3, this instrument was created on-site as a locally-relevant, Malay-language version of the HFIAS outlined by Coates and colleagues (2007). A comprehensive description of this process is provided within the chapter, and copies of the original HFIAS instrument as well as Malay- and English-language versions of the adapted survey are provided in Appendix A for comparative purposes.
second was forced to relocate outside of the immediate area and was consequently lost to follow-up. For all intents and purposes then, this sample is identical to the target population for the household census and survey described above and speaks to the conditions of village households with small children less than six years of age.

Drawing on the guidance provided by Coates and associates (2007:17-22), I present (1) frequencies for nine specific perceptions and behaviors that have been cross-culturally linked to the experience of food insecurity; (2) summary information on the prevalence of village households subjected to each of the three primary domains of food insecurity (i.e., certainty, quality, and intake); and (3) the prevalence of food insecurity by household status: food secure, or mild, moderately, or severely food insecure.\textsuperscript{28} The first two measures are condensed to form Table 4.5 (overleaf) and the final measure appears in Table 4.6 on page 107.

Strikingly, over half of the surveyed households experience food insecurity in each of its major domains and as an overall status. When considering lived experience within the households over the course of the past month, 51.4 percent (n = 36) worried that their families would not have enough to eat, and moreover the most common response to this question was not a simple “yes” but rather “mesti” – the local Malay equivalent of “of course.” For the majority of households then, food-related anxiety has become a given. In relation to food quality, 55.7 percent of respondents (n = 39) reported making some form of compromise: 45.7 percent (n = 32) were unable to eat the foods that they would prefer (i.e., fruit or meat) while an equivalent number were forced to eat a limited variety of foods due to economic necessity. Only 25.7 percent (n = 18) indicated that they consumed unwanted foods as a result of resource constraints, but this response was often accompanied by the assertion that the family was not picky or overly fussy [sik cerewet] – echoing one of the more common forms of praise used by low-income women to describe their children. This association suggests that the relatively low reported incidence of unwanted food consumption likely reflects an acceptance of the situation (reinterpreted as a desirable personal trait) rather than an absence of structural

\textsuperscript{28} Data collected using the HFIAS also allows for the creation of a cumulative score, which provides a continuous measure of the degree of food insecurity with a low score indicating less food insecurity and a high score indicating more food insecurity. This measurement is useful both for documenting small-scale change over time and for offering a broader array of hypothesis-testing options. However, this relative measure has limited meaning in isolation and will not be reported here.
<table>
<thead>
<tr>
<th>Number</th>
<th>Condition</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td><strong>Worry about not having enough to eat</strong></td>
<td>36</td>
<td>51.4</td>
</tr>
<tr>
<td>1a.</td>
<td>Seldom (1-2 times per month)</td>
<td>14</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Sometimes (3-10 times per month)</td>
<td>11</td>
<td>15.7</td>
</tr>
<tr>
<td></td>
<td>Always (more than 10 times per month)</td>
<td>11</td>
<td>15.7</td>
</tr>
<tr>
<td>2.</td>
<td><strong>Unable to eat preferred food types due to expense</strong></td>
<td>32</td>
<td>45.7</td>
</tr>
<tr>
<td>2a.</td>
<td>Seldom (1-2 times per month)</td>
<td>14</td>
<td>20.0</td>
</tr>
<tr>
<td></td>
<td>Sometimes (3-10 times per month)</td>
<td>10</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>Always (more than 10 times per month)</td>
<td>8</td>
<td>11.4</td>
</tr>
<tr>
<td>3.</td>
<td><strong>Eat a limited variety of foods due to expense</strong></td>
<td>32</td>
<td>45.7</td>
</tr>
<tr>
<td>3a.</td>
<td>Seldom (1-2 times per month)</td>
<td>10</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>Sometimes (3-10 times per month)</td>
<td>15</td>
<td>21.4</td>
</tr>
<tr>
<td></td>
<td>Always (more than 10 times per month)</td>
<td>7</td>
<td>10.0</td>
</tr>
<tr>
<td>4.</td>
<td><strong>Eat undesirable foods due to expense of alternatives</strong></td>
<td>18</td>
<td>25.7</td>
</tr>
<tr>
<td>4a.</td>
<td>Seldom (1-2 times per month)</td>
<td>4</td>
<td>5.7</td>
</tr>
<tr>
<td></td>
<td>Sometimes (3-10 times per month)</td>
<td>9</td>
<td>12.9</td>
</tr>
<tr>
<td></td>
<td>Always (more than 10 times per month)</td>
<td>5</td>
<td>7.1</td>
</tr>
<tr>
<td>5.</td>
<td><strong>Eat meals smaller than considered sufficient due to a lack of food</strong></td>
<td>31</td>
<td>44.3</td>
</tr>
<tr>
<td>5a.</td>
<td>Seldom (1-2 times per month)</td>
<td>12</td>
<td>17.1</td>
</tr>
<tr>
<td></td>
<td>Sometimes (3-10 times per month)</td>
<td>12</td>
<td>17.1</td>
</tr>
<tr>
<td></td>
<td>Always (more than 10 times per month)</td>
<td>7</td>
<td>10.0</td>
</tr>
<tr>
<td>6.</td>
<td><strong>Eat fewer meals in a day than considered sufficient due to a lack of food</strong></td>
<td>26</td>
<td>37.1</td>
</tr>
<tr>
<td>6a.</td>
<td>Seldom (1-2 times per month)</td>
<td>8</td>
<td>11.4</td>
</tr>
<tr>
<td></td>
<td>Sometimes (3-10 times per month)</td>
<td>10</td>
<td>14.3</td>
</tr>
<tr>
<td></td>
<td>Always (more than 10 times per month)</td>
<td>8</td>
<td>11.4</td>
</tr>
<tr>
<td>7.</td>
<td><strong>Have no food in the house and no means of obtaining food</strong></td>
<td>8</td>
<td>11.4</td>
</tr>
<tr>
<td>7a.</td>
<td>Seldom (1-2 times per month)</td>
<td>3</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>Sometimes (3-10 times per month)</td>
<td>3</td>
<td>4.3</td>
</tr>
<tr>
<td></td>
<td>Always (more than 10 times per month)</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td>8.</td>
<td><strong>Go to sleep hungry or go to sleep early to avoid hunger</strong></td>
<td>8</td>
<td>11.4</td>
</tr>
<tr>
<td>8a.</td>
<td>Seldom (1-2 times per month)</td>
<td>4</td>
<td>5.7</td>
</tr>
<tr>
<td></td>
<td>Sometimes (3-10 times per month)</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>Always (more than 10 times per month)</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td>9.</td>
<td><strong>Go the entire day without eating because there is not enough food</strong></td>
<td>3</td>
<td>4.3</td>
</tr>
<tr>
<td>9a.</td>
<td>Seldom (1-2 times per month)</td>
<td>2</td>
<td>2.9</td>
</tr>
<tr>
<td></td>
<td>Sometimes (3-10 times per month)</td>
<td>1</td>
<td>1.4</td>
</tr>
<tr>
<td></td>
<td>Always (more than 10 times per month)</td>
<td>0</td>
<td>0.0</td>
</tr>
</tbody>
</table>
constraints. Some form of insufficient food intake or its physical consequences was
experienced by 51.4 percent of households (n = 36), with scarcity manifesting itself most
commonly in the form of smaller (44.3%, n = 31) or less frequent (37.1%, n = 26) meals.
Extreme depravation was also present. Sadly, 11.4 percent (n = 8) of households
reported that they had had no food in the home and no means of acquiring food on at
least one day during the previous month; 11.4 percent (n = 8) either went to sleep early
to avoid hunger or went to bed hungry; and 4.3 percent (n = 3) had been unable to eat
for an entire day.29

The level of extreme hardship experienced within the villages is not well-known even
among residents. When administering the final question on the HFIAS to one young
mother, I prompted a gale of laughter and the incredulous response, “This is not Africa!”
Yet while this informant jokingly questioned the applicability of the survey to the local
area, two families within walking distance of her home had answered yes to this question
with embarrassed, down-cast eyes. In total, only 35.7 percent (n = 25) of village
households were food secure, and among the food insecure majority 28.6 percent
experienced forms of severe insecurity (see Table 4.6 overleaf).

These classifications are based on the standards outlined by Coates and colleagues
(2007:19-20) in which a food secure household experiences no more than rare worry –
operationalized as reported food-related anxiety on less than two days out of the month
– and no other food insecurity conditions. Mildly food insecure households experience
worry on more than three day per month and may be forced to make compromises in
terms of the quality of their food, sacrificing preferred foods (at any frequency) or
consuming a monotonous or undesirable diet for one to two days each month.
Moderately food insecure households are forced to make more frequent quality
compromises, exhibiting the latter two coping behaviors at least three times each month,
and may have begun to reduce food intake with smaller or less frequent meals as many
as ten days out of the month. These households do not, however, report running out of
food, going to bed hungry, sleeping to avoid hunger, or going an entire day without
eating due to a lack of resources. If a household does experiences any one of these

29 In the interest of brevity, only the occurrence of specific conditions is discussed in text. Frequency-of-
ocurrence data is limited to Table 4.5.
Table 4.6: Household Food Insecurity Status

<table>
<thead>
<tr>
<th>Classification</th>
<th>N</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Secure</td>
<td>25</td>
<td>35.7</td>
</tr>
<tr>
<td>Food Insecure</td>
<td>45</td>
<td>64.3</td>
</tr>
<tr>
<td>Mildly Food Insecure</td>
<td>7</td>
<td>10.0</td>
</tr>
<tr>
<td>Moderately Food Insecure</td>
<td>18</td>
<td>25.7</td>
</tr>
<tr>
<td>Severely Food Insecure</td>
<td>20</td>
<td>28.6</td>
</tr>
<tr>
<td>Total</td>
<td>70</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4.7: Classification Scheme for Household Food Insecurity Status*

<table>
<thead>
<tr>
<th>Question</th>
<th>Frequency (per month)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Seldom (1-2)</td>
</tr>
<tr>
<td>1a</td>
<td>SECURE</td>
</tr>
<tr>
<td>2a</td>
<td>MILDLY INSECURE</td>
</tr>
<tr>
<td>3a</td>
<td>MILDLY INSECURE</td>
</tr>
<tr>
<td>4a</td>
<td>MILDLY INSECURE</td>
</tr>
<tr>
<td>5a</td>
<td>MODERATELY INSECURE</td>
</tr>
<tr>
<td>6a</td>
<td>MODERATELY INSECURE</td>
</tr>
<tr>
<td>7a</td>
<td></td>
</tr>
<tr>
<td>8a</td>
<td></td>
</tr>
<tr>
<td>9a</td>
<td></td>
</tr>
</tbody>
</table>

*Adapted from Coates et al. (2007:20).

conditions or is required to reduce food intake for more than ten days per month, then it is considered severely food insecure. For clarification, this categorization scheme is presented graphically in Table 4.7 (above). The question numbers provided correspond to those in Table 4.5 (page 106), which details each food insecurity condition in full.

**Nutritional Status, Illness, and Health-Related Interactions**

*Child Nutritional Status and Anthropometric Indices*

As noted in Chapter 3 (pages 53-56), heights and weights were collected from a total of 103 children within the 71 participant households. These measurements were combined with confirmed data on child age and sex within Epi Info 3.4.3 (Epidemiology Program Office 2007) to create a set of three standard indices for the evaluation of child nutritional status: weight-for-age, height-for-age, and age-for-height (see Cogill 2003:11). Taken together, these measurements allow for the assessment of both chronic and acute malnutrition. More specifically, a child’s relative height (or length for children
under two years of age) is indicative of his or her long-term nutritional history and represents past growth failure, i.e., stunting, as a result of consistent shortages in protein and energy intake, frequent infection and illness, sustained inappropriate feeding practices, and poverty. The child’s weight in relation to his or her current height is a more immediate indicator of wasting, one that is sensitive to seasonal patterns in resource availability and disease prevalence. Weight in relation to age is essentially a composite measure, incorporating the effects of both short- and long-term food scarcity but incapable of differentiating the two. This index is typically valued as a means of assessing either the magnitude of malnutrition in a given area or its change over time (see Lohman et al. 1988, Beaton et al. 1990, Frisancho 1990, Gibson 1990, 1993, WHO 1995, and Cogill 2003:10-12).

Each of these three standard indices is presented as a z-score or standard deviation (SD) unit, which captures the level of disparity between a child’s measurements and the median value of a reference population of the same sex and age in the context of the standard deviation of that reference population. As a conceptual equation:

\[
Z\text{-score value} = \frac{(\text{observed value}) - (\text{median reference value})}{(\text{reference population SD})}
\]

Z-scores were chosen as a well-known and convenient indicator. Not only are they the most commonly used format within the international nutrition community, but z-scores offer the simplicity of a single, fixed cut-off point for the distribution of different indices across the full range of ages. For example, the most widespread cut-off point is -2 SD, a marker below which 2.28 percent of the reference population falls whether one considers infants or children, stunting or wasting, etc. Z-scores further allow for the creation and reporting of meaningful summary statistics such as the mean and the standard deviation. Ultimately, as Cogill (2003:40) notes, it is the “simplest way of describing the reference population and making comparisons to it.”

The selected reference population in this instance is based upon the 1978 Centers for Disease Control and Prevention (CDC)/WHO growth curves (see Dibley et al. 1978), a normalized version of the 1977 National Center for Health Statistics (NCHS) growth curves. The NCHS has released a set of updated calculations (Kucz marski et al. 2000), largely distinguished by their enhanced nutritional data for infants (birth to 36-months), revised head circumference standards, and the addition of body mass index-for-age
BMI-for-age) charts. These guidelines were intended to address concerns about the representativeness of the Fels Research Institute data, which were the source for earlier infant charts, and ultimately, to better “describe the size and growth of children in the United States” (Kuczmarski et al. 2000:3). Given the uniquely American focus of this revision and the continued widespread use of the 1978 CDC/WHO growth curves within Malaysia, I have chosen to apply the older reference population when calculating z-scores. This decision does compromise accuracy to some extent by (1) relying on observations recorded at three-month intervals to infer a monthly reference for children in the three to 12-month-old age range, (2) using suspect recumbent length data, and (3) ignoring size and growth pattern differences between formula fed and breastfed infants (see Hamill et al. 1977, Victora et al. 1998, WHO Working Group on the Growth Reference Protocol 1998, Kuczmarski et al. 2000). However, it facilitates in-country comparisons and is justifiable despite the limited diversity of the older reference population given that racial or ethnic differences in growth and development are “small and inconsistent” and long-standing evidence indicates that well-nourished, healthy children throughout the world grow at comparable rates, attaining the same heights and weights as children from industrialized nations at least until ten years-of-age (Habicht et al. 1974, Martorell and Habicht 1986, Kuczmarski et al. 2000:38-43, Cogill 2003:39).

Returning to the data from Kpg. Trusan Jaya and Kpg. Tanah Hitam, 23.3 percent of children less than six-months-old are moderately to severely underweight for their age (< -2 SD) and an additional 21.4 percent are mildly underweight (> -2SD, < -1SD) according to the WHO classification system outlined by Cogill (2003:42). Overweight and obesity have yet to become an issue within the villages, and only two children (1.9%) have disproportionately high (> 2SD) weight-for-height measures. Alternative indicators demonstrate that 13.6 percent experience chronic undernutrition as evidenced by moderate to severe stunting, while 11.7 percent show the effects of acute wasting

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30 The Fels data was drawn from a single longitudinal study (1929-1975) of primarily white, middle-class infants, who were formula-fed and living in a small area in southwest Ohio (Kuczmarski et al. 2000).

31 Child health cards currently stocked at the Sematan and Lundu clinics included a mixture of revisions ranging from December 1995 to December 2001 and uniformly based on the 1978 NCHS standards. As state and national figures are derived from local reporting, it is safe to assume that government estimates of malnutrition prevalence rely on this older population of reference.

32 The most common cut-off point for creating prevalence statistics and identifying suffering or at-risk children remains less than -2 SD – i.e., in the moderate to severe range. Reporting will focus on this group for simplicity and to facilitate comparison.
Table 4.8: Distribution of Nutritional Indicators (Z-scores)

<table>
<thead>
<tr>
<th></th>
<th>Height-for-Age</th>
<th>Weight-for-Age</th>
<th>Weight-for-Height</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total N</td>
<td>103</td>
<td>103</td>
<td>103</td>
</tr>
<tr>
<td>Mean</td>
<td>-0.74 (SD = 1.30)</td>
<td>-0.93 (SD = 1.30)</td>
<td>-0.56 (SD = 1.19)</td>
</tr>
<tr>
<td>N below -2 SD</td>
<td>14</td>
<td>24</td>
<td>12</td>
</tr>
<tr>
<td>% below -2 SD</td>
<td>13.6</td>
<td>23.3</td>
<td>11.7</td>
</tr>
</tbody>
</table>

Table 4.9: Prevalence of Undernutrition by Sex (Z-Scores)

<table>
<thead>
<tr>
<th></th>
<th>Height-for-Age &lt; -2 SD (Stunting)</th>
<th>Weight-for-Age &lt; -2 SD (Underweight)</th>
<th>Weight-for-Height &lt; -2 SD (Wasting)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Boys</td>
<td>18.8% (N=48, M=-0.82, SD=1.37)</td>
<td>20.8% (N=48, M=-0.94, SD=1.39)</td>
<td>10.4% (N=48, M=-0.55, SD=1.28)</td>
</tr>
<tr>
<td>Girls</td>
<td>9.1% (N=55, M=-0.87, SD=1.26)</td>
<td>25.5% (N=55, M=-0.92, SD=1.23)</td>
<td>12.7% (N=55, M=-0.56, SD=1.11)</td>
</tr>
</tbody>
</table>

(Table 4.8 above). Disaggregated figures suggest both a higher prevalence of wasting and underweight among girls and a higher prevalence of stunting among boys (Table 4.9 above). However, a Chi-square test for independence indicated no significant association between sex and stunting, $\chi^2 (2, n = 103) = 3.49, p=0.18$, Cramer’s V=0.18; underweight, $\chi^2 (2, n = 103) = 0.35, p=0.84$, Cramer’s V =0.06; or wasting, $\chi^2 (2, n = 103) = 0.28, p=0.87$, Cramer’s V =0.05. Effect sizes (Cramer’s V) were within the small to medium range for each indicator according to the standards presented by Gravetter and Wallnau (2004:605). This variation was even less pronounced in terms of mean z-scores (Table 4.9 above), and independent samples t-tests showed no significant difference between boys and girls for height-for-age ($t(101) = -0.58, p=0.56$ (two-tailed)), weight-for-age ($t(101) = -0.07, p=0.95$ (two-tailed)), or weight-for-height ($t(101) = 0.04, p=0.97$ (two-tailed)).

With regards to age, there were again no significant differences in mean z-scores for any of the profiled anthropometric indicators according to the performed one-way between-groups analysis of variance (ANOVA). Child participants were divided into five groups on the basis of age as modeled by Cogill (2003:44-45): (1) six to 11-months, (2) 12 to 23-months, (3) 24 to 35-months, (4) 36 to 59-months, and (5) 60-months and older. None of the average z-scores for these age groups differed at a statistically significant level for height-for-age ($F (4, 98) = 2.09, p=0.09$), weight-for-age ($F (4, 98) = 1.37, p=0.25$), or weight-for-height ($F (4, 98) = 1.24, p=0.30$).
The height-for-age value ($p=0.09$) did approach significance suggesting that a larger sample might capture meaningful differences among age cohorts. Though without a significant difference overall, it was impossible to use post-hoc analysis to identify exactly where the differences among groups were occurring (see Pallant 2007:246). These results were, however, reinforced by the prevalence of stunting (Table 4.10a, overleaf) and wasting (Table 4.10b, overleaf), which were markedly higher among 12 to 23-month-old children, while children in the six to 11-month age range demonstrated a low prevalence of malnutrition across all indicators (Tables 4.10a-c). The superior health of children less than one year of age is well recognized within the local public health system, where it is attributed to both exclusive breastfeeding and reduced independence and willfulness on the part of the child. As phrased by the Head Health Nurse at the Sematan clinic:

> When we talk about children, from the time that they’re born, zero to one year – No! – The body weight is ok, because they’re fully breastfed. After one year, maybe the mother can’t afford to buy milk and just gives the child the milk bottle with no milk. Maybe that slows down the weight… I really didn’t do a survey, but mostly, zero to one year, there’s no problem. After that, the baby’s already begun to walk – is already able to eat [on his or her own]. Then the mother comes and tells us her child doesn’t want to eat, doesn’t have an appetite.

Due to the relatively small sample size ($n=103$) and large number of necessary subgroupings, assumptions concerning minimum expected cell frequency were violated, and it was not possible to perform a chi-square test for independence to evaluate the significance of these observed differences.

It is important to note the relatively high prevalence of stunting in children at least two-years of age, represented by the shaded regions of Table 4.10a (overleaf). Overall, 12.3 percent of village children in this older age range are moderately to severely stunted – a particularly problematic fact as Cogill (2003:11) notes that this form of growth retardation is likely irreversible after the child reaches 24-months.
Village malnutrition rates are elevated in comparison to child samples collected at both the national and district levels. The WHO nutritional profile for Malaysia, submitted on behalf of the Malaysian MOH by Parman (2009:1), provides two separate estimates of child nutritional status: (1) the 2002 National Nutrition Survey which states that 12.6 percent of children under five years of age are moderately to severely underweight – reduced from 16.0 percent in 1999 – and (2) an earlier cross-sectional household study conducted in 1999 (n=5108) which classified 19.0 percent of children less than five-years-old as underweight, 15.6 percent as stunted, and 13.3 percent as wasted. The results of this latter study – currently available through the WHO Global Database on Child Growth and Malnutrition (n.d.) – indicate that among the 515 children sampled from within Sarawak, 19.4 percent were underweight, 14.6 percent were stunted, and 8.9 percent were wasted. A recently released UNICEF (2007) report provides more

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**Table 4.10a: Prevalence of Low Height-for-Age (Stunting) by Age Group***

<table>
<thead>
<tr>
<th>Age Group (months)</th>
<th>Mean</th>
<th>N below -2SD</th>
<th>N in Age Group</th>
<th>% below -2 SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-11</td>
<td>-0.06 (SD = 1.16)</td>
<td>1</td>
<td>19</td>
<td>5.3</td>
</tr>
<tr>
<td>12-23</td>
<td>-0.92 (SD = 1.72)</td>
<td>5</td>
<td>19</td>
<td>26.3</td>
</tr>
<tr>
<td>24-35</td>
<td>-1.07 (SD = 1.41)</td>
<td>2</td>
<td>21</td>
<td>9.5</td>
</tr>
<tr>
<td>36-59</td>
<td>-0.66 (SD = 1.01)</td>
<td>4</td>
<td>30</td>
<td>13.3</td>
</tr>
<tr>
<td>60 and older</td>
<td>-1.11 (SD = 1.02)</td>
<td>2</td>
<td>14</td>
<td>14.3</td>
</tr>
</tbody>
</table>

*Shading indicates age ranges at which stunting is likely irreversible (see Cogill 2003:11).

**Table 4.10b: Prevalence of Low Weight-for-Age (Underweight) by Age Group**

<table>
<thead>
<tr>
<th>Age Group (months)</th>
<th>Mean</th>
<th>N below -2SD</th>
<th>N in Age Group</th>
<th>% below -2 SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-11</td>
<td>-0.63 (SD = 0.97)</td>
<td>1</td>
<td>19</td>
<td>5.3</td>
</tr>
<tr>
<td>12-23</td>
<td>-1.18 (SD = 1.43)</td>
<td>7</td>
<td>19</td>
<td>36.8</td>
</tr>
<tr>
<td>24-35</td>
<td>-1.38 (SD = 1.33)</td>
<td>7</td>
<td>21</td>
<td>33.3</td>
</tr>
<tr>
<td>36-59</td>
<td>-0.71 (SD = 1.13)</td>
<td>6</td>
<td>30</td>
<td>20.0</td>
</tr>
<tr>
<td>60 and older</td>
<td>-0.77 (SD = 1.68)</td>
<td>3</td>
<td>14</td>
<td>21.4</td>
</tr>
</tbody>
</table>

**Table 4.10c: Prevalence of Low Weight-for-Height (Wasting) by Age Group**

<table>
<thead>
<tr>
<th>Age Group (months)</th>
<th>Mean</th>
<th>N below -2SD</th>
<th>N in Age Group</th>
<th>% below -2 SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-11</td>
<td>-0.66 (SD = 0.79)</td>
<td>1</td>
<td>19</td>
<td>5.3</td>
</tr>
<tr>
<td>12-23</td>
<td>-0.84 (SD = 1.22)</td>
<td>5</td>
<td>19</td>
<td>26.3</td>
</tr>
<tr>
<td>24-35</td>
<td>-0.79 (SD = 1.02)</td>
<td>2</td>
<td>21</td>
<td>9.5</td>
</tr>
<tr>
<td>36-59</td>
<td>-0.34 (SD = 1.08)</td>
<td>2</td>
<td>30</td>
<td>6.7</td>
</tr>
<tr>
<td>60 and older</td>
<td>-0.13 (SD = 1.85)</td>
<td>2</td>
<td>14</td>
<td>14.3</td>
</tr>
</tbody>
</table>
optimistic figures, citing the prevalence of underweight Malaysian children under the age of five as 8.0 percent. Although recent, consistent indicators are unavailable, it remains clear that aggregate prevalence rates within the villages exceed the range reported at the national level and compare poorly with state-level rates for both wasting and underweight even following on a decade of nutritional programming under the PPKZM. Moreover, my own data support assertions by Sarawak SHD staff indicating that this site is an area of special concern within the Sematan subdistrict.

*Child Illness Incidence and Perceptions of the Clinic*

After excluding a single household with a chronically ill, asthmatic child (n = 62), the number of monthly illness episodes experienced by children in the target population ranged from zero to five with an average of 1.07 (SD=1.07). Expressed in terms of frequency, 64.5 percent of surveyed households (n=40) reported that one or more of their children was sick at least once over the course of the past 30 days. Over half of the respondents (57.1%, n=36) had visited their local health clinic within the past month, and the most common rationales for these visits are presented in Table 4.11 (overleaf). With only three households seeking clinic-based medical care, it is clear that both the majority of illness events are treated within the home and that most children enter the clinic for routinely scheduled services such as growth monitoring and immunization.

This usage pattern dovetails with the community members’ perceptions of health clinic function as outlined in Table 4.12 (overleaf). Again, we find that kampung residents conceptualize the role of the clinic largely in terms of prevention – in particular, those preventative measures which they encounter on a regular basis (*i.e.*, growth monitoring, immunization, and vitamin distribution).

This focus shifts slightly when participants are asked to consider the actual benefits their households receive from the clinic (Table 4.13, overleaf). In this instance, respondents tend to think quite literally in terms of tangible outcomes such as medications received (46.0%, n=29) or injections administered (34.9%, n=22). As a result, treatment is emphasized rather than the largely intangible services associated with preventive care.

33 The annual Health Facts summary publications produced by the Malaysian MOH Planning and Development Division do not include information on the population’s nutritional status.
### Table 4.11: Common Rationale for More Recent Clinic Visit

<table>
<thead>
<tr>
<th>Rational</th>
<th>N</th>
<th>Percent of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Growth Monitoring (i.e., weighing)</td>
<td>54</td>
<td>85.7</td>
</tr>
<tr>
<td>Immunization</td>
<td>17</td>
<td>27.0</td>
</tr>
<tr>
<td>Treatment for Fever</td>
<td>3</td>
<td>4.8</td>
</tr>
<tr>
<td>Food Basket (PPKZM) Collection</td>
<td>2</td>
<td>3.2</td>
</tr>
</tbody>
</table>

### Table 4.12: Perceived Clinic Functions

<table>
<thead>
<tr>
<th>Function</th>
<th>N</th>
<th>Percent of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theme: Prevention</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ensure Health/Prevent Disease</td>
<td>47</td>
<td>74.6</td>
</tr>
<tr>
<td>Growth Monitoring</td>
<td>32</td>
<td>50.8</td>
</tr>
<tr>
<td>Immunization</td>
<td>17</td>
<td>27.0</td>
</tr>
<tr>
<td>Promote Nutrition (e.g., provide vitamins)</td>
<td>12</td>
<td>19.0</td>
</tr>
<tr>
<td>Health Education</td>
<td>3</td>
<td>4.8</td>
</tr>
<tr>
<td>Provide Food</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td>Promote Cleanliness</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td><strong>Theme: Treatment</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Diagnosis and Treatment of Disease</td>
<td>22</td>
<td>34.9</td>
</tr>
<tr>
<td><strong>Theme: Larger Mandates</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Promote Mental Health and Socialization</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td>Provide Low-Cost Services</td>
<td>1</td>
<td>1.6</td>
</tr>
</tbody>
</table>

### Table 4.13: Benefits Received from the Clinic

<table>
<thead>
<tr>
<th>Benefit</th>
<th>N</th>
<th>Percent of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theme: Tangible Benefits</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medication and Treatment for Illness</td>
<td>29</td>
<td>46.0</td>
</tr>
<tr>
<td>Preventative Treatments (i.e., immunization)</td>
<td>22</td>
<td>34.9</td>
</tr>
<tr>
<td>Vitamins</td>
<td>3</td>
<td>4.8</td>
</tr>
<tr>
<td><strong>Theme: Services and Intangible Benefits</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>General Assurance of Good Health</td>
<td>22</td>
<td>34.9</td>
</tr>
<tr>
<td>General Advice and Health Education</td>
<td>7</td>
<td>11.1</td>
</tr>
<tr>
<td>Growth Monitoring and Assistance with Weight</td>
<td>6</td>
<td>9.5</td>
</tr>
<tr>
<td>Assistance Maintaining Cleanliness</td>
<td>3</td>
<td>4.8</td>
</tr>
<tr>
<td><strong>Theme: Characteristics of Care</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Easily Accessible Services</td>
<td>4</td>
<td>6.3</td>
</tr>
<tr>
<td>Free Services</td>
<td>2</td>
<td>3.2</td>
</tr>
</tbody>
</table>
When prompted specifically about nutritional messages, 85.7 percent of surveyed households (n=54) stated that they had received nutrition-related advice or information from the clinic. Of these respondents, only 37.7 percent (n=20) had received new information. Yet, despite this redundancy, they were overwhelmingly positive in their characterizations with 98.1 percent (n=52) indicating that the information provided was both useful and appropriate given their household’s current circumstances. Interestingly, a slightly lower number of respondents (94.3%, n=50) actually believed that the advice disseminated by the clinic was factually correct.

Few individuals had any direct involvement with the PPKZM. Seven households (9.9%) reported participating in the program at some point in time, three of which were currently enrolled (4.2%). Unsurprisingly then, the majority of village residents (60.6%, n=43) were uncertain of the program’s purpose; 32.4 percent (n=23) connected it in a general way to “balanced food” or nutrition; 8.5 percent (n=6) recognized it as an intervention for underweight children; 4.2 percent (n=3) erroneously labeled it an initiative to improve household cleanliness; and only a single individual noted its focus on low-income households. Given that the program’s name literally translates as the “Program to Rehabilitate Undernourished Children from Hard-Core Poor Households” these misinterpretations and overwhelmingly generic responses are particularly troubling and can be taken to reflect a genuine lack of name recognition and program awareness within the villages.

Together, collected data on household income levels and child weight-for-age measures indicates that during the 2008 fieldwork period six village households were consistently eligible for assistance according to the more stringent (and outdated) SHD guidelines. Sixteen households were eligible by current MOH standards based on income estimates obtained during the initial census conducted from February to early March – 12 of which remained eligible for the duration of my time on-site. PPKZM coverage within Kpg. Trusan Jaya and Kpg. Tanah Hitam is therefore 50 percent at best and may be as low as 18.8 percent during seasonal lows if the correct national eligibility standards are applied. This failure to reach the majority of the target population is

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34 The PPZKM malnutrition criterion is met by moderate to severe (<-2 SD) undernutrition, taking into account only the weight-for-age indicator (see Foo Li Chien 2003:15).
unsurprising. Local nutritional surveillance is passive and without knowledge of the program and its entry requirements, there is little opportunity for villagers to assert their right to these essential services.

**Overview of Child Feeding Strategies and Perceptions**

When children are not consuming the food necessary to sustain normal growth and activity, a variety of explanations emerge. Ethnographic interviews with both community mothers and clinic nursing staff consistently returned to the idea that decreases in weight are attributable to the child’s own disinterest in food – “the child doesn’t want to eat.” This theme was further explored in the final survey in which over half of community respondents (55.6%, n=35) indicated that children are naturally hyper-selective or “picky” eaters. A variety of strategies are adopted to overcome this difficulty and encourage sufficient food consumption as profiled in Table 4.14 (below).

The trend here is overwhelming that of positive reinforcement in which food preparation and consumption becomes an interactive, game-like activity or an act that is directly rewarded through gifting or the inclusion of favored foods. Physical intimidation was quite rare with only a single household reporting that the children were threatened with a belt when they refused food. Participant observation supports these findings as corporal punishment was nearly absent in the villages, and the few isolated incidences that I did observe were performed surreptitiously by a more marginal member of the household and community in the absence of the child’s primary caretakers.

<table>
<thead>
<tr>
<th>Strategy</th>
<th>N</th>
<th>Percent of Households</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play together while feeding the child</td>
<td>31</td>
<td>49.2</td>
</tr>
<tr>
<td>Act as an example by consuming a wide variety of foods</td>
<td>28</td>
<td>44.4</td>
</tr>
<tr>
<td>Invite the child to participate in the cooking</td>
<td>16</td>
<td>25.4</td>
</tr>
<tr>
<td>Offer the child a gift in exchange</td>
<td>13</td>
<td>20.6</td>
</tr>
<tr>
<td>Offer the child special or favorite foods</td>
<td>11</td>
<td>17.5</td>
</tr>
<tr>
<td>Feed the child in a new location</td>
<td>4</td>
<td>6.3</td>
</tr>
<tr>
<td>Give the child vitamins to improve his or her appetite</td>
<td>4</td>
<td>6.3</td>
</tr>
<tr>
<td>Offer the child intangible, activity-based awards</td>
<td>2</td>
<td>3.2</td>
</tr>
<tr>
<td>Provide verbal encouragement</td>
<td>2</td>
<td>3.2</td>
</tr>
</tbody>
</table>
Interestingly, 6.3 percent (n=4) of respondents attributed selective food consumption to the child’s limited appetite and proposed a more organic solution: administering vitamins. Vitamins are freely distributed by the clinic when available – typically in conjunction with food basket distributions, immunization events, or routine growth monitoring – and 53.5 percent (n=38) of village households provide vitamins to their children with 50.7 percent (n=36) doing so on a regular basis.

Though not explicitly cited as a strategy for encouraging children to eat, dietary diversity was highly valued and closely associated with the idea of “balanced food”\(^{35}\) and adequate nutrition. Throughout recorded and informal interview sessions, participants consistently linked food selection to these two criteria. As one mother explained her food choices:

> It’s just – a balanced diet that’s rotated – vegetables, fish, and such so that it’s not always, every day, eggs and only eggs.

Overall, 92.1 percent of participant households (n=58) routinely varied their meal selections, in large part to ensure adequate nutrient intake (87.3%, n=55) and avoid boredom (82.5%, n=52) as seen in Table 4.15 (overleaf). Boredom was further associated with appetite suppression as children become “bored with eating,” just as there is a clear connection – made by community members and in the larger literature (\textit{e.g.}, Allen \textit{et al.} 1991, Taren and Chen 1993, Onyango \textit{et al.} 1998, Tarini \textit{et al.} 1999, and Hatloy \textit{et al.} 2000) – between facilitating the consumption of a broad array of nutrients and ensuring child growth, development, and total health.

Variety was attributable to the inclusion of both preferred foods (7.9%, n=5) and undesirable foods (3.2%, n=2), which families were forced to accept due to income restrictions. This dual association is striking as dietary diversity – the “number of unique foods consumed over a given period of time” – is widely considered a promising proxy for the access dimension of food security (Hatloy \textit{et al.} 1998, Lorenzana and Sanjur 1999, and Hoddinott and Yohannes 2002:2) and has been operationalized as a measurement tool by Swindale and Bilinsky (2006) based on this assumption. Although further research is clearly needed, the Malay context may be an exception or an

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\(^{35}\) The concept of balanced food is further explored in Chapter 6 (pages 184-196).
exemplar of a previously unidentified group of settings in which greater variety is in fact indicative of great need, i.e., food insecurity.

To facilitate triangulation and determine to what extent conscious distinctions were being made between child and adult foods, respondents were asked whether or not there were special “child foods” and if so to provide one or more examples. Over half of the surveyed households – 52.4 percent (n=33) – responded in the affirmative, providing the archetypal child foods listed in Table 4.16 (below).

<table>
<thead>
<tr>
<th>Table 4.15: Common Rationale for Providing a Varied Menu</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rationale</td>
</tr>
<tr>
<td>To ensure that the child consumes a variety of nutrients</td>
</tr>
<tr>
<td>To prevent boredom</td>
</tr>
<tr>
<td>To enhance the child’s appetite</td>
</tr>
<tr>
<td>To enhance the child’s growth, development, and overall health</td>
</tr>
<tr>
<td>To introduce new foods to the diet</td>
</tr>
<tr>
<td>To accommodate child preferences</td>
</tr>
<tr>
<td>To cope with income restrictions</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Table 4.16: Archetypal Child Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Food Item</td>
</tr>
<tr>
<td>Porridge</td>
</tr>
<tr>
<td>Bread, Crackers, and Biscuits</td>
</tr>
<tr>
<td>Fried Rice and Fried Noodles</td>
</tr>
<tr>
<td>Vegetables</td>
</tr>
<tr>
<td>Soup</td>
</tr>
<tr>
<td>Eggs</td>
</tr>
<tr>
<td>Processed Meat (e.g., hotdogs, nuggets)</td>
</tr>
</tbody>
</table>
CHAPTER FIVE
TECHNIQUES FOR DATA ANALYSIS

This chapter details the analyses applied to cognitive methodologies employed in this study (i.e., free-listing, pile-sorting, belief statement analysis and vernacular data visualization techniques). It aims to supply additional justification and explanation for less familiar techniques and the non-traditional applications of the cultural consensus model first introduced by Romney and colleagues (1986, 1987).

Free Lists
Verbatim participant responses were coded and standardized in collaboration with the primary research assistant as recommended by Weller and Romney (1988). Synonyms and dialect variations (e.g., ayam, manok [chicken]), phrases with similar meanings (e.g., “apa saya makan” [what I eat], “makanan orang dewasa” [adult food]), and morphological derivatives (e.g., sayur [vegetable], sayur-sayuran [vegetables]) were combined through an iterative, daily review of the collected lists. Item combinations were noted in a separate file while the context of the free-listing sessions was still fresh. Raw data files were maintained in their original state until data collection was completed. Proposed item combinations were then independently reviewed and approved by two local research assistants, and data files were adjusted accordingly. A manual check for spelling and data entry errors was also performed. While ANTHROPAC 4 (Borgatti 1996b) does include an optional algorithm (SOUNDEX) for this purpose, which identifies items that sound alike but are spelled differently, it proved unhelpful in evaluating terms in the Malay language.

For each domain, an initial unprompted and an extended list were obtained using the methodologies outlined by Brewer (2002) to ensure full elicitation as noted in the preceding methodology (see Chapter 3, pages 64-67). Both sets of free lists were standardized as described above and entered into ANTHROPAC 4 (Borgatti 1996b) to (1) create a standard respondent-by-item matrix for each domain and (2) to determine item frequencies, the percentage of total individuals who named each item, average item
rank, and saliency based on Smith’s Saliency Index (Smith’s S). The saliency index, as developed by Smith (1993), accounts for both an item’s frequency and the order in which it was recalled by calculating a gross mean percentile rank for each item across all participant lists. More specifically, an item’s percentile rank on a given list is determined by subtracting the item’s rank order from the total number of items in the list and then dividing this difference by the total number of list items. The percentile ranks from each participant list are then averaged to produce an item’s overall gross mean percentile rank or saliency index (Smith 1993, Gravlee 1998).

This set of basic outputs was then used to (1) assess list length and content, (2) determine whether the proposed domains of local food and local child food were coherent and meaningful, (3) evaluate the usefulness of aggregate data reporting, (4) investigate potential patterns of difference in participant attributes, and (5) compare the contents of the general and child food domains for similarities and differences. Specific analytic techniques are discussed in the following sections.

**Meaningfulness of the Domains and Boundary Selection**

As Borgatti (1999), Gravlee (1998), and Weller and Romney (1988) note, most valid cultural domains demonstrate a core/periphery structure with a large proportion of idiosyncratic terms and no defined boundaries. This understanding of cognitive domains is supported by an established body of psychological literature dating back to the 1970s, which empirically demonstrates that most natural categories are not logical, bounded and based on a set of critical features as previously assumed (e.g., Katz and Postal 1964) but rather are “continuous and possess an internal structure in which members are ordered according to the degree to which they are judged good examples (typical) of the category” (Rosch et al. 1976:491). Thus, once a sufficient sample size is reached, the top item will have been mentioned by the majority of the sample and additional informants will simply extend the periphery at a continually decreasing rate.

Item frequencies for both the general and child food free lists were plotted to visually assess this assumption with the expectation of creating standard “scree plots.” These plots resemble the side of a mountain where “scree” refers to the fallen debris at the mountain’s base. The visual is that of a slope that “descend[s] slowly, dribbling down to the lowest frequency” (Weller and Romney 1988:15).
Subsequent pile-sorting required that the domains of interest be defined. Thus, frequency plots were assessed for a natural break or “elbow” as recommended by Borgatti (1999) as a convenient and meaningful way of distinguishing the culturally shared items of the domain from the more individualized items. It is possible to define the domain by including all items mentioned by more than one respondent (i.e., those that meet the minimum definition for sharing) or by arbitrarily selecting the top N items, where N is the maximum number of items that can be realistically assessed in the remainder of the study. Yet neither of these alternatives is as useful or theoretically justified as a visual analysis of the frequency plot.

Justification of Aggregation: Cultural Consensus Analysis

A certain level of agreement is a precondition for data analysis based on aggregation (Pelto and Pelto 1975, Nerlove and Walters 1977, Foster 1979, Lopez et al. 1997, Ross 2004). This is not a new concept, nor is pooling data a new technique. As Weller (2007:363) notes with respect to any statistical analysis, the Central Limit Theorem states that assuming representative sampling “an aggregation of responses is the single best estimate [of the population mean] but the relative accuracy of that estimate diminishes as variance in responses increases.” For instance, imagine a sample of ten individuals, each of whom are asked to rate their level of satisfaction with the local clinic on a scale of one to ten, where one is completely dissatisfied and ten is completely satisfied. Six participants unhappily rate the clinic a one, while four select the top measure, ten. It would be technically accurate but a clear distortion to report an average satisfaction score of 4.6, which fails to represent the rating choice of any of the participants or distinguish between two qualitatively different experiences. In this simplistic example there is only a single question, and the bimodal distribution and lack of group consensus is clear. Yet with multiple response items or lengthy free lists, it becomes more difficult to determine the level of agreement within and across groups without some type of formalized assessment. The Cultural Consensus Model (CCM) introduced by Romney and colleagues (1986, 1987) provides the necessary statistical justification for looking at group patterns. As Ross (2004:130) phrases it, “We have to establish whether the members of a group under investigation – our informants – agree strongly enough with one another for us to assume a common cultural model that will allow ascribing meaningful content to the model.”
Admittedly, cultural consensus analysis has rarely been applied to free lists despite their frequent and long-term use within anthropology,¹ and the standard application of the CCM has been to measure informant “competence” and reconstruct the “correct answers” in a given research context (Weller and Romney 1988:74, Chavez et al. 1995, Lopez et al. 1997). Yet because the technique uses an aggregation of responses to estimate these answers, it begins by assessing response heterogeneity, providing the desired empirical check on the level of participant agreement. Moreover, its focus on individuals rather than response data allows the researcher to assess subgroup variation and patterns of difference within the larger cultural group.

The potential benefits of combining free list methodology with CCM analysis have not gone unnoticed. Over the past five years, free-listing has assumed greater visibility and prominence within a growing body of interdisciplinary work (e.g., Ross 2004, Ross and Medin 2005, Schrauf and Sanchez 2008), which draws on cognitive anthropology and psychology to justify the use of CCM as a methodological tool in circumstances where the researcher can reasonably assume that each participant has some knowledge of the subject matter and that correspondence between any two informants is a function of their shared cultural knowledge. The extension and reinterpretation of this technique is not itself problematic. In fact, Weller (2007:363) – one of the co-developers of the cultural consensus model – asserts that “statistical methods are not synonymous with the theories and hypotheses that they test; they are tools to test ideas.” Although contested in the larger literature, a strong case can be made for the use of cultural consensus analysis in order to (1) evaluate the level of participant agreement and (2) assess potential subgroup variation. Unfortunately, recent works have tended to gloss over important distinctions between the formal cognitive model (Romney et al. 1986), which aims to represent the answering process, and the set of informal analytic procedures (Romney et al. 1987) often used to estimate question answers and respondent accuracy without restrictions related to the ways that questions are asked and answered. The proper application of these statistical techniques requires that the differences between formal and informal consensus analysis are recognized and used to inform subsequent data processing. As such, the following sections provide a comparative outline of the formal and informal techniques; justify the use of the informal

¹ Ross and Medin (2005:134) have suggested that the very simplicity of free-listing may be overshadowing its potential use as a “serious research instrument” in combination with more formal statistical techniques.
model for free list analysis; and delineate the procedure and modifications necessary to conduct the analysis.

*Formal and Informal Consensus Analysis*

To reiterate, the aim of cultural consensus analysis – both formal and informal – is to estimate a group’s cultural beliefs while determining the degree to which each individual shares in these beliefs. To accomplish this, individual knowledge is estimated first, based on the level of agreement among participants as measured by the similarity (correlation) in responses between each possible pair. Participants who demonstrate the highest levels of overall agreement are assumed to be the most representative or “knowledgeable,” and their responses are weighted more heavily as the content of the cultural model is determined. This analysis relies on a set of three assumptions: (1) participants answer independently of one another, (2) questions refer to a single topic and are written at the same level of difficulty, and (3) there is a high level of agreement within the group. The first two assumptions must be addressed through careful research design, while the third assumption is directly tested in the course of the analysis as previously noted.

The first step then is to identify those individuals who best represent the underlying cultural model – those with the highest levels of agreement with the group as a whole. In this instance, we want to select the respondents who both included most of the foods that the group included and excluded most of the foods that the group excluded. With categorical data – such as free-listing results – this is done by calculating the proportion of identical answers to produce an inter-informant agreement matrix of match coefficients (see Table 5.1, overleaf). Each cell in this square matrix records the proportion of observed agreement between the pair of respondents listed in the corresponding row and column. With the collected free lists, this would mean the number of foods that were either mutually listed or mutually omitted. The main diagonal or intersection of identical respondents (bolded) is understood as the individual’s unknown level of agreement with the group as a whole and by extension with the larger cultural model. Cultural consensus analysis uses a minimal residual factoring method to estimate this agreement and displays it as the loadings on the first latent root (eigenvalue).
Table 5.1: Conceptual Example of Respondent-by-Respondent Agreement Matrix

<table>
<thead>
<tr>
<th></th>
<th>Respondent A</th>
<th>Respondent B</th>
<th>Respondent C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Respondent A</td>
<td>Agreement with Model (Respondent A)?</td>
<td>Observed Matches (Respondents A and B)</td>
<td>Observed Matches (Respondents A and C)</td>
</tr>
<tr>
<td>Respondent B</td>
<td>Observed Matches (Respondents B and A)</td>
<td>Agreement with Model (Respondent B)?</td>
<td>Observed Matches (Respondents B and C)</td>
</tr>
<tr>
<td>Respondent C</td>
<td>Observed Matches (Respondents C and A)</td>
<td>Observed Matches (Respondents C and B)</td>
<td>Agreement with Model (Respondent C)?</td>
</tr>
</tbody>
</table>

The first factor loadings can then be used to weight the participants’ responses and determine the content of the underlying cultural model. This is achieved by assessing the questions separately and comparing the total likelihood of accuracy for all possible answers. An answer’s likelihood of accuracy is determined by summing the likelihoods that participants who selected that answer were selecting correctly (Weller 2007).

Typically, the weighted results confirm the group’s modal response, but the minority opinion can be deemed the “culturally appropriate” answer when chosen by the more representative participants. Yet in order for these results to be meaningful (i.e., to represent a true cultural model and corresponding levels of participant agreement), the factor analysis must produce a single factor solution, verifying the assumed high level of group agreement. Thus when interpreting the output, three conditions must be met: (1) the first latent root (eigenvalue) must be large in comparison to the remaining factors (indicated by a ratio of at least three-to-one), (2) the first factor must account for the majority of the variance, and (3) all individual first factor loadings must be positive and relatively high (Chavez et al. 1995, Lopez et al. 1997, Nyamongo 2002, Ross 2004).

Beyond this set of commonalities, formal and informal consensus analysis diverge on several important points. These distinctions stem from the fact that formal consensus analysis (Romney et al. 1986) is based on a process model that represents the ways in which questions are asked and answered. It is assumed that when individuals are asked a question they will respond correctly if they know the answer or make a random, unbiased guess if they do not. By virtue of chance alone, some of these guesses will align with the informed responses of other participants and be artificially interpreted as cultural knowledge. To correct for this, formal consensus analysis automatically adjusts the inter-informant agreement matrix by taking into account the number of possible responses. The correction formula is as follows where A is the number of possible responses and L is the level of observed agreement (Ross 2004: 143):

\[(A \times (L-1)) ÷ (A-1)\]
For this reason, formal consensus analysis is only applicable to categorical data and accounts for each individual’s level of knowledge, the number of response categories, and the proportion of culturally correct answers in each response category.

With no corresponding process model, informal cultural consensus analysis (Romney et al. 1987) is less constrained by assumptions and can handle ordinal, interval and ratio-scaled responses. It essentially operates as a “factor analysis of people” typically using either a principal components or maximum likelihood factoring method (Weller 2007:347-349). By operating without an underlying process model, this technique does not include a correction for guessing. Moreover, the participants’ first factor loadings can only be interpreted as their level of agreement with the group and not their relative knowledge in the specified domain. These differences are summarized in Table 5.2 (below).

**Justification of Informal Consensus Analysis**

Free-listing data is not the typical input for cultural consensus analysis. Instead, the formal model was originally applied to dichotomous and multiple-choice data (Romney et al. 1986), and the use of yes/no questionnaires and true/false statements with this technique has now become routine, particularly within medical anthropology where it has been used to address perceptions and beliefs related to AIDS (Trotter et al. 1999), diabetes (Weller et al. 1999), asthma (Pachter et al. 2002), folk illnesses (Weller et al. 1994, 2003, Baer et al. 2004) and even the common cold (Baer et al. 1999). Drawing on

| Table 5.2: Major Differences between Formal and Informal Cultural Consensus Analysis |
|------------------------------------------------------------------------|---------------------------------|
| **Formal Model**                                                        | **Informal Model**              |
| Based on a process model of how questions are asked and answered       | No process model is assumed     |
| Automatic guessing correction                                          | No guessing correction          |
| Accommodates only categorical data *(i.e., open-ended, multiple-choice and true/false questions)* | Accommodates a full range of data types including ordinal, interval, and ratio-scaled data |
| First factor loadings can be interpreted as both the level of individual-group agreement and the proportion of cultural information known | First factor loadings can only be interpreted as the level of individual-group agreement |
| Analysis is performed in ANTHROPAC or UCINET                          | Analysis is performed with standard statistical software *(e.g., SPSS, SAS)* |
this body of literature, Weller (2007) sets forth a set of guidelines for interview materials that can be appropriately assessed using formal consensus analysis: (1) questionnaires should consist of a minimum of 20 items on a single topic at the same level of difficulty, (2) the questions’ content should be developed based on a sample of individuals similar to the target population, and (3) in the case of dichotomous questions, there should be a balance of positive and negative items. As consensus analysis assesses the more abstract phenomenon of underlying cultural models, it is assumed that more questions will be needed to produce a stable estimate of agreement. Working with similar samples during the exploratory and hypothesis-testing phases is intended to maximize content validity by ensuring that the items included reasonably approximate the concept to be measured, and the balancing of positive and negative aspects during question writing is a mandate developed and justified through psychometric work with attitudinal scales (see Nunnally 1978). In brief then, the cultural consensus model is designed to address a series of questions, each of which elicits a single answer. In contrast, free-listing is a single question which elicits a series of answers, prompting Weller (2007:351) to directly assert that this technique cannot be accommodated by the CCM. Strictly speaking, this is correct. However, if we reconceptualize the free-listing data as a series of true/false questions, the method aligns with Weller’s (2007) standards surprisingly well. We begin by justifying this transformation.

First, consider the free-listing prompts: (1) What are all of the foods that people here eat? and (2) What are all of the foods that children here – that is, children between the ages of six-months and six-years – eat? Participants respond by providing a list of foods that are eaten in the village or more specifically in the second case, eaten by village children. We can safely assume that if an individual lists “tapioca shoots”, then they would also designate as true a statement such as “Tapioca shoots are a type of food eaten here.” Henley’s (1969) now classic study of the ordering of free list responses demonstrates that more important or central items tend to be reported first. As phrased by Schrauf and Sanchez (2008:S387), free-listing is not “an exhaustive test of the contents of the mind, but rather a sampling of salient items in response to a cue.” Thus omission can be interpreted as agreement that a given item is not significant,

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2 Gatewood (2009) extends this recommendation to rating scales based on his own work with both formal and informal consensus analysis (see Cameron and Gatewood 1994, Gatewood et al. 2006, Gatewood and Lowe 2008)

3 Local Malay translations for both prompts are provided in the preceding methodology (see Chapter 3, pages 64-67).
particularly when individuals are not forced to produce a fixed number of responses (Ross and Medin 2005). At the practical level, we can thus restate the hypothesized true/false question as “Tapioca shoots are an important type of food here.” Again, we can draw on the literature to assert that individuals who list this food would designate this item as true and those who do not list it would consider the item false. As the standard interpretation of free list results is that frequently mentioned items are highly salient to the respondents (e.g., Weller and Romney 1988, Gravlee 1998, Borgatti 1999, Ross 2004), the proposed true/false format would yield the same results as the original free list data – both at the individual and the aggregate level.

Returning to Weller’s (2007) standards for appropriate interview materials, the free list prompts, reimagined as a series of true/false statements, aptly address each criterion. First, as free-listing is designed to elicit items in one domain, the process itself ensures that each item relates to a single topic (i.e., that domain). Moreover, participants are essentially creating and answering questionnaire items simultaneously such that the sample generating and responding to the survey items is identical, maximizing content validity. There is also the potential to construct as many items as there are unique free list responses – in this case, a total of 756 general local food items and 317 local child food items, which clearly exceeds the 20-item minimum proposed by Weller (2007). The final criterion is the necessary balance of positive and negative items. Although routinely ignored in most of the recent interdisciplinary work (e.g., Ross 2004, Ross and Medin 2005, Schrauf and Sanchez 2008), this consideration is a theoretically sound means of resolving the thorny issue of agreement by omission and the related potential for the artificial inflation of consensus levels. The concern is that idiosyncratic items – those mentioned by only one or two respondents – are registered as producing high-levels of agreement due to the fact that the majority of the respondents do not list them. This omission is interpreted as a match (i.e., agreement that a food is not important). As cognitive domains are defined by their core/periphery structure (see pages 121-122), analyses that fail to exclude items in the periphery will always demonstrate consensus and are effectively meaningless. It is however possible to overcome this difficulty by computing a running average of the percentage of total individuals who named each item and identifying a cut-point at around 50 percent, which includes the most frequently

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4 Schrauf and Sanchez (2008) refute this fact but not in a convincing manner. Their justification is based on logic disassociated with the parameters of the statistical test they seek to apply.
mentioned foods while maximizing the variation in responses. Essentially, when the running average reaches 50 percent, the number of respondents listing and omitting a given food item have equalized at the group level and we have the theoretical equivalent of a balance between positive and negative questions.

 Appropriately truncated free lists therefore meet all of the necessary requirements for cultural consensus analysis when reconceptualized as true/false data. The only remaining barrier is the underlying process model associated with formal consensus analysis. As previously noted the formal assessment makes specific assumptions about the ways in which questions are asked and answered, leading to the incorporation of a correction for guessing. As Ross (2004:144) notes, this type of correction is patently inappropriate for free-listing because “an adjustment for guessing is neither possible nor plausible, as the number of possible answers is infinite.”5 The informal model is used to bypass these difficulties. As a factor analysis based on the use of correlation matrices, informal consensus analysis has traditionally been used to assess rank-ordered data (e.g., Chavez et al. 1995, Magana et al. 1995, and Dressler et al. 1997), but as Ender (2005) notes it can be usefully applied to dichotomous data as well.6 There is considerable debate on this point. Yet following Kim and Mueller (1978:74-75), it is reasonable to apply factor analysis given that the intent here is heuristic, meaning that we are only interested in the structure of clustering in the data – specifically the presence or absence of a single factor solution. In this more limited sense, the use of factor analysis can be justified both as a statistical technique and as an appropriate form of cultural consensus analysis.

**Informal Consensus Analysis Procedure for Free-Listing Data**

The basic ANTHROPAC 4 (Borgatti 1996b) free list outputs were imported into Microsoft Office Excel 2007 where a running average was computed for the percentage of total individuals who named each item. For both the general and the child food lists, the 50 percent cut-off point closely aligned with the previously identified natural break in the frequency plots, which was used to select food items for inclusion in the pile-sorting tasks (see pages 121-122). Due to this similarity and the importance of the pile-sorting

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5 Remember that the correction formula presented in the preceding section (pages 124-126) is based on a concrete number of possible responses.

6 For Ender (2005) nominal data becomes problematic only when the number of non-orderable indicators exceeds two categories.
stimuli to subsequent data collection, I chose to extract these items for further analysis, selecting a total of 81 high-frequency general foods and 30 high-frequency child foods. The mean number of individuals listing these items was 42.01 percent and 40.97 percent respectively – well within the range of balance (30 to 70 %) dictated by Weller (2007).

Returning to ANTHROPAC 4, I extracted these items of interest from the respondent-by-item matrices (FLMAT) for both the general and child food data sets. Standard respondent-by-item matrices are generated through basic free list processing and list participants as rows and food items as columns. The intersection of each row and columns states the rank of a given food item in a participant’s free list. If the item was not mentioned it is represented as missing data. In order to treat these results as true/false responses for the purposes of cultural consensus analysis, they must be recoded as dichotomous matrices such that each cell contains a “1” if the respondent named that item and a “0” if he or she did not. Following recoding, the matrix was exported to Microsoft Office Excel 2007 for cleaning and formatting and then imported into SPSS Version 17.0, where the data was transposed in order to (1) assess the reliability and validity of the selected sample using Cronbach’s alpha and to (2) perform principal components analysis (PCA) on the participants and assess the existence of an underlying cultural model.

Patterns of Difference among Participants

As detailed in the accompanying results (see Chapter 6), principal components analysis indicated an absence of shared cultural models for the sample as a whole in regards to both general local foods and local child foods. Weller (2007) affirms that a lack of fit with the CCM in the presence of a multi-factor solution suggests the existence of more than one set of beliefs or group of respondents. Three methods were used to identify possible groupings: (1) principal components analysis of the non-transposed, dichotomous respondent-by-item matrices, (2) correlation of individual-to-group agreement scores (first factor loadings) with average monthly household income, average monthly per capita income and child health status, and (3) multidimensional scaling (MDS) of the respondent-by-respondent similarity matrices. Each assessment was performed separately for the general local food and child food lists in SPSS Version 17.0.

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7 Visuals for each of these food items are included in Appendix B.
The application of PCA to the non-transposed, dichotomous matrices is an exploratory technique. If we can reasonably group items, identifying two major sets of foods that are routinely mentioned together, we can then plot individuals based on their responses to each group (i.e., their first and second factor scores) and visually identify more nuanced belief clustering as modeled by Handwerker (2002). Case labels based on *a priori* variables of interest can then be applied to assess possible rationale for these groupings. However, this usage assumes that the first two factors are meaningful, explaining a significant proportion of the observed variation. This was not the case for either the general or child food listings as PCA revealed that the first two factors explained only 23.19 percent and 33.84 percent of the variance, respectively.

As a simpler alternative to PCA, Weller (2007:358) recommends correlating the first factor scores from the consensus analysis with "information about the people in the sample." This strategy is a form of hypothesis testing and requires that the researcher directly identify the variables of interest. In this instance, average household income levels, *per capita* income, and child health status were investigated. Ethnographic interviews and community observations demonstrated that (1) wild food collection is considered indicative of poverty, (2) the use of low-cost, protein alternatives such as eggs and dried anchovies [*pusuk*] is a standard strategy for dealing with household budgetary constraints and (3) non-local foods are both expensive and inconsistently available to individuals without access to motorized transportation. Based on this evidence, one would expect conceptions of important or typical food items to align with household income. Moreover, interviewed health workers consistently emphasized the role of maternal knowledge in determining child nutritional status as signified by the child’s weight-for-age z-score. One means of evaluating this perspective is to determine whether awareness of a range of food items varies between households with healthy and unhealthy children. Neither of these hypothesized relationships was supported by the resulting Pearson product-moment correlation coefficients. The degree to which participants agreed with the aggregate group response for general local food and local child foods was not correlated with their average monthly household income ($r = -0.97, p = 0.53; r = -0.05, p = 0.76$), average monthly *per capita* income ($r = 0.02, p = 0.92; r = -0.07, p = 0.66$), the weight-for-age z-score of their most severely

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Mean values and information on the frequency distributions of each of these variables is presented in Chapter 4.
undernourished child ($r = -0.14, p = 0.37; r = 0.28, p = 0.09$), or the presence of an undernourished child in the household ($r = -0.01, p = 0.96; r = 0.22, p = 0.20$).

Recognizing that both of the previous analyses were based on factor loadings in instances where the first eigenvalue failed to account for even a quarter of the observed variance, I opted to visually assess the original respondent-by-respondent similarity matrices using non-metric multidimensional scaling (MDS) plots labeled according to the presence of an undernourished child in the household and the respondents’ poverty status and PPKZM program eligibility-by-income as determined by current Sarawak State Health Department guidelines (Jabatan Kesihatan Negeri Sarawak 2004). This type of visual analysis requires a priori modeling. In essence, the researcher creates a set of idealized MDS plots representing various possible outcomes as modeled by Garro (1986).

In this instance, there are three possible distributions representing the null and two alternative hypotheses. If the null hypothesis is correct, and there is no systematic variation in the way that high- and low-income families conceive of child-appropriate foods, then we should see a distribution similar to the one presented in Model A (Figure 5.1 overleaf). In this depiction, households above the SHD poverty line do not tend to agree with one another more often than with households below the poverty line. There is no strong clustering by income and households are randomly distributed throughout the plot. In contrast, Model B represents what Garro (1986:357) terms a “two variant system.” Here, there are two distinct understandings of child food – one associated with low-income households and one associated with high-income households – as reflected in the separate clusters at the plot’s polar extremes. Alternatively, it may be that a single core group of foods is salient only among low-income households as depicted in Model C. This hypothesis is attractive from an ethnographic standpoint as community respondents repeatedly emphasized the need for a varied, balanced diet [makanan seimbang], while associating the difficulty of achieving this ideal with limited financial resources. This correlation between restricted income and reduced dietary diversity is noted both by village residents and within the larger literature on food insecurity (e.g., Radimer et al. 1990, 1992, Wehler et al. 1992, Hatloy et al. 1998, Hoddinott and Yohannes 2002, Swindale and Bilinsky 2006). Ostensibly, the value placed on variety
should result in the common usage of a wide range of food items – and the corresponding absence of a set of core foods – so long as household income levels support this idealized consumption pattern.

The actual MDS plots for respondent-by-respondent similarity are shown overleaf in Figure 5.2 and Figure 5.3. With regards to the general local food listings (Figure 5.2), there appears to be clustering by average household income exclusively among those families below the SHD-defined poverty line with higher income families being randomly distributed throughout the plot as anticipated by Model C (see Figure 5.1 above). The MDS plot for local child foods shows a similar concentration of extremely low-income, PPKZM-eligible households. Yet, this low-income grouping largely excludes impoverished households containing undernourished children (Figure 5.3, overleaf). These results suggest that while there is no consensus at the larger group level, low-income households may have a shared model of salient local food items and extremely low-income households with healthy children may have a unique, shared understanding of what constitutes “child food.” These impressions were statistically assessed by extracting respondents in the specified subgroups and analyzing them separately using informal cultural consensus analysis (PCA) in SPSS Version 17.0.

**Comparing the General and Child-Specific Food Domains**

Free-listing also presents an opportunity to compare the contents of two related domains. Following on the work of Gravlee (1998), simple counts were used to assess the degree of overlap between recognized general local foods and local child foods. In addition, the frequency distributions of the two domains were systematically evaluated by applying a linear regression fit line and equation to a scatterplot of the frequencies for
Figure 5.2: Response Similarity for Salient General Foods Marked by Income

Figure 5.3: Response Similarity for Salient Child Foods Marked by Income and Child Health Status
items which were mentioned at least twice in each domain. Then to further assess the qualitative differences between general and child-specific local foods, each item’s frequency from the child food lists was subtracted from its frequency on the general food lists to provide a set of difference scores ranging from positive values (items more commonly cited as general, local foods) to negative values (items more commonly cited as child-specific foods). By selecting subsets of items from either end of this continuum (n = 10), I was able to characterize the primary differences between the two domains with reference to the larger body of qualitative data. The results of each of these analyses are presented in detail in Chapter 6 (pages 155-159).

Pile Sorts

Creating the Similarity Matrices

A total of 33 community-based and 17 health worker pile sorts were collected. Village and clinic data were assessed separately, using ANTHROPAC 4 (Borgatti 1996b) to create dichotomous item-by-item similarity matrices for each individual, where similarity was defined as co-occurrence and designated with a “1.” Dissimilarity (i.e., items appearing in separate piles) was designated with a “0” (see Weller and Romney 1988, Borgatti 1999). For example, four of the pile-sorting cards depicted long beans [kacang panjang], chicken [ayam], cabbage [kobis], and beef [daging sapi]. Suppose Participant A created two piles – grouping (1) long beans and cabbage and (2) chicken and beef – and Participant B created three piles – grouping (1) long beans and cabbage and forming separate piles for (2) chicken and (3) beef. The resulting similarity matrices for Participants A and B would be as follows:

<table>
<thead>
<tr>
<th>Participant A</th>
<th>long beans</th>
<th>chicken</th>
<th>cabbage</th>
<th>beef</th>
</tr>
</thead>
<tbody>
<tr>
<td>long beans</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>chicken</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>cabbage</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>beef</td>
<td>0</td>
<td>1</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

The creation and evaluation of difference scores applied here is a variation on the technique described by Schrauf and Sanchez (2008: S388). While the rationale is largely the same, I have employed it to compare related domains while its authors apply it to respondent subgroups, specifically the comparison of older and younger participants.
As illustrated, pile-sorting data produces a series of square, symmetrical item-by-item matrices, where matches between an item and itself are represented on the (bolded) diagonal. Individual matrices like the above were then combined to form aggregate proximity matrices for the community and health worker samples. Conceptually, this procedure works as though the individual matrices for each group were stacked on top of one another allowing the researcher to peer down each cell, count the number of “1”s, and then divide this sum by the total number of participants in order to determine the proportion of individuals who placed each pair of items in the same pile. Returning to our previous example with Participants A and B, the calculation would be as follows:

This type of aggregation assumes that if numerous respondents place a set of items together, then there is a high level of similarity between the items. Conversely, if none of the respondents group a set of items in the same pile, this is interpreted as evidence of dissimilarity. In more technical terms, we refer to the proposed relationship as monotonical agreement: a “one-to-one correspondence between the rank orders of the data” such that the items that were placed in the same pile with the highest frequency are the most similar, the pair that were grouped with the second highest frequency are the second most similar, and so forth (Borgatti 1999:149). This interpretation is based on two related process models for pile sort decision-making – the metric and the attribute models.

As described by Borgatti (1999), the metric model assumes that each participant begins the task with an existing mental continuum of similarity. When presented with stimuli, the participant draw on this continuum to make a series of yes/no judgments concerning whether or not a card belongs in a particular pile. When items are determined to be
extremely similar, they are highly likely to be grouped in the same pile. When they are viewed as not at all similar, they are more likely to be placed in separate piles. At intermediate levels, respondents essentially perform a mental coin toss to determine the appropriate placement. Thus at the aggregate level, one can expect similar items to be grouped at a high frequency, dissimilar items to be grouped at a low frequency, and items of intermediate similarity to be grouped at an intermediate frequency given that approximately 50 percent of the time they would be grouped together and approximately 50 percent of the time they would not. The attribute model is similar, but rather than determining the stimuli’s placement on a single continuum of similarity participants are believed to view each item as a bundle of distinct attributes (Borgatti 1999). Participants compare the stimuli attribute-by-attribute, adding up these perceived dimensional distances to form an overall impression of the items’ similarity (Borg and Groenen 1997). When two items share the majority of their attributes they are placed in the same pile. When the attributes for two items are largely different these items are placed in separate piles and so forth, such that both individual decision-making and aggregate group data for this model mirror that of the metric model.

Regardless of the underlying hypothesized mechanisms then, the aggregate proximity matrix presents a rank ordering of items based on their perceived similarity. The only point of contention is the interpretation of items classed at intermediate levels of similarity. Per Borgatti (1999), we cannot definitively state whether these items (1) demonstrate only moderate levels of similarity or (2) are items for which there is limited agreement. To make this distinction, it is necessary to establish the level of cultural consensus. However, as Weller (2007:353) notes, pile sort data cannot be reasonably assessed with the CCM unless each person has the same number of piles. As previously noted, this study employed unconstrained sorts, which elicit similarity data without reference to a predetermined number of groups. While this decision does make interpretation more of a challenge, it minimizes the intrusion of the researcher’s own assumptions and biases.

**Creating Multidimensional Scaling (MDS) Plots**

Once aggregate proximity matrices have been calculated, this data can be represented spatially using a nonmetric form of multidimensional scaling (MDS) in ANTHROPAC 4 (Borgatti 1996b). MDS was selected due to its reliability as means of analyzing and
representing conceptual information (Romney et al. 1972, Shepard 1974, 1975, Kruskal and Wish 1978, Weller 1984). Ultimately, the object of MDS is to visually display the “hidden structure” in the data, revealing both (1) the underlying perceptual dimensions used to distinguish between items and (2) the clustering of items by attribute or subdomain (Kruskal and Wish 1978:7, Borgatti 1999). To accomplish this, each item is represented as a point in space, separated from all other points by a distance inversely proportionate to its similarity with each of these items. In nonmetric MDS, this process begins with ordinal inputs, such as the similarity rankings contained in the aggregate proximity matrix derived from pile-sorting data. This information is transformed through an iterative process ultimately producing interval-scaled data that can be plotted in metric (i.e., continuous) space (Green et al. 1989, Dunn-Rankin et al. 2004).

To do this, ordinal similarities input is first converted into a set of Euclidean distances, usually by subtracting a constant.\textsuperscript{10} Then the number of dimensions is selected, and the items are placed in these dimensions. The specific mechanism varies according to the statistical package and approach selected. This analysis utilizes the TORSCA (Young 1968) starting configuration in ANTHROPAC 4 (Borgatti 1996b), which uses principal components analysis to select the original number of dimensions and the initial placement of the points in space. Kruskal’s method is then applied to iteratively move each point, as it recalculates the distances between every pair of items, and orders and compares these distances with the originally calculated distances. If the rank order of the new distances becomes increasingly similar to that of the original distances (i.e., more monotonic) the movements continue in the same direction. If they do not, changes in step length and direction are made. Kruskal and Wish (1978:27) present the analogy of a blindfolded parachutist attempting to find the lowest point in the terrain by proceeding step-by-step in the most strongly downhill direction until she reaches a spot where no direction is downhill. Thus, through successive approximations, the average difference between the original and estimated distances – the stress value – is minimized, and the degree of fit or correlation between the ranks is improved (Dunn-Rankin et al. 2004).

\textsuperscript{10} If needed, an additive constant may also be applied to fulfill triangle inequality requirements, but this is beyond the scope of this simplified overview. Interested readers are directed to Dunn-Rankin et al. 2004 and Kruskal and Wish 1978.
As the goal of the analysis was to facilitate the interpretation of an intricate set of relationships, an easily interpretable, two-dimensional solution was requested. With a total of 55 stimuli, the pile-sorting data could only be perfectly represented in 54 dimensions. Yet as Borgatti (1996a:31) notes, three dimensions present a significant challenge in terms of comprehension and presentation, while four or more dimensions “render MDS virtually useless as a method of making complex data more accessible to the human mind.” Recognizing that the choice of a two-dimensional solution could over-compress the data and distort its structure, the plot’s degree of fit was assessed with the Kruskal Stress function, drawing on the range of acceptability advocated by Kruskal (1964:16) and Borgatti (1996a:33).

ANTHROPAC 4 (Borgatti 1996b) is capable of performing this entire analytic sequence – creating matrices from the raw pile-sorting data, producing the desired coordinates for each item and representing them spatially. However, as a DOS-based program, the quality of ANTHROPAC-produced MDS plots is limited. For this reason, the coordinates were exported to SPSS Version 17.0 for plotting.

**Interpreting the Multidimensional Scaling (MDS) Plots**

Interpreting an MDS plot is ultimately a researcher’s attempt to find rules that help to explain the observed data structure in terms that are as simple as possible (Borg and Groenen 1997). Though based on quantitative input, visual assessment is an exploratory, intuitive linking of the observed spatial configurations with existing knowledge – gleaned in this instance from extended participant observation, ethnographic interviews, and the input of key informants. Due to this creative element, most sources remain vague as to exact procedure for the analysis. For instance, Kruskal and Wish (1978:45) advocate that one “use any means at your disposal to understand as much of the data and results as possible.” For this study, these means included: (1) plot preparation, (2) plot assessment by the research staff and (3) community-based plot interpretation.

As MDS plots are based on the relative distance between points, the axes and orientation of these graphs are essentially meaningless (Borgatti 1996a). Thus to avoid distraction, both axes were eliminated from the plots, while point labels were added to facilitate interpretation. Tightly-clustered item subsets were plotted in isolation, effectively magnifying these sections. Borgatti (1996a) states that the finer distinctions...
in placement among items in close proximity are more prone to distortion,\textsuperscript{11} and suggests that subsets of clustered items be independently assessed via MDS rather than simply replotted. However, this separate analysis ignores the potential for excluded items to evoke attributes of comparison that impact the ways in which items in the subset are viewed. When this is the case, the subset plots lack vital reference points and become highly distorted. Therefore without additional data collection, the best option is simple magnification and caution regarding interpretations based on slight differences in positioning. Following on these basic forms of plot preparation, the community-derived MDS visuals were further enhanced by overlaying each point with a color image of that item in order to facilitate collaborative interpretation of the plots with low-literacy village informants.

Plot interpretation began by amassing food item attributes elicited directly from participants during the pile-sorting task. After reviewing these emic categories and rationales, I assessed the maps for distributions that were unlikely to have resulted from chance alone, giving special attention to possible dimensions, clusters, and regions. To explain, a dimension is a scatter of points along a straight line that represents a continuum for a given attribute and is often identified by assessing distant yet well-known items for distinguishing criteria (Borgatti 1996a, Borg and Groenen 1997). Clusters are densely populated areas separated from one another by empty space, which may represent a series of subdomains. Regions are a general form of partitioning modeled on facet theory (see Guttman 1959, 1991, Borg and Shye 1995) that roughly divide the entire plot into one of three prototypical forms: axial, modular or polar as represented overleaf in Figure 5.4.

Following on my initial interpretations, I used the illustrated community-derived plot (see Figure 5.5, page 142) to elicit feedback, suggestions, and alternative explanations from the primary research assistant. This session began with general guidance and questioning based on the premise that items in close proximity should be similar and distant items different. Sulastri was asked to comment on whether or not the community-derived plot followed these guidelines and why she felt that particular items were placed as they were. After her preliminary impressions were collected, I introduced

\textsuperscript{11} As stress is calculated using a formula which accentuates the discrepancies in the larger distances, the MDS program prioritizes the accuracy of these placements as it attempts to iteratively improve the stress value (see Borgatti 1996a:35).
the regions diagram illustrated in Figure 5.4 (above) and the concept of dimensions and clusters and invited her to designate similar patterns within the MDS plot. Finally, I presented my reading of the plot for commentary and critique. This session was both intrinsically valuable and useful as a training exercise, identifying appropriate vocabulary and serving as a model for subsequent village focus groups (n = 9) and collaborative plot interpretation.

**Assessing Visual Interpretations with Property Fitting (PROFIT) and Cluster Analysis**

**Analyzing Rating Data**

A total of 105 rating tasks were completed, assessing the degree of processing (n = 20), time of day for consumption (n = 21), level of satiety (n = 20), price (n = 23), and healthiness (n = 21) for each food item. The raw data were first entered into Notepad as a set of ASCII files in data language (DL) format. The DL protocol essentially creates a header providing the information necessary for ANTHROPAC 4 (Borgatti 1996b) to convert it into an internal dataset that can serve as input for any of the program’s analyses (see Borgatti 1996c:16-27, 1996d:14-15,152-160). In this case, ANTHROPAC 4 (Borgatti 1996b) transformed the DL files into a series of item-by-respondent matrices, which could then be assessed for cultural consensus using the formal model (see Romney *et al.* 1986).\(^\text{12}\)

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\(^\text{12}\) Cultural consensus analysis is discussed in detail in the context of free list analysis. Readers are directed to pages 122-130 for further background information on the technique and its assumptions.
Figure 5.5: Illustrated, Community-Derived MDS Plot of Local Food Classifications (Focus Group Visual)

Food Classification: Multidimensional Scaling (MDS) Plot

Kumpulan-Kumpulan Konseptual Untuk Jenis Makanan
Determined the degree of shared knowledge for each proposed food array is a necessary first step when considering a property fitting (PROFIT) analysis. As previously noted, PROFIT attempts to create a regression in which the MDS map coordinates are the independent variables and the hypothesized food attribute is the dependent variable – requiring a measurement of the relative processing, price, healthiness, etc. for each item included in the pile sort. Ratings were collected for this purpose, producing a series of individual numerical judgments. Without sufficient agreement between participants, aggregating these numbers would simply produce a meaningless average, which cannot be expected to estimate the parameters of the proposed models (see Weller 1984). An initial consensus analysis thus allows the researcher to distinguish between a lack of fit resulting from no clear agreement as to a given attribute and a lack of fit that results when an attribute is simply not salient for classification purposes.

As Weller (2007) notes, rating scales present a special challenge for consensus analysis forcing a difficult choice between conceptualizing the information as either ordinal or categorical data. Technically speaking, the informal model requires fully-ranked, interval, or ratio data. In practice, these requirements are routinely ignored to the extent that Weller (2007:352) is willing to consider a factor analysis of rating scales “appropriate,” particularly for scales with a higher number of steps (i.e., a seven-point rather than a four-point rating scale). Despite this justification, I have chosen an analysis based on the formal model for cultural consensus, which draws on the example presented by Handwerker and Wozniak (1997).

As previously discussed (see pages 124-126), the formal consensus technique is based on a process model that represents the ways in which questions are asked and answered. More specifically, the model assumes that when individuals are asked a question they will respond correctly if they know the answer or make a random, unbiased guess if they do not. For this reason, the formal consensus model requires that participant responses be viewed in a categorical sense as “qualitative assignments of meaning rather than rankings” (Handwerker and Wozniak 1997:871). This conceptualization is more in keeping with the project methodology, particularly the oral administration required for illiterate and low-literacy respondents. To avoid response
bias and the need for a complex concept of ordination, I designed a simple, illustrated four-point scale (see Figure 3.1), which was referenced for each food item individually. While it is certainly possible and appropriate to apply this data to the creation of an ordered hierarchy, ordinal data – as noted – cannot be directly analyzed with cultural consensus. Given the clear scalar issues involved with ratings, I feel more comfortable with an analysis which ignores ordinal information than with one which assumes an interval scale with specific, meaningful distances between items. Moreover, this choice is in keeping with current practice as identified through a review of the literature (see Chavez et al. 1995, Handwerker and Wozniak 1997, Handwerker 2002, and Berges et al. 2006). The processed ratings data was therefore assessed in ANTHROPAC 4 (Borgatti 1996b) with a minimal residual factor analysis adjusted for random error (Romney et al. 1986), where similarity among individuals was determined using simple match coefficients.

Property Fitting (PROFIT) Analysis

Drawing on the conceptual model of local foods created from the community pile-sorting data, a linear multiple regression was performed using the aggregate ratings for the degree of processing as the dependent variable and the coordinates from the two-dimensional MDS plot as the independent variables. As phrased by Kruskal and Wish (1978:36), this analysis “regresses the [processing] variable over the configuration” in order to determine if the spatial placement of items corresponds with independently collected judgments (ratings) on the attribute of interest.

As previously discussed (see pages 139-141), the proximity data visualized through multidimensional scaling can be variously interpreted with respect to dimensions, clusters, and regional distributions. PROFIT is a confirmatory analysis used specifically for proposed dimensions, meaning that this test only registers arrangements that are based on an underlying attribute which increases monotonically in a straight line (Borgatti 1994:273). As regression analysis cannot detect any alternative spatial arrangements, it was only applied to the proposed degree of processing array. The time of day for consumption, price, healthiness, and satiety ratings were not considered

13 Local numeracy rates remain undocumented.
14 See Madrigal (1998:6-8) for a concise review of scales of measurement and variables in an anthropological context.
appropriate for this technique based on the results of the cultural consensus analyses outlined in the following chapter (see Chapter 6, pages 184-196).

Within ANTHROPAC 4 (Borgatti 1996b), the standard univariate statistics procedure was employed to compute the mean degree of processing rating for each food item. Then a multiple linear regression was performed with this set of averages acting as the dependent attribute variable. The resulting scale was normalized and optimally positioned within the MDS plot. For the purposes of interpretation, PROFIT analysis produces two primary outputs: (1) the r-squared statistic, which indicates the “fit” – the degree to which there is a relationship between the items’ map locations and their value for the attribute – and (2) the direction cosines, rescaled regression coefficients that indicate the exact direction in which the attribute increases (Weller 1984, Borgatti 1996a). According to Kruskal and Wish (1978:39), a given array is accepted as meaningful when the correlation is significant at the 0.01 level or better and the r-squared value is at least in the upper 0.70’s. When a relationship is present, the direction cosines can be utilized as coordinate values for the head of an arrow representing the underlying dimension. These arrays always pass through the plot at the origin (0,0) and can therefore be manually added by drawing a straight line from the origin to the coordinate point formed by the direction cosines (Borgatti 1996a). The relative placement of a given item on the attribute continuum can then be predicted by drawing a perpendicular line from that item to the PROFIT-determined attribute arrow. The point of intersection between the two lines indicates the degree to which the attribute is associated with that particular item.

Hierarchical Clustering Analysis

While the dimensional approach to MDS interpretation is particularly helpful for evaluating dissimilarity and large spatial differences, an attention to clusters and regional distributions can provide balance and an enhanced understanding of small-scale spatial arrangements (Kruskal and Wish 1978). These interpretations are an important analytic tool, but as previously noted they cannot be empirically evaluated through PROFIT. One option is to validate the MDS plot using an alternative visualization such as Johnson’s (1967) hierarchical clustering. This agglomerative technique assesses a symmetric

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15 Weller (1984:343) asserts that a correlation coefficient greater than 0.9 is necessary, citing Kruskal and Wish (1978:39). The authors do provide this figure, but it is labeled “desirable” while results in the 0.75-0.8 range are still considered a “sufficient” basis for interpreting the MDS structure.
item-by-item similarity matrix identifying a series of “nested partitions” organized in levels of decreasing similarity (Borgatti 1996d:102). Essentially, the process begins by assuming that each item constitutes its own individual grouping – a starting configuration referred to as the identity partition. From this point, the most similar pair of clusters is identified and joined to form a single unit. The proximity of the newly formed cluster to all other clusters is computed, and the process is continuously repeated until all of the items are joined to form a single, overarching group (the complete partition) (see Borgatti 1994, 1996a).

The similarity between clusters can be calculated in a variety of ways. Originally, Johnson (1967) identified two approaches: the minimum and maximum methods. In the minimum method – alternatively referred to as single-linkage clustering or the connectedness method – combination is based on the smallest distance (i.e., greatest similarity) between any two items in separate clusters. With the maximum or diameter method – also known as complete-linkage clustering – combination decisions are determined with respect to the greatest distance between any two items in separate clusters. ANTHROPAC 4 (Borgatti 1996b) provides the additional option of averaging the distance between all members of any two given clusters when determining proximity. If clustering is distinct, each of these alternatives will yield comparable results. With less defined groupings, the minimum method tends to create a single core cluster with numerous peripheral connections while the maximum method generates many small clusters. As noted by Borgatti (1996a), the average method is a preferred, practical compromise for interval-scaled data.

For the purposes of this analysis, Johnson’s (1967) hierarchical clustering was performed on the aggregate proximity matrices from both the community-based and clinic health worker pile sorts working within ANTHROPAC 4 (Borgatti 1996b). As these aggregate matrices are composed of mean similarity scores, they meet Borgatti’s (1996a) proposed scale of measurement requirements and the average method was considered appropriate and applied. The cluster diagram outputs were visually assessed, and Microsoft Office Visio 2007 was used to create simplified dendrograms for presentation.

Additional Uses of Cultural Consensus Analysis

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16 See pages 135-137 for additional background and a description of how these matrices were created.
Cultural consensus analysis was also used in its more traditional sense to assess the level of agreement concerning both (1) the potential use of common local foods as appetite enhancers or suppressants and (2) a set of 28 true/false belief statements on the topic of child undernutrition. As these questions were asked and answered in standard fashion producing categorical data, formal consensus analysis (Romney et al. 1986) was applied as the preferred means of estimating the group’s beliefs (or cultural model) and determining the degree to which each individual shared in these beliefs.\footnote{See pages 124-125 for a more detailed discussion of the differences in theory and application for formal and informal consensus analyses.}

Both data sets were therefore assessed in ANTHROPAC 4 (Borgatti 1996b) with a minimal residual factor analysis adjusted for random error (Romney et al. 1986), where similarity among individuals was determined using simple match coefficients.

Recipe Collections

The child-specific (n = 71) and general family (n = 70) recipes elicited from village participants were recorded and translated in full in collaboration with the primary research assistant. I then independently translated Healthy Recipes: Guidelines for Health Clinic Cooking Demonstrations, a 43-recipe collection compiled and distributed by the Sarawak State Health Department (SHD) for use in all of its local clinics (see Unit Pemakanan Seksyen Pembangunan Kesihatan Keluarga n.d.).\footnote{The standard vocabulary used in this document made it less of a translation challenge.} In addition to providing an important contextual background, these recipes allowed for a comparative assessment of the ways in which food beliefs are applied to cooking strategies.\footnote{The full recipe sets are available in both English and Malay upon request.}

Due to the convenience sample and relatively informal methodology used for recipe collection, I opted to apply a series of simple vernacular data visualization techniques rather than a more formal textual analysis. As characterized by Viegas and Wattenberg (2008:49), vernacular visualization is a “type of streetwise visualization” that has been propagated outside of academic circles. Though grounded in the social sciences by Milgram and Jodelet’s (1976) work with the collective mental mapping of Parisian landmarks, the tag cloud – a representation of relative frequency through font size – has since become a largely Internet-based phenomenon charting the aggregate activity of thousands of users on socially-oriented websites such as Flickr, del.icio.us, and
Technorati (Educause Learning Initiative 2007, Viegas and Wattenberg 2008). However, it remains capable of examining a wide variety of unstructured texts. For this analysis, I used the TagCrowd (Steinbock 2006) and Many Eyes Tag Cloud and Wordle (CUE Visual Communication Lab n.d.) web applications\(^\text{20}\) to create visual representations of the relative frequency of food items in common recipes associated with both the Sematan and Lundu health clinics and the villages of Tanah Hitam and Trusan Jaya. For the community-based data, I produced separate Notepad files for the child-specific and general family recipes containing the recipes’ titles, brief descriptions, and ingredients. An additional Notepad file was compiled from the titles and ingredients in the SHD recipe collection. Each file was assessed independently by copying and pasting directly into TagCrowd (Steinbock 2006). TagCrowd is an ideal initial visualization tool as it allows the user to view frequency counts and manipulate both the maximum number of displayed terms and the frequency at which a term appears in the visualization. Each data set was ultimately displayed with the following parameters: a 75-word maximum and a minimum frequency count of five. The Many Eyes Tag Cloud (CUE Visual Communication Lab n.d.) application was then used in order to make explicit comparisons between (1) the child-specific and general family recipes and (2) the published SHD recipe collection and a composite of village recipes. By entering each data set as a marked fragment within the larger whole, it is possible to compare the two in a single tag cloud, which displays unique terms at the vertical poles and pairs terms toward the middle of the plot. Separate texts are demarcated with contrasting colors, and the size of the terms reflects their relative frequency eliminating the need to standardize the amount of text being compared. Finally, Wordle (CUE Visual Communication Lab n.d.) was used to create a more spatially condensed and aesthetically pleasing set of tag clouds for general presentation.\(^\text{21}\)

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\(^{20}\) TagCrowd is licensed under Creative Commons for non-commercial use and can be accessed at [http://tagcrowd.com/](http://tagcrowd.com/). The Many Eyes site, a project of IBM, offers Tag Cloud and Wordle in additional to multiple other visualization tools. A one-time, free registration allows users to upload their own data sets for analysis at [http://manyeyes.alphaworks.ibm.com/manyeyes/page/create_visualization.html](http://manyeyes.alphaworks.ibm.com/manyeyes/page/create_visualization.html).

\(^{21}\) The algorithm applied by Wordle aims to create the most efficient spatial layout possible, which often requires that some terms be arranged vertically. This orientation is purely aesthetic and has no significance in regards to plot interpretation.
CHAPTER SIX

RESULTS FOR CONCEPTIONS OF FOOD AND NUTRITION

In this chapter, I present the study’s belief-related results, outlining clinic and community understandings of food and nutrition as determined through the analysis of free lists, pile sorts, general and child-specific recipe sets and data derived from a community-wide household survey.

**Free Lists**

**List Length and Content**

After coding for similarity, the mean unprompted list length was 20.55 items (SD = 18.18) for general local foods and 12.16 items for local child foods (SD = 7.47). A paired-samples t-test was used to evaluate the impact of the redundant questioning, non-specific prompting, and alphabetic and semantic cues recommended by Brewer (2002) on average list length. There was a statistically significant increase in the number of general food items (M = 72.23, SD = 44.74, \( t(43) = -7.66, p < .0005 \) (two-tailed)) and child food items (M = 29.51, SD = 15.30, \( t(36) = -7.50, p < .0005 \) (two-tailed)) recorded following prompting. General food lists demonstrated a mean increase of 51.68 items, and child food lists averaged a 17.35 item increase. The eta squared statistic indicates that prompting exerts a large effect size when eliciting both general local foods (\( \eta^2 = .58 \)) and local child foods (\( \eta^2 = .61 \)). In addition to increasing average list length, systematic prompting uncovered an additional 636 unique items for a total of 756 general foods and 317 child foods. The ten most frequently cited items in each domain are presented in Tables 6.1 and 6.2 overleaf.
Table 6.1: Ten Most Frequently Mentioned Items in Each Domain (Basic Listing)

<table>
<thead>
<tr>
<th>Rank</th>
<th>General Local Foods</th>
<th>Local Child Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>vegetables (sayur-sayuran)</td>
<td>rice porridge (bubur nasi)</td>
</tr>
<tr>
<td>2</td>
<td>fish (ikan)</td>
<td>vegetables (sayur-sayuran)</td>
</tr>
<tr>
<td>3</td>
<td>chicken (ayam/manok)</td>
<td>fruit (buah-buahan)</td>
</tr>
<tr>
<td>4</td>
<td>meat (daging)</td>
<td>fish (ikan)</td>
</tr>
<tr>
<td>5</td>
<td>rice (nasi)</td>
<td>milk (susu)</td>
</tr>
<tr>
<td>6</td>
<td>spicy chili-shrimp salsa (sambal belacan)</td>
<td>chicken (ayam/manok)</td>
</tr>
<tr>
<td>7</td>
<td>bread/crackers (roti)</td>
<td>eggs (telur)</td>
</tr>
<tr>
<td>8</td>
<td>fruit (buah-buahan)</td>
<td>crisps/chips (keropok)</td>
</tr>
<tr>
<td>9</td>
<td>squid/cuttlefish (sotong)</td>
<td>rice (nasi)</td>
</tr>
<tr>
<td>10</td>
<td>crab (ketam)</td>
<td>bread/crackers (roti)</td>
</tr>
</tbody>
</table>

Table 6.2: Ten Most Frequently Mentioned Items in Each Domain (Extended Listing)*

<table>
<thead>
<tr>
<th>Rank</th>
<th>General Local Foods</th>
<th>Local Child Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>chicken (ayam/manok)</td>
<td>rice porridge (bubur nasi)</td>
</tr>
<tr>
<td></td>
<td>market-purchased chicken (ayam pasar)</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>beans (sayur kacang)</td>
<td>leaf mustard/bok choy(sawi)</td>
</tr>
<tr>
<td></td>
<td>long beans (kacang panjang)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>green beans (kacang buncis)</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>fish (ikan)</td>
<td>chicken (ayam/manok)</td>
</tr>
<tr>
<td></td>
<td>Spanish mackerel (ikan tenggiri)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>ray/skate (ikan pari)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Indian mackerel (ikan kembong)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>[green, leafy vegetable] (cangkuk)</td>
<td>fish (ikan)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Spanish mackerel (ikan tenggiri)</td>
</tr>
<tr>
<td>5</td>
<td>leaf mustard/bok choy(sawi)</td>
<td>fruit (buah-buahan)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>banana (pisang)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>apple (epal)</td>
</tr>
<tr>
<td>6</td>
<td>cabbage (kobis)</td>
<td>milk (susu)</td>
</tr>
<tr>
<td>7</td>
<td>tapioca shoots (pucuk bandung)</td>
<td>crisps/chips (keropok)</td>
</tr>
<tr>
<td>8</td>
<td>meat (daging)</td>
<td>eggs (telur)</td>
</tr>
<tr>
<td></td>
<td>beef (sapi/daging lembu)</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>local eggplant (terung asam)</td>
<td>local spinach (bayam)</td>
</tr>
<tr>
<td>10</td>
<td>local spinach (bayam)</td>
<td>rice (nasi)</td>
</tr>
</tbody>
</table>

*Identical items at different levels of contrast (i.e., specificity) were grouped together at the rank of the most frequently mentioned item.

These free list responses mirror results obtained from extended ethnographic interviews in which the majority of participants conceptualized food as a set of basic, largely
unprocessed food items—rice, vegetables, eggs, chicken, meat, dried anchovies, and wheat—i.e., “Food like vegetables, rice.” More limited references were made to food as a prepared dish (e.g., fried rice, fried noodles, and local cakes), but these items comprised a conceptually distinct class of breakfast foods:

Normally, [my son] eats rice. [He] eats vegetables, fish—fish. As for meat and chicken, that’s just sometimes—once a week of course—once a week. Then there’s other food like fried noodles in the morning.

This categorization is further supported by subsequent pile-sorting results (presented in the following sections), and community-based observations indicate that this focus on food as a basic ingredient can be attributed to two complementary influences: local availability and clinic-based health education. First, there is a relative scarcity of processed foods in the community, prompting participants to purchase individual, constituent ingredients for in-home meal preparation. It is feasible that the respondents’ choice of terminology is a reflection of this direct relationship with the ingredients—reasoning supported by the fact that the salient dishes (i.e., fried noodles, fried rice, and local cakes) are those items which are routinely available at area foodstalls and comprise the majority of the vendors’ prepared offerings. Community residents are further influenced by the clinic health education model, which focuses on in-home meal preparation from a set of basic ingredients defined and organized in terms of the standard food pyramid.

**Meaningfulness of the Domain and Boundary Selection**

Item frequencies from the prompted free-list tasks were plotted (see Figures 6.1 and 6.2) and demonstrate the standard core/periphery structure described by Borgatti (1999), Gravlee (1998), and Weller and Romney (1988). Twenty-one of the general foods (2.78%) and five of the child foods (1.58%) were mentioned by over half of the respondents. In contrast, 48.28 percent of general foods and 53.31 percent of child foods were idiosyncratic—mentioned by only one person. As seen in the accompanying Figure 6.1 (overleaf), a natural break occurs at a frequency of ten in the general food item scree plot, suggesting a total of 81 items for inclusion in the pile-sorting task. With the child food plot (Figure 6.2, overleaf) the break occurs at a frequency of nine to include the top 30 items. Redundant items between the two lists were deleted and an additional five, lower-frequency PPKZM distribution items were
Figure 6.1: Item Frequencies for General, Local Foods Free-Listing

Figure 6.2: Item Frequencies for Local Child Foods Free-Listing
included due to their theoretical significance to form an initial set of 81 food items.\(^1\) The PPKZM items included: flour \([\text{tepung}]\), green lentils \([\text{kacang hijau}]\), sugar \([\text{gula}]\), cooking oil \([\text{minyak masak}]\), and a type of child-specific multivitamin \([\text{vitamin}]\). 

While pile-sorting was feasible with these 81 stimuli, it imposed an undesirable level of respondent burden, and the number of cards was ultimately reduced to a set of 55 by (1) omitting lower frequency items that were not visually distinct from higher frequency items, \((\text{e.g.,} \) green beans \([\text{kacang buncis}]\) were excluded in favor of long beans \([\text{kacang panjang}]\) as the necessary length distinctions were difficult to make when assessing still images); (2) representing food subgroups at a higher level of contrast with prototypical examples, \((\text{e.g.,} \) the use of tiger prawns \([\text{udang rimau}]\) to signify all types of prawn and the use of a single type of banana \([\text{pisang otel}]\) as a representation of bananas in general); and (3) eliminating repetitions presented in varied forms \((\text{i.e.,} \) separate images of a whole cow \([\text{sapi/lembu}]\) and butchered beef \([\text{daging}]\)). The final pile-sorting card manifest is presented below in Table 6.3 (overleaf).

**Agreement and the Justification of Aggregation**

Principal components analysis (PCA) for the extended listings demonstrates that the matrices constructed from the truncated 81-item general food list and 30-item child food list do not fit the cultural consensus model. The presence of a single factor solution was unsupported in both instances. For the general food listing, there was less than a two-fold increase between the first latent root (6.27) and the second (3.29), and the first factor accounted for only 14.24 percent of the variance. Although levels of agreement were marginally higher in regards to local child foods, the minimum three-to-one ratio between the first (8.55) and second factor (3.97) was not achieved, and the first factor accounted for only 23.12 percent of the variance.

Despite the lack of consensus, results for the general local food listing were both valid and reliable with a Cronbach’s alpha (reliability coefficient) of 0.82, which falls within the “good” range established by George and Mallery (2003:231). Following on Nunnally (1978) and Weller (2007), the square root of Cronbach’s alpha can be used to establish 90.44 percent validity for this sample. Thus, while the range of variation is too great to

\(^1\) Labeled photographs of each of these 81 foods are presented in Appendix B.
Table 6.3: Card Manifest for Pile-Sorting

<table>
<thead>
<tr>
<th>Item</th>
<th>Food Name</th>
<th>Item</th>
<th>Food Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>long beans (kacang panjang)</td>
<td>29</td>
<td>fried noodles (mee goreng)</td>
</tr>
<tr>
<td>2</td>
<td>chicken (ayam/manok)</td>
<td>30</td>
<td>bean sprouts (taugeh)</td>
</tr>
<tr>
<td>3</td>
<td>[green, leafy vegetable] (cangkuk)</td>
<td>31</td>
<td>goat meat (daging kambing)</td>
</tr>
<tr>
<td>4</td>
<td>cabbage (kobis)</td>
<td>32</td>
<td>squid/cuttlefish (sotong)</td>
</tr>
<tr>
<td>5</td>
<td>tapioca shoots (pucuk bandung)</td>
<td>33</td>
<td>herring (ikan parang)</td>
</tr>
<tr>
<td>6</td>
<td>Spanish mackerel (ikan tenggiri)</td>
<td>34</td>
<td>shark (ikan yu punai)</td>
</tr>
<tr>
<td>7</td>
<td>local eggplant (terung asam)</td>
<td>35</td>
<td>loafed bread (roti paun)</td>
</tr>
<tr>
<td>8</td>
<td>Indian mackerel (ikan kempong)</td>
<td>36</td>
<td>rambutan (rambutan)</td>
</tr>
<tr>
<td>9</td>
<td>local spinach (bayam)</td>
<td>37</td>
<td>eggs (telur)</td>
</tr>
<tr>
<td>10</td>
<td>water spinach (kangkung)</td>
<td>38</td>
<td>local crisps/chips (keropok)</td>
</tr>
<tr>
<td>11</td>
<td>beef (daging sapi)</td>
<td>39</td>
<td>grouper (ikan kerapu)</td>
</tr>
<tr>
<td>12</td>
<td>Chinese cucumber (timun Cina)</td>
<td>40</td>
<td>Malay salad (ulam-ulaman)</td>
</tr>
<tr>
<td>13</td>
<td>croaker (ikan gelama)</td>
<td>41</td>
<td>locally-produced cakes (kuih-muih)</td>
</tr>
<tr>
<td>14</td>
<td>Chinese eggplant (terung panjang)</td>
<td>42</td>
<td>crackers/cookies (roti macam-macam)</td>
</tr>
<tr>
<td>15</td>
<td>spicy chili-shrimp salsa (sambal belacan)</td>
<td>43</td>
<td>pomfret (ikan duey)</td>
</tr>
<tr>
<td>16</td>
<td>rice (nasi)</td>
<td>44</td>
<td>shrimp/prawn (udang rimau)</td>
</tr>
<tr>
<td>17</td>
<td>okra (kacang lendid)</td>
<td>45</td>
<td>rice porridge (bubur nasi)</td>
</tr>
<tr>
<td>18</td>
<td>dried anchovies (pusuk/ikan bilis)</td>
<td>46</td>
<td>commercial crisps/chips (keropok 20sen)</td>
</tr>
<tr>
<td>19</td>
<td>wild fern variety (midin)</td>
<td>47</td>
<td>sweetened condensed milk (susu cair)</td>
</tr>
<tr>
<td>20</td>
<td>apple (epal)</td>
<td>48</td>
<td>Nestum (Nestum)</td>
</tr>
<tr>
<td>21</td>
<td>crab (ketam suri)</td>
<td>49</td>
<td>candy (gula-batu)</td>
</tr>
<tr>
<td>22</td>
<td>leaf mustard/bok choy(sawi)</td>
<td>50</td>
<td>powdered milk (susu tepung)</td>
</tr>
<tr>
<td>23</td>
<td>local orange (limau manis)</td>
<td>51</td>
<td>flour (tepung)</td>
</tr>
<tr>
<td>24</td>
<td>wild fern variety (paku)</td>
<td>52</td>
<td>green lentils (kacang hijau)</td>
</tr>
<tr>
<td>25</td>
<td>banana (pisang otel)</td>
<td>53</td>
<td>sugar (gula)</td>
</tr>
<tr>
<td>26</td>
<td>ray/skate (ikan pari)</td>
<td>54</td>
<td>cooking oil (minyak masak)</td>
</tr>
<tr>
<td>27</td>
<td>angled loofah (ketola)</td>
<td>55</td>
<td>vitamins (vitamin)</td>
</tr>
<tr>
<td>28</td>
<td>papaya (betik)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Present a single listing of foods that are recognized as salient by the community as a whole, the sample size (n = 44) was sufficient to accurately capture this variation, and we can be reasonably certain that multiple, subsequent samples would produce equivalent results. Surprisingly, reliability was questionable (Cronbach’s alpha = 0.64) for the child food listing, producing a validity estimate of 79.81 percent. Higher levels of agreement and in-situ monitoring notwithstanding, these results suggest that the sample (n = 37) could have benefitted from further data collection.
Patterns of Difference among Participants

The hypothesized groupings indicated by exploratory multidimensional scaling (MDS) were not confirmed through cultural consensus analysis. The low-income sample from the general local food free-listing failed to produce the minimum three-to-one ratio between the first (4.16) and second (2.46) latent roots, and the first factor accounted for only 16.65 percent of the variance. The ratio between the first (2.27) and second (1.18) factors was similarly insufficient in the consensus analysis of extremely low-income households with healthy children, although this result is likely due in large part to the limited sample size (n = 5). The first factor did explain 45.29 percent of the total variance.

Comparing the General and Child-Specific Food Domains

Excluding those idiosyncratic items mentioned by only one respondent, the general local food list consisted of 391 items, 68.03 percent (n = 266) of which were unique to that list. The child-specific food domain consisted of a total of 148 items, 15.54 percent (n = 23) of which were unique. The accompanying scatterplot (Figure 6.3 below) displays the 125 items common to both lists with a minimum frequency of two along with the linear regression line and equation. As reflected by the Pearson product-moment correlation (r = 0.52), there is a strong positive association between the frequency distributions of the two domains (see Cohen 1988:79-81, Pallant 2007:132).² Taken together these results indicate that as expected the child-specific food listing is a subset of the general local food listing such that the more often a item was mentioned in the general listing the more likely it was to appear in the child-specific listing and vice-versa with some notable exceptions. With respect to the frequency plot, we see that rice porridge [bubur nasi] is listed far more often as a child-specific food than one would expect given its frequency on the general local food lists. Crisps [keropok], milk [susu], candy [gula batu], and chocolate [coklat] are similarly disproportionately common as child-specific foods. On the opposite end of the spectrum, green beans [sayur kacang] and stingray or skate [ikan pari] both appear as frequently mentioned general local foods but are not considered local child foods.

² A correlation coefficient of 0.50 to 1.0 is considered “large” by both authors. As I am solely interested in assessing the strength of association for the content of these particular domains the significance level is not applicable and a full correlation analysis was not performed.
These impressions are confirmed by the differential frequency scores for each domain (Table 6.4, overleaf). Child-specific foods consisted almost entirely of milk, porridge and its commercial substitutes (e.g., Nestum), and junk foods such as crisps, candy and ice-cream. The general association of these latter foods with sweetness, fat content, and the risk of obesity, diabetes, and tooth decay emerged during the pile-sorting task and subsequent focus group interpretation sessions (see pages 159-177). Foods appearing in this grouping were locally designated as “makanan ringan” which literally translates as light or insubstantial food and is commonly glossed as either junkfood or snack food for Western audiences, thus prompting the junkfood classification applied here. The high-frequency general food items, which were largely absent from the child-specific lists, emphasized bitterness (local eggplant), spiciness (chili and shrimp-based salsa), suspected allergens (crab) and initially toxic food items, which require specific preparation to allow for safe consumption (tapioca shoots).
Table 6.4: Differential Frequency Scores by Domain

<table>
<thead>
<tr>
<th>General Local Foods</th>
<th>Child-Specific Foods</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>Food Name</td>
</tr>
<tr>
<td>-------</td>
<td>--------------------</td>
</tr>
<tr>
<td>28</td>
<td>beans (sayur kacang)</td>
</tr>
<tr>
<td>28</td>
<td>tapioca shoots (pucuk bandung)</td>
</tr>
<tr>
<td>25</td>
<td>green beans (kacang buncis)</td>
</tr>
<tr>
<td>24</td>
<td>local eggplant (terung asam)</td>
</tr>
<tr>
<td>24</td>
<td>eggplant (terung)</td>
</tr>
<tr>
<td>23</td>
<td>ray/skate (ikan pari)</td>
</tr>
<tr>
<td>21</td>
<td>spicy chili-shrimp salsa (sambal belacan)</td>
</tr>
<tr>
<td>20</td>
<td>Chinese eggplant (terung panjang)</td>
</tr>
<tr>
<td>20</td>
<td>crab (ketam suri)</td>
</tr>
<tr>
<td>19</td>
<td>wild fern variety (midin)</td>
</tr>
</tbody>
</table>

As with the overall free-listing results, the distinctions between general, everyday foods and child-specific foods are supported by participant observation and ethnographic interviewing. Reported and observed behaviors serve to document the ways in which community residents classify food items as either normal (adult) foods or child foods subdivided by age. Such differentiation is necessary as “Adults eat differently. Kids have another way of eating.” Membership in these categories is determined in part by the cooking method employed. Infants and toddlers are recognized as having immature stomachs and intestines, which are easily injured by the introduction of hard, coarse food items. As a preventative measure, child foods are often crushed with a mortar and pestle or boiled for an extended period until thoroughly softened. These procedures transform typical community food items into more child-appropriate offerings. In particular, a family’s vegetables are added to a large quantity of water and boiled down to become a child’s soup, while the essential village staple – rice – becomes rice porridge, the archetypal child food. Although rice remains the ultimate base for meals throughout an individual’s lifespan, its preparation must be altered, and this distinct meal base (i.e., porridge rather than standard rice) marks the boundary between child and adult foods as demonstrated in the following texts:

3 At this stage, assessment of the specific timing and food content for weaning stages has not been prioritized. Child anthropometry results (see Chapter 4, pages 108-114) indicate that there are no significant differences in child undernutrition prevalence rates across age groups, and the PPKZM program design (see Chapter 2, pages 37-40) stipulates the provision of a uniform food assistance package irrespective of age. For this reason, the current analysis focuses on general, conceptual differences between child and adult foods.
Of course [child and adult food] is different. Children this big only eat rice porridge. We adults eat rice. We already eat hard rice. Yes, that’s the only difference.

Kids eat porridge. Regular people eat rice. We eat vegetables, fish. We cook soups with or without gravy – [we eat] botok [a seasoned, steamed fish mixture], but for children we do it, and it goes into the porridge, right? If it’s for children, we put it straight into the porridge. Ha! Give it to [the child] to eat. If it’s for adults – rice. Make vegetables, whatever you have. It’s just like that.

At six months, they have to eat – children have to be fed soup. After that, porridge – porridge with a bit of egg or a little meat, but that’s not all the time of course. In a week, maybe three times for meat, ah, three days a week – [the same with] chicken. Must have vegetables. Cook the porridge, then thoroughly blend it. You don’t want to give it to them when it’s coarse in big, rough pieces. You have to blend the porridge… Occasionally I add beans, sometimes local spinach, leaf mustard/bok choy, beans, local oranges - fruit, like that. For all of my children – Sister definitely does it like that.

As the mode of preparation is a large factor in the separation of child and adult foods, it is unsurprising to find less specific categories – vegetables, chicken, and fish – in the high overall frequency region of Figure 6.3. Such foods could be obtained and used for a variety of purposes, and their differentiation occurs within the household only after they have been allocated for a specific meal.

Child and adult foods are further marked by the differential taste preferences expressed by these groups as the level of spiciness emerges as the ultimate determinant of suitability and milk and commercially-produced chips and crisps are viewed as the exemplars – positive and negative respectively – of child food. Preference may also be expressed in relation to meal preparation techniques, and frying is considered to be highly desired by children. These observations are reflected in Figure 6.3 as foods that are not amenable to frying and low spice content preparation (e.g., green beans, ray, and skate) have gravitated toward the high frequency general food region of the plot. Taken together then, child food is accurately described and plotted as:
Vegetable soup, fried fish – Kids like things like that but not with overly spicy things mixed in. There are those things that can be eaten and those that can’t be.

Pile Sorts

**MDS Results and Visual Interpretations of Community-Based Pile Sorts**

Multidimensional scaling (MDS) produced an excellent fit (stress = 0.062) in two dimensions for the final community pile-sorting dataset (n = 33), based on the standards outlined by Borgatti (1996M:33). These results were nearly identical to the preliminary on-site analysis (n = 26) in terms of both the level of fit (stress = 0.061) and the spatial distribution. As the intent of the analysis was to facilitate interpretation and distortion was minimal, no additional, higher-dimension solutions were sought. The final MDS results appear in Figure 6.4 (overleaf) and can be interpreted in terms of dimensions, clusters, and regions. In each instance, close proximity is indicative of perceived similarity.

Collaborative visual assessment suggested that local foods are conceptualized using a set of five classification dimensions or attributes: (1) healthiness, (2) time of day for consumption, (3) level of satiety, (4) price, and (5) degree of processing. The community plot also clearly displays clustering based on food group taxonomies and site of purchase and regional distributions by nutrient content and what I will refer to as “emic scripts” borrowing on the terminology of Ross and Murphy (1999).

At the most basic, intuitive level the plot displays a set of food items divided into constitutive kinds or types: fruit, vegetables, meat, fish and seafood (see Figure 6.5, page 161). These categories reflect morphological similarity (see McDonald 2006) as well as linguistic conventions. For example, within the vegetable grouping, nearly all of the items are routinely referred to using the common noun for vegetable (*sayur*).

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4 Kruskal (1964:16) presents a more conservative set of guidelines based on his “experience with experimental and synthetic data” in which a stress value of 0.06 would fall within the good (0.05) to fair (0.10) range. The Borgatti (1996M:33) interpretation is favored here as a more recent, discipline-specific standard in line with the majority of the publications reviewed (e.g., Weller 1983, Dressler et al. 2005).

5 To facilitate understanding, the basic MDS results for the community-based pile sorts (Figure 6.4) have been reproduced, substituting individual item labels with interpretive overlays in order to enhance the clarity of Figures 6.5 to 6.12.
Figure 6.5: Typology Organization of Community-Based MDS Results
combined with an item-specific modifier, such that cabbage becomes *sayur kobis* and the local variety of spinach, *sayur bayam*. The same is true for the fruit (*buah*), meat (*daging*), and fish (*ikan*) groupings. Within these larger clusters, we do see a limited number of finer taxonomic distinctions such as the division of fruit-like (*sayur buah*) and leafy vegetables (*sayur daun*). The taxonomic organizational rationale was vocalized often and early during both the pile-sorting activity and the interpretation sessions and was routinely characterized as a matter of commonsense.

Several informants also noted the presence of a related, alternative taxonomic system that located food items according to their perceived nutrient content. In the words of one mother,

> *Fish has protein, like meat. [It] has carbohydrates, like chicken.*
> *Vegetables have – each of them has vitamins. Like vegetables have vitamins. Ok?*

As shown in Figure 6.6 (overleaf), this organization can be visualized as a polar regional configuration (see Borg and Groenen 1997) in which vitamin-rich fruits and vegetables are situated along with lentils and vitamin-pills in the upper left of the plot, high-protein and high-cholesterol foods such as meat and seafood are located in the lower left of the plot, non-essential food items that either lack nutrients or provide secondary nutrients are found on the right-hand side of the plot, and carbohydrates or “energy foods” are loosely grouped at the plot’s center. Understandably, this classification prompted extensive commentary on the relative health of local foods, often phrased in terms of “balance.” Essentially, “Balanced food helps us to be healthy – like that,” while imbalance invites sickness:

> *If [their food is] not balanced, of course the children will get sick – stomach aches.*
> *What’s it called? It’s like they have an advantage. They can – if there’s enough balanced nutrition, they can probably avoid sickness. So, less*

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6 This grouping strategy should not be construed as simply matching text as participants were not presented with written stimuli, but rather responded to a set of color images.

7 The intent of this section is to illuminate emic, community understandings of food items. Health-based claims are presented as stated by participants without comparison to current scientific literature. The relative accuracy and implications of these beliefs will be addressed in the discussion.
Figure 6.6: Nutrition Related Organization of Community-Based MDS Results

- **HEALTH DIMENSION**
  - **HEALTHY**
    - VITAMINS AND NUTRIENTS
    - FRUIT
    - VEGETABLES
    - LENTILS
    - CARBOHYDRATES
    - "ENERGY FOODS"
    - MEAT
    - SEAFOOD
    - EGGs
    - FISH
    - ALLERGENS
    - SWEETNESS, FAT, TOOTH DECAY AND CHEMICAL PRESERVATIVES
    - COMMERCIAL SNACKS (crisps/chips, candy, cookies)
    - POWDERED MILK
    - CONDENSED MILK

- **UNHEALTHY**
  - HEALTH DIMENSION
  - HEALING AND MEDICINAL PROPERTIES
  - RICE
  - HEALTH DIMENSION
  - SECONDARY NUTRIENTS OR LACKING NUTRIENTS
  - HIGH PROTEIN, HIGH CHOLESTEROL

163
fever, they have fewer fevers – sickness. People say they don’t get infected either. They don’t catch it if there’s balance in the body.

Returning to the plot, the vitamin-based grouping was described in wholly positive terms as a collection of healthy foods to be consumed on a daily basis in order to provide mental and physical energy and improve brain function.

It’s important, because it activates the ‘IQ’ towards – an active brain, of course. This food must be a priority to increase the child’s intelligence.

More specifically, fruit was associated with growth, good skin and improved vision and recommended for pregnant women and their unborn children. In particular, watermelon⁸ and bananas were said to prevent dehydration and constipation respectively.

Vegetables that were typically consumed raw or blanched with a spicy chili-prawn salsa – ulam – were believed to slow the aging process and provide relief to those suffering from high blood pressure and diabetes.

Green lentils were similarly marked for their high vitamin content, but appear more tangentially due to their dual association with the central carbohydrate grouping. This placement represents the liminal status of beans [kekacang], which are considered not quite vegetables but not quite grains. The standard preparation for green lentils is to boil them down with coconut milk and palm sugar, creating a sweet porridge with cooling properties, which is particularly beneficial for pregnant women. This medicinal attribute was a strong rationale for placing the lentils in the vitamin group – the only region in which foods were attributed with healing properties. Vitamin pills and syrups were a second tangential item in this grouping and were often referred to directly as medicines and cited as a possible substitute for the consumption of fruit and vegetables. In the words of one respondent,

If we don’t eat vegetables or fruit, then we need to eat vitamins.

Moving to the lower half of the plot, health messages become more ambiguous as the meat and seafood groupings are dually characterized by high levels of protein and cholesterol, creating a group of foods that is simultaneously necessary yet dangerous. There is overall agreement that these foods should be included in the diet on some level

⁸ Watermelon was included in the 81-card pre-testing phase and often mentioned in conjunction with bananas even in the focus groups, where it was not pictured or introduced by the research staff.
as they provide necessary protein and other nutrients, but such benefits are tempered by the potential for obesity, high cholesterol, high blood pressure, and diabetes. This is particularly true for foods outside of the standard fish grouping such as shrimp, crab, squid, cuttlefish, and eggs, which are also commonly cited as potential child allergens:

Sometimes [the children] are allergic, because if [my daughter] eats a lot she could have an allergic reaction. Sometimes the children become itchy.

There were isolated reports that crab, ray and some fish types could serve as anthelmintics in children, but these assertions were strongly contested in the group settings with some individuals insisting that fish were more likely to be the source of intestinal worms.

To the right of the plot, we see a collection of non-essential or secondary foods, which are characterized by some combination of sweetness, fat or carbohydrate content. Respondents consistently emphasized that these foods could only be consumed in limited quantities without risking obesity, diabetes, and tooth decay. There was also a strong association between these food items and harmful chemical preservatives. The major exceptions to this trend were Nestum – a commercial, infant cereal marketed throughout Southeast Asia, Africa, and Central America by Nestlé (Nestlé 2009) – powdered milk, and sweetened, condensed milk. These food items had much more positive connotations and were designated as important sources of protein, calcium, iron, and other “secondary vitamins important for child growth.” The general perception was that these foods were beneficial for children but not consistently available due to more prohibitive pricing. Interestingly, very few participants distinguished between nutrient-enhanced, full cream milk powder (the commercial equivalent of the standard health department distribution) and sweetened, condensed milk, which contains approximately one cup of sugar per 14-ounce can (GourmetSleuth 2008). In the words of one respondent, “It’s milk, of course – the ingredients are the same.” Though less commonly cited, there is also some indication that items at the center of the plot constitute a set of carbohydrate-rich daily foods, which may provide a base or form of balance for other dietary elements. This was particularly true of rice:

The things that we use as food? Usually, for me, I eat rice of course – various dishes.
The meaning of balanced food? There should to be balance… Must be balanced. Don’t have more junkfood – more than the amount of rice that’s eaten. It has to be the same. That’s balanced food.

Taken together, the spatial distribution of these taxonomic clusters suggests an overall health dimension beginning at the extreme top left corner of the plot with high vitamin content foods of uncontested health value and extending diagonally to the lower right corner where one encounters foods associated with high cholesterol (chicken, beef, and goat meat) and diabetes (sugar).

These groupings can also be interpreted through scripts (see Ross and Murphy 1999), the contexts in which community members encounter these foods, such as the site of purchase and the time of day for consumption. Beginning with the site of purchase clusters (see Figure 6.7 overleaf), one finds fruit and vegetables in close association as they are presented for sale side-by-side in the nearby open-air markets of Sematan and Lundu. Separate open-air structures jointly house the seafood and poultry vendors. Throughout my nine-month stay in the village area, fresh seafood was consistently available at both market locations, while access to poultry was irregular in Sematan. Frozen chicken and meat cuts, however, were regularly stocked in cold storage at two Sematan locations and multiple locales within Lundu, which may have lead to a closer association between these items.

Moving from the minimally processed and packaged, market-based foods to the center of the plot, we find a set of basic food stall offerings (fried noodles, rice, and rice porridge) and their constituent ingredients (spicy chili-prawn salsa, dried anchovies, and eggs). These items represent dishes that are prepared and served on location as complete meals, typically for on-site consumption. Just to the right and overlapping slightly are the kiosk items (locally produced cakes and crisps) and their primary ingredients (eggs, rice, lentils, oil, flour, sugar, and Nestum). These foods are prepared off-site in the local area, although they may be finished – typically via frying – on-site. Once purchased, they are transported to a secondary location, usually the home, for consumption. The final cluster to the far right consists of foods offered in fixed, enclosed sundry or grocery shops for off-site, post-purchase preparation and consumption. These items tend to be more highly processed, commercial goods obtained from distributors in either Lundu or the state capital, Kuching.
Figure 6.7: Organization of Community-Based MDS Results by Site of Purchase
Figure 6.8: Organization of Community-Based MDS Results by Degree of Processing

- **Processing Dimension I**
  - Natural
  - Unprocessed Ingredients
  - Prepared Foods
  - Standard Accompaniments
  - Processed Ingredients
  - Heat-based cooking essential to health

- **Processing Dimension II**
  - Cooking unnecessary
  - Instant Foods
  - Modular regional configuration

- **Ulam Consumed Raw/Blanched**
- **Commonly Pan-Fried/Boiled**
- **Shrimp Umei**
- **Meat**

PREPARED FOODS
STANDARD ACCOMPANIMENTS
INSTANT FOODS
PARALLEL REGIONAL CONFIGURATION
HEAT-BASED COOKING ESSENTIAL TO HEALTH
Clearly, these site of purchase distinctions are closely related to the food items’ degree of processing (see Figure 6.8 above). There is an evident modular regional configuration – demonstrated previously in Figure 5.3 – in which prepared foods and their standard accompaniments constitute the core – *i.e.*, foods relied upon when a mother is “too lazy to cook” – surrounded by sets of constituent ingredients, both processed (to the right of the plot) and unprocessed (to the upper and lower left of the plot). Towards the center of the processed ingredients, we find a clustering of immediately available food items (local cakes, bread, cookies, candy, and commercially-produced chips and crisps). These foods can be purchased in advance and stored within the home for near-instant access, distinguishing them from the core of fried noodles, rice, rice porridge, and spicy chili-shrimp salsa [*sambal belacan*], which must be consumed on the day prepared.

When processing is considered as a general attribute, it appears as a dimension running at a slight diagonal from the fresh vegetables at the mid-to-upper left of the plot to the highly-processed, chemically-preserved commodities at the right. Upon discussion of this array, participants in two focus groups noted a second possible processing dimension based on the necessity of cooking. As noted by the respondents, fruits – appearing at the top of the plot – do not require cooking as they are “cooked on the tree” (*i.e.*, ripened).\(^9\) Likewise, the vegetables displayed in higher positions on the plot are typically served as *ulam* – either raw or blanched – while those in lower positions are more commonly pan-fried or boiled. Seafoods at higher positions in the plot (*e.g.*, shrimp) are frequently denatured using lime juice to create a traditional dish known as *umai*.\(^10\) It is only at the bottom of the plot, where we encounter meats, that heat-based cooking become essential, creating an overall vertical array.

As previously noted, distinctions based on the time of food consumption were also proposed (Figure 6.9 overleaf). While only one family organized their entire sort according to morning, midday, afternoon, and evening meals, it was common for participants to create special groupings for breakfast foods and foods associated with

\(^9\) In Malay, the verb “to cook” [*masak*] also literally means “to ripen.” In formal Malay, the alternative meanings are distinguished by the use or absence of a suffix – “cooked” (*bermasak*) does not require the direct object suffix (*‐kan*) while “ripening” (*bermasakan*) does. Colloquial village Malay largely ignores these distinctions and many of my participants enjoyed presenting me with this pun.

\(^10\) *Umai* is similar to *ceviche*, typically consisting of shrimp, fish, or jellyfish combined with shallots, chilies, ginger, ground peanuts, and lime juice or (in the less appetizing version) vinegar.
Figure 6.9: Organization of Community-Based MDS Results by Time Consumed

POST-MEAL
CLEANSE THE PALATE

BREAKFAST
EATEN BEFORE WORK
HIGH ENERGY

LENTILS
OIL
RICE
EGGS

NON-MAJOR MEAL EVENTS
MORNING/AFTERNOON TEA

FOODS FOR FREE TIME

POST-MEAL
CLEANSE THE PALATE

BREAKFAST
EATEN BEFORE WORK
HIGH ENERGY

LENTILS
OIL
RICE
EGGS

NON-MAJOR MEAL EVENTS
MORNING/AFTERNOON TEA

FOODS FOR FREE TIME
non-major meal events such as morning and afternoon tea. This reasoning is reflected in the following timelines for family meals described by two community mothers:

*Oh, in the morning, it's always noodles for breakfast, fried noodles. After that, [my child] will drink milk until noon and eat rice. He eats normal rice dishes, normal dishes – that's fish, chicken, vegetables.*

*In the morning, I cook something like porridge – something like local cakes for the morning. If it was for lunch, I'd cook normal food to eat like rice dishes. That's what we eat of course. That's what – if it's the afternoon, we have local cakes. After that, we eat a few more cakes as well. But in the evening, we really eat of course. [We] eat rice like we had for lunch.*

Drawing on these categorizations, we can identify the breakfast group at the center of the plot, including fried noodles, rice, eggs, rice porridge, dried anchovies, spicy chili-prawn salsa, lentils, and oil. These items are all essential elements in standard village breakfast fare, whether prepared in the home or at a local food stall. Porridge is the archetypal child breakfast food, commonly made from softened, overcooked rice mixed with small amounts of either crushed, dried anchovies or egg and a leafy, green vegetable (*e.g.*, leaf mustard or bok choy) as depicted in the stimulus image.11 Sweetened variations also exist, which mix palm or processed sugar and occasionally coconut milk with either boiled green lentils or sago flour, thus accounting for the close proximity of the lentils. Adults and older children typically consume either fried rice or fried noodles for breakfast as noted in the preceding interview excerpts. These dishes can consist of a simple combination of salt, monosodium glutamate (MSG, marketed as AJI-NO-MOTO), oil, and left-over rice or noodles but more commonly have an additional seasoning component such as soy sauce, chili sauce, shallots or chilies; a protein accompaniment like egg or dried fish; and a side of spicy chili-prawn salsa.12 On-hand vegetable scraps may also be included in the dish as well as chicken or meat, although the latter is not common in household preparation due to the prohibitive cost. Returning to the plot, we find that when included in the pile-sort stimuli each of these items is found

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11 Appendix B contains photographic images of each of the original 81 pile-sorting stimuli, including rice porridge.

12 Recipes for a range of fried rice and noodle dishes were collected from community respondents and are assessed on pages 209-216. The full recipe sets are available upon request in both English and Malay.
in close proximity within the central breakfast cluster. Interpretations do overlap to some extent as breakfast foods are considered “before you work” foods and must therefore supply the body with energy. As one participant describes it:

*I eat rice. For example, if we eat nasi lemak\textsuperscript{13} in the morning, we can stand [the work]. Even at noon we can stand it.*

Clinic health education efforts have created a close association between energy-rich foods and carbohydrates. Thus, it is unsurprising to find both sets of labels applied to this grouping.

Continuing to the right of the breakfast group, we find a slightly overlapping cluster of foods (and constituent ingredients) encountered at non-major meal events such as morning and afternoon tea: oil, local cakes, Nestum, flour, local crisps, bread, sugar, sweetened condensed milk and powdered milk. Flour, sugar, sweetened condensed milk, and oil for frying are the base ingredients – along with yeast and margarine (not included) – for the majority of local cakes, including Malay doughnuts [*kuih gelang*] and Chinese dumpling cakes [*kuih pau*]. Nestum and powdered milk are high prestige additions, more commonly encountered in celebratory cakes such as those prepared for Hari Raya Aidilfitri. Less often, lentils or rice substitute flour as the base of the snack, usually in combination with grated coconut as with green lentil fritters [*cucur kacang hijau*]. One or more eggs may also be added to the batter (e.g., Malay pancakes [*kuih lempeng*]). These occasional variations are more tangentially associated with the group in the spatial distribution. In addition to local cakes, locally-produced seafood crisps (fish, shrimp, and squid or cuttlefish varieties)\textsuperscript{14} are also a frequent component of the mid-morning or mid-afternoon snack as is commercially-produced loaf bread – often served with a sweet coconut-egg spread known as *kaya*. To the far right is a closely associated group of “relaxation foods” – those that require no preparation, are easily stored in the home, and are available during one’s freetime [*waktu rehat*]: commercially-produced chips or crisps, candy, and cookies. The fruit grouping at the top center of the

\textsuperscript{13} *Nasi lemak* is a dish consisting of rice cooked in coconut milk and traditionally served with roasted peanuts, dried anchovies, boiled egg, sliced cucumber, and a spicy chili-prawn salsa all wrapped in a banana leaf.

\textsuperscript{14} The crisps are made by grinding the selected seafood, combining it with a small amount of flour (typically sago), and spreading it into a thin layer to be dried in the sun. After drying, the hardened sheets of paste are cut into strips, which can be bagged for sale and in-home frying or deep-fried on-site for immediate consumption. The final product is puffed into a light, crispy snack resembling the pork rinds encountered in the American South or the home-made equivalent of prawn crackers.
plot also has a timing component as these items are eaten at the conclusion of the meal in order to cleanse the palate [mencuci mulut].

The two final proposed arrays are price (Figure 6.10, overleaf) and level of satiety (Figure 6.11, page 175). Neither dimension was extensively vocalized during the sorting or focus group discussions. However, both are theoretically interesting in the context of a low-income community with demonstrated food insecurity and child undernutrition (see Chapter 4, pages 104-114). Price issues were most frequently discussed in regards to sources of protein, where eggs and fish – particularly dried anchovies – were recommended as a low cost alternative to chicken, meat, shrimp, crab and squid or cuttlefish. As directly noted by one sorter, “Fish can be had in large quantities because its price is cheap and it is easy to access.” This point was consistently reinforced by categorizing the community as a set of fishing villages. Similar distinctions were made between local and imported fruits and wild and cultivated vegetables. Flipping through images of cabbage and beansprouts, one mother asserted that “rich people or Chinese people eat these. It’s the Chinese that grow them... in the Cameron Highlands.” These statements reflect a larger, racialized conception of the distribution of wealth and space within Malaysia – drawing on essentialized divisions between rural and urban environments and colonialist-inspired understandings of ethic occupational niches. These small-scale, within-cluster divisions appear to mirror a larger diagonal price array, which begins at the upper left of the plot with uncultivated, naturally appearing vegetables – those that are ostensibly freely available for gathering – and extends down toward commercial goods and the most expensive forms of protein. The hypothesized satiety array runs horizontally from the filling meal base of vegetables and proteins toward what have been identified as “unbalanced foods” – that is, foods that provide a false or temporary sense of fullness without an accompanying nutritional benefit.

Finally, participant commentary and interpretation supports the existence of an overall emic cosmology of food – a local ordering of the food universe which combines common cluster and region partitioning (see Figure 6.12, page 176). Items are first divided into primary [utama] foods located to the left of the plot and secondary [sampingan] foods on the right of the plot. At the upper intersection of primary and secondary foods, there is a separate clustering of fruits, which represent a dessert grouping, routinely referred to by participants as items intended to “cleanse the palate [mencuci mulut]” after eating.

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15 Further elaboration is provided in the subsequent discussion (see Chapter 7).
Figure 6.10: Price Related Organization of Community-Based MDS Results

- **PRICE DIMENSION**
  - *FREELY AVAILABLE*

- **JUNGLE PRODUCE**
  - (tapioca shoots, fern, *ulam*, water spinach)

- **CITY VEGETABLES**
  - (cabbage, Chinese eggplant, beansprouts)

- **DRIED ANCHOVIES**
  - *CHEAP PROTEIN*

- **SEAFOOD**
  - *EXPENSIVE PROTEIN*

- **MEAT**
  - *EXPENSIVE COMMERCIAL GOODS*

- **POWDERED MILK**
  - NESTUM

- **EGGS**
Figure 6.11: Satiety Related Organization of Community-Based MDS Results

- Satiety Dimension: Satisfying/Filling
- Satiety Dimension: Unsatisfying/False Satiety

- Unbalanced Foods (marked)
- Vegetables
- Fried Noodles
- Nestum
- Local Cakes
- Commercial Chips
- Candy
- Cookies
- Powdered Milk
- Proteins
Figure 6.12: Organization of Community-Based MDS Results by Emic Cosmology

- **REGIONAL PARTITIONING**
  - **DESSERT GROUP [PENCUCI MULUT]**
    - **PRIMARY FOODS [UTAMA]**
    - **SECONDARY FOODS [SAMPINGAN]**
    - **CHILD-SPECIFIC FOOD ITEMS (marked)**

- **GENERAL FOOD ITEMS**
  - **GENERAL FOOD ITEMS**
  - **USING GROUP [PENUNDA]**
  - **GENERAL INGREDIENTS**
  - **CONDIMENTS**
  - **FISH/SEAFOOD**
  - **MEAT/POULTRY**
  - **VEGETABLES**
  - **BEANS**
  - **DISHES**
  - **INGREDIENTS**
  - **NESTUM COMMERCIAL CRISPS**
  - **CANDY**
  - **COOKIES**
  - **BREAD**
  - **POWDERED MILK**
  - **DRINK COMPONENTS**
Primary foods are further subdivided in a modular regional pattern which centers on items conceptualized as dishes: fried noodles, rice, and rice porridge. Surrounding these meals are a set of common ‘add-ons’ or condiments: spicy chili-prawn salsa, dried anchovies, oil, and eggs. In the third layer, we find the basic ingredients, clustered as previously noted into their respective taxonomic divisions of vegetables, fish and seafood, meat and poultry, and beans. The secondary foods are less differentiated although there is some indication of a slight clustering of drink components – powdered milk, sweetened condensed milk and sugar – within the larger snack food grouping.

One alternative interpretation – somewhat disturbing from a nutritional point of view – is to recategorize the primary/secondary regional distinction as a separation of general and child-specific foods. This explanation is supported by the free-listing results, in particular the differential frequency scores (see pages 155-159). With the exception of rice porridge, each of the top ten foods identified as over-represented in the child food lists and included in the pile-sort stimuli, appear in this cluster. Ethnographic interviews add further weight to this depiction as community members routinely describe milk as the archetype of child food and commercially-produced chips and crisps as a constant, though highly inappropriate, child request.

**MDS Results and Visual Interpretations of Clinic-Based Pile Sorts**

As noted in the methodology section, it was not possible to achieve the recommended minimum sample size (n = 20-30) for pile-sorting with clinic workers involved in maternal and child health programs at the local level despite multiple attempts. Moreover, with unconstrained sorting the data are not amenable to consensus analysis (Weller 2007), which bars the use of the Spearman-Brown Prophesy formula and reliability coefficient to determine sample size sufficiency with respect to informant agreement. However, the evident similarity in sorting strategies and reported rationales indicates that this sample of 17 is likely large enough to represent the group regardless of its high turnover. The resulting multidimensional scaling (MDS) analysis produced an excellent fit (stress = 0.043) in two dimensions based on the standards outlined by Borgatti (1996M:33),\(^\text{16}\) and

\(^\text{16}\) Even the more conservative Kruskal (1964:16) guidelines would place a stress value of 0.04 within the excellent (0.25) to good (0.05) range.
Figure 6.13: MDS Results for Clinic-Based Pile Sorts
Figure 6.14: Interpretations of Clinic-Based MDS Results

1. **Carbohydrates**
   - NESTUM (-)
   - LENTILS

2. **Energy**
   - LOCAL SEAFOOD CRISPS

3. **Carbohydrate cross-classifications**
   - SUGAR
   - OIL
   - OIL
   - COMMERCIAL CHIPS/CRISPS (-)

4. **Energizing fats**
   - HIGH PROTEIN FATS

5. **Healthy fats**
   - POWDERED MILK
   - CONDENSED MILK

6. **Conceptual difficulties**
   - POLAR REGIONAL PARTITIONING
   - PROTEINS

7. **Vitamins**
   - VITAMIN PILL
   - OTHER VITAMINS

8. **Other vitamins**
   - BEAN-LIKE VEGETABLES
   - OTHER VEGETABLES

9. **Fats**
   - COMMERCIAL CHIPS/CRISPS (-)

10. **POULTRY MEAT**
11. **SEAFISH**
12. **EGGS**
13. **High fat**
14. **High cholesterol**
15. **Iodine**
16. **Vegetables**
17. **Seafood**
18. **Fatty meat**
no additional higher-dimension solutions were required. The basic MDS results and MDS with interpretive overlay appear in Figure 6.13 (page 178) and Figure 6.14 (page 179) respectively.

Clinic workers consistently framed their classification decisions in nutritional terms, creating taxonomic divisions based on perceived nutrient content. At the most basic level, foods were distributed in a polar regional configuration with protein-rich foods appearing at the top right, vitamin-rich foods at the bottom right, and carbohydrate-based foods to the left of the plot. Foods with dual associations, such as locally-produced seafood crisps and lentils, mark the boundary between protein and carbohydrate groupings, and in fact, the lentils pictured at the center of the plot are a salient member of each of the three groupings and serve to mark their intersection. This interpretation is supported by the labels elicited from participants directly following the sorting process. Each of the 17 health workers created separate carbohydrate and protein groupings, while 13 identified one or more vitamin-based groups. Moreover, the four participants who failed to cite a “vitamin” pile instead created “fruit” and “vegetable” groupings which contained the vitamin supplement card making this association explicit.

The use of three basic groupings further reflects the clinic’s dominant health education message. As phrased by the Sematan Head Health Nurse:

> Typically for the mothers, we need to know the food pyramid, a simple one with three types of groups: carbohydrates, proteins, and vitamins. Carbohydrates are for increasing energy, so bread, things like… What is it? Noodles, flour, rice… Second is protein – fish, eggs, chicken, meat, types of beans. The third one is vitamins – vegetables, fruit… Yes, there must be three food groups. It’s very simple of course. If you look at the food pyramid, you must have five. The mothers get confused so we use one that has three food groups to motivate the mothers.

The resulting MDS plot mirrors this perspective while highlighting the lower levels of group agreement with regards to carbohydrates and certain conceptually problematic foods such as locally-produced crisps and spicy chili-prawn salsa. As discussed with respect to Borgatti (1999), items at intermediate distances in plots resulting from unconstrained pile-sorting can represent either moderate levels of similarity or limited agreement as to the items’ categorizations. The latter interpretation is more suitable for
the health worker data. Clinic respondents provided nearly identical rationale framed in nutrition-related vocabulary with variation occurring as participants organized their categories at different levels of specificity\textsuperscript{17} or attempted to force food items into accepted groupings.

This tendency is most evident within the carbohydrate region, where we find a core group of tightly clustered, non-contested carbohydrates: rice porridge, rice, local cakes, flour, bread, fried noodles, and cookies. Located on the left-hand side of this cluster, both rice porridge and fried noodles are distinguished as more complex carbohydrate-based dishes with high energy potential. Extending out from this core in a modular regional pattern, the second concentric layer incorporates locally-produced crisps, lentils, and Nestum. Each of these items is an example of cross-classification, as participants are divided as to whether seafood-based crisps are a carbohydrate or a protein. Similarly, the lentils, as a bean, are known to have high protein content but visually resemble carbohydrates such as rice and are the uncultivated form of beansprouts, which are recognized as a nutrient-rich vegetable. Nestum’s status as a carbohydrate is challenged by its association with the fat subgroup.

The proposed fat grouping is located below the core carbohydrate cluster and includes: sugar, oil, sweetened condensed milk, and powdered milk. Each of these items was identified by at least one respondent as a carbohydrate. Yet, their recognized fat content draws them into a unique secondary cluster within which one finds a tight linkage between powdered and sweetened, condensed milk – as a combination of fat and protein – and between sugar and oil, which are characterized as “energizing fats.” The close association of these milk types is surprising in a health care setting, although similar links were noted in the community-based pile sort results. The nurses themselves are aware of the distinction as articulated by one Sematan clinic worker, discussing sweetened, condensed milk:

\textit{Yes, definitely milk. It's definitely milk, but with a difference. It's a bit different, because this one has too much sugar, which the powdered one doesn't have. It's not healthy, of course.}

The separation of healthy and unhealthy forms of milk may not, however, be as apparent to community mothers. Milk is often referenced in health education sessions in a more

\textsuperscript{17} The number of piles created by this group ranged from four to 11 with an average of 6.06 (SD = 2.08).
general sense as simply susu [milk], the term commonly applied to sweetened, condensed milk in the villages. Further ethnographic evidence of this potential confusion and its health implications are presented in detail in the subsequent discussion (see Chapter 7).

The final items included in the general carbohydrate region are candy and commercially-produced chips and crisps. These foods were grouped together by each of the 17 participants and were labeled in negative terms (typically as junkfood or unhealthy or inappropriate snacks) when isolated from the larger fat and carbohydrate piles. Interestingly, positive and negative evaluations were rare among clinic workers, who tended to speak instead in neutral terms about relative nutrient content. Yet, those value judgments that were vocalized were overwhelmingly disapproving and clustered in the lower left of the plot, overlapping the proposed fat grouping to a large extent. This critical attitude toward high-fat foods directly contradicts the published recommendations and targeted health education materials disseminated by the Malaysian Ministry of Health specifically for underweight children (see Kementerian Kesihatan Malaysia n.d.).

In particular, these publications emphasize the use of cooking oil, margarine, coconut milk and sugar to encourage weight gain. Yet the aggregate perspective reflected in the MDS plot suggests a point-of-view more closely aligned with general and adult nutritional guidelines, which group fats, oils and sugars in the fourth layer of the food pyramid, recommending that they be consumed sparingly (see Kementerian Kesihatan Malaysia 2003, 2004).¹⁸

This interpretation is further supported by observations of the health education sessions that accompany food basket distribution at the Sematan and Lundu clinics. In many cases, these talks are viewed as an opportunity for student attachment workers to fulfill their presentation quotas. Typically relying on generic visual aids, which are interpreted on the spot with limited contextual knowledge of the local area, it is unsurprising that student health workers deliver inapplicable and sometimes contradictory information, such as the following excerpts from the August and September 2008 food basket distributions:

¹⁸The association of fats, oil and sugar with both the carbohydrate and dairy groupings is unique to the local clinic and not supported by any of the reviewed state or national health education materials. The standard Malaysian food pyramid groups complex carbohydrates at the base (8-12 servings) followed by vegetables and fruit (5 servings), meat, fish and beans with dairy products (1-2 servings) and fat, oil and sugar at the top (minimal amounts) (Kementerian Kesihatan Malaysia 2003, 2004).
And here we have the fifth group. This one we take in small amounts. Don't take a lot of fat and oil...

It's just like I've said before. We look, and if the meat has a lot of fat, we throw the fat out. We fry it without oil or we roast it in a wok that isn't sticky. Use it without oil.

The fifth one is sugar, salt and fat like you see here. Your child must only be given a little oil.

These statements may be corrected by the Head Health Nurse or other more experienced staff members if they are overheard. Yet they point to a clear knowledge gap regarding the special requirements of undernourished children. This need for further education and training is seconded by the lack of agreement evident in the MDS results for food items to the far left of the plot – the ostensible “carbohydrate” group.

Less pronounced variation is also present in the vitamin and protein groupings. Images representing vegetables were sorted into a standard vitamin group, occasionally referred to as the “folic vitamin” or “vitamin, fiber and iron” group. Within this cluster, vegetables were further divided into “bean-like” vegetables (e.g., cabbage, cucumber, long beans, Chinese eggplant) and “other” vegetables (e.g., local spinach, tapioca shoots, bok choy). Though not directly vocalized, this separation mirrors the standard morphological distinction encountered in the villages between “fruit-like” and leafy vegetables. Beansprouts are further removed from the vegetable cluster, appearing at the group’s top, left periphery due to their dual association with the bean grouping – represented by lentils at the center of the plot. As with the community members, clinic health workers made frequent reference to the fact that beansprouts and green lentils were the germinated and ungerminated forms of the same plant. Fruits appear at the top right of the larger vitamin cluster, although they are more frequently labeled as Vitamin C, Vitamin A, or “other vitamins” in contrast to the undifferentiated vegetable-based vitamin grouping. The image of vitamin pills and syrup is found at the lower left periphery of the vitamin group and was often distinguished from the remaining food items as a form of medicine. Unlike with the community-based sort, clinic respondents failed to associate any foods with illness prevention or treatment.
Returning to the final region in the upper right of the plot, there was overwhelming agreement as to the placement of high-protein foods such as meat and seafood. Each type of fish represented in the pile-sorting stimuli was placed in the same group as all other fish by all respondents. Occasional distinctions were made between fish and other seafood based on the proposed high-cholesterol content of crab, shrimp, and squid or cuttlefish but without mention of the differences between beneficial high density lipoprotein (HDL) and problematic low density lipoprotein (LDL) cholesterol varieties. The core seafood grouping was also associated with iodine and spatially separated from both chicken and meat (i.e., beef and goat), which were cited as high-fat, protein sources. These food items were considered standard proteins and connected more tangentially with “alternative proteins” like eggs and proteins with dual associations such as locally-produced seafood crisps, lentils, beansprouts, and spicy chili-prawn salsa. Crisps and salsa posed the greatest challenge to clinic participants, often appearing alone in their own piles under the labels “I’m not sure” or simply, “I don’t know.” As further outlined in the subsequent discussion, it is disturbing that two foods so emblematic of village foodways are largely outside the scope of nutritional education and knowledge – an omission that hints at the larger lack of fit between national and state-level models of health education and local realities.

Property Fitting (PROFIT) and Cluster Analysis Results for the Community-Based Pile Sorts

Rating Data Results

Cultural Consensus Analysis

The consistency among ratings for the degree of processing, time of day for consumption, price, and healthiness of the 55 food items of interest indicates a single response pattern and overall fit with the cultural consensus model for each of these proposed dimensions. The presence of a single factor solution was supported in each case with an eigenvalue ratio exceeding the recommended 3:1 standard and a first factor solution which accounted for between 76.9 percent (healthiness) and 90.0 percent (time of day) of the variance (see Chavez et al. 1995, Lopez et al. 1997, Nyamongo 2002, Ross 2004). First and second eigenvalues, respectively, for each attribute are as follows: degree of processing (9.75, 1.07), time of day for consumption (10.60, 0.66), price (8.80, 1.50), and healthiness (7.98, 1.32). Thus, consensus analysis reveals that
respondents share a single set of beliefs regarding the relative ordering of local foods according to these four properties.

With respect to degree of processing, average agreement was high according to the standards applied by Berges and colleagues (2006:424). All individual first factor loadings were positive with an average knowledge score of 0.67 (SD = 0.20). This level of agreement is sufficient to classify at least 99 percent of items correctly at the 0.99 confidence level using between 13 and 20 respondents (see Weller and Romney 1988:76-77). The selected sample size (n = 20) was therefore adequate to accurately represent an aggregation of responses, and the estimated culturally-preferred arrangement of food items by degree of processing is presented in Table 6.5 (overleaf). As outlined in the analysis (see Chapter 5, pages 124-126), these categorizations are based on weighted frequencies, which emphasize the responses of those individuals who best embody the underlying cultural model – that is, those with the highest levels of agreement with the group as a whole.

As anticipated, the majority of salient local foods are considered natural, ostensibly due to the fact that they are harvested and presented to the consumer with minimal alterations. Spicy chili-prawn salsa [sambal belacan] is the only item in the intermediate “less processed” category. Respondents agreed that it was not a “naturally-occurring” food but experienced difficulty determining to what extent it had been processed. Packaged food items, particularly those which were either locally-produced or considered in some way beneficial, were designated as “processed,” while vitamins and commercial imports with negative health associations were classed as “heavily processed.” Although the formal consensus model was able to predict the culturally appropriate classification for each item with a probability of accuracy greater than 0.95, items prompting greater contention remain instructive. Raw frequency counts indicate that fried noodles and locally-produced cakes were often labeled as “less processed” pointing to an underlying distinction between on-site preparation and off-site commercial processing, which was overshadowed by lumping tendencies at the group level. A substantial number of less representative respondents also classified vitamins as “processed” and powdered milk as “heavily processed.” Overall, these results support

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19 These results are skewed to some extent by a single participant with a first factor loading of 0.03. The average level of shared belief increases to 0.70 (SD = 0.15) when this data is removed. However, as this mother was presented with the same set of stimuli and demonstrated a comparable level of understanding I see no valid reason to exclude the data.
Table 6.5: Degree of Processing for Pile-Sorting Stimuli

<table>
<thead>
<tr>
<th>Natural</th>
<th>Processed</th>
<th>Heavily Processed</th>
</tr>
</thead>
<tbody>
<tr>
<td>long beans</td>
<td>Chinese eggplant</td>
<td><em>spicy chili-prawn salsa</em>^</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(less processed)</td>
</tr>
<tr>
<td>chicken</td>
<td>okra</td>
<td><em>rice</em></td>
</tr>
<tr>
<td><a href="cangkuk">green, leafy vegetable</a></td>
<td><a href="midin">wild fern variety</a></td>
<td>dried anchovies</td>
</tr>
<tr>
<td>cabbage</td>
<td>apple</td>
<td>*fried noodles~</td>
</tr>
<tr>
<td>tapioca shoots</td>
<td>crab</td>
<td>loaf bread</td>
</tr>
<tr>
<td>Spanish mackerel</td>
<td>leaf mustard/bok choy</td>
<td><em>local crisps/chips</em>^</td>
</tr>
<tr>
<td>local eggplant</td>
<td>local orange</td>
<td>locally-produced cakes~</td>
</tr>
<tr>
<td>Indian mackerel</td>
<td>green lentils</td>
<td><em>rice porridge</em>~</td>
</tr>
<tr>
<td>local spinach</td>
<td>banana</td>
<td>sweetened, condensed milk</td>
</tr>
<tr>
<td>water spinach</td>
<td>ray/skate</td>
<td>Nestum~</td>
</tr>
<tr>
<td>beef</td>
<td>angled loofah</td>
<td>*powdered milk~</td>
</tr>
<tr>
<td>Chinese cucumber</td>
<td>papaya</td>
<td>flour</td>
</tr>
<tr>
<td>croaker</td>
<td>eggs</td>
<td>sugar</td>
</tr>
<tr>
<td>bean sprouts</td>
<td>grouper</td>
<td><em>cooking oil</em></td>
</tr>
<tr>
<td>goat meat</td>
<td>Malay salad</td>
<td></td>
</tr>
<tr>
<td>squid/cuttlefish</td>
<td>pomfret</td>
<td></td>
</tr>
<tr>
<td>herring</td>
<td>shrimp/prawn</td>
<td></td>
</tr>
<tr>
<td>shark</td>
<td><a href="paku">wild fern variety</a></td>
<td></td>
</tr>
<tr>
<td>rambutan</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Bolded items represent foods with less than definitive probabilities of accurate classification: (*) over 0.99 probability correct, (~) over 0.95 probability correct.

^ Spicy chili-prawn salsa was the only food in the "less processed" category. It has been combined with the processed foods in this table to conserve space.

the initial hypothesized processing array visually identified in the community-based MDS plot.

Average respondent agreement was equally high for the time of day for consumption ratings. Again, all individual first factor loadings were positive, and the average knowledge score was 0.68 (SD = 0.19). This level of agreement is sufficient to classify at least 99 percent of items correctly at the 0.99 confidence level using between 13 and 20 respondents (see Weller and Romney 1988:76-77). Thus, the selected sample size (n = 21) is more than adequate to accurately represent the group aggregate.

Interestingly, the four respondents with the lowest levels of agreement with the group as a whole performed their rating tasks in the presence of a male household member – the respondent’s husband, father, or an elder son. The only other male-assisted rating task
Table 6.6: Time of Day for Consumption for Pile-Sorting Stimuli

<table>
<thead>
<tr>
<th></th>
<th>Morning</th>
<th>Noon</th>
<th>Afternoon</th>
</tr>
</thead>
<tbody>
<tr>
<td>fried noodles</td>
<td>long beans</td>
<td>dried anchovies</td>
<td>rambutan</td>
</tr>
<tr>
<td>loaf bread</td>
<td>chicken</td>
<td>[wild fern variety]</td>
<td>local crisps/chips</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(midin)</td>
<td></td>
</tr>
<tr>
<td>Eggs</td>
<td>[green, leafy vegetable]</td>
<td>apple*</td>
<td>green lentils*</td>
</tr>
<tr>
<td></td>
<td>(cangkuk)</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>locally-produced cakes</td>
<td>cabbage</td>
<td>crab</td>
</tr>
<tr>
<td></td>
<td>crackers/cookies</td>
<td>tapioca shoots</td>
<td>leaf mustard/bok choy</td>
</tr>
<tr>
<td></td>
<td>rice porridge</td>
<td>Spanish mackerel</td>
<td>local orange</td>
</tr>
<tr>
<td></td>
<td>commercial crisps/chips*</td>
<td>local eggplant</td>
<td>[wild fern variety] (paku)</td>
</tr>
<tr>
<td></td>
<td>sweetened condensed milk</td>
<td>Indian mackerel</td>
<td>banana</td>
</tr>
<tr>
<td>Nestum</td>
<td>local spinach</td>
<td>water spinach</td>
<td>angled loofah</td>
</tr>
<tr>
<td>powdered milk</td>
<td>beef</td>
<td>papaya</td>
<td></td>
</tr>
<tr>
<td>Sugar</td>
<td>Chinese cucumber</td>
<td>bean sprouts</td>
<td></td>
</tr>
<tr>
<td>cooking oil~</td>
<td>croaker</td>
<td>goat meat</td>
<td></td>
</tr>
<tr>
<td>Vitamins</td>
<td>Chinese eggplant</td>
<td>squid/cuttlefish</td>
<td></td>
</tr>
<tr>
<td></td>
<td>spicy chili-prawn salsa</td>
<td>herring</td>
<td></td>
</tr>
<tr>
<td></td>
<td>rice</td>
<td>shark</td>
<td></td>
</tr>
<tr>
<td></td>
<td>okra</td>
<td>grouper</td>
<td></td>
</tr>
<tr>
<td></td>
<td>shrimp/prawn</td>
<td>Malay salad</td>
<td></td>
</tr>
<tr>
<td></td>
<td>candy*</td>
<td>pomfret</td>
<td></td>
</tr>
</tbody>
</table>

Bolded items represent foods with less than definitive probabilities of accurate classification: (*) over 0.95 probability correct, (~) over 0.90 probability correct, (˘) over 0.70 probability correct.

was performed by the most representative participant. While the current data does not allow for an assessment of gendered differences in perspective, these results do indicate that it is an issue which warrants further consideration. For the time being, the estimated culturally-preferred arrangement of food items by the time of day for consumption is presented in Table 6.6 (above).

These results support a revised understanding of the time of day distinctions implicit in the community-based MDS plot. Specifically, there is a differentiation between (1) breakfast foods, foods associated with non-major meal events such as morning and afternoon tea, and “relaxation foods” and (2) standard meal components (i.e., “normal food”). Fifteen of the nineteen non-standard meal items (78.95%) identified with the MDS results were categorized, as expected, outside of the primary noon grouping.

While these results do not indicate a linear array amenable to PROFIT analysis, they do
confirm time of day as an element of local food classification and support the proposed reasoning behind these three separate time-based clusters.

The formal consensus model predicted the culturally-appropriate classification for the majority of items with a probability of accuracy greater than 0.95. Items of greater contention included cooking oil (0.94), commercial chips and crisps (0.76), and candy (0.74). This classification difficulty is likely due to these items’ more widespread use throughout the day. As demonstrated in the community recipes sets profiled in the final chapter section (see pages 209-213), cooking oil is a basic component of nearly every commonly prepared village dish, making it unsurprising to find a small dual association with the standard noon grouping. Candy and commercially-produced chips and crisps are likewise linked to times throughout the day – albeit at a lower frequency.

There were also high levels of participant agreement in regards to price with an average knowledge score of 0.60 (SD = 0.14) and positive individual first factor loadings across the board. As with processing and time of day, the level of agreement for item pricing is sufficient to classify at least 99 percent of items correctly at the 0.99 confidence level with 20 respondents (see Weller and Romney 1988:76-77). Again, the selected sample size (n = 23) is more than adequate to accurately represent the group aggregate and the estimated cultural model for item price perceptions is presented in Table 6.7 (overleaf).

As clearly demonstrated in the accompanying table, participants did not utilize the full range of the rating scale, opting instead for a dichotomy of inexpensive and expensive foods. This tendency was noted during the data collection phase, and a deliberate effort was made to refer respondents back to the four-option visual but with little effect. “Very inexpensive” was ultimately glossed as “free” by the majority of participants who applied this label – a point further emphasized by the higher level of disagreement regarding the appropriate rating for commercially-produced crisps and chips (0.64 probably correct). Although these small snack packets retail for RM0.20 – the approximate equivalent of an American nickel – consensus analysis indicates that they were considered inexpensive rather than very inexpensive by the group as whole. Again, this underscores the point that the label “very inexpensive” only applies to freely obtained food items. Still, a variety of foods were classified in this way – including crab, shrimp, multiple types of fish, wild fern, long beans, and water spinach. Yet, only tapioca shoots were recognized at the aggregate level. This difference is explained at least in part by the respondents’
Table 6.7: Perceived Price for Pile-Sorting Stimuli

<table>
<thead>
<tr>
<th>Very Inexpensive</th>
<th>Inexpensive</th>
<th>Expensive</th>
</tr>
</thead>
<tbody>
<tr>
<td>tapioca shoots</td>
<td>long beans</td>
<td>herring</td>
</tr>
<tr>
<td>[green, leafy vegetable] (cangkuk)</td>
<td>loafed bread</td>
<td>Spanish mackerel</td>
</tr>
<tr>
<td>cabbage~</td>
<td>rambutan</td>
<td>Indian mackerel</td>
</tr>
<tr>
<td>local eggplant</td>
<td>eggs*</td>
<td>beef*</td>
</tr>
<tr>
<td>local spinach</td>
<td>local crisps/chips~</td>
<td>rice</td>
</tr>
<tr>
<td>water spinach</td>
<td>Malay salad</td>
<td>apple</td>
</tr>
<tr>
<td>Chinese cucumber</td>
<td>locally-produced cakes~∞</td>
<td>crab</td>
</tr>
<tr>
<td>croaker</td>
<td>crackers/cookies*</td>
<td>fried noodles~</td>
</tr>
<tr>
<td>Chinese eggplant</td>
<td>rice porridge</td>
<td>goat meat</td>
</tr>
<tr>
<td>spicy chili-prawn salsa*</td>
<td>commercial crisps/chips~∞</td>
<td>squid/cuttlefish</td>
</tr>
<tr>
<td>okra</td>
<td>candy*</td>
<td>shark</td>
</tr>
<tr>
<td>dried anchovies~</td>
<td>green lentils</td>
<td>grouper</td>
</tr>
<tr>
<td>[wild fern variety] (midin)</td>
<td>sugar*</td>
<td>pomfret</td>
</tr>
<tr>
<td>leaf mustard/bok choy</td>
<td>bean sprouts</td>
<td>shrimp/prawn</td>
</tr>
<tr>
<td>local orange</td>
<td>[wild fern variety] (paku)</td>
<td>sweetened condensed milk*</td>
</tr>
<tr>
<td>papaya</td>
<td>angled loofah</td>
<td>Nestum</td>
</tr>
<tr>
<td>banana</td>
<td>ray/skate~</td>
<td>powdered milk</td>
</tr>
<tr>
<td></td>
<td></td>
<td>flour</td>
</tr>
<tr>
<td></td>
<td></td>
<td>cooking oil</td>
</tr>
<tr>
<td></td>
<td></td>
<td>vitamins</td>
</tr>
</tbody>
</table>

Bolded items represent foods with less than definitive probabilities of accurate classification: (*) over 0.99 probability correct, (~) over 0.95 probability correct, (˘) over 0.90 probability correct, (∞) over 0.60 probability correct.

varied environmental resources, ranging from the crab-filled mangrove swamps of Kpg. Trusan Jaya Hilir to the richer soils and gardening potential of Kpg. Tanah Hitam. Only tapioca shoots are freely available to all from a variety of sites on unclaimed or marginal land. Formal observations by van Welzen and associates (1997) confirm my own impressions based on time spent in the villages and further assert that tapioca (*Manihot sp.*) tends to be locally common within Southeast Asia, appearing without cultivation in “waste places” such as abandoned gardens and roadsides.

Moving to the more frequently applied “inexpensive” category, we find vegetables, local fruits, more economical fish varieties, and protein sources routinely designated as “cheap proteins” in clinic health education messages: dried anchovies, eggs, and green lentils. Although finer distinctions among vegetables were voiced during the pile-sorting and follow-up focus groups, they fail to appear in rating results. Part of the issue may be
market pricing conventions. While there are clear differences in per kilogram costs ranging from a low of RM2.00 for beansprouts and tapioca root to a high of RM12.00 for spring onions and broccoli, vegetables are typically priced and purchased in RM1.00 piles of varying sizes. This form of exchange creates at least the superficial impression that all vegetables are similarly low-cost.

The local fruits, fish varieties, and green lentils included in this rating group do all fall within the RM1.00 to RM4.00 per kilogram range. Eggs also appear to be an economical choice, ranging in price from RM0.25 to RM0.35 each or between RM6.40 and RM8.80 for a carton of 30 eggs. Dried anchovies, however, are surprisingly expensive (RM12.00 to RM18.00 per kilogram), far surpassing the price of all but the most costly fresh fish varieties (i.e., pomfret). Their categorization as an inexpensive food may be linked (1) to their standard marketing in small RM1.00 to RM2.00 bags and (2) to prevalent clinic examples of dried anchovies as a low-cost protein source. The following excerpts from the PPKZM distribution health education sessions at the Sematan and Lundu clinics, respectively, illustrate this latter point. Both speakers are staff members – the former a student attachment worker and the latter a long-term clinic employee:

*You mothers know all of this food is easy to access in the village [i.e., affordable]. Is it like that or not? Do we have to have big fish? Dried anchovies also have protein.*

*If we don’t have chicken, don’t have meat, we don’t need it – dried anchovies are sufficient. Things like nuts and lentils are also sufficient.*

Meanwhile, the remaining proteins, imported fruit, vitamins, Nestum, powdered and sweetened condensed milk, and the majority of non-perishable pantry staples (e.g., flour, cooking oil, and rice) were rated as expensive foods. Prices are clearly higher for the profiled high-prestige proteins. For instance, beef prices range from RM16.00 to RM18.00 per kilogram depending upon the meat’s country of origin; shrimp prices can be as high as RM36.00 for large-grade varieties; and chicken – excluding organ meat – averages RM9.00 per kilogram. Fish species, which were assigned this rating, also commanded higher prices. Spanish mackerel – a common ingredient in many village dishes and a noted child-friendly food due to its low bone content – routinely brings

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20 The full 300-item community pricing list is available upon request.
RM9.00 per kilogram, and the most expensive, locally available fish, pomfret, is offered at RM40.00 per kilogram.\textsuperscript{21} The perceived expense of apples, powdered milk, and Nestum are also in keeping with average market costs: RM12.00, RM34.81,\textsuperscript{22} and RM27.00 per kilogram, respectively. However, the inclusion of non-perishable staples – such as flour, cooking oil, sweetened, condensed milk, and rice – in this rating category is initially paradoxical. Both flour and cooking oil retail for RM2.80 per kilogram while sweetened, condensed milk is RM5.20 and rice ranges in price from RM1.80 to RM5.60.

It seems likely that these foods are perceived as expensive despite their relatively low market prices due to their recognized status as government-subsidy items. During my fieldwork, several domestic rice varieties were being subsidized, and the other noted staples continue to be included, along with chicken, in the national 11-item, long-term subsidy list (see Jabatan Penerangan Malaysia 2008:2-4).

These subsidies are widely recognized throughout both communities due in part to the villages’ close proximity to Indonesia. Local smuggling and anti-smuggling efforts have served to highlight the price differential between the two countries. Moreover, in the build-up to the March 8, 2008 general election, the incumbent party, Barisan Nasional (BN) had been active in the area, promoting, among other things, their ongoing efforts to control the price of petroleum and essential food commodities through subsidies. The timing also coincided with major global food price increases as the ratings were collected from August to September of 2008 in the wake of the much-publicized Asian rice crisis. Over the course of four months during the preceding spring and summer, rice prices had tripled, reaching a 30-year inflation adjusted high in April with global costs peaking at $1,100.00 per ton (Timmer 2008, Slayton 2009). Although the price of subsidized domestic rice was maintained at RM1.80 per kilogram in the local stores of Sematan, availability was inconsistent, and individuals making purchases on non-shipment days were seldom left with this option. Based on these observations and related experiences within the villages, I believe that respondents are creating generalized distinctions based on the perceived price of a good rather than their personal purchasing experiences. Though interesting and significant in its own right, this sort of dichotomy is not amenable

\textsuperscript{21} Pomfret is rarely consumed in the village and is marketed primarily to travelers, tourists, and wholesale buyers for the Lundu and Kuching markets.

\textsuperscript{22} This figure is an average price for the four major, locally available powdered milk brands – Ammo, Lactogen (Nestlé), Dugro (Dumex), and Fernleaf. Recorded prices for standard 700 gram packages were converted to per kilogram prices to facilitate comparison with other food items.
to a PROFIT-based analysis, which establishes the presence or absence of proposed linear arrays.

Average respondent agreement was also sufficiently high for the healthiness ratings. With a single exception, the individual first factor loadings were positive, and the mean knowledge score was 0.58 (SD = 0.22). Though admittedly lower than that for the previous attributes, this level of agreement is sufficient to classify at least 90 percent of items correctly at the 0.99 confidence level with a total of 21 respondents (see Weller and Romney 1988:76-77) – the selected sample size for this data collection task. As the rating administration was standardized and no external threats to validity could be identified with respect to the idiosyncratic household, there was no justifiable reason for excluding the data. In fact, Weller (2007) asserts that the elimination of individuals who fail to fit the model is in most instances unethical because the results no longer describe the whole sample. Thus the estimated culturally-preferred arrangement of food items by level of healthiness for all 21 respondents is presented in Table 6.8 (overleaf).

Though ethnographic data suggests that respondents make finer distinctions based on medicinal properties, traditional usage, origin, and site of cultivation, the majority of local food items were considered to be generally healthy with the exception of sugar (less healthy), and commercially produced crisps, chips and candy (unhealthy). These results are likely connected to the prevalent concept of “balanced food.” Although clearly linked to exposure to health education messages at the local clinic, this is by no means a unified concept within the villages as the term balance [seimbang] is variously interpreted in terms of simultaneity, clinic vocabulary, economic adaptation, and staple and supplementary food items. For instance, balanced food may be “enough at one time” or a seeming hodgepodge of nutritional terminology, that is “food that contains energy, protein, carbohydrates, starch – vitamins.” It can also be the product of successful economic adaptation. As noted by one local mother:

*We eat just rice or rice with soy sauce so we have to ensure that it is healthy. If there’s not enough money to – We have to balance. Buy a bit of fish, a small amount of vegetables, [and] then combine it with rice.*
<table>
<thead>
<tr>
<th>Table 6.8: Perceived Healthiness for Pile-Sorting Stimuli</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unhealthy</td>
</tr>
<tr>
<td>commercial crisps/chips</td>
</tr>
<tr>
<td>candy</td>
</tr>
<tr>
<td><a href="cangkuk">green, leafy vegetable</a></td>
</tr>
<tr>
<td>cabbage</td>
</tr>
<tr>
<td>tapioca shoots</td>
</tr>
<tr>
<td>Spanish mackerel</td>
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<tr>
<td>local eggplant</td>
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<tr>
<td>Indian mackerel</td>
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<tr>
<td>local spinach</td>
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<tr>
<td>water spinach</td>
</tr>
<tr>
<td>beef~</td>
</tr>
<tr>
<td>Chinese cucumber</td>
</tr>
<tr>
<td>croaker</td>
</tr>
<tr>
<td>Chinese eggplant</td>
</tr>
<tr>
<td><strong>spicy chili-prawn salsa</strong></td>
</tr>
<tr>
<td>rice</td>
</tr>
<tr>
<td>okra</td>
</tr>
<tr>
<td>dried anchovies</td>
</tr>
<tr>
<td><a href="midin">wild fern variety</a></td>
</tr>
<tr>
<td>apple</td>
</tr>
<tr>
<td>crab</td>
</tr>
<tr>
<td>leaf mustard/bok choy</td>
</tr>
<tr>
<td>local orange</td>
</tr>
<tr>
<td><a href="paku">wild fern variety</a></td>
</tr>
<tr>
<td>banana</td>
</tr>
<tr>
<td>ray/skate</td>
</tr>
</tbody>
</table>

Bolded items represent foods with less than definitive probabilities of accurate classification: (*) over 0.99 probability correct, (~) over 0.95 probability correct, (~) over 0.90 probability correct.

This concept is further used to describe a state of equilibrium between the amount of staple and secondary foods consumed:

_The meaning of balanced food? There should be balance – fruits, water, like that. It must be balanced. Don’t have more junkfood – more than the amount of rice that’s eaten. It has to be the same. That’s balanced food._
Aside from these standard uses, a handful of participants recognize but reject and even satirize the idea of balance, questioning the term’s applications among low-income groups and their own families in particular:

*For us here, balanced food? Eat rice. Eat that, right – There’s no balance. Just eat.*

Yet with each definition, the common, unifying element is the idea of health *in context.* The concept of health as an intrinsic property of specific food items is substituted to some extent by the focus on balance. Presented in the appropriate combination to the appropriate group, nearly every local food has the potential to enhance individual health, making healthy food “whatever can be taken”:

*Like fish has protein – Like meat has carbohydrates – Like chicken, vegetables have – Each of them has vitamins. Like vegetables have vitamins. Ok, there are a variety of foods that can [be considered] balanced food, including a little bread, a few biscuits… so it’s balanced of course. With seafood – If there are vegetables, a bit of fruit – local fruit, like that – If it contains vegetables, fish, chicken, fruit, bread, biscuits, then it’s balanced food. That’s right – balanced.*

Thus despite the fact that my personal observations indicate that clear health-based distinctions are being made between individual food items, respondents drawing on the ideas of “balanced food” and health-defined-through-context are reluctant to rate foods outside of the general catch-all “healthy” classification.

This point is evident with regards to the three most contested food items: spicy chili-prawn salsa, grouper, and beef. Numerous interviewees indicated that grouper and chili-prawn salsa were unhealthy foods for children, although fully appropriate for adults. These age-related restrictions are based on the idea of children as a physically immature and therefore vulnerable population. Their under-developed organs are easily injured by spicy foods with high chili content as chili seeds may become lodged in the stomach or the intestines.\(^{23}\) Grouper – and additional species not included in the pile

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\(^{23}\) Interestingly, this folk belief mirrors Western concerns over seed consumption among elderly individuals diagnosed with diverticulosis – small bulges in the lining of the colon. Diverticulosis is recognized in half of the American population over 60 years of age and can be considered in many ways a medicalization of the aging process, which culturally designates the elderly as a vulnerable group (see also
sort stimuli, such as queenfish, needlefish, and barracuda [ikan bekalang, ikan todak biru, ikan aruan tasek, and ikan alu-alu] – are designated as pantang, a type of taboo without the accompanying social or moral stigma. The repercussions of consuming pantang food items are often serious, but exclusively physical. As described by one local mother:

> It’s definitely forbidden. If we don’t heed this injunction, [the children] can become itchy; get warts – like a little bit of a virus. Then they go blind.

Laderman (1983) describes a similar phenomenon based on her earlier ethnographic work among a rural Malay population in the peninsular state of Terengganu. Identical to the possible symptoms noted in Kpgs. Trusan Jaya and Tanah Hitam, Laderman’s informants developed red, itchy welts after consuming pantang fish, a result she linked to scombroid poisoning. As described by Laderman (1983:65), this illness occurs when a naturally occurring chemical compound in fish meat – histadine – interacts with bacteria to produce saurine, typically as a result of overheating in the absence of refrigeration. As histadine content varies by species, the possible level of resulting saurine would also vary, making some fish more potentially toxic than others and providing a functionalist rationale for the differentially applied pantang label.

The symptoms of scombroid poisoning resemble a severe allergic reaction, and many of the village residents, who I encountered, had begun to draw on clinical vocabulary obtained through monthly interactions with local health staff to reinterpret pantang foods as potential allergens, thus avoiding the invocation of ‘outdated superstitions’. Yet however it is conceptually packaged, scombroid poisoning constitutes a real threat within Malaysia’s tropical environment for a vulnerable child population with high rates of undernutrition (see Chapter 4, pages 108-114). In contrast, healthy adults with strong constitutions are able to consume high-risk fish species with only the occasional, minor discomfort. The lower probability of accurate, consensus-based classification for grouper thus reflects the tendency for village respondents to rate food items as generally healthy, while still noting their illness-causing potential in specific settings and among defined subgroups. Beef is likewise understood as normally healthy but detrimental in

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Estes and colleagues 2001). As with the prohibition of spicy foods among children, no scientific evidence exists to support these dietary restrictions (NDDIC 2008).

24 As one responded interjected when her adult daughter mentioned pantang, “That’s the old people, an old person’s taboo from long ago!”
excessive amounts. Although still included in the healthy grouping, the relative health of each of these food items – spicy chili-prawn salsa, grouper, and beef – is clearly conditional.

There are, however, several food attributes which are considered definitively unhealthy – excess oil, additives and preservatives, and allergens. The exemplar of this category, commercially-produced crisps and chips, is explicitly linked to the two latter characteristics and its standard preparation, deep frying, leaves little doubt that the food’s oiliness is implied. Moreover, its close association with candy – as demonstrated in the pile-sorting results (see pages 159-177) – hints at similarly negative connotations for this food. Candy – along with sugar in general – is also explicitly linked to tooth decay, a major health issue within both villages.25 As with the hypothesized time of day and price arrays, the limited use of the full range of the rating scale makes a confirmatory PROFIT analysis inappropriate.

Satiety was the only proposed food classification dimension for which there was no cultural consensus despite a comparable sample size (n = 20). The resulting eigenvalue ratio (1.96) failed to meet the recommended 3:1 standard (see Chavez et al. 1995, Lopez et al. 1997, Nyamongo 2002, Ross 2004) and did not support the existence of a single response pattern. Though unconfirmed at this point, lack of agreement may be due in part to differences in assumptions concerning how the food items were to be consumed. Informal questioning after the fact indicated that some respondents believed that they were being asked about each food as the major component of a dish with a rice accompaniment while others considered the item as an isolated ingredient. Further research is needed to clarify this point, but at present the lack of consensus makes the data unsuitable for PROFIT analysis.

**Property Fitting (PROFIT) Analysis**

PROFIT analysis indicates that, as hypothesized, the perceived degree of processing is a legitimate organizing dimension for community-based pile sorts ($R^2 = 0.77$, $p = 0.001$), according to the interpretive standards established by Kruskal and Wish (1978:39). As visible in the accompanying Figure 6.15 (overleaf), the processing dimension extends horizontally from left to right, running from natural to processed and then heavily

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25 While statistics on dental health are not available for the local area, Kpgs. Trusan Jaya and Tanah Hitam do not have access to dental care and issues of tooth loss and decay are evident among all age groups.
Figure 6.15: PROFIT Analysis of Perceived Degree of Processing for Community-Based MDS Results
processed foods. The location of specific food items on this dimension is determined by drawing a perpendicular line between each item and the PROFIT-defined array arrow as noted in the preceding analysis section and modeled in the figure. Reading the intersections of the individual item lines and the array from left to right, this operation demonstrates that in a general sense vegetables are classified as the most natural food items, followed by: seafood, locally prepared dishes, and fruit; meat, poultry, and local snack items; and then commercially-produced items at the far end of the spectrum. This categorization differs slightly from the visual interpretation discussed above (see pages 159-177 and Figure 6.8) due to a differential emphasis on seafood rather than fruit. To explain, the initially proposed processing array unconsciously conflated outside and in-home processing attributes – both of which were cited during the collaborative focus groups. As fruits are both minimally packaged (outside processing) and do not require cooking (in-home processing), they were assumed to be a fully natural food on par with vegetables. Seafood likewise undergoes minimal outside processing, arriving at the market in its natural state. Yet as food safety requires that it be cooked prior to consumption, it was believed to represent an increased level of processing thus creating a diagonally-oriented array. However in the independent rating tasks, participants seemed to focus exclusively on pre-purchase processing, which is more accurately depicted as a horizontal dimension.

Hierarchical Cluster Analysis Results for the Community Pile Sorts

Findings from the hierarchical cluster analysis support the proposed interpretations for the MDS plot producing five basic groupings: (1) poultry, meat, and seafood; (2) vegetables; (3) fruit; (4) vitamins; and (5) other food items. While vitamins are more conceptually isolated than anticipated, this organization reflects the basic taxonomic divisions hypothesized with respect to the MDS visual. Finer distinctions separate chicken from the red meats (i.e., beef and goat) and fish from other types of seafood – squid or cuttlefish, crab, and shrimp. Yet in general, these taxonomic categories are quite cohesive with the majority of diversity occurring within the “other” category.

Due to the large number of included items and the potential lack of familiarity with these foods among Western audiences, I have translated the basic cluster output into a more accessible, concept-based dendrogram, which depicts the hierarchical levels of organization employed by village residents (see Figure 6.16, page 200). To simplify the
Based on this diagram, there is a sequential application of the grouping rationale previously identified through MDS analysis. As noted above with respect to the initial clustering output, there is a basic differentiation of food items based on taxonomic categories or food groups as denoted in blue within Figure 6.16 (overleaf). Beyond these “common-sense” divisions, foods in the initial “other” cluster are subdivided according to the site of purchase as standard food stall dishes and their constituent ingredients are separated from the larger, more undifferentiated group as marked in red. Continuing with the “other” classification, finer distinctions are made based on the degree of processing, where ready-to-eat, convenience foods are first distinguished from the larger group and then further subdivided into commercially- and locally-prepared items as signified in green. The ingredients excluded from this convenience food cluster can be understood as either child-specific foods or more generally consumed local cake components. The child food/general food dichotomy is also evidenced within the category of prepared dishes as spicy chili-prawn salsa is distinguished from fried noodles and rice porridge. Both proposed distinctions are noted in orange. Health-based differentiations – indicated in purple – are the last to emerge as cookies are distanced from candy and commercially-produced chips and crisps, the village archetypes for junkfood. A similar decision-making process may be at work as sweetened, condensed milk is separated from powdered milk and Nestum. However, based on qualitative data from the villages, it seems more likely that we are looking at a lack of agreement over lower consensus items. In general, green lentils, powdered milk, sweetened condensed milk, and Nestum are associated with a child diet. However, lentils are also a major component of locally-produced cakes and as plant seeds they have taxonomic associations with the vegetable group. This cross-classification contributes to their isolation. Likewise, milk is a recognized child food, and yet sweetened, condensed milk is routinely used in a general sense in baking and beverage preparation drawing it outside of the dedicated child food category. At the level of classification in Figure 6.16, each lone food item is likely to be a salient member of more
Figure 6.16: Conceptual Dendrogram of Hierarchical Cluster Analysis Results for the Community Pile Sorts
than one group – a “spanner” as Ross and Murphy (1999) phrase it – with interesting theoretical implications. In sum, multiple parallels between the results of the MDS and hierarchical cluster analyses lend further support to both methods.

**Hierarchical Cluster Analysis Results for the Clinic Health Worker Pile Sorts**

Clinic health workers tend to create much larger, relatively undifferentiated groupings, and at the 0.39 grouping level, four basic nutrition-related categories emerge: (1) vitamins, (2) proteins, (3) carbohydrates, and (4) fats. Few distinctions were made in either the protein or vitamin clusters with the majority of sub-classification occurring in the latter two groupings. These patterns are further clarified in the concept-based dendrogram, which presents hierarchical clustering arrangements up to an average within group similarity of 0.86 (see Figure 6.17 overleaf). While taxonomic differences between (1) vegetables and fruits and (2) meat, poultry and seafood were recognized, the bulk of the divisions served to isolate food items with cross-classifications (e.g., local crisps, spicy chili-prawn salsa, green lentils, cookies, Nestum, beansprouts, and local eggplant). These foods presented an additional sorting challenging due both to their multiple associations and a lack of familiarity among certain staff members concerning rural cultivars such as local eggplant *terung asam*, which was often misclassified as an unknown fruit. Both the major clusters and the degree of association within clusters are in keeping with the patterns identified in the clinic-based MDS plot.

**Additional Cultural Consensus Analysis Results**

**Common Village Food Items as Appetite Enhancers or Suppressants**

The participants’ consistent labeling of each of the 12 food items of interest as either an appetite enhancer, an appetite suppressant, or a food with no measureable impact on appetite indicates a single response pattern and an overall fit with the formal cultural consensus model (see Romney *et al*. 1986). The first and second eigenvalues of 18.60 and 5.41, respectively, exceed the recommended eigenvalue ratio of 3:1, and the first factor solution accounts for 64.1 percent of the variance. Thus, consensus analysis provides a satisfactory single factor solution, which represents the respondents’ shared set of beliefs regarding the potential uses of common, village foods to regulate appetite.
Figure 6.17: Conceptual Dendrogram of Hierarchical Cluster Analysis Results for the Clinic Health Worker Pile Sorts

ALL FOOD TYPES

OTHER

PROTEIN

LOCAL CRISPS

OTHER PROTEINS

SPICY CHILI-PRawn SALSA

OTHER PROTEINS

MEAT & POULTRY

EGGS & SEAFOOD

CARBOHYDRATES

GREEN LENTILS

OTHER CARBOHYDRATES

COOKIES, NESTUM

OTHER CARBOHYDRATES

RICE FORRIDGE

OTHER CARBOHYDRATES

FATS

MILK VARIETIES

OTHER

SUGAR

OIL

SUGAR

COMMERCIAl CHIPS, CRISPS CANDY

VITAMINS

STANDARD VITAMINS (VEGETABLES)

BEAN SPROUTS

STANDARD VITAMINS (FRUIT)

OTHER VITAMINS

STANDARD VITAMINS (VEGETABLES)

LOCAL EGGPLANT
The average level of agreement was 0.47 (SD = 0.28), and all but four of the individual first factor loadings were positive. This level of agreement is sufficient to classify at least 99 percent of items correctly at the 0.95 confidence level using 29 respondents (see Weller and Romney 1988:76-77). The selected sample size (n = 63) was therefore adequate to accurately represent an aggregation of responses, and the estimated culturally-correct categorization of food items according to their effect on appetite is presented in Table 6.9 (below). As previously noted (see Chapter 5, pages 124-126), these classifications are based on weighted frequencies, meaning that the responses of those individuals with the highest levels of agreement with the group as a whole are disproportionately emphasized.

At the group level, each of the 12 food items was determined to have some effect on appetite. This result was unexpected given that I included four control items (powdered milk, cordial, chicken soup, and fried noodles), which were not mentioned in connection with appetite regulation during community observations or ethnographic interviews. As demonstrated above, all of the control items were viewed as appetite enhancers.

Based on the respondents’ overall preference for dichotomous categories, their classification of powdered milk and cordial is understandable. To explain, village mothers consistently cited the use of coffee or tea as a short-term coping strategy intended to abate child hunger. The low cost and high caffeine content of these beverages ostensibly provided an affordable alternative to standard child drinks such as

| Table 6.9: Community-Perceived Effects of Specific Food Items on Appetite |
|-----------------------------|-----------------------------|
| Enhancers                  | Suppressants                |
| powdered milk              | coffee                      |
| cordial                    | canned, carbonated soda     |
| chicken soup               | tea                         |
| fried noodles [bihun]      | brined cabbage [sayur sawi masin] |
| bok choy or leaf mustard soup | commercial chips/crisps |
| red rice porridge          |                             |
| vitamins                   |                             |

26 Sample size requirements are presented for the 0.95 rather than the 0.99 confidence level as Weller and Romney (1988:77) do not provide a concrete number at this higher level for average agreement scores of less than 0.6 – instead stating only that “well over” 30 informants would be needed. It remains unclear whether the selected sample size of 63 would constitute “well over,” so I have erred on the side of caution and limited my reporting to the 0.95 confidence level.

27 Again, at the group level all food items were classified as either appetite enhancers or suppressants, omitting the third possible response category, no effect on appetite.
powdered milk or cordial-flavored water, while simultaneously dulling the child’s appetite. Over the course of my fieldwork, I became accustomed to seeing small children holding coffee-filled baby bottles, and clinic staff members were similarly aware of this phenomenon. As noted by a nurse at the Sematan clinic:

*We were told children can lose their appetites. That’s why we don’t advise mothers to give caffeine to their children, especially coffee – but when you go to the house of a mother that probably can’t afford to buy milk, maybe sometimes she will really tell the child to drink caffeine – coffee or tea.*

In combination with the ethnographic data, the results of the cultural consensus analysis confirm that community members are both cognizant of the relative caffeine content of local beverages and able to actively exploit this knowledge to cope with child hunger. Village mothers routinely associate coffee and tea with canned, carbonated sodas when discussing their relative health risks and potential use as appetite suppressants, displaying an implicit knowledge of caffeine content. When questioned about the two additional beverages – powdered milk and cordial-based drinks – they were able to surmise a lack of caffeine based on their personal experiences and information derived from the local clinics, leading them to classify these items as appetite enhancers.28 Overall, these results demonstrate community residents’ sophisticated use of health information and their ability to apply acquired knowledge in new contexts to facilitate decision-making. While largely aware of the negative impact of high-caffeine consumption on child growth and development, many mothers continue to employ these strategies as necessary to cope with the structural constraints imposed by limited household resources. These choices are not the result of limited awareness but rather the product of a careful balancing of short- and long-term needs within a less than ideal setting.

The labeling of chicken soup as an appetite enhancer is also likely a product of categorization by association. Vegetable-based soups, particularly those including

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28 These classifications are factually correct in terms of caffeine content. The USDA Agricultural Research Service Nutrient Data Laboratory (2008) lists the caffeine content for a standard eight-ounce cup of brewed coffee, a standard eight-ounce cup of brewed tea, and a 12-ounce can of carbonated soda as 95 milligrams, 47 milligrams, and 29 milligrams, respectively. Both powdered milk and cordial (the nutritional equivalent of grenadine) are caffeine-free.
green, leafy vegetables such as bok choy or leaf mustard, were cited as a favorite child food in many households. The enjoyable physical sensation of slurping soup was actively encouraged and often dramatized as a fun, playful ritual used to encourage reluctant children to eat, making soup an important component of two major household strategies for coping with hyper-selective or “picky” eaters: (1) playing together while feeding the child and (2) offering the child special or favorite foods (see Table 4.14). Given the larger context, it seems likely that vegetable soups were noted as appetite enhancers not because of some organic property derived from their specific ingredients but due instead to the unique uses of soup. Chicken soup would similarly fulfill these needs but was not mentioned initially due to its more prohibitive cost, which made it less salient for community members. This interpretation is further supported by the fact that soups are a recognized poverty food within the villages, employed as a means of stretching limited food resources. As soups are more commonly consumed during times of relative scarcity, it would be unusual to find an expensive, high-prestige ingredient such as chicken in soups prepared within the home.29

Individual reports of the use of vitamins and red rice porridge as appetite enhancers were also confirmed at the group level. Interestingly, staff members at both local clinics concurred with the widespread village belief that vitamin supplements actively stimulate child appetites. While it is true that food restrictions can induce a loss of appetite, which returns when food is reintroduced (see Whitney and Rolfes 2005), a multivitamin cannot produce the same effect even when it contains a broad array of nutrients. In short, food is a complex system greater than the sum of its nutrient parts,30 and is improbable that selective micronutrient supplementation is having any real impact on appetite. What is more likely is that clinic staff – undertrained in the areas of nutrition – have rationalized the provision of multivitamins to undernourished children as a means of encouraging higher levels of food consumption. This misinterpretation has, in turn, been passed on to the community through routine health education sessions.

29 Chicken soup is routinely offered for sale at the village food stalls where higher expectations and economies of scale make chicken a (small) component of nearly every dish. Admittedly, I did far less of my own cooking than my participants, and as a regular fixture at the food stalls I was accustomed to seeing chicken soup as a menu component. Though initially an error on my part, the inclusion of chicken soup in the survey instrument was a valuable means of clarifying “appetite enhancer,” which was shown to apply both to foods which intrinsically stimulate the appetite and to those that are used to encourage eating.

30 See Pollan (2008) and Nestle (2002) for further discussion.
While additional research is warranted, the positive association between appetite enhancement and red rice porridge – a food based on a non-commercial, local rice variety\(^\text{31}\) – is indicative of a larger glorification of traditional culture and foodways. This privileging of long-established, uniquely Malay foods can also be seen in (1) an emphasis on the healing properties of local ingredients and preparation methods, such as the dish, *ulam* – a mixture of raw or blanched, naturally-occurring vegetables (e.g., *pegaga* [Centella or Hydrocotyle sp.] and tapioca shoots) served with chili-prawn salsa – and (2) the differential health evaluations of local cakes and crisps and their commercial equivalents (see pages 159-177, 184-198).

Just as village foods stimulate the appetite, outside foods – notably canned, carbonated drinks and commercial crisps and chips – suppress it. While the impact of soda is linked to its caffeine content as noted above, chips and crisps both promote a false sense of satiety and threaten to become an empty substitute for “real” foods, such as rice-based dishes. In the words of one community mother:

\[
\text{He's rarely given chips...I'm scared that he won't want to eat rice if he's already full from eating those chips – He won't want to eat rice. Now, since we've reduced the amount of chips he's given, he does eat rice.}
\]

Continuing on the theme of primary and secondary foods identified in the pile-sorting results (see pages 159-177), it appears that appetite is narrowly defined as a desire for standard, local foods. Secondary foods only serve to impinge on these appetites by substituting or diverting attention away from primary food items. This interpretation reconciles cultural consensus results, which firmly categorize commercial chips and crisps as appetite suppressants, with numerous anecdotes regarding children’s perpetual desire for these foods.

Finally, brined cabbage was the only food item for which cultural consensus analysis directly contradicted ethnographic data, labeling it an appetite suppressant rather than an enhancer. As such, its use within the reporting household can be dismissed as an idiosyncratic appetite regulation strategy.

\(^{31}\) As noted in the Daily Express (2007), the Sarawak Department of Agriculture (DOA) has partnered with Nestle to commercially produce this traditional red rice (TRR). Yet at present, it remains an independent, artisanal product, which is obtained directly from nearby farmers – at least within the Lundu district.
Belief Statement Analysis

Community members’ consistent evaluations of each of the 28 true/false belief statements point to a single response pattern and an overall fit with the cultural consensus model. The presence of a single factor solution was supported with an eigenvalue ratio exceeding the recommended 3:1 standard (7.93, 1.19) and a first factor solution which accounted for 81.2 percent of the variance. Consensus analysis therefore demonstrates that respondents share a single set of beliefs regarding child undernutrition.

According to the standards applied by Berges and associates (2006:424), the average level of agreement with the predicted cultural model was high. Moreover, all individual first factor loadings were positive with an average knowledge score of 0.68 (SD = 0.17). At this level of agreement, 20 respondents are more than enough to classify at least 99 percent of items correctly at the 0.99 confidence level (Weller and Romney 1988:76-77). The selected sample size (n = 63) was therefore clearly adequate to accurately represent an aggregation of responses, and the estimated culturally-preferred evaluations for each statement are presented on the following page in Table 6.10.

In a general sense, respondents tended to agree with each of the statements presented despite the fact that approximate half of the stimuli had been deliberately rewritten to express sentiments that directly contradicted opinions asserted during the ethnographic interviews. Participants accepted each of the three possible causes for child undernutrition, affirmed all statements that presented the government in a positive light while rejecting those which were critical of it; and agreed to contradictory statements regarding their knowledge of child care practices and a mother’s degree of responsibility for her child’s nutritional status. As these belief statements encapsulate many of the overarching themes emerging from the fieldwork period, they will be more extensively addressed in the discussion which follows (see Chapter 7) and will not be further elaborated here.
<table>
<thead>
<tr>
<th>T/F</th>
<th>Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>T</td>
<td>Usually, children who do not get enough sleep are underweight.</td>
</tr>
<tr>
<td>T</td>
<td>I think that government actions are beneficial.</td>
</tr>
<tr>
<td>T</td>
<td>Children must eat foods that have carbohydrates, protein, and vitamins, if you want them to be healthy.</td>
</tr>
<tr>
<td>F</td>
<td><strong>Children are always eating junkfood that is cheap and quick, like crisps, Maggie [instant noodles] and candy.</strong></td>
</tr>
<tr>
<td>T</td>
<td>I definitely know how to care for my child so that s(he) is healthy.</td>
</tr>
<tr>
<td>T</td>
<td>Healthy food is the same for everyone.</td>
</tr>
<tr>
<td>F</td>
<td><strong>The government doesn’t do enough to encourage child health and nutrition.</strong></td>
</tr>
<tr>
<td>F</td>
<td><strong>If their mother is busy, it is not a problem if children eat on their own if they are able to do so.</strong></td>
</tr>
<tr>
<td>F</td>
<td><strong>The health clinic here is not able to provide treatment for undernourished children.</strong></td>
</tr>
<tr>
<td>T</td>
<td>The government already provides enough assistance to poor families.</td>
</tr>
<tr>
<td>T</td>
<td>If children are underweight, it is easy for them to become sick.</td>
</tr>
<tr>
<td>T</td>
<td>Mothers should restrict themselves to a schedule when feeding their child even if the child asks for food at other times.</td>
</tr>
<tr>
<td>T</td>
<td>Sometimes children are underweight because they lack good personal hygiene.</td>
</tr>
<tr>
<td>F</td>
<td><strong>Breastmilk is not necessary for children.</strong></td>
</tr>
<tr>
<td>T</td>
<td>If my child does not want to eat, I give him/her special foods to increase his/her appetite.</td>
</tr>
<tr>
<td>T</td>
<td>Government assistance is always given to those who need it most.</td>
</tr>
<tr>
<td>T</td>
<td>For children, healthy food is balanced food.</td>
</tr>
<tr>
<td>T</td>
<td>Sometimes, I am not sure about the best way to feed and cook for my child.</td>
</tr>
<tr>
<td>T</td>
<td>If we want to know if children are healthy, we have to look at their body weight. That is the best method.</td>
</tr>
<tr>
<td>T</td>
<td>Kids cannot be forced. If they don’t want to eat, then they don’t want to eat. You have to follow their preferences.</td>
</tr>
<tr>
<td>T</td>
<td>If a mother cares for her child correctly, then that child will be healthy.</td>
</tr>
<tr>
<td>T</td>
<td>When children are always sick, their weights do not increase.</td>
</tr>
<tr>
<td>F</td>
<td><strong>People should not request aid. If you have it, you have it. If you don’t, you don’t. Just keep quiet.</strong></td>
</tr>
<tr>
<td>T</td>
<td>I have enough time to feed my child, care for him/her, and do all of my housework, etc. without having to rush.</td>
</tr>
<tr>
<td>T</td>
<td>The nurses at the health clinic truly want to help me and my child. They always do everything that they can.</td>
</tr>
<tr>
<td>T</td>
<td>Child foods are healthy but more expensive than normal, like powdered milk and grapes.</td>
</tr>
<tr>
<td>T</td>
<td>When children are undernourished, they are mentally slow and have difficulty succeeding in school.</td>
</tr>
<tr>
<td>T</td>
<td>If we use our money to give our children healthier foods, that is like an investment in the future.</td>
</tr>
</tbody>
</table>

Statements determined to be false are bolded and those where over 25 percent of respondents had a dissenting opinion are italicized. Note: Cultural consensus analysis determined that the probability that each of the 28 items is accurately evaluated above (based on the underlying cultural model) was 100 percent.
Recipe Collections

Comparison of Community-Derived Child-Specific and General Family Recipes

Tag cloud-based data visualization highlights the strong community focus on savory food, frying, and a core set of flavor enhancers as seen in Figures 6.18 and 6.19 (overleaf). Both child-specific and general family recipes rely to a large extent on AJI-NO-MOTO, a brand of monosodium glutamate (MSG) produced and marketed by the Japanese Ajinomoto group (see Sand 2005). Salt, shallots, garlic, and soy sauce are also emphasized albeit to a lesser extent in both recipe sets and can be understood – together with AJI-NO-MOTO – as the essential flavor base for the majority of village meals. A limited number of high-importance proteins are also visible, including dried anchovies, chicken, eggs, mackerel, and shrimp. Overall, the most prominent ingredients are pantry staples with long shelf-lives.

Beyond these commonalities, the direct comparison of relative item frequencies presented in Figure 6.20 (page 212) demonstrate that the child-specific recipes (denoted in blue, toward the bottom of the plot) center much more explicitly on rice and rice porridge, including a number of one-dish meals such as rice porridge with dried anchovies, rice porridge with shark meat, and fried rice with dried anchovies or soy sauce. Yet, these results must be taken in context. Rice is an essential food throughout the lifespan and is such an integral part of the dining experience that its presence at the meal is simply assumed. White rice is the standard accompaniment for the full range of meat and vegetable dishes [lauk] encountered in the villages and is typically mixed on the plate with the fingertips of the right hand to create small, glutinous mounds that can be easily transferred to the mouth. For this reason, it is more accurate to say that general family recipes include more component dishes, which would then be served with rice, while child-specific recipes focus on single pot meals based on either rice or rice porridge. This interpretation is ethnographically feasible as food intended for

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32 Superficially, the child-specific recipes appear to place more emphasis on frying whereas the family recipes focus on cooking in general. However, this is simply an artifact of a slight difference in terminology across translations. While I glossed “minyak untuk mengoreng” as “cooking oil” when working with the general recipes, I used the literal translation “oil for frying” with the child-specific recipes. The meaning and relative emphasis in both cases are the same.

33 The full recipe sets are available in both English and Malay upon request.
Figure 6.18: Tag Cloud Visualization of Community-Derived, Child-Specific Recipes
Figure 6.19: Tag Cloud Visualization of Community-Derived, General Family Recipes
Figure 6.20: Comparative Tag Cloud Visualization for Community-Derived, Child-Specific and General Family Recipes
young children often necessitates separate preparation to avoid suspected allergens and the overly sour or spicy foods preferred by the general population. A single, all-inclusive “child food” mixture would be less labor-intensive to create and serve. As expected, the general family recipes do demonstrate a wider range of flavorings and higher frequencies for spicy (e.g., chilies, spicy chili and shrimp-based salsa) and sour (e.g., tamarind, lemongrass) foods and reported allergens (e.g., shrimp). There is also a relative overrepresentation of vegetables, particularly long beans, and fritters in the general recipe set.

Comparison of Community-Derived and Clinic Recipes

In contrast to the predominantly savory recipes collected among community members (Figures 6.18 and 6.19), the SHD publication, *Healthy Recipes: Guidelines for Health Clinic Cooking Demonstrations* (see *Unit Pemakanan Seksyen Pembangunan Kesihatan Keluarga* n.d.), concentrates largely on sweet foods such as banana cake, sweet potato *bingkas* [a type of traditional Malay cake], and banana pudding. Following on this emphasis, powdered milk, sugar, eggs, flour, coconut, margarine, honeycomb, and *pandan* leaf [a type of fragrant palm34] are all prominent in the clinic-based visualization depicted in Figure 6.21 (overleaf). While a direct comparison of relative ingredient frequencies (see Figure 6.22) shows that recipes for fried fritters are common to both collections, we see an exclusive focus on savory snacks in the village as each recipe includes a protein component – typically dried anchovies. The SHD-promoted recipes depicted in red toward the top of the plot rely much more on a sweetened mixture of green lentils. The clinic further promotes a wider variety of spices – many demonstrating an Indian-Malaysian influence, such as coriander, turmeric, and (white) cumin. Pepper, in particular, is much more common in clinic recipes while village cooking disproportionately emphasizes AJI-NO-MOTO, shallots, garlic, and soy sauce.

Interestingly, the clinic recipes omit chicken entirely while it features in small amounts in many of the reported community recipes. According to the SHD nutrition officer, chicken is excluded due to its prohibitive price (Yahya b. Ahmad, personal communication, October 24, 2008). However, powdered milk – an item noted as expensive in the villages – is consistently featured as a component of baked goods, a usage that is

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34 Formally referred to as *pandanus leaf* (*Pandanus latifolius*, *P. amaryllifolius*), the plant has a delicate scent and flavor that invites comparisons with vanilla (see Solomon 1998). Tan and Tay (2003:70) refer to the foliage as “screwpine leaves” and note the plants’ use as a bug repellent in many urban taxi within peninsular Malaysia.
Figure 6.21: Tag Cloud Visualization of Clinic Recipes
Figure 6.22: Comparative Tag Cloud Visualization for Clinic and Community-Derived Recipes

pandan margarine honeycomb essence peanuts biscuits coriander crushed dhal glutinous young round spring onions sweet potato
powdered powdered tomato pepper banana lentils lentil cake pudding green green milk milk
wheat flour sugar sugar filling sardines sardines sardines sardines squash squash winter squash eggs eggs
coconut onion onion water water leafy leafy sweet corn limes spinach spinach yolk yolk
anchovies anchovies anchovies
coconut dried turmeric dish dish long beans long beans white rice rice tamarind tamarind
bihu bihu salt salt cyclone planta plants

Created on Many Eyes (http://many-eyes.com) © IBM
considered wasteful to the extent of conspicuous consumption and only (jealously) accepted as a sign of wealth during holiday celebrations such as *Hari Raya Aidilfitri*. Porridge, a food noted by community members as an important means of providing children with a sense of satiety in the context of economic constraints, was also largely absent from the clinic recipes. Overall, the ingredient lists contained in the SHD publication implicitly stressed local cakes and sweets both by providing a disproportionate number of these types of recipes and by calling for the use of high-cost, high-prestige ingredients in their preparation. This is an awkward emphasis given the tangential nature of these foods to the local community and the clinic health workers’ negative associations towards them as demonstrated in the preceding pile sort results (see pages 159-201).
CHAPTER SEVEN

SUMMATION, DISCUSSION, AND CONCLUDING RECOMMENDATIONS

This chapter aims to clarify, integrate, and apply more detailed findings concerning the demographic and socioeconomic status, food security, and child nutritional status, illness incidence and feeding strategies of study households (Chapter 4) and these households’ conceptions of food and nutrition (Chapter 6). As previously noted, this study focuses exclusively on households which (1) had legal standing as either citizens or documented immigrants within the community and (2) included at least one child between the ages of six-months and six-years. Comprising 16.6 percent of the total population of Kpgs. Trusan Jaya and Tanah Hitam, this targeted sample is not intended to represent the communities as a whole but rather that subset of families with small children, which is the ostensible target of any child nutrition program advanced by the Malaysian Ministry of Health (MOH). To aid comprehension, the main findings are presented as a series of concise facts, organized categorically. Following this brief review, the data is synthesized and interpreted with respect to the study’s overall goal, specific research objectives, and hypotheses (see Chapter 1). Building on this analysis, I conclude with a set of grounded policy recommendations and suggestions for further research and elaboration.

Main Findings

Demographic and Socioeconomic Measures for Study Households

A1. The village household [isi rumah] or kin-based, residence group is organized as a composite of patriarchal, nuclear families [keluarga]. Households vary as to the extent to which families are differentiated when allocating sleeping space and food resources. The total number of family units occupying a household ranges from one to four with an average of 1.53 families (SD = 0.65), while the total number of household members ranges from three to six individuals with a mean of 6.81 (SD = 2.37).
A2. Excluding children six-years-old and younger, the mean age is 28.42 years (SD = 17.03) and the sex ratio is 96.35, denoting a slightly higher number of women (50.9%). This younger sample was expected given that study households were selected on the basis of having at least one child who was born within the past six years, thus guaranteeing an overrepresentation of individuals, particularly women, in their childbearing years.

A3. Among village children between six-months and six-years old, the mean age was 34.71 months (SD = 20.55) with a sex ratio of 87.27, reflecting a higher number of girls (53.4%). Larger birth cohorts occur in the six- to ten-month and 51-month age ranges.

A4. Accurate income estimates are difficult to obtain, and the applied poverty line standards differ between state and national agencies. Yet despite variations in individual income estimates over time, results are clear and consistent at the village level where over one-quarter of the population is income-eligible for food assistance according to Sarawak SHD guidelines and well over half (54.0 to 61.1%) according to the Malaysian MOH standards.

A5. Community members’ perceived monthly income needs far exceed the dated poverty line cut-off applied by the SHD but would still place a household below the poverty line recommended by the MOH.

A6. Overall, actual income estimates exceeded reported need by an average of RM224.56 (SD = 516.05) or $63.62. It is only the most impoverished households that report income scarcity (i.e., an average deficit of RM151.35 or $42.93). This suggests a general attitude of coping and acceptance of low-income conditions except in the most extreme cases where poverty cannot be normalized.

A7. The majority of working-age individuals are unemployed (44.9%); an additional 36.9 percent are self-employed, leaving only 18.2 percent as salaried employees. Primary occupations mirror those reported for the district as a whole with a few
basic exceptions: (1) the underrepresentation of farmers and teachers and (2) the overrepresentation of construction workers.

A8. Village-level observations and ethnographic interviews indicate that labor categories are more fluid than the figures imply. Local men cycle through multiple employment categories performing wage work when they are lucky, working for themselves as they take on odd jobs, and becoming unemployed in the interims.

A9. Despite its symbolic weight as a form of identity and cultural capital, the role of fisherman is relatively rare – perhaps as the result of a younger sample and the greater association with fishing among older generations. Strong fishing identities persist in spite of low and potentially declining rates of personal involvement.

A10. Unemployment figures reflect a gendered division of labor and ultimately the devaluing of women’s work. Female family members are routinely labeled as “unemployed” housewives in spite of their extensive involvement in the informal economy, including: gathering, cultivation, handicraft and food production, resale activities, fishing, crabbing and sewing. With limited access to the resources necessary to participate in many mainstream supplementary income activities, more impoverished women are precluded from all but the most marginal, stigmatized pursuits.

A11. Neither women’s alternative livelihood strategies nor the selected set of basic household assets formed a unidimensional continuum of economic need capable of serving as a proxy for income.
**Food Insecurity Rates for Study Households**

B1. Over half of the surveyed population experiences food insecurity in each of its major domains (i.e., certainty, quality, and intake) and as an overall status.

B2. Only 35.7 percent of village households were food secure, and among the food insecure majority 28.6 percent experienced forms of severe insecurity such as reduced food intake for more than ten days per month and the lived experience of running out of food, going to bed hungry, sleeping to avoid hunger, or going an entire day without eating due to a lack of resources.

**Child Nutritional Status and Anthropometric Indices**

C1. Within the villages, 23.3 percent of children less than six-months-old are moderately to severely underweight for their age and an additional 21.4 percent are mildly underweight. Overweight and obesity have yet to become an issue, and only two children (1.9%) have disproportionately high weight-for-height measures. These figures compare poorly to national estimates of underweight prevalence ranging from eight to 19 percent and district rates at 17.8 percent.

C2. Chronic undernutrition – as evidenced by moderate to severe stunting – is experienced by 13.6 percent of village children, while 11.7 percent demonstrate the effects of acute wasting.

C3. There are no significant associations between sex and stunting, underweight, or wasting in terms of either frequencies or mean z-scores for height-for-age, weight-for-age, and weight-for-height values.

C4. There are no significant differences in mean z-scores according to age for any of the profiled anthropometric indicators (i.e., height-for-age, weight-for-age, and weight-for-height). Yet, the height-for-age value does approach significance suggesting that a larger sample might capture meaningful differences among age cohorts. These results are reinforced by the markedly higher frequencies of stunting and wasting among 12 to 23-month-old children and the lower
prevalence of malnutrition across all indicators for children in the six to 11-month age range. A larger sample is needed to evaluate the significance of these observed differences in frequency. However, the superior health of children less than one year of age is well recognized within the local public health system, where it is attributed to both exclusive breastfeeding and reduced independence and willfulness on the part of the child.

C5. The relatively high prevalence of moderate to severe stunting in children at least two-years-old (12.3%) is particularly problematic as this form of growth retardation is likely irreversible at this more advanced age.

**Child Illness Incidence and Perceptions of the Clinic**

D1. The number of monthly illness episodes ranged from zero to five with an average of 1.07 (SD = 1.07) with 64.5 percent of surveyed household reporting that one or more of their children was sick at least once during the past 30 days.

D2. Over half of respondents (57.1%) had visited their local clinic within the last month and the most common reasons for these visits were routinely scheduled services such as growth monitoring (85.7%) and immunization (27.0%), indicating that the majority of illness events are treated within the home.

D3. Village residents conceptualize the role of the clinic largely in terms of prevention – in particular, those preventative measures which they encounter on a regular basis (i.e., growth monitoring, immunization, and vitamin distribution). In contrast, benefits are understood as tangible outcomes such as medications received (46.0%) or injections administered (34.9%).

**Respondent Understandings of Clinic-Based Nutritional Information and Services (PPKZM)**

E1. The majority of households (85.7%) obtained some form of nutritional information from the clinic, yet this advice was typically redundant. Still, participants
remained overwhelmingly positive in their characterizations with 98.1 percent indicating that the information provided was both useful and appropriate. Interestingly, this percentage was higher than the number of respondents who rated the advice as factually correct.

E2. Only seven households had participated in the PPKZM with three households currently enrolled.

E3. The majority of respondents (60.6%) were uncertain of the program’s purpose while the remainder offered overwhelmingly generic characterizations or misinterpretations, reflecting a lack of name recognition and program awareness within the villages.

Respondents’ Child Feeding Strategies and Perceptions

F1. Community caregivers attribute decreases in weight to the child’s own disinterest in food (e.g., boredom) with over half of surveyed respondents (55.6%) indicating that children are naturally hyper-selective or “picky” eaters.

F2. Eating is encouraged through positive reinforcement in which food preparation and consumption becomes an interactive, game-like activity or an act that is directly rewarded through gifting or the inclusion of favored foods.

F3. It is believed that appetites can be directly stimulated through the use of vitamins or suppressed with high-caffeine beverages such as coffee and tea. Child caretakers actively work to manipulate child appetites by applying knowledge of food items’ pharmacological effects in combination with parenting strategies.

F4. In general, dietary diversity is highly valued and closely associated with the idea of “balanced food” and adequate nutrition. It is deliberately introduced by varying meal content in accordance with clinic recommendations. However, the consumption of a variety of foods is also cited as a negative by-product of income restrictions, which force families to accept additional, nonstandard or un-
preferred food items with important implications for the use of dietary diversity as a potential proxy for food security.

F5. Over half of respondents (52.4%) consciously differentiate between child and adults food and are capable of providing examples of child-specific food items.

Local Understandings and Conceptualizations of Food

G1. Community members recognize a wide variety of foods, citing a total of 756 unique general food items and 317 child-specific foods. Individual participants listed 72 general and 30 child-specific foods on average when prompted. Within these listings, the foods included in the PPKZM distributions rank low in terms of relative saliency.

G2. Participants do not have a uniform understanding of food. While the free list results (see Chapter 6, pages 149-151) do accurately and reliability capture the range of variability, peripheral items may be of greater importance to some as yet undefined subgroup, which is based on neither income nor child nutritional status.

G3. Food is conceptualized as a set of basic, largely unprocessed ingredients. Prepared dishes are less often referenced and are more salient for particular times (i.e., breakfast, snacking, and non-major meal events) and groups (i.e., children).

G4. More commonly recognized foods are more likely to be mentioned first as child foods and vice versa as child foods are differentiated largely through in-home processing. Only milk, rice porridge and its commercial substitutes (e.g., Nestum), and junkfoods such as crisps, candy, and icecream are definitively categorized as child-specific foods.

G5. Village families categorize food using a nuanced etiology which combines a basic morphological taxonomy with judgments based on (1) health and nutrient
content, (2) time consumed, (3) expense, (4) degree of processing, (5) site of 
purchase, (6) common usage, and (7) separate understandings of child and adult 
food. Overall, this classification system supports a distinction between primary 
food items – arranged in a modal configuration that separates dishes from 
condiments and basic ingredients – and secondary or child-specific food items.

G6. Each proposed attribute for food classification was confirmed and further 
elaborated through the use of independent rating tasks, and the proposed 
processing array was confirmed and reoriented slightly to focus on pre-purchase 
processing through PROFIT analysis as outlined below:

G6a. Health: Most local food items are considered generally healthy with the 
extinction of sugar, which is “less healthy,” and commercial crisps, chips, 
and candy, which are “unhealthy.” Although foods with medicinal 
properties are recognized, healthiness is largely determined in context, 
drawing on the idea of “balanced” food.

G6b. Time Consumed: There is a differentiation between (1) breakfast foods, 
foods associated with non-major meal events such as morning and 
afternoon tea, and “relaxation foods” and (2) standard meal components 
(i.e., “normal food”).

G6c. Expense: Participants glossed “very inexpensive” as free and classified a 
variety of foods using this label (e.g., crab, shrimp, multiple fish species, 
wild fern, long beans, and water spinach). However, only tapioca shoots 
were considered very inexpensive at the aggregate level. Vegetables, 
local fruits, and “cheap proteins” (i.e., dried anchovies, eggs, and lentils) 
were considered inexpensive, mirroring unit pricing and clinic 
classifications. Other proteins, imported fruits, vitamins, and non-
perishable pantry staples were labeled as expensive. This categorization 
reflects the prices recorded in the market survey with the exception of 
flour, cooking oil, rice, and sweetened, condensed milk, which were 
comparatively quite cheap. Perceptions of these items’ high cost are
likely based on their known subsidization, indicating that community price categorizations do not directly reflect personal purchasing experiences.

**G6d. Degree of Processing:** Most salient local foods are considered natural ostensibly due to the fact that they are harvested and presented to the consumer with minimal alterations. Food items that were prepared on-site, packaged locally, or considered in some way beneficial were designated as “processed,” while vitamins and commercial imports with negative health associations were classed as “heavily processed.”

**G7. Hierarchical clustering** demonstrates the sequential ordering of classification dimensions. Basic distinctions are made according taxonomic categories or food groups, while secondary distinctions separate foods according to their site of purchase – either at a food stall or elsewhere. Focusing on the less cohesive “other” category, foods are distinguished by their degree of processing, sorting ready-to-eat convenience foods out away from the larger group and then subdividing them into commercial and locally-prepared items. Distinctions are then made according to the child food/general food dichotomy, and health-based differentiations are the last to emerge.

**G8. Clinic food categorizations** focus exclusively on the tripartite division of proteins, vitamins, and carbohydrates with demonstrated uncertainty regarding the carbohydrate category and how it is distinguished from both fat and protein groupings. High-fat foods were characterized as unhealthy, and distinctly local foods (i.e., spicy chili-prawn salsa and seafood crisps produced within the villages) posed the greatest classification challenges.

**G9. Hierarchical clustering results for clinic-based pile-sorting** indicates a simple classification system based on taxonomic differences between (1) vegetables and fruits and (2) meat, poultry, and seafood. Additional divisions served largely to isolate food items with cross-classifications.
G10. Village consumption patterns, resource allocation, and food conceptualizations prioritize savory foods, while clinic health education materials and cooking demonstrations focus on sweet foods despite the negative perceptions of these food items, which clinic staff members exhibited during the pile-sorting task.

G11. Respondents tend to agree with any belief statement they are presented with, even when statements contradict one another and opinions expressed during previous ethnographic interviews. High levels of consensus point toward a shared cultural model, but this may be a model for responding to formal questioning rather than an underlying set of shared beliefs regarding child nutrition. Still, participants accepted each of the three proposed causes for child undernutrition (i.e., illness, lack of sleep, and poor personal hygiene); affirmed all statements that presented the government in a positive light while rejecting those which were critical of it; and agreed to conflicting statements regarding their knowledge of child care practices and a mother’s degree of responsibility for her child’s nutritional status.

**Hypothesis Testing, Synthesis, and Interpretation**

To reiterate, the intent of this research has been to assess the ways in which common, local foods are perceived and categorized and the degree to which these understandings are shared both (1) within the local communities and (2) between community members and the maternal and child health (MCH) clinics that serve them. Documented cultural models for food categorization were related to clinic health education messages, PPKZM programming guidelines, and community conditions and food beliefs and practices. The overall aim has been to create an understanding of place and experience in two rural Malay villages as viewed through the lens of food security and to assess the relative fit of current nutritional programming within this context.

More specifically, I began by establishing the local need for a nutrition-based, public health intervention such as the PPKZM by assessing child anthropometry and household food insecurity. The collection of child weights and heights allowed for a direct comparison of study villages with national and district-level statistics, while food security
measurements updated these results to reflect current public health best practice for the monitoring and evaluation of nutritional programs (see Coates et al. 2007). As noted in Finding C1 (above), the results confirm my initial hypothesis (H1) that child anthropometric measures for village children between the ages of six-months and six-years demonstrate a higher prevalence of undernutrition. The household food insecurity measures, profiled in Findings B1 and B2, likewise support the need for a nutritional intervention within the two target villages as anticipated in Hypothesis 2b. Moreover, as expected in Hypothesis 2a, child height-for-age z-scores have a strong, significant negative correlation ($r = -0.29, p=0.002$) with household food security scores such that more severely stunted children are more likely to be found within less food secure families. A similar, although weaker, relationship exists between weight-for-age (i.e., underweight) and food security ($r = -0.18, p=0.03$), and there was no significant relationship between weight-for-height (i.e., wasting) and food security ($r=-0.06, p=0.28$) (see Cooper 2008a).

These results are biologically plausible if we assume that food insecurity – while ostensibly measured over the past month – is, in fact, a long-term hunger indicator within this research population as is stunting (height-for-age) and wasting, albeit to a lesser extent. This interpretation also corresponds to the accepted social science understanding of respondent reliability. As noted in Bernard and associates’ (1984) classic review, informants are simply inaccurate when it comes to recounting specific past events, behaviors, and circumstances, although they can be counted on to report general patterns and norms. It is therefore highly likely that village families are relating a more generalized, long-term state of affairs, which aligns with the children’s embodied nutritional history.

A quick comparison of the numbers demonstrates that there are a greater proportion of households experiencing the emotional impact of deprivation and food insecurity than there are children suffering from its physical consequences (as determined through routine anthropometry). Given the correlation between these measurements, it is clear that the HFIAS is a more sensitive indicator, which precedes visible child malnutrition and identifies hunger in a larger sense. Child anthropometry and food insecurity results thus mutually validate one another as appropriate indicators, offering support for the local, Malay-language adaptation of the HFIAS as a meaningful and culturally relevant
instrument. Moreover, these results undercut arguments for genetic difference or the inapt application of Western standards, which are often used to dismiss evidence of long-term nutritional deprivation, particularly stunting, within resource constrained settings (see Seckler 1982). In short, these arguments are difficult to support when such a high proportion of “naturally short” children live within food insecure households.¹

Having confirmed the need for a nutrition-based public health intervention within the local area, results further demonstrate dismal coverage rates for the PPKZM – the only nutritional invention available to Malaysian children prior to their entry into the school system. Given the collected data on household income levels (Finding A4) and child weight-for-age measures (Finding C1), six village households were consistently eligible for program assistance during the 2008 fieldwork period according to the more stringent (and outdated) SHD guidelines. Sixteen households were eligible by current MOH standards based on income estimates obtained during the initial census conducted from February to early March. Twelve of these households remained eligible for the duration of my time on-site, yet only three households were enrolled in the program (Finding E2). PPKZM coverage within Kpg. Trusan Jaya and Kpg. Tanah Hitam is therefore 50 percent at best and may be as low as 18.8 percent during seasonal lows if the correct national eligibility standards are applied. As previously noted in Chapter 4, this failure to reach the majority of the target population is unsurprising. Local nutritional surveillance is passive and most community members are misinformed, uncertain, or unaware of the program’s purpose and its entry requirements (Finding E3), providing little opportunity for them to assert their right to these essential services.

Before addressing the PPKZM in detail, it was necessary to establish a comprehensive understanding of locally-relevant food items and the ways in which these foods are classified by community members and by nursing staff at the district and subdistrict MCH clinics. I initially hypothesized (H3) that there was a core set of food items well-known to the community as a whole, which would be represented by a single factor solution

¹ Admittedly, the “adaptation” and “small but healthy” hypotheses are quite dated and were thoroughly discussed and largely dismissed in the mass of publications appearing during the early to mid-1980s – Beaton’s (1989) review in Human Organization is a particularly useful summary of this body of work. Still, the popular appeal of these theories has given them significant currency within Malaysia, especially given Mahathir’s anti-imperialist rejection of Western models and standards. Within this context, it is necessary to explicitly state that the low anthropometry measures recorded in Kpg. Trusan Jaya and Kpg. Tanah Hitam are not the result of naturally-occurring variation between populations.
through cultural consensus analysis. As demonstrated in Finding G2, this assumption was not supported by the community free list results. Although the reliability coefficient (Cronbach’s alpha) confirms that the data do accurately and reliably capture the range of variability for salient local food items,\(^2\) it remains likely that some of the more peripheral foods are of greater importance to an as yet undefined group within the community, which is based on neither income level nor child nutritional status.

These results were unexpected, leading to the rejection of two early hypotheses (H3, H4). Yet they are reasonable given the local setting. As described in Chapter 4, there are few physical or social barriers between the adjacent villages of Trusan Jaya and Tanah Hitam, and community members typically purchase food items from the nearby subdistrict capital, Sematan (Images 7.1, 7.2, and 7.3 overleaf). Shopping is conducted among a single set of shops and stalls as the limited number of high-income households in the area cannot support the emergence of a niche market. Within this small, open environment, income restrictions are unlikely to change individual awareness of specific food items or prompt contrasting cultural models of relevant local foods between high- and low-income groups.

Knowledge of purchased food items is therefore largely standardized. What differs is the relative importance of gathered or cultivated foods. According to Finding G6c, community respondents indicate that they can freely obtain a variety of foods, including crab, shrimp, multiple fish species, wild fern, long beans, and water spinach. However, only tapioca shoots are classified as free at the aggregate level. This result is explained to some extent by the respondents’ varied environmental resources, ranging from the crab-filled mangrove swamps of Kpg. Trusan Jaya Hilir – where wooden planking, elevated structures, and the extensive application of large quantities of wood chips have made it possible to construct housing well into the mangrove areas – to the richer soils and gardening potential of Kpg. Tanah Hitam. Tapioca shoots are unique in that they are freely available to all from a variety of sites on unclaimed or marginal land such as abandoned gardens and roadsides. Beyond shaping respondent perceptions of cost, the multiple microenvironments contained within the boundaries of these two villages

\(^2\) See Finding G1 for further details on the wide variety of foods listed. In addition, the complete roster of general and child-specific local foods is available upon request in both English and Malay.
likely dictate differential diets and prioritize distinct sets of food items. It is unsurprising then to find a lack of overall consensus regarding salient local foods or separate cultural models organized by income-level.

As depicted in Chapter 5, there is some indication that resource-constrained households with healthy children tend to emphasize a separate core set of food items (see Figure 5.2). This unique perspective was not confirmed through cultural consensus analysis – most likely as a result of the limited number of sampled households within this category (n = 5). Nevertheless, this group is of particular theoretical interest as families who manage to provide adequate nutrition in highly challenging settings can be used as examples to develop effective, participatory interventions based on the positive deviance (PD) model, which was introduced to the field of public health in the 1970s (see Wray 1972, Wishik and Vynckt 1976) and successfully applied to combat child undernutrition in a variety of settings (Zeitlin et al. 1990, Bolles et al. 2002, Sethi et al. 2003) including

3 Informal household observations and collected recipes from the small subset of target families within Trusan Jaya Hilir (n = 6) indicate a greater reliance on mangrove-derived foods such as crabs and mollusks. However, a larger sample size is needed for cultural consensus analysis as further detailed in the concluding section.
Southeast Asia (see Sternin et al. 1997, 1999 and Dearden et al. 2002). As profiled by Cederstrom (2000) and Himmelgreen and Crooks (2005), the PD model continues to be a relevant strategy for applied nutritional anthropology. Moreover, it has potential applications at this fieldsite based on visual assessment of the respondent-by-respondent similarity matrices obtained through free-listing (Figure 5.2), which again suggest – albeit without statistical validation – that this group is emphasizing a set of food items distinct from the more generalized community listing. Related benefits, limitations, and next steps for applying the PD model are outlined below.

Given the lack of significant patterns of difference among respondents for the free-listing data (Finding G2) and the corresponding lack of significant differences in preliminary assessments of pile-sorting data using quadratic assignment procedure (QAP) – see Cooper (2008b) – community food item classifications were not assessed for within-group variation. Instead, qualitative differences between food categorizations employed by clinic staff and by the local families that they serve were investigated. The hypothesis that health workers emphasize food items’ nutritional aspects while community members take into account a larger set of factors in addition to health (H5) was overwhelmingly confirmed as noted in Findings G5 to G9. Overall, clinic sorting patterns reflect a simple classification system based almost exclusively on taxonomic differences (i.e., the separation of fruits and vegetables from (1) meat, poultry, and seafood and (2) other foods). The rationale for these distinctions is expressed in nutritional terms as a need to separate vitamins from proteins and carbohydrates. At its most basic, intuitive level the community-derived multidimensional scaling (MDS) plot displays a similar division of constitutive kinds or types – fruit, vegetables, meat, fish and seafood – which are then related to the same primary nutrients, namely vitamins, proteins, and carbohydrates. However, community categorizations are far more nuanced and consider a number of additional elements such as the time consumed, price, degree of processing, site of purchase, common usage, and separate understandings of child and adult food. This comparison yields two important findings:

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4 No significant differences were found in food classification schemes based on divisions according to income above or below the SHD poverty line standard or between those families with healthy and with unhealthy children. The correlation between pile-sorting results for families above and below the SHD-applied poverty line was 0.96 with an equivalent p-value (i.e., a proportion as large statistic) of less than 0.001. Between families with healthy and underweight children the correlation was again 0.96 with an equivalent p-value of less than 0.001. Due to the use of permutation statistics, results are robust to sample size limitations.
1. Village caretakers are accustomed to fine distinctions and complex etiologies when conceptualizing food, and

2. Community members are attentive to clinic health education messages and actively apply this knowledge to the classification of local foods.

Following on these results, it is simply unreasonable to assert – as clinic staff routinely do – that “the mothers get confused” when presented with more than three food groups. Focus group discussions and more informal ethnographic interviews within the villages demonstrate specific, detailed knowledge of the physiological impact of numerous local food items, and while some of these beliefs are difficult to substantiate, others such as the use of watermelon or bananas to prevent constipation are clearly logical and grounded in current nutritional science. Similarly, as noted in Finding F3, caretakers draw on their knowledge of the pharmacological effects of caffeine to actively suppress child appetites with low-cost, readily-available beverages such as coffee and tea. Though cognizant of the negative impact of high caffeine consumption on child growth and development, many mothers continue to employ these strategies as necessary to cope with the structural constraints imposed by limited household resources. Their actions are not the product of a lack of awareness but rather a careful balancing of short- and long-term needs in less than ideal circumstances. Taken together, these findings prove that community members are far more knowledgeable and sophisticated in their understanding and use of food than has been previously assumed.

This complexity of thought is also evident in the notion that healthiness is defined in-situ, drawing on the concept of “balanced food” (see Finding G6a). The underlying idea here is that food is made healthy through balancing – an active, contextualized process. As outlined in Chapter 6, the concept of health as an intrinsic property of specific food items has been largely substituted by a focus on balance. Presented in the appropriate combination to the appropriate group, nearly every local food has the potential to

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5 For example, the local herb, pegaga – a common base for the dish, ulam – is said to slow the aging process, reduce high blood pressure, and treat diabetes. While I have tentatively identified the plant as a Centella or Hydrocotyle species, further research is needed. Recent local works exploring the medicinal properties of Bornean plants either omit pegaga (Liau 2008) or uncritically document its uses without attempting to validate these claims (Salma bt. Omar 2008).

6 Constipation results from the combination of a low-fiber diet and inadequate water intake; bananas are a high-fiber, high-potassium food capable of restoring this balance, and watermelon hydrates in a more general sense.
enhance individual health, giving clinic workers a parallel opportunity to work with community mothers to define these situations.

As stated above, village residents are listening to clinic health education messages. There is a clear clinical influence present in how community members define food (Finding G3) – as a set of basic, largely unprocessed ingredients like those encountered in the standard food pyramid – categorize food, and speak about food and balance. The problem is that clinic health education messages are by and large generic, simplistic and repetitive. Of the 85.7 percent of participants who reported receiving nutrition-related advice or information from a MCH clinic, only 37.7 percent considered it new information. Moreover, while the clinics’ simple tripartite division of foods may be easier to present and recall, it offers very little in the way of advice for real living. As hypothesized (H6), the classification principles applied by community members reflect the concerns of day-to-day practice, encompassing when and how a food item is encountered; its origins, relative expense, and common usage; and who will likely consume it (see Findings G6a to G6d). In contrast, the clinics are essentially providing a vocabulary rather than a set of concepts or more in-depth knowledge. Villagers are able to use this set of vaguely defined terms to repackage their own received local knowledge, translating pantang or taboo foods to allergens and describing income-mandated purchasing trade-offs as balanced food. These interpretations are admittedly sophisticated and certainly interesting, but one cannot help but feel that this is a missed opportunity for public health, particularly given the community’s positive orientation toward the clinics (Finding E1) and government interventions in general (Finding G11).

The final research objective has been to evaluate the degree of fit between current PPKZM programming and community needs and belief systems and to offer recommendations for improved program design. Along these lines, it was hypothesized (H7) that the documented lack of impact for the PPKZM (see Chapter 2, pages 37-40 and Foo Li Chien 2003) is related to a disconnect between underlying program assumptions of how foods are used and organized and local realities concerning their use. It has not been possible to directly connect the PPKZM’s failures within Kpg. Trusan Jaya and Kpg. Tanah Hitam to this specific set of factors. The program’s local inefficacy is much simpler to explain, hinging on administrative issues such as delayed funding transfers and a lack of coordination between the clinic and its contracted
suppliers. The PPKZM was not operational for six of the nine months that I spent on-site within the villages, and as noted, it applied an outdated poverty-line income standard and neglected to enroll the majority of eligible households. When a program is simply not functioning, it is impossible to produce an impact, and these basic issues must be addressed first. Still, the fact remains that community members are in need of an intervention, and the clinic-based, nutritional services that they do receive – largely health education and cooking demonstrations – exhibit a lack of fit with community food beliefs and practices. For example, as outlined in Finding G10, village consumption patterns, resource allocation, and food conceptualizations prioritize savory foods while the SHD and its clinics implicitly stress local cakes and sweets both by providing a disproportionate number of these types of recipes and by calling for the use of high-cost, high-prestige ingredients (e.g., powdered milk) in their preparation. Noting this disconnect, it is possible to draw on the earlier, national evaluation of the PPZKM conducted by Foo Li Chien (2003) in combination with my own more intensive, on-site ethnographic research to think about the program’s design in a larger sense and its relevance for the rural, coastal Malay populations of southwest Sarawak.

Policy Recommendations

As previously discussed in Chapter 2 (pages 37-40), the PPKZM was severely criticized when formally assessed in 2003 due to its limited impact on nutritional status, particularly child weight-for-age measures. Citing the lack of significant improvement and relatively high expense for measured benefit, the evaluation concluded: “The cost of rehabilitation was astronomical by any estimate, and there was just too little effect to warrant the program’s continuation in its present form” (Foo Li Chien 2003:79). This failure was associated with food basket design issues and in particular, concerns that the items distributed are over-standardized, nutritionally deficient, and promote improper usage such as waste and “leakage” to non-targeted family members. These criticisms cannot be properly evaluated without a larger understanding of the local environment in which the program is administered and experienced – a context provided by the discussion that follows.

The PPKZM is highly standardized, relying on a limited number of basic food items regardless of the age of the target child (see Table 2.1). This is less problematic than it initially appears. Admittedly, nutritional needs differ by age – they also differ according
to a child’s sex, height, weight, and activity level. However, these are largely quantitative rather than categorical differences. Dietary reference intakes may vary in terms of grams and milligrams, but healthy food choices change very little over the course of the human lifespan. The basic nutrients lacking in the diets of low-income populations are roughly the same regardless of age, making it possible to tailor food aid simply by varying the amount and introducing solid foods in accordance with pediatric guidelines (Besharov and Germanis 1999, IOM Committee to Review the WIC Food Packages 2005). Over-standardization is therefore not an issue per se. The real question is whether the included food items are (1) nutritionally adequate and (2) culturally appropriate – given the stated objectives of the PPZKM.

Foo Li Chien (2003) reports that the food package is sufficient to meet the needs of an individual child within the specified age range of six-months to six-years in terms of monthly caloric intake (81,000 calories) and protein content (2,100 grams). However, the contents of the food basket have a low nutrient density and invite concerns over iron absorption in the absence of vitamin C. When available, multivitamins are included in the distribution at both the Sematan and Lundu clinics – ostensibly to address this very issue – but a food-based solution would be preferable, and the included food items remain nutritionally deficient in isolation. Moreover, these foods are not optimally utilized. Green lentils, cooking oil, and flour were found to accumulate in excess within seven to 17 percent of households, and within “virtually every household” meals for the target child are prepared together with those for the family as a whole, leading to estimates that less than one-third of the total food distribution reaches its intended recipient (Foo Li Chien 2003:5, 47).

Given the contents of the food basket and community perceptions of these items, such findings are unsurprising. According to the free list results, rice, dried anchovies, and crackers are highly salient foods for both children and the general population. Under Sarawak’s dated poverty line standard, any household receiving food-based assistance will be extremely low-income in addition to having at least one undernourished child. Based on the observed correlation between household food insecurity and child

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7 While supplement dilution or “leakage” is a common phenomenon for this type of intervention, PPKZM rates are particularly high. Mora and associates (1979, 1981) estimate that in most cases 40 to 60 percent of food reaches the intended beneficiary – although in these instances additional food is provided to the other household members.

236
anthropometry, one can reasonably assume that the PPKZM is introducing this set of general-use food items to households that are currently experiencing anxiety and overall reductions in food quality and quantity. In such circumstances, it is simply unrealistic to expect the family to channel these resources exclusively to a single, target child, particularly given the additional labor demands it would place on the primary caretaker. As described in Finding A10, village housewives routinely engage in multiple alternative, income-generating activities. To expect them to prepare a separate, additional meal, working largely from scratch, would be to fail to recognize the numerous responsibilities of women, not only as cooks and caretakers but also as farmers, workers, and entrepreneurs. As Baer (1999, 2000) relates, Malaysian health policies rarely take this issue into account with predictable consequences.8

Mirroring the disproportionate emphasis on local cakes and sweets documented in the health education messages and cooking demonstration of the Sematan and Lundu MCH clinics, the current food basket design includes a number of items – flour, green lentils, sugar, and oil – which are associated with secondary foods and non-major meal events. In contrast, community participants understand “real food” as a combination of savory ingredients as evidenced by their pile-sorting and the consumption and resource allocation patterns emerging from common local recipes and ethnographic observations. Each of the largely unused food items cited by Foo Li Chien (2003) is a secondary food.

If the aim is to improve the PPKZM while preserving its exclusive focus on a single, undernourished child, the form of the food package must be modified. At present, powdered milk is the only child-specific food included in the distribution, and as might be expected, it is also the only food item fully consumed by the intended recipient (Foo Li Chien 2003:61). From a global perspective, supplementary food packages are surprisingly similar despite their diverse cultural, geographic, and political contexts, reflecting a common solution to the need for a low-cost, non-perishable form of food energy. The current standard is to provide 300 to 400 kilocalories of energy per day with a combination of grain or cereal products, butter and cooking oil, sugar, milk, and an

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8 This oversight is not limited to the MOH. An early assessment by Grijpstra (1976) details the failure of a group of home demonstrators organized by the Malaysian Department of Agriculture (DOA). Their three-part program of vegetable cultivation, cooking techniques, and hygienic practice had little impact on the health and well-being of the target families as women simply lacked the time and energy to perform the recommended tasks.
additional form of protein such as dried fish, nuts, or legumes – as is the case with the PPKZM distribution. Differences arise primarily in the form of delivery as ingredients may be individually packaged in a familiar state\(^\text{9}\) or combined in advance to create a mix or paste.\(^\text{10}\) If a larger percentage of food aid is to be directed to the target child, the PPKZM food basket components will need to be processed and reworked to create a micronutrient-fortified “ready-to-use food” (RUTF) as modeled by Patel and associates (2005).

As previously discussed, child foods are created within the home from general ingredients using standard preparation methods such as extending boiling or crushing with a mortar and pestle, and for this reason, food items must enter the home in a prepared state for the maximum targeting effect. A generic variation on Nestlé’s instant baby porridge would be a particularly effective means of combining these food elements. The majority of current PPKZM distribution items could be included in one of two versions of the porridge – a savory rice porridge mixture to be provided during meals and a sweetened lentil porridge for non-major meal events such as snacking and morning and afternoon tea. Porridge is already an established child food, and this type of premixed powder would both minimize the time investment required from the child’s caretaker and fit current understandings of appropriate food types according to the time of day consumed. Moreover, porridge is considered a standard meal base which can be enhanced with on-hand vegetable scraps as well as chicken and meat, when available – an existing village practice that could be encouraged and expanded upon through clinic health education efforts.

This approach does involve significant trade-offs. It entails much higher per unit costs that the provision of basic food commodities and would likely achieve reduced leakage at the expense of household participation rates, which are demonstrably higher for programs that dispense “real” food (Gopaldas et al. 1975, Patel et al. 2005). Yet more

\(^9\) See, for example, Beaton and Ghassemi (1982:901) for descriptions of the World Food Program supplement package for Pakistan, Indonesia, India, Bangladesh, Colombia, Peru and Mexico and Moazzem Hossain and colleagues (2005) for details on the Bangladesh Integrated Nutrition Project (BINP) supplement. While not a direct distribution system, the American Special Supplemental Program for Women, Infants and Children (WIC) also provides a very similar set of items, distinct only in its use of perishable foods such as fruit juice and eggs and its omission of sugar (Oliveira et al. 2002).

\(^{10}\) Simondon et al. (1996) and Patel et al. (2005) use manufactured pastes while Husaini and associates (1991) provide a variety of pre-made snacks. Each of these supplements would be easily producible from most standard food baskets.
importantly, we have to question the value of a program that addresses child undernutrition in isolation with a narrowly-defined, short-term intervention. The seaside villages of Trusan Jaya and Tanah Hitam present a lovely visual, but they hardly constitute a utopia “beneath the palms.” In contrast to Mead’s (2001) idyllic Samoa, the beauty of rural Sematan is belied by the realities of poverty, limited legitimate economic opportunities, and the physical and emotional repercussions of food insecurity. As noted in Findings A7 and A8, the majority of working-age individuals (44.9%) are unemployed and many self-employed village men are under-employed or temporary workers. Self-described “housewives” are meanwhile overextended with gathering, cultivation, handicraft and food production, resale activities, fishing, crabbing, and sewing (Finding A10). With the January 2008 closing of the area’s major timber factories, it has become increasingly difficult to find steady, salaried employment, placing well over half of the surveyed population below the national MOH poverty line standards (Finding A4).

Tragically, over a decade of local development efforts has focused on exploiting an exaggerated set of natural resources rather than cultivating industry and human capital (see Chapter 4, pages 83-87). International funding agencies, domestic non-governmental organizations (NGOs), federal ministries, and the state-owned Sarawak Economic Development Corporation (SEDC) have accepted and perpetuated colonial myths regarding Sarawak’s boundless natural resources (see Ooi Keat Gin 1997:319-328), reinterpreting them as a modern justification for the exclusive focus on ecotourism-related development. False assumptions of natural abundance also contribute to clinic staff members’ negative perceptions of village mothers. Due to high turn-over rates and a preponderance of temporary student attachment workers unfamiliar with the local area, the villages are easily characterized as a place of plenty where the presence of undernourished children can only be explained through a combination of poor parenting and the children’s own willfulness. Alternative explanations are therefore dismissed as a form of deceit:

*Each time they’re weighed, it’s like that. She’ll say he just got over a fever. That’s also a lie. A fever every month? From the first time she arrived, fever? Liar. The weight is decreasing.*

Without long-term ties to the community, clinic workers remain essentially unacquainted with local history and current conditions. In particular, they fail to realize that the area
cannot support widespread gathering activities and was overexploited and depleted by the early 1960s, forcing many of the original inhabitants of what was to become Kpg. Tanah Hitam and Kpg. Trusan Jaya to relocate to the nearby villages of Temaga, Siru, and Sungai Kelong in search of food and more secure livelihoods (see Chapter 4, pages 78-83). Neither are staff members aware that strong local fishing identities mask the fact that community members’ personal involvement in fishing is relatively low, and few families have consistent, direct access to this food resource despite their coastal location (Finding A9).

Thus, while the profiled results can be used to tailor the PPKZM as a more effective, short-term fix for child undernutrition, they also highlight the need to move beyond this exclusive focus on the child to realistically assess the foundations of Malaysia’s continued rural/urban divide and adopt a more holistic perspective. This more comprehensive approach would promote sustainability by improving the health status of the entire family, thus eliminating a potential disease reservoir within the household. This is particularly important in light of (1) the high illness incidence reported among village children (Finding D1) and (2) the well-established link between malnutrition and infection in which undernutrition negatively impacts the body’s ability to resist or respond to infection just as infection adversely effects the utilization of energy and nutrients from the diet, leading to a detrimental synergism (Scrimshaw 1968, Pelletier et al. 1993, and Pelletier 1994, 1999). Given the nature of disease transmission and child play and the documented occurrence of multiple, malnourished siblings living in confined spaces, it is extremely unlikely that any program could achieve the long-term rehabilitation of a single child. Based on the current body of literature, household-level food access and utilization are simply more amenable to change than individual caloric intake and anthropometry (Strauss and Thomas 1995, Rivera and Habicht 1996, Kain and Uauy 2001, Hendricks et al. 2003, and Kochar 2005). Moreover, attention to the household unit better corresponds with the PPKZM’s proclaimed commitment to multi-sectoral and interdisciplinary interventions, eliminating the logical disconnect between individually-based nutritional assistance and household-level interventions such as the provision of sanitary facilities and clean water.11

11 Based on my independent observations within the Kuching and Sarakei divisions between 2006 and 2008 and those reported by Foo Li Chien (2003), clinic staff involved with the PPKZM often neglect to
Areas for Further Research and Analysis

Broad-based, holistic solutions necessarily entail a more comprehensive understanding of local conditions and community perceptions than do specific, technical interventions. Unfortunately, prior research within the selected fieldsite was extremely limited, particularly in terms of English-language publications, and even existing health statistics were contradictory and unreliable. These knowledge gaps required a large amount of background work, including the independent collection of sociodemographic data, child anthropometry, and local histories. While valuable, the crafting of this broad framework has come at the expense of more in-depth analysis, and I would like to conclude with a review of pertinent questions and areas of inquiry, which fall outside the scope of the present work.

As noted above with respect to Hypotheses 3 and 4, village free-listing results did not support the proposed existence of a core set of food items well-known to the community as a whole, and there were no unique cultural models based on either differential household income levels or child nutritional status. Instead, I attribute the lack of overall consensus to variations in the relative importance of gathered or cultivated foods and the frequency with which they are encountered in the multiple microenvironments inhabited by respondents. The previously obtained GPS coordinates for village households, fishing and boat access points, and uncultivated food resources can be combined with information on homegardening and rates of wild food collection to more accurately determine the boundaries of these proposed microenvironments and facilitate the selection of an expanded sample from each area, allowing for a comparative assessment of the relationship between environment and food conceptualizations. More general spatial analysis of patterns of food insecurity and child undernutrition in relation

make the appropriate referrals to outside agencies such as the District Office (DO) and the Agriculture, Education, and Welfare Departments. Program staff typically lack nutrition credentials so the links between disease and nutritional status would not necessarily be included in their training. As a result, they cannot be expected to be aware of all of the contributing factors and consequences of malnutrition, and the necessity of a holistic approach must be consistently emphasized at every level of PPKZM programming.
to plotted food-related resources\textsuperscript{12} and access to health care is also warranted given the proposed importance of household location.

Given the time constraints and my still evolving Malay-language proficiency, I have yet to complete a formal analysis of the bulk of the approximately 34 hours of digital audio resulting from the more structured, taped ethnographic interviews. This body of text has potential applications as a source of both (1) positive deviance (PD) data and (2) richer ethnographic descriptions of respondents’ decision-making principles and worldviews. As described by Berggren and Wray (2002:9), the concept of positive deviance is related to “the observation that in most settings a few at-risk individuals follow uncommon, beneficial practices and consequently experience better outcomes than their neighbors who share similar risks.” These localized coping strategies can be documented and popularized as affordable, sustainable, and culturally-relevant interim measures, which provide partial solutions while work continues on more complex, underlying threats to community well-being. As outlined by Marsh and colleagues (2004:1178), the positive deviance model is a participatory approach, which is potentially limited by the cost and difficulty associated with identifying rare case examples that typically occur at a prevalence of one to ten percent. The combined use of similarity measures and visualization techniques such as MDS bypasses this issue, allowing for the quick identification of high similarity groups that can then be marked according to any number of collected variables of interest. As displayed in Figure 5.2, resource-constrained households with healthy children tend to emphasize a separate core set of food items. Drawing on this image, it is possible to identify six\textsuperscript{13} positive deviance households in order to (1) begin a more in-depth analysis of their existing transcripts and (2) establish these families a prioritized key informant group in the event of a return to the field.

In addition to these particular subgroups of interest, my background reading, experiences and observations within the villages, and preliminary assessment of the ethnographic interview data suggest a number of themes which may be valuable areas for further inquiry with respect to both the on-hand materials and future data collection:

\textsuperscript{12} As detailed in Chapter 3, these food-related resources include: (1) market locations, grocers, and sundry shops; (2) roadside food stalls, government-sponsored food courts, and independent restaurants; (3) fishing and boat access points, and (4) major, uncultivated food collection points.

\textsuperscript{13} Marsh and associates (2004:1177) assert that four to six cases is the ideal range for a sample of positive deviance cases. Thus, although this subgroup is not sufficient to establish a separate cultural model through cultural consensus analysis, it is useful for more qualitative comparisons.
1. Child Agency (i.e., a child’s ability to make independent choices or determinations regarding his or her own body, thus acting as an agent of change): Children are recognized as having their own preferences, being aware of and able to express their level of satiety, and capable of influencing their own nutritional status by refusing certain food types or indulging in excessive play. This understanding promotes a remarkable progressive style of parenting and a specific type of inter-household nutritional strategy including food rewards, substitution, monitoring and observation, and attempts to familiarize the child with novel food items. It further highlights the notion of boredom. If a child is able to impact a given situation, his or her boredom takes on new significance – it matters – and provides a justification for introducing variety and change to the household menu. As previously noted, this variety is a prominent criterion of balanced food. Moreover, it legitimizes attention to the child taste preferences that influence the classification of child and adult foods.\(^\text{14}\)

2. Parental Responsibility for Child Undernutrition and Gendered Divisions of Labor: This combined focus creates a space for the evaluation of a woman’s worth as a mother based on her child’s assumed nutritional status, a judgment which is often based on assumed laziness and used to gloss over related structural constraints, thus contributing to (a) the continuation of narrowly-focused health interventions such as the PPKZM, (b) an on-going miscommunication between clinic health workers and village mothers and (c) a lack of social support for food insecure families.

3. Acceptance and Adaptation: Participants appear to negotiate food insecurity and financial stress through one of two broad response categories. In the face of unavailable or inequitable forms of assistance, caretakers may adopt a form of fatalism in which the presence or absence of food is stated as a matter of fact, as something that cannot be altered (e.g., “If we have it, we have it. If we don’t, we don’t”). Assistance is therefore not to be expected or sought, leading to the injunction to simply “keep quiet.” In contrast, individuals may employ a variety of adaptive strategies to overcome resource-related

\(^{14}\) See Chapter 6, pages 155-159.
constraints or improve child health more generally. Yet these strategies rely heavily on individual effort and routinely involve a trade-off, which makes demands on the mother’s time.
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275


APPENDICES
Table A.1 (below) presents the standard HFIAS questionnaire format as detailed by Coates and colleagues (2007:14-16).

<table>
<thead>
<tr>
<th>No</th>
<th>Question</th>
<th>Response Option</th>
<th>Code</th>
</tr>
</thead>
</table>
| 1. | In the past four weeks, did you worry that your household would not have enough food? | 0 = No (skip to Q2)  
1 = Yes                                                                 |                                                |
| 1.a| How often did this happen?                                               | 1 = Rarely (once or twice in the past four weeks)  
2 = Sometimes (three to ten times in the past four weeks) 
3 = Often (more than ten times in the past four weeks) |                                                |
| 2. | In the past four weeks, were you or any household member not able to eat the kinds of foods you preferred because of a lack of resources? | 0 = No (skip to Q3)  
1 = Yes                                                                 |                                                |
| 2.a| How often did this happen?                                               | 1 = Rarely (once or twice in the past four weeks)  
2 = Sometimes (three to ten times in the past four weeks) 
3 = Often (more than ten times in the past four weeks) |                                                |
| 3. | In the past four weeks, did you or any household member have to eat a limited variety of foods due to a lack of resources? | 0 = No (skip to Q4)  
1 = Yes                                                                 |                                                |
| 3.a| How often did this happen?                                               | 1 = Rarely (once or twice in the past four weeks)  
2 = Sometimes (three to ten times in the past four weeks) 
3 = Often (more than ten times in the past four weeks) |                                                |
| 4. | In the past four weeks, did you or any household member have to eat some foods that you really did not want to eat because of a lack of resources to obtain other types of food? | 0 = No (skip to Q5)  
1 = Yes                                                                 |                                                |
| 4.a| How often did this happen?                                               | 1 = Rarely (once or twice in the past four weeks)  
2 = Sometimes (three to ten times in the past four weeks) 
3 = Often (more than ten times in the past four weeks) |                                                |
| 5. | In the past four weeks, did you or any household member have to eat a smaller meal than you felt you needed because there was not enough food? | 0 = No (skip to Q6)  
1 = Yes                                                                 |                                                |
<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
</table>
| 5.a | How often did this happen? | 1 = Rarely (once or twice in the past four weeks)  
2 = Sometimes (three to ten times in the past four weeks)  
3 = Often (more than ten times in the past four weeks) |
| 6. | In the past four weeks, did you or any other household member have to eat fewer meals in a day because there was not enough food? | 0 = No (skip to Q7)  
1 = Yes |
| 6.a | How often did this happen? | 1 = Rarely (once or twice in the past four weeks)  
2 = Sometimes (three to ten times in the past four weeks)  
3 = Often (more than ten times in the past four weeks) |
| 7. | In the past four weeks, was there ever no food to eat of any kind in your household because of lack of resources to get food? | 0 = No (skip to Q8)  
1 = Yes |
| 7.a | How often did this happen? | 1 = Rarely (once or twice in the past four weeks)  
2 = Sometimes (three to ten times in the past four weeks)  
3 = Often (more than ten times in the past four weeks) |
| 8. | In the past four weeks, did you or any household member go to sleep at night hungry because there was not enough food? | 0 = No (skip to Q9)  
1 = Yes |
| 8.a | How often did this happen? | 1 = Rarely (once or twice in the past four weeks)  
2 = Sometimes (three to ten times in the past four weeks)  
3 = Often (more than ten times in the past four weeks) |
| 9. | In the past four weeks, did you or any household member go a whole day and night without eating anything because there was not enough food? | 0 = No (questionnaire is finished)  
1 = Yes |
| 9.a | How often did this happen? | 1 = Rarely (once or twice in the past four weeks)  
2 = Sometimes (three to ten times in the past four weeks)  
3 = Often (more than ten times in the past four weeks) |
Appendix A (Continued)

Table A.2 (below) provides an English-language version of the locally-adapted HFIAS questionnaire, which was used for data collection within Kpgs. Trusan Jaya and Tanah Hitam. As pre-testing and initial small group discussions indicated that community members preferred a timeframe stated in terms of days or months rather than weeks, participants were instructed to answer for “thirty days before today” for each question, and answer choices referenced the current month. Respondents were also reminded that their information was confidential and would be used solely for the purposes of this study.

<table>
<thead>
<tr>
<th>No.</th>
<th>Question</th>
<th>Answer Choices</th>
<th>Code</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Did you worry that your family didn’t have enough food?</td>
<td>0 = No (skip to Q2) 1 = Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>When I say “family,” I mean a group that usually stays together and eats together. This is true for all of my questions.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.a</td>
<td>How many times this month has this happened?</td>
<td>1 = Rarely (once or twice this month) 2 = Sometimes (three to ten times this month) 3 = Often (more than ten times this month)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Were you or your family members unable to eat the types of foods that you liked because you couldn’t afford to buy that sort of food?</td>
<td>0 = No (skip to Q3) 1 = Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>For example: Fruit, red meat, chicken breasts, crab, or [a very expensive local fish variety]</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.a</td>
<td>How many times this month has this happened?</td>
<td>1 = Rarely (once or twice this month) 2 = Sometimes (three to ten times this month) 3 = Often (more than ten times this month)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Did you or your family members eat the same kinds of foods because you couldn’t afford to buy other things?</td>
<td>0 = No (skip to Q4) 1 = Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>For example: Only rice and chili-prawn salsa, tapioca shoots</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.a</td>
<td>How many times this month has this happened?</td>
<td>1 = Rarely (once or twice this month) 2 = Sometimes (three to ten times this month) 3 = Often (more than ten times this month)</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Did you or your family members eat food that you were forced to eat because you couldn’t afford to buy other types of food?</td>
<td>0 = No (skip to Q5) 1 = Yes</td>
<td></td>
</tr>
<tr>
<td></td>
<td><em>For example: Palm flour pellets, boiled cassava, rice porridge with lots of water</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table A.2: Locally-Adapted HFIAS Questionnaire (English) (Continued)

<table>
<thead>
<tr>
<th>Question</th>
<th>Response Options</th>
</tr>
</thead>
</table>
| 4.a How many times this month has this happened?                          | 1 = Rarely (once or twice this month)  
2 = Sometimes (three to ten times this month)  
3 = Often (more than ten times this month) |
| 5. Did you or your family members eat meals that are smaller than you think that you need because there wasn’t enough food? | 0 = No (skip to Q6)  
1 = Yes |
| 5.a How many times this month has this happened?                          | 1 = Rarely (once or twice this month)  
2 = Sometimes (three to ten times this month)  
3 = Often (more than ten times this month) |
| 6. Did you or your family members eat fewer meals over the course of a day because there wasn’t enough food? | 0 = No (skip to Q7)  
1 = Yes |
| 6.a How many times this month has this happened?                          | 1 = Rarely (once or twice this month)  
2 = Sometimes (three to ten times this month)  
3 = Often (more than ten times this month) |
| 7. Was there ever a time when there was no food in the house and you couldn’t afford to get food? | 0 = No (skip to Q8)  
1 = Yes |
| 7.a How many times this month has this happened?                          | 1 = Rarely (once or twice this month)  
2 = Sometimes (three to ten times this month)  
3 = Often (more than ten times this month) |
| 8. Did you or your family members go to sleep while you were still hungry or go to bed early because there was not enough food? | 0 = No (skip to Q9)  
1 = Yes |
| 8.a How many times this month has this happened?                          | 1 = Rarely (once or twice this month)  
2 = Sometimes (three to ten times this month)  
3 = Often (more than ten times this month) |
| 9. Did you or your family members go a whole day without eating anything because there was not enough food? | 0 = No (questionnaire is finished)  
1 = Yes |
| 9.a How many times this month has this happened?                          | 1 = Rarely (once or twice this month)  
2 = Sometimes (three to ten times this month)  
3 = Often (more than ten times this month) |
Finally, Table A.3 (below) provides the actual Malay-language survey instrument.

<table>
<thead>
<tr>
<th>No.</th>
<th>Soalan</th>
<th>Pilihan Jawaban</th>
<th>Kod</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Adakah kitak bimbang sebab keluarga kitak sik cukup makanan?</td>
<td>0 = Sik (Melangkau ke Soalan 2)</td>
<td>1 = Aok</td>
</tr>
<tr>
<td></td>
<td><em>Bila kamek kata “keluarga,” maksudnya kumpulan yang biasanya tinggal dan makan bersama-sama. Ini betul untuk semua soalan.</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.a</td>
<td>Ini terjadi berapa kali sebulan?</td>
<td>1 = Jarang (1-2 kali sebulan)</td>
<td>2 = Kadang-kadang (3-10 kali sebulan)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 = Selalu (lebih 10 kali sebulan)</td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Adakah kitak atau pun ahli keluarga kitak sik dapat makan jenis makanan yang disukai sebab kitak sik mampu beli makanan itu?</td>
<td>0 = Sik (Melangkau ke Soalan 3)</td>
<td>1 = Aok</td>
</tr>
<tr>
<td></td>
<td><em>Contohnya: buah-buahan, daging, dada ayam, ketam, ikan aeron</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.a</td>
<td>Ini terjadi berapa kali sebulan?</td>
<td>1 = Jarang (1-2 kali sebulan)</td>
<td>2 = Kadang-kadang (3-10 kali sebulan)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 = Selalu (lebih 10 kali sebulan)</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>Adakah kitak atau pun keluarga kitak makan bermacam-macam makanan yang terhad sebab sik mampu beli?</td>
<td>0 = Sik (Melangkau ke Soalan 4)</td>
<td>1 = Aok</td>
</tr>
<tr>
<td></td>
<td><em>Contohnya: nasi dan sambal belacan saja, ulam pucuk bandung</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.a</td>
<td>Ini terjadi berapa kali sebulan?</td>
<td>1 = Jarang (1-2 kali sebulan)</td>
<td>2 = Kadang-kadang (3-10 kali sebulan)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 = Selalu (lebih 10 kali sebulan)</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>Adakah kitak atau pun ahli keluarga kitak makan makanan yang terpaksa makan sebab sik mampu beli makanan lain?</td>
<td>0 = Sik (Melangkau ke Soalan 5)</td>
<td>1 = Aok</td>
</tr>
<tr>
<td></td>
<td><em>Contohnya: sagu, ubi kayu rebus, nasi bubur dengan banyak air</em></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.a</td>
<td>Ini terjadi berapa kali sebulan?</td>
<td>1 = Jarang (1-2 kali sebulan)</td>
<td>2 = Kadang-kadang (3-10 kali sebulan)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>3 = Selalu (lebih 10 kali sebulan)</td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td>Adakah kitak atau pun ahli keluarga kitak makan hidangan lauk yang lebih sekit daripada apa kitak rasa perlu sebab sik cukup makanan?</td>
<td>0 = Sik (Melangkau ke Soalan 6)</td>
<td>1 = Aok</td>
</tr>
<tr>
<td></td>
<td><em>Bila kamek kata ‘hidangan lauk,’ maksudnya sarapan pagi, makan tengahari, atau makan malam.</em></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
### Table A.3: Locally-Adapted HFIAS Questionnaire (Malay) (Continued)

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>5.a</td>
<td>Ini terjadi berapa kali sebulan?</td>
<td>1 = Jarang (1-2 kali sebulan)</td>
<td>2 = Kadang-kadang (3-10 kali sebulan)</td>
</tr>
<tr>
<td>6.</td>
<td>Adakah kitak atau pun ahli keluarga kitak makan kurang hidangan lauk semasa sehari sebab sik cukup makanan?</td>
<td>0 = Sik (Melangkau ke Soalan 7)</td>
<td>1 = Aok</td>
</tr>
<tr>
<td>6.a</td>
<td>Ini terjadi berapa kali sebulan?</td>
<td>1 = Jarang (1-2 kali sebulan)</td>
<td>2 = Kadang-kadang (3-10 kali sebulan)</td>
</tr>
<tr>
<td>7.</td>
<td>Pernahkah sik ada makanan dalam rumah dan sik mampu mendapatkan makanan?</td>
<td>0 = Sik (Melangkau ke Soalan 8)</td>
<td>1 = Aok</td>
</tr>
<tr>
<td>7.a</td>
<td>Ini terjadi berapa kali sebulan?</td>
<td>1 = Jarang (1-2 kali sebulan)</td>
<td>2 = Kadang-kadang (3-10 kali sebulan)</td>
</tr>
<tr>
<td>8.</td>
<td>Adakah kitak atau pun ahli keluarga kitak masuk tidur bila masih lapar atau masuk tidur awal sebab sik cukup makanan?</td>
<td>0 = Sik (Melangkau ke Soalan 9)</td>
<td>1 = Aok</td>
</tr>
<tr>
<td>8.a</td>
<td>Ini terjadi berapa kali sebulan?</td>
<td>1 = Jarang (1-2 kali sebulan)</td>
<td>2 = Kadang-kadang (3-10 kali sebulan)</td>
</tr>
<tr>
<td>9.</td>
<td>Adakah kitak atau pun ahli keluarga kitak menghabiskan masa selama sehari tanpa makan apa-apa sebab sik cukup makanan?</td>
<td>0 = Sik (Tinjauan sudah habis)</td>
<td>1 = Aok</td>
</tr>
<tr>
<td>9.a</td>
<td>Ini terjadi berapa kali sebulan?</td>
<td>1 = Jarang (1-2 kali sebulan)</td>
<td>2 = Kadang-kadang (3-10 kali sebulan)</td>
</tr>
</tbody>
</table>
APPENDIX B: COMMON LOCAL FOOD ITEMS

To aid in reader comprehension, this appendix provides labeled images of specific fish species, plant varietals, and non-Western food items from among the 81 high-frequency general foods and 30 high-frequency child foods identified during the community-based free-listing tasks. Additional images are available from the author upon request.


Image B.2: Indian Mackerel [Ikan Kembong]  Image B.3: Tuna [Ikan Tongkol]
Appendix B (Continued)


Image B.6: Village Chicken [Ayam Kampung]  Image B.7: Local Spinach [Bayam]

Image B.8: Cabbage [Kobis]  Image B.9: White Leaf Mustard [Sawi Putih]
Appendix B (Continued)


Image B.14: Spanish Mackerel [Ikan Tenggiri]  Image B.15: Grouper [Ikan Kerapu]
Appendix B (Continued)

Image B.22: No English Term [Cangkuk]

Image B.23: Water Spinach [Kangkung]

Image B.24: Green Leaf Mustard [Sawi Hijau]

Image B.25: Loafed Bread [Roti Paun]

Image B.26: Fried Noodles [Mee Goreng]

Image B.27: Okra [Kacang Lendir]

Image B.28: Dayak Cucumber [Timun Dayak]
Appendix B (Continued)

Image B.29: Chinese Eggplant [*Terung Panjang*]

Image B.30: Local Eggplant [*Terung Asam*]

Image B.31: Wild Fern Variety [*Paku*]

Image B.32: Papaya [*Betik*]

Image B.33: Ray [*Ikan Pari*]

Image B.34: Shark [*Ikan Yu*]
Appendix B (Continued)

Image B.41: Commercial Crisps [Keropok 20sen]

Image B.42: Dried, Salted Fish [Ikan Masin]

Image B.43: Dried Shrimp [Bubuk Kering]

Image B.44: Mangrove Crab [Ketam Kalok]

Image B.45: Fried Rice [Nasi Goreng]

Image B.46: Herring [Ikan Parang]
Appendix B (Continued)

Image B.53: Cookies/Crackers [Roti Macam]  Image B.54: Powdered Milk [Susu Tepung]

ABOUT THE AUTHOR

Elizabeth Elliott Cooper graduated magna cum laude with a Bachelor’s Degree in Anthropology from the University of South Carolina Honors College in 2003 and a M.P.H. in Global Health from the University of South Florida in 2006. Her research interests include nutritional anthropology – food beliefs, food security, dietary delocalization, and hunger and household coping strategies – the anthropology of policy, and cognitive and visual methodologies. She has published a recent book chapter on teaching anthropological theory using television in Teaching Strategies in Anthropology; coauthored an article on post-migration dietary change in Ecology of Food and Nutrition; and presented at several national and international conferences. At present, Ms. Cooper is a faculty member at Indiana University of Pennsylvania, where she offers courses on Applied Anthropology, Southeast Asia, and the Anthropology of Food.