

**Household food expenditures used as indicators  
of basic needs and social norms**

by

Hooman Sassani

A thesis

Submitted to the Faculty of Graduate Studies,

University of Manitoba in partial fulfillment

of the requirements for the degree of

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## **Abstract**

Food is one of the most dynamic indicators to reflect household ability to meet its physiological needs. As an indicator of basic needs, food has been widely used in the study of poverty to determine a threshold below which a household cannot meet its energy requirement (Human Resources Development Canada, 1998; Sutanto, Irawan & Said, 1999). The importance of food goes beyond fulfilling physiological needs. It is bound to the cultural identity of communities and is socially defined and influenced by economic factors. Because food plays an important role in determining people's ability to make choices in accordance with social norms, it can be used as a potential indicator in determining household capability. Meeting physiological needs and conforming to social norms depends primarily on household accessibility to available resources. Both household accessibility and social norm concepts are imbedded in the definition of food security (Campbell, 1991).

Chapter 4 (paper 1) of this research defines household basic needs based on household purchasing behavior of cereal. The hypothesis is that households unable to respond to energy needs have a lower total expenditure compared to other households. The influences on household responsiveness to meet energy demand from cereal are identified regardless of the socio-economic status of households. The results from paper 1 indicate that household responsiveness has a direct relationship with the estimates of the household resource balance. Non-responsive households have more children under 5 years of age and their total household expenditure is significantly ( $p < 0.05$ ) different from responsive households.

Chapter 5 (paper 2) of this research study defines household ability to make effective choices (i.e., low and high capability) through measuring accessibility to a variety of socially expensive foods. Households with a higher food variety index (FVI) have a higher capability

than those with a lower food variety index (FVI). The result in paper 2 indicates direct association between total household expenditure and FVI values.

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We always measure individual achievements by solely looking at individual determination and devotion to a specific task. Although determination and devotion are required factors but they are not the only ones. In the self-development path, our determination and devotion need to be fed to give us the incentive to move forward to accomplish what we have started. I found that regardless of how strong we can be, we always need the support and care of others to nourish and strengthen our souls and ultimately our thoughts and deeds. In my life I have been through many difficulties, but have never stopped moving forward. When I think about what really keeps me going, I always come to one fact and it is that I respect of have for my parents, their happiness is my pleasure. Even though, they are miles away but I feel their supports, their desire for my wellness, and I always try to keep their warmth and good deeds with me. During the process of completing my Master degree I encountered many difficulties, but the combination of believing in myself, the great support of my advisor Dr. Gustaaf Sevenhuysen, the patient and help of Dr. Beverly Watts and Dr. Karen Duncan, helped me to overcome these difficulties and accomplish what I have started. Also, I would like to thank Mary Pelton that helped very much with the editing of the thesis and ensured that the presentation of the ideas was a clear as possible. I would also like to thank my best, compassionate, and patient friend Silvana Tirado for her support in last two years of my study. There are of course more people that I always appreciate their support and always be thankful to them. Dr. Carla Taylor, I never forget all the help you gave me in my undergraduate and graduate years of study.

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## Chapter 1

### 1 Introduction

Government planners and social researchers commonly use household expenditure to estimate income (Cotton et al., 1999; Wodon, 1997; Sutanto et al., 1999; Pradhan et al., 2001). Expenditure data are also used to determine the level of income necessary to meet basic needs (Spector, 1992; BPS, 2000). Expenditure is conventionally regarded as the preferred indicator of well-being because it has been shown to be more reliable than household income to estimate resources available in the household (Streeten, 1998). In addition, expenditure is believed to reflect long-term welfare levels more accurately than income.

In the North American setting, poverty status is identified by income level. The data used to generate the income cutoff point is primarily census data (Michaud S, Cotton C, Bishop K, 2004). The procedures for calculating the poverty line are closely related to the income data available. In this thesis, Indonesian data was used from the national socioeconomic surveys for several reasons. First, the data includes economic and food purchasing data for the same households. Second, the data was collected at the start of the most serious economic crisis in Indonesian history, which made it important to find ways of identifying poor households. Third, the Indonesian government was publishing a number of monographs, reports and other publications related to over the indicators and their use in public planning. Hence the information available from Indonesia facilitated the research presented in this thesis.

The level of income below which people are regarded as poor is a necessary tool for social policy planning, and defines “income” or “status” poverty (Spector, 1992). However, selecting the level of income that reflects the need for public assistance appears to be difficult in practice. Since food is one of the basic needs, lower than expected food expenditures is a common

indicator of poverty (Cotton et al, 1999; Sutanto et.al, 1999; Streeten, 1998). The ability to purchase a pre-defined basket of food is one approach used to define poverty (Human Resource Development Canada, 1998). More commonly, food is part of a basket of goods that is deemed to be essential for meeting basic needs (Human Resource Development Canada, 1998; Sutanto Irawan & Said, 1999).

Two major difficulties are inherent in the market basket measure approach: the first is which goods should be part of the basket; the second is the price of the basket of goods. Cultural or ideological interpretations on the part of social planners may make it difficult to come to a consensus on the types and amounts of goods to be included. The final selection may not meet the psychological and physiological needs of poor people. Because prices change over time and differ among locations, a large amount of data is needed from many locations to estimate the average price of a nationally representative basket and prices need to be updated frequently. As a result of these difficulties, assumptions are made about the types of goods, and the minimum amounts of these goods, which are necessary to meet basic needs of a household (Spector, 1992; Sutanto et al., 1999). As these assumptions are open to interpretation, the levels of expenditure that indicate poverty are uncertain.

A greater problem is that expenditure calculations define only one aspect of poverty, that of income status. Other aspects of poverty can include food insecurity, social dysfunction and poor resource management. Income status does not reflect these other aspects, even though they affect the capability of poor households to use available resources or to create access to new ones, and therefore indirectly affect economic status. Food security, social functioning and resource management comprise a behavioral component.

It may be possible to identify differences in the ability to manage resources among poor households by observing economic behavior specifically related to the types and amounts of

foods purchased by the household. Theoretically, the food amounts purchased should relate to the food energy needed to maintain physiological and metabolic functioning of the members without deprivation. This thesis deals with the problem of recognizing household deprivation by observing food purchase behavior and by associating status poverty with particular food purchase amounts (Chapter 4, paper 1).

A different, although related, problem is that household expenditures define only status poverty and disregard dimensions of poverty. One such dimension is the inability to function socially, which may be related to an inability to manage resources effectively. Social dysfunction affects the capability of poor households to improve their economic status, and hence to respond to poverty alleviation interventions. In this thesis study the term “capability poverty” has been used to define this dimension of poverty. Measures of capability poverty are seen as distinct from those used to define status poverty. Previous studies have used the expenditures of households on schooling or health care to identify low capability for social function (Dhanani & Islam, 2000). Such measures are important to social planners because households that function well socially will respond differently to interventions compared to households that function poorly.

Socially important expenditures such as schooling and health care depend not only on the money a household has, but also on preferences, differences in the local availability of services, and their effectiveness and cost. It is difficult to identify whether a low usage of such services is due to low economic status onto these other differences between households related to social norms. However, the use of food is expected to follow social norms more closely because it is involved in the cultural communication that determines a socially expected dietary pattern. In relation to food, it is easier to recognize households that fail to meet culturally expected dietary patterns. A household may fail to meet such a pattern because of low economic status, a

preference for a simple diet, or medical or health concerns. Households that meet the expected dietary pattern demonstrate an ability to access or to manage resources more effectively than households that do not. In the case of poor communities, these households would be identified as “capable poor.” For the households that have to purchase all of their food, which is the majority, the pattern of expenditures on various or socially expensive food groups might be used as an indicator of capability poverty.

This thesis also investigates social functioning of households by analyzing food purchase behavior and associating a capability poverty designation to particular patterns of food purchased (Chapter 5, paper 2). The pattern of food use relates to the pattern of food purchases for households that are required to buy all of the food they consume.

## Chapter 2

### 2 Review of Literature

#### 2.1 Concepts of poverty

##### 2.1.1 General definition of poverty

Poverty can be viewed as the inability to access enough resources or the deprivation of resources in society. Two types of deprivation can be identified: physiological and social. Physiological deprivation relates to the inability of people to meet basic needs, such as shelter and food. Sociological deprivation relates to the inability to access resources which affect social function either directly or indirectly. Both types of deprivation are the result of social and economic inequities and embedded disadvantages (Dessalliens, 1998).

Basic human needs and well being are continuously changing and evolving as the standard of living changes at any given time and context. So quantification of these dimensions of life is difficult. Accessibility and availability of basic resources, considered necessities by wider society, are important factors in achieving well being. The four dimensions of well being, economic, physical, social and emotional (McGregor & Goldsmith, 1998), clearly addresses all aspects of human life in relation to both family and the wider social environment. Therefore, lack of accessibility and availability of resources to meet basic needs, which allow individuals to achieve and maintain well being on their own terms, may lead to lower social and economic function.

### **2.1.2 Dimensions of poverty**

Two dimensions to the study of poverty are the causes and the outcomes of poverty. Understanding the causes of poverty allows changes at the grass root level. The causes of poverty are in fact the barriers to human functioning. In contrast to conditions of war or social conflict, normal changes in the socio-economic structure of any society are a gradual process. People are assumed to adapt to changing circumstances in accordance with the dominant culture, and it is difficult to identify specific causes of poverty within the changes taking place and the interactions between these changes.

The outcomes or experiences associated with poverty are direct and negative for the ability of the household to function. In an attempt to mitigate negative outcomes, work has focused on identifying the minimum requirements for survival. The interpretation of a minimum requirement usually reflects the perception of the dominant social group that has the power to make decisions. As a result, the definition of minimum basic need used by governments or social agencies may differ from the needs perceived by the poor. There appears to be an inherent social conflict in setting criteria that can separate poor from non-poor.

### **2.1.3 Effects of poverty**

The direct and indirect effects of poverty are many. Higher incomes are related to better health, not only because people have the ability to purchase adequate food, housing, and other basic necessities; but also because the people more choices have and more the more likely they control their lives (Rose & Victor, 1997). Lack of accessibility to food affects health and limits people from participating in regular daily social affairs.

The wide range of effects of poverty on well-being is well documented by many research studies (Townson, 1999; Thiede & Traub, 1997; Olson, 1999). Poverty affects the life of people,

and ultimately society, in negative ways, such as inability to function or compromised learning. There are a number of explanations of the relationship between poverty and health. According to the materialist/structural explanation, the unhealthy effects of poverty result from decreased access to the material conditions and resources that facilitate health (Reutter et al., 1999). According to the artifact explanation, often referred to as myth, the observed relationship between socio-economic status and health results from biases in measuring socio-economic status and health (Reutter et al., 1999). The natural or social selection explanation, often referred to as drift hypothesis, maintains that people suffer from ill health first and then drift down in social position or become poor (Reutter et al., 1999). The behavioral/cultural explanation indicates that individuals engage in health-inhibiting behaviors based on free-choice decisions influenced by personal values and attitudes toward health (Reutter et al., 1999). In this thesis the relationship between poverty and its unhealthy effects is based on a materialist/structural explanation.

## **2.2 Defining status poverty**

### **2.1.1 Defining the concept of status poverty**

Status poverty is the extent to which the basic needs of food, shelter and clothing of a household are met. Status poverty can be defined in two ways: absolute and relative. The absolute definition quantifies food and non-food items required by households and identifies a minimum level of resources required by all households, commonly expressed as a minimum level of income (Sutanto et al., 1999). The relative definition documents the distribution of average expenditure of all households on basic needs such as clothing, housing, and food. A household is considered to be poor if the expenditure on basic needs is above an arbitrarily

selected percentage of total expenditure. Status poverty can be determined by observing and documenting the value of household possessions, the quality of housing materials, and the ownership of durable goods and vehicles. The procedure contributes to the information needed for targeting interventions, but it does not provide reliable policy planning data. Moreover, when compared to the outcome of use of income data, different households are identified as poor or not poor.

Because absolute poverty is partly a function of average living standards, it is clear that "absolute" does not mean fixed in time. The absolute level of poverty can rise as incomes increase. The ability of a person to appear in public without shame, to participate in the life of the community, or to maintain self-respect varies with the conventions, regulations, and material comforts of a society (Streeten, 1998).

Either the absolute or the relative way of defining status poverty is difficult because all dimensions of human basic needs are highly interrelated. Each fulfilled need is taken as a prerequisite to satisfy other needs; deprivation of any one need ultimately affects human well-being. One example of a basic human need is food. As well as its physiological importance, food has social, psychological and cultural importance. As a result, any factor that negatively affects individual accessibility to food negatively affects individual physical and socio-cultural well-being.

### **2.1.2 Defining the concept of the poverty line**

The relationship between socio-economic status and a child's achievement in school is well documented (Human Resource Development Canada, 1999). The research shows that children of higher socio-economic status have a higher level of achievement in school. Socio-economic status affects the functioning of people both directly and indirectly. People with low

socio-economic status have a lower level of social supports and consequently a higher level of depression leading to family dysfunction, poor parenting quality and ultimately transfer a negative attitude towards school to their children (Human Resource Development Canada, 1999; Devaney, Ellwood & Love, 1997).

A clear understanding of the effects of poverty has compelled researchers to establish a threshold of poverty by which people can be identified as poor and effective decisions can be made. Reasons for establishing a poverty line both through absolute and relative approaches are five-fold:

1. Monitoring poverty rate;
2. Developing a poverty profile;
3. Developing a threshold for entitlement;
4. Focusing public debate;
5. Lowering the gap between rich and poor socio-economic status groups.

To monitor the poverty rate is the common reason for constructing a poverty line. The information can be used to make comparisons across groups and to monitor changes in poverty across time in order to inform policy makers. The characteristics of poor people (e.g., ethnicity, location, and occupation status) can be drawn from the poverty profile and used by policy makers to reach the poor at times when detailed information on income or expenditure is not available. Poverty lines also allow the transfer of publicly provided benefits to poor people to reduce the socio-economic gap among households.

The poverty line distinguishes between poor and non-poor households using an expression of expenditure of household resources. The level of resources can be calculated on the basis of absolute or relative methods. Although the most common type of resource used to set a poverty

line is household income, it is possible to use a set of household characteristics such as material goods, housing characteristics or food purchasing behavior as a grouping indicator. (Sutanto et al., 1999) The absolute poverty measurement calculation is also called the “budget standard approach.” There has been a long standing debate among economists about whether income or consumption poverty lines should be defined in absolute or relative terms. Most international organizations, such as the World Bank and the Food and Agriculture Organization, define the poverty line in an absolute manner, as the level of income necessary for people to buy the goods necessary to their survival.

### **2.1.3 Measuring status poverty: absolute measures**

Absolute measures of status poverty estimate the minimum income required to purchase a basket of goods and services judged by experts such as academics, social workers, program administrators, or politicians as necessary to achieve a basic or minimum standard of living (Spector, 1992; Sutanto et al., 1999). The advocates of an absolute approach in constructing poverty lines argue that it is easier to compare poverty over time and across groups through this method. Under severe circumstances such as starvation, malnutrition and other harsh conditions, this approach might be useful to help monitoring groups establish policies and implement programs.

One essential disadvantage of the absolute approach to the poverty line is the definition of basic needs. A minimum basket of goods and services does not necessarily include what is considered “essential” by the rest of the society. Absolute poverty is not an entity separate from relative poverty. According to Streeten (1998), absolute deprivation is the function of relative advantages. If the relative concept considers a broader aspect of poverty, then absolute poverty is part of this broader concept. The relative approach to poverty is very important in terms of

policy intervention to reduce absolute poverty since it covers social norms issues as well as absolute deprivation. A relative measure of poverty estimates the differences in income or resources between households and identifies the proportion of households that differ meaningfully from the majority. These measures are discussed in section 2.2.4.

### ***2.1.3.1 Food component of the poverty line***

There are two common approaches in setting the food component of the poverty lines: a) the least cost approach, and b) the expenditure approach (Dessallien, 1998). The least cost approach is established by selecting a basket of food items that are presumably consumed in certain settings. The food value of the contents of each basket is calculated to identify which one yields a specified energy requirement at the lowest cost, considering common prices. The cost of this basket establishes the food poverty line. The least cost approach does not require detailed data on household food consumption. One needs to know only the prices for food items and their calorie contents.

The least cost approach of establishing the poverty line does not consider people's preferences regarding food. The implications of this approach are that an individual with the level of expenditure equal to the food poverty line probably does not consume the recommended minimum amount of calories and that people do not necessarily purchase the cheapest calories available. The least cost approach is not necessarily in accord with any individual's eating habits.

The most commonly used method of establishing a food poverty line, the expenditure approach, begins with the actual food consumption pattern of some segment of society rather than beginning with the cost of various food items. The foods included in the basket are weighted by the expenditure shares and quantities, are then set to reach a minimum calorie level.

The expenditure-based food poverty line approach includes individual tastes and preferences in the established basket of food. In contrast to the least cost approach, the expenditure approach reflects consumption of minimum energy requirements for individuals, with food expenditure at the level of the food poverty line (Sutanto, 1999).

The expenditure approach requires detailed survey data on food consumption in addition to the quantity of food consumed. In most developing countries much of the food consumed by the household is home-produced, especially in rural areas. This means that it is more difficult to collect data that reflect the food expenditure of rural households because these household may produce part of their food requirement that is not shown in the collected food expenditure data.

A variant of the least cost approach used by the government of Indonesia (Sutanto et al., 1999) is the calculation based on the quantity of food needed to be consumed to produce 2,100 kcal of energy intake, recognized as the minimum energy requirement for a person to stay healthy. This food energy method of calculating a food poverty line is based on an absolute measure of poverty. The most commonly consumed foods, viewed as essential within a reasonable price range, are identified by the government of Indonesia to estimate the poverty line. Based on these criteria, 52 items have been selected and the expenditure value that satisfies the minimum energy requirement of 2,100 kcal is calculated by assigning a certain markup to maintain the consumption pattern, where satisfying the 2,100 kcal requirement. The final calculation of the Indonesian poverty line, which is explained in the next section, involves both food and non-food items.

There are a number of other agencies that use the concept of the food poverty line based on a required quantity of food. The Food and Agriculture Organization (FAO, 2001), the World Bank (Pakko, & Pollard, 1996) and the World Health Organization recommend an intake of

2,100 kcal for normal metabolism. In the World Bank (2001) estimates, expenditure on food and non-food consumables is expressed in terms of the International dollar, adjusted for purchasing power parity (PPP). The PPP serves as a solid foundation for thinking about adjusting prices in international markets to attain long-term equilibrium. People living in households with a per capita expenditure of less than PPP \$1.08 per day are considered to be living in extreme poverty. The PPP \$1.08 poverty line is obtained as the median of the ten lowest national poverty lines of the 33 calculated by the World Bank. National poverty lines take into account the value of the basic food basket which also involves estimates of energy requirements of approximately 2,200 kcal per capita per day.

### ***2.1.3.2 Non-food component of the poverty line***

Every method of determining a poverty line based on a food quantity or a food basket calculation to set the minimum food needs of poor households also includes a calculation of non-food expenditures. There are two methods of calculating minimum essential expenditure on non-food items: a) directly choosing a non-food basket, and b) to mark-up the food poverty line by including non food expenditures.

Directly choosing a non-food basket involves simply meaning determining what items should be included, then the items are priced and the total gives an amount for minimum non-food expenditure. This method is simple and straightforward and does not need information on household consumption. The mark-up method is used by applying a certain mark-up that reflects non-food expenditures to the food poverty line to arrive at final poverty line. A number of essential non-foods items were selected to calculate the mark-up. For each of the non-food commodities, the minimum requirement was arbitrary and based on value judgment. This means that a standard was based on the judgment of what constitutes an acceptable threshold below

which people would be considered poor, which requires that information on the prices of the chosen items must be available. The absence of objective standards makes it difficult to arrive at thresholds that are equivalent and comparable across regions and across time. In setting the non-food poverty line, Ravallion and Bidani (1994), used the non-food expenditure of households on the food poverty line. They assumed that these households could meet their food energy requirements and that their non-food expenditure was basic and essential. Ravallion and Bidani's criteria to establish non-food basic needs are relative to the existing levels of poverty and does not represent an objective measure.

Sutanto et al., (1999) sets a minimum living standard shown in the life style of people belonging to a class just above the expected poverty line, which for convenience is called the reference population. A person who can afford the life style of the reference population should not be classified as poor. Both food and non-food commodities that are most commonly used and considered as essential are selected and measured to determine the minimum amount of money required to obtain these commodities. Criteria that are used to determine the commodities, both food and non-food items, which need to be included in measuring the poverty line are:

- The commodities should be commonly consumed, and therefore considered as essential.
- The commodities should have a reasonable budget share.

Applying such criteria, Statistics Indonesia has identified as many as 52 food items and 26 non-food items as essential. The average values of monthly per capita expenditure for each of the selected non-food items in a subgroup have been computed, and the fractions of most essential non-food items within the subgroups were calculated. Applying these fractions to the

SUSENAS survey data (BPS, 1998), the estimates of minimum expenditure for each item is then obtained. Adding together all of these expenditures give the minimum standard for non-food sufficiency.

#### **2.2.4 Measuring status poverty: relative measures**

A relative poverty standard is defined relative to the typical income or consumption level in the wider society. The purchasing power of the relative poverty standard changes over time as society-wide consumption levels or incomes change. For example, a low income cut-off (LICO) calculated by Statistics Canada is based on a relative definition of poverty. According to Statistics Canada Annual Survey of Consumer Finances (Cotton; Webber & Saint-Pierre; 1999) the average Canadian family spends about 36% of pre-tax income on the basic necessities of food, shelter and clothing. The 36% value is subject to change each year. To establish the low income cut off (LICO), Statistics Canada adds 20% to this figure. Therefore, any family whose expenditure on the basic necessities is more than 56% of gross income is considered to be in straitened circumstances. The (LICOs) are adjusted for communities and family sizes.(ref)

Low income measure is another relative approach that is intended to set the low income threshold directly in relation to the range of incomes within the population as a whole. The relative income approach identifies people less able than others to access goods or resources within a given society at a particular time. Based on this method, a family is considered poor if the proportion of expenditure on necessities is above the pre-determined level, leaving the family with a low proportion of its income for other necessities. Relative income approach estimates low income in relation to the incomes received by all families. Based on this approach, a family whose income is less than 50% of the median family income adjusted for family size is considered to be living under the poverty line. The choice of parameter is subject to change

based on the socio-economic structure of a country at a given time. The relative approach, and its effect on policy intervention, minimizes the perception of the differences between poor and non-poor and the associated perception of first and second class citizens. The critics of the relative approach of setting the poverty line indicate that this approach is not useful in measuring the poverty rate across times and regions. It is believed that, even as standards of living increase, there is always a percentage of the population that has an income below the 50% of the median income of the survey population. The second disadvantage of the relative poverty approach is the arbitrary choice of percentage cut-off points of median income of the survey population (Lanjouw, 1998; Streeten 1998).

### **2.3 Defining capability poverty**

#### **2.1.4 Defining the concept of capability poverty**

Sen (1987) defines capability as “the ability to function” rather than the actual functioning attained. Both “capability” and “ability” are relative concepts as is functioning, given that individuals are cognitively and physically sound. The concept of capability means that there are households that able to meet wider society’s obligations and there are households that are not able to do so. Capability and basic needs, although they are closely linked, are not synonymous. Basic needs can be understood as the physical means required for an individual to achieve a minimum level of functioning (Duclos, 2002). Insufficient resources to meet basic needs do not necessarily mean that a household has no capability to conform to social norms. Capability poverty, on the other hand, is the ability of a household to exit poverty. It can be assumed that households that are able to conform to social norms and meet social obligations, are more likely to have the ability to exit poverty than those that are not able to conform to social norms.

The primary effort to define poverty and to set a criterion to identify poor from non-poor is based on the assumption that basic needs are not influenced by social contexts. Based on this assumption, the poverty line is designed in terms of the financial capability of a household to purchase the basic necessities of life or to survive at a subsistence level. However, basic needs are defined by, and are not completely independent from, the social and cultural structure of society. Since there are different standards of living both at national and international levels, poverty can be defined in relation to particular groups. The relative approach is a clearer indicator of inequality among different groups in the society. In literature reviews this conceptual duality is referred to in terms of subsistence versus relative deprivation (Whyte, 1971) basic needs versus relative approach (Sarlo, 1992), economic versus socio-cultural (Oster et al., 1978), and physical versus social (Ross et al., 1994).

The most comprehensive concept of poverty was expressed by Sen (1983), who described the interconnectedness of the relative and the absolute concepts of poverty: "Poverty is an absolute notion in the space of capabilities but very often it will take a relative form in the space of commodities and characteristics". For example, households may be considered poor both in terms of not having access to meet basic needs and in terms of not being able to live at the same standard as other households.

### **2.1.5 Measuring capability poverty**

The way in which poor households utilize the available resources is in accordance with their capability. The basic needs approach captures several dimensions of the use of resources, because it includes social, economic, psychological, physical and emotional needs. This approach focuses on individual needs relative to basic commodities. In contrast, the welfare concept reduces the broad concept of well-being by stating that household welfare is a function

of only goods and services consumed. The welfare concept defines economic well-being as the total consumption level determining utility or satisfaction (Asselin & Dauphin, 2001).

Access to natural, produced, social, human and cultural capital relates not only to resources that people utilize in order to build their environment, but also to assets that give them the capability to be and to act (Bebbington, 1999; Boisjoly, Duncan & Hofferth, 1995). It is assumed that when households act they do so in accordance to wider society, and that household access to capital, and ability to use capital, may be associated with the capability to conform to social norms.

Household food expenditure practices can be used as a potential indicator of household capability to access and to conform to social norms. Both the dynamic nature of food expenditure as a daily task, and its cultural and traditional importance, make food expenditure a good candidate for determining household capability (Bebbington, 1999). Food expenditure practices have a tendency to reflect household capability to meet basic needs.

## **2.4 Relationship of poverty to food security**

The common bond of undernourished and vulnerable people is poverty. Their incomes are too low to provide adequate nutrition. Differences in income or purchasing power among households result in unequal access to food. If poverty is defined as an individual's inability to access basic necessities, or a lack of command over resources, then there is a possibility that the household is unable to meet the most essential need of food.

The nature of food acquisition and complexity of the poverty phenomenon make food-related behaviors a very sensitive indicator in predicting the household ability to meet its energy

requirement. Food related behaviors are affected by the ability to access available resources which in turn affects the ways households acquire and utilize food.

Lower socio-economic status is assumed to be directly associated with having less access to available resources. However, studies show that there are households that live below the poverty line and are food secure (Rose, 1999). This finding infers that access to available resources is not limited to nor directly associated with income alone (Rose, 1999). Food security status of a household is the household's capability to access available foods. The fact that there are some food insecure households among the non-poor indicates that there are other factors in addition to income that affect household food security status. These factors can be identified and incorporated in conjunction with household income to reflect more precisely the household status poverty, capability and food security status.

## **2.5 Food security**

### **2.1.6 Defining food security**

Food security as an issue became prominent in 1970. Originally, there was a tendency to define food security only from a supply point of view. Nevertheless, in 1979 the World Food Program Report conceptualized food security as "assurance of supplies and a balanced supply-demand situation of stable foods in the international market" (World Food Programme, 1979).

Food security has meaning if it is understood in line with the legal commitments of the United Nations: the Universal Declaration of Human Rights (1948) accepts the "Right to adequate standard of living," including food; the International Covenant on Economic, Social, and Cultural Rights (1966), which ensures "an equitable distribution of world food supplies in relation to need"; and the Universal Declaration on the Eradication

of Hunger and Malnutrition (1974), which declares that "every man, woman, and child has an inalienable right to be free from hunger and malnutrition." (Melaku, 1997).

The main concept in the United Nations declaration, if followed by all nations, is the availability of food at the global level. It is obvious that availability of food supplies at a global level does not guarantee the accessibility to the global food market by poor countries since poor countries do not have enough foreign currency to purchase food from the world market. In addition, food availability at a national level does not guarantee food entitlement to households and individuals. Therefore, in addition to availability of food at both international and national levels, accessibility is an important factor. The concept of accessibility is used by researchers to define food security.

One can notice that the earlier definitions of food security do not guarantee households/individuals access to nutritionally adequate and socially acceptable foods. Since poor households have less purchasing power to meet their daily needs for food and non-food items, available food might be accessible but it requires compromising for both quantity and quality of obtainable food items. (Kendall, Olson & Frongillo, 1995)

A comprehensive definition of food security is given by Campbell (1991): "Food security is access by all people at all times to enough food for an active, healthy life, and at a minimum includes the following: 1) the ready availability of nutritionally adequate and safe food and 2) the assured ability to acquire personally acceptable foods in a socially acceptable way" (p.408-409). Any factors preventing an individual having access to physiological needs such as food interferes with striving for higher order needs such as esteem, cognitive needs, aesthetic needs, self-actualization and peak experiences (Gleitman, 1992). Therefore, food insecurity exists whenever "the availability of nutritionally adequate, safe foods or the ability to acquire

personally acceptable foods in socially acceptable ways is limited or uncertain” (Campbell, 1991).

To put this definition into operation requires a comprehensive data collection method. For example, measuring the available nutritionally adequate and safe food is not necessarily a simple task. A large data base in relation to household food practices and consumption is required to determine whether or not a household has access to adequate and safe foods. Measuring household accessibility to food is a more direct and straightforward way of measuring household food security status. Measuring availability and safe food requires indicators at national or regional levels since it affects many groups rather than specific households. Nevertheless, establishing indicators for the definition of food security is one of several methods in recognizing food secure and food insecure households. The two main concepts included in the definition of food security are access and ability to acquire personally acceptable foods in a socially acceptable way. Access to food, in other words, is the capability of an individual to meet his or her needs. “Personally acceptable foods in a socially acceptable way” (Campbell, 1991) is, in fact, the ability of an individual to conform to social norms. In this thesis food security is defined as the ability of a household to have access to variety of foods in accordance with social norms.

### **2.1.7 Measuring food security**

Food security is a broad concept dealing with production, distribution, consumption and food entitlement for all household members. Traditionally, availability of food at the national level is one element of food security (Lorenzana & Sanjur, 1999). A food balance sheet is used for a given country and if food availability is more or less equal to the food needs of the country’s population in general, the country is considered to be food secure. Nevertheless, the

availability of food supply alone does not guarantee accessibility. Household entitlement to resources and household capability are two important factors in the access of available food. Entitlement is related to policies and regulations put in place by government that guarantees and provides benefits. Capability, on the other hand, is the ability of an individual to make effective choices to function both socially and economically in order to maintain capability.

Both quantitative and qualitative methods have been used to measure food security. The most common quantitative method of measuring the amount and type of food consumed is the twenty-four hour diet recall. Twenty-four hour diet recall covers a three day period. Collected information on the amount and type of food consumed by a household is used to analyze both micro and macro nutrients to determine the nutritional status of the household (Gibson, 1990). Another quantitative method to identify household food security status is through collected survey data information on household food expenditure patterns. The qualitative method, on the other hand, focuses on the social, economic and psychological food-related experiences of the individual living in poverty. As a result of a series of in-depth interviews, researchers establish a set of questions to identify food insecure households (Kendall et al., 1995). The qualitative approach identifies not only who is food secure and who is food insecure, but also the perceptions and limitations experienced by a food insecure household.

In the study of poverty and food security, identifying who is poor and who is food insecure is the initial stage followed by identifying who needs what kind of help. A household might be poor, but at the same time be food secure (Rose, 1999). The concept of socially acceptable food, embedded in the most recent food security definition, implies the importance of social norms related to food acquisition. The effective choices a household makes regardless of the type of choices are generally in accordance with social norms and obligations and also with the existing

ability of the household. Food purchasing behavior of a food secure household is in accordance with household food desirability, social norms and household energy requirements. Food purchasing behavior of the household is therefore affected by, and is the reflection of, both social environment and household energy metabolism. The general trend indicates that households with access to food enjoy a variety of foods that fulfill both physical and socially-related food needs. Therefore, it may be that an indicator of food variety might help to understand whether or not a household has access to available food relative to others with access to adequate food.

### **2.1.8 Food purchasing behavior, capability and possession**

The functioning of a household is directed by both external and internal demands. Household functioning is affected by intra-household structure and by socio-cultural obligations. Failure to meet both internal and external demands can readily affect the functioning of the household.

Household ability to meet energy demands is one of the determinants of household capability. Meeting energy demands is a universal basic need regardless of culture, environment or socio-economic structure of society. There is a direct, positive relationship between food purchasing behavior of a household and household energy demand. Household food purchasing behavior in relation to the energy demand of most eaten food groups by society can determine household basic needs more objectively. It also means that the household has the ability to conform to social norms.

### **2.1.9 Recognizing social norms**

Food is selected not only according to availability and access, but also according to social norms. Often diets of poor households differ from those of other socio-economic status groups

because access to food is restricted. These restrictions make it more likely that a household fails to meet social norms, but not in all cases. The extent to which a poor household maintains social norms in food choice may therefore be an indicator of capability poverty.

Food choices may be a sensitive indicator of behavior that determines a household's food patterns and ultimately household ability to meet physiological and psychological needs. There are several reasons why food behavior indicator can be used to reflect household ability to meet both physiological and psychological needs:

- Food is a relevant experience of all adults and children.
- Food choices are influenced by economic factors.
- Food choices are made in accordance with social norms.
- Food expenditure of poor people is more discretionary than other types of expenditure.
- Changes in food patterns are seen in short periods of time because people eat every day.

Household food purchasing behavior can be used to calculate dietary food variety, which is influenced by social, cultural or economic differences between households. For example, poor households are likely to select less expensive food and restrict the variety of food, compared to other households. The food variety indicator should be sensitive to these differences.

Other basic household capabilities are being free from avoidable disease, being well sheltered, having essential non-food consumption goods (i.e. possessions) and being adequately educated. In theory one can speculate a correlation among basic household capabilities; however, choices that guarantee sustainable functioning and are readily obtainable are most likely in accordance with social norms.

The fact that some poor households are food secure indicates that, for some households the means of acquiring food is not completely dependent on income. Therefore, among poor

households, those identified as food secure are the ones with a higher capability to meet basic needs and to conform to social norms. As a result, household capability as the component of the measurement of both poverty and food security can be used to distinguish groups of poor that are food secure or food insecure.

### **2.1.10 Food variety**

Food variety has been the focal point of many human nutrition and dietary quality studies (Kant; 1996). Nutritionists generally believe that the key to an optimum diet is to eat a variety of foods (Health Canada, 1992). Health organizations actively encourage populations to consume a variety of foods from different food groups for two purposes: 1) to maintain the national health status; and 2) to prevent food related diseases.

The basic concept behind establishing a food variety index is to construct a set of indices which describes and compares food related behaviour to the adequacy of nutrient intake and ultimately the relationship to measure health status among households (Wahlqvist, Lo & Myers, 1989). Food related behaviour is associated either with food purchase or food consumption behavior of the household. The latter requires more detailed data collection about household food habits and consumption patterns (i.e., type and amount). The former can easily be obtained from survey data. The ways in which the indices are established depends on the purpose of the research study (Wahlqvist, Lo & Myers, 1989).

## **2.6 Gaps in knowledge**

The problems in measuring basic needs have been discussed by a number of authors, as shown in this literature review. Although there are several approaches for using absolute criteria, such as physiological requirements, the resulting measures remain difficult to use and often

unreliable because of subjective assumptions. An objective measurement of basic needs might help to recognize which households can obtain resources that are considered essential for household functioning. In this thesis, household expenditure on staples will be examined to determine whether this behaviour can measure a household's ability to meet energy requirements.

As shown in this literature review, descriptions of capability poverty provide extensive descriptions of natural, produced, social, human and cultural capital. Nevertheless, these descriptions do not explain practical ways of measuring capability poverty or identifying the household's capability to function.

Food use has been widely implemented in identifying poor or food insecure households. The importance of food is twofold: physiological and social/cultural. The former relates to physical health and security; the latter relates to psychological health and comfort. It is not known whether a food behavior indicator can provide more information about a household's capability to manage resources than existing indicators. In this thesis, household ability to access a variety of foods will be examined to determine whether this behaviour can measure a household conformity to social norms.

### 3 Research Design and Methods

#### 2.7 Purpose

This thesis attempts to answer two questions:

- 1) Is it possible to recognize which households suffer from deprivation by observing household food purchasing behavior? This question associates status poverty with amounts of food purchased.
- 2) Is it possible to recognize which households can function adequately in a social context by observing their food purchasing behavior? This question associates capability poverty with patterns of food purchased.

The purpose of the research is to formulate approaches to examine if food behavior can identify deprivation and minimum level of social functioning. Food behavior is the set of choices households make in accordance with resource availability to fulfill basic needs and social norms (i.e., food acquisition and type of food). The inability of a household to fulfill basic needs and/or social norms using food-related choices is defined in this study as deprivation. In this thesis, poverty is defined on the basis of economic behavior of households, specifically household food purchasing behavior. This behavior should identify the minimum basic needs of households and minimum levels of social functioning. Economic behaviors, such as the acquisition or use of scarce resources, are behaviors that are perceived in economic theory as efficient and effective and undertaken by an individual in order to meet both absolute and normative needs at any given time and context.

## 2.8 Hypotheses

1. Households that purchase cereal in relation to their energy requirement have higher total expenditure and higher per capita expenditure than households that do not purchase in according to their energy requirement.
2. Households that do not conform to social norms in their food patterns have lower total expenditures than other households.

## 2.9 Source of data

The data used to test the hypotheses has been previously collected by Statistics Indonesia (BPS, 1998). BPS, an agency of the Government of Indonesia, has the mandate to provide data for national planning. Nationally representative socio-economic data is collected annually from 60,000 households; the data are representative for each of the 26 provincial populations. The sampling frame was developed over a period of more than ten years by statisticians and staff from BPS to meet internationally accepted calculations.

The National Social-Economic Survey (SUSENAS) was representative of the population in Indonesia that was structured using enumeration areas designed for the survey. These enumeration areas did not coincide with administrative areas, such as districts and sub-districts. Instead, these areas are defined by population density. The enumeration areas are geographical areas of different size, with approximately 500 households each, designed for the national survey by Statistics Indonesia and have no administrative function in other government departments (BPS, 1998). In each enumeration area, 16 households were selected by systematic random sampling. Although the documentation on refusal rates was incomplete, these rates were very

low because the agency was well known in all parts of the country, representatives were part of local communities, and local administrators explained the survey to people because it was carried out under government mandate. Each year a sample of households is drawn from 36,000 enumeration areas, which is half of the total number of enumeration areas in the country.

For this thesis the data from one province, West Java, was used. The number of enumeration areas selected in each province was proportional to the total population of the province. The province of West Java has a larger population than other provinces, and has both urban and isolated rural areas. The large range of communities with different characteristics made West Java province a good candidate for study. This data set consisted of 21,119 households, of a total of 207,625 households interviewed for the national survey. These households were representative for the population in 26 provinces.

Each year the survey includes of specialized questions such as health services and housing. The numbers of areas selected in each province proportional to the total population of the province (BPS, 1998).

### **3.1.1 Indonesian poverty line calculation**

BPS uses the SUSENAS data for setting the Indonesian poverty line, an income-based indicator of status poverty. BPS uses the estimate of 2,100 kcal/person determined by the National Workshop on Food and Nutrition (1978) as the average food energy required by people in Indonesia as a basic needs criterion. This estimate is the same as that obtained by the Food and Agriculture Organization of the United Nations (FAO) from food balance sheets and nutrition survey data (Sutanto et al., 1999). These requirements are translated into amounts of 52 foods reported most frequently by households in nutrition surveys that can satisfy the food needs of the average person. The 52 foods, with the amounts, constitute a “basket” of food. BPS

calculates the food poverty line as the cost of this basket of foods using local prices in each of 51 localities identified as either urban or rural, in 25 provinces, plus a representative for the urban metropolitan area of Jakarta. Since the year 2000, poverty lines have been calculated separately for 59 localities, covering 26 provinces by urban and rural areas, plus Jakarta (Sutanto et al., 1999).

The poverty line is calculated by increasing the food poverty line by an average amount for non-food expenditures observed from the socio-economic survey, using econometric formulae (Sutanto et al., 1999). Households are identified as poor if they spend less than the amount of money that defines the poverty line. In this comparison, the expenditures of each household were adjusted for the size of the family number of family members.

All data were collected in face-to-face interviews with trained interviewers. The interviews were conducted in the homes of the respondents. Most commonly, the respondent was the head of household, but a small proportion of respondents were spouses or other family members. The core socio-economic questionnaire is used. All questions are closed. Respondents select either from a predetermined choice of answers or provide the estimate of an amount to answer a specific question, such as the amount of money spent on health services, purchase of a particular food group, or floor size of the house. The interview lasted approximately one hour. The questionnaires include a core module dealing with the demographics and expenditures of the household and a selection of other modules dealing with specific areas of interest, such as health problems and the use of health services, housing and living environments and work and employment opportunities.. The survey teams consist of interviewers trained in using the SUSENAS survey questionnaires, supported by supervisory staff who review data in the field and monitor data collection and data recording procedures.

Quality control during data processing included verifying data entry, double-checking outliers against original survey forms, and duplicate entry to ensure high data quality.

## **2.10 Analysis**

To recognize deprivation among households, three indicators have been used in this study. One indicator is the food basket measure, which quantifies the resources necessary to meet basic needs, and is used in Indonesia to differentiate poor from non-poor. The other two indicators measure differences in two separate food behaviors between households: one indicator detects whether households purchase staples in accordance with estimates of household food energy requirements (food purchasing behavior); the other detects whether the variety of food that households purchase meets the apparent social norms of the majority of households (food variety index). All three indicators link food and poverty, and represent different aspects of the food security concept.

## **2.11 Statistical procedures**

K-means clustering is a procedure that attempts to identify relatively homogeneous groups of households based on selected household characteristics. The algorithm requires that the number of clusters be specified. The algorithm can handle large numbers of cases. Initial cluster centers are specified by the user when this information is known; otherwise the algorithm assumes initial centers. K-means clustering will start with  $k$  random clusters, and then move objects between those clusters with the goal to 1) minimize variability within clusters, and 2) maximize variability between clusters. In k-means clustering, the program tries to move objects (e.g., cases) in and out of groups (clusters) to get the most significant ANOVA results.

The reason for using K-means clustering is find households that are similar in behavioural or economic characteristics. The results show groups of households with common variable values, such as high cereal or low meat purchases, and these variable values define the key characteristics of the group of households.

The classification analysis is used to determine the probability with which particular variable values correctly separate pre-defined groups of households. For example, the CART software identifies the variables, and the values of these variables, that have the highest probability of separating responsive and non-responsive households. A large number of variables can be used in the classification. Only the ones that are able to separate households in their respective pre-defined groups are reported. The results show the variables that are important in characterizing differences between the groups of households.

The statistic t-test is a statistical procedure used to test the equality of the means of two samples. It assumes that the data in both samples follow a statistically normal distribution and that the variances of the two samples are equal. In cases where the distribution is not normal, data needs to be transformed to make it match the normal curve. The t-test can be used to test the hypotheses in this thesis. For example, it is possible to test whether the mean total expenditures of responsive and non-responsive households are significantly different or could have occurred by chance.

Chapter 4 explains the process of distinguishing minimum basic needs from household food purchases. The underlying concept is that the household changes the amounts of socially acceptable staple foods it purchases when the household has too few resources to meet basic needs. The basic needs indicator described in chapter 4 could function in a similar way to income based indicators or market basket indicators of status poverty.

The primary determinant of food amounts purchased by a household is the total food energy requirement of the household members. By expressing food energy requirements of households relative to each other, it is possible to detect purchases of staples that do not follow the same relationship between households as do the food energy requirements.

Chapter 5 explains the process of identifying minimum levels of social functioning from household food purchases. The underlying concept is that those households with low levels of social functioning because of poverty have food purchasing pattern that do not meet social norms. The social functioning indicator described in chapter 5 could function as an indicator of capability poverty.

Societal norms are the shared ideals or expectations of how certain people should act in given situations (Peoples & Bailey, 1997). The food security literature reports that food insecure households fail to meet their basic needs, purchase fewer and a smaller variety of foods than non-poor households, and fail to conform to dominant social norms (Peoples & Bailey, 1997, Hamelin et al., 1999).

Status poverty and capability poverty are two essential concepts in the study of poverty but they are not the same. Food is potentially a good indicator of either concept because it integrates both physiological and social needs. The procedures described in chapters 4 and 5 are an attempt to incorporate food into the operational definitions of status poverty and capability poverty by using household food purchasing behavior of people.

Several aspects of food in the context of poverty relate to elements of food security. The food security aspects of this research are used as tools or indicators to understand both economic and social differences among households, rather than areas of study that describe all of the dynamics of household food security. Food use is potentially a sensitive indicator of economic

and social differences between households. Because all households use food, its use can change quickly when circumstances change, and it reflects cultural and social differences.

## **2.12 Concepts**

In the study of poverty, status poverty is usually defined in terms of possessions, household expenditure or income. Indicators of poor status are based on the criteria of minimum possessions, household expenditure or income. These indicators define status poverty.

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households fail to meet their basic needs, purchase fewer foods in a smaller variety than non-poor households and fail to conform to dominant social norms (Hamelin et al., 1999).

Status poverty and capability poverty are two essential concepts in the study of poverty and they are not the same. Food is potentially a good indicator of either concept since it integrates both physiological and social needs. The procedures described in Chapters 4 and 5 are an attempt to incorporate food into the operational definition of status and capability poverty by using the economic behavior of people.

Aspects of food in the context of poverty relate to several elements of food security. The food security aspects of this research are used as tools or indicators to understand both economic and social differences among households, not as areas of study that describe all of the dynamics of household food security. Food use is potentially a sensitive indicator of economic and social differences between households, because all households use food, its use can change quickly when circumstances change, and it reflects cultural and social differences. The purpose of this research study is twofold: 1) to define basic household need using food purchasing behavior by calculating the adequacy of purchases; 2) to define 'capability poverty' on the basis the variety of foods purchased, and test whether households identified as poor have higher or lower capability to use resources than households that are not poor.

## **4 Identifying households responsiveness to food energy requirement using food purchasing behavior indicator**

### **2.13 Abstract**

In order to capture household food purchasing behavior, two purchasing behavior variables were established by using household expenditure data from the province of West Java from the Indonesian National Social and Economic Survey (SUSENAS) (BPS, 1998), a sample of 19,693 households. The objective is to construct an indicator that is sensitive to changes in household staple food purchases, and to identify households where the relationship of these purchases to the household food energy requirement is lower than expected by using household expenditure data from the SUSENAS (BPS, 1998). Results showed that the majority of households purchase staples in proportion to the adult food energy requirement. However, a number of households in different food practice classes did not purchase staples according to this proportion and can be identified as being non-responsive to meeting energy requirements. In general, responsive households have higher total and daily expenditures, as well as expenditures on schooling and utilities. Responsive households on average had fewer individuals residing in households, fewer children under the age of 4 and an older head of household.

### **2.14 Introduction**

Identifying the level of income below which people are regarded as poor is a necessary tool in social policy planning (Spector, 1992). A low-income criteria identifies people who are deprived, and that justifies the spending of public resources in many countries. It is difficult to calculate directly the income level of households. Income tends to fluctuate from time to time,

especially in the case of poor people (Streeten, 1998). Therefore, expenditures are widely used to estimate income (Cotton et al., 1999; Wodon, 1997; Sutanto et al., 1999; Pradhan et al., 2001), and expenditure data is often used to determine the level of income necessary to meet basic needs (Spector, 1992, BPS; 2000). Household surveys commonly provide this type of consumption expenditure data, and these data are believed to capture long-term well-being better than estimates of current income (Streeten, 1998).

However, it appears to be difficult to select the level of income that reflects the need for public assistance. The minimum amount of money required to meet basic needs such as food, clothing and shelter is difficult to define because individuals appear to be able to survive with different combinations of expenditure on these needs. In addition to these physical needs, there are needs related to the ability to function socially (Spector, 1992).

One approach is to determine a threshold below which a family is likely to spend a significantly greater proportion of its income on food, shelter and clothing than the average family. For example, in Canada, if families spend 20% more of their income than the average family on food, shelter and clothing, then they are considered by (Michaud et al., 2004) to be in straitened circumstances. The 20% parameter is an arbitrary level rather than the result of informed judgment. Deciding whether any portion of the population is poor depends on the definition of socially acceptable conditions. Moreover, the level of household expenditure on food, clothing and shelter changes when economic conditions change, adding a dimension of uncertainty.

Another approach to measurement of household ability to meet basic needs is to measure the market cost of a basket of goods that is deemed to be essential. The market basket measure is also used in some countries to determine type and amount of food necessary in satisfying the

2,100 kcal energy requirement for an individual (Human Resource Development Canada; 1998, Sutanto et al., 1999). The amount of money needed to purchase food that meets the 2,100 kcal requirement is then added to the expenditure on non-food commodities. This total is considered to be the level below which a household consider to be poor. The inherent problem in this approach is deciding on the content, size and cost of the basket, because all three parameters are influenced by culture and perception. In addition, the prices of goods change over time and differ among locations, which add uncertainty. The indicated disadvantages of market basket measure show that more objective measures need to be developed to capture a household's response to energy demand more objectively. Using income status to generalize the food behavior of a household might not capture households' ability to meet energy requirements. Many studies (Lorenzana & Sanjur; 1999, Poleman & Thomas; 1995) that generalize household food behavior by income status indicator neglect the fact that a lesser income is not the only factor affecting household food behavior.

Purchasing behavior could be used to define poverty, because households of all economic classes make economic decisions. More specifically, food purchases can be linked to the physiological requirement for food energy, because it is assumed that people do not starve themselves voluntarily, except for medical or psychological reasons. The metabolic food energy requirement is the same for all human beings (WHO, 1985). Any household can, therefore, be expected to purchase enough food to meet minimum food energy needs. The purchase of staple foods is most likely to relate to physiological energy requirements because staple foods provide the bulk of food energy in the diet of all cultures but especially for poor households (Poleman & Thomas, 1995). Therefore, in this research study, staple foods were selected to examine household ability to respond to energy demand through food purchasing behavior.

The objective of this study was to construct an indicator that is sensitive to changes in household staple food purchases, and to identify those households by using household expenditure data from the SUSENAS (BPS, 1998). where the relationship of these purchases to the household food energy requirement was lower than expected because of inadequate resources.

## **2.15 Methods**

### **4.1.1 Source of data**

Household expenditure data from the SUSENAS (BPS, 1998) was used. This survey included data from a statistically representative sample of all households, by province, in Indonesia. The annual survey collects a wide variety of data related to the social and economic status of households and household members. The data from the province of West Java provided a sample of 19,693 households, with an average of 3.91 members per household.

The data included the monthly household expenditure on each of 13 groups of foods, total household food expenditure, total household expenditure on food and non-food items, and the number and ages of household members. One of the food groups, labeled “cereals” included all of the commonly eaten cereal staples, such as rice, corn and wheat. Expenditures on rice represented close to 90% of all cereal expenditures.

### **4.1.2 Defining the household food purchase indicator**

The methodology relies on comparing two different ways of expressing the cereal purchases of households. The first is the expenditure on cereal expressed as a proportion of household food expenditures that fit one of five observed food purchasing patterns among all

households. The second is the expenditure on cereal expressed as a proportion of total household cereal expenditure that is associated with the energy requirement of adults in the household.

It is possible to identify similarities among households in the money spent on major food groups. Within each group of households, the pattern reflects economic, social, cultural, and physical factors, as well as personal preferences, that determine food choice. The households in any one group are therefore expected to adhere to more or less the same pattern, and this pattern is likely slow to change. These groups of households define food practice groups.

One of the factors influencing cereal purchases is the food energy requirement of the household. The purchase of cereal, representing a staple, is expected to be closely related to the food energy requirement of adults in the household because children eat a lower proportion of staple foods in their diets. Cereals, as one of the major food groups, are therefore expected to be purchased in a proportion that reflects, in part, the adult food energy requirement of the household. By using the differences between households in the proportion of food energy associated with adults, it is possible to create an index of household cereal expenditure that is strongly influenced by the household food energy requirement associated with adults. This index represents an expected proportion of cereal expenditure for each household. Because household is expected to purchase food in proportion to its energy requirement, and purchase a stable pattern of major food groups to meet the requirement, the comparison of (CEI) and food practice class indicators can identify households that do not purchase cereals according to expected amounts associated with adult energy requirement.

#### ***4.1.2.1 Defining household food requirements***

The adult equivalent unit has been used by researchers to compare estimates of the basic needs of different households regardless of the number of household members or their ages

(Gronau, 1988; Streeten, 1998). Adult equivalent units allow comparisons of characteristics across households to be more consistent. An adult equivalent food energy requirement is constructed by expressing the requirements of children at different ages as percentages of an average adult requirement. Metabolic requirements for food energy are the same for all human beings. An average food energy requirement can be estimated for all adults in a population, as well as average food energy requirement for each child age group (WHO, 1985). By representing the requirement of each adult by the index 1 and the requirement of each child by a proportion of the adult index, it is possible to represent the food energy requirements in a household by adding the indices of all adults and children in the household (Table 4.1). The resulting index shows relative differences in energy requirements among households.

**Table 4.1. Human food energy requirements by age**

<b>Age in years</b>	<b>% of adult food energy requirement</b>	<b>Requirement index</b>
0-4	45	0.45
5	75	0.75
6	79	0.79
7	83	0.83
8	84	0.84
9	86	0.86
10	91	0.91
11	96	0.96
12	99	0.99
13 and over	100	1.00

In this study the household food energy requirement is based on the adults in the household. The household food energy requirement is defined as the proportion of the total food energy requirement that is contributed by the requirements of adult household members (13 years and older). The reason for selecting the proportion of energy requirements from adults is

that adults consume more staples than children, not only because of larger amounts eaten, but also because children are usually given higher proportions of other foods.

The reason for using a proportion of household food energy requirements in the definition of household food energy requirement is twofold. First, adults eat a greater proportion of cereals available in the household than do children, and it is necessary to identify the proportion associated with adults. Second, the survey data records total expenditure on cereals for the whole household, not disaggregated by age-group. If a relationship is expected between cereal expenditure and energy requirement, then it is necessary to use the same unit of measure in both variables, that is the household. Therefore a relationship can be expected between household cereal expenditure and the proportion of household energy requirement associated with adults, but not with the energy requirement of adults only.

#### ***4.1.2.2 Defining basic need***

In addition to physiological food energy requirements, people choose food according to cultural and social norms. Culturally acceptable staples are not necessarily the cheapest foods. In the Indonesian diet, for example, the majority of people eat rice, but it is possible to survive eating the culturally less desirable cassava. Poor households that have to compromise on food because of a lack of money purchase less rice than they would if they had more money. They purchase less of the more expensive staples; hence, it is necessary to identify households that purchase less rice than expected.

It is expected that the majority of households purchase cereals in proportion to the household food energy requirement. However, the amount of cereals purchased is influenced by a large number of factors, such as the culturally dominant food pattern, food preferences, and food preparation practices. These influences differ for each household, and it is not practical to

quantify the effects on the food purchases of individual households. It is possible to emphasize the effect of the household food energy requirement on staple expenditures by multiplying the household expenditure on cereals by the household food energy requirement. The resulting index, CEI, reflects all of the same influences that affect the purchases of staples, but the influence of the food energy requirement in this index is stronger than in staple expenditures (Formula 4.1).

**Formula 4.1**      **Formula to calculate Cereal Expenditure Index**

$$CEI = HE \times \frac{ADER}{HR}$$

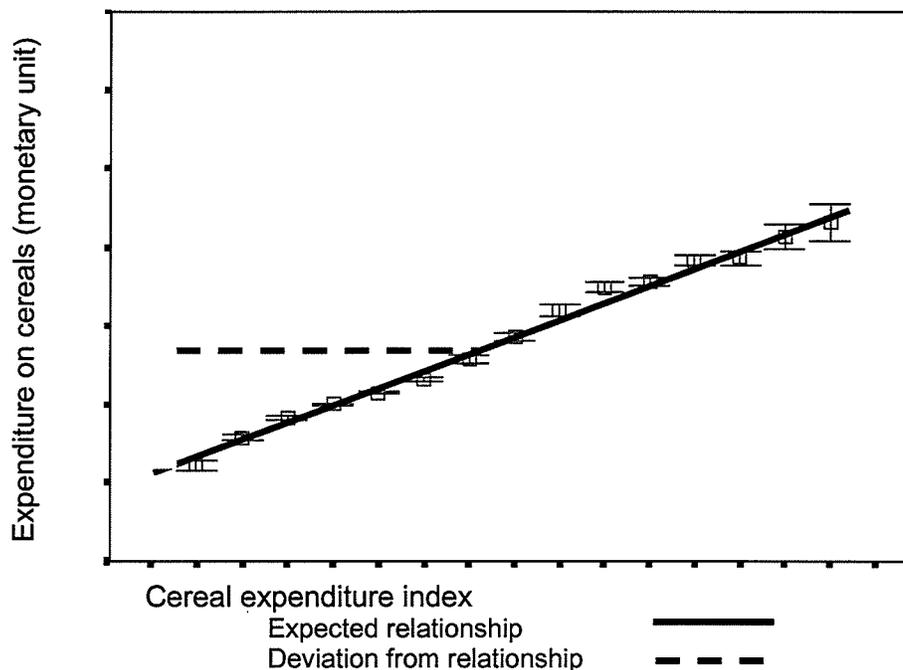
CEI = cereal expenditure index  
 HE = household expenditure on cereals (Rupiah/month)  
 HR = household energy food requirement (index)  
 ADER = proportion of household food energy requirement associated with adult (index)

This cereal expenditure index has no meaning other than to emphasize the effect of household food energy requirements on the expenditures of staples. Households that purchase cereals in proportion to the household food energy requirement associated with adult members show, by definition, an expected and close to perfect, relationship between the household cereal expenditure index (CEI) and the observed household cereal expenditure. This theoretical relationship is shown in Figure 4.1. Households that exhibit the theoretical relationship, shown by the solid black line show their cereal expenditures to be responsive to the household food energy requirement. It is likely that many of these households have no restrictions in purchasing the food they need. Households that do not purchase cereals in proportion to the household food energy requirement associated with adult member will deviate from this relationship, as shown by the dotted black line in Figure 4.1.

The CEI is divided into equal intervals, thereby creating discrete categories of households that have similar CEI values. The households in each category are expected to have very similar

cereal expenditures. The mathematical behaviour of the categorized CEI causes households to deviate from the solid black line if two household conditions occur at the same time. First, their cereal purchases are not in proportion to the food energy requirement. Second the proportion of households with children in the category differs from the proportion of households with children among the households that follow the theoretical relationship. If the proportion of households with children in the category is greater than the same proportion among households following the theoretical relationship, then the mean index of these households is lower (deviation to the left) than the index of households on the theoretical line. Conversely, their index will be higher (deviation to the right) when the proportion of households with children in the category is smaller than the proportion of households on the theoretical line. The relationship expressed in Figure 4.1 can be used as an indicator of the household's ability to purchase sufficient staples to meet needs.

**Figure 4.1** Theoretical relationship between the expenditure on cereals and the cereal expenditure index



Households unable to meet food energy needs deviate from the relationship by showing a lower regression coefficient than the theoretical one, i.e. the slope is less steep.

### 4.1.3 Food practice classes

The factors that affect both the expenditure on cereals and the cereal expenditure index differ in their influence on household purchasing behaviors. Some of these factors are unique to individual households or small groups of households, such as personal tastes, tradition, or response to urban environments. Other factors have an influence on large groups of households, such as socioeconomic status, cereal prices, and local food availability. The relationship between household (CEI) and household expenditure on cereal has therefore been investigated separately for households in different food practice classes.

Food practice classes are established by K-means clustering households having similarities among the proportions of meat, vegetables, and cereals purchased. These three food types are assumed to reflect fundamental patterns in food practices and have been associated with socioeconomic class rankings. In addition, the number of household members and children under five are included to define the classes because these variables defined household structure that can influence food patterns (The K-means clustering routine is discussed in the Methods, Chapter 3). The routine calculates the lowest within-cluster mean squares for 9 cluster centers and 70 iterations.

These factors personal tastes, tradition, response to urban environments, socioeconomic status, cereal prices, and local food availability change the relationship of large numbers of households in the same direction and obscure the effect of unique household factors such as the household food requirement. These other factors also predict certain food practices for groups of households. Studies on poverty report that poor households purchase less food than other

households (Lorenzana & Sanjur, 1999; Poleman & Thomas, 1995) and food purchasing patterns differ by socio-economic group.

## 2.16 Results

### 4.1.4 Constructing food practice classes

The result of K-mean cluster analysis was 9 clusters that explained 87 percent of the variation in the dataset (Table 4.2).

**Table 4.2: Mean expenditures (Ruupiah) on three food groups used to classify nine household clusters (Rupiah/month)**

Expenditure and non-expenditure variables	Cluster 1	Cluster 2	Cluster 3	Cluster 4	Cluster 5	Cluster 6	Cluster 7	Cluster 8	Cluster 9
Cereal expenditure (Rupiah)	10238	36092	29287	12649	17889	12194	6252	77604	18458
Meat expenditure (Rupiah)	8823	15289	4255	4884	19754	1474	1478	9647	2911
Vegetables expenditure (Rupiah)	3552	38376	4180	11319	6305	2344	1956	7994	2871
No. of adults (over 12 years)	2.96	3.66	4.57	3.44	4.12	2.86	2.05	4.73	3.72
Child energy equivalent index	.80	.81	1.50	.82	.96	.83	.38	1.24	1.19

In order to establish relative economic status, the nine clusters were ranked in ascending order first by average total household expenditures on cereals, then meat and lastly on vegetables, where a higher expenditure indicated a higher rank (see Figure 4.2 and Table 4.3). In

the cases where expenditures were similar between two clusters, any differences in household members, or number of young children were used to interpret relative status.

**Table 4.3 Food practice clusters ordered by average household expenditure on three food groups**

<b>Cluster number</b>	<b>Number of cases in each clusters</b>	<b>Rank number</b>
7	6532.000	1
6	5971.000	2
9	3637.000	3
1	2679.000	4
3	884.000	5
4	623.000	6
5	706.000	7
8	49.000	8
2	38.000	9

Clusters 7 could be labeled as very poor (food practice class 1) because the average expenditure on the three food groups is the least of all clusters. Cluster 6 and 9 could be labeled as poor (food practice class 2) and near poor (food practice class 3) respectively, because their expenditures on the three food groups were progressively higher. Among the remaining six clusters 1, 3, and 4, could be labeled as low middle class (food practice class 4) because expenditures on the food groups were high compared to clusters 7, 6 and 9. The clusters 2, 8, and 5, could be labeled as high middle class (food practice class 5) because their expenditures were the highest of all clusters. Hence, five food practice classes were identified from the nine clusters obtained from the K-means cluster routine. These food practice classes were used only to determine differences in responsiveness.

In order to verify relative economic status, the nine clusters were ranked in ascending order by average total household expenditure of each cluster of households. Cluster rank based on food group expenditures and on total household expenditures were the same.

#### **4.1.5 Household food purchasing behavior**

There is a direct relationship between household food purchasing behavior and household energy requirement: the majority of households were found to purchase staples in proportion to the household energy requirement. That is, the majority of households show the same relationship between the two variables, household total cereal expenditure and cereal expenditure index, represented by the red theoretical line in Figure 4.2. These households are responsive to household energy requirements. Figure 4.2 also shows that some households do not exhibit this relationship between expenditure and requirement and are identified in Figure 4.2 by the green and blue ellipses respectively. These households are not responsive to household energy requirement.

The relationship exhibited by the majority of households can be described by three main factors: 1) insufficient money to acquire food to meet energy needs, 2) access to other ways of acquiring foods (e.g. foods that are home produced and not purchased), or 3) a diet that includes little or no staple foods. These factors may explain why some households are not responsive to energy requirements.

The cereal expenditure index is established by multiplying household total expenditure on cereal by the ratio of adult food energy requirement to household food energy requirement. The household expenditure on cereal is then arbitrarily cut into consistent units of 1999 Rupiah and categorized into 16 categories. Categorizing household expenditure on cereal allows for grouping household that spend similar range of expenditure on cereal. It minimizes the

variability in each category (CEI) so that the differences and similarities in dietary pattern of households are more easily displayed.

**Table 4.4: Cereal expenditure index category**

Cereal expenditure index category	Range of cereal expenditure index values	Cereal expenditure index category	Range of cereal expenditure index values
1	0-1999	9	16000-17999
2	2000-3999	10	18000-19999
3	4000-5999	11	20000-21999
4	6000-7999	12	22000-23999
5	8000-9999	13	24000-25999
6	10000-11999	14	26000-27999
7	12000-13999	15	28000-29999
8	14000-15999	16	30000-above

The food practice class 4 is selected as the theoretical line for two reasons:

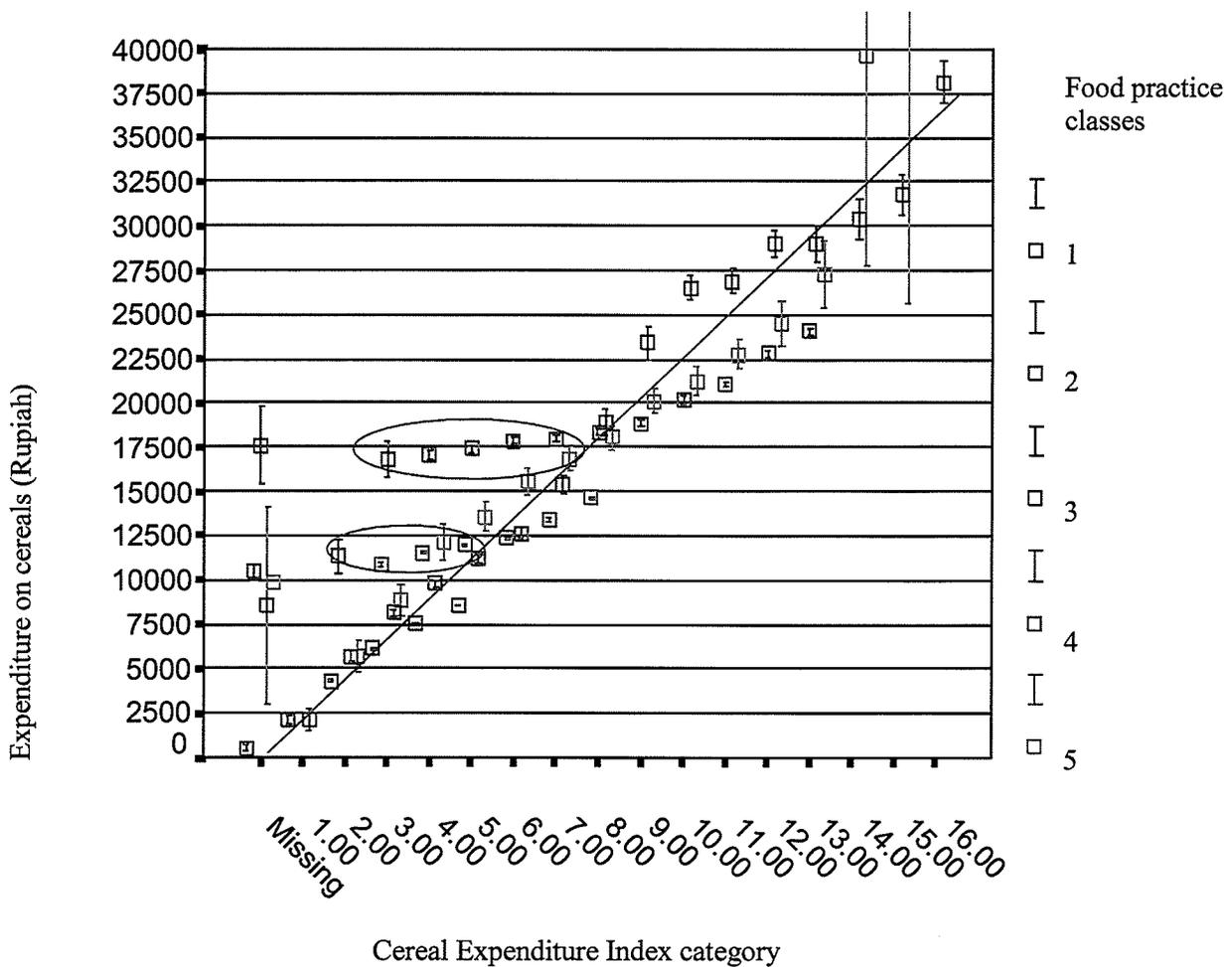
1) Households in food practice class 4 show consistent response to their food energy requirements; 2) The number of poor households in the food practice class 4 is less than 40%, compared to more than 70% for food practice class 2 and 3 (using per capita total household expenditures).

#### **4.1.6 Household characteristics**

The independent t-test of household responsiveness to energy requirement showed a significant ( $p < 0.05$ ) difference in household total expenditure (t-value of 7.963 and total of 19,693 households). The t-test was used to test the mean differences between responsive and non-responsive households of their total expenditure. Since the households' total expenditure was not normally distributed, the log of total household expenditure was used.

The characteristics of responsive and non-responsive households were found to be different (Classification analysis). The non-responsive households had more children under 5 years of age, a younger head of household, and more individuals residing in each household compared to responsive households. The non-responsive households in food practice group 2 and 3 had incomes below the Indonesian poverty line.

**Figure 4.2: Relationship between cereal expenditures and Cereal Expenditure Index**



To determine the relatively more important defining differences between responsive and non-responsive households, classification analysis was carried out (CART classification trees).

Relatively few variables were found to predict the responsiveness or non-responsiveness of a household. The predictive variables were household size (number of members), total expenditure, and expenditure on schooling (Table 4.5). The first two are key variables

**Table 4.5: Contributions of variables to predict responsive and non-responsive of households.**

Household characteristics	Rankings of variables by probability of separating groups correctly (variable with highest probability = 100 units, other variables proportional).
Number of household members	100.00
Household total expenditure	16.12
Expenditure schooling	11.25
Household utility expenditure	4.74
Age of head of the household	3.35
Children under age of 5	1.29
Household daily expenditure	0.45
Expenditure on health	0.00
Expenditure on clothing	0.00
Expenditure on durable goods	0.00
Expenditure on tax and insurance	0.00

commonly used to define the resource status of a household, since the size of the household and its needs need to be balanced. This finding suggests that the responsiveness of a household is associated with estimates of the resource balance in the household. The finding also confirms the concepts underlying the responsiveness characteristic of a household. In general, responsive households have higher total expenditures, expenditure on schooling, daily expenditure, and expenditure on utilities. Responsive households on average have fewer individuals residing in the household, fewer children under the age of 4, and older heads of households.

## **2.17 Discussion**

The analysis bears out the premise that households with enough money can be expected to purchase food in according to their energy requirement. This finding is difficult to compare to

other studies because the methodology reported differs markedly from the one used in this thesis. Both absolute and relative measures of poverty reported in the literature differ in that they define the amounts of goods and services needed for basic needs. The method used in this thesis records changes in purchasing behaviour instead of amounts of goods. The resulting groups, and the findings based on them, are not comparable.

In this thesis, households purchasing behavior from Indonesian survey data (SUSENAS, 1998) was used to test the hypothesis:

Hypothesis 1: “Households that purchase cereal in relation to their energy requirement have higher total expenditure and higher per capita expenditure than households that do not purchase in according to their energy requirement.” This hypothesis was accepted because the total household expenditure of households that did not purchase cereal in accordance to the proportion of their energy requirement associated with adult members was significantly lower than the total households expenditures of households that did purchase cereals in this proportion.

The reason for choosing cereal to identify a household's responsiveness to the expected proportion of energy requirement associated with adults was two-fold. First, cereals constitute the main source of food energy for adults and hence cereal expenditure is more sensitive to energy expenditure than other foods that contribute less energy in the diet. Second, cereal is the desirable staple in Indonesia and therefore more expensive than less desirable staples, such as roots and tubers. Poor households that can not afford to purchase rice will substitute cassava or yams for rice. Households in food practice class 4 purchase cereals in accordance to the proportion of energy adult requirement, show consistent increase in their cereal expenditure as each unit increase in cereal expenditure index (CEI) (Figure 4.2).

Households in any food practice class have a range of food expenditures. Food practice classes are the classifications of households in terms of the amount spent to purchase staples, meat and vegetables. The expenditures of different classes overlap; some households in a higher food practice class have lower expenditures than some of the households in a lower food practice class. Such overlap probably occurs because of differences among households in the access to their own production, and non-monetary, in-kind earnings.

As the number of members of a household increases, so does the household energy requirement and expenditure on food. In any one household, culture, taste, income, and local food prices determine how much money is spent on food, and there may be great differences between households in food expenditure. However, under circumstances of adequate availability and access to food, it is assumed that the amount spent relates to the number of household members, children between 4 years of age and number of household members going to school. The combination of number of household members, total household expenditure, and expenditure on schooling, was found to be a most important factor in the household's responsiveness to energy demand. This relationship, "responsiveness to food energy requirement," shows a consistent increase in household food expenditure for each additional increment in CEI.

Under circumstances where access to food is inadequate, this relationship will be different. Poor or food insecure households are not able to increase food expenditure by a consistent amount for each additional household member (Poleman & Thomas, 1995). Hence, the responsiveness to food requirement is lower for poor households compared to other households.

## **2.18 Conclusion**

Usually, household “needs” are analyzed and measured indirectly and subjectively by using general ideas of what a household requires in order to survive. Household food pattern is a universal indicator that is sensitive to both actual and perceived barriers that may prevent people from using resources effectively. A food purchasing behaviour indicator enables the identification of households that are not able to respond to household energy demand. Clearly, the household food purchasing behaviour indicator can be used to identify household deprivation. Measuring household food purchasing behaviour is more objective, easier to calculate, and is assumed to be applied more readily at different locations and times than the food basket market approach. The food market basket approach requires a set of pre-defined assumptions about a household’s basic requirements. Since the food purchasing behaviour approach focuses on household functioning in relation to food acquisition, it will more readily reflect a household’s ability to meet its needs.

## 5 Defining Capability Poverty through Food Purchasing Behavior

### 2.19 Abstract

Household capability is defined as the ability to conform to social norms and to meet social obligations. Household expenditure data from the Indonesian National Social and Economic Survey SUSENAS (BPS, 1998) was used. The data from the province of West Java provides a sample of 19,693 households, with an average of 3.91 members per household. The objective of the study was to construct an indicator of household food patterns to examine the association between household food pattern, household total expenditure and the ability to use resources and conform to social norms. The Food Variety Index (FVI) for a household is the sum of food group ranks for the household, multiplied by the ratio of their respective food group expenditures to the total household food expenditure. The result showed that there were a significant differences in mean total expenditures between households with higher and lower capability ( $P < 0.05$ ). The result from classification analysis showed differences in household with higher and lower capability in their daily expenditure, expenditure on tax and insurance, utility and clothing.

The incorporation of the food variety index (FVI) into the study of poverty allows grouping of households based on both expenditure and the capability to access a greater variety of socially expensive foods. Grouping households based on the ability to conform to social norms indicates that among both poor and non-poor households, there are households with more capability to access variety and socially expensive foods.

## **2.20 Introduction**

The most common indicator of poverty is per capita or household income; however, it has been widely recognized that per capita income is not an adequate indicator of aggregate well-being (Dasgupta & Weale, 1992). Income usually fails to incorporate the value of human and non-human capital in the measure of economic status; it neglects the benefits of public transfers and public services and intra-family flows of income and services. In addition, income often fluctuates more than human capital and therefore, may not reflect the household income characteristics.

The various kinds of capital (i.e., produced, social, natural, human and cultural) are not simply resources which can be utilized to achieve certain goals, they are assets that give individuals the capability to be and to act (Bebbington, 1999). The capabilities to use resources, and indicators to measure them, have been discussed by many researchers (Islam, 2001; Islam & Dhanani, 2000; Temple & Johnson, 1998; Garfinkel & Haveman, 1977; Sen, 1997; Hartog, 2001).

An increased capability of poor people to use resources improves their economic security and social functioning. Resource use determines, in part, whether a person or household becomes poorer or richer. A higher capability to use resources may allow households to exit poverty because they are more able to recover from losses, reduce the risk of becoming poor again, and ensure continuous financial independence.

Even if the absolute amount of resources does not allow the household to exit poverty, a higher capability to use resources reduces social barriers to improve well-being and future economic status. Food insecurity and poverty are socially determined problems. A higher capability to use resources effectively decreases the effects of these problems.

Measurement of capability poverty differ from compared to the measurements of health, education, nutrition and housing status that have been used to define capability poverty (Islam & Dhanani, 2000). These status measurements are compared to minimum thresholds to find the number of households deemed to be capability poor.

This kind of definition does not adequately capture the qualitative component of social functioning. Capability poverty depends in part on a household being able to meet social norms. People function in relation to others and maintain relationships. Poor households have difficulty maintaining relationships because they fail to meet certain norms, reducing the ability of poor households to participate in mainstream activities.

Capability poverty is defined as an inadequate ability of an individual, or a household, to get and use the resources that ensure the minimum social and economic functioning necessary to maintain the capability and to exit poverty. Adequate capability is judged as making effective choices that meet social norms.

The objective of the study was to construct an indicator of household food patterns to examine the association between household food pattern, household total expenditure and the ability to use resources and conform to social norms. The household food pattern was used to construct a food variety index (FVI).

## **2.21 Methods**

### **5.1.1 Source of data**

Household expenditure data from the Indonesian National Social and Economic Survey (SUSENAS) (BPS, 1998) was used. This survey included data from a statistically representative sample of all households by province in Indonesia. The annual survey collects a wide variety of

data related to the social and economic status of the household and household members. The data from the province of West Java provided a sample of 19,693 households, with an average of 3.91 members per household.

The data included the monthly household expenditure on each of 13 groups of foods, total household food expenditure, total household expenditure on food and non-food, the number of household members and the age of each member. One of the food groups was labeled “cereals,” which included all of the commonly eaten cereal staples, such as rice, corn and wheat.

### **5.1.2 Constructing a capability indicator**

Monthly food purchases of 13 food groups from the SUSENAS survey were used. The 13 food groups include cereals, roots, fish, meat, eggs and milk, vegetables, legumes, fruit, oil and fat, beverages (non-alcoholic such as tea, coffee), spices, food items that support a meal (i.e., side dish), and prepared foods and drinks (bread, biscuits, cake, rice noodles mixed with vegetable, sweet ice). Socially desirable foods are generally more expensive. A diet that meets dominant norms costs more than a diet that simply allows physical survival. Hence, the relative proportions of cheap and expensive foods in a diet are associated with social environment and economic status.

Ranking these 13 food groups by the average price for all the foods in each group associates an estimate of relative cost with each food group. Cheap foods had rank 1, while expensive foods had high ranks up to 13. The SUSENAS manual identifies food items that belong to each group. The prices for these foods were available from studies about food markets in several locations carried by university research groups and government departments. The information on food prices was collected by students as part of their academic programs. By eating more expensive foods poor households are seen as more likely to be meeting social norms.

As a result, households eating a greater proportion of socially important foods, that is, more expensive foods, are seen as more capable in accessing and in managing resources.

The Food Variety Index (FVI) for a household is the sum of food group ranks for that household multiplied by the ratio of their respective food group expenditures to the total household food expenditure (see Formula 5.1). By using price ranks, the calculations become unit-free, and this obviates the need to construct time-consuming equivalency factors between areas. Following the concept of capability to use resources, the price rank is also an indicator of social desirability of the food group.

In order to eliminate the effect of different amounts of money spent on food by households, the monthly expenditures for each food group is expressed as a proportion of the total household food expenditure. The resulting proportions of expenditure on food groups therefore reflect the pattern of purchases in each household, not the absolute amounts spent.

**Formula 5.1 Food Variety Index**

$$FVI = \sum_{0-i} \left( pr_i \times \frac{fep_i}{tfe} \right)$$

$FVI =$	food variety index
$pr_i =$	rank of the $i^{\text{th}}$ food group (based on price)
$fep_i =$	monthly average food expenditure of the $i^{\text{th}}$ food group
$tfe =$	total monthly food expenditure on all groups

## 2.22 Results

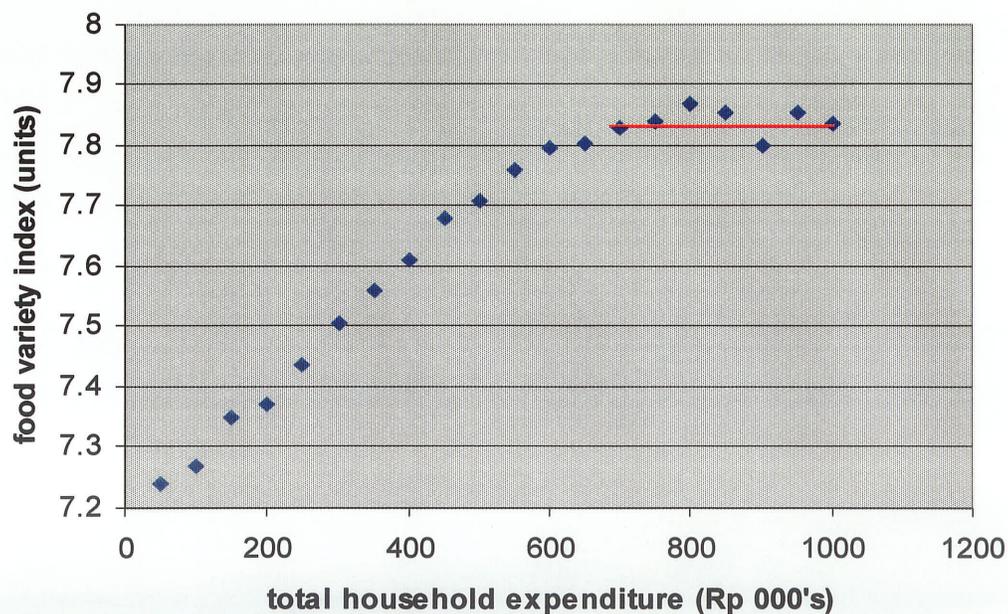
### 5.1.3 Food variety index threshold

The FVI is expected to identify households that can meet social norms in their food selection by identifying a household's accessibility to a variety of socially expensive foods.

Hence, it is necessary to establish a threshold below which households are seen as not meeting

social norms. The FVI threshold is the point below which a household is considered to be less capable of conforming to social norms than other households. The relationship between total household expenditure and FVI values shows no increase in the food variety index for households with expenditures over 700,000 Rupiah (see Figure 5.1). Of 19,693 households, only 1,101 have expenditures above 700,000 Rupiah. It was assumed that households with higher levels of total expenditure have the capability to access a variety of available foods. Therefore, the 1,101 households with expenditure above 700,000 Rupiah were selected as a reference population. The mean (FVI) of these 1,101 households was identified. Then a threshold of two-standard deviations from the mean food variety index was established to determine capable and non-capable households.

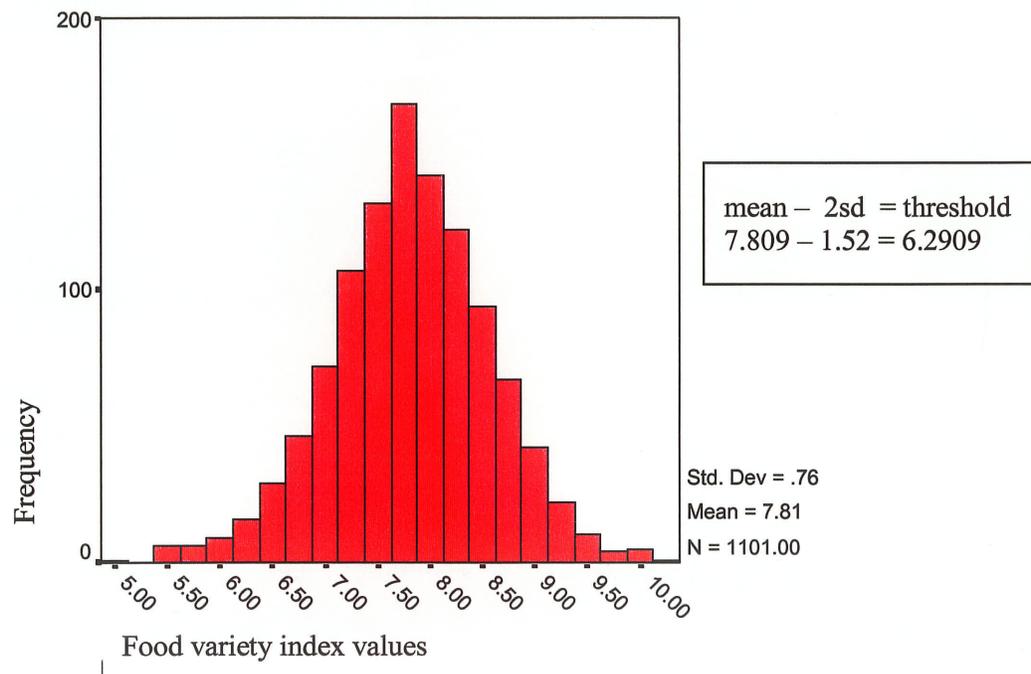
**Figure 5.1: Association between household total expenditure and Food Variety Index**



The threshold that separates capable and non capable households is a FVI of 6.29, which is the mean FVI of the reference population minus two standard deviations (Figure 5.2). This

threshold is taken as the lowest FVI above which there is no relationship between FVI and total household expenditure. Households were designated as having low capability if their FVI values were lower than 2 standard deviations below the mean value of the reference population. Households above this threshold were designated as having high capability. The reason for choosing two standard deviations is that the households included by 2 standard deviations above and below the mean represent the majority of households, or 95% of the total population, which in this case is the reference population.

**Figure 5.2: Food Variety index Histogram for reference group**

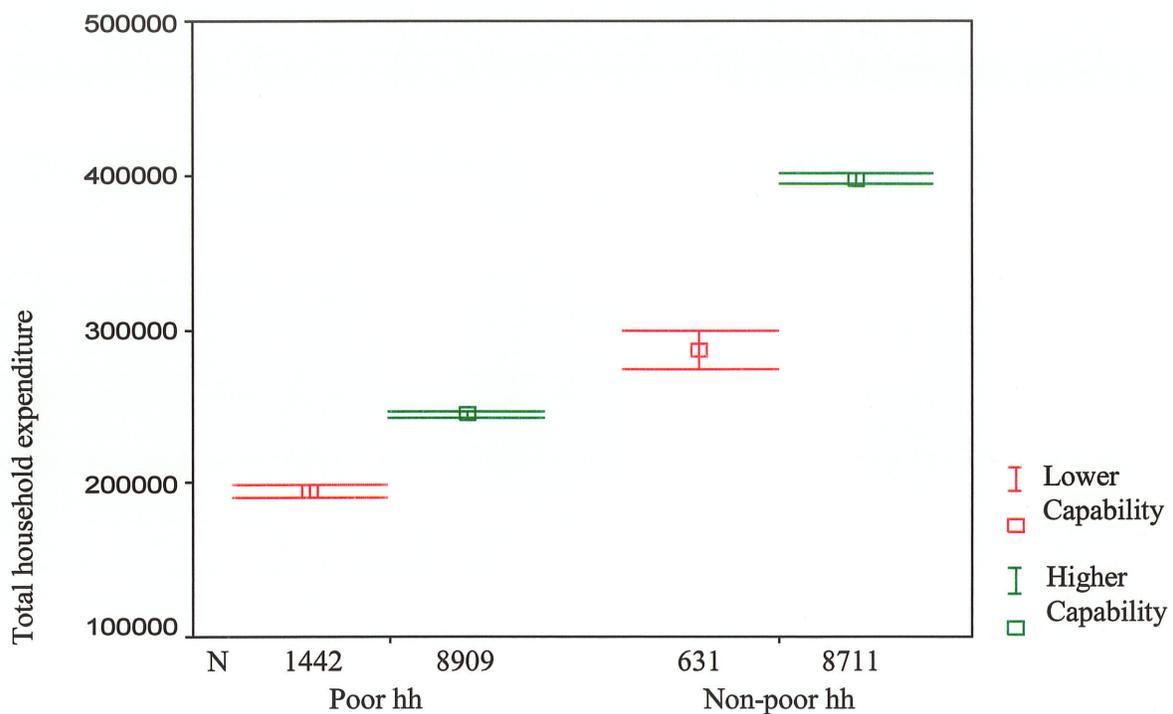


#### 5.1.4 Food Variety versus Total Expenditure

The relationship of the FVI and total monthly household expenditure (Rupiah), shown in Figure 5.3, indicates lower expenditures for households with low capability compared to those with high capability, both within and between poor and non-poor households. The log of

household total expenditure was used as a test variable and the mean differences between and within poor and non-poor household calculated. The result of an independent t-test showed the differences in total household expenditure between households with low and high capability, both within and between poor and non-poor households to be significant with p value  $<0.05$ .

**Figure 5.3: Total household expenditure, poverty and capability**



### 5.1.5 Food Variety versus socially sensitive expenditures

Total household expenditures are associated with FVI values. The types of expenditures that are related to social functioning may associate more strongly with FVI values than with other types of expenditures. The assumption is that access to a wider variety of socially expensive foods associates with the ability to conform to social norms as well as food norms. It can be assumed that the same economic factors that influence accessibility to a variety of foods

also influences access to other commodities. This assumption indicates that there will be differences in economic behavior of households with lower and higher capability.

Classification tree analyses were run to determine if there are differences between high and low capable households in the way in which resources were allocated. The analysis, using Classification and Regression Trees (CART 5), classified households on selected variables of household expenditures. The results show that four of the variables best separate lower and higher capability households are the ones that have social functioning and social norm components, in particular clothing expenditure (see Table 5.1 and Appendix 1).

**Table 5.1: Contributions of variables to predicting high and low capability of households.**

Household characteristics	Rankings of variables by probability of separating groups correctly (variable with highest probability = 100 units, other variables proportional).
Household daily expenditure	100.00
Expenditure on tax and insurance	78.94
Household utility expenditure	22.55
Expenditure on clothing	14.83
Number of household members	4.45
Age of head of the household	1.72
Expenditure on schooling	1.07
Expenditure on health	0.00
Children under age of 5	0.00
Expenditure on durable goods	0.00

The FVI values were found to be associated with specific types of household expenditure. Each of the specific types of expenditure had a social norm component. Daily expenditures include the cost of soap, cosmetics, recreation, newspapers, which imply social connections or activities. Expenditures on tax and insurance include the cost of TV licenses or taxes on durable goods, which imply socially important status symbols. Expenditures on household utilities include the cost of electricity, gas, and housing, which imply the use of socially desirable space, air-conditioners and other advantages. Expenditures on clothing imply the ability to present a

socially adequate and fashionable image at work and social occasions. An example of a short, incomplete classification tree, i.e. one that does not show all of the splits needed for optimum probability of separating households, is shown in Appendix 1.

### **2.23 Discussion**

Hypothesis 1:

The hypothesis “Households that do not conform to social norms in their food patterns have lower total expenditures than other households”. Contrary to the hypothesized relationship, there are poor households that are identified as being in the group with higher capability. Therefore, the hypothesis is rejected. Having access to more expensive and socially desirable foods suggests that the household is food secure, since the definition of food security implies 1) the ready availability of nutritionally adequate and safe food, and 2) the assured ability to acquire personally acceptable foods in a socially acceptable way (Campbell, 1991).

The finding in this research study also is in line with the findings of Lorenzana and Sanjur (1999), who measured the food security status of poor Salvadorian households with questionnaires. They found that there were poor households that were food secure. Similarly, a study by Rose (1999) that was used a different methodology with an American population, found food-secure households among the poor. The author reports that the definition of poverty used by government department did not match the designation of food security obtained by questionnaire, which included a record of perception of food security. The study data showed there were fewer poor and food insecure households than officially designated. These findings are similar to the findings of this research with the Indonesian data because a large number of households officially designated as poor could be seen as food secure (i.e., higher capability).

Grouping households into two groups of higher and lower capability enrich the definition of poverty by adding more information about household characteristics. A poor lower capable household can be assumed to be more economically vulnerable because it does not appear to be less capable in managing resources. A poor higher capability household appears to be managing some of its resources in ways that more well off households do. Assistance to such poor households should take account of this apparently higher capability.

The results showed that the FVI was associated with total household expenditures. Households with a higher level of expenditure showed higher FVIs. This relationship may be mediated by poverty status, since there is a greater risk of poor households having low FVI values. At the same time, the majority of poor households were found to have more capability in managing food resources, as their FVI was above the threshold. The associations may reflect the capability to use not only food, but also other resources according to social norms. The FVI is seen as an indicator of differences between households in the capability to manage resources in the same socially appropriate context because food-purchasing behavior is influenced by the same economic factors as other commodities.

A potential advantage of a household indicator of capability poverty is the chance to identify the large numbers of near-poor whose income is just above the poverty line. Given the inherent vulnerability of the situation of these households, an estimate of capability may help identify not only poor households, but also near-poor households that can benefit from the same investments, such as supplying equipment for production or access to transport. Investments to alleviate poverty are likely to be effective if directed at households that have more capability of exiting poverty independently. Those not capable need investments that aim to increase

capability; those that have capability need investments to remove barriers in the local economic environment.

## **2.24 Conclusion**

Households that do not conform to social norms in their food patterns have lower total expenditures than other households. Household income is a strong indicator of household capability to access available resources. Nevertheless, income is not the sole indicator to define household capability, since each household has a different ability to access and to manage available resources. In fact a large number of households with income status below the poverty line were found to have a capability to manage their food resources and could have been food secure.

It appears that among the several household characteristics that distinguish higher capability households from lower capability ones is at least one characteristic that is strongly influenced by social norms. It may be possible to recognize households which can function adequately in a social context by observing their food purchasing behavior. Interestingly, a number of households among those designated as non-poor on the basis of income status were in fact found to have a lower capability. The incorporation of the FVI into the study of poverty allows groupings of households based on both expenditure and the capability to conform to social norms by acquiring a greater variety of socially desirable foods.

## 6 Thesis Discussion and Conclusion

### 2.25 Thesis discussion

The research tested the following two hypotheses:

1. Households that purchase cereal in relation to their energy requirement have higher total expenditure and higher per capita expenditure than households that do not purchase in according to their energy requirement. (Accepted)
2. Households that do not conform to social norms in their food patterns have lower total expenditures than other households. (Rejected)

In most developing countries, including Indonesia, food dominates low income household budgets. This means that often the proportion of household income dedicated to food expenditure is higher than the proportion dedicated to non-food expenditure. This makes low income household food expenditure behavior a sensitive indicator because household ability to meet and maintain energy requirements can be affected by other social and cultural factors. A food purchasing approach would be able to capture the responses of households to these factors. Observing the responses, and comparing them to criteria for appropriate responses, is possibly a more objective approach than using a set of pre-defined criteria such as in a food market basket measure.

This research presents two indicators based on food purchasing behaviour. The first, basic needs indicator presented identifies changes in behaviour related to food energy requirements, and which can apparently separate poor households with inadequate resources to buy food from other households. The objective element in the calculation of this indicator is the food energy

requirement, which are the same for people of all cultures, economic or social status, and which affects rich and poor households the same way.

The second, capability poverty indicator presented identifies a difference in food variety between households, where low food variety is seen as being associated with a lower capability to manage food resources, and possible other household resources. The objective element in the calculation of this indicator is the numerical estimate of the low food variety that is still seen as part of the behaviour of households identified as lower middle class.

Both basic needs and capability poverty indicators differ from the commonly used measures to define poverty because they rely on observing behaviour instead of quantifying amounts of resources. The basic needs indicator has the same function as the common measures in that it can be used to define poverty. However, the capability poverty indicator not differs in method but also in function. The indicator is not comparable to the common measures to define poverty. Instead it describes a different dimension of poverty that may be related to income but is conceptually independent.

Food purchasing behavior, like other human behaviors, is affected and shaped by social and cultural factors. Both social and cultural factors affect the ways households obtain and maintain energy demand. Households that are living well below the level of adequate income that is required to meet basic needs are assumed to have a diet of less variety compared to those with adequate income. These households are also dependent on social assistance to meet food needs. The assistance is usually set to fulfill basic household needs and does not consider the social and cultural obligations of the households. It may be that households that are not dependent on social assistance are able to fulfill social obligations, even though they might have adequate income according to immediate poverty criteria. Each household has a different

capability to manage resources and to deal with barriers that affect social functioning. The result in Chapter 5 indicates that poor households have the ability to access a variety of socially desirable foods. This means that grouping households by their capability to access more socially desirable foods allows one to distinguish different needs that each household might have.

The result from the papers presented in chapter 4 and 5 indicates that there is a significant difference ( $p < 0.05$ ) between responsive/non-responsive households and households with lower and higher capability in their total household expenditure. Household total expenditure is a strong indicator for both household responsiveness to energy demand and household capability to conform to social norms. In chapter 4 this finding is predictable because household responsiveness is influenced mainly by household total expenditure and household characteristics such as adult energy requirement.

In chapter 5, even though household total expenditure separates lower and higher capability households, it does not imply that households with lower capability live below the poverty line and households with higher capability live above the poverty line. In chapter 5, the variables that separate lower and higher capability households show an association with the FVI variable. This finding is in accordance with the established conceptual framework that food acquisition is influenced by the same economic factors as other commodities.

In this research study both urban and rural areas are treated as one economic unit based on the simple fact that urban and rural areas are in constant economic interaction. Looking at urban and rural areas as two separate units might in fact contribute to the existing gap between the two areas. The ability to conform to social norms does not have to be limited to certain contexts. If the ability to conform to social norms becomes limited to a context, individual ability to make effective choices may be affected. The result in chapter 4 is in accordance with a pre-defined

assumption that households living below the poverty line have a lower ability to respond to energy requirements. This indicates that household food purchasing behavior can reflect household ability to manage resources.

## **2.26 Thesis conclusion**

Combining both food purchasing behavior and capability poverty methods provides broader and more specific understanding about household basic needs and capability to function socially. Theoretically households that have higher capability also have more ability to deal positively with restrained circumstances to lower the negative effects of any external disturbances.

The contribution of this research is twofold: 1) the household total expenditure variable can be only partially used to determine household physical and social deprivation, and 2) a better understanding of household characteristics is achieved through easier methods of identifying household ability to meet basic needs, both physical and social, which allows decision makers to allocate public resources in a more efficient and effective way.

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# 1 Appendix 1

Figure 5.4: Classification of low and high capable households (move to previous section)

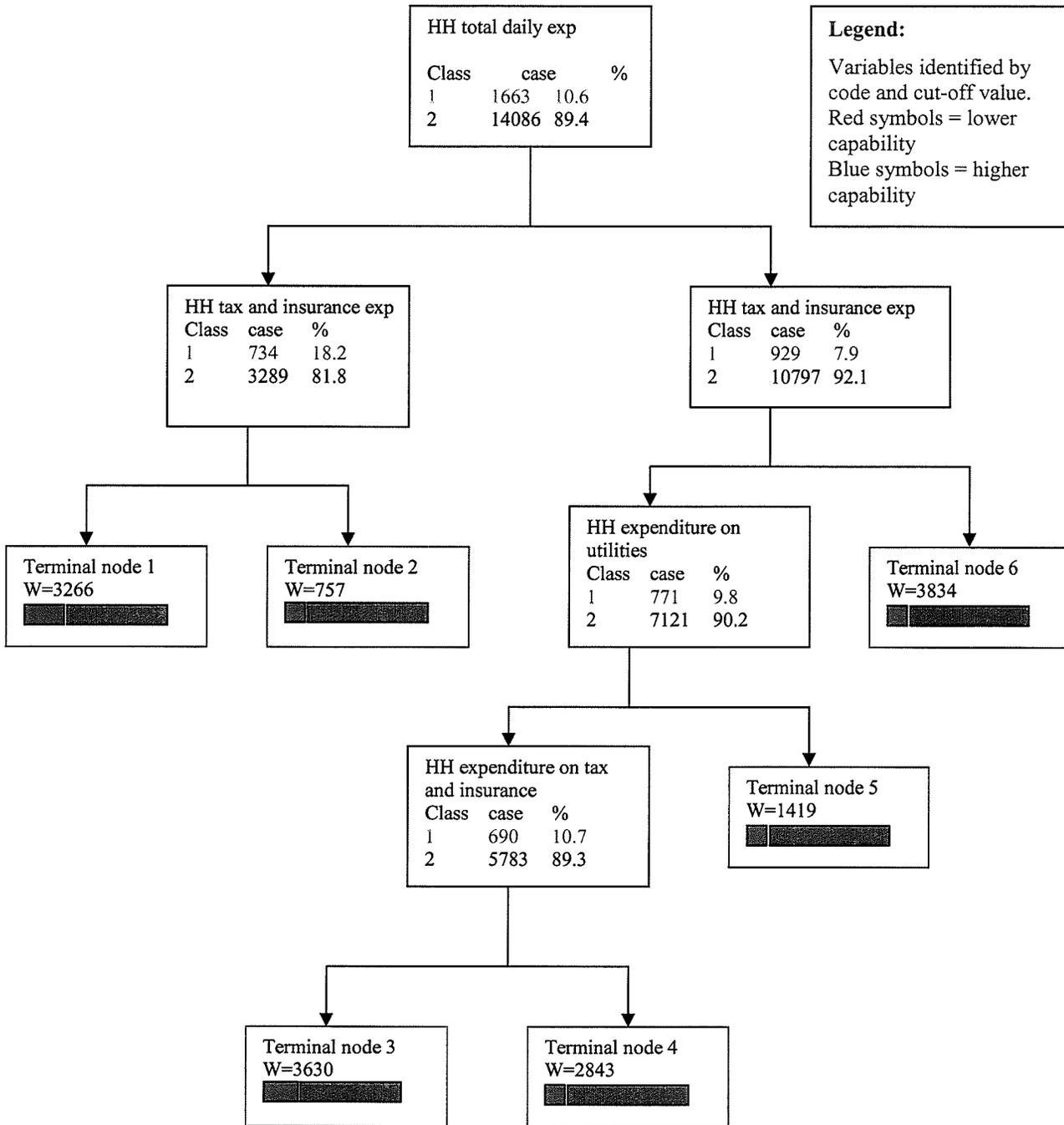


Figure 5.4 shows the variables that split lower and higher capability households most efficiently among all variables available in the SUSENAS data. The first split is achieved by total daily expenditures in households. Households with lower expenditures are shown in the box to the left of the starting box, while households with higher expenditures are shown in the right-hand box. The next two splits are achieved by tax and insurance expenditures of households, both for the household with lower and higher expenditures. Again, in each case the households with lower expenditures go to the left and those with higher expenditures go to the right. The process of classification continues to separate households until no other variables, or values of previously used variables, help in separating the households correctly into higher or lower capability. The Terminal nodes are the end result of the classification and they show the extent to which the variables matched the original designation of higher or lower capability. The red bar in each terminal node graphically shows the proportion of lower capability households, while the blue bar shows the higher capability households.